Evaluation of Individual Innovative Characteristics and Problem-Solving Skills of Students

Sağlık Bilimleri Alanında Öğrenim Gören Öğrencilerin Bireysel Yenilikçilik Özellikleri ve Problem Çözme Becerilerinin Değerlendirilmesi

Semra Açıksöz ⬤, Merdiye Şendir ⬤, Hamiyet Kızıl ⬤, Ela Yılmaz Coşkun ⬤

ABSTRACT

Purpose: *The purpose of this study is to evaluate the individual innovative characteristics and problem-solving skills of students who are studying in health sciences.*

Methods: *This research is descriptive. A sample of 608 students who were at school at the time of collection of the study data and who agreed to participate in the survey were included. Three data collection methods were employed: 1) A socio-demographic questionnaire, 2) Individual Innovativeness Scale, 3) Problem Solving Inventory.*

Results: *The individual innovativeness level score of the students participating in the study was 67.13 ± 8.19; and the problem-solving skill score was 89.82 ± 19.23.*

Conclusions: *The students perceived their individual innovativeness level in the questionable category and perceived themselves as moderately competent in problem solving skills. The positive relationship between these two skills suggests that plans for the development of these skills in education should be made.*

Keywords: *Education, health, innovation, problem solving*

Hamiyet Kızıl
Beykent University, School of Health, Fundamentals of Nursing Department, Istanbul, Turkey
✉ hamiyetkizil@beykent.edu.tr
ORCID: 0000-0002-0722-589X

S. Açıksöz 0000-0003-0451-698X
University of Health Sciences, Faculty of Nursing, Fundamentals of Nursing Department, Istanbul, Turkey

M. Şendir 0000-0002-8243-1669
University of Health Sciences, Faculty of Nursing, Fundamentals of Nursing Department, Istanbul, Turkey

E. Yılmaz Coşkun 0000-0003-3746-1858
Tekirdag Namık Kemal University, School of Health, Fundamentals of Nursing Department, Tekirdag, Turkey

ÖZ

Amaç: *Bu çalışmanın amacı; sağlık bilimleri alanında öğrenim gören öğrencilerin bireysel yenilikçilik özellikleri ve problem çözme becerilerinin değerlendirilmesidir.*

Yöntem: *Bu araştırma tanımlayıcı türdedir. Araştırmanın evrenini; üç farklı üniversitede sağlık bilimleri alanında ön lisans ve lisans öğrenimi gören öğrenciler oluşturmuştur (N=967). Araştırmada örneklem seçimine gidilmemiş, evreni oluşturan tüm öğrencilere ulaşılması hedeflenmiştir. Çalışma verilerinin toplandığı tarihlerde okulda olan ve araştırmaya katılmayı kabul eden 608 öğrenci örnekleme dahil edilmiştir. Araştırmada veri toplama aracı olarak; Öğrenci Tanıtıcı Özellikler Formu, Bireysel Yenilikçilik Ölçeği ve Problem Çözme Envanteri kullanılmıştır. Elde edilen veriler SPSS programı kullanılarak analiz edilmiştir.*

Bulgular: *Çalışmaya katılan öğrencilerin yaş ortalaması 20.66±2.34 yıl olup, %67,1'i (n=408) kadın, %32,1'i (n=195) Anadolu-Fen lisesi mezunu ve %66,0'ı (n=401) ön lisans programına kayıtlıdır. Öğrencilerin, %71,2'si (n=433) bölümünü isteyerek seçtiğini ve %87,3'ü (n=531) ilk üç tercihi arasında yer verdiğini bildirmiştir. Öğrencilerin teknolojik araç olarak sıklıkla akıllı telefonu (%93,3, n=597) ve günde 3-4 saat arasında (%30,8, n=187) bir süre ile kullandıkları belirlenmiştir. Çalışmaya katılan öğrencilerin bireysel yenilikçilik düzeyi puanı 67.13±8.19; problem çözme becerisi puanı ise 89.82±19.23 olarak saptanmıştır. Bireysel yenilikçilik düzeyinin problem çözme becerisi üzerinde pozitif belirleyici etkisinin bulunduğu ve herhangi bir hobi varlığının bu durumu olumlu yönde etkilediği belirlenmiştir.*

