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The Influence of Sense of Community and Satisfaction With E-Learning and Their Impact on Nursing Students' Academic Achievement

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Abstract

The COVID-19 pandemic has caused a sudden shift to distance learning. For many nursing students, distance learning is a new experience and an essential requirement if they hope to complete their programs. Two challenges that nursing students could face during e-learning are the lack of social presence and low satisfaction. This study aimed to assess students' sense of community and satisfaction during e-learning and determine their impacts on academic achievement. This cross-sectional descriptive study used convenience sampling to collect data via a student satisfaction survey and a classroom community scale. There was a positive and significant correlation between the sense of community, total satisfaction with e-learning ($p < .001$), and academic achievement ($p < .001$). Academic achievement was positively and strongly correlated with satisfaction with teaching ($p < .001$), assessment ($p < .001$), generic skills and learning experiences ($p < .001$), and total satisfaction with e-learning ($p < .001$). Students who worked collaboratively with their classmates and were more engaged in their learning were more satisfied with e-learning and had higher academic achievement ($p < .01$). Female participants reported a strong sense of community and satisfaction with e-learning and greater academic achievement than males. Junior students perceived higher satisfaction scores and greater academic achievement ($p < .01$) than senior students. The findings of this study suggest that failing to meet student expectations can lead to low levels of student involvement. Students' engagement and satisfaction are good indicators of the quality and effectiveness of online programs.

Keywords: satisfaction, students, distance learning, sense of community, academic achievement, Saudi Arabia

Introduction

In most institutions, distance learning is not a novel mode of instruction. Yet, the spread of coronavirus disease beginning in 2019 (COVID-19) affected education systems globally (Murphy, 2020). Moreover, lockdowns during the ongoing pandemic affected health professionals' education and training. At the beginning of the pandemic, most courses went online to enforce social distancing among students and reduce transmission of the virus. Several programs conducted all their classes via distance learning using various online educational platforms to achieve learning outcomes and sustain the learning process. Distance learning was considered an effective strategy for delivering course content (Taylor et al., 2020).

The use of e-learning in higher education has increased rapidly in the last decade (Khalil et al., 2020). E-learning is a valuable method that allows students flexibility in their learning experiences and enables them to study at a time and location that is convenient. According to several studies, students consider e-learning simple to use (Opeyemi et al., 2019) and also comfortable and accessible due to readily available learning materials (Mukhtar et al., 2020).

Like other programs across the globe, the nursing programs in Saudi Arabia (SA) shifted to distance learning mode due to the rise in COVID-19 cases to help students complete required courses. The sudden shift to distance learning was a new experience for many nursing students (Bdair, 2021).

The effectiveness of e-learning is well documented in the literature. Numerous studies have highlighted the various benefits of online learning for students, including saving money and time spent on transportation and being able to spend more time with their families, study at their convenience, and sleep or rest more (Suliman et al., 2021; Tang et al., 2015). Students also discovered that online learning made them more independent in their learning, enhanced their critical thinking and problem-solving abilities, and encouraged self-reliance (Button et al., 2014; Sinaga et al., 2018; Suliman et al., 2021; Tang et al., 2015). However, there is a dearth of research assessing nursing students' sense of community and its impact on their satisfaction.

Background

Development of a sense of community is not only an essential component of student retention, but also influences students' success in distance learning (Bond & Lockee, 2014). The concept of a classroom community refers to the sense that members matter to one another and to the group, that they have responsibilities and obligations to one another and to the school, and that they have shared expectations, through which members' educational needs will be satisfied via shared learning goals (Rovai, 2002).

