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Relationship Between Nursing Students Innovativeness Characteristics and Online Learning Systems Acceptance

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ABSTRACT:
Purpose: This study was aimed to determine the relationship between undergraduate nursing student's individual innovativeness characteristics and technology acceptance during emergency distance learning due to COVID-19 pandemic.
Methods: The cross-sectional study was conducted with 350 nursing students. Personal information form, individual innovativeness scale (IIS), and online learning systems acceptance scale (OLSAS) were used for data collection. The independent samples t-test, One-way ANOVA, Duncan test, Pearson's correlation analysis was used for data analysis.
Results: Most of the nursing students were at a traditionalist and late majority innovativeness characteristic level. Perceived ease of use, perceived usefulness sub-dimensions, and total OLSAS mean scores were 9.67 ± 3.21, 16.26 ± 6.92, and 25.92 ± 9.26, respectively. A statistically significant, weak positive correlation was found between the total IIS, opinion leadership, and risk-taking scores and the total OLSAS, OLSAS-PEU, and OLSAS-PU scores. Students with high OLSAS, perceived ease of use, and perceived usefulness scores expressed positive opinions toward the lesson in all dimensions, such as interest, adaptation, success, perceived benefit from the lesson, and motivation.
Conclusion: It can be said that technology acceptance is important in nursing education and as the perceived ease of use and perceived usefulness increases, a positive effect is seen on outcomes, such as interest, adaptation, motivation and success. When designing online learning systems to be used in nursing education, recommended to take into account innovativeness, the perceived usefulness, ease of use.
Keywords: *Distance education, Innovativeness, Nursing students*

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INTRODUCTION

In line with the measures undertaken during the COVID-19 pandemic, which has affected the whole world in recent years, institutions providing higher education aimed to slow the spread of the virus and help provide a safe learning environment for students. Therefore, face-to-face education was suspended throughout the world (Seven and Abban, 2021; Aguilera-Hermida et al., 2021). In this process, the American Association of Colleges of Nursing (AACN) remained committed to ensuring the safety of faculty and students, but also recognized the importance of continuity of teaching and learning throughout the pandemic (AACN, 2020). Due to the duration of the pandemic being unpredictable, most educational institutions switched over to emergency distance learning through online learning platforms (Ho et al., 2021). Similarly, in Turkey, after the first COVID-19 case was reported, one of the most important measures taken by the Ministry of Education and Higher Education Institutions was to suspend face-to-face education. The training continued with distance education (Telli Yamamoto and Altun, 2020). The COVID-19 pandemic prompted

nursing programs to transfer traditional didactic content synchronously and asynchronously using alternative platforms such as learning management systems (Dewart et al., 2020; Wallace et al., 2021). Online learning management systems used in online learning are software that is developed for the execution, documentation, monitoring, reporting, and automation of the lessons and are important components of distance education (Seven and Abban, 2021). Today, higher education institutions and students were required to quickly adopt distance education and learning methods without any other options due to the COVID-19 pandemic (Hodges et al., 2020; Affouneh et al., 2020; Aguilera-Hermida, 2020; Daniel, 2020). Although these practices have been used in higher education for many years, using an online learning system is a new experience for Turkish nursing educators and students (Seven and Abban, 2021).

Successful transition to online learning is influenced by the user's intention, the usefulness of technology, and the user's adoption of technology to a large extent (Kemp et al., 2019; Yakubu and Dasuki, 2019; Tarhini et al., 2017). According to Davis's technology acceptance model perceived usefulness and perceived ease of use are two important components. The degree to which the person believes that using the particular system would enhance her/his job performance is determined by perceived usefulness, whereas the perceived ease of use was defined as the degree to which the person believes that using the particular system would be free of effort (Marangunić and Granić, 2015). The previous studies have addressed issues related to the adoption of technology and results indicated that there are several effective factors in this regard, such as quality, trust, knowledge sharing, self-efficacy, anxiety etc. (Salloum et al., 2019; Al-Gahtani, 2016; Almaiah et al., 2016). Recently, some studies attention has been drawn to personality as an explanatory factor in the field of information systems (Kim et al., 2021; Li et al., 2006; Turan et al., 2015). Accordingly, it is thought that the innovativeness of individuals may be effective in adapting to rapidly changing scientific and technological developments (Kim et al., 2021, Gündüz, 2021). Rogers divided individuals into five groups as innovative, pioneering, questioning, skeptical, and traditionalist individuals according to their acceptance of innovation (Rogers, 1983). According to this categorization, innovators can be defined as individuals with entrepreneurial and creative skills who like to try new ideas and take risks, think ahead, accept change before anyone else, interact with their environment (Akgün, 2017; Korucu and Olpak, 2015). Although studies on transition to emergency distance education can be found in the literature (Aguilera-Hermida et al., 2021; Ho, et al., 2021). There is a gap in studies in the relevant literature that evaluate nursing students' individual innovativeness characteristics and technology acceptance.

MATERIAL and METHODS

Purpose and Type of the Study

This research was conducted in the 2019-2020 academic year as a cross-sectional study.

Sampling and Participant

The population of the research comprised 450 nursing students studying in a Faculty of Health Sciences in the Central Anatolia Region. The faculty where the research was conducted was using the formal education system; however, face-to-face education was suspended due to the Covid-19 pandemic; therefore, theoretical and practical nursing lessons were taught using distance education and online learning systems in the relevant semester. The sample of the study comprised 350 nursing students who agreed to participate in the study and continued their education during the pandemic, 77.7% of the population was included in the sample.

Data Collection Tools

Due to the COVID-19 pandemic measures, the study was conducted using an online survey. In the first part of the online form prepared, the purpose of the study was explained and informed consent was obtained with a confirmation check box stating that the participant was approved to participate in the study. Data collection tools used in the study were as follows:

Personal Information Form

The form was prepared by the researchers considering relevant literature, questioning the sociodemographic characteristics of the participants and their views on online learning (Çetintaş Öner et al., 2018; Keskin Kızıltepe and Kurtgöz, 2020; Keskin and Özer Kaya, 2020; Tarhan and Doğan, 2018). Before data collection, a pilot study was conducted. The participants of the pilot study were not included in the main study, and no changes were necessary as the form was considered appropriate for the study purpose.

Individual Innovativeness Scale (IIS)

The scale was developed by Hurt et al. (1977) and its validity and reliability study on nurses was conducted by Sarıoğlu Kemer and Altuntaş (2017). IIS is a 5-point Likert type scale and consists of 3 sub-dimensions and 18 items: resistance to change, opinion leadership, and risk taking. In the scale, 11 items are positive (1, 2, 3, 4, 7, 8, 10, 11, 14, 16, 17) and 7 items are negative (18, 15, 13, 12, 9, 6, 5). Negative items are scored in reverse. In the scale, sub-dimension and total scores are obtained by summing the scores from each item. A minimum of 18 and a maximum of 90 points can be obtained from the scale. A score below 57 indicates that the person is a traditionalist/laggards, a score of 58–65 points indicates that the person who has skeptical or timid attitudes towards innovation is a late majority, a score of 66–74 points indicates that the person is a early majority, a score of 75–82 points indicates that the person who act as pioneers for innovation is a early adopters, and a score of over 82 points indicates that the person is an innovator. The Cronbach's alpha value of the scale was found to be 0.82 for the overall scale, and between 0.72 and 0.80 for the sub-dimensions (Sarıoğlu Kemer and Altuntaş, 2017). In the present study, the Cronbach's α coefficient for the opinion leadership dimension of the scale was 0.88, resistance to change was 0.79, risk taking 0.84, and the Cronbach's α coefficient for the overall scale was 0.80.

Online Learning Systems Acceptance Scale (OLSAS)

OLSAS was developed by Ilgaz (2008) based on the scale prepared by Davis (1989) for technology acceptance. OLSAS is a 7-point Likert type scale and consists of 6 items in total and has two factors: perceived ease of use (OLSAS-PEU) and perceived usefulness (OLSAS-PU). The Cronbach alpha coefficient of the scale was found to be 0.89. On the basis of factor scores, the Cronbach α coefficient was found to be 0.90 for PEU and 0.93 for PU (Ilgaz, 2008). In the present study, the Cronbach α coefficient was found to be 0.89 for PEU subscale, 0.95 for PU subscale, and 0.92 for the overall scale.

Statistical Analysis

The data were analyzed using the IBM SPSS Statistics Standard Concurrent User V 26 (IBM Corp., Armonk, New York, USA) statistical package program. Number (n), percentage (%), and mean ± standard deviation ($\bar{x} \pm sd$) values were used in the evaluation of descriptive data. The internal consistency of the scales was evaluated with the Cronbach alpha coefficient. The compatibility of scale scores to normal distribution was evaluated with the Shapiro–Wilk normality test and Q-Q graphs. Levene test was used for evaluating the Homogeneity of variances. Since the scale scores showed normal distribution, independent samples t-test was used to compare two groups, and One-way Anova was used to compare three or more groups. Duncan test was used as multiple comparison test in one-way analysis of variance. Comparisons between scales were made using Pearson's correlation analysis and partial correlation analysis. The significance level was accepted as $p<0.05$.

Ethical Approval

The relevant institutional and ethics committee (Decision no: 2017-KAEK-189_2020.06.23_06) approvals were obtained.

RESULTS

In Table 1, %26.5 of the students were in the first grade. Of the nursing students, 48.6% were between the ages of 21–23, 80% were girls, %96.9 of students were single and 48.9% lived in the city center. In this sample, 78.0% of the nursing students attended online lessons mostly via mobile phone. The technological application used in online learning reduced 42.6% of nursing students' interest in

lessons, reduced 52.0% of the nursing students' adaptation to lessons, and did not affect the academic achievement of 42.6% of nursing students. It was determined that 61.4% of the students did not find the theoretical and practical nursing lessons given online to be beneficial, and 45.7% of them stated that giving nursing lessons online reduced their motivation.

Table 1. Nursing students' introductory characteristics and views on online learning

Features	Number (n)	Percentage (%)
Class		
1. class	93	26.5
2. class	79	22.6
3. class	92	26.3
4. class	86	24.6
Age		
18-20 age	145	41.4
21-23 age	170	48.6
24 and above	35	10.0
Gender		
Female	280	80.0
Male	70	20.0
Marital status		
Married	11	3.1
Single	339	96.9
Place of residence		
Province	171	48.9
District	119	34.0
Village	60	17.1
Device mostly used to attend online classes		
Laptop/desktop/tablet computer	77	22.0
Mobile phones	273	78.0
The effect of the technological application used in online learning on the interest in the lessons		
Increased	53	15.1
Hasn't Changed	148	42.3
Reduced	149	42.6
Influencing the adaptation of the technological application used in online learning to the lessons		
Increased	61	17.4
Hasn't Changed	107	30.6
Reduced	182	52.0
The effect of the technological application used in online learning on the success of the lessons		
Increased	104	29.7
Hasn't Changed	149	42.6
Reduced	97	27.7
Whether you find it useful to offer nursing lessons online		
Yes	135	38.6
No	215	61.4
The effect of online teaching of nursing lessons on motivation		
Increased	67	19.2
Hasn't Changed	123	35.1
Reduced	160	45.7

Table 2 shows nursing students' Innovativesness type, average scores of IIS, and OLSAS sub-dimensions and total scores. According to IIS scores, 39.4% of the nursing students were in the traditionalist group and 38.3% were in the late majority group. Opinion leadership, resistance to change, risk taking, and total IIS mean scores were 25.34 ± 5.77, 18.18 ± 5.34, 15.87 ± 3.38, and 59.39 ± 9.48, respectively. The OLSAS-PEU, PU sub-dimensions, and total OLSAS mean scores of the students were 9.67 ± 3.21, 16.26 ± 6.92, and 25.92 ± 9.26, respectively.

Table 2. Nursing students' Innovativesness type, average scores of IIS, and OLSAS sub-dimensions and total scores

Innovativesness type	**n**	**%**
Traditionalist/Laggards	138	39.4
Late majority	134	38.3
Early majority	65	18.6
Early adopters	8	2.3
Innovators	5	1.4
Total score	350	100
IIS subscale and total scores	$\bar{x} \pm sd$	***M (Min-max)***
Opinion leadership	25.34±5.77	26(7-35)
Resistance to change	18.18±5.34	18(7-35)
Risk taking	15.87±3.38	16(4-20)
IIS total score	59.39±9.48	60(18-90)
OLSAS subscale and total scores	$\bar{x} \pm sd$	***M (Min-max)***
Perceived ease of use-PEU	9.67±3.21	10(2-14)
Perceived usefulness-PU	16.26±6.92	16(4-28)
OLSAS total score	25.92±9.26	26(6-42)

ISS: Individual Innovativeness Scale OLSAS: Online Learning Systems Acceptance Scale
$\bar{x} \pm sd$: mean ± standard deviation M: median, min: minimum, max: maximum

Table 3. Comparison of the scale scores of nursing students according to their introductory characteristics

Variables	**Individual Innovativeness Scale**				**Online Learning Systems Acceptance Scale**		
	Total Score $\bar{x}$±*sd*	Opinion Leadership $\bar{x}$±*sd*	Resistance to Change $\bar{x}$±*sd*	Risk Taking $\bar{x}$±*sd*	Total Score $\bar{x}$±*sd*	Perceived Ease of Use $\bar{x}$±*sd*	Perceived Usefulness $\bar{x}$±*sd*
Class level							
1. class	58.94±7.92	24.27±4.31	19.32±4.38^{a}	15.34±2.92	24.39±7.86^{a}	9.25±2.75	15.13±5.78^{a}
2. class	60.33±8.47	25.83±5.21	18.14±5.07^{ab}	16.35±3.05	26.61±9.04^{ab}	10.05±3.19	16.55±6.91^{ab}
3. class	60.11±9.98	25.74±6.29	18.27±6.11^{ab}	16.09±3.37	28.17±9.96^{b}	9.96±3.25	18.21±7.47^{b}
4. class	58.23±11.22	25.60±6.87	16.87±5.44^{b}	15.75±4.04	24.53±9.64^{a}	9.43±3.60	15.10±7.08^{a}
Test statistics	*F*=0.929 *p*=0.427	*F*=1.456 *p*=0.226	*F*=3.207 *p*=**0.023**	*F*=1.469 *p*=0.223	*F*=3.519 *p*=**0.015**	*F*=1.304 *p*=0.273	*F*=4.193 *p*=**0.006**
Age							
18-20	59.33±7.63	25.13±4.68	18.22±4.79	15.97±2.83	25.91±8.80	9.78±3.03	16.12±6.60
21-23	60.12±9.96	25.67±6.05	18.48±5.67	15.97±3.54	25.89±9.39	9.59±3.22	16.30±7.08
24 and above	56.02±12.99	24.60±8.07	16.51±5.66	14.91±4.42	26.11±10.60	9.51±3.94	16.60±7.62
Test statistics	*F*=2.746 *p*=0.066	*F*=0.662 *p*=0.517	*F*=1.989 *p*=0.138	*F*=1.564 *p*=0.211	*F*=0.008 *p*=0.992	*F*=0.182 *p*=0.834	*F*=0.073 *p*=0.930
Gender							
Female	59.70±8.74	25.68±5.38	17.95±5.27	16.06±3.12	25.36±9.10	9.43±3.16	15.92±6.85
Male	58.12±11.99	23.97±6.98	19.07±5.58	15.08±4.17	28.17±9.57	10.57±3.27	17.60±7.07
Test statistics	*t*=1.032 *p*=0.305	*t*=1.913 *p*=0.059	*t*=1.569 *p*=0.117	*t*=1.844 *p*=0.069	*t*=2.286 *p*=**0.023**	*t*=2.659 *p*=**0.008**	*t*=1.820 *p*=0.070
Marital status							
Married	50.81±12.02	18.55±5.52	20.09±4.70	12.18±3.94	28.36±7.84	9.72±2.65	18.63±6.08
Single	59.67±9.27	25.56±5.64	18.12±5.36	15.99±3.29	25.84±9.29	9.66±3.23	16.17±6.94
Test statistics	*t*=3.083 *p*=**0.002**	*t*=4.058 *p*<**0.001**	*t*=1.208 *p*=0.228	*t*=3.747 *p*<**0.001**	*t*=0.888 *p*=0.375	*t*=0.064 *p*=0.949	*t*=1.158 *p*=0.247
Place of residence							
Province	59.06±9.16	25.33±5.86	17.76±5.35	15.96±3.46	26.40±9.47	9.93±3.11	16.47±7.31
District	59.01±9.93	25.02±5.71	18.36±5.34	15.63±3.31	26.06±8.35	9.71±3.11	16.34±6.16
Village	61.06±9.45	25.98±5.63	19.00±5.30	16.08±3.31	24.27±10.26	8.82±3.59	15.45±7.27
Test statistics	*F*=1.135 *p*=0.323	*F*=0.550 *p*=0.578	*F*=1.306 *p*=0.272	*F*=0.485 *p*=0.616	*F*=1.211 *p*=0.299	*F*=2.710 *p*=0.068	*F*=0.504 *p*=0.605

The superscripts a, b indicate the difference between categories. Categories with the same letters are statistically similar.

Table 4. Comparison of scale scores according to nursing students' views on online learning

Variables	Individual Innovativeness Scale				Online Learning Systems Acceptance Scale		
	Total Score $\bar{x}\pm sd$	Opinion Leadership $\bar{x}\pm sd$	Resistance to Change $\bar{x}\pm sd$	Risk Taking $\bar{x}\pm sd$	Total Score $\bar{x}\pm sd$	Perceived Ease of Use $\bar{x}\pm sd$	Perceived Usefulness $\bar{x}\pm sd$
Device mostly used to attend online classes							
Laptop/desktop/tablet	58.16±8.11	25.21±5.69	16.89±4.41	16.05±3.35	28.49±8.34	10.80±2.38	17.68±6.80
Mobile phones	59.74±9.82	25.37±5.79	18.53±5.53	15.82±3.39	25.19±9.38	9.34±3.34	15.85±6.91
Test statistics	*t*=1.293	*t*=0.228	*t*=2.399	*t*=0.530	*t*=2.786	*t*=4.311	*t*=2.063
	p=0.197	*p*=0.820	*p*=**0.017**	*p*=0.596	*p*=**0.006**	*p*<**0.001**	*p*=**0.040**
The effect of the technological application used in online learning on the interest in the lessons							
Increased	62.39±9.51^a	27.18±6.51^a	18.01±5.62	17.18±2.95^a	34.81±7.12^a	11.66±2.82^a	23.15±4.94^a
Hasn't Changed	58.54±7.89^b	24.80±4.95^b	17.95±4.80	15.79±2.93^b	28.61±6.34^b	10.31±2.26^b	18.29±4.85^b
Reduced	59.15±10.69^b	25.21±6.13^b	18.45±5.75	15.48±3.81^b	20.09±8.63^c	8.31±3.58^c	11.78±6.31^c
Test statistics	*F*=3.338	*F*=3.446	*F*=0.356	*F*=5.171	*F*=91.399	*F*=31.101	*F*=99.785
	p=**0.037**	*p*=**0.033**	*p*=0.701	*p*=**0.006**	*p*<**0.001**	*p*<**0.001**	*p*<**0.001**
Influencing the adaptation of the technological application used in online learning to the lessons							
Increased	61.47±9.57	26.63±6.32	18.16±5.63	16.67±3.14	34.51±7.09^a	11.66±2.56^a	22.85±5.02^a
Hasn't Changed	58.28±8.51	24.66±5.37	17.74±4.90	15.87±3.08	29.08±6.88^b	10.28±2.69^b	18.80±5.14^b
Reduced	59.34±9.92	25.30±5.75	18.43±5.49	15.59±3.58	21.18±8.21^c	8.64±3.29^c	12.54±6.02^c
Test statistics	*F*=2.224	*F*=2.306	*F*=0.579	*F*=2.321	*F*=82.648	*F*=26.288	*F*=93.228
	p=0.110	*p*=0.101	*p*=0.561	*p*=0.100	*p*<**0.001**	*p*<**0.001**	*p*<**0.001**
The effect of the technological application used in online learning on the success of the lessons							
Increased	60.42±8.51	25.83±5.81	18.39±4.75	16.19±3.19^a	32.01±7.56^a	11.21±2.62^a	20.79±5.52^a
Hasn't Changed	59.67±7.98	25.75±5.09	17.74±5.13	16.18±2.84^a	25.92±8.16^b	9.58±2.95^b	16.34±6.15^b
Reduced	57.83±12.12	24.17±6.52	18.61±6.19	15.05±4.13^b	19.39±7.99^c	8.13±3.43^c	11.25±5.96^c
Test statistics	*F*=2.001	*F*=2.772	*F*=0.889	*F*=4.016	*F*=63.275	*F*=26.455	*F*=65.179
	p=0.137	*p*=0.064	*p*=0.412	*p*=**0.019**	*p*<**0.001**	*p*<**0.001**	*p*<**0.001**
Whether you find it useful to offer nursing lessons online							
Yes	60.38±8.39	26.04±5.72	17.85±5.03	16.48±2.88	32.61±6.53	11.17±2.50	21.44±4.60
No	58.76±10.07	24.89±5.76	18.37±5.53	15.48±3.61	21.72±8.18	8.72±3.26	13.00±6.11
Test statistics	*t*=1.561	*t*=1.817	*t*=0.882	*t*=2.700	*t*=13.746	*t*=7.918	*t*=14.692
	p=0.119	*p*=0.070	*p*=0.378	*p*=**0.007**	*p*<**0.001**	*p*<**0.001**	*p*<**0.001**
The effect of online teaching of nursing lessons on motivation							
Increased	62.10±8.90^a	28.86±5.73^a	18.52±5.64	16.71±2.84^a	34.21±6.94^a	11.41±2.73^a	22.79±4.98^a
Hasn't Changed	58.39±7.59^b	24.73±5.47^b	17.77±4.66	15.88±2.92$^{a\ b}$	28.42±6.48^b	10.26±2.32^b	18.14±4.80^b
Reduced	59.01±10.77^b	25.16±5.92^b	18.34±5.70	15.61±3.84^b	20.54±8.53^c	8.47±3.52^c	12.06±6.23^c
Test statistics	*F*=3.604	*F*=3.139	*F*=0.569	*F*=3.064	*F*=87.237	*F*=26.616	*F*=99.676
	p=**0.028**	*p*=**0.045**	*p*=0.566	*p*=**0.048**	*p*<**0.001**	*p*<**0.001**	*p*<**0.001**

