Original Article

Relationship between Educational Environment and Self-Directed Learning in Nursing Student in COVID-19 Pandemic

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Abstract

Background & Objective: The COVID-19 pandemic has created a stressful teaching and learning environment that puts it out of its dynamic state and puts most of the learning burden on the student. The aim of this study was to investigate the relationship between educational environment and self-directed learning in undergraduate nursing students.

Materials & Methods: In this cross-sectional descriptive study, 200 undergraduate nursing students of Birjand School of Nursing and Midwifery from different terms were studied by available sampling method in the year 1401-1400. DREEM and CHENG online questionnaires were used to evaluate the educational environment and self-directed learning, respectively. The questionnaires were analyzed by SPSS20.

Results: The mean score of educational environment (120.20 ± 27.20) and self-directed learning (75.85 ± 11.73) was obtained. The results of this study showed that there is a direct and significant linear relationship between educational environment and all its dimensions with self-directed learning and all its dimensions ($p < 0.05$). Also, the educational environment was significantly associated with gender and interest in the nursing and self-directed learning with interest in the nursing ($p < 0.05$). Multiple linear regression test showed that the dimensions of the educational environment can predict to 23% (adjusted $R2 = 0.232$) of self-directed learning changes in nursing students.

Conclusion: According to the results of the study and the sensitivities of the nursing profession, it is recommended to consider self-directed training programs and workshops and to create an educational environment that stimulates this skill.

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Introduction

The educational environment is the most important external manifestation of the curriculum, defining its concept and encompassing everything that takes place in the college. The educational environment is one of the important factors which determine behavior, and in fact, students' behavior is associated with their perception of the educational environment (1). Classes, learning resources, teaching methods, evaluation methods, clinical experiences, clear learning outcomes, academic schedule, access to educational facilities, students' sense of belonging, and support are the building blocks of the academic environment (2).

The educational atmosphere also includes students' general perception of the educational environment of the university. In other words, the atmosphere is the soul and spirit of the educational environment and curriculum (3), as well as students' feelings towards the educational environment (2). Students' experience of the academic climate governing the university is effective in their success, satisfaction, and achievements (3). According to a study by Bagheri et al. (2017), the educational environment strongly affected the satisfaction and success of students. Therefore, it is essential to receive continuous feedback from students about their perceptions of educational environments (4). The COVID-19 pandemic has created a stressful environment for teachers and students to teach and learn by affecting all areas of human life, including the

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teaching and learning process. Moreover, it has presented students with such challenges as the lack of face-to-face support and peer-to-peer interactions, as well as rapid upgrading of online technologies (5, 6). This epidemic exerted an unprecedented impact on medical education, especially clinical education, which has undergone extensive changes since the emergence of the epidemic disease (7). Due to the deadly threat of the spread of the virus, universities have switched to remote online learning.

Although distance learning methods are no longer unknown, their unanticipated implementation with little preparation often leads to serious problems (8). Therefore, it is necessary to study the extensive consequences of this issue (6). Nonetheless, the impact of Covid-19 on medical education has been less investigated. The pandemic conditions have posed daunting challenges to the professors of medical sciences due to the practical and clinical nature of many courses at all academic levels (9). Health professions education is beyond the acquisition of knowledge and skills since it also includes learning in common clinical work environments. Face-to-face learning in authentic clinical settings can help build self-confidence, improve communication skills, and strengthen team-building.

The COVID-19 pandemic has potentially created major barriers to these aspects of teaching and learning (5). Currently, students in various fields of medicine are struggling with drastic changes made to the educational environment. In this era, the role of individuals in learning has assumed particular importance (6) since the dominant educational approach in this era is online learning and reliance on self-directed learning. Nonetheless, switching to an online educational environment does not always reduce the academic performance of students.

This problem can help the development of intellectual processes related to student-centered learning and promote peer-to-peer learning (9). Therefore, nowadays, the acquisition of necessary skills for self-directed learning is one of the ultimate goals of educational curricula. Moreover, the transformation of "teaching" into "learning" is considered necessary, and education based on the mere transfer of content and topics is no longer suitable for the present and the future; instead, what is most needed is "learning how to learn." Therefore, due to the necessity of preparing students for lifelong learning, the theory of self-directed learning is increasingly proposed as a requirement in medical education, especially nursing education (10).

The conditions of the Covid-19 pandemic have severely affected the educational environment, jeopardizing its dynamism and imposing the greatest burden of learning on students. In this era, self-directed learning is a special advantage, especially for students. Self-directed learning is a method in which the ideation, design, implementation, and evaluation of a learning project is guided by the learner. Nonetheless, it is not suggested that in this method, learning is completely individual, rather the students are responsible for their own learning even when participating in a group learning activity (11).

