

Innovation Research in the Field of Nursing: Systematic Review and Meta-Analysis

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Abstract

Change in healthcare needs requires the creation of innovative strategies. Although this situation causes better quality care in nursing; unexpected changes pose a high risk for patients. This meta-analysis was conducted to determine innovation in nursing. In this study, GOOGLE SCHOLER, MEDLINE, TÜRKMEDLINE, ULAKBİM, CINAHL databases were used. In this context, ten studies published between January 2009 and February 2020 were found. The studies were crawled with the keywords "nurse", "nursing" and "innovation". As a result of the screening, 856 studies were reached. Ten studies were examined in the research. Of the study; four were descriptive cross-sectional and descriptive, one was descriptive correlation and correlation type. The number of samples in the studies is between 165 and 1040, and almost all of the studies; demographic information form, in addition to the individual innovation scale; It was determined that scales such as readiness scale for online learning, barriers to innovation, entrepreneurship tendency scale, inventory of online information search strategies, entrepreneurship scale and California critical thinking tendency scale were used. In these studies; innovation has a positive effect on research strategies, being inquisitive and open to entrepreneurship, and critical thinking disposition. It is recommended to use teaching methods that enable educational content to be creative, entrepreneurial, to create an innovative perspective, to increase critical thinking trends, to conduct studies with high level of evidence in which nurses' innovation features and influencing factors are evaluated.

Keywords: Innovation, Innovative approaches, Individual innovation, Nursing practices, Nursing, Turkey

INTRODUCTION

Technology drives both people and society to change and develop. With the developing technology, it is necessary to follow more innovative processes to meet the increasing requirements of the education processes [1]. Innovation is defined as the renewal of science and technology in a way that will provide economic and social benefits, creating inventions and being different. According to TDK (2023), "innovation is the adaptation and application of new creative ideas or inventions to economic fields" [2].

Rogers (2003) defines innovation as "an idea, practice, object that is perceived as new by the individual or society" and lists its characteristics as follows [3]: relative utility, compatibility, complexity, trialability and observability. In addition, in this process, attitudes towards innovation as Innovators, Pioneers, Curiosity, Skepticism, Traditionalists are specified. (looking with prejudice against change, tending to adopt innovations last, waiting for the innovation to be tried by others and the results to be observed before adopting the innovation) defined [4]. The International Union of Nurses-ICN (2023) described innovation in the health care system as transforming a good idea into a viable/achievable outcome for health promotion, disease prevention, and higher quality patient care [5].

Developing new ideas, technologies and techniques, suggesting new ways/methods for realizing goals, testing new work procedures in the work area, changing work routines and applying new methods are defined as "innovative behavior" [6]. In global trend analysis studies, it is prominent that innovative practices in the health field will increase with the developing technology in the future [7-9]. The National Nursing Association (NLN) has called for dramatic reform and innovation in nursing education [10]. NLP recommended the preparation of evidence-based curricula that can act with technology in nursing and respond to the needs of students and health care systems. For this purpose; the theme of Nursing Week in 2009 was determined as "nursing and

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innovation". The International Council of Nursing advocated that nurses should be pioneers in developing innovative care practices. It supported the creative behaviors of nurses, the products and methods developed by nurses as an innovation, and the revealing of the proactive role of nurses in health care, in cooperation with educational institutions and professional organizations, both in public health and public health. It recommended the development of professional knowledge [11, 12]. In the report published by the American Institute of Medicine (IOM) in 2010, health informatics, innovation, technology applications, and applications for developing healthcare technologies come to the fore among the competencies nurses should have in the future [13]. This shows that innovation is still on the agenda for the development and advancement of nursing. Personal entrepreneurship is essential in the health care system. Entrepreneurship has been defined as a concept that encompasses all processes of entrepreneurs to take risks, pursue opportunities, implement, and innovate [14]. Entrepreneurship is the expenditure of a great deal of energy in establishing an enterprise or organization [5, 15]. Entrepreneurship is essential to nurses' decision-making or career-planning processes [14]. When this information is evaluated, innovation in nursing is significant. When the studies in the literature were examined, no meta-analysis examined the studies on determining individual innovativeness characteristics (innovation) in nursing. This research was conducted to determine the personal innovativeness characteristics of the invention in nursing.

Research Hypotheses

H1: Innovation in nursing affects individual innovativeness.

MATERIALS AND METHODS

This research was done by meta-analysis method. Literature review method was used in the study. Since the literature review does not directly affect animals or humans, ethics committee. Keywords for article searches were determined by searching the database of Turkish Science Terms and medical topics (MeSH Browser) [16]. Identified keywords "nurse", "nursing" and "innovation" articles related to the subject were searched from databases in English and Turkish. In the searches made from Google Scholar, Medline, Turk Medline, ULAKBIM, and Cinahl databases, related research articles published between 2009 January and February 2020 were included in the evaluation. After the repetitions in the themes downloaded from separate databases were deleted, the articles' title, abstract, and full-text reading stages were started, respectively. A total of 856 articles were found in the searches performed, with the search strategy determined in five databases. After removing duplicates and those whose title and abstract did not match, the remaining articles were evaluated within the scope of title and abstract reading. Articles that were found to be irrelevant to the subject were classified in detail and excluded from the study. The data obtained in the MOOSE studies were displayed based on the criteria of authors, year, type of study, sample size, quality assessment score of innovation. The implementation steps of the study were classified based on PRISMA [17] and MOOSE criteria. These are presented in **Figure 1** and **Table 1**.

Implementation Steps of the Study

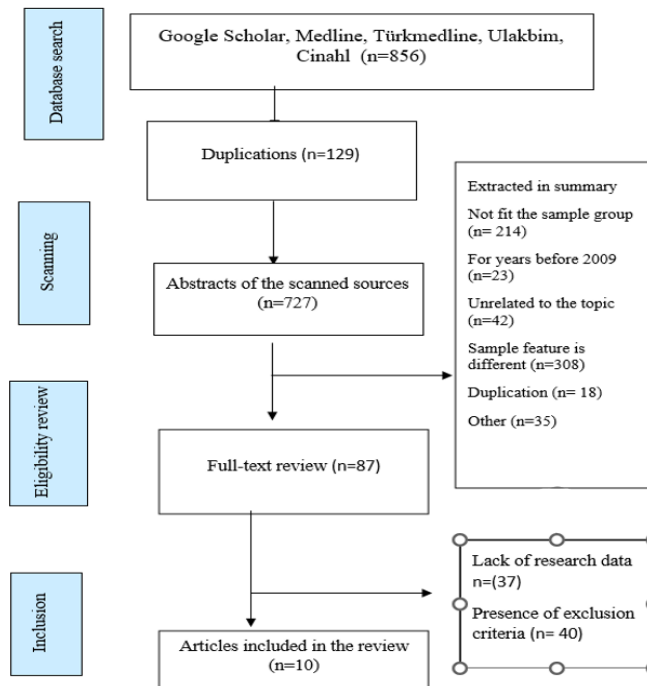


Figure 1. Prisma (Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement)

Table 1. Moose (Meta-analysis of Observational Studies in Epidemiology)

Author	Study	Sample size	Innovator	Pioneer	interrogator	Skeptical	Quality Score (A:9-12) (B:5-8) (C:1-4)
Bodur 2018	Descriptive cross-sectional	155	×	×	×	×	B
Ozden <i>et al.</i> 2019	Descriptive correlation	548	×	×	×	×	A
Utli and Vural Dogru 2018	Descriptive cross-sectional	369	×	×	×	×	B
Leblebicioglu 2018	Descriptive	216	×	×	×	×	A
Durmus Iskender <i>et al.</i> 2018	Descriptive	534	×	×	×	×	A
Basoglu and Durmaz Edeer 2017	Descriptive cross-sectional	650	×	×	×	×	B
Ertug and Kaya, 2017	Descriptive	277	×	×	×	×	A
Erol <i>et al.</i> 2018	Descriptive	530	×	×	×	×	A
Ceylan 2019	Descriptive cross-sectional	279	×	×	×	×	A
Surme <i>et al.</i> 2019	Descriptive	573	×	×	×	×	A

Criteria for Inclusion in Meta-Analysis and Methodological Quality Assessment

- i. Quantitative articles,
- ii. Only those written in English and Turkish,
- iii. Accessible full text and published in a national/international peer-reviewed journal
- iv. Nursing and innovation articles,
- v. Articles from the last 11 years (2009-2020)

Two researchers evaluated the articles separately to avoid publication bias. Information about the articles is as follows.

- i. Publication year of the study
- ii. Types of work
- iii. The sample size of studies
- iv. Individual innovative features
- v. Quality evaluation score

Kappa statistics [15] suggested by Polit and Beck and 12 of the research quality evaluation criteria were used in all studies. Each study was evaluated on all requirements and separately by the researchers, and if each item fully met, "1 point" was given; if not, "0 points" was given, and studies that met the inclusion criteria were included in the study. It was evaluated as an article with a weak quality of 0-4 points, medium quality with 5-9 points, and robust quality with 9-12 points [18]. As a result of the evaluation, the highest score was 11, and the lowest was 7. A total score of 12 indicates that the study is of good quality. The quality evaluation of the seven studies included in the meta-analysis and the distribution of the scores they received from each domain are given in **Table 1**. Cohen kappa statistic was used to evaluate the agreement between researchers for selecting articles and bias scoring made independently by the three authors. A kappa statistic between 0.41 and 0.60 was considered moderate, between 0.61 and 0.80, a significant degree of agreement, and a score over 0.80 was an excellent agreement. The agreement between the scorers was calculated with the SPSS-25 program, and the kappa values based on articles were Cohen's kappa of 0.718 95% in the confidence interval [Confidence interval: 0.645-0.986]. The general agreement

rate kappa value in this study was calculated as 0.718, and the reliability was high.

Analysis of Data

"Comprehensive Meta-Analysis Academic/Non-profit Pricing (Version 3)" was used. "Cochran's Q statistic" was used for heterogeneity. In the heterogeneity assessment, if the heterogeneity rate (I^2) is below 25%, it does not exist; 25-50% is low; 51-75% is moderate, and above 75% is considered high [19]. "Random effects model was used in group analyses with $p \leq 0.05$ in the heterogeneity test for overall effect sizes, and fixed effects model was used in analyses with $p > 0.05$ ". "RR and OR" values were taken as the basis for evaluating the overall effect size in the binary data analyses. In evaluating the overall effect, the limit of statistical significance was accepted as $p \leq 0.05$. "Classic Fail-Safe N and Tau coefficient calculation results were used to test the publication bias".

Research Findings

A total of 856 research articles were reached. Ten studies that met the research criteria were reviewed. Four of these studies are cross-sectional, five are descriptive and one is descriptive correlation type.

Evaluation of Methodological Quality

Kappa statistics [18] and quality assessment criteria consisting of 12 items were used by Polit and Beck for the quality assessment of all studies. All articles were evaluated separately and received "1 point" if each item was fully met and "0" if not. It was evaluated as an article with a weak quality of 0-4 points, medium quality with 5-9 points, and robust quality with 9-12 points [18]. As a result of the evaluation, the highest score was 11, and the lowest score was 7. Studies with a total score of 12 are quality studies. Seven of the studies ($n=10$) whose quality was evaluated by the independent evaluators included in the study were rated as "strong" and three as "moderate." Ten studies that met the evaluation criteria and were of good quality were included in the study. The chart showing the quality evaluation of the 10

studies included in the meta-analysis and the distribution of the scores they received from each domain is given in **Table 1**.

The article was evaluated by three authors independently. The "Cohen kappa" statistic was used to evaluate the scores given by the researchers. The agreement between raters was calculated with the SPSS-25 program, and the kappa values based on the reports were in the 95% confidence interval of "Cohen's kappa 0.718 (Confidence Interval: 0.645-0.9869)". In this study, the kappa value showed good agreement between raters [20].

Effect Sizes and Heterogeneity

These research results, individual innovative features in nursing and innovation; innovativeness was the covariate for all leading, questioning, and skeptical articles and "Cochran's Q" statistic was used to test for cross-study heterogeneity. As a result of the heterogeneity test, the p-value was found to be "less than 0.05, and the Q value" (6093,496) is more remarkable than the value corresponding to the df value. All articles are heterogeneous. "I²" statistic value 99,360 The overall effect size was evaluated according to the random effects model.

Table 2. Heterogeneity Test Results for Individual Innovation Traits Variable

Effect size and 95% interval				
Model	Number Studies	Point Estimate	Lower Estimate	Upper Limit
Fixed	10 (40 sub-dimensions)	0.213	0.197	0.231
Random	10 (40 sub-dimensions)	0.080	0.029	0.217
Test Of Null (2-Tail)				
Model	Z-Value	P-Value		
Fixed	-38.664	0,000		
Random	-4.995	0,000		
Heterogeneity				
Model	Q-Value	Df (Q)	P-Value	I-Squared
Fixed	6093.436	9(39 sub-dimensions)	0,000	99.360
Random				
Tau-Squared				
Model	Tau Squared	Standard Error	Variance	Tau
Fixed	10.116	3.065	9.364	3.181
Random				

Analysis according to the random effects model showed that the overall effect size of individual innovativeness traits in nursing was 0.080 (CI; 0.029-0.217; p<0.05) **Table 2**. According to the confidence interval results; if we repeat this study with 100 different samples selected from the same population, the odds ratio value we calculated in 95% of them

could be between 0.029 and 0.217. The odds ratio value is 0.080 <1. Although the calculated odds ratio value is statistically smaller than 1, it is significant (P=0.000). The nurses' characteristics of making individual initiation have a decreasing effect on general initiation. H1 hypothesis is rejected.

Table 3. The effect of Individual Innovation Variable.

Study	Statistics for each study					Study	Statistics for each study				
	Odde ratio	Lower Limit	Upper Limit	Z-Value	p-Value		Odde ratio	Lower Limit	Upper Limit	Z-Value	p-Value
[22]a	0.000	0.000	0.001	-7.100	0.000	[27]e	0.042	0.014	0.123	-5.772	0.000
1221b	0.550	0.361	0.863	-2.603	0.000	[27]f	0.042	0.014	0.123	-5.772	0.000
[22]c	1000	0.641	1.561	0.000	1	[27]g	0.042	0.014	0.123	-5.772	0.000
122]d	0.007	0.003	0.016	-11,66	0.000	[28]a	0.000	0.000	0.000	-31.559	0.000
[23]a	6.549	4.490	9.563	9.758	0	[28]b	0.000	0.000	0.000	-29.468	0.000
12316	5.62S	3.883	8.158	9.122	0.509	[28]c	0.000	0.000	0.000	-29.007	0.000
[23]c	7278	4.967	10.664	10.182	0.000	[28]d	0.001	0.001	0.002	-26.773	0.000
[23]d	10.251	6.884	15266	11.155	0.000	[29]a	0.550	0.410	0.718	-3.98S	0.000
[24]2	0.159	0.108	0,234	9.389	0.000	[29]b	0.001	0.000	0.002	-15.397	0.000
1241b	0.001	0.000	0.003	13.520	0.000	[29]c	0.061	0.042	0.08S	-15.048	0.000
[24]c	0.045	0.029	0.072	13.308	0.002	[29]d	0.000	0.000	0.000	-11.685	0.000
[24]d	0.001	0.000	0.002	11.384	0.000	[30]a	0.045	0.029	0.000	-13.898	0.000
						[30]b	0.075	0.050	0.112	-12.566	0.000

25a	2.881	1.734	4.785	4.086	0.000	[30]c	1.919	1.371	2.687	3.796	0.000
25b	1.505	0.922	2.457	1.635	0.102	[30]d	0.001	0.000	0.003	-14.195	0.000
[25]c	3.129	1.878	5.215	4.378	0	[31]a	0.007	0.005	0.011	-22.425	0.000
[25]d	2.869	1.727	4.765	4.072	0.000	[31]b	0.000	0.000	0.000	-14.901	0.000
[26]a	6.972.250	1.729.375	28.109.734	12.441	0.000	[31]c	0.070	0.063	0.003	-18.298	0.000
125b	0.137	0.087	0.215	-8.591	0.000	[31]d	0.151	0.140	0.233	-13,241	0.000
[26]c	458.329	9.068.123	231621	6.513	0.000	The general effect size	0.080	0.029	0.217	4.965	0.000
[26]d	28.224.000	3.952.642	201.534.632	102.18	0.000	general					

^askeptical of innovation, ^b pioneer innovation, ^c innovation questioner, ^d innovative, Odds(R)>1.000, p<0,05

The random effects model was used in **Table 3**, which shows the effect size of the study for the individual innovativeness characteristics variable. According to the results of the analysis made according to this model, it was concluded that the overall effect size of individual innovativeness characteristics in nursing was 0.080 (I.A; 0.029-0.217; $p < 0.05$), which was not statistically significant. This is thought to be due to the limited number of studies on this subject in the literature.

Reliability and Validity of the Research

Funnel plot, Rosenthal's Safe N method, and Orwin's Safe N method were used to demonstrate that the meta-analysis study was reliable and valid and to determine publication bias. The effect sizes of 10 studies examining nursing and innovation were evaluated according to the funnel scatter plot. If the effect sizes of individual studies are distributed symmetrically in the funnel plot, it does not cause publication bias; Although it is distributed asymmetrically, it causes publication bias [21]. In line with this information, when examined in **Figure 2**, it can be said that the effect sizes of the studies are distributed on the graph close to a symmetrical shape. This distribution indicates the absence of publication bias.



Figure 2. Funnel Scatterplot

When the “Begg-Mazumdar and Egger tests regarding” the bias indicators of the “funnel plot” are evaluated, these values were determined as “Begg-Mazumdar Kendall's tau = 0.164, $p=0.138$ and Egger: bias = 1.49 (95% CI = 0.197 to 0.230), $p=0.06$ ”. In this case, the p-value was found to be greater than 0.05 ($p=0.06>0.05$). With the results of the analysis, it was determined that there was no bias. In addition, “Rosenthal's fail-safe number data, another test to determine the study bias, also supports the data in the funnel plot (**Figure 2**).

RESULTS AND DISCUSSION

Innovation makes essential contributions to improving nursing care and developing new ideas in care [22]. An example of nursing innovation in the clinical field is the virtual nurse character, which was developed in cooperation with Boston Medical Center and Northeastern University to assist discharge procedures. The virtual nurse character, a computer-based program, offers nursing activities such as collecting patient information, providing information to

patients, evaluating the patient's health status, applying discharge instructions, and counseling patients [23].

Sawatzky *et al.* (2013), in their study conducted in a 500-bed tertiary care center in Canada, found that cardiac surgery patients experienced fatigue, sleep disturbance, shortness of breath, palpitations, anorexia, limitation of movement, and emotional/psychological problems after discharge, and how the patients dealt with these problems at discharge. They found that they needed to be sufficiently informed about how to cope [24]. Home visits, follow-up of the patient by phone, and interviews with people who have overcome this process before have reduced the return of patients after discharge.

According to the research results, when individual innovativeness (innovation) in nursing was evaluated as a whole, the result of this study was found to be statistically significant. In addition, when the six dimensions of the individual innovativeness characteristics discussed in the research were evaluated separately, in conclusion that the innovativeness variable had a significant and significant effect. The variables of pioneering, questioning, and skepticism, which are the other sub-dimensions, were found to have a negative impact [25-34]. When previous studies were evaluated, no such study was found. Based on all this information, when the studies in the literature were evaluated, similar results were obtained with the results of this research.

CONCLUSION

To determine individual innovativeness characteristics in nursing, it is recommended to use teaching methods that enable educational content to be creative and entrepreneurial, to create an innovative perspective, and to increase critical thinking tendencies.

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CONFLICT OF INTEREST: None

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ETHICS STATEMENT: A literature review model was used since the research is a meta-analysis study. Ethics committee approval was not obtained for the analysis, as the literature review did not include any direct effects on animals or humans.

REFERENCES

1. Çuhadar C, Bülbül T, Ilgaz G. Exploring of the relationship between individual innovativeness and techno-pedagogical education competencies of pre-service teachers. *Elementary Educ Online*. 2013;12(3):797-807.
2. Türk Dil Kurumu (TDK). Current Turkish dictionary. 2023. Available from: www.tdk.gov.tr, 15.02.2023
3. Rogers ME. Diffusion of innovations. New York: Free Press; 2003.
4. Kılıçer K, Odabaşı HF. Individual innovativeness scale: The study of adaptation to Turkish, validity and reliability. *Hacet Üniv Eğit Fak Derg*. 2010;38:150-64.
5. International Union of Nurses-ICN. Delivering quality, serving communities: Nurses leading care innovations. International Nurses Day Kit. 2009. Available from: <http://www.İcn.Ch/Images/Stories/Documents/Publications/İnd/İndki t2009.Pdf> (Erişim 15.03.23).
6. Sönmez B, Yıldırım A. Determination of nurses' innovative behaviours and their views about the factors affecting their innovative behaviours: A qualitative study in a university hospital. *J Health Nurs Manag*. 2014;2(1):49-59.
7. European Commission, Directorate-General for Research and Innovation, The junction of health, environment and the bio economy – Foresight and implications for European research & innovation policies, Publications Office, 2015. Available from: <https://op.europa.eu/en/publication-detail/-/publication/375971b3-ba8a-11e5-8d3c-01aa75ed71a1> (Access Date: 15.03.23).
8. European Strategy and Policy Analysis System (ESPAS). Global Trends to 2030: Can the EU meet the challenges ahead? 2015. Available from: https://espas.eu/files/espas_files/about/espas-report-2015.pdf (Access Date: 15.03.23).
9. Omachonu VK, Einspruch NG. Innovation in healthcare delivery systems: A conceptual framework. *Innov J: Public Sector Innov J*. 2010;15(1):1-20.
10. National League for Nursing. Innovation in nursing education: A call to reform. New York, US; 2003.
11. Dil S, Uzun M, Aykanat B. Innovation in nursing education. *Int J Hum Sci*. 2012;9(2):1217-28.
12. Herdman EA. Nursing and innovation. *Educ Nur Res J*. 2009;6(2):2-4.
13. IOM (Institute of Medicine). The future of nursing: Leading change, advancing health, The National Academies Press, Washington DC; 2010.
14. Arslan H, Şener DK. A new and important concept in nursing: Entrepreneurship. *Istanbul Univ Florence Nightingale Nurse Fak Derg*. 2012;20(2):140-5.
15. Kılıç R, Keklik B, Çalış N. A study on entrepreneurship tendency of university students: Example of Bandırma department of Business Administration. *SDU Econ Adm Sci Fac J*. 2012;17(2):423-35.
16. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *Int J Surg*. 2021;88:105906. Available from: <http://prismastatement.org/prismastatement/flowdiagram.aspx?AspxAutoDetectCookieSupport=1> (Access Date: 15.02.23).
17. National Library of Medicine. Medical Subject Headings. Available from: <https://meshb.nlm.nih.gov> Access Date: 04.02.2023
18. Polit DF, Beck CT. Literature reviews: Finding and reviewing research evidence. In: Polit, Df., Tatano, Bc., Eds. *Essentials of Nursing Research: Appraising Evidence for Nursing Practice*. 7thed. Philadelphia: Lippincott Williams & Wilkins; 2009. pp.169-93.
19. Landis JR, Koch GG. The measurement of observer agreement for categorical data. *Biometrics*. 1977;33:159-74.
20. Higgins JP, Thompson SG, Deeks JJ, Altman DG. Measuring inconsistency in meta-analyses. *BMJ*. 2003;327(7414):557-60.
21. Borenstein M, Higgins JP. Meta-analysis and subgroups. *Prev Sci*. 2013;14:134-43.
22. McSherry RO, Douglas M. Innovation in nursing practice: A means to tackling the global challenges facing nurses, midwives and nurse leaders and managers in the future. *J Nurs Manag*. 2011;19(2):165-9.
23. Abbott MB, Peggy Shaw MS. Virtual nursing avatars: Nurse roles and evolving concepts of care. *Online J Issues Nurs*. 2016;21(3):1C.
24. Sawatzky JA, Christie S, Singal RK. Exploring outcomes of a nurse practitioner-managed cardiac surgery follow-up intervention: A randomized trial. *J Adv Nurs*. 2013;69(9):2076-87.
25. Bodur G. The relationship between nursing students' individual innovativeness levels and entrepreneurial tendencies. *Health Sci Vocational J*. 2018;5(2):139-48.
26. Ozden G, Cevik S, Saritas SC. Do the online information searching strategies affect individual innovativeness in nursing students? *Ann Med Res*. 2019;26(4):629-35.
27. Hediye UT, Doğru BV. Evaluation of individual innovativeness characteristics of nursing and midwifery students. *Gümüşhane Univ Health Sci J*. 2018;7(3):23-32.
28. Hulya Leblebicioglu RN, Ebru Baysal RN, Leyla Khorshid RN. Investigation of relationship between entrepreneurship and individual

- innovativeness in nurse academicians. *Int J Caring Sci.* 2018;11(3):1812-21.
29. Durmuş İskender M, Kaş Güner C, Oluk A. Determination of the relationship between nursing students' critical thinking tendencies and individual innovation characteristics. *J Int Soc Res.* 2018;11(56):490-7.
30. Başoğlu M, Edeer AD. Comparison of individual innovation awareness of nurses and nursing students in Generation X and Y. *Gümüşhane Univ Health Sci J.* 2017;6(4):77-84.
31. Ertuğ N, Kaya H. Examination of nursing students' individual innovation profiles and barriers to innovation. *Nurs Educ Res J.* 2017;14(3):192-7.
32. Erol ÖZ, Yacan LA, Hayta RA, Şahin İD, Yağcı M. Innovation characteristics of nursing students and affecting factors. *Nurs Educ Res.* 2018;15(3):142-6.
33. Ceylan S. Innovativeness levels and perceived barriers to innovativeness of nursing students. *Gümüşhane Univ Health Sci J.* 2019;8(4):363-71.
34. Sürme Y, Efe YS, Ceyhan Ö, Korkut S, Caner N. Do Individual Innovation Characteristics Affect Readiness Online Learning? *Higher Educ Sci J.* 2019;8(2):342-8.