Original Article

Determining the Relationship between Bricolage and Individual Innovation Behaviors of Nurses

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Abstract

Objective: This study aimed to determine the relationship between nurses' innovativeness and bricolage levels.
Method: The study is a descriptive study. It was conducted with 224 nurses working in a hospital in Izmir. Individual Innovation Scale and Bricolage Scale were used to collect data. The study analysis used numbers, percentage distribution, Kruskall Wallis, Mann Whitney U test, and correlation analysis.
Result and Conclusion: It was found that the total mean score of the nurses from the individual innovativeness scale was 67.91±9.63, and the total mean score of the bricolage scale was 32.05±5.11. A positive correlation was found between nurses' bricolage scale scores and individual innovativeness scale total scores. According to the results of the study, we can say that the nurses have a high level of bricolage activities. It is possible that nurses' use of existing resources, that is, bricolage activities, affects individual innovativeness levels. For this reason, we can recommend organizing seminars, training programs, and new product definitions so that nurses can be aware of the innovations in care services.

Keywords: Individual innovation, bricolage, nurse, innovation.

Introduction

Nurses use clinical decision-making skills by detecting patient condition changes and providing patient care with team collaboration. For this reason, nurses should follow innovative technologies and perform care practices in line with scientific knowledge (Korhan et al., 2015, Nibbelink and Brewer, 2018). Especially today, the rapid increase in innovative technologies necessitates their active use in the field of nursing as well as in every field (Cansoy, 2018). Innovation is accepted as a process and is becoming necessary for increasing the quality of care in the nursing profession (Messick et al., 2019).

The concept of bricolage was first defined by the French anthropologist LeviStrauss in 1966 as "people doing something using the resources they have" (Duymedjian and Ruling, 2010). In 2005, Baker and Nelson defined bricolage as "doing something new by combining available resources to cope with new problems" (Baker and Nelson, 2005). Bricolage, which is a structure of innovation, means bringing pieces together with cread making innovations by using the available resources, even in limited resources (Shanker et al., 2017). However, providing health care with existing resources in resource-limited workplaces will prevent the quality of patient care from being adversely affected (Krontoft et al., 2018).

In cases where there are existing but unusable or limited resources in health institutions, using available resources will also help reduce costs. For this reason, practical and innovative solutions will be created by combining the

individual innovativeness of nurses, specially in difficult situations (Maniago, 2018).

Nurses, who constitute an essential part of the health field, must meet the patient's needs by adopting an innovative approach, having the necessary knowledge and equipment, and providing quality care using existing resources (Maniago, 2018). In particular, it is reported that individual innovativeness levels of nurses increase job satisfaction and quality of care and reduce health costs (Lin et al., 2013, White et al., 2016, Weng et al., 2016). Today, rapidly advancing technology has also been reflected in the health field, and it is expected that these innovative technologies will be used in patient care. However, due to the bad economic conditions worldwide, these innovative approaches must be made cost-effectively (Kilicer and Odabasi, 2010). This situation leads nurses to bricolage. In some studies in the literature, it is stated that there is a positive relationship between nurses' bricolage level and individual innovativeness levels (Krontoft et al., 2018, Ayhan and Yilmaz, 2022, Oztas et al., 2021). Individual innovation levels are significant for the continuous development of the nursing profession and keeping up with the changing technology. However, they can show their innovative side by using the resources available to ensure cost-effectiveness. There are not enough studies on the subject in the literature, so we think our study will make significant contributions.

Therefore, our study aims to determine the relationship between nurses' individual innovativeness levels and bricolage levels.

Methods

This descriptive study was conducted with 224 nurses working in a hospital in Izmir between October and December 2022.

The universe, sample, and research group of the research: Nurses working at Bakircay University Cigli Training and Research Hospital formed the population of the research. In order to determine the number of nurses to participate in the study, G Power analysis was conducted on the sample numbers of Ayhan and Yilmaz (2022), Oztas 2021 studies (Oztas et al., 2021, Ayhan and Yilmaz, 2022). According to the G Power analysis, 224 nurses were included in the study and completed it with 90% power.