The *superscripts a, b,c indicate the difference between categories. Categories with the same letters are statistically similar.*

Table 5. The relationship between nursing students' ındividual ınnovatioveness characteristics and acceptance of online learning systems

Individual Innovativeness Scale	Online Learning Systems Acceptance Scale		
Subscales	Total Score	Perceived Ease of Use	Perceived Usefulness
Total score	*r*=0.215; *p*<0.001	*r*=0.197; *p*<0.001	*r*=0.196; *p*<0.001
Opinion leadership	*r*=0.243; *p*<0.001	*r*=0.300; *p*<0.001	*r*=0.185; *p*<0.001
Resistance to change	*r*=-0.064; *p*=0.230	*r*=-0.198; *p*<0.001	*r*=0.006; *p*=0.915
Risk taking	*r*=0.290; *p*<0.001	*r*=0.353; *p*<0.001	*r*=0.223; *p*<0.001

In table 3 provides comparison the scale scores of nursing students according to their introductory characteristics. When the IIS and OLSAS scores were compared according to the introductory characteristics of nursing students, resistance to change scores of the first-grade students were significantly higher than the fourth graders. The total OLSAS and OLSAS-PU scores of the third-year students were significantly higher than those of the first- and fourth-year students. The total and subscale scores of IIS and OLSAS showed a similar distribution according to age groups. The total OLSAS and OLSAS-PEU scores of male students were statistically higher than female students (p= 0.023; p= 0.008). The IIS total score, opinion leadership, and risk-taking scores of single students were significantly higher (p= 0.002; p<0.001; p<0.001). The ISS and OLSAS total score and subscale scores showed statistically similar distribution according to place of residence.

In table 4, while the IIS resistance to change scores of those who used mobile phones to attend classes in online learning were significantly higher than those who used other devices (p= 0.017); the total OLSAS, OLSAS-PEU, and OLSAS-PU scores were statistically lower as compared to those using other devices (p= 0.006; p<0.001; p= 0.040). IIS total, opinion leadership, and risk-taking scores of the students who stated that the technological application used increased their interest in the lessons were higher than the students who stated that the technological application did not affect or decrease their interest in the lessons (p=0.037; p=0.033; p=0.006).

The mean scores for OLSAS total, OLSAS-PEU, and OLSAS-PU differed statistically in all categories (p<0.001). While the mean OLSAS score was the highest in the group that reported increased interest in the lesson, it was the lowest in those who reported decreased interest. According to the answers given to the technological application used in online learning affecting the adaptation to the lessons, the IIS scores showed a statistically similar distribution (p>0.05).

However, OLSAS scores were the highest for those who reported increased adaptation to the lesson and were lowest for those who reported decreased adaptation to the lesson (p<0.001). The risk-taking scores of the students who stated that technological application reduced their success in the lessons were significantly lower than the students who stated that it increased their success or did not affect it (p=0.019). The OLSAS scores were the highest for those who reported increased success and the lowest for those who reported decreased success (p<0.001). Those who found online learning useful in nursing education had significantly higher risk taking (p=0.007), total OLSAS, OLSAS-PEU, and OLSAS-PU scores compared to those who did not find it useful (p<0.001). Students who reported that online nursing education increased their motivation had higher total IIS scores, opinion leadership, and risk-taking scores compared to those who reported decreased motivation (p=0.028; p=0.045; p=0.048). While the total OLSAS, OLSAS-PEU, and OLSAS-PU scores were higher in students with increased motivation, students who reported decreased motivation had the lowest scores (p<0.001) (Table 4).

In Table 5, a statistically significant, weak positive correlation was found between the total IIS, opinion leadership, and risk-taking scores and the total OLSAS, OLSAS-PEU, and OLSAS-PU scores. A weak negative correlation was found between the IIS resistance to change scores and the OLSAS-PEU scores (r= −0.198; p<0.001). The correlation coefficients between the IIS resistance to change scores and the OLSAS total and OLSAS-PU scores were not statistically significant (p> 0.05).