The acquisition of this skill, especially during the student period, depends on various factors, such as the educational environment. In other words, the atmosphere governing the educational environment is the determining factor in fostering student motivation to learn (12). The educational environment is known to be the most crucial factor in shaping students' learning experiences (4). Assiduous attention has been recently devoted to the impact of the educational environment on students' approaches to learning, and quality is known as a reliable indicator of the effectiveness of educational programs (12).

The learning environment is a behavioral determinant, indicating students' perception of their surrounding learning environment (13). The educational environment is affected by various factors, including well-defined learning outcomes, teacher competencies, learning and teaching resources, assessment methods, timetables, student support, facilities, classrooms, group size, atmosphere, and many other issues (12). In this regard, the educational disruption resulting from the COVID-19 pandemic highlights the importance of self-directed learning. The flexibility of online courses has increased the responsibility of learners for self-direction and self-determination.

Online learning, which makes use of computer-based interaction as a primary learning medium, is radically different from face-to-face learning environments. The experience of online learning in an unfamiliar environment challenges learners' coping resources and adaptability (14). Therefore, considering the recent developments in education in the current pandemic situation and an urgent need to prepare students for responsible learning, it seems necessary to examine the relationship between the educational environment and self-directed learning. Moreover, with the shift of focus toward virtual education and increased emphasis on self-directed learning, the present study aimed to determine the relationship between the educational environment and self-directed learning in undergraduate nursing students at the Birjand School of Nursing and Midwifery during the COVID-19 pandemic.

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Material & Methods

In this descriptive cross-sectional correlational study, the statistical population consisted of undergraduate nursing students of Birjand University of Medical Sciences, who were selected via convenience sampling. The sample size was determined based on a study by Lastefo et al. (15) and the formula of correlation $n = \frac{\left(z_{1-\frac{\alpha}{2}} + z_{1-\beta}\right)2}{\omega^2} + 3 = 188$, with the following parameters:

$z_{1-\frac{\alpha}{2}} = 0$ ω^2 /8 1 $z_{1-\beta} =$ /96=0/041

Accordingly, the sample size was calculated at 188 subjects and increased to 218 cases taking into account the probability of 10% sample attrition. After the removal of incomplete questionnaires, 200 participants were studied. First to fourth-year nursing students who were willing to complete the questionnaire and participate in the study were included in the study. On the other hand, those with incomplete questionnaires were excluded from the study. To implement this study, after the approval of the proposal and obtaining the code of ethics (IR.VUMS.REC.1400.047) from the Virtual University of Medical Sciences, participants completed the Dundee Ready Educational Environment Measure (DREEM) questionnaire and Self-Directed Learning Readiness Scale (SDLRS) by Cheng et al. online after signing the written informed consent. After completion, incomplete questionnaires were removed. All the questionnaires were distributed and collected by one of the members of the research team.

The research instruments included the demographic characteristics form (age, gender, marital status, grade point average, academic semester, being native, living in a dormitory, interest in the field of study, and skill in using IT technologies), as well as DREEM and SDLRS questionnaires. The DREEM questionnaire, which was adjusted and modified according to the pandemic conditions and virtual education, was used to examine the educational environment. It includes five subscales of students' perception of learning, students' perception of teachers, students' academic self-perceptions, students' perception of atmosphere, and students' social self-perception.

The scores in this questionnaire range from 0-200. Each item is measured using a 5-point Likert scale: 0=strongly disagrees, 1=disagree, 2=neither agree or disagree, 3=agree, and 4=strongly agree. Items 4, 8, 9, 17, 25, 35, 39, 48, and 50 are negatively worded. The validity and reliability of this questionnaire have been confirmed in the study by Soltani Arabshahi (4, 13).

The SDLRS by Cheng et al., which was adjusted and modified according to the conditions of the pandemic, was used to assess self-directed learning. It includes four dimensions of learning motivation (6 items), planning and implementation (6 items), self-monitoring (4 items), and interpersonal communication (4 items). The items are rated on a 5-point Likert scale (1=completely disagree to 5=completely agree), and the scores range from 20-100. A higher score indicates a greater ability in self-directed learning. The validity of this questionnaire was confirmed in a study by Shen et al., and its reliability was confirmed, rendering Cronbach's alpha coefficients of 0.85 and 0.821-0.708 for the entire questionnaire and its dimensions, respectively (16).

