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THE RELATIONSHIP BETWEEN THE ATTITUDES OF MEDICAL SCHOOL STUDENTS TOWARDS PROBLEM-BASED LEARNING AND THEIR SELF-DIRECTED LEARNING READINESS*

(TIP FAKÜLTESI ÖĞRENCİLERİNİN PROBLEME DAYALI ÖĞRENMEYE YÖNELİK TUTUMLARI İLE ÖZYÖNETİMLİ ÖĞRENMEYE İLİŞKİN HAZIRBULUNUŞLUKLARI ARASINDAKI İLİŞKİ)

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ABSTRACT

The aim of this study was to examine the relationship between the attitudes of the medical school students undergoing Problem-Based Learning (PBL) towards PBL and their levels of self-directed learning readiness. The comparison method of this study was based on relational survey model. The participants of the study was the Medical Faculty of Çanakkale Onsekiz Mart University in Turkey. There were 336 students in the first, second and third terms in the academic year of 2014-2015, and the practices related to PBL were performed with 33 groups of students. Each group was composed of approximately 10-12 students. Students were randomly assigned to each group. The study was conducted with 11 groups of students randomly selected, undergoing the exercises of PBL. The data of the study were collected by the Attitude towards Problem-Based Learning Scale developed by Kemahlı and Alper (2006) and the Self-Directed Learning Readiness Scale (SDLRS) developed by Fisher and et al. (2001) and adapted into Turkish by Şahin and Erden (2009). The study revealed a negative, insignificant relationship between the total scores of the students in regard to PBL and the scores in regard to SDLRS. Further, the study found that there was a significant relationship between the sub-scale of self-management of the scale of SDLR and the sub-scale of problem-solving and group work of the scale of PBL and that there were significant relationships between the sub-scale of eagerness to learn, problem-solving and group work of these scales.
Keywords: PBL, Self-directed Learning, Self-directed Learning Readiness, Medical Education.

ÖZET

Bu araştırmanın amacı, Probleme Dayalı Öğrenme (PDÖ) yönteminin uygulandığı tıp fakültesi öğrencilerinin probleme dayalı öğrenmeye yönelik tutumları ile özyönetimli öğrenmeye hazırbulunuşluk düzeyleri arasındaki ilişkiyi incelemektir. Katılımcıları Çanakkale Onsekiz Mart Üniversitesi Tıp Fakültesi öğrencilerinin oluşturduğu çalışma, ilişkisel tarama modelindedir. 2014-2015 akademik yılında birinci, ikinci ve üçüncü dönem öğrenci sayısı 336 olup PDÖ etkinlikleri her bir grupta 10-12 öğrencinin olduğu 33 grup üzerinden yapılmıştır. Araştırma rastgele seçilen 11 adet PDÖ grubu öğrencileriyle sürdürülmüştür. Veriler, Şahin ve Erden (2009) tarafından Türkçe'ye uyarlanan Özyönetimli Öğrenmeye Hazırbulunuşluk Ölçeği (ÖYÖHÖ) ile Kemahlı ve Alper (2006) tarafından geliştirilen Tıp Fakülteleri için PDÖ'ye Yönelik Tutum Ölçeği ile toplanmıştır. Katılımcıların PDÖ'ye yönelik toplam puanları ile ÖYÖHÖ toplam puanları arasında negatif yönde, anlamlı olmayan bir ilişki olduğu saptanmıştır. ÖYÖHÖ alt boyutları olan özyönetim ile PDÖ ölçeğinin alt boyutları problem çözme ve grup çalışması arasında, aynı ölçeklerin öğrenme istekliliği, problem çözme ve grup çalışması alt boyutları arasında, anlamlı ilişkiler olduğu belirlenmiştir.
Anahtar Sözcükler: PDÖ, Özyönetimli Öğrenme, Tıp Eğitimi, Kendi Kendini Yönlendirerek Öğrenme.