Sonuç: *Çalışmamızda sağlık alanında öğrenim gören öğrencilerin bireysel yenilikçilik özelliklerinin sorgulayıcı kategoride olduğu ve problem çözme becerileri konusunda kendilerini orta düzeyde yeterli olarak algıladıkları saptanmıştır. Bu iki beceri arasında pozitif ilişkinin olması, eğitimde bu becerilerin geliştirilmesine yönelik planlanmaların yapılmasına işaret etmektedir. Özellikle interaktif eğitim yöntemlerinin tercih edilmesi, öğrenciler için hobi olanaklarının artırılması, inovatif çalışma ortamlarının düzenlenmesi ve bu alanda daha fazla sayıda çalışma yapılması önerilir.*

Anahtar kelimeler: *Eğitim, Problem çözme, Sağlık, Yenilikçilik*

INTRODUCTION

Innovation is an important element in ensuring development and change in every field and activity [1]. Innovation as a value innovation brings is to turn new and valuable information or idea, product, process or service into social benefit at the right time. The rapid change with globalization necessitates the individual to adapt to new situations. It is therefore important that the individual carries innovative characteristics in order to be able to stand out from the competition in both business life and learning life [2,3].

Innovation is one of the characteristics of the individuals that sectors and organizations need in the changing world. Individual innovativeness; is perceiving any product, service or intellectual as new by an individual, and is defined as the degree of earlier adoption of any innovation relative to the others [4]. Individual perception of an idea as novel depends on the reaction that the individual has shown against innovation [5]. In order for individual innovativeness to be realized, the individual must have an adequate level of education, to be experienced in the relevant field, to have creative thinking skills, to adopt the problem and to solve the problem [5].

One of the sectors where rapid innovation is experienced in parallel with technological developments in society; is health care areas. Innovation in healthcare; It represents the most innovative perspective of the discovery, invention and development process of materials that support the health services and the devices, equipment, medicines and all other diagnostic and therapeutic methods used in the delivery of these services, and the better way to explore this process [6]. Being healthy; is a right offered to all individuals. In meeting this need, the health institutions and professionals; they should renew themselves in parallel with the development in terms of technological, scientific, economic, social and social changes [7]. Innovation in healthcare systems positively contributes to the reduction of patients' hospitalizations, the success of chronic disease management and the increase in quality of life and the communication and coordination between health professionals [8]. When changing health care needs are taken into consideration, professional members who are creative, searching, reaching information, producing information and using information in the field of health are needed [3,5].

In recent years, the increase in evidence-based practices in the field of health, the inclusion of interactive trainings, and the emergence of the concepts of accreditation and quality have all made it necessary for students to develop problem solving, critical thinking, multidisciplinary team work, effective communication and innovative skills [9,10]. Rapid adaptation to developments in the health care environment for the students in the health field is very important in terms of qualified health services. Students are primarily asked to develop their characteristics that facilitate this adaptation and then use them throughout their professional lives [11,12]. To achieve this, educational institutions should develop strategic plans within a common vision and integrate curricula with innovative strategies that support the development of their students' professional knowledge and skills [10,13].

Innovative thinking enable individuals to solve problems more consciously and to make more effective decisions [14]. The better the health professionals have the ability to solve problems, the more effectively they are to protect, improve and increase life quality of the individual and the community [3,15]. Innovation in solving problems refers to the production, acceptance and implementation of new ideas, products, processes or services. Acceptance and practice at the center of this definition reflects the capacity for adaptation and change of innovation. It is therefore anticipated that individuals with innovative skills will have higher levels of problem solving skills [2].

The literature on innovativeness studies shows that innovativeness studies concentrate on issues such as research and development, technology, knowledge and management. In this sense, the main purpose of this study is to evaluate the individual innovative characteristics and problem-solving skills of the students in the health sciences and to determine whether the individual characteristics of the students according to their demographic characteristics and the major they have studied and their problem solving skills are different. In this sense, this study has importance and original value and can contribute both to the literature and give directions to future studies.

METHODS

Aim

The research was conducted to evaluate the individual innovation characteristics and problem-solving skills of health education students. For this purpose, answers to following research questions were sought.

1. What are the individual innovative characteristics and problem-solving skill levels of students?

2. Is there a significant relationship between students' individual innovativeness and problem-solving skill levels?

3. Is there a significant relationship between individual innovative characteristics and problem-solving skill levels according to the students' demographic characteristics?

4. Is there significant relationship between the major in which students are enrolled, and individual innovative characteristics and problem-solving skill levels?

Design: The study was designed as a descriptive study.