Connectedness and learning comprise two components of a classroom community in online studies. Rovai (2002) identified the following four essential prerequisites to support the development of a sense of community in an online class: spirit (recognition of membership), trust (willingness to rely on other team members), interaction (either task-driven or socio-emotional in origin), and the commonality of expectations and goals (learning). A sense of community in online classes is essential to promote students' satisfaction and help them feel connected and engaged. Instructors and faculty members are responsible

for building students' sense of community in online classes by designing interactive learning experiences (Glazier, 2016). Many authors have stated that student-faculty connections foster students' sense of community, belonging, cohesiveness, and engagement. In their studies, students seemed to value their relationship with their instructors, which is a proven predictor of students' satisfaction with online learning (Ali & Ahmad, 2011; Lee & Bonk, 2016; Luo et al., 2017; Smith, 2016). Online discussions facilitate interactions among students and provide them with opportunities to discuss academic and personal experiences with their peers (Shackelford & Maxwell, 2012).

Creating an online community was found to positively affect the quality of education as well as students' engagement and motivation. A meaningful online educational experience is one that is rooted inside the community of inquiry (COI), made up of the most important participants in the learning process: students and instructors (Fiock, 2020). The COI is a model that focuses on the promotion of meaningful learning experiences through the use of three factors: cognitive presence, which is reflected in students' engagement with the course materials; social presence, represented by students' involvement with other learners and cultural aspects of the learning environment; and instructional presence, which is symbolized by students' interaction with instructional methods and learning activities (Fiock, 2020).

Learning occurs when students participate, engage, and collaborate with each other (Green et al., 2017; Trespalacios & Perkins, 2016). Instructors enhance students' sense of community through regular communication, quality feedback, support, and interactions with the students (Green et al., 2017; LaBarbera, 2013). Furthermore, synchronous activities allow students to learn and interact with their peers and instructors (Rockinson-Szapkiw et al., 2016). Different tools and strategies have been identified to enhance students' sense of community in online classes, such as social networking platforms (Rockinson-Szapkiw et al., 2016), video conferencing (Armstrong et al., 2018), asynchronous discussion boards (Trespalacios & Perkins, 2016), and collaborative tools such as Google Workspace (Abdelmalak, 2015).

A major challenge that nursing students could face during e-learning is the lack of social presence (Mayne & Wu, 2011). Social presence is considered one of the factors required for creating a successful online learning experience. It is defined in the COI model as the ability of individuals to project their personal traits into the community, thus presenting themselves to the other participants as "actual people" (Fiock, 2020).

Prior studies have reported a positive association between a sense of community in online classes and student satisfaction (Moore, 2014; Shackelford & Maxwell, 2012). Perceived learning, satisfaction, engagement, and achievements were also positively influenced by the sense of community in online classes (Glazier, 2016; Top, 2012). LaBarbera (2013) reported that students' satisfaction with online classes was greater among those who felt engaged and got along with their classmates and instructors. However, studies comparing students' sense of community in online and face-to-face classes found that students experienced a higher level of satisfaction in the latter (Ritter & Polnick, 2008). The unexpected switch to online learning caused by the pandemic may have affected students' sense of community and satisfaction, especially in cases where instructors lacked the skills to successfully implement strategies to create a classroom community in this context (Robinson & Hope, 2013; Vilppu et al., 2019). In this regard, it is worth noting that studies examining the influence of a sense of community and satisfaction with e-learning on nursing students' academic achievement are lacking.

Student responses are vital indicators of concern regarding online courses as they reflect variations in the sense of community, especially in distance learning. A sense of community can be achieved desirably, in a well-structured manner, to facilitate the satisfaction and comfort of online learners regarding knowledge acquisition. Therefore, this study aimed to assess students' sense of community and satisfaction during e-learning and determine their impact on students' academic achievement.

Methodology

Design and Sampling

This was a cross-sectional, descriptive study. The study data were collected at a single point in time using the convenience sampling method. The inclusion criteria were as follows: (a) current enrollment as an undergraduate nursing student, (b) prior or current enrollment in practical courses (e.g., health assessment, adult, or critical care courses), (c) current enrollment in courses that were completely online or hybrid, and (d) proficiency in English, as the study questionnaires were not translated into Arabic. Interns who were no longer taking theoretical and clinical courses were excluded.

