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INVESTIGATION OF THE USE OF CONCEPT MAP AS A TOOL FOR THE EVALUATION OF VIDEO-BASED DISTANCE SURGICAL NURSING LABORATORY TRAINING DURING THE COVID-19 PANDEMIC

COVID-19 PANDEMİSİ SIRASINDA UZAKTAN VİDEO TEMELLİ CERRAHİ HEMŞİRELİĞİ LABORATUVAR EĞİTİMİNİN DEĞERLENDİRİLMESİNDE BİR ARAÇ OLARAK KAVRAM HARİTASI KULLANIMININ İNCELENMESİ

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ABSTRACT

Objective: During the pandemic, laboratory education of applied courses has been carried out through distance education with previously-known, valid methods. One of these methods is video teaching and concept maps. This study aimed to examine the results of and student satisfaction from using concept maps as an assessment method in video-based distance surgical nursing laboratory education during the COVID-19 pandemic.

Method: This study used a cross-sectional study design. The study was conducted with the second-year nursing students of a four-year faculty in the fall semester of the 2020-2021 academic year. The study sample consisted of 182 second-year nursing students. The students were divided into 11 small groups on the digital education platform. They were shown a total of six different videos, in one-video-a-day fashion, about perioperative nursing approaches within the scope of surgical nursing laboratory practice. They were asked to create a concept map explaining the applications presented during each video teaching and upload it to the system using the homework tab of the distance learning system. The students were asked to evaluate their education through an online questionnaire. Each concept map was scored by the instructors within the framework of the template map prepared previously.

Results: The students' total scores from the concept maps were high, but the scores from the Hierarchy, Examples, and Cross Links sections in all of the maps they created were statistically lower than the scores from the Proposition section ($p<0.05$). Also, their scores from the first map they created and their general satisfaction were lower ($p<0.05$).

Conclusion: In this study, it was found that the use of concept maps as an assessment method in video-based distance surgical nursing laboratory education affected student success and satisfaction positively. Concept maps are considered to be an appropriate method even for crowded classes when planned well.

Key Words: Nursing Education, Concept Map, Distance Education, COVID-19 Pandemic

ÖZ

Amaç: Pandemi döneminde uygulamalı derslerin laboratuvar eğitimleri, daha önceden bilinen geçerli yöntemlerle yapılandırılarak ve harmanlanarak uzaktan eğitimle sürdürülmektedir. Bu yöntemlerden biri de video eğitimleri ve kavram haritalarıdır. Çalışmanın amacı, COVID-19 pandemisi sürecinde, uzaktan video temelli cerrahi hemşireliği laboratuvar eğitiminde bir değerlendirme yöntemi olarak kavram haritası kullanımı sonuçlarının ve öğrenci memnuniyetinin incelenmesidir.

Yöntem: Bu çalışmada kesitsel araştırma tasarımı kullanıldı. Araştırma, 2020-2021 eğitim-öğretim yılı güz döneminde 2. sınıf hemşirelik öğrencileri ile yürütülmüş olup, araştırmanın örneklemini 182 öğrenci oluşturdu. Öğrenciler dijital eğitim platformunda 11 küçük gruba ayrıldı. Cerrahi Hastalıkları Hemşireliği laboratuvarı uygulaması kapsamında öğrencilere, perioperatif hemşirelik yaklaşımları ile ilgili günde bir video olmak üzere toplam altı farklı video izletildi. Öğrencilerden video eğitimin içeriğinde yer alan uygulamaları açıklayan bir kavram haritası oluşturmaları ve ödev sekmesine yüklemeleri istendi. Ardından dijital eğitim platformunun küçük grup kanallarında öğretim elemanı eşliğinde, öğrencilerle videonun çözümlemesi yapıldı. Öğrencilerden dijital anket platformu ile eğitimi değerlendirmeleri istendi. Her bir kavram haritası, daha önce hazırlanan şablon harita çerçevesinde öğretim elemanları tarafından puanlandırıldı.

Bulgular: Öğrencilerin kavram haritalarından aldıkları toplam puanın, oldukça yüksek olduğu, ancak hazırladıkları tüm haritalarda Hiyerarşi, Örnekler ve Çapraz Bağlantılar kısımlarından aldıkları puanların, Kavramlar kısmına göre istatistiksel olarak daha düşük olduğu bulundu ($p<0.05$). Ayrıca, öğrencilerin ilk hazırladıkları haritadan başarı puanlarının ve memnuniyetlerinin daha düşük olduğu saptandı ($p<0.05$).