The questionnaire link was sent to different groups of students, and they were completed online as a self-report within two months. Finally, the completed questionnaires were entered into SPSS (version 20) and analyzed. Descriptive statistics (frequency distribution, mean, standard deviation) were used to describe and categorize the data, while inferential statistics were used to test the hypothesis. The Kolmogorov-Smirnov test was used to assess the normal distribution of data.

To determine the relationship of the educational environment and its dimensions with self-directed learning and its dimensions, Pearson's correlation test (in a normal distribution) or Spearman rank-order correlation coefficient (in non-normal distribution) was used. Spearman or independent t-test was used to investigate the relationship between demographic variables and main variables, Mann-Whitney U-test was used for quantitative variables with non-normal distribution. In all performed tests, a confidence level of 95% and a significance level of 0.050 were considered.

Results

The majority of students were female (61.5%), single (80.5%), non-native (53.0%), dormitory residents (54.5%), interested in nursing (83.0%), and moderately skilled in using IT (55.0%).

The mean scores of age and grade point average of the students were 20.97±1.83 and 16.60±1.33 years, respectively (Table 1).

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Table 1. Descriptive information of the variables related to the personal characteristics of nursing students of the Nursing and Midwifery school in Birjand

variables		Frequency	Percentage
Sex	Female	123	61.5
	Male	77	38.5
Marital Status	Single	161	80.5
	Married	39	19.5
Semester	First semester	47	23.5
	Second Semester	52	26.0
	Third semester	54	27.0
	Fourth Semester	47	23.5
Native	Yes	94	47.0
	No	106	53.0
Living in a dormitory	Yes	109	54.5
	No	91	45.5
Interest in nursing	Yes	166	83.0
	No	34	17.0
Skill in using IT	Very much	18	9.0
	Much	58	29.0
	Medium	110	55.0
	little	11	5.5
	Very little	3	1.5
	SD±Mean	**Maximum**	**Minimum**
Age	1.83±20.97	30	19
Average	1.33±16.60	20	13

The mean score obtained from the DREEM questionnaire by undergraduate nursing students was 120.20±27.20. The highest and lowest mean scores among the components of the educational environment pertained to students' social perception (16.76±3.90) and students' perception of learning (26.64±7.95).

The mean score of self-directed learning in undergraduate nursing students was 75.85±11.73, and the highest and lowest mean scores among the dimensions of self-directed learning according were related to interpersonal communication (15.47±2.80) and planning and implementation (21.51±4.66) (Table 2). Moreover, most of them estimated the educational environment as somewhat favorable (39.5%) and favorable (49.5%) (Table 3).

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Table 2. Descriptive indicators related to the educational environment and self-directed learning and its dimensions in undergraduate nursing of the Nursing and Midwifery school in Birjand

variables		SD±Mean	Maximum	Minimum	Range of scores
educational environment		27.20±120.20	182	33	0-200
dimensions	**Perceptions of learning**	7.95±26.64	44	4	0-48
	Perceptions of teaching	7.35±28.77	44	2	0-44
	Academic self-perceptions	5.51±18.92	32	4	0-32
	Perceptions of atmosphere	7.47±29.10	43	6	0-48
	Social self-perceptions	3.90±16.76	25	5	0-28
self-directed learning		11.73±75.85	100	25	20-100
dimensions	**learning motivation**	3.42±23.47	30	6	6-30
	Plan and execution	466±21.51	30	7	6-30
	Self-monitoring	2.92±15.39	20	4	4-20
	Interpersonal relationship	2.80±15.47	20	5	4-20

Table 3. Classification of educational environment scores in undergraduate nursing students of the Nursing and Midwifery school in Birjand

variables	Frequency	Percentage
educational environment		
Undesirable	3	1.5
semi desirable	9	4.5
somewhat desirable	79	39.5
Desirable	99	49.5
very desirable	10	5.0

The results of the Spearman correlation test pointed out that the total score of self-directed learning showed a significant direct linear with the total score of the educational environment and all its dimensions ($P<0.001$). There was also a significant direct linear relationship among all the dimensions of the educational environment ($P<0.001$) (Table 4).