G*Power software, release 3.1 (https://www.psychologie.hhu.de/arbeitsgruppen/allgemeine-psychologie-und-arbeitspsychologie/gpower), was employed to determine the sample size. A minimum of 82 participants were required to run the bivariate Pearson's correlation and independent sample *t*-test. The final sample size in this study was 103.

Participants and Procedures

As the education system was largely run online across the country during the initial phase of the COVID-19 pandemic, nursing students were recruited using social media, such as Twitter, student clubs, and university e-mail accounts. Nursing students were recruited from a public university in SA.

Anonymous surveys were created using an online platform. Students were presented with the recruitment statement, the classroom community scale, and the student outcomes survey during the semester and prior to final exams. The recruitment statement included specific information regarding participants' privacy, confidentiality, and the risks and benefits of participation. Students were informed that participation in this study was completely voluntary and that there would be no consequences if they decided to withdraw. Moreover, students were informed that no identifiers, except the university identifier, would be collected, and that all gathered data would be reported in aggregate form.

Table 1 shows the demographic characteristics of the participants (n = 103). The students' ages ranged from 18 to 23 years, with the majority being 18 to 20 years old (63.1%). Female students comprised the majority of the study sample (84.5%). Regarding the level of education, all students were enrolled at the time in a bachelor's program in nursing (BSN), with junior students representing the majority of the sample (59.2%). The mean sample academic achievement score was 3.59 (SD = 0.55), with a possible range of 1–5.

Table 1

Sample Characteristics of the Participants

Characteristic	*n*	%
Age (years)		
18–20	65	63.1
21–23	38	36.9
Gender		
Male	16	15.5
Female	87	84.5
Level of education		
Junior	61	59.2
Senior	42	40.8

Note. *N* = 103. The mean GPA was 3.59 (*SD* = 0.55).

Measures

The participants completed a sociodemographic form that collected information on age, sex, and their current semester in nursing school. The students' grade point average (GPA) was extracted from the registration records using the university identifier.

In addition, students completed the student outcomes survey, a self-reported instrument aimed at measuring students' satisfaction with their learning. It included 19 items and three subscales (i.e., teaching, assessment, and generic skills and learning experiences; Fieger, 2012). All items were rated on a 5-point Likert scale that ranged from 1 (*strongly disagree*) to 5 (*strongly agree*). Higher scores indicated a greater level of satisfaction. This instrument was previously used with the same population and demonstrated reliable and valid results (Alqahtani et al., 2021).

In this study, the Cronbach's alpha (α) values were .92 for teaching, .94 for assessment, and .95 for generic skills and learning experiences. The overall reliability of the scale was .93, thus indicating the reliability and suitability of the scale (see Table 2).

Finally, students completed the classroom community scale, which measures the sense of community in a particular learning environment (Rovai, 2002). This self-reported measure comprised 20 items and two subscales: connectedness and learning. Each item was measured on a 5-point Likert scale ranging from *strongly agree* to *strongly disagree*. Specific items within each subscale were reverse-coded in this study to ensure that the least favorable choice imparted a low value and the most favorable choice was assigned a high value. This instrument has previously shown reliable and valid results, with a Cronbach's α of .93 (Rovai, 2002). In this study, the Cronbach's α values were .75 for connectedness and .70 for learning, which were toward the lower end of acceptability. The overall reliability of the scale was .72.

Data Analysis

IBM SPSS Statistics software (Version 28) was used to analyze the results. Data management and cleanup were completed prior to the analysis. Descriptive statistics (*M*, *SD*, and percentage values) were used to describe the demographic characteristics and missing data across all variables. Except for the demographic questions, all items were completed using the force completion option. None of the variables had more than 5% missing data. The reliability coefficient was calculated for the scales and subscales. Bivariate correlation was used to assess the association between sense of community, students' satisfaction, and GPA.

An independent sample *t*-test was used to determine the relationship between nursing students' characteristics and the outcome variables.