* This study is based on the Master's thesis of the first author entitled as "The Relationship between the Attitudes of the Medical School Students towards Problem-based Learning and their Self-directed Learning Readiness." Furthermore, a part of the study was presented as a conference proceeding in "5th International Research Conference on Education" hold between October 8th and 10th, 2015 and published as a part of conference proceedings.

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SUMMARY

Introduction

Medical education is a field of learning, a domain of research and an area of implementation that aspires to maintain and enhance the existing order of human life, to ensure the continuity of a state of well-being, to achieve the learning objectives. It is fundamentally important particularly in regard to practical skills that the prospective physicians encounter real-life experiences or other experiences of a nature which draws on real-life experiences and problems close to real-life situations in their education process so that the desired outcomes in the education process can be achieved.

The knowledge acquired by a student during his or her education at school may turn out to be insufficient due to various reasons including primarily rapid developments in technology. Accordingly, it is necessary to reach out for new information both in professional life and during daily activities. Therefore, one of the most important objectives of the educational institutions has become "teaching to learn", "raising individuals who can learn on their own" (Hofer and Yu, 2003).

The societies today are in need of the individuals to produce knowledge in addition to possess lifelong learning skills, in other words, to renew their knowledge continuously, to keep up with the changes, to follow the recent developments, and to be a conscious information consumer. What is expected from the educational institutions that have shouldered the responsibility of raising individuals with the characteristics in conformity with the needs of by the society is to raise the individuals equipped with knowledge and skills (who are able to reach out, use, disseminate and produce the information) who are able to utilize technology and learn on their own (have learnt to learn) (Akkoyunlu and Kurbanoğlu, 2003; Evin Gencel, 2013). The acquisition of self-directed learning objectives can be through real-life problems (Abubakar and Arshad, 2015). For this reason, PBL enables prospective physicians to go through the problems that they might encounter during their real-life experiences.

Self-directed learning means that the learner has the control over the learning activities and over the decision-making process in regard to both the goals and means of learning (Mocker and Spear, 1992). According to Baden (2003), PBL is a method that is designed to enable the students to acquire self-directed learning, independent studying, questioning, problem-solving skills, to be involved in the conditions that may be considered similar to those that they will encounter in their lives by providing assistance them to overcome these conditions, to learn and research on their own.

Holen (2000) reported that students begin the exercise equipped with certain study skills, which the students acquired through their individual characteristics and their previous learning experiences, at the start of their education; however, Holen (2000) also stated that students are able to acquire life-long learning, self-directed learning, problem-solving skills, which are anticipated to be acquired by students apart from these study skills, easily through the group studies in the sessions of

PBL. Additionally, Kaufman (2003) put forward that the methods and environments featuring the learning dimensions such as self-directed learning, self-sufficiency and reflective practice are more effective.

In regard to the problem-based learning and self-directed learning in the works through which the attitude scale towards PBL for medical faculties in this study was developed, Kemahlı and Alper (2006) reported that the process of PBL allows for the acquirement of problem-solving skill apart from various skills such as self-directed learning and cooperative learning and that if a student has acquired self-directed learning skills and problem-solving skill, he or she may not have a difficulty in solving a problem about which he or she does not initially have any knowledge. Problem-based learning involves four basic steps: problem analysis, self-directed learning, brainstorming and solution testing (Massa, 2008).

Self-directed learning can be defined as a process where the individuals can choose the appropriate strategies and methods in order to achieve the learning objectives. This process continues throughout the life of an individual (Hollis, 1991, 46).

In this process, individuals can decide on their own how they can measure their learning success. When involved in an independent and a flexible learning environment, individuals can practice self-directed learning more effectively (Gade and Chari, 2013)

Tutors reflected that students gain communication skill, collaboration and collaborative learning skills during the process of problem-based learning, and also the students agree with this reflection. Furthermore, while students consider that research skill, research responsibility and reasoning skill as being the skills that an individual gains through problem-based learning, tutors consider self-directed learning, expression and language development, discussion and problem-solving skills as being such skills.