Participants: The universe of this research; is composed of student (N = 967) who had two-year associate degree and undergraduate studies in health sciences at three different universities. It was aimed to reach all students who constitute the universe, thus there was not a sample selection in the study. The sample of the study consisted of 608 students who were not absent on the research days or did not have a health report and who agreed to participate in the study.

The research was conducted between April-June 2017 at a private, and two-state university.

Data Collection: A socio-demographic questionnaire, Individual Innovativeness Scale and Problem-Solving Inventory were used as a data collection tool.

A socio-demographic questionnaire: Based on the literature review, the researchers created 25 questions in which the students' demographic data (age, gender, graduation, school grade, computer usage status, etc.) are included.

Individual Innovativeness Scale (IIS): Hurt et al. developed this Likert type scale consisting of 18 items and 3 sub-dimensions (idea leadership, change resistance, risk taking) in 1977 and Sarıoğlu and Altuntaş (2014) adapted the scale through conducting validity and reliability study. Scale sub-dimension and total score values are obtained by adding scores from each item. A total of at least 18 and at most 90 points are taken from the scale. It separates individuals under five different categorizations in terms of their characteristics. It is stated that those who score 82 or above are "innovative", those who score between 75-82 are "pioneers", those who score between 66-74 are "interrogators", those who score between 58-65 are "skeptical" and those 57 and below are "traditionalists". The Cronbach alpha value of the scale is 0.82. The Cronbach alpha value in this study was found to be 0.81.

Problem Solving Inventory (PSI): The scale, developed by Heppner and Peterson (1982) and tested for validity and reliability by Şahin et al. (Sahin et al., 1993), is a 6-point Likert-type scale consisting of 35 items. The high total score of the scale indicates that the individual perceives himself / herself as inadequate in problem solving skills. The lowest score that can be taken from the scale is 32 and the highest score is 192.The Cronbach alpha value of the your scale is 0.88. In this study, the Cronbach alpha value is 0.79.

In our study, statistical evaluation of the data obtained from the scales used the total score of PSI and IIS, and no analysis were conducted on the subgroups of the scale.

After researchers explained the purpose of study and the forms to be used in the study, questionnaires were distributed in the classroom environment. Immediate feedback was provided to the students who had question. Data collection time lasted approximately 20 minutes.

Data Analysis: The data obtained in the study were analyzed using the SPSS 21.0 program Kolmogorov-Smirnov Z test revealed that the IIS and PSI scores were normally distributed (p>0.05). In the analysis of the data, parametric methods were preferred. The t-test was used to compare quantitative continuous data between two independent groups, and one-way Anova test was used to compare quantitative continuous data among more than two

independent groups. The Scheffe test was used as a complementary post-hoc analysis to determine the differences after the ANOVA test. Pearson correlation and linear regression analysis were applied among the continuous variables of the study. The findings were evaluated at the 95% confidence interval and at the 5% significance level.

Ethical Considerations: The permission to perform the research from the institutional ethics commission was obtained (Number: 45778635-/1). Students received information about the aim of the study, remarking confidentiality and anonymity conditions. Informed consent was given.

Limitations of the Study: This study is limited to students who enrolled associate degree and undergraduate education in the field of health sciences at the universities where the research is conducted.

RESULTS

The mean age of the students was 20.66±2.34 years and 67.1% (n=408) were females. 34.4% of the students (n=209) were in the anesthesia, 34% (n=207) in nursing, 15.6 % (n=95) in dialysis, 11.3% operating room (n=69) and 4.6% were in physiotherapy (n=28) program. 66% (n=401) were enrolled in the associate degree program.69.7% of the students (n=424) were freshman, 71.2% of them (n=433) chose their major willingly and 73.4% (n=446) indicated their satisfaction with their occupational choice (Table 1).

The majority of students (98.2%, n=597) indicated that they used a technological tool, they preferred (93.3%, n=567) most likely to use the telephone. It is also reported that 75.7% of the students (n=460) had hobbies (Table 1).

When the average scores of IIS and PSI students are compared according to gender; it was found that the IIS mean score of female students was significantly higher than male students (t=-3.165, p=0.002), and the mean score of PSI was significantly lower than male students (t=2.092, p=0.048) (Table 2).