Ethical Considerations

Approval from the appropriate ethics committee (Institutional Review Board) was obtained prior to study onset. Permission to use the instruments was obtained from the authors prior to data collection. Participants signed an informed consent form prior to filling out the questionnaire.

Findings

Table 2 shows the average score and reliability coefficient for students' sense of community and satisfaction regarding e-learning. The average score on the sense of community scale was moderate ($M = 3.3$, $SD = 0.62$). However, the total students' satisfaction score was high ($M = 3.99$, $SD = 1.00$), indicating that students were satisfied with the e-learning system.

Table 2

Average Scores and Reliability of the Scales

Variable	*M*	*SD*	Cronbach's α
Sense of community scale	3.3	.62	.72
Connectedness	3.33	.69	.75
Learning	3.25	.62	.70
Satisfaction scale	3.99	.87	.93
Teaching	4.22	.83	.94
Assessment	3.86	.97	.92
Generic skills and learning experiences	3.89	1.0	.95

Association Between Sense of Community, Satisfaction with E-Learning, and Academic Achievement

Table 3 presents the correlation matrix for sense of community, total satisfaction with e-learning and its subscales, and students' academic achievement (GPA). The bivariate correlation showed a positive and significant correlation between the sense of community and satisfaction with teaching (r = .269, p < .001), assessment (r = .258, p < .001), generic skills and learning experiences (r = .238, p < .01), academic achievement (r = .526, p < .001), and total satisfaction with e-learning (r = .272, p < .001). Academic achievement (GPA) was positively and strongly correlated with teaching (r = .454, p < .001), assessment (r = 455, p < .001), generic skills and learning experiences (r = 439, p < .001), and total satisfaction with e-learning (r = 480, p < .001).

Table 3

Correlation Matrix for Sense of Community, Total Satisfaction with E-Learning and its Subscales, and Academic Achievement

Variable	1	2	3	4	5	6
1. Sense of community	—					
2. Teaching subscale	.269**	—				
3. Assessment subscale	.258**	.809**	—			
4. Generic skills and learning experiences	.238*	.750**	.852**	—		
5. Total satisfaction with e-learning	.272**	.905**	.954**	.937**	—	
6. Academic achievement (GPA)	526**	454**	.455**	.439**	.480**	—

Note. N = 103. Pearson's correlation was used. *p < .01. **p < .001

Relationship Between Demographic Characteristics, Sense of Community, Total Satisfaction with E-Learning, and Academic Achievement

Regarding the sample characteristics (Table 4), there was no statistically significant difference among the age groups regarding sense of community, overall satisfaction with e-learning, and GPA. However, gender showed significant associations with a sense of community, overall satisfaction with e-learning, and academic achievement. Specifically, female participants reported a strong sense of community (t = 1.69, p < .05), total satisfaction with e-learning (t = 2.29, p < .05), and greater academic achievement (t = 2.04, p < .05) compared to male students. Additionally, there was a statistically significant difference between junior and senior students in terms of total satisfaction with e-learning and academic achievement. Junior students had higher satisfaction scores (t = 3.51, p < .001) and higher GPAs (t = 2.44, p < .01). This may indicate that it is feasible for junior students to learn nursing skills using e-learning before the onset of clinical practice. However, applying nursing skills may require physical attendance, which could explain the lower satisfaction levels toward e-learning and lower academic performance of senior students.

Table 4

Differences Between the Sample Characteristics and Sense of Community, Total Satisfaction with E-Learning, and Academic Achievement

Characteristic	Sense of community				Total satisfaction with e-learning				Academic achievement			
	M	*SD*	*t*	*p*	*M*	*SD*	*t*	*p*	*M*	*SD*	*t*	*p*
Age												
18–20	3.23	.69	1.07	.14	4.0	.86	1.43	.07	3.61	.58	.323	.37
21–23	3.37	.48			3.83	.87			3.57	.49		
Gender												
Male	3.04	.81	1.69	.04*	3.44	1.0	2.29	.017*	3.34	.56	2.04	.02*
Female	3.33	.58			4.09	.79			3.64	.53		
Education												
Junior	3.35	.58	1.32	.09	4.25	.57	3.51	<.001**	3.70	.50	2.44	.008**
Senior	3.19	.68			3.61	1.07			3.43	.58		

Note. $N = 103$. Independent sample t test was used. $^{*}p < .05$. $^{**}p < .01$.