According to Kelly and Boyer (2005), the process of self-directed learning is a life-long social system. This system acknowledges that self-directed learning is a cyclical order involving self-directed learning, inputs, processes, outputs and feedbacks. The inputs of the system are personal information, individualized learning styles, technological experiences, content knowledge and the level of self-directed learning readiness. The processes of the system are utilizing metacognition strategies, interacting and determining the level of participation, self-directed learning process, authentic learning process, reflection, and constantly providing feedbacks. The outputs of the system are the features of learning products, evaluation methods, the level of effectiveness of learning and the levels of the ability to transfer the knowledge to practical life. Given the characteristics of the system, individuals are able to practice self-directed learning during their professional lives as well. Thanks to their self-direction, individuals can determine the professional fields where they have shortcomings; they can be engaged in learning consistently in order to compensate for their shortcomings and become more competent in their fields by means of self-improvement.

It is emphasized that the importance of self-directed learning skills particularly in terms of medical education since physicians are also required to organize their own learning experiences (Ramani and Leinster, 2008).

PBL as an approach enabling a learner to have more responsibility and control and it is defined as a means to facilitate the development of self-directed learning skills (Marra et al., 2014). PBL encourages students to pursue self-regulated and self-directed learning (Fee and Minkley, 2010).

That being said, PBL and self-directed learning appear to two important variables for medical school students. Moreover, as stated by Baden, the examination of the contribution of PBL in the acquisition of self-directed learning skill by students is considered to be of importance.

With the adaption of a constructivist approach in education, it is observed that the efforts to enhance the efficiency of learning-teaching process and educational programs focus on individual differences such as learning styles, strategies, intelligence areas. Furthermore, the increase in the importance of the concept of life-long learning shifted the focus of scientific research more towards the characteristics of learners (Evin Gencel, 2013). PBL, has been one of the leading learner-centered approach that enables students to structure a comprehensive and flexible knowledge base, to acquire self-learning and life-long learning skills and to develop higher-order thinking skills (Wang et al., 2016)

PBL is an educational approach designed to enable them to gain the skill of learning to learn and to increase their learning capacities. In this approach, students work in groups of five to seven in order to resolve real-life problems by means of self-direction. On the other hand, in conventional education, where individual skills and abilities are not taken into consideration, all teaching is based upon the assumption that all of the students have the same competencies. This assumption prevents students from developing certain skills such as creative thinking, critical thinking, problem-solving, the ability to make a research (Dahlgren, Castensson and Dahlgren, 1998; Ngeow and Kong, 2001).

The retention of the knowledge gained by means of problem-based learning is higher, which improves the self-directed learning skills of students, facilitating learning (Strobel and Bareneld, 2009).

It is indicated that the students with high levels of self-directed learning readiness are curious, eager, self-confident and aware of their responsibilities in learning; they act independently without the help of others, use the time effectively, and have the ability of planning to complete their works (Hewitt-Taylor 2011, Williams 2001).

Moreover, one of the most important contributions of problem-based learning method is the improvement of problem-solving skills. Saracaloğlu and Kanmaz (2012) states that individuals should be able to acquire problem-solving skills during the educational process in order to raise a generation solving problems instead of creating them. It is reflected that educators can benefit from the determination of problem-solving skills and problem-solving approaches that students have and utilize in resolving the problems of students and teaching more

effectively. When students become aware of their problem-solving skills, they can recognize their strengths and shortcomings during their educational process and become an effective problem solver, which will positively contribute to the school performance of a student and his or her achievement in life.

A modern individual in this information and communication age, in other words, in a globalizing world, should be one who appreciates the importance of continuous learning, knows how and where to find knowledge and how to use it, fulfils the requirements thereof, overcomes the problems, mobilizes himself or herself with his or her own internal motivation, knows how to learn individually and collaboratively by means of self-direction, makes the effort, monitors and controls his or her own learning, exercises and behaviors, complies with the principles of collaborative work during his or her education and training (Duman, 2002).