A statistically significant difference was found between the IIS score average of the students and the program registered (t=2.668, p<0.05), individual innovativeness characteristics of the associate degree

Table 1. Student Identification Characteristics (n=608)

Characteristics (Specifications)	n	%
Age (Year) (X ±SD)	20.66±2.34	
Gender		
Female	408	67.1
Male	200	32.9
Program Enrolled		
Associate Degree		
Anesthesia	209	34.4
Dialysis	95	15.6
Operating room	69	11.3
Physiotherapy	28	4.6
Undergraduate		
Nursing	207	34.0
Class		
Freshman	424	69.7
Sophomore	163	26.8
Junior	21	3.5
Used Technological Tool		
Telephone	567	93.3
Computer	41	6.7
Hobbies		
Yes	460	75.7
No	148	24.3

students (x=67.76±8.22) were found to be higher than individual innovativeness characteristics of the undergraduate students (x=65.90±8.01).A significant difference was found between the students' average of PSI scores and the program enrolled (t=-2.603, p<0.05), (t=-2.603, p<0.05), and problem-solving skills (x= 88.37±19.80) of associate degree students were found to be higher than those of undergraduate students (x=92.63±17.79) (Table 2).

When the IIS score averages of the students are compared according to their grade levels; it was determined that the difference between the classes was statistically significant (F=5.229, p<0.05). In binary comparisons to determine which group originated this difference; junior students had significantly higher IIS scores than the freshman and sophomores. There was no statistically significant

difference between grade level and PSI score averages (p>0.05) (Table 2).

A statistically significant difference was found between the IIS score averages of the students and their occupational satisfaction status (F=6.393, p=0.002), the individual innovativeness scores of those who are satisfied with the occupation are found to be higher than those who are partially satisfied with the occupation. Compared with the PSI scores average, those who were partially satisfied

with the occupation were found to have higher problem solving skills scores and the difference between them was statistically significant (F=3.689, p=0.026) (Table 2).

When the IIS point average of the students is compared with the use of technological tools; the individual innovativeness scores of technological tool users were found to be higher than the individual innovativeness scores of partial technological tool users (t=1.989,p=0.047). There was no

Table 2. Comparison of Total Scores of Student Identification Characteristics and Individual Innovativeness Scale (IIS) and Problem-Solving Inventory (PSI) (N=608)

Identification Characteristics	n	%	IIS Total Score X ±SS	PSI Total Score X ±SS
Gender				
Female	408	67.1	67.86±7.756	88.68±18.10
Male	200	32.9	65.64±8.86	92.15±21.21
			t= -3.165	t=2.092
			p=0.002	p=0.048
Program enrolled				
Associate degree	401	66.0	67.76 ± 8.22	88.37 ± 19.80
Undergraduate	207	34.0	65.90 ± 8.01	92.63 ± 17.79
			t= 2.668	t= -2.603
			p=0.008	p=0.007
Class				
Freshman	424	69.7	66.62±8.06	90.64±18.27
Sophomore	163	26.8	67.81±8.20	88.73±20.23
Junior	21	3.5	72.04±9.02	81.71±27.39
			F=5.229	F=2.533
			p=0.006	p=0.080
Occupation Satisfaction				
Yes	446	73.4	67.83±7.75	88.55±19.00
No	29	4.8	66.10±9.05	94.00±23.26
Partial	133	21.9	65.01±9.07	93.16±18.64
			F=6.393	F=3.689
			p=0.002	p=0.026
Use of Technological Tool				
Yes	597	98.2	67.22±8.20	89.66±19.23
Partial	11	1.8	62.27±6.35	98.81±17.69
			t=1.989	t=-1.567
			p=0.047	p=0.118
Hobbies				
Yes	460	75.7	67.73±8.20	87.51±19.45
No	148	24.3	65.25±7.91	97.00±16.66
			t=3.236	t=-5.334
			p=0.001	p<0.001

t=independent sample t-test, F=one-way analysis of variance

statistically significant difference between the use of technological tools and the average of PSI scores (p>0.05) (Table 2).

A statistically significant difference was found between the students' IIS score averages and hobby status (t=3.236,p=0.001). Students who had hobbies have high individual innovativeness scores. When it is compared with the average scores of PSI; the scores of students with hobbies were lower than those without hobbies and the difference between them was statistically significant (t=-5.334,p<0.001) (Table 2).

It was determined that there was no statistically significant difference between the average of the IIS scores and the average of the scores of the PSI scores, with age, type of education, preference of department, types of most frequently used technological tools and time intervals allocated to the use of technological tools (p>0.05).