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Table 4. The relationship between the total score of self-directed learning and the total score and dimensions of the educational environment in undergraduate nursing students of the Nursing and Midwifery school in Birjand

variables	educational environment	Perceptions of learning	Perceptions of teaching	Academic self-perceptions	Perceptions of atmosphere	Social self-perceptions
educational environment	1					
Perceptions of learning	r= 0.882 p<0.001	1				
Perceptions of teaching	r=0.787 p<0.001	r=0.610 p<0.001	1			
Academic self-perceptions	r=0.858 p<0.001	r=0.716 p<0.001	r=0.551 p<0.001	1		
Perceptions of atmosphere	r=0.868 p<0.001	r=0.720 p<0.001	r=0.611 p<0.001	r=0.710 p<0.001	1	
Social self-perceptions	r=0.645 p<0.001	r=0.469 p<0.001	r=0.373 p<0.001	r=0.596 p<0.001	r=0.517 p<0.001	1
self-directed learning	r=0.417 p<0.001	r=0.254 p<0.001	r=0.329 p<0.001	r=0.477 p<0.001	r=0.372 p<0.001	r=0.365 p<0.001

The results of the Spearman correlation test pointed out that the total score of the educational environment demonstrated a significant direct linear relationship with the total score of self-directed learning and all its dimensions (P<0.001). There was also a significant direct linear relationship among all the dimensions of self-directed learning (P<0.001) (Table 5).

Table 5. The relationship between the total score of the educational environment and the total score and dimensions of self-directed learning in undergraduate nursing students of the Nursing and Midwifery school in Birjand

variables	self-directed learning	Learning motivation	Plan and execution	Self-monitoring	Interpersonal relationship
Self-directed learning	1				
Learning motivation	r= 0.762 p<0.001	1			
Plan and execution	r=0.897 p<0.001	r=0.560 p<0.001	1		
Self-monitoring	r=0.788 p<0.001	r=0.570 p<0.001	r=0.678 p<0.001	1	
Interpersonal relationship	r=0.241 p<0.001	r=0.442 p<0.001	r=0.565 p<0.001	r=0.509 p<0.001	1
Educational environment	r=0.417 p<0.001	r=0.422 p<0.001	r=0.349 p<0.001	r=0.329 p<0.001	r=0.252 p<0.001

According to the multiple linear regression test, if the other variables are constant, for every one-unit increase in students' perception of learning, the self-directed learning score decreased by 0.470. In addition, for every one-unit increase in students' perception of their academic ability, the score of self-directed learning increased by 0.941.

Among the predictive variables, the students' perception of their academic ability has had the greatest effect on self-directed learning in undergraduate nursing students. Furthermore, the components of the educational environment can predict up to 23% (adjusted $R^2 = 0.232$) of changes in self-directed learning in undergraduate nursing students (Table 6).

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Table 6. Prediction of self-directed learning based on the components of the educational environment in undergraduate nursing students, using the multiple linear regression models (Enter method)

Predictive variables	Unstandardized B	Standard Error	Standardized β	t	p-value	R	R^2	Adjusted R^2
constant	53.48	3.65	-	14.61	<0.001			
Perceptions of learning	-0.470	0.158	-0.319	-2.97	0.003			
Perceptions of teaching	0.131	0.138	0.082	0.948	0.344	0.501	0.251	0.232
Academic self-perceptions	0.941	0.220	0.442	4.27	<0.001			
Perceptions of atmosphere	0.210	0.174	0.134	1.21	0.228			
Social self-perceptions	0.430	0.245	0.143	1.75	0.081			

Based on the results of Spearman's correlation test, the total score of self-directed learning and its dimensions showed no significant direct linear relationship with the age and grade point average of undergraduate nursing students (P<0.05).

The results of the Pearson correlation test illustrated that the total score of the educational environment and the dimension of students' perception of professors displayed a significant inverse linear relationship with the age of undergraduate nursing students (P<0.05). Nonetheless, the other dimensions of the educational environment showed no significant direct or inverse linear relationship with the age and grade point average of undergraduate nursing students (P<0.05). The results of the independent t-test and Mann-Whitney U test showed that the mean scores of self-directed learning and its dimensions did not significantly differ based on gender, marital status, being native, and residing in a dormitory (P< 0.05). However, the mean scores of self-directed learning, as well as the dimensions of planning, implementation, and self-monitoring, significantly differed based on interest in the field of nursing (P<0.05).

Discussion

The present research aimed to assess the relationship between the educational environment and self-directed learning in undergraduate nursing students at the Faculty of Nursing and Midwifery of Birjand University of Medical Sciences. Based on the results of this study, the nursing students rated the educational environment as somewhat favorable (39.5%) and favorable (49.5%). In a similar vein, in a study by Bagheri et al. (2018), students rated the educational environment as semi-favorable (24.8%) and favorable (63.9%) (4).

The study by Bagheri et al. was conducted before the Covid-19 pandemic; nonetheless, its results were almost similar to those obtained in the current research. Moreover, the two universities are similar in terms of ranking; therefore, it can be concluded that the pandemic conditions did not have a significant impact on students' perception of the educational environment of the university. The results of the study by Chew et al. (2021) have also indicated that students' perception of the educational environment based on the DREEM tool remained positive during the pandemic (17). In the study by Azizi et al. (2012), 51.1% of pharmacy students evaluated the educational environment as favorable, while 46.6% assessed the educational environment as unfavorable (18).