Sonuç: Bu çalışmada uzaktan video temelli cerrahi hemşireliği laboratuvar eğitiminde bir değerlendirme yöntemi olarak kavram haritası kullanımının, öğrenci başarısını ve memnuniyetini olumlu etkilediği görülmektedir. İyi planlandığında kavram haritalarının kalabalık sınıflar için bile uygun bir yöntem olduğu değerlendirilmektedir.

Anahtar Kelimeler: Hemşirelik Eğitimi, Kavram Haritası, Uzaktan Eğitim, COVID-19 Pandemisi

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INTRODUCTION

Due to the COVID-19 pandemic, higher education institutions suspended face-to-face education and switched to distance learning [1]. This transition has led to difficulties in the implementation of nursing programs, in which applied education is just as important as theoretical education [2–5]. Surgical nursing education is an important component in applied nursing education; it requires laboratory and clinical practice, and the active participation of the student. Although clinical practice education can still be planned for after the pandemic, theoretical and laboratory education can be carried out through distance education during it. Meeting new needs and facilitating clinical learning during the pandemic period is only possible by developing alternative strategies [2–4,6,7]. To achieve this, it is necessary to quickly integrate well-known and already used teaching methods into extraordinary situations.

Before the pandemic, with the integration of the simulation into the process, laboratory teaching was carried out effectively and efficiently in small groups, face to face, and was practice-based [5]. During the pandemic, virtual simulation has been used as an alternative [8,9]. However, the free online versions of virtual simulation software are not in the students' native language, and they particularly have limited scenarios related to surgical nursing, which restricts their use in this field. In addition, educators in the health field can also use blended learning methods to improve the acquisition of both cognitive knowledge and practical skills in line with the needs of students [10]. Video teaching, which is one of these methods, is an innovative approach used to facilitate the teaching of clinical skills and to encourage continuous learning [11,12].

Another well-known teaching strategy that enables active learning is the concept map [13,14]. The concept map was developed by Novak and Govin based on Ausubel's Assimilation Theory of Meaningful Learning [15,16]. These maps organize information, concepts, and their relationships visually, thereby making comprehension and learning easier [17]. In the literature, concept maps are used as a tool to reinforce theoretical teaching in nursing education, [18,19] to examine problem-based scenarios, [20,21] to analyze the relationship among patient data in clinical practice, and to create a bridge between theoretical and practical skills [22,23]. The use of concept maps in nursing education has positive effects on students' academic achievement and satisfaction [24,25]. In addition, the concept map moves the student from a passive state to an active learner state [22].

During the pandemic, the laboratory practice of the applied lessons has been structured and blended with previously-known valid methods and carried out through distance education. Some of these methods are video teaching and concept maps. Sharing existing experiences and good practice examples make it easier to be prepared for similar situations. However, no study has been found in the literature about sustaining laboratory teaching in nursing education with alternative methods under pandemic conditions. Therefore, this study aimed to examine the results and student satisfaction by using concept maps as an assessment method in video-based distance surgical nursing laboratory education during the COVID-19 pandemic.

METHOD

Study Design

In this study, a cross-sectional study design was used.

Setting and Participants

The study was carried out in a nursing faculty in Ankara province between November 11th and 25th, 2020. The Surgical Nursing Course in this faculty is given in the fall semester and consists of 70 hours of theoretical, 42 hours of laboratory, and 84 hours of clinical practice education, consecutively. Laboratory education is carried out in small groups in the clinical simulation laboratory of the faculty. However, during the COVID-19 pandemic, laboratory teaching has been offered through distance education.

The study was conducted with the second-year nursing students of a four-year faculty in the fall semester of the 2020-2021 academic year. The population of the study consisted of 188 students. The sample size of the study was determined by convenience sampling method and consisted of 182 students who submitted concept map assignments and completed the assessment forms of the laboratory practice. The partipitacion rate of the study is 96.80% (182/188). But, the number of students who attend the class and submit their assignments is different for each video education.

Data Collection Tools

The Concept Map Assessment Form, the Student Form for Laboratory Education Assessment, and the feedback that the students wrote in the chat section of the online education platform after video analyses were used for the assessment of laboratory practice education.