DISCUSSION

This research was conducted to determine the relationship between nursing students' individual innovativeness characteristics and online learning systems acceptance. In this study, more than three-quarters of the nursing students used mobile phones to participate in online classes (Table 1). In the study of Keskin Kızıltepe and Kurtgöz, it was determined that 57.1% of nursing students had access to online classes by computer and 41.9% by smart phone during distance education (Keskin Kızıltepe and Kurtgöz, 2020). The technological application used in online learning decreased the interest of approximately half of the nursing students in the

lessons, decreased the adaptation of more than half of the students to the lessons, and did not affect the academic success of approximately half of the students in this study (Table 1). Keskin Kızıltepe and Kurtgöz found nursing students had difficulties in following the lessons and participating in the lessons, understanding and learning the theoretical and practical aspects of the lesson, and felt inadequate in clinical practice (Keskin Kızıltepe and Kurtgöz, 2020). More than half of the students reported that they did not find online theoretical and applied nursing lessons to be useful and nearly half of the students online lessons decreased their motivation in this study (Table 1). This may be because students started using online learning systems with no preparation due to the Covid-19 pandemic. As a matter of fact, in their research on digital transformation in education and students' readiness for online learning, Sarıtaş and Barutçu found that students felt inadequate in terms of online learning control (Sarıtaş and Barutçu, 2020). Another reason why students do not find online learning useful in nursing may be due to the thought that online learning would not be sufficient to provide them with competence because it is a practice-based profession. Kahyaoğlu Süt and Küçükkaya stated that 87.5% of the students did not approve distance education in nursing, 79.8% thought that it is not possible to provide all programs in nursing with distance education, and 83.5% thought that online education will cause deficiencies in laboratory and clinical practices that have an important place in a practice-oriented profession, such as nursing (Kahyaoğlu Süt and Küçükkaya, 2016). Özbay and Çınar, stated that nursing students think that distance education is insufficient to provide practice-based competencies in nursing and may cause deficiencies in laboratory and clinical practices, which are crucial nursing (Özbay and Çınar, 2020). In another study, most of the students did not find web-based distance education as effective as face-to-face education, and the contribution of web-based distance education to students' theoretical knowledge level was higher than its contribution toward practical skills (Keskin and Özer Kaya, 2020). More than half of the nursing students were in the traditionalist and late majority group according to their IIS scores (Table 2).

Looking at other studies evaluating nursing students' individual innovativeness characteristics; Ertuğ and Kaya, found that students had low level of innovativeness and most of them were in early majority category; Bodur, found that students had low level of innovativeness, were highly in early majority, and were early adopters; Zengin et al., found that students were in early majority characteristic; and Özen et al., on the other hand, found that 41.1% of nursing students were early adopters and 40.3% were early majority (Ertuğ and Kaya, 2017; Bodur, 2018; Zengin et al., 2019; Özen et al., 2020). Similar to the present research, Erol et al., found that the majority of nursing students were late majority and traditionalists and Tarhan and Doğan, found that one-third fell in the late majority innovator category (Erol et al., 2018; Tarhan and Doğan, 2018). In the present study, the resistance to change scores of the nursing students differed according to their grade, and the first-year students' resistance to change scores were significantly higher than the fourth graders. One aspect of human behavior which seems to be critical for technology acceptance is resistance to change. Contrary to the findings of the present study, in Utli and Vural Doğru's research, no difference was found between the IIS scores of nursing and midwifery students with respect to their grades (Utli and Vural Doğru, 2018). Similarly, Durmuş İskender et al., found that there was no difference between the IIS scores of nursing students with respect to their grades (Durmuş İskender et al., 2018). It was found that OLSAS total and OLSAS-PU scores were higher in the third grade than in the first and fourth grades (Table 3). The reason for this may be that the first graders have not taken the technology-related lessons yet and most of the lessons of the last year curriculum are applied vocational courses.

In the present study, no difference was found between IIS sub-dimension scores according to gender (Table 3). In the study of Sis Çelik et al., examining nurses' individual innovativeness characteristics and influencing factors according to their gender roles, it was determined that those in feminine roles were traditionalists toward innovations (Sis Çelik et al., 2020). In the present

study, the total OLSAS and OLSAS-PEU scores were significantly higher in males than in females. In line with stereotypes emerging within the framework of traditional gendered division of labor, these scores are likely to be higher for boys, as girls tend to use technological devices less. While the IIS resistance to change scores of those who used mobile phones to attend classes in online learning were significantly higher than those who used other devices; the OLSAS total, OLSAS-PEU, and PU scores were significantly lower than those using other devices (Table 4). Although the widespread use of distance education supported with information technologies provides important opportunities, such as equal opportunity in education and the elimination of time and space limitations, the difference between learners' access to technology due to socioeconomic differences in society is still an important problem (Sezgin and Fırat, 2020). Although more technologically equipped smart mobile phones are used today, it can be said that trying to follow lessons from small screens has negative consequences in terms of PEU and PU in online learning.