Inclusion criteria for the study:

• Being 18 years or older

• Working as a nurse at Bakirçay University Cigli Training and Research Hospital

• Volunteering to participate in the research

Exclusion criteria from the study:

• Nurses who did not agree to participate in the study

Data collection tool(s):

Nurse Identification Form: This form was prepared by the researchers; It consists of five questions, including the descriptive characteristics of nurses: age, gender, educational status, the clinic where they work, and years of experience in the profession.

Individual Innovation Scale (CIO): "Scales for The Measurement of Innovativeness" developed by Hurt et al. (1977) to assess the innovativeness of individuals and validated and reliable in Turkish by Kilicer and Odabası (2010) has four sub-dimensions and a total of four sub-dimensions. It consists of 20 items. When the sub-dimensions are examined, "Resistance to change" consists of eight items (4, 6, 7, 10, 13, 15, 17, and 20; minimum: 8 points, maximum: 40 points), "opinion leadership" consists of five items (1, 8, 9, 11 and 12). ; minimum: 5 points, maximum: 25 points), "Openness to experience" consists of five items (2, 3, 5, 14, and 18; minimum: 5 points, maximum: 25 points), and "Risk-taking" consists of two items (16 and 19). ; minimum: 2 points, maximum: 10 points). The scale is answered in a 5-point Likert type, and each statement is scored as strongly disagree: (1), disagree: (2), being in the middle: (3), agree: (4), strongly agree: (5). 12 items of the scale are positive (1,2,3,5,8,9,11,12, 14,16,18,19) and 8 items are negative (4,6,7,10,13, 5,17,20)). The scale's total score is calculated by adding 42 points to the score obtained by subtracting the total score from the negative items from the total score obtained from the positive items. A score between 14 and 94 can be obtained from the scale. If the score above 80 is considered "Innovative," between 69-80 as "Pioneer," between 57-68 as "Questions," between 46-56 as "Skeptical," and below 46 as "Traditional." In addition, according to the score obtained from the scale, an evaluation can be made about the innovativeness level of

individuals. According to this, Individuals with a score above 68 are considered highly innovative, while individuals below 64 are interpreted as low on innovativeness (Kilicer and Odabasi, 2010). The Cronbach's alpha value of the scale was found to be 0.82. In this study, Cronbach's alpha value of the BCS was 0.76.

Bricolage Scale: The scale was developed in 2014, and its Turkish validity and reliability were done by Oztas et al. in 2018. The eight-item scale consists of bricolage activities. Scale; It includes a 6-point Likert-type evaluation consisting of never (1), rarely (2), sometimes (3), often (4), always (5), and I do not know (0) options. There is no reverse-coded item in the scale. The scale's total score is obtained by summing the scores of the answers given to all the items. The total scale score is between 0-40. A high score indicates a high level of bricolage activities. The Cronbach's alpha value of the scale was determined as 0.90 (Oztas et al., 2021). In our study, Cronbach's alpha value of the bricolage scale was found to be 0.88.

Data Collection Method: The study's data were used by face-to-face interviews with nurses. Before the interview, the nurses were informed about the purpose of the study and the questionnaires. Before starting the study, nurses were asked to fill out a voluntary consent form, and nurses who wanted to participate were included.

Ethical Dimension: Ethical approval was obtained for the research from the Non-Interventional Research Ethics Committee of a university in Izmir (Decision no: 736). Institutional permission was obtained from the hospital where the research was conducted.

Statistical Analysis: The analysis of the data obtained from the research was carried out in the SPSS (Statistical Package for Social Science) 21.0 package program. Numerical and percentile distribution, Keuskall Wallis, Mann Whitney U test, and correlation analysis were used in the data analysis. Statistical significance was determined as $p < 0.05$.

Results

A total of 224 nurses participated in the study. It was determined that the mean age of the nurses was 40.9±5.31. Of the nurses, 71.4% (n=160) were female, 61.2% (n=137) had a bachelor's degree, 30.4% (n=68) had been working in the clinic for 6-10 years, and 27.7% (n=62) had emergency medical education. It has been determined that he is working in the service (Table 1).

It was determined that the total mean score of the nurses from the individual innovativeness scale was 67.91 ± 9.63, the sub-dimension resistance to change mean score was 20.20 ± 2.92, the opinion leadership sub-dimension 17.27 ± 1.46, the openness to experience 19.70 ± 2.22, and the risk-taking dimension 9.14 ± 0.99. The mean total score of the nurses from the bricolage scale was found to be 32.05 ± 5.11. It was found that there was a significant relationship between the genders of the nurses and the individual innovativeness scale sub-dimension and total scores and between the bricolage scale total scores ($p<0.001$). Men's resistance to change subscale scores were higher than women's ($p<0.001$). It was found that women's total points of openness to experience, risk-taking, opinion leadership, individual innovativeness, and bricolage scale total scores were higher than men's ($p<0.001$). It was found that there was a significant relationship between the education levels of the nurses and the risk-taking sub-dimension and the total scores of the bricolage scale and that the nurses with undergraduate education had higher scores than the other education levels ($p<0.001$).

It was found that there is a significant relationship between the working years of the nurses and the total score of the individual innovativeness scale and the total score of the bricolage scale. It was found that risk-taking and individual innovativeness scale scores of employees between 1-5 years and bricolage scale total scores of nurses with 16 years or more working experience were larger ($p<0.001$). Correlation analysis was applied to determine the relationship between nurses' bricolage scale scores and individual innovativeness scale sub-dimension and total scores. According to the analysis, a positive correlation was found between the bricolage scale and opinion leadership ($p=0.000$), openness to experience ($p=0.001$), risk-taking ($p=0.002$), and individual innovativeness total scores ($p=0.000$).

Table 1. Demographic characteristics of nurses (n= 224)

Age (40.9 ± 5.31)	**n**	**%**
Gender		
Female	160	71.4
Male	64	28.6
Level of Education		
High School-Associate Degree	76	33.9
Undergraudate	137	61.2
Masters	11	4.9
Working Year		
1-5 year	37	16.5
6-10 year	68	30.4
11-15 year	65	29.0
16-20 year	54	24.1
Unit Types		
Internal Unit	60	26.8
Insentive care or critical care	59	26.3
Surgical Unit	43	19.2
Emergency	62	27.7

Table 2. Individual Innovation Scale and Bricolage Scale Mean Scores

Scale Sub-Dimension and Total Score	**Mean SD**	**Min-Max**
Dimension of Resistance to Change	20.20 ± 2.92	15-27
Thought Leadership	17.27 ± 1.46	14-23
Openness to Experience	19.70 ± 2.22	14-24
Risk Taking	9.14 ± 0.99	8-10
Individual Innovation Total Dimension	67.91 ±9.63	55-78
Bricolage Scale Total Dimension	32.05 ±5.11	20-38

Table 3. Comparison of Nursing Demographic Characteristics and Bricolage Scale and Individual Innovation Scale Sub-Dimension and Total Scores