It is necessary to define the concept of "adult" since the students in medical faculties are considered as adults. An adult is defined as one with a developed sense of self-responsibility and sense of identity, who can take responsibility and has his or her own life experiences. Adulthood is regarded as a process involving legal, biological, social and psychological elements. Psychological adulthood is the underlying structure in adult education. In terms of social and psychological aspects, adulthood is the state of being responsible of one's own life, of possessing a self-directed identity, of being aware of one's responsibilities. That said, the question of "are our students aware of the responsibilities of the medical profession which they will join in the future" would be to the point (Özdemir, 2003).

In conclusion, the number of studies on self-directed learning particularly in Turkey was found insufficient. The study, designed to research and improve the relationship between problem-based learning and self-directed learning in medical education, aims to contribute to the existing literature.

METHOD

Research Model

The study follows a relational survey model by means of comparison. Relational survey models are research models designed to determine the presence and/or degree of the co-variation between two or more variables.

Participants

The participants of the study was the Faculty of Medicine of Çanakkale Onsekiz Mart University. The number of the students in the first, second and third terms was 336 in the academic year of 2014-2015. The PBL were performed with 33 groups of up to ten or twelve students. The students were randomly assigned to the groups. The study was conducted with 11 groups of students randomly selected, undergoing the practice of PBL. The study, was performed with a total of 111 students.

Data Collection

Attitude towards PBL Scale and the Self-Directed Learning Readiness Scale (SDLRS) were used as data collection tools in this study.

Attitude towards PBL Scale

Attitude towards PBL Scale was developed by Kemahlı and Alper (2006). It has six sub-scales entitled 'problem-solving', 'group working', 'web environment', 'self-direction', 'course subject', 'attitude towards mentor'. The Cronbach's alpha reliability coefficient of the scale was .86.

Self-Directed Learning Readiness Scale(SDLRS)

Self-Directed Learning Readiness Scale (SDLRS) was developed by Fisher and et al. (2001). It was adapted into Turkish by Şahin and Erden (2009). The Cronbach's alpha reliability coefficient of the scale was 0.87 and it has three sub-scales entitled 'self-management', 'eagerness to learn' and 'self-control'.

Data Analysis

SPSS 17.00 (Statistical Package for Social Science) software was used to analyse of the data. First of all; Kolmogorov-Smirnov test was used in order to determine whether the data a normal distribution. In the data analysis, the study utilized mean (x), standard deviation (s), frequency (f), percentage (%),correlation analysis (r).

FINDINGS

The findings of the study are summarized below. Table 1 shows the distribution of the participants.

Table 1. The Distribution of Participants across the Grades.

Grades	**f**
2nd Grade Students	26
3rd Grade Students	85
Total	111

Table 1 shows the distribution and frequency of the participants who participated in the PBL sessions. Table 2 shows the normality test results.

Table 2. Normality test results.

	Kolmogorov-Smirnov Statistical value	*sd*	*p*	*Shapiro-Wilk Statistical value*	*sd*	*p*
SDLRS						
2. Grade	,18	26	,25	,92	26	,04
3. Grade	,09	85	,25	,92	85	,00
PBL						
2. Grade	,09	26	,20	,98	26	,89
3. Grade	,19	85	,00	,85	85	,00

p>,05

Table 2 indicates that the number of 2nd grade students was less than 30; for that reason, the results of Shapiro-Wilk test were taken into consideration. The result of Shapiro-Wilk test demonstrated that ($p<0,05$) the scores of SDLRS of the students in the second term did not follow a normal distribution. Given that the number of 3rd grade students was more than 30, the results of Kolmogorov-Smirnov test were taken into consideration. The result of Kolmogorov-Smirnov test indicated that the scores of SDLRS of the students in the third term did not follow a normal distribution ($p<0,05$).