The average IIS and PSI scores of the students were found as 67.13±8.19 and 89.82±19.23, respectively. It has been determined that the individual innovation characteristics of the students are in the interrogator category. When the scale is evaluated according to the total score range (32-192), students perceive themselves to be moderately competent problem solving skills. There was a moderately significant relationship between the IIS score averages of the students and the average of the PSI scores in the negative direction (r=-0.541,p<0.001) (Table 3). As the individual innovativeness of students increases, they perceive themselves more adequate in problem solving skills.

Linear regression analysis was used to determine the causal relationship between individual innovativeness levels and problem-solving skills of the students (F=250.120, p<0.001). As a determinant of the level of individual innovativeness, it has been found that the relationship with the problem-solving skill variables (explanatory power) is strong (R^2=0.291). Problem solving skill level (score) reduces the level of individual innovativeness (ß=-0,230). Problem-solving skills were found to be positively related to individual innovativeness (Table 4). IIS scores predict PSI scores in the positive direction. (Since the increase in the PSI scores indicates a decrease in problem solving skills, "-" value is positive, "+" value points to a prediction in negative direction).

DISCUSSION

It is very important that students in the health field can keep up with the changes in the health care environment [16]. Considering this change, innovation is one of the important required characteristics of students. In literature, the number of studies examining innovative behaviors of health education students is very few [16-18]. In the non-health care field, there are studies in which individual innovativeness is explored [19-23]. There is only one study to compare the relationship between problem-solving skills and individual innovativeness [24]. For these reasons, it is thought that this study will lead other studies.

It was found that the average score of individual innovativeness of female students was significantly higher than male students and the average score of problem solving skill was significantly lower than male students. In other studies, the individual innovativeness scores of female students were higher than male students. It has been determined that this characteristic of the students in the study group is similar to other study findings [18,21,23,25,26].

Individual innovative characteristics and problem-solving skills of two-year associate degree students were found significantly higher than undergraduate students in the study. This result of our research is

Table 3. The Relationship Between Individual Innovativeness Characteristics and Problem-Solving Skills of Students (N=608)

IIS Mean Score	PSI Mean Score		
X ± SD	X ± SD	r*	p
67.13±8.19	89.82±19.23	0.541	<0.001

Table 4. The Effect of Problem Solving Skill on Individual Innovativeness Level (N=608)

Dependent Variable	Independent Variable	ß	t	p	F	Model (p)	R^2
IIS	Constant	87.819	65.650	0.000	250.120	0.000	0.291
	PSI	-0.230	-15.815	0.000			

not similar to other research findings [25,27]. As the level of education increases, individual innovative characteristics and problem-solving skills are expected to increase, and the research findings in this subject are also very limited. On the other hand, the majority of students in the study group are associate degree students, which can be considered as the reason for this difference. In addition to the level of education, social and cultural characteristics of schools, educational programs, critical thinking skills and experiences of trainers, educational techniques used and number of students in class can be considered as effective factors that fosters innovative characteristics of students and their problem-solving skills. In this respect, there is a need for studies to assess individual innovativeness of the students who are studying in the field of health sciences and studies that evaluate the problem-solving skills with different variables.

When the mean scores of the students were compared according to their grade levels, junior students had significantly higher PSI scores than the freshman and sophomores. This situation can be explained by the increase in the awareness of students about innovations as a result of education. There was no statistically significant difference between the grade level and the PSI score averages. These characteristics of the students in our study group were found to be similar to other study findings [21,24]. Kanbay et. al. (2013) indicated in their studies; although there were differences between problem solving skills average scores according to the classes, this difference was not statistically significant [27].

Participants who were satisfied with the occupation choice in the study were found to have higher IIS scores than those who were partially satisfied. When compared with the average of PSI scores, the students who were partially satisfied with the occupational choice were found to have higher problem-solving skills scores and the difference between them was statistically significant. This research finding suggests that the problem-solving skills and innovative approach, which play an important role in job success, are related to motivation. In a study conducted to evaluate students' problem solving skills was reported that university students evaluated their problem solving skills more positively as their satisfaction level of the program enrolled increased [20,28].

The individual innovativeness scores of students using technological tools in the study were found to be higher than the individual innovation scores of those who use technological tools partially. There was no statistically significant difference between technological tool use and the average of PSI scores. This situation can be explained by the fact that the technologically driven individuals are more aware of the innovations. Mahata et al. (2012) study shows that innovation is a very effective factor in mobile learning, mobile learning contributes to the learning process, and use of phones, iPads and digital devices support the learning process of university students [25]. Bayraktar (2012) has been working with the instructors, he has been determined that technology and social media have benefited to be informed about innovations for education purposes. In this context, it has been reported that Facebook is the most used and that those who use Facebook every day are in the innovative category [29].

A statistically significant difference was found between the students' average scores of IIS and hobby status. Students who had hobbies have high individual innovativeness scores. When the average scores of PSI are compared; the scores of the students with the hobbies were lower than those without the hobbies and the difference between them was found to be statistically significant. In the literature, it was found that there was no statistically significant difference between the mean scores of IIS and PSI scores of the students who have hobbies and do not have hobbies in the studies comparing the hobbies habit with the individual innovativeness characteristics [30,31]. It is stated in the literature that, besides the addition of activities to develop problem solving skills into curricula, social activities may also support problem solving skills [24].

The average individual innovativeness score of the students is 67.13±8.19.In the study conducted by Ertuğ and Kaya (2017) in order to determine the levels of individual innovativeness of nursing students and the obstacles in front of them [18]; the average individual innovativeness score of the students was found as 63.92±10.06.In the study conducted by Başoglu and Edeer (2017), which is a similar study in terms of sample groups, in order to compare the innovativeness of the nurses in the X and Y generations and the nursing students, the average score was found as 68.92±7.76.In terms of these two studies, our findings are in line with the literature [16].

When the level of innovativeness in our study is examined in terms of categories, majority of students (36.3%, n=221) fell under the category of "interrogators". "Interrogators"; spend a great deal of time thinking about a new idea before they adopt it. Thus, the process decision for innovation takes longer for the interrogators. Therefore, moving institutions and educators in this direction will strengthen the innovative behavior of students [16]. In the study conducted by Uslu and Mansur (2017) in order to determine the individual-social innovation and proactive personality characteristics of the students who have undergraduate education in health management; the vast majority of students are "pioneers" and "interrogators" [32]. In the study of Ertugrul and Kaya (2017), it was determined that the nursing students were in the "interrogator" category and that the majority of the students in Başoglu and Edeer (2017) were "pioneers" and "interrogators" [16]. Considering the studies carried out with the students in the health field, the findings support the findings of our studies.

Problem solving skill is one of the other characteristics that students should have in today's conditions. In our study, the mean score of problem solving inventory is 89.82±19.23, and students perceive themselves as moderate problem solvers. Several studies have examined the problem-solving skills in the field of health. It was also determined that students perceive themselves as moderately problem solvers in other studies conducted by other researchers [15,27,28].

In our study, it was determined that the relationship with the problem-solving skill variables (explanatory power) was strong as a determinant of the level of individual innovativeness. In a study that examined the relationship between the individual innovativeness of teacher candidates and their problem solving skills; no statistically significant relationship was found between individual innovativeness scores and problem solving skill scores [24]. The study differs from the literature in this regard, and it is thought that this difference is due to the difference in the descriptive and program (major) properties. At this point, there is a need for similar studies.

CONCLUSIONS

Health-education students' rapid adaptation to developments in the health care environment is very important in terms of providing more qualified services. Students are first expected to develop the characteristics to facilitate this adaptation and then to use them throughout their professional lives. When the students are considered in terms of these characteristics, it has been determined that the individual innovativeness characteristics are in the "interrogators" category and they perceive themselves as moderate enough in problem solving skills. Problem-solving skills were found to be positively influential on individual innovativeness. The positive relationship between these two characteristics points to the need for planning of the training of the students to develop these skills. Particularly it is suggested that preference should be given to the use of interactive training methods, hobby opportunities should be increased for students in universities, and further studies should be carry out in this field.

Author contribution
Study conception and design: SA, MS, HK, and EYC; data collection: SA, MS, HK, and EYC; analysis and interpretation of results: SA, MS, HK, and EYC; draft manuscript preparation: SA, MS, HK, and EYC. All authors reviewed the results and approved the final version of the manuscript.

Ethical approval
The study was approved by the Beykent University Ethics Committee (Protocol no. 2017-1/1/04.05.2017).

Funding
The authors declare that the study received no funding.

Conflict of interest
The authors declare that there is no conflict of interest.

Yazar katkısı
Araştırma fikri ve tasarımı: SA, MS, HK ve EYC; veri toplama: SA, MS, HK ve EYC; sonuçların analizi ve yorumlanması: SA, MS, HK ve EYC; araştırma metnini hazırlama: SA, MS, HK ve EYC. Tüm yazarlar araştırma sonuçlarını gözden geçirdi ve araştırmanın son halini onayladı.