	Resistance to Change Median (Min-Max)	**Thought Leadership Median (Min-Max)**	**Openness to Experience Median (Min-Max)**	**Risk Taking Median (Min-Max)**	**Individual Innovation Total Dimension (Min-Max)**	**Bricolage Scale Total Median (Min-Max)**
Gender						
Female(n=160)	18 (15-27)	18 (14-22)	21 (14-24)	8 (8-10)	71 (55-78)	35 (29-38)
Male (n=64)	21 (18-23)	16 (14-23)	19 (18-20)	7(6-10)	68 (63-73)	24 (20-37)
	U=3310,00 **p=0.000**	U=3666,50 **p=0.000**	U=3124,00 **p=0.000**	U=2048,00 **p=0.000**	U=3432,00 **p=0.000**	U=2514,00 **p=0.000**
Education Level						
High School-Associate Degree(n=76)	19 (15-27)	18 (14-20)	19(16-23)	9(8-10)	70 (55-77)	32 (20-37)
Undergraudate (n=137)	19(16-27)	16 (14-23)	21 (14-24)	10 (9-10)	71 (55-78)	35 (20-38)
Masters (n=11)	21 (18-23)	18 (16-21)	19(18-20)	9 (8-10)	68 (65-71)	25 (20-33)
	KW=3.352 p=0,187	KW=3.874 p=0.216	KW=4.079 p=0.130	KW=8.857 **p=0.012**	KW=3.851 p=0.146	KW=45.198 **p=0.00**
Working Year						
1-5 year	20 (18-23)	16 (15-18)	21 (16-23)	10 (9-10)	71 (57-78)	24 (20-36)
6-10 year	23 (15-27)	17 (14-20)	17 (14-24)	8 (8-9)	58 (55-77)	34 (20-38)
11-15 year	18 (16-24)	16(15-22)	19(19-20)	10 (8-10)	68 (65-71)	33 (20-36)
16 years and above	20 16-27)	18 (14-22)	20 (16-21)	8 (7-10)	70 (54-76)	36 (29-38)
	KW=1,995 p=0.485	KW=2.896 p=0.532	KW=1.428 p=0.615	KW=2.790 p=0.583	KW=13.657 **p=0.000**	KW=79.167 **p=0.001**

Table 4. The Relationship Between the Total Scores of the Nurses' Bircolage Scale and the Individual Innovation Scale Sub-Dimension and Total Scores

	Resistance to Change	Thought Leadership	Openness to Experience	Risk Taking	Individual Innovation Total
Bricolage Scale	r=-0.85 p=0.230	r=0.453 p=0.00	r=0.518 p=0.001	r=0.207 p=0.002	r=0.529 p=0.000

Discussion

With the developing technology and its reflection on health care services, individual innovativeness levels of nurses come to the fore. At the same time, it is expected that the bricolage aspects of nurses will be revealed due to the globally affected economy (Krontoft et al., 2018, Senyard et al., 2014). Our study aimed to reveal the relationship between nurses' bricolage levels and individual innovativeness.

The use of bricolage, a part of the innovation concept, in health systems will contribute to making innovations and increasing the quality of care in an optimum level and cost-effective way of existing resources (Maniago, 2018). The highest score that can be obtained from the Bricolage Scale is 40. Oztas et al. (2021), it was stated that the score the nurses got on the Bricolage Scale was 32.72, and in the study of Ayhan and Yilmaz (2022), it was 33.44; Oztas et al., 2021). In our study, the total mean score of the nurses' bricolage scale was 32.05 ±5.11, similar to the literature. According to the results of the study, we can say that the nurses have a high level of bricolage activities.

Nursing care is one of the areas where innovation is most applied (Ozlem, 2021). In order to realize the needs in nursing care and meet these needs, nurses are expected to be innovative in their thinking, think about innovations, and use them in care practices (Ertug and Kaya, 2017). Innovation in nursing care is an essential criterion for maintaining and improving the quality of care (Sahan and Yildiz, 2020). Nurses' innovative features and behaviors will ensure patient safety, quality of care, and health care improvement (Weng et al., 2016). In their study, Ayhan and Yilmaz (2022) stated that the total score of nurses' AQI was 58.62±5.61. Oztas et al. In the study, it was stated that the total score of the nurses' AQI was 60.47 (Oztas et al., 2021). In the literature, studies that determined the individual innovativeness levels of nurses were found to have high AQ scores (Turgut and Begenirbas, 2013, Sonmez and Yildirim, 2018, Basoglu and Edeer, 2017, Zengin et al., 2019, Ergin and Yucel, 2022, Kemer and Yildiz, 2020).). Similarly, our study found that nurses' mean total score on the AQS scale was 67.91 ± 59.63 and they had pioneering characteristics. We can say that our study's results are similar to those of the literature studies, and the nurses' individual innovativeness levels are moderate and inquisitive.