Discussion

Online education has emerged as an essential component of the Saudi Arabian education system. In particular, it has established its significance by enabling students to continue their learning during the COVID-19 pandemic. However, evaluating the effectiveness of online education in SA is challenging due to differences in students' schooling levels, specialty types, and age groups. Recent studies have reported contradictory results regarding the effectiveness of online learning in SA.

The results of our study in terms of high satisfaction with e-learning are in line with the findings of Aboud (2021), although a number of students faced some issues with information technology resources. With respect to community and participation, our results comply with those of Mahyoob (2021), who exhibited the success of online learning in his study of the parameters of preference, participation, and assessment.

In our study, nursing students were satisfied with e-learning, which is consistent with previous studies (Abbasi et al., 2020; Alqahtani et al., 2021). Moreover, our study exhibited a significant, positive, and strong relationship between the sense of community, satisfaction with e-learning, and students' academic achievement. These results are in line with the research conducted by Rajabalee and Santally (2021), who collected data from students in different disciplines and found a significant relationship between learners' engagement and satisfaction with the learning-teaching process.

Furthermore, the findings of our study indicated that the level of satisfaction was also directly associated with students' academic achievement, and these findings are consistent with the study conducted by Jawad

and Shalash (2020), who revealed that implementing e-learning strategies for college students improved students' academic achievement. In one study, perceived interactions with other students had the greatest effect (30%) on student satisfaction (Asoodar et al., 2016), and these findings are consistent with our research, which also exhibited a positive relationship between the sense of connectedness and community and satisfaction in terms of teaching, knowledge acquired, and assessment methodology.

Other studies have stressed the importance of blended learning in students' academic achievements (Alshawish et al., 2021; Alvarez et al., 2017; Leidl et al., 2020). Blended learning differs from e-learning, enabling instructors to integrate technology with traditional face-to-face teaching. In e-learning, courses are taught completely online with few or no face-to-face interactions. Ghasemi et al. (2020) reported that the level of engagement in academic learning influenced nursing students' success. Previous research indicated that the high frequency of meetings between nursing students and their mentors increased students' satisfaction with the clinical learning environment (Papastavrou et al., 2016). It is worth mentioning that previous studies did not assess the learning outcomes for senior nursing students. Students at advanced levels need to apply their nursing skills under supervision, which could enhance their satisfaction with the learning strategies and, in turn, enhance their learning outcomes. This could explain the low levels of satisfaction and academic achievement among senior nursing students observed in our study. To date, few studies have focused on the sense of community and satisfaction with e-learning among nursing students, which prevents us from drawing comparisons.

We also specified how nursing students' satisfaction with e-learning influenced their academic achievement. We found that students' GPA was positively and significantly associated with teaching, generic skills, and learning experiences. This result is congruent with the work of Ludin and Fathullah (2016), who found that clinical teaching behaviors had a strong influence on nursing students' learning. Pournamdar (2015) collected data from 165 nursing students to understand their perceptions of the characteristics of effective instructors. The students revealed that applying appropriate teaching methods was one of the highest rated characteristics of instructors (Pournamdar, 2015).

Female participants in this study reported a strong sense of community within the e-learning system compared to their male counterparts. This result is consistent with previous studies conducted in Western countries (Johnson, 2011; Tsai et al., 2015), which found that female students perceived greater social presence during online learning compared to male students. We also found that female participants had higher satisfaction and GPAs compared to male students. Jawad and Shalash (2020) evaluated the effects of a sudden transition to e-learning among Palestinian nursing students and concluded that despite the overall increase in students' GPAs after the implementation of e-learning, female students had higher GPAs than male students. One reason for this may be the fact that a higher number of respondents or participants were female, which could influence the average GPA of the total sample size.