In the present study, the mean score of the educational environment was 120.20±27.20. Moreover, the highest and lowest mean scores pertained to students' perception of their social environment (16.76±3.90) and students' perception of the learning environment (26.64±7.95). In the study by Azizi et al. (2013), the dimension of students' perceptions of the learning environment obtained a lower score than other dimensions of the educational environment (18). In the study by Arabi (2019) et al., the highest and lowest mean scores were related to the dimension of students' perception of their academic ability (15.7±8.2) and students' perceptions of the atmosphere (23.3±9.9) (19). The stated study was conducted on medical students and in clinical departments (internal medicine, gynecology, pediatrics, and general surgery), and the educational environment was different from that of the present study. Therefore, it is expected that students' perceptions of its various dimensions would be different from that of nursing students in an academic environment.

In the current study, the educational environment and its dimensions showed a significant direct linear relationship with self-directed learning and its dimensions according to the conditions of the Covid-19

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pandemic (P>0.05). In a study by Hosseini et al. (2017), the results demonstrated that the creative educational environment with the mediation of learning motivation had a direct and significant effect on the use of self-regulation learning strategies (P>0.01) (20). The study by Hosseini was conducted on female students of Psychology, Social Sciences, and Economics Faculties of Tehran University before the pandemic, and the research tools and data analysis method were utterly different from those of the present study.

It is worth noting that both studies have yielded almost similar results, indicating the relationship between these two variables. Chakkaravarthy et al. (2018) investigated the predictors for nurses and midwives' readiness toward self-directed learning in a systematic review. This systematic review showed that these predictors include personality traits, work environment, online learning, and readiness for self-directed learning. The mentioned study denoted that although the demographic characteristics of nurses and midwives did not affect their readiness for self-directed learning, the work environment affected their readiness for self-directed learning (21). In agreement with the present research, in the referred study, the environment was mentioned as a predictor.

The noteworthy point is the predictive role of online learning in self-directed learning, considering that the study was conducted in 2018, before the start of the pandemic. The current study investigated the effect of a pandemic-based online educational environment on self-directed learning. It seems that the conditions created in the educational environment caused by the pandemic have been effective in this regard. The characteristics of both educational and clinical environments can serve as a stimulus for self-directed learning, which is strengthened and leads to lifelong learning in a good environment.

In the present study, based on the results of the regression analysis, students' perceptions of their academic ability and learning were the predictors of students' self-directed ability. In their study, Song et al. (2007) presented three models or perspectives for self-directed learning, including personal attitude, process, and context. Personal attitude refers to learners' motivations and ability to accept responsibility for their own learning. Process refers to learners' independent learning processes. The context focuses on environmental factors and their effects on the level of self-directed learning. Various factors in the field of learning can affect learners' self-directed experience (22). Therefore, the results of the present study are in line with different models that have been presented for self-directed learning.

Based on the results of the present study, the total score of the educational environment and the dimension of students' perception of teachers showed a significant inverse linear relationship with the age of students (P<0.05). Nevertheless, the score of the educational environment and its dimensions displayed no significant linear relationship with students' grade point average (P<0.05). In the study by Bagheri et al. (2018), no significant correlation was detected between age and the educational environment (P=0.083); nonetheless, there was a significant direct correlation between grade point average and educational atmosphere (P=0.022) (4).

The results of the present study pointed out that male and female students significantly differ in the dimensions of students' perception of learning and educational atmosphere (P>0.05), and male students obtained higher scores in these dimensions. In a similar vein, in the study by Bagheri et al. (2018), the dimensions of students' perception of learning, students' perception of educational atmosphere, students' social perception, and the overall score of the educational environment significantly differed based on gender, and male students obtained higher mean score (P<0.05) (4).

Conclusion

As evidenced by the results of this study, there was a direct and significant linear relationship between the educational environment and self-directed learning. Moreover, the pandemic has created requirements and opportunities for the development of E-learning in medical science education. Furthermore, up-to-date knowledge and skills, as well as self-direction, are essential prerequisites for success in nursing education. Therefore, it is recommended that the trustees of nursing education seize this opportunity and make maximum use of the conditions created by the Covid-19 pandemic .

Considering the sensitive nature of this profession, it is recommended to develop self-directed training programs and workshops and change the educational environment in such a way as to motivate students to self-directed learning. In addition, the creation of a creative educational environment and innovative educational methods can be effective in students' self-directed learning.

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Conflict of interest

There is no conflict of interest in the present study by the author.

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