In our study, it was determined that there was a significant relationship between gender and AQI total and sub-dimension scores. According to the results, it was found that men's resistance to change sub-dimension scores were higher than women's, while women's other AQI sub-dimension and total scores were found to be higher than men's. Himmet (2021) in his study; found a significant difference in terms of the scores that nurses got from the "resistance to change" sub-dimension according to gender and determined that the score of male nurses was higher than that of female nurses (Himmet, 2021). In Aktas (2018)'s study, it was determined that there was no difference in the AQ scores of male and female nurses. It was seen that women got the highest score from the "opinion leadership" sub-dimension, and men got the lowest score from the "resistance to change" sub-dimension. In other studies in the literature, it is seen that there is no significant relationship between gender's RF sub-dimension and total scores (Cakin, 2019; Oztas et al., 2021, Ozgur, 2013). Oztas et al.

(2021) stated that the Bricolage Scale total score showed a significant difference in favor of female participants (Oztas et al., 2021). In the study of Ayha and Yilmaz, it is stated that the bricolage levels of women differ significantly compared to men (Ayhan and Yilmaz, 2022). Similarly, in our study, it was found that there was a significant difference between gender and the bricolage scale, and the bricolage levels of women were higher than men. Our study shows that gender significantly affects individual innovativeness and bricolage levels, and women's scores are higher. The high scores of women on both scales suggest that there may be a relationship between individual innovativeness and bricolage. However, although the same scales are used to determine nurses' individual innovativeness levels in the literature studies, the results differ. In this case, it may be due to differences such as the sample numbers of the studies, the distribution of the number of female and male participants, the institutions worked, the resources of the institutions they work, and access to resources. For this reason, it may be recommended to conduct systematic compilation and meta-analysis studies to reveal the effect of the gender variable on the individual innovativeness levels of nurses.

It was determined that there was a significant relationship between the nurses' working years and the total score of AQI, and the scores of the nurses who worked between 1-5 years were higher. Similarly, in the study of Ayhan and Yilmaz, it was stated that nurses with 4-8 years of professional experience had higher AQ scores (Ayhan and Yilmaz, 2022). We can say that nurses who have just started their profession are more open to change and innovations.

According to the results of the comparison made with the educational status of the nurses, it is seen that the BQS risk-taking sub-dimension score and the total score of the bricolage scale are higher in nurses with a bachelor's degree. Contrary to our study, in the study of Ayhan and Yilmaz (2022), it is stated that there is no significant difference between education level and ACO and bricolage scale. In another study, the Bricolage Scale total score average was higher in nurses with doctoral education (Oztas et al., 2021). In a study conducted on 251 nurses in California, it was stated that the education level of nurses positively affected innovative behavior (Bunpin et al., 2016). However, in some studies contrary to these, it has been determined that the education level of nurses does not affect innovative behaviors (Oztas et al., 2021, Bunpin et al., 2016, Baksi et al., 2020).

Our study determined a positive correlation between the level of bricolage and the total score of ACS, risk-taking, opinion leadership, and openness to experience. Similarly, Ayhan and Yilmaz (2022) and Oztas et al. (2021) also found a significant relationship between the level of bricolage and the level of individual innovativeness. It is possible that nurses' use of existing resources, that is, bricolage activities, affects their individual innovativeness levels. For this reason, we can recommend organizing seminars, training programs and new product definitions so that nurses can be aware of the innovations in care services. At the same time, it can be suggested that the concept of innovation should be disseminated, adopted, and adapted to technological developments. It should be put into nursing education curricula, including courses that include innovation and bricolage activities. The practices carried out by nurses within the bricolage activities can be shared with all health professionals to encourage bricolage.

Conclusion: According to the results of our study, it was determined that the nurses' individual innovativeness and bricolage levels were high. It has been determined that there is a positive relationship between individual innovativeness levels and bricolage activities. We can say that nurses who have and adopt the concept of innovation cannot only use new technologies but also maintain their innovativeness by using existing resources. Today, great strides have been made in the development of technology and continue to be taken. However, there are significant economic problems. Although health institutions support technology, access to technological devices is not always possible due to economic conditions. Therefore, it is important to use available resources for the benefit of patient hospitals and healthcare professionals. We think nurses

can continue their bricolage activities with their individual innovativeness levels.

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