Nursing Students' Satisfaction with Blended Learning in Palestinian Nursing Schools Amidst the COVID-19 Epidemic

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Abstract

Students' theoretical and clinical learning is strongly impacted by blended learning (BL) in general and by nursing students specifically. This study aims to assess nursing students' satisfaction with BL in the context of the COVID-19 pandemic. An electronic survey questionnaire was used to survey 300 undergraduate nursing students from five nursing schools in Palestine. According to the study's findings, 71% of the students thought that BL was helpful. With a mean of 2.92, the management domain (which includes organization, scheduling, and clarity of subject structure) was the highest, whereas the interaction domain (which involves student–instructor and peer-to-peer communication and engagement) had the lowest mean (M = 2.78). The study revealed statistically significant differences between academic level (P value = 0.039), academic accomplishment (P <0.001), and other characteristics that were associated with student satisfaction with BL. The findings suggest that despite the rapid transition to remote learning, most undergraduate nursing students expressed satisfaction with their BL experience. To summarize, BL is not restricted to pandemic-related disturbances; it also serves as an important educational technique during wars, political instability, and mobility constraints, ensuring continuity and resilience in nursing education

Keywords: *blended learning, satisfaction, nursing students, online learning*

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Introduction

Identifying and financing alternatives to in-person training became crucial with the lockdown imposed due to the global spread of COVID-19, Nursing and higher education curricula employ a variety of teaching tactics, such as tutorials, small group tutoring, lab and hands-on sessions, and traditional classroom lectures. Digital learning tools are increasingly being used in all of these approaches. Blended learning (BL) is an educational approach that combines traditional classroom instruction with online learning, offering a flexible and adaptive learning experience that aligns with students' needs (Hrastinski, 2019; Ughade et al., 2020).

Lockdowns during the COVID-19 pandemic required the replacement of face-to-face instruction with e-learning. Because nursing requires in-person and laboratory-based training, nursing education in some Palestinian settings opt for a blended education approach (Martin et al., 2023; Nuuyoma et al., 2023; Quintiliani et al., 2021; Tarkar, 2020). For nursing students, previous research has suggested a link between BL and several variables, including their satisfaction with both academic and practical performance (Tong et al., 2022). Due to the sudden spread of COVID-19, nursing students' learning in hospitals was entirely halted. Beyond the COVID-19 pandemic, BL has continued to be used in various Palestinian nursing schools, owing primarily to the ongoing war in Gaza, which began on October 7, 2023, and has had a significant influence on the educational sector (Asmar, 2025b, 2025a). Infrastructure damage, academic timetable disruptions, and pervasive instability, compounded by road closures, checkpoints, and mobility restrictions, have frequently resulted in the suspