

## INVESTIGATING NURSING STUDENTS' SATISFACTION WITH THE QUALITY OF COURSES AND VIRTUAL LEARNING DURING THE COVID-19 PANDEMIC IN 2020-2021

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### ABSTRACT

Education in medical sciences, including nursing, has encountered numerous challenges following the worldwide outbreak of coronavirus disease 2019 (COVID-19). Additionally, students' satisfaction with the methods of instruction can be accompanied by improved learning outcomes. This study aimed to investigate the nursing students' satisfaction with the quality of courses (SQC) and satisfaction with virtual learning (SVL) during the COVID-19 pandemic. This cross-sectional study was conducted at a nursing school (105 nursing students) in Tehran, Iran, in the first semester of 2020-2021. The individual characteristics questionnaire, the Course Experience Questionnaire (CEQ), and the e-Learning Satisfaction Questionnaire (e-LSQ) were used for data collection. More than 88% of the nursing students were satisfied with the quality of the courses. The level of SVL in 57.1% of them was moderate. Among the individual variables, only the academic semester was regarded as a predictor of SQC ( $p=0.025$ ). There was no significant relationship between the dimensions and the total score of CEQ with students' academic achievement ( $p<0.05$ ). Additionally, all the CEQ dimensions were significant predictors of the nursing students' SQC ( $p<0.001$ ). Given the unknown time of eradicating COVID-19, it is necessary to adopt appropriate policies and perform proper planning to continue better nursing education and increase student satisfaction.

**Keywords:** COVID-19, education, learning, nursing, pandemic, satisfaction, students, virtual learning.

## INTRODUCTION

The first reported outbreak of the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) occurred in December 2019, and it continues to spread around the world. This condition led to the instability of many standard procedures worldwide, facing nations with considerable burdens in socioeconomic, healthcare, political, and educational domains (Chen et al., 2020). Considering the government instructions on the closures of higher education institutions and universities, medical and nursing schools worldwide, including Iran, encountered many challenges. However, given the unknown time of eradicating COVID-19 and the urgent need in healthcare systems for nursing graduates, education could not be postponed (Dewart, Corcoran, Thirsk, & Petrovic, 2020; Farsi, Sajadi, et al., 2021; Hayter & Jackson, 2020). These challenges are mainly due to the in-person, virtual, and hybrid learning courses (Hayter & Jackson, 2020).

Virtual learning (e-learning) refers to one type of planned learning wherein teaching and learning are typically performed in separate environments in which educators present course contents through learning management systems (LMS), multimedia resources, the Internet, and video conference. Video calls, video/ audio conferencing, chats, and webinars; Zoom, Skype, Sky Room, Adobe Connect, Hangouts Meet, and LMS such as NAVID system (viz. an online platform for academic teaching and learning) in Iran are platforms that can be used (Alqahtani, Innab, & Bahari, 2021). Evidence also suggests that accelerated interactions between students and educators, reductions in travel costs (Bora & Ahmed, 2013), flexibility, diverse nature, and time-saving are the main benefits of virtual learning. Nevertheless, hardware and software problems, connectivity issues, financial burdens, privacy protection, technical difficulties and support, and a lack of face-to-face interactions are some of the challenges facing this type of learning (Hoq, 2020). Although cyberspace allows educators to communicate with students regardless of distances during the COVID-19 pandemic, network problems, inadequate knowledge, and no in-person communications are the drawbacks of virtual learning in times of this crisis (Arora & Srinivasan, 2020).

Medical sciences students, including nursing students, need to take clinical training courses in hospitals and medical centers to acquire the necessary skills (Phillips, Mathew, Aktan, & Catano, 2017). During the COVID-19 pandemic, educators can teach theoretical courses through distance learning and e-learning, such as the use of cyberspace and social networking platforms (Murphy, 2020). With the outbreak of this condition, some universities have also canceled clinical internships to minimize personal interactions to curb the spread of the disease. Contrastingly, others have not done so to provide clinical opportunities, improve clinical skills, facilitate students to gain more experience, help students graduate, compensate for medical staffing shortages, and provide clinical education, especially for senior students in healthcare environments (Zand S, Nejat N, Salehi omran E, & Izadi, 2020).

According to the university chancellor and organizational head decisions within the available facilities and infrastructure, teaching and learning processes have been shifted into virtual methods or a hybrid combination of in-person and virtual (viz. online and offline) methods through this pandemic. So now the main question addressed is, how satisfied are students with this type of education?

Teaching and learning based on students' satisfaction with the quality of the courses (SQC) are essential tasks of the higher education systems (Seifollahi & Eskandari, 2021). Academic satisfaction means a certain amount of positive feelings and attitudes in students towards their fields of study and their universities as an indicator for the performance improvement and success of such centers. In this regard, Hamdan et al. (2021) had reported that the levels of satisfaction in Jordanian undergraduate students during the COVID-19 pandemic were low (Hamdan et al., 2021). Kaur et al. (2020) showed a direct relationship between the education quality dimensions and satisfaction levels in graduate students in India (Kaur, Singh, & Garg, 2020). The researchers also found that 66.2% of nursing students in one of the nursing schools in Tehran, Iran, were satisfied with the quality of courses after the onset of the COVID-19 pandemic, despite the emergence of critical conditions and numerous burdens on educational systems.