The Concept Map Assessment Form: This form, which was created by the course instructors to evaluate the concept map assignments of the students, consists of two parts: Propositions (50 points), Hierarchy, Examples, and cross-links (50 points). The scores that can be obtained from this form range between 0 and 100. High scores were considered to indicate a high level of concept mapping skills.

The Student Form for Laboratory Education Assessment: This form was prepared by the faculty members to assess the education given to the students and to function as a guide to structure the education to be given in the future. It consists of four questions about the educational quality of the video teaching, the benefits of preparing concept maps, satisfaction from the video analysis, and overall satisfaction. The answers in the form are scored between 0 (none) and 10 (maximum) on a 10-point Likert-type scale. High scores indicate high levels of student satisfaction.

Ethical Approval

The written permission of the nursing faculty where the study would be conducted and the approval of the ethics committee of the university were obtained so that students' course grades and opinions could be used in the study (46418926-2021/53).

Preparation Phase

The students were given the theoretical section of the Surgical Nursing Course through distance education using Microsoft Office TEAMS software. After the theoretical education, six different video teaching topics were determined, which included learning objectives of the course, and the perioperative nursing approaches widely used in surgical clinics (Table 1). A faculty member and a doctoral student were responsible for the objectives, scenario, and shooting of each video. The videos were taken using a 4-dimensional camera in the Nursing Faculty Clinical Simulation Education Laboratory or the surgical clinics of the training and research hospitals affiliated with the university. In the videos, volunteer nurses, care staff, and graduate students played the roles of patients, nurses, and caregivers. Learning objectives were determined for each video and a template concept map was created.

Table 1. Video training topics

1st Video	Prevention of pressure injury
2nd Video	Preoperative patient care
3rd Video	Preparating patient on the day of surgery
4th Video	Early postoperative care after general anesthesia
5th Video	Early postoperative care after spinal anesthesia
6th Video	Early postoperative mobilization

For small group analysis, the students were divided into 11 groups of 17-18 people. Eleven channels were created for these groups on the digital education platform (Microsoft Office TEAMS).

Eleven instructors took part in the small group studies, with one instructor responsible for each group. The instructors taught the groups in rotation so that each group could study and make assessments with different instructors. At the outset, a meeting was held with the instructors, and the principles of the application were shared so that the application could be implemented with as much standardization as possible. Before the application was initiated, students were informed about the purpose of concept maps and how they should be prepared, and they were shown various concept map examples. This introduction took one lesson.

Data Collection

Laboratory practice was carried out two days a week, for a total of three weeks (six working days). A video was presented at 08:00 every day on the general channel created on the digital education platform. Afterward, the students were asked to individually create a concept map explaining the applications included in the video teaching until 15:00 and upload it from the assignments tab on the digital education platform. They were told that they could make concept maps using their own drawings or concept mapping software. Drawing the concept maps was left to students' preference, thus giving them the opportunity to show their creativity. After the assignments were uploaded, the video of the day was watched again on the general channel with all of the students between 15.00 and 15:30. Then, the video was analyzed on the group channel with the students under the guidance of the instructor in charge. In these sessions, each concept and related sub-concepts in the video and how they were exemplified in the video were discussed using the question-answer method. The subject was summarized using the sample (template) concept map. Afterward, the students were asked to express their opinions about the use of video-based education and concept mapping. They mostly preferred to text their opinions in the chat sections of the channels. Finally, they were asked to assess the education of the day by filling out the Student Form for Laboratory Education Assessment, which was sent to the digital education platform via a digital questionnaire platform (Microsoft Office 365 Forms).

Data Analysis

Scoring Criteria for Concept Maps developed by Novak & Gowin (1984) was used in the evaluation of concept maps [16]. Each template was scored on the concept map and concept maps of the students were evaluated accordingly.

The data obtained from the students participating in the study were analyzed using numbers, percentages, means, standard deviation values, and correlation analysis through IBM SPSS Statistics for Windows 29.0 software package. The Kolmogorov-Smirnov normality test was employed to evaluate the compliance of the data to normal distribution. Friedman's rank Test for K-Related Samples and the Paired Samples t-test were used to compare the concept map scores. $p<0.05$ was accepted as the indicator of statistical significance.

RESULTS

88.5% of the students taking part in the study were female. It was observed that most of the students (92%) used computer software to create the concept maps describing the applications in the videos (CMapTools®, Mindmeister, Bubbl.us, etc.) and that they made very creative designs (Figure 1).