Etik kurul onayı
Bu araştırma için Beykent Üniversitesi Etik Kurulundan onay alınmıştır (Karar no: 2017-1/1/04.05.2017).

Finansal destek

Yazarlar araştırma için finansal bir destek almadıklarını beyan etmiştir.

Çıkar çatışması

Yazarlar herhangi bir çıkar çatışması olmadığını beyan etmiştir.

REFERENCES

1. Eren H. Üniversite öğrencilerinin sosyal yenilikçilik kapasitelerinin teknolojik yenilikçilik eğilimlerine etkisini ölçmeye yönelik bir model önerisi. Kara Harp Okulu Savunma Bilimleri Enstitüsü Teknoloji Yönetimi Ana Bilim Dalı, Yayımlanmamış Doktora Tezi. 2010.

2. Işık C, Türkmendağ T. Atatürk Üniversitesi Turizm Fakültesi Öğrencilerinin Bireysel Yenilikçilik Algılarının Belirlenmesi. Gazi Üniversitesi Turizm Fakültesi Dergisi. 2016:70-99.

3. Hughes F. Nurses at the forefront of innovation. International Nursing Review. 2006;53(2):94-101. **[Crossref]**

4. Kılıçer K, Odabaşı HF. Bireysel yenilikçilik ölçeği (BYÖ): Türkçeye uyarlama, geçerlik ve güvenirlik çalışması. Hacettepe Üniversitesi Eğitim Fakültesi Dergisi. 2010;38:150-64.

5. Sarıoğlu A. Bireysel Yenilikçilik Ölçeğinin hemşirelikte geçerlik ve güvenirliği 2014.

6. Şengün H. Sağlık hizmetleri sunumunda inovasyon. Haseki Eğitim ve Araştırma Hastanesi Haseki Tıp Bülteni. 2016;54:194-8. **[Crossref]**

7. Kouta C. Delivering quality, serving communities: nurses leading care innovations. 2009.

8. Ersoy S, Yıldırım Y, Şenuzun Aykar F, Fadıloğlu Ç. Hemşirelikte İnovatif Alan: Evde Bakımda Telehemşirelik ve Telesağlık. Acıbadem Üniversitesi Sağlık Bilimleri Dergisi. 2015;6(4):194-201.

9. Elçi Ş. İnovasyon: rekabet ve kalkınmanın anahtarı: tasarım, Ar-Ge. İnovasyon: Çerçeve; 2006.

10. Yuan H, Williams BA, Fan L. A systematic review of selected evidence on developing nursing students' critical thinking through problem-based learning. Nurse Education Today. 2008;28(6):657-63. **[Crossref]**

11. Herdman EA. Hemşirelik ve yenilikçilik. Koç Üniversitesi Hemşirelik Fakültesi Hemşirelikte Eğitim ve Araştırma Dergisi (HEAD). 2009;6(2):2-4.

12. Uzuntarla Y, Ceyhan S, Fırat İ. Sağlık Kurumlarında Yenilikçilik: Bingöl İli Örneği. Journal of Social Sciences Institute. 2016;6(11):189-201.

13. Dil S, Uzun M, Aykanat B. Hemşirelik eğitiminde inovasyon. International Journal of Human Sciences. 2012;9(2):1217-28.

14. Taşçı S. Hemşirelikte problem çözme süreci. Erciyes Üniversitesi Sağlık Bilimleri Dergisi Hemşirelik Özel Sayısı. 2005;14:73-8.

15. Şahiner G, Açıksöz S, Açıkel C. Hemşirelik Yüksek Okulu Öğrencilerinin Problem Çözme Becerilerinin İncelenmesi. TAF Preventive Medicine Bulletin. 2013;12(6):673-80.

16. Başoğlu M, Edeer AD. X ve Y Kuşağındaki Hemşirelerin ve Hemşirelik Öğrencilerinin Bireysel Yenilikçilik Farkındalıklarının Karşılaştırılması. Gümüşhane Üniversitesi Sağlık Bilimleri Dergisi. 2017;6(4):77-84.

17. Yigit S, Aksay K. A Comparison between Generation X and Generation Y in Terms of Individual Innovativeness Behavior: The Case of Turkish Health Professionals. International Journal of Business Administration. 2015;6(2):106-17. **[Crossref]**

18. Ertuğ N, Kaya H. Hemşirelik Öğrencilerinin Bireysel Yenilikçilik Profilleri ve Yenilikçiliğin Önündeki Engellerin İncelenmesi. Koç Üniversitesi Hemşirelik Fakültesi Hemşirelikte Eğitim ve Araştırma Dergisi 2017;14(3):192-7.