Additionally, the level of satisfaction in 56.3% of the students with virtual learning was moderate. The nursing school used blended face-to-face education and virtual learning and continuing clinical internships in the wards wherein COVID-19 patients had not been hospitalized (Farsi, Aliyari, Ahmadi, Afaghi, & Sajadi, 2021). The researchers in an action research study attempted to identify and address the weaknesses

in the education system after the onset of the pandemic during different semesters. The most significant changes included utilizing virtual instead of face-to-face learning for theoretical courses, increasing the Internet speed, upgrading classroom equipment to make more and better use of online video/audio communications, developing chat rooms and webinars, and more coherent exploitation of offline LMS like the NAVID system. Instructors also tried to increase interactions between educators and students through a variety of online and offline methods. The regular presence of a physician and a psychologist in the school, increased access to personal protective equipment, and consistent decision-making by managers about time constraints and conditions were also other changes in the school.

Lastly, the student's level of SQC and satisfaction with the virtual learning (SVL) in the first semester of the 2020-2021 academic year were examined and reported in this study.

## **METHOD**

This cross-sectional (descriptive-correlational) study was conducted in the first semester of 2020-2021.

### **Participants**

Through the convenience sampling method, 105 nursing students were recruited in the study. The inclusion criteria were willingness to participate in the study and taking theoretical courses. The students with incomplete questionnaires were excluded.

The majority of the nursing students enrolled in this school lived in dormitories located in Tehran, Iran. The first semester of the 2020-2021 academic year began from September 5, 2020, to January 16, 2021. The students entered the university at various intervals during the course of the first four consecutive days to prevent congestion and allow for social distancing at the beginning of the semester. Before entering the students into the school, each one was examined by the physician. The students suspected of having COVID-19 were then isolated from others and tested using polymerase chain reaction in the quarantine room until the results were reported.

Moreover, the students' belongings were disinfected. These students had the experience of participating in in-person and virtual theoretical courses, clinical training in hospitals, and living in dormitories with adherence to health protocols in the second semester of 2019-2020. All the school facilities and classrooms were disinfected daily. All students and staff were also required to put on face masks and observe social distancing in all parts of the school and the dormitory. Nursing managers and educators also oversaw the proper implementation of the health protocols. Facemasks and surface disinfectants were given to the students. Also, separate locker rooms were dedicated to the students to change their internship uniforms. The students were additionally monitored daily for clinical signs and symptoms. Their body temperature was monitored daily. Furthermore, senior nursing students trained junior students on sanitation, adherence to health protocols, and provided updated information on COVID-19.

Following the third wave of COVID-19 in Iran in November, all in-person classes were canceled. At this time, virtual theoretical courses were presented through the online Sky Room platform. Some theoretical courses were additionally provided offline on the NAVID system. Thus, the educational content was developed by the educators as multimedia on the Microsoft PowerPoint software. The departments' managers checked the quality of the content.

Other teaching aids such as educational videos, audio files, and educational content in PDF format had been uploaded onto the NAVID system. Furthermore, in addition to online and offline education, the NAVID system, smartphones, short message services, emails, and other forms of telecommunication were utilized to keep in touch with the students. Although using the school network was free, students using their cellphone were subject to data surcharges. Finally, after completing the courses and following the reductions in the pandemic peak, the end-semester exams were held in person.

The Sample, their characteristics and their selection methods should be described in detail and justified.

## Data Collection and Analysis

The individual characteristics questionnaire, Course Experience Questionnaire (CEQ) and e-Learning Satisfaction Questionnaire (e-LSQ) was used for data collection.

The data analysis was performed using the SPSS Statistics (ver.20) software. The Kolmogorov-Smirnov test was employed to check the normality of the data. In addition, descriptive (i.e., mean, standard deviation [SD], frequency, and percentage) and analytical (one-way analysis of variance [ANOVA], stepwise linear regression, Pearson correlation coefficient, independent-samples t-test, and Chi-square test) statistics were obtained. A linear regression model was used to predict the effects of the individual variables on the total score of the CEQ. Accordingly, the first variable was imported into the model based on the largest effect size in a stepwise manner. If other variables could significantly influence the dependent variable, they were further entered into the model in the following steps. The level of significance was set at  $p = 0.05$ . In addition to the significance levels, adjusted R-squared (R<sup>2</sup>) was one of the regression analysis results. These findings suggested how much the independent variable had predicted the dependent one.

### The Scale

The individual characteristics questionnaire was used for data collection. The questionnaire included age, gender, semester, previous-semester grade point average (GPA), cumulative GPA, level of education, the field of study, number of courses selected in the current semester, and accommodation.

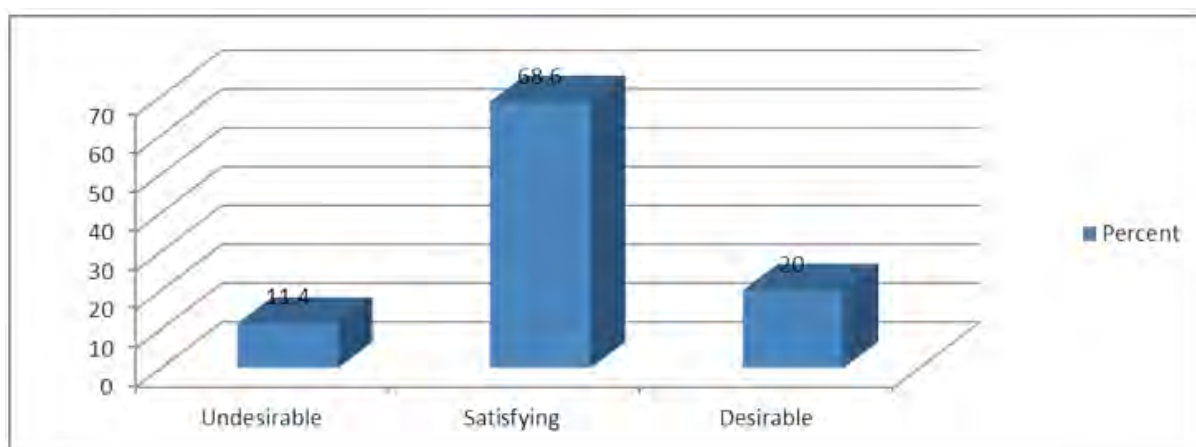
The Course Experience Questionnaire (CEQ) was also used for data collection. The CEQ designed by Ramsden and Entwistle (1981) was used to assess the SQC. This questionnaire covered all the essential teaching and learning quality aspects that could affect students' academic success (Cheraghi & Mahjub, 2013). This 50-items questionnaire included six dimensions of teaching (items 1-15), curriculum goals and standards (items 16-19), the volume of lessons (items 20-24), teaching resources and materials (items 25-38), course evaluation (items 39-47), and satisfaction (items 48-50). The answers were on a five-point Likert scale (strongly agree, agree, neutral, disagree, strongly disagree) scored +100, +50, 0, -50, and -100, respectively. The maximum and minimum scores of this questionnaire were +4500 and -4500, respectively. Of note, items 1, 2, 4, 8, 9, 39, 40, 42, 46, and 47 were scored in reverse. The total score was also classified into low (less than -1500), satisfactory (between -1500 and +1500), and high (more than +1500). In this study, the total score of the questionnaire was considered as the overall students' SQC. The validity and reliability of this questionnaire had been previously confirmed with the Cronbach's alpha coefficient of 85% (Cheraghi & Mahjub, 2013), as well as the study's own Cronbach's alpha values of the CEQ was 96% for the internal reliability. Also, the dimensions of CEQ questionnaire Cronbach's alpha were: Teaching (91%), Curriculum goals and standards (77%), Volume of lessons (89%), Teaching resources and materials (93%), Course evaluation (81%) and Satisfaction (79%).

The e-Learning Satisfaction Questionnaire (e-LSQ) was also used for data collection. The e-LSQ developed by Sheikh Taheri et al. was used to assess the nursing students' SVL. This questionnaire included some descriptive questions about virtual learning. In addition, the questionnaire contained 26 items that were scored from 1 (strongly disagree) to 5 (strongly agree), whose scores ranged between 26 and 130. In this sense, the scores less than 45.4 indicated low levels of satisfaction, the scores from 45.5 to 90 denoted moderate levels of satisfaction, and those between 91 and 131 suggested high levels of satisfaction. The validity and reliability of this questionnaire were approved in a former study, with a content validity ratio higher than 0.6, the mean content validity index 0.92, and Cronbach's alpha coefficient 0.94 (Sheikh Taheri A, 2020), as well as the study's own Cronbach's alpha values of the e-LSQ was 0.97 for the internal reliability. The validity and reliability processes in data collection and analyses should be described sufficiently.

## FINDINGS

The mean age of the nursing students was  $22.27 \pm 3.73$  (19-36) years. The students were also taking theoretical and clinical courses in the first to seventh semesters. The students' mean previous-semester GPA was  $16.66 \pm 3.96$ , and their cumulative GPA was  $15.89 \pm 4.89$ . The nursing students had taken  $16.98 \pm 4.25$  courses

in time of the study. Moreover, 67.6% of the students were female, 84.4% were living in dormitories, and 88.6% were enrolled in undergraduate programs. The mean and standard error (SE) of students' SQC was  $422.86 \pm 161.88$ , ranged from -5000 to 4550. Thus, the quality of the courses from the students' perspectives was satisfying and at a desirable level (Figure 1).



**Figure 1.** Quality of the academic course from the perspectives of the students

The stepwise linear regression demonstrated that only the “academic semester” was a predictor of the students' SQC ( $p=0.025$ ), which could explain only 5% of the variance in this regard. The significance level of other individual variables was less than 0.05, and they were not imported into the regression model. Therefore, the “academic semester” was the best predictor of the students' SQC (Table 1).

**Table 1.** Relationship between satisfaction with the quality of the courses and satisfaction with virtual education according to the individual characteristics of students

Variable		Age	Semester	Previous-semester GPA	Cumulative GPA	Number of selected courses
Total CEQ score	Pearson Correlation Coefficient	-0.232	-0.364	-0.45	-0.08	-0.08
	P-Value	0.19	* $<0.0001$	0.684	0.494	0.449
Satisfaction with virtual education	Pearson Correlation Coefficient	-0.144	-0.027	0.119	0.102	0.183
	P-Value	0.148	0.786	0.274	0.383	0.08

GPA: grade point average; CEQ: Course Experience Questionnaire; \* $P<0.05$

The independent-samples t-test outcomes revealed that the students' SQC was not significantly different between females and males ( $t= 1.041$ ,  $p=0.301$ ), while SVL was significantly different in both genders ( $t = -3.377$ ,  $p = 0.001$ ). Moreover, the nursing students' SQC in undergraduate and graduate students ( $t = -3.445$ ,  $p = 0.001$ ), as well as the fields of study ( $F = 5.876$ ,  $p = 0.004$ ), was significantly different, while no significant difference was observed in SVL among undergraduate and graduate students ( $t = 1.349$ ,  $p = 0.188$ ) as well as the fields of study ( $F = 0.460$ ,  $p = 0.632$ ). In addition, the students' SQC ( $F = 2.071$ ,  $p = 0.090$ ) and virtual learning ( $F = 1.378$ ,  $p = 0.347$ ) did not differ significantly according to their accommodation (Table 2).

**Table 2.** Satisfaction with the quality of the course and satisfaction with the virtual education by gender, degree, fields of study and accommodation of students

Variable	Frequency	Mean	Standard Deviation	Value of test statistics, degree of freedom, level of significance	
Total CEQ score	Female	34	666.18	1876.16	t= 1.041
	Male	71	306.34	1544.67	df=103 P=0.301
Satisfaction with virtual education	Female	34	54.03	25.54	t= -3.377
	Male	71	72.06	25.62	df=103 *P=0.001
Total CEQ score	BS	93	232.26	1609.06	t= -3.445
	MSc	12	1900	1293.34	df=103 *P=0.001
Satisfaction with virtual education	BS	93	66.95	28.11	t= 1.349
	MSc	12	60.58	12.85	df=27.516 P=0.188
Total CEQ score	Nursing	93	232.26	1609.06	F= 5.876
	Emergency nursing	9	1894.44	1464.04	df=2
	Military nursing	3	1916.67	791.1	*P=0.004
Satisfaction with virtual education	Nursing	93	66.95	28.11	F= 0.460
	Emergency nursing	9	58	12.59	df=2
	Military nursing	3	68.33	12.42	P=0.632
Total CEQ score	Dormitory	89	284.83	1611.77	F= 2.071
	With Family	10	1415	1117.05	df=4
	Alone	3	2066.67	3144.17	P=0.090
	With Friends	1	-250	0	
	Other	2	-525	2156.67	
Satisfaction with virtual education	Dormitory	89	67.9	27.38	F= 1.378
	With Family	10	56.1	17.23	df=4
	Alone	3	53	4.58	P=0.347
	With Friends	1	26	0	
	Other	2	82	48.08	

CEQ: Course Experience Questionnaire; BS: Bachelor of Science; MSc: Master of Science; \*P<0.05

Pearson correlation coefficient also established a significant relationship between the dimensions and the total score of the CEQ and the students' academic achievement (viz. cumulative GPA and previous-semester GPA) (Table 3).

**Table 3.** Relationship between dimensions and total CEQ score with students' academic achievement

Dimensions and range scores of CEQ questionnaire	Mean (SD)	Previous-semester GPA		Cumulative GPA	
		Pearson Correlation Coefficient	P-Value	Pearson Correlation Coefficient	P-Value
Teaching, 1400 to -1500	165.24 (52.39)	-0.040	0.714	-0.075	0.524
Curriculum goals and standards, 400 to -400	72.38 (15.94)	0.125	0.250	0.057	0.625
Volume of lessons, 500 to -500	-17.14 (25.16)	-0.028	0.799	-0.045	0.702
Teaching Resources & Materials, 1400 to -1400	94.29 (52.77)	-0.080	0.464	-0.119	0.309
Course evaluation, 900 to -900	97.62 (31.97)	-0.088	0.422	-0.111	0.344
Satisfaction, 300 to -300	10.48 (14.81)	0.031	0.778	0.034	0.774
Total CEQ score, 4550 to -5000	422.86 (161.88)	-0.45	0.684	-0.08	0.494

CEQ: Course Experience Questionnaire; SD: Standard Deviation; GPA: grade point average

The mean and SE of the dimensions and the total score of the CEQ are illustrated in Table 2. Except for the "volume of lessons," other dimensions had positive mean values.

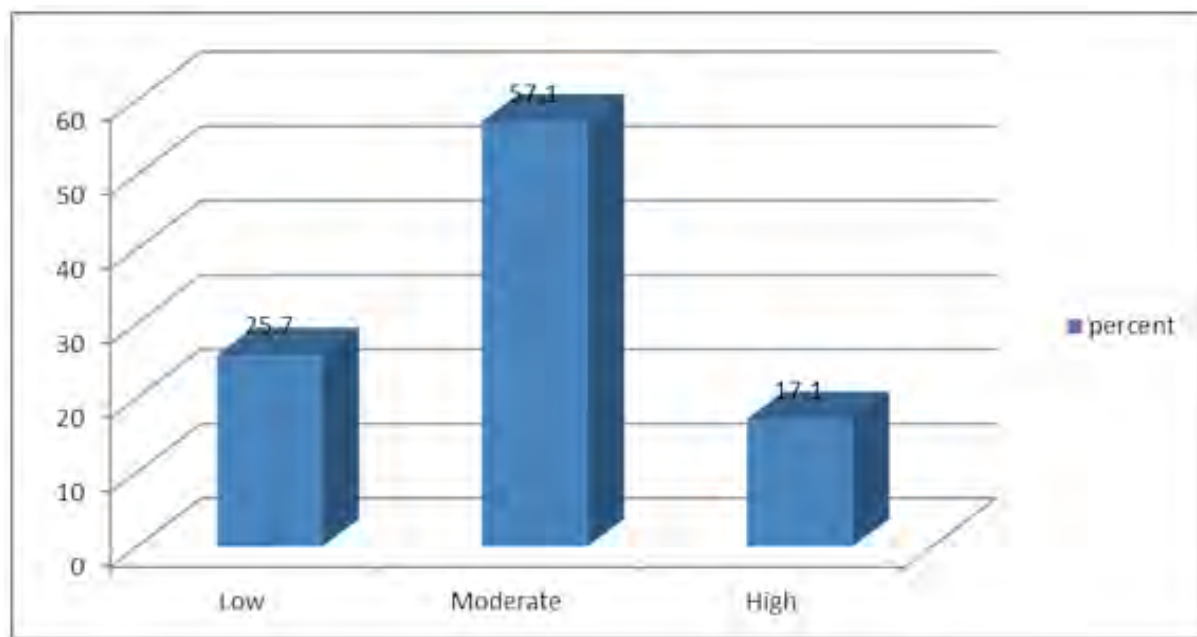
A linear regression model was used to predict the effect of the CEQ dimensions on the total score of the students' SQC. The findings showed that the best predictors of SQC were "teaching resources and materials" ( $p < 0.001$ ). The "teaching resources and materials" could predict the SQC by 0.9 units in the first step ( $p < 0.001$ ), which meant explaining 90% of the variance in this variable. During the second step, along with the addition of the "teaching dimension," these two variables could predict SQC by 0.954 units ( $p < 0.001$ ), denoting the prediction of 95% of the dependent variable by two independent variables. Within the third step, the "course evaluation" was entered into the model. These three variables thus could predict 0.977 units of the variable of SQC ( $p < 0.001$ ). In the fourth step, by adding the "volume of lessons" to the model, the variable of SQC was predicted by 0.992 units ( $p < 0.001$ ). During the fifth step, "curriculum goals and standards" were further added to the previous variables, leading to a prediction of 0.996 units of the dependent variable, i.e., SQC ( $p < 0.001$ ). Finally, the last variable, viz. "student satisfaction," was added to the model, so the total changes in the students' SQC could be predicted with the inclusion of these six variables (Table 4). It should be noted that the "academic semester" did not have a confounding effect on the model.

**Table 4.** Predictors of satisfaction with the quality of the courses based on multiple linear regression by stepwise method

Predictive variables	Satisfaction with the quality of the courses						
	Step	R2	Adjusted R2	B	$\beta$	t	P-value
Teaching Resources & Materials	1	0.901	0.900	2.912	0.949	30.581	*<0.0001
Teaching	2	0.955	0.954	1.106	0.358	11.064	*<0.0001
Course evaluation	3	0.977	0.977	1.070	0.211	10.036	*<0.0001
Volume of Lessons	4	0.992	0.992	1.064	0.165	13.565	*<0.0001
Curriculum Goals and Standards	5	0.997	0.996	1.071	0.098	11.482	*<0.0001
Satisfaction	6	1.000	1.000	1.000	0.098	-	-

\* $P < 0.05$

The mean±SD of the nursing students' SVL was 66.22±26.84. The levels of SVL in the majority of the students (57.1%) were also moderate, and 17.1% were very satisfied (Figure 2).



**Figure 2.** Satisfaction of virtual education from the perspective of students

Flexibility in course time (35.9%) and place (44%) were the important reasons some students were interested in virtual learning. However, the lack of two-way communications with educators (40.1%) and problems with the Internet connection (35.2%) were also mentioned as the most important drawbacks of virtual learning and offline courses. Furthermore, the students noted that about 14.36±7.6 Gigabytes had been added to their Internet use during this semester, mostly to download course contents via emails and virtual networks.

## DISCUSSIONS AND CONCLUSION

In this study, SQC and virtual learning levels in nursing students in the first semester of the 2020-2021 academic year were examined during the COVID-19 pandemic. The majority of the students believed that the quality of training was at a satisfactory and desirable level. In addition, this study showed that SQC increased compared with that in the previous semester, indicating the effectiveness of the changes stated in the introduction section. Similar findings had been reported in other studies (Cheraghi & Mahjub, 2013; Farsi, Aliyari, et al., 2021). Fatani (2020) reported that 82% of the medical students were very satisfied with the quality of online training during the COVID-19 pandemic (Fatani, 2020). Considering the quality of educational services for the competitiveness, survival, growth, and sustainability of higher education systems (Saleem, Moosa, Imam, & Khan, 2017), ensuring students' SQC is thus an essential requirement.

This study revealed no significant relationship between the nursing students' overall SQC and the age, previous-semester GPA, cumulative GPA, and the number of courses. Similar findings had been reported in the previous studies (Cheraghi & Mahjub, 2013; Farsi, Aliyari, et al., 2021). In this study, the students' academic semester was considered as the only predictor of their SQC. There was a significant inverse relationship between the students' overall SQC and their semester. These findings were consistent with a previous survey by the researchers (Farsi, Aliyari, et al., 2021), while Noghan et al. (2013) had found no relationship between semesters and students' overall SQC (Cheraghi & Mahjub, 2013).



This study also showed that the students' overall SQC was not different in females and males, while the male students were more satisfied with virtual learning. Shahrabadi et al. (2014) had observed no significant difference between the levels of SQC in both genders (Shahrabadi, Rezaeian, & Haghdoost, 2014), while the researchers showed that the male students were more satisfied with their courses compared with their female counterparts (Farsi, Aliyari, et al., 2021). Men have been noted to demonstrate more interest in using technologies and software. Nikkhah Ghamsari and Mansourian Ravandi (2015) showed that the use of the Internet had been at higher rates in men (Nikkhah Ghamsari & Mansourian Ravandi, 2015).

The graduate students were more satisfied with their courses in the present study than undergraduate ones, while their SVL was not significantly different. In this regard, Hamdan et al. (2021) and Farsi et al. (2021) reported that there was a significant difference in the students' levels of satisfaction considering their levels of education (Farsi, Aliyari, et al., 2021; Hamdan et al., 2021). Prior experiences in graduates in education, more information about dealing safely with pandemics, and the small number of such students in each course could pave the way for their peace of mind and satisfaction.

A significant relationship was observed between the fields of study and the students' overall SQC in the present study, while there was no significant difference between their SVL and fields of study. Noghan et al. (2013) reported a significant relationship between the fields of study in the students surveyed and their overall SQC (Cheraghi & Mahjub, 2013).

In this study, there was no significant relationship between SQC and virtual learning and accommodation. Demuyakor (2020) had shown that students living in the dormitories of China had complaints about the Internet as a challenge to e-learning (Demuyakor, 2020).

This study demonstrated that all the CEQ dimensions could be significant predictors of the students' SQC. These findings were consistent with other investigations in this area (Farsi, Aliyari, et al., 2021; Shahrabadi et al., 2014). Good experience with the courses could thus include indicators such as good teaching, clear curriculum goals and standards, an appropriate volume of lessons, beneficial teaching resources and materials, proper course evaluation, and high satisfaction (Price et al., 2011). The students' failure can be thus associated with factors such as poor teaching, no clear educational goals, and inadequate evaluation methods (Shahrabadi et al., 2014).

The findings showed that the best predictors of the nursing students' SQC were "teaching resources and materials." Consistent with this, Demuyakor (2020) had reported that 315 Ghanaian international students had felt satisfied with e-learning in the higher education institutions in Beijing, China, in terms of the teaching materials available. Successful and effective e-learning mainly depended on the design of the course contents and the availability of teaching resources (Demuyakor, 2020). The researchers also recently found that "teaching resources and materials" with a positive score were the best predictors of SQC (Farsi, Aliyari, et al., 2021), while Noghan et al. (2013) had reported that the majority of students had given a negative score to this dimension (Cheraghi & Mahjub, 2013). If educators properly present the course contents, they can increase students' satisfaction and performance (Gopal, Singh, & Aggarwal, 2021).

During the COVID-19 pandemic, education is not being provided in a traditional mode but mainly in cyberspace and through e-learning; therefore, using valid e-learning resources such as digital lessons designed with educational models, online books, up-to-date software, and virtual simulations are recommended.

The findings showed that "teaching" was the second variable as a strong predictor of students' SQC. In Gopal et al.'s (2021) survey, the instructor's quality had been introduced as the most significant factor affecting students' satisfaction with online courses (Gopal et al., 2021). In the study by Shahrabadi et al. (2014), good teaching could significantly affect students' SQC (Shahrabadi et al., 2014). Contrastingly, students gave a negative score to the teaching dimension in the survey by Noghan et al. (2013), denoting their dissatisfaction (Cheraghi & Mahjub, 2013).

Education is a two-way process of teaching and learning (Rahmani Pour, Aliyari, Farsi, & Ghelich, 2020); therefore, one of the essential strategies to improve students' learning and promote the performance of educational systems is to exploit new teaching methods. The use of virtual learning environments through

web-based clinical training platforms can thus lead to students' satisfaction (Mehrdad et al., 2020). Boa (2020) had reported that educators could significantly contribute to the implementation of e-learning. However, the technology by itself was not able to replace their work (Bao, 2020). Therefore, educators' views are vital, so they must be very efficient during education because their interests lead to a better quality of e-learning.

The third predictor imported into the model was "evaluation," which obtained a positive mean score and representing the students' satisfaction with the current evaluation. Similar results had also been reported in other studies (Cheraghi & Mahjub, 2013; Farsi, Aliyari, et al., 2021). An appropriate feedback system is required to increase the efficiency of educators and help them in planning lessons and promoting strategies (Tawafak, Romli, & Alsinani, 2019). To improve the quality of education, providing performance feedback to educators can be very useful because performance awareness is a prelude to behavioral change (Shahrabadi et al., 2014). The school in question developed comprehensive evaluations during courses, providing the grounds for the students' progress and allowing managers and educators to make changes in case of unsatisfactory evaluations in every field. Reviewing the evaluation results during the COVID-19 pandemic and addressing it can accordingly increase the quality of educational services.

The fourth predictor of the students' SQC was the "volume of lessons" in this study. The students only gave a negative score to this dimension, suggesting their dissatisfaction. Other studies had further shown that the high volume of lessons could reduce student satisfaction (Cheraghi & Mahjub, 2013; Farsi, Aliyari, et al., 2021; Shahrabadi et al., 2014). Kaur (2020) showed that the volume of lessons could indirectly shape student satisfaction (Kaur et al., 2020). One of the most critical points in courses is the high volume of teaching materials, which may not be practical in some fields or may not effectively shape career prospects. Therefore, in addition to reviewing educational curricula according to community needs, educational managers should pay more attention to the quality of the educational content and students' professional competence.

The fifth predictor of the nursing students' SQC was the "curriculum goals and standards," which received a positive score, indicating the students' relative satisfaction. Similar results had been reported in other studies (Cheraghi & Mahjub, 2013; Farsi, Aliyari, et al., 2021; Shahrabadi et al., 2014). Shahrabadi (2014) found that the strongest predictor of GPA was clear goals and standards (Shahrabadi et al., 2014). Specific educational goals can lead to managing students' activities, which supervisors should consider (Haghdooost, Rafiei, Raeisvandi, & Kazemzadeh, 2015).

The last variable imported into the model was the "students' satisfaction with the courses," which received a positive score. The students' SQC occurred following the improvement in the CEQ dimensions, so the students' satisfaction with educational methods could lead to better learning outcomes. Gopal et al. (2021) reported that instructor's quality, students' expectations, prompt feedback, and course design could positively shape student satisfaction, leading to better student performance. These four factors are essential in educational management to reach more satisfaction and better performance in online courses (Gopal et al., 2021).

In this study, the majority of students had a moderate level of SVL in the current semester. Providing more equipment and developing infrastructure for e-learning during this semester compared with the previous one could thus lead to higher SVL. Oducado and Estoque (2021) revealed that 46.3% of the nursing students had a moderate level of satisfaction with e-learning during the COVID-19 outbreak (Oducado & Estoque, 2021). Moreover, Surahman and Sulthoni (2020) found that 19% of the students were very satisfied with online learning services in the Indonesian higher education system during the COVID-19 pandemic, and 41%, 30%, and 10% of them were satisfied, dissatisfied, and very dissatisfied, respectively (Surahman, 2020). Alqahtani et al. (2021) reported that prior experience and readiness for e-learning could affect the nursing students' overall SVL and evaluations in Saudi Arabia (Alqahtani et al., 2021). Some researchers found that no awareness, lack of interest, and skepticism about the usefulness of virtual courses were the main reasons for those refusing such courses in New Delhi, India (Arora & Srinivasan, 2020). Holding empowerment programs for all those involved in e-learning, including students, educators, and staff in the form of training workshops to introduce the basic concepts of virtual learning and digital content production and familiarity with online course software, would thus contribute.

Despite its advantages and disadvantages, many experts believe that e-learning is the best supplement to traditional methods and led to increasing learners' experiences (Akmayeva, 2017). However, educational managers should identify weaknesses and then provide appropriate solutions to meet the needs of students in terms of education, health, safety, and welfare.

In the present study, the nursing students also pointed out some of the problems facing e-learning, including connectivity issues, high costs of the Internet, and no two-way interactions with teachers. In a similar study, the difficulty of measuring learners' levels of attention and ensuring their quality, problems with the Internet speed and its high costs, inefficient teaching of practical courses via virtual systems, need for face-to-face interactions to fulfill thesis and dissertation requirements, technical difficulties, and inappropriate educational contents had been mentioned as the main challenges of e-learning (Rezaei, 2020). In other studies, no access to online tools and the Internet, inadequate equipment such as laptops, poor digital skills (Ahmed, Allaf, & Elghazaly, 2020), and no interactions (Ferrel & Ryan, 2020) were the most challenges facing virtual learning. The discrepancy between the results of this study and other investigations may be due to the differences in the study population and settings, the critical conditions dominating the global community, including the COVID-19 pandemic during the study.

Finally, it is suggested to reinforce the hardware and software infrastructure demanded by students, educators, and staff to produce educational content, prepare supplementary materials, develop online nursing simulations, create learning techniques based on online problem-solving techniques, and promoting virtual hospitals, which make up for the process of responsive education and help students fill educational gaps and promote their future career path through proper planning and practice. As much as possible, interactive technologies are required to present active and exciting learning through online tools.

One of the limitations of this study was assessing the nursing students' SQC using a survey, wherein the views of officials, educational managers, and educators were not assessed. Therefore, more research is suggested at other universities and higher education institutions in a survey on managers, educators, and faculty members.

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## REFERENCES

- Ahmed, H., Allaf, M., & Elghazaly, H. (2020). COVID-19 and medical education. *The Lancet Infectious Diseases*, 20(7), 777-778.
- Akmayeva, G. (2017). Impact of access control and copyright in e-learning from user's perspective in the United Kingdom. Brunel University London.
- Alqahtani, N., Innab, A., & Bahari, G. (2021). Virtual Education During COVID-19: Exploring Factors Associated With E-Learning Satisfaction Among Saudi Nursing Students. *Nurse Educator*, 46(2), E18-E22.
- Arora, A. K., & Srinivasan, R. (2020). Impact of pandemic COVID-19 on the teaching-learning process: A study of higher education teachers. *Prabandhan: Indian journal of management*, 13(4), 43-56.
- Bao, W. (2020). COVID-19 and online teaching in higher education: A case study of Peking University. *Human Behavior and Emerging Technologies*, 2(2), 113-115.
- Bora, U. J., & Ahmed, M. (2013). E-learning using cloud computing. *International Journal of Science and Modern Engineering*, 1(2), 9-12.
- Chen, T., Peng, L., Yin, X., Rong, J., Yang, J., & Cong, G. (2020). Analysis of user satisfaction with online education platforms in China during the COVID-19 pandemic. Paper presented at the Healthcare.
- Cheraghi, M., & Mahjub, H. (2013). Survey on Satisfaction from Quality of Passed Educational Course from Last Year Students' Perspective of Hamadan University of Medical Sciences. *Iranian Journal of Nursing Research*, 8(1), 76-86.
- Demuyakor, J. (2020). Coronavirus (COVID-19) and online learning in higher institutions of education: A survey of the perceptions of Ghanaian international students in China. *Online Journal of Communication and Media Technologies*, 10(3), e202018.

- Dewart, G., Corcoran, L., Thirsk, L., & Petrovic, K. (2020). Nursing education in a pandemic: Academic challenges in response to COVID-19. *Nurse education today*.
- Farsi, Z., Aliyari, S., Ahmadi, Y., Afaghi, E., & Sajadi, S. A. (2021). Satisfaction of the Quality of Education and Virtual Education during the Covid-19 Pandemic in Nursing Students of Aja University of Medical Sciences in 2020. *Journal Mil Med*, 23(2), 174-185.
- Farsi, Z., Sajadi, S. A., Afaghi, E., Fournier, A., Aliyari, S., Ahmadi, Y., & Hazrati, E. (2021). Explaining the experiences of nursing administrators, educators, and students about education process in the COVID-19 pandemic: a qualitative study. *BMC nursing*, 20(1), 1-13.
- Fatani, T. H. (2020). Student satisfaction with videoconferencing teaching quality during the COVID-19 pandemic. *BMC Medical Education*, 20(1), 1-8.
- Ferrel, M. N., & Ryan, J. J. (2020). The impact of COVID-19 on medical education. *Cureus*, 12(3).
- Gopal, R., Singh, V., & Aggarwal, A. (2021). Impact of online classes on the satisfaction and performance of students during the pandemic period of COVID 19. *Education and Information Technologies*, 1-25.
- Haghdoost, A. A., Rafiei, H., Raeisvandi, A., & Kazemzadeh, Y. (2015). Satisfaction of Postgraduate Students of Kerman University of Medical Sciences Iran with their Training Program and Campus Facilities. *Strides in Development of Medical Education*, 12(2), 355-365.
- Hamdan, K. M., Al-Bashaireh, A. M., Zahran, Z., Al-Daghestani, A., Samira, A.-H., & Shaheen, A. M. (2021). University students' interaction, Internet self-efficacy, self-regulation and satisfaction with online education during pandemic crises of COVID-19 (SARS-CoV-2). *International Journal of Educational Management*.
- Hayter, M., & Jackson, D. (2020). *Pre-registration undergraduate nurses and the COVID-19 pandemic: Students or workers? : Wiley Online Library*.
- Hoq, M. Z. (2020). E-Learning during the period of pandemic (COVID-19) in the kingdom of Saudi Arabia: an empirical study. *American Journal of Educational Research*, 8(7), 457-464.
- Kaur, S., Singh, G., & Garg, A. (2020). Evaluating the relationship between the course experience questionnaire and student satisfaction: A case from India. *Journal of Public Affairs*, e2471.
- Mehrdad, S., Dadgaran, I., Taheri Ezbarmi, Z., Taheri, M., Asgari, F., & Akhoundzadeh, L. (2020). The Necessity of Move Towards Virtual Clinical Teaching in the COVID 19 Pandemic: Introducing the SAID Model for Clinical Teaching of Endocrine Diseases by Webside Teaching Method. *Research in Medical Education*, 12(4), 1-4.
- Murphy, M. P. (2020). COVID-19 and emergency eLearning: Consequences of the securitization of higher education for post-pandemic pedagogy. *Contemporary Security Policy*, 41(3), 492-505.
- Nikkhah Ghamsari, N., & Mansourian Ravandi, F. (2015). The Relationship Between Cyber Space and Gender Identity, Case Study of the Internet Users in Kashan, Iran. *Media Studies*, 9(27), 107-120.
- Oducado, R. M., & Estoque, H. (2021). Online Learning in Nursing Education during the COVID-19 Pandemic: Stress, Satisfaction, and Academic Performance. *Journal Of Nursing Practice*, 4(2), 143-153.
- Phillips, K. F., Mathew, L., Aktan, N., & Catano, B. (2017). Clinical education and student satisfaction: an integrative literature review. *International journal of nursing sciences*, 4(2), 205-213.
- Price, L., Richardson, J. T., Robinson, B., Ding, X., Sun, X., & Han, C. (2011). Approaches to studying and perceptions of the academic environment among university students in China. *Asia Pacific Journal of Education*, 31(2), 159-175.
- Rahmani Pour, E., Aliyari, S., Farsi, Z., & Ghelich, Y. (2020). Comparing the effects of interactive and noninteractive education using short message service on treatment adherence and blood pressure among patients with hypertension. *Nursing and Midwifery Studies*, 9(2), 68-76.

- Rezaei, A. (2020). Student learning evaluation during the Corona: Challenges and Strategies. *Educational Psychology*, 16(55), 179-214.
- Saleem, S. S., Moosa, K., Imam, A., & Khan, R. A. (2017). Service quality and student satisfaction: the moderating role of university culture, reputation and price in education sector of Pakistan. *Iranian Journal of Management Studies (IJMS)* <http://ijms.ut.ac.ir>, 10(1), 237-258.
- Seifollahi, N., & Eskandari, N. (2021). The Role of Emotional Intelligence and Social Capital in Students' Academic Satisfaction. *Social Capital Management*, 8(1), 29-51.
- Shahrabadi, E., Rezaeian, M., & Haghdoost, A. (2014). Prediction of Academic Achievement Evaluation in University of Medical Sciences Based on the Students Course Experience. *Strides in Development of Medical Education*, 10(4), 485-493.
- Sheikh Taheri A, D. A. (2020). Investigating the views of students of Iran University of Medical Sciences on the use of e-learning management system. (Research Project), Iran University of Medical Sciences.
- Surahman, E. (2020). Student Satisfaction toward Quality of Online Learning in Indonesian Higher Education During the Covid-19 Pandemic. Paper presented at the 2020 6th International Conference on Education and Technology (ICET).
- Tawafak, R. M., Romli, A. B., & Alsinani, M. (2019). E-learning system of UCOM for improving student assessment feedback in Oman higher education. *Education and Information Technologies*, 24(2), 1311-1335.
- Zand S, Nejat N, Salehi omran E, & Izadi, S. (2020). Covid19 crisis as an opportunity for medical education evolution. *JMED*, 15(2), 151-155.