When the scores of the students from the concept maps were examined (Figure 1), it was found that their scores from the proposition section of the maps were quite high but paired group comparisons showed that the scores obtained from the 1st concept map were lower than the scores from other maps ($p<0.05$). Similarly, it was found that the scores from the Hierarchy, Examples, and Cross Links evaluation of the first concept maps were statistically lower than the scores of other maps ($p<0.05$). Accordingly, the lowest total score was obtained from the 1st concept map ($p<0.05$). It was further found that the total score of the students from the concept maps was quite high, but that the scores from the Hierarchy, Examples, and Cross Links sections in all of the maps they prepared were statistically lower than the scores obtained from the Proposition section ($p<0.001$).

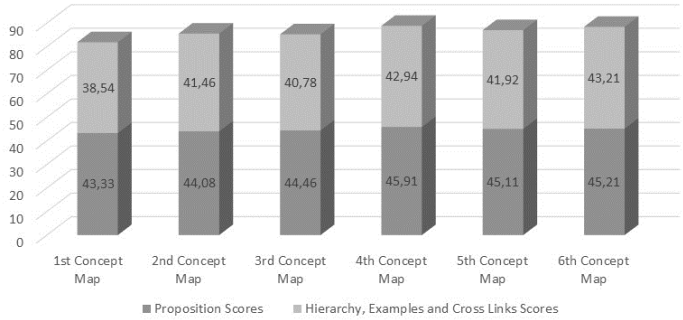

Figure 1. Students' concept maps scores.

The students' assessments of the video-based laboratory education through concept maps are shown in Table 2.

Table 2. Students' views and satisfaction about video-based laboratory education

Videos	Educational quality of the videos	Benefits of concept map preparation	Satisfaction from video debriefing	General satisfaction
1st Video (n=145)	8.36±1.82	8.53 ±1.61	8.42 ±1.75	8.08±1.66[a]
2nd Video (n=141)	8.77 ±1.40	8.40 ±1.62	8.72 ±1.67	8.72±1.39[b]
3rd Video (n=124)	8.45±1.55	8.48±1.50	8.46±1.53	8.62±1.39[b]
4th Video (n=150)	8.76±1.63	8.51±1.76	8.67±1.71	8.63±1.59[b]
5th Video (n=137)	8.38±1.84	8.38±1.90	8.35±1.92	8.64±1.75[b]
6th Video (n=110)	8.85±1.42	8.76±1.58	8.82±1.37	8.81±1.39[b]
p value	0.124	0.178	0.117	**0.002**

a-b <0.05

Their mean scores from the educational quality of the videos, the benefits of concept map preparation, and the level of satisfaction from the analysis sessions were above 8 points, and there was no difference between the groups in terms of video teaching ($p>0.05$). It was also found that the mean general satisfaction scores were over 8 points, but the general satisfaction with the 1st video application was significantly lower than other applications ($p<0.05$).

Table 3 contains the opinions of the students about the use of concept maps. Most of the opinions were very positive. Accordingly, they stated that preparing a concept map was useful (49.4%), it was educational (36.4%), and that it increased retention (26%). However, some students expressed negative opinions. For example, they said that preparing concept maps was difficult (9.1%), time-consuming (5.2%), and stressful (3.9%).

The students also said that few subjects were addressed in concept maps (2.6%).

Table 3. Students' positive and negative feedback (n=77)

Positive Feedback	**n***	**%**
It was useful.	38	49.4
It was educational.	28	36.4
It improved retention.	20	26.0
It helped me do a search.	13	16.9
It allowed us to repeat / consolidate our knowledge.	12	15.6
It was a nice / good practice.	11	14.3
It was fun. / It was enjoyable.	11	14.3
It was efficient.	11	14.3
It facilitated understanding.	4	5.2
It increased my creativity.	3	3.9
It facilitated learning.	3	3.9
It allowed me to establish a cause and effect relationship.	2	2.6
It was interesting.	1	1.3
Negative Feedback	**n***	**%**
It was compelling	7	9.1
It was time-consuming	4	5.2
It was stressful	3	3.9
More topics could be covered.	2	2.6
It was tiring	1	1.3

**n was multiple*

DISCUSSION

Concept maps are useful in establishing a link between theory and practice by helping students to adopt a holistic approach, make associations, identify priorities, and improve their clinical judgment [13,24,26,27]. They can be used as an innovative assessment method to develop and improve teaching [28]. In this study, the results of using concept maps as an assessment method in video-based distance surgical nursing laboratory education and students' satisfaction from the application during the COVID-19 pandemic were examined.