Moreover, we found that students at lower levels of nursing school had higher satisfaction rates compared to those at advanced levels. This result is consistent with previous research studies. Papastavrou et al. (2016) found that first-year nursing students had higher satisfaction levels compared to students in other years (Papastavrou et al., 2016). Nursing students at lower levels learn nursing skills prior to the onset of clinical practice (Jeong, 2017), which may be more feasible through e-learning, whereas those at advanced levels, such as students in their internship year, must apply their acquired nursing skills in clinical settings

(Grande et al., 2021). Similar findings were also reported by Abbasi et al. (2020), who found that more than two thirds of the nursing students who participated in their study believed that practical skills were best learned in clinical settings. Thus, the evaluation of clinical competence among nursing students at advanced levels, specifically those who participated in e-learning, warrants further investigation.

Nursing researchers have raised the question of how nursing education can be successfully delivered in a culture of social distancing in real-world clinical practice (Dewart et al., 2020; Natarajan & Joseph, 2022). Some courses are clinical in nature and need a face-to-face approach. Thus, it is unsurprising that senior students in this study expressed concern about being able to successfully earn their degree without reaching students' learning outcomes.

Implications

Education is among the basic pillars facilitating the development of a country. Since the onset of the COVID-19 pandemic, the online learning medium has been predominantly used in education systems (Alqahtani et al., 2021). In this context, our study is relevant as it has implications for the future of teaching and learning in technology-enabled learning environments. Online learning has not only disrupted traditional teaching practices, but also created difficulties for instructors in adapting to this medium. Failure to meet students' expectations can lead to low levels of student involvement. Thus, students' satisfaction and engagement are good indicators of the quality and effectiveness of online programs. Nursing programs must determine whether their students are satisfied with their learning experience. Repeating this investigation is necessary to adopt appropriate policies for the survival of the education system. Therefore, higher education institutions should continuously strive to create a reliable and supportive environment that includes interactive techniques to increase students' sense of community in order to increase their satisfaction with e-learning.

This study calls for further action through seminars and training sessions to introduce innovative teaching techniques and alternative assessment plans for instructors and learners. This study can help educational institutes develop effective techniques for online communication while helping them manage the possible behavioral and emotional difficulties of students during online learning courses. Instructors need to stay involved in promoting collaboration and conversations among students. Our findings also have implications for institutional e-learning policies aimed at improving learning design models, student support and counseling, and learning analytics.

Limitations

This study has some limitations. First, social desirability bias may be present in the participants' responses due to the self-reported nature of the measures. To minimize social desirability bias, the students were informed that their responses would be reported in an aggregate form. Second, we did not assess differences in the pedagogical styles of faculty members in the nursing school. We recommend that future researchers determine the differences in teaching style, quality of teaching, and quality of instructional practices and their impact on students' academic achievement. This could be assessed by adopting a between-subjects study design.

Conclusion

This study highlights the influence of nursing students' sense of community and satisfaction during e-learning on their academic achievement. It devises strategies for educational institutions to improve the level of interaction and cooperation among students using participatory teaching methods. Our findings reveal a significant relationship between a sense of community and satisfaction with e-learning and students' academic achievement, which has not been documented in previous literature.

The rise of e-learning in SA is an unexpected benefit of the COVID-19 pandemic. However, nursing students at advanced levels of schooling might not be able to maximize the benefits of e-learning due to their inability to demonstrate their skills in real-world clinical practice. In order to meet nursing students' needs, proper strategies should be implemented based on existing evidence. The national distance education plan may require further modifications to completely satisfy the needs of nursing students. The use of blended learning may help accomplish their learning objectives.

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