The students who stated that the technological application used in online education increased their interest in the lessons had statistically higher IIS total scores, opinion leadership, and risk-taking scores. This can be interpreted as those who take risks in using new technologies and who are open to new ideas are more interested in online lessons. Similarly, OLSAS total scores, PEU, and PU scores were higher in those who answered that online learning systems increased their interest in the lesson. This finding was interpreted as the fact that the systems used in online learning were user friendly and useful in contrast to complex systems that require effort to learn, and interest in the lesson is also important (Table 4). The IIS scores showed a statistically similar distribution according to the effect of the technological application used in online learning on the adaptation to the lessons ($p > 0.05$). While the OLSAS scores were highest in all categories for students who reported “increased adaptation”, they were lowest in those who reported “decreased adaptation” (Table 4). The COVID-19 pandemic caused an urgent transition from face-to-face education to distance education. This resulted in the rapid introduction of online learning systems in students' lives. Online methods require not only a high level of self-directed learning in terms of students' volition and skills but also a high level of readiness for technological capacity of digital learning platforms (Kim et al., 2021; UNESCO, 2020). In this context, the high adaptation of students with high technology acceptance to online lessons reveals the importance of PEU and PU.

The risk-taking scores of the students who stated that the technological application used in online learning decreased their academic success was significantly lower than the students who stated that it increased or did not affect their academic success. OLSAS scores differed significantly in all categories. While the OLSAS scores were highest for those who reported “increased success”, they were lowest for those who reported “decreased success” (Table 4). In the present scenario, within the distance education model, educational activities are performed through online learning environments. The effective ability of the teaching staff to teach and the students to learn in the online learning environments is directly related to the usefulness of these platforms. Crowther et al., have determined that problems arising due to the usability of the website/platforms used in education can affect academic success (Crowther et al., 2004). This finding can be interpreted as risk taking for trying a new application as well as accepting online learning systems is related to academic success. The IIS total, opinion leadership, and risk-taking scores were higher for students who reported that online nursing classes increased their motivation. The OLSAS total, PEU, and PU scores differed significantly in all categories. While the students with increased motivation had the highest scores, students with decreased motivation had the lowest scores (Table 4). Motivation includes the student's intrinsic motivation to learn, the inherent satisfaction of the activity, and the intention to reach a goal. Motivated students participate in self-regulated activities that help them reach their targets (Kemp et al., 2019). Similarly, Geng et al., found that technology readiness positively influenced learning motivation during blended learning in higher education (Geng et al., 2019).

A weak positive correlation was found between nursing students' total IIS score, opinion leadership, risk-taking scores and OLSAS total, PEU, and PU scores (Table 5). This can be interpreted as the students who are open to new ideas and take risks in using new applications can adopt new technology more easily and PEU and PU are higher for these people. Kim et al., found that innovativeness had no moderate effect between attitude and perceived ease of use and perceived usefulness. They found that user innovation regulates the relationship between subjective norms and behavioral intention (Kim et al., 2021). In the present study, PEU increased as the resistance to change decreased. In this context, it is thought that the innovative characteristics of the students in this study are important in technology acceptance.

CONCLUSION

In the present study, the individual innovativeness characteristics of most of the nursing students were at a traditionalist and late majority level. Perceived ease of use and perceived usefulness in online learning were moderate. Students with high mean scores on the opinion leadership sub-dimension of the IIS stated that the online learning systems used in nursing education increased their interest and motivation in the lesson. Students with high scores on the risk-taking sub-dimension of IIS stated that their interest and motivation for the lesson and academic success increased and they found online nursing lessons useful. Students with high OLSAS, perceived ease of use, and perceived usefulness scores expressed positive opinions toward the lesson in all dimensions, such as interest, adaptation, success, perceived benefit from the lesson, and motivation. A weak positive correlation was found between the IIS opinion leadership and risk-taking scores and the OLSAS total, OLSAS-PEU, and PU scores. As the perceived ease of use increased, the resistance to change decreased.

In this respect, it can be said that individuals' acentence of technology is higher for people who are open to new ideas and take risks. It can be said that technology acceptance is important in nursing education and as the perceived ease of use and perceived usefulness increases, a positive effect is seen on outcomes, such as interest, adaptation, motivation and success. Distance education practices in nursing education should be innovative, evidence-based, and at the same time student-centered and accessible to all. The results of this study can be used for designing online learning systems to be used in nursing education, taking into account the perceived usefulness and ease of use dimensions. Similarly, it is recommended to contribute to the development of innovativeness in students with innovative systems that will increase the number of people who not dread making mistakes, are courageous, have confidence, do not hesitate to ask questions, have the ability to dream, know the value of being different, and are successful in creating new concepts.

Conflict of Interest

The authors report no actual or potential conflicts of interest.

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