19. Kert S, Tekdal M. Farklı eğitim fakültelerine devam eden bireylerin yenilikçilik algılarının karşılaştırılması [Comparison of individual innovativeness perception of students attending different education faculties]. Gaziantep University Journal of Social Sciences. 2012;11(4):1150-61.

20. Oktuğ Z, Özden MS. Bireycilik/Toplulukçuluk ile bireysel yenilikçilik eğilimi arasındaki ilişkide içsel motivasyonun biçimlendirici rolü. Eskişehir Osmangazi Üniversitesi Sosyal Bilimler Dergisi. 2013;14(2):1-22.

21. Özgür H. Bilişim teknolojileri öğretmen adaylarının eleştirel düşünme eğilimleri ile bireysel yenilikçilik özellikleri arasındaki ilişkinin çeşitli değişkenler açısından incelenmesi. Mersin Üniversitesi Eğitim Fakültesi Dergisi. 2013;9(2):409-20.

22. Çuhadar C, Bülbül T, Ilgaz G. Öğretmen adaylarının bireysel yenilikçilik özellikleri ile teknopedagojik eğitim yeterlikleri arasındaki ilişkinin incelenmesi. İlköğretim Online. 2013;12(3):797-807.

23. Demiralay R, Bayır EA, Gelibolu MF. Öğrencilerin Bireysel Yenilikçilik Özellikleri ile Çevrimiçi Öğrenmeye Hazır Bulunuşlukları İlişkisinin İncelenmesi. Journal of Research in Education and Teaching. 2016;5(1):161-8.

24. Şahin-İzmirli Ö, Gürbüz O. An Investigation of the Relationship between the Individual Innovativeness and Problem Solving Skills of Teacher. SDU International Journal of Educational Studies. 2017;4(1):29-43.

25. Mahat J, Ayub AFM, Luan S. An assessment of students' mobile self-efficacy, readiness and personal innovativeness towards mobile learning in higher education in Malaysia. Procedia-Social and Behavioral Sciences. 2012;64:284-90. **[Crossref]**

26. Putzer GJ, Park Y. The effects of innovation factors on smartphone adoption among nurses in community hospitals. Perspectives in Health Information Management/AHIMA, American Health Information Management Association. 2010;7(1):1-20.

27. Kanbay Y, Aslan Ö, Işık E, Kılıç N. Hemşirelik Lisans Öğrencilerinin Problem Çözme ve Eleştirel Düşünme Becerileri. Journal of Higher Education & Science/ Yükseköğretim ve Bilim Dergisi. 2013;3(3):244-51.

28. Koç Z, Koyuncu S, Sağlam Z. Sağlık Yüksekokulu Hemşirelik ve Ebelik Öğrencilerinin Problem Çözme Beceri Düzeyleri ve Etkileyen Faktörler. Koç Üniversitesi Hemşirelik Fakültesi Hemşirelikte Eğitim ve Araştırma Dergisi. 2015;12(1):41-50. [Crossref]

29. Bayraktar DM. Adoption of Web 2.0 Tools and the Individual Innovativeness levels of Instructors (Öğretim Elemanlarının Bireysel Yenilikçilik Düzeyleri Ve Web 2.0 Araçlarını Benimsemeleri). Hasan Ali Yücel Eğitim Fakültesi Dergisi. 2012;9(2):35-47.

30. Elkin N, Karadağlı F. Araştırma Makalesi Üniversite Öğrencilerinin Problem Çözme Becerilerinin Değerlendirilmesi. Adıyaman Üniversitesi Sağlık Bilimleri Dergisi. 2015;1(1):11-8.

31. Olgun F YM, Özkütük M. Hemşirelik yüksekokulu öğrencilerinin problem çözme ve atılganlık becerilerinin karşılaştırılması. I Uluslararası & V Ulusal Hemşirelik Eğitimi Kongresi Kongre Kitabı İstanbul, Özlem Grafik Matbaacılık. 2003:170-4.

32. Uslu D, Mansur F. Sağlık Yönetici Adaylarının Bireysel-Sosyal Yenilikçilik ve Proaktiflik Özelliklerini Belirlemeye Yönelik Bir Araştırma. İktisadi ve İdari Bilimler Fakültesi Dergisi. 2017:52-68.