

Original Article

**Determination of the Learning Styles of Nursing Students:
A Descriptive Study**

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Abstract

Background: Nursing is a practice-based professional profession that requires integrating theoretical knowledge harmoniously with the ability to apply it. Therefore, it is important to determine the learning styles of the students in order to plan appropriate teaching methods, use and evaluate various learning methods and materials in order to ensure optimal learning in nursing education.

Aim: The aim of this study is to determine the learning styles of nursing students.

Methodology: This descriptive study was conducted with 236 volunteer students studying in the nursing department of a foundation university in the 2019-2020 academic year. Data were collected online using the Introductory Information Form and the Learning Styles Inventory. In the IBM SPSS 25 Versions New York package program descriptive analyses were evaluated with Independent Samples t test and One Way ANOVA test. $P < 0.05$ was accepted as statistical significance level.

Results: It was determined that 80.1% of the nursing students were female, 49.2% were first grade and their mean age was 21.19 ± 1.35 . It was found that 52.1% of the students had a predominantly visual learning style. It was determined that male students had a predominantly kinesthetic learning style compared to female students ($p < 0.05$), and fourth-grade students had a higher percentage of auditory learning style than other classes ($p < 0.05$).

Conclusions: It was determined that nursing students mainly have a visual learning style. For a more effective learning environment, students' needs and learning style(s) should be known. The study can be repeated in a larger sample and in line with the experiences gained in distance education.

Keywords: Education, Learning, Learning styles, Nursing, Student.

Introduction

The learning process of the individual starts with the perception of a stimulus through the sense organs (Yildirim, Koc&Karabudak, 2012). Learning style is among the many factors that

enable learning to take place in the learning process (Gezmiş&Sarıcoşan, 2005; Yıldırım, Koc& Karabudak, 2012). Learning style is a pattern of physiological, cognitive, and affective characteristics that indicate how individuals perceive their learning environment, how they

interact, and how they respond to the learning environment (Butler, 1987). In general, there are three different types of learning styles: kinesthetic, auditory, and visual. A student usually tends to use one or more of these learning styles predominantly. The learning style that the student predominantly uses is expressed as the style in which he/she develops skills and gains expertise by using more and more over time (Yildirim, Koc & Karabudak, 2012).

Nursing is a practice-based professional activity that requires integrating theoretical knowledge in harmony with the ability to apply it. The most important goal of nursing education is to develop practical skills by providing students with theoretical knowledge. Therefore, the nursing education process contributes to students' assimilation of knowledge, skills, and attitudes about the nursing profession and transforming them into behaviour (Karagozoglu, 2005; Boztepe & Terzioglu, 2013). The nursing profession assumes the role of protecting and maintaining the health of the individual, family, and society and constitutes a role model in establishing interpersonal relationships (Ozkutuk, Orgun & Akcakoca, 2018). Providing appropriate vocational training is important for the nursing profession (Tachtsoglou, et al., 2021). In our country, there are both theoretical and applied courses based on theoretical foundations for four years in nursing education (Boztepe & Terzioglu, 2013).

Students encounter different learning styles when they start health professions training programs such as nursing education. Nursing students mainly take theoretical and practical courses that support critical thinking, hands-on and independent learning. For this reason, instructors should have knowledge about learning styles. Knowing learning styles can help instructors identify and understand different learning styles and learning needs of students, change biases against certain learning styles, and present new methods and solutions to increase the efficiency of the course (Asiabar et al., 2015; Mckenna et al., 2018). At the same time, it promotes assessment in harmony between the learning style offered by the instructors and the learning style that students have, the use of individual learning styles for students with low academic success, and the organization and development of knowledge in a way that can be adopted by most students (Rassol & Radaw, 2007; Andrews, 2009; Alkhasawneh,

2013; Asiabar et al., 2015; Stirling & Alquraini, 2017; Mckenna et al., 2018).

Since students have different skills and abilities, it has been argued that instead of using a single material in the learning process, it is more appropriate to use different approaches in education that match students' learning styles (Andrews, 2009; James & Thomas, 2011). In addition, education methods prepared for different learning styles contribute to updating the curriculum and students' analysis, synthesis, and active use of their knowledge in the education process, while making learning enjoyable (Alkhasawneh et al., 2013; Andreou, Papastavrou & Merkouris, 2014; Stirling & Alquraini, 2017). Alkhasawneh (2008) stated in his study that in case of incompatibility between the learning style of the students and the learning method used by the instructors, or when the learning style used does not sufficiently meet the needs of students, a decrease in interest and desire for the lesson, distraction, a decrease in active participation in the lesson, and failure in exams are observed. Therefore, he stated that it may cause students to change their perspectives on the nursing profession and even to consider quitting education, causing the loss of high-potential healthcare candidates and thereby negatively affecting society (Alkhasawneh, 2008).

Learning styles are also subject to change due to the current period of learning styles, the technological structure of education and training, the learning methods that students have used previously, generational differences, as well as technological advances (Urlick, 2017). Creating a learning environment appropriate for nursing students' past and present learning styles, seasonal patterns, the environment and environmental conditions they are in, and current technological developments is a requirement for optimal learning (Alkhasawneh et al., 2013). It is recommended to use students' learning styles in updating the nursing curriculum and reviewing education and teaching methods (Andrews, 2009; Mckenna et al., 2018). Although many studies have been conducted over the past 10 years to determine the learning styles of nursing students (Alkhasawneh et al., 2013; Asiabar et al., 2015; Azari et al., 2015; Celik et al., 2014; Flemmig, McKee & Huntley-Moore 2011; Koch et al., 2011; Unlu, Taskin & Elbas, 2015; Yildirim, Koc & Karabudak, 2012) current technological developments, innovations needed for theory and

practice in nursing education make it necessary to redefine the learning style of nursing students. Therefore, it was anticipated that this study would contribute to the literature in determining the learning styles necessary for planning appropriate teaching methods, using and evaluating various learning methods and materials.

The main purpose of this study is to determine the learning styles of nursing students studying at a foundation university. The study also sought to determine the weighted learning approach of the students by examining students' learning styles in terms of variables such as age, gender, and educational status.

The research questions were as follows: What are the learning styles of nursing students according to the BIG16 Inventory? What is the difference in the learning styles of nursing students according to the BIG16 Inventory according to age, gender, grade level?

Methodology

Design and Sample: The scope of this descriptive study consisted of students enrolled in the nursing department of a foundation university in the 2019-2020 academic year (N=328). Data collection forms were sent to 328 students online via Google forms in March 2020, and all students were invited to participate in the research. 236 nursing students who voluntarily answered the data collection forms were included in the study (71.95%). Nursing education is given in a four-year education program at the foundation university where the research was conducted. During the period of the study, the total number of students studying in the nursing department was 328 (NEPAB, 2013; Texas BON, 2013; Ozkutuk, 2018) and the number of students per academic staff is 20, which is close to universal standards. The theoretical and practical training process is carried out together for four years. There are two laboratories, a simulation and a skill laboratory, for the development of practical skills and a suitable classroom environment for the development of students' theoretical lessons. The curriculum in nursing education includes compulsory field courses where theoretical and applied courses are carried out simultaneously and elective courses where students can improve their cognitive, social, and psychomotor skills. Students receive practical training once or twice a week in addition to theoretical lessons in the first, second, and third grades. In addition, there is a

hospital application within the scope of intern education covering four days a week for fourth-grade students.

Data Collection: Introductory Information Form and Learning Style Inventory (BIG16) were used as data collection tools. Research data was collected online via Google forms.

Introductory Information Form: The form prepared by the researchers; consists of questions indicating the age, gender, and grade level of the students.

Learning Style Inventory (BIG16): Learning Style Inventory was developed by Simsek in 2002. The inventory determines three learning styles: visual, auditory, and kinesthetic. Each learning style of the BIG16 Inventory contains 16 items, with a total of 48 items. The inventory items consist of 5 Likert-type categories (-2=strongly disagree, -1=disagree, 0=undecided, 1=agree, 2=strongly agree). The inventory involves counting items related to each learning style separately in order to measure the learning style in which the individual is dominant or reactive. Kinesthetic learning style score is calculated by summing the answers given to questions 5, 7, 10, 11, 15, 16, 18, 19, 23, 24, 27, 32, 34, 38, 41, 45; Auditory learning style score is calculated by summing the answers given to questions 1, 3, 8, 9, 19, 13, 17, 21, 26, 29, 31, 33, 39, 42, 44, 47; The visual learning style score is calculated by summing the answers given to questions 2, 4, 6, 12, 14, 20, 25, 28, 30, 35, 36, 37, 40, 43, 46, 48. Cronbach value of inventory α was calculated as 0.87. If the total score of each learning style in the scale is between 7 and -7, it is assumed to have no style, if it is between 8 and 32, it has one or more styles, and if it is between -8 and -32 points, it is assumed to be responsive to the relevant style. Among the learning styles, the total score is calculated separately for each sub-style (kinesthetic-auditory-visual), and the style with the highest positive total score is defined as the student's dominant style. If the total scores are very close or equal to each other, it indicates that the student has more than one style or he/she is responsive to more than one style. The overall total score of the scale is not calculated (Simsek, 2002).

Ethical Considerations: Before starting the research, approval from the Non-Interventional Research Ethics Committee of the relevant foundation university that the research is in compliance with ethical principles (Date: 19. 02. 2020, Decision No: 2020/010) and written

permission from the management of the institution where the research to be conducted (Date: 02.03.2020, No: 66384015-604.01.03-E2003020011) were obtained. All participants were provided with written information regarding the purpose of this study, and were informed that their participation was voluntary, that they could withdraw from the study at any time, and that all data obtained would remain confidential. Introductory Information Form and BIG16 Learning Style Inventory were prepared as online questionnaires in Google Forms program. These questionnaires were sent to the students using the students' e-mail addresses given by the university. In the context of e-mail, after the students were informed about the research, their online approval was obtained in order for them to participate in the study. During the implementation phase of the study, the participants were asked not to indicate their identity information (name-surname, T.R. ID number, student number). Students were advised that the average response time to the online questionnaires (data collection forms) prepared for the research would be 15-20 minutes.

Data Analysis: Statistical evaluation of the data was done in Statal Package for the Social Sciences (SPSS) for Windows, 25.0 Version, (IBM Corp. New York) package program. In the data of continuous variables, mean, standard deviation; Number (n) and percentage (%) values were calculated by categorical data representation. The conformity of the data to the normal distribution was evaluated with the Kolmogorov-Smirnov test. Since the data were in accordance with the normal distribution ($p>0.05$); the Independent Samples t-test was used to compare the BIG16 Inventory averages of two groups (gender) and the One Way ANOVA test was used to compare three or more groups (grade level). Post Hoc LSD test was performed in order to determine the statistically significant group in the comparison according to grade levels. Since 99.2% of the students participating in the study were single, a comparison could not be made as per marital status groups. In the BIG16 Inventory application, the total score of each learning style of the students participating in the research was calculated and included in the learning style with the highest score category (Table 2). A value of $p<0.05$ was accepted as a statistical significance level and the results were analyzed at a 95%

confidence interval.

Results

Introductory information about nursing students is given in Table 1. When the distribution of the introductory information of the students within the scope of the study was examined, it was found that 80.1% were girls and 49.2% were studying in the first grade. The mean age of the students was 21.19 ± 1.35 years (Table 1). When the learning styles of the students participating in the research are examined, 19.5% of them were kinesthetic, 21.6% were auditory, 52.1% were visual. While their learning styles were found to be dominant, 6.8% of the participants did not have a dominant learning style. It was found that 63.0% of the students with kinesthetic learning style participating in the research were girls, 56.5% were first grade, 90.2% of students with auditory learning style were girls, 45.1% were first grade, 81.3% of students with visual learning style were girls, 48.8% of them were first-year students, 87% of the students with no dominant learning style were girls and 43% of them were first-year students. Table 3 shows the statistical comparisons of results for groups of students by gender and grade level, as well as sub-styles of the BIG16 inventory. According to the gender of the students, female students' auditory (female: 10.78 ± 6.75 ; male: 9.29 ± 6.46) and visual learning (female: 10.49 ± 6.12 ; male: 14.74 ± 6.10) sub-styles were higher than male students, but the difference between them was not statistically significant ($p>0.05$). It was found that male students had a higher kinesthetic learning style than female students (male: 13.80 ± 5.71 ; female: 10.19 ± 7.70 ; $p<0.05$). Although the kinesthetic and visual learning style mean scores of the fourth-grade students were higher than the mean scores of the students in other classes, the difference between the mean scores was not statistically significant ($p>0.05$). According to the auditory learning style averages, we see that the average scores of the fourth-grade students were higher than the other classes and the difference between them was statistically significant ($p<0.05$). In the Post Hoc advanced analysis, it was found that the group that formed the statistical significance was originated from the fourth graders.

Table 1. Introductory Information for Nursing Students

| Introductory Information | n | % |
|--|------------|-------------|
| Age (Min-Max:18-24; ^aOrt±Sd; 21.19±1.35) | | |
| 18-21 | 144 | 61 |
| 22-24 | 92 | 39 |
| Gender | | |
| Female | 189 | 80.1 |
| Male | 47 | 19.9 |
| Marital status | | |
| Married | 234 | 99.2 |
| Single | 2 | 1.8 |
| Education Status | | |
| 1 st Grade | 116 | 49.2 |
| 2 nd Grade | 33 | 14 |
| 3 rd Grade | 59 | 25 |
| 4 th Grade | 28 | 11.9 |
| Total | 236 | 100 |

^a $\bar{x}\pm Sd$: Mean± Standard Deviation

Table 2. Dominant Learning Styles of Nursing Students

| Dominant Learning Styles | Kinesthetic (n/%)^a | Auditory (n/%)^a | Visual (n/%)^a |
|---------------------------------|--------------------------------------|-----------------------------------|---------------------------------|
| Gender | | | |
| Female | 29/15.3 | 46/24.3 | 100/52.5 |
| Male | 17/36.2 | 5/10.5 | 23/48.9 |
| Education Status | | | |
| 1 st Grade | 26/22.4 | 23/12.1 | 60/20.3 |
| 2 nd Grade | 4/19.8 | 6/18.2 | 20/22.0 |
| 3 rd Grade | 12/51.7 | 13/60.6 | 29/49.2 |
| 4 th Grade | 4/6.0 | 9/9.1 | 14/8.5 |
| Total^b | 46/19.5 | 51/21.6 | 123/52.1 |

^aColumn is taken as percent (%) ^bRow is taken as percent (%)

Table 3. Differences in Students' Learning Styles by Gender and Education Status (n=236)

| | N | $\bar{x}\pm SD$ | t and F v | |
|-------------------------|-------------------------|-----------------|-----------|------|
| Gender | | | | |
| | | 10.78±6.7 | | |
| Female | 189 | 5 | 1.36 | |
| Male | 47 | 9.29±6.46 | | |
| Education Status | | | | |
| Auditory | 1 st | | | |
| | Grade | 116 | 9.75±6.73 | |
| | 2 nd | | 10.03±6.9 | |
| | Grade | 33 | 3 | 2.83 |
| | 3 rd | | 10.62±6.3 | |
| | Grade | 59 | 8 | |
| | 4 th | 28 | 13.78±6.3 | |
| | | 5 | | |
| Gender | | | | |
| | | 10.49±6.1 | | |
| Female | 189 | 2 | 0.42 | |
| | | 14.74±6.1 | | |
| Male | 47 | 0 | | |
| Visual | Education Status | | | |
| | 1 st | | 15.12±5.5 | |
| | Grade | 116 | 7 | 1.81 |
| | 2 nd | | 15.30±6.9 | |
| | Grade | 33 | 8 | |

| | | | | | |
|-------------------------|-----------------|-----|-----------|--------|----------------|
| | 3 rd | | 13.91±6.2 | | |
| | Grade | 59 | 4 | | |
| | 4 th | 28 | 17.14±6.5 | | |
| | Grade | | 5 | | |
| Gender | | | | | |
| | | | 10.19±7.7 | | |
| | Female | 189 | 0 | -3.597 | 0.001** |
| | | | 13.80±5.7 | | |
| | Male | 47 | 1 | | |
| Education Status | | | | | |
| Kinesthetic | 1 st | | 10.34±7.6 | | |
| | Grade | 116 | 2 | | |
| | 2 nd | | 10.21±7.5 | | |
| | Grade | 33 | 8 | 2.386 | 0.070 |
| | 3 rd | | 10.77±6.3 | | |
| | Grade | 59 | 7 | | |
| | 4 th | 28 | 14.39±8.3 | | |
| | Grade | | 1 | | |

^a *t* and *F* values= Independent Samle *t* Test; *F*= One Way ANOVA, Post Hoc LSD Test ;
**p*<0.05

Discussion

Nursing is an active profession that requires the use of various skills. A suitable learning environment is essential for the professional development of every student (Skřivánková, 2012). Being aware of the learning styles of nursing students is the first step in planning and preparing nursing education (Stirling & Alquraini, 2017). Presenting information to students in different ways and supporting students' active participation in the lesson contribute to the determination of students' learning styles (Andrews, 2009). Nursing students can learn and understand the information in one or more ways (Stirling & Alquraini, 2017). Accordingly, it has been reported that most of the students may have more than one learning style (Alkhasawneh, 2013; Asiabar et al., 2015; Azari, 2015; Flemmig, McKee & Huntley-Moore, 2011; Koch et al., 2011). In this study, unlike the literature above, it was found that most of the students (52.1%) had a visual learning style and each student took part in a uniform learning style (Table 2). However, similar to this study, there are also studies stating that students have a single learning style (Andrews, 2009; Mckenna et al., 2018; Stirling & Alquraini, 2017). Although it is considered that the differences between the studies may be due to the period in which the research was conducted, educational infrastructure, and study designs, the opinion is that more research needs to be done on this topic.

When the data in Table 2 are examined in the study, we can see that students in the same class with different learning styles take the same courses together. For example, out of 116 first-year students, 26 have kinesthetic, 23 auditory, and 60 visual learning styles. This situation made us think that it would be helpful if the education methods to be prepared for the students who take the same courses address the kinesthetic, auditory and visual learning areas, taking into account the different learning styles of the students. The literature recommends diversifying the education methods for students with different learning styles and organizing curriculum content accordingly (Flemmig, McKee & Huntley-Moore, 2011; Mckenna et al., 2018; James, D'Amore & Thomas, 2011). At the same time, it is stated that the use of multiple learning styles by the instructors in the learning process contributes to the students' development of different learning styles and to enjoy their learning experiences (Mckenna et al., 2018).

In this study, we see that students mainly have a visual learning style (Table 2). Although there are study reports that are similar to the results of the study (Amaniyan et al., 2020; Yildirim, Koc & Karabudak, 2012); Most of the studies indicate that nursing students predominantly have a kinesthetic learning style (Alkhasawneh 2013; Mckenna et al., 2018; Stirling & Alquraini, 2017; James, D'Amore & Thomas, 2011; Johnson et al., 2015). The different learning styles of the students may be due to the fact that the studies are conducted in different countries and the educational infrastructure differs between the countries. It is recommended to re-examine this situation in future studies.

Asiabar et al. (2015) stated that there is a relationship between learning styles and gender and male students have more kinesthetic learning styles than female students (Asiabar et al., 2015). In the current study, in parallel with the literature, it was found that male students had a higher kinesthetic learning style than female students ($p < 0.005$). However, since the effect of gender on learning styles has not been examined in enough studies, it is assumed that it should be studied in a larger sample and in different societies to confirm these results.

Learning styles are the feature that can change (Alkhasawneh, 2013). In the nursing education process, while the curriculum in the first years focuses on theoretical education, the curriculum content in the final years is mainly focused on practical education. For this reason, there may be a difference between the grade level of the students and the learning style. There are studies in the literature stating that there is a difference between grade level and learning style (Andrews, 2009; Asiabar et al., 2015; James, D'Amore & Thomas, 2011). This study also supports the literature. Fourth-grade students have a higher auditory learning style than students in other grades ($p < 0.05$, Table 3). The fact that the fourth-year students in the institution where this study was carried out received more case-discussion and storytelling-based education within the scope of intern education compared to the students in other classes may have been effective in the emergence of this result. It is also stated in the literature that the use of active learning methods such as case discussions and storytelling in nursing education is effective in students' auditory learning skills (Arthurs, 2007).

Limitation of Study: This study was conducted online at the beginning of distance education due to the Covid-19 pandemic in the nursing department of a foundation university. Therefore, the number of students attending was less than expected (participation rate 71.2%). The study is limited to the sample group in which the research took place and the results cannot be generalized.

Conclusion: As a result, in this study, it was found that nursing students had a uniform learning style. At the same time, it was observed that the weighted learning styles were also visual learning styles. It was found that students at the same grade level can show different learning styles (kinesthetic-auditory-visual), while male students mostly have a kinesthetic learning style, and fourth-grade students have an auditory learning style. The results of the study showed that the learning styles of nursing students were affected by their gender and grade level. In the nursing education process, it is recommended to use appropriate teaching methods that can address students' learning styles or to update existing teaching methods in line with the needs of students, and to increase the awareness of the instructors about the learning style(s) of the students in order to provide a more effective learning environment. It is considered that conducting studies on this subject in a larger sample group and in different educational institutions that provide nursing education will contribute to the literature.

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