In the study, it was found that the students' total scores from their concept maps and satisfaction were quite high. Since it was the first experience, the lowest total score was obtained from the first concept map. Although there are no studies in the literature that use concept maps as an assessment method in video-based surgical nursing laboratory education, there are few studies in which student-prepared concept maps on various topics were evaluated by the instructor. For example, similar to our study, Hsu and Hsieh (2005) examined six different concept maps of students within the scope of a scenario-based lesson and stated that the first concept maps (n=43) were very basic, the students obtained low scores, and that their scores started to increase from the third concept map [21]. Atay (2012) found a statistically significant increase in students' scores over time from the different concept maps of care plans that they prepared [29]. Jaafarpour (2016) examined the effect of concept maps on students' academic achievement and found that there was a gradual increase in the mean scores obtained from the maps developed by the students [30]. Hsu (2016) found concept maps were more effective in providing higher learning satisfaction [31]. In line with these results, it is thought that with the increased use of concept maps, students' success at and satisfaction from preparing concept maps were also positively affected.

The Hierarchy, Examples, and Cross Links sections make the concept maps distinctive. When these sections are absent or not adequately addressed, the Proposition section is thought to look like flowcharts showing how a process progresses. In our study, it was found that the total scores of the students from the concept maps were quite high, but the scores from the Hierarchy, Examples, and Cross Links sections in all of the maps were lower ($p < 0.05$). The Hierarchy, Examples, and Cross Links sections require more cognitive skills. It is thought that students get lower scores from these sections because they are still in the second year and they are just getting acquainted with concept maps. Competencies in these sections can be developed with more practice and experience. Studies on the use of concept maps as an assessment tool are quite limited in the literature. In these studies, concept maps were scored as a whole, and their components were not separated and compared [28–30]. In the study of Hsu and Hsieh (2005), concept maps were evaluated qualitatively, and similar to our study, students' feedback was recorded [21]. It was found that the first concept maps did not contain hierarchical concepts and cross-links and that they were created in the form of a simple diagram. For the third and last concept maps, it was noted that they were more integrative and included hierarchical concepts and cross-links. For educators, it can be very time-consuming to evaluate the concept maps prepared by students one by one. However, the analysis of concept maps is extremely valuable in terms of knowing within which dimensions deep learning takes place. For this reason, as in our study, concept maps can be used as an objective assessment method even in large classes using a pre-prepared template concept map regarding the subject of the course, with the inclusion of a large number of instructors. In addition, it is recommended to particularly emphasize the Hierarchy, Examples, and Cross Links sections, which organize the information, during the stage of teaching students how to make concept maps and review them.

Concept maps contain multidimensional structures and can be complex to use. Therefore, it is important to use both quantitative and qualitative designs together in the assessment of their effectiveness. In this study, it was found that the majority of the students' opinions about the use of concept maps were very positive. Although there were very few negative opinions, even the negative opinion that "more issues could be addressed (2.6%)" was considered as an indicator of satisfaction from the implementation. Similarly, in the study of Bilik (2020), students stated that concept mapping encouraged learning, and made understanding easier, but took a lot of time [24]. The students in Fawaz's (2020) study, in which their perceptions of concept maps were evaluated, thought the concept maps would increase learning and specifically improve comprehensive learning by encouraging active and independent learning [13]. Accordingly, it was evaluated that the use of concept maps positively affected learning and that students were highly satisfied.

There are some limitations of this study. The research was carried out in a single center with second-year students of a nursing faculty. In addition, the results of this study, which was conducted in a cross-sectional study design, may not be generalized to all nursing students. Another limitation of the study is that it is not validity and reliability of the The Student Form for Laboratory Education Assessment.

CONCLUSION

The results of this study showed that the use of concept maps as an assessment method in video-based distance surgery nursing laboratory education made the students highly successful and satisfied. Moreover, the students thought that the use of concept maps affected their learning positively. Concept maps can be used as an assessment method for video analysis even in crowded classes, guided by a pre-prepared template concept map about the topic of the course and by forming small groups. At the outset, students should be given a comprehensive education on the main components of concept maps. More studies using concept maps as an assessment tool are needed.

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