In regard to the scores of PBL, Table 2 indicates that the number of 2nd grade students was less than 30, the results of Shapiro-Wilk test were taken into consideration. The result of Shapiro-Wilk test demonstrated that the scores of PBL of the 2nd grade students follow a normal distribution ($p<0,05$). Given that the number of 3rd grade students was more than 30, the results of Kolmogorov-Smirnov test were taken into consideration. The result of Kolmogorov-Smirnov test indicated that ($p<0,05$) the scores of PBL of the 3rd grade students did not follow a normal distribution. Table 3 shows that the descriptive statistics on the scores of SDLRS and PBL of the participants.

Table 3. Descriptive Statistics on the Scores of SDLRS and PBL of the Students

	N	**S**	$\bar{x}$	**minimum**	**maximum**
SDLRS	111	11,30	153,76	95,00	200,00
PBL	111	21,38	119,81	83,00	148,00

As can be seen from Table 3, the mean and standard deviation of the scores of SDLRS was 153.67 and 11.30. The maximum score on SDLRS was 200; and the minimum score was 85. The mean score corresponds to the value 4, namely "I agree", in Likert's scale.

The maximum score on PBL was 148 whereas the minimum score was 35. Table 3 demonstrates that the average of the scores of PBL was 119.81, which corresponds to the value 4, namely "I agree", in Likert's scale. It can be seen the correlation between the scores of scales.

Table 4. Correlation between the Scores of SDLRS and PBL

		PBL
SDLRS	Spearman correlation coefficient (r)	-.140
	Significance (p)	.143
	N	111

Table 4 indicates that there is a negative non-significant relationship between the total scores of PBL and SDLRS of the participants (p>,05). Table 5 shows correlation between the scores of the sub-scales.

Table 5. Correlation Table on the Relationship between the Scores of the Sub-scales of SDLRS and PBL

		Self-management	Eagerness to learn	Self-control Skills	Problem Solving	Group Work	Learning by Means of Self-direction	Learning in Web Environment	Course Subject	Mentor
	Self-management									
SDLRS	**Eagerness to learn**	,12*								
	Self-control Skills	71**	,03							
	Problem-solving	25**	30**	33**						
	Group Working	,29**	15	,31**	,16					
PBL	**Self-direction**	02	68**	06	24*	00				
	Web Environment	01	61**	,04	19*	,06	,27**			
	Course Subject	07	29**	06	30**	,13	,29**	27**		
	Mentor	,02	,03	,03	25**	,06	-,10	-,05	11	

p<,05.

Table 5 indicates the correlation values across the sub-scales of the data collection tools. According to Table 5, there is a positive and significant relationship between Self-Management, the sub-scale of SDLRS, and Problem-Solving, the sub-scale of PBL (r=,25, p<,05). Furthermore, there is a negative and significant relationship between Self-Management and Group Working (r=-,29, p<,05), a positive and significant relationship between Eagerness to Learn and Problem-Solving (r=,30, p<,05) a positive and significant relationship between Eagerness to Learn and Learning by means of Self-Direction (r=,68, p<,05) and Course Subject (r=,29, p<,05). Moreover, there are positive and significant relationships between Self-Control Skills, and Problem-Solving (r=,33, p<,05) and Group Working (r=-,31, p<,05).

Discussion and Conclusion

This study revealed the relationship between the attitudes of medical school students towards problem-based learning and their level of self-directed learning readiness.

The first question of the study was discussed in terms of the scores of the attitudes of the participants towards PBL. The findings of the study revealed that the average of the scores of the students in PBL was 119.81, which corresponds to the value 4, namely "I agree", in Likert's scale. This finding may indicater that the students adopted the method of PBL and considered the use of PBL as an educational method during their education as a positive intervention.

The students in medical schools will encounter real medical cases in their professional life. These cases will occasionally involve certain critical situations such as the continuation of one's life and recovery. For this reason, it may be stated that students aspire to come across the problems similar to those that they will encounter in their professional life as much as possible during their learning experiences. Indeed, PBL is an approach designed to enable a student to learn on his or her own the subject in the process of problem-solving, to gain problem-solving skills by allowing him or her to encounter such problems that are common in real life and to make reasoning, by providing the resources that he or she may need and by guiding him or her (Tan, 2009; Goh, 2013)

In regard to another question of the study, it was observed that the average of the scores of SDLRS of the participants was 153.67 and the standard deviation was 11.30. The maximum score on SDLRS was 200; and the minimum score was 85. It was revealed that the average of the scores obtained from SDLRS was 153.57.

The study also found out that 64% of the students achieved a score higher than 150 points. This average score was above the cut-off score determined by Fisher and et al. (2001) for the level of the Self-Directed Learning Readiness. In their study with 1st grade students on the reliability and validity of the scale of PBL to be used in Turkey, Kocaman et al. (2006) revealed that the average score of the students in regard to the scale of PBL was 157.9. Sarmasoğlu and Görgülü (2014) observed in their study that the total scores of 76.6% of undergraduate nursing students were above 150, which is considered as the cut-off score for the level of Self-Directed Learning Readiness, and that the average of the scores was 160.7 ± 21.4 .The findings of this study are in conformity with the findings in the existing literature. Therefore, the finding on the levels of the self-directed learning readiness of the medical school students has been also substantiated.

Another dimension and the last question of the study examined the relationships between the total scores of the students on the scales of PBL and SDLR and the sub-dimensions of the scale. The study found out that there was no significant relationship between PBL and SDLRS. However, there were significant relationships between some of the sub-scales. There were significant relationships between problem-solving and self-management, eagerness to learn, self-management skills, which are the sub-scales of the of SDLRS. Holen (2000) reported that students begin the exercise equipped with certain study skills, which

the students acquired through their individual characteristics and their previous learning experiences, at the start of their education; however, Holen (2000) also stated that students are able to acquire life-long learning, self-directed learning, problem-solving skills, which are anticipated to be acquired by students apart from these study skills, easily through the group studies in the exercises of PBL.

According to Baden (2003), PBL is a method that is designed to enable the students to acquire self-directed learning, independent studying, questioning, problem-solving skills, to be involved in the conditions that may be considered similar to those that they will encounter in their lives by providing assistance them to overcome these conditions, to learn and research on their own.

It can be concluded that the self-management skills of the medical school students improved by means of the exercises of PBL; thus, there was a significant relationship between problem-solving, a sub-scale of the scale of PBL, and other sub-scales of the SDLRS.

In sum, the findings of the current study are in conformity with the findings in the existing literature. The level of the medical school students in regard to self-directed learning readiness was relatively high, the attitudes of the students towards problem-based learning were found to be positive, there were significant relationships between group working and self-management and self-management skills. The results of the study suggested that the curricula in the faculties of medicine should be mainly based on certain teaching methods encouraging self-improvement skills of students (e.g. case study, experiential learning etc.) and that students should build upon learning experiences to improve their self-directed learning skills. It is acknowledged that most of the PBL sessions cannot be performed in the faculties of medicine due to the elements of time and mentor, which are considered as the disadvantages or the limitations of PBL. The results of the study indicated that there is a positive and significant relationship between eagerness to learn and learning in web environment of the students. Based on this conclusion, the exercises, sessions and examinations of PBL may be performed in web environment and thus the restrictive factors for the implementation of the method such as time and mentor may be eliminated. Also, it is proposed that there should be an experimental study on PBL and the levels of self-directed learning readiness. The PBL sessions in medical schools were administered during the basic medical education in the first, second and third terms. It is suggested that there should be a longitudinal study on the relationship between the exercises of PBL and self-directed learning, as stated by the advocators of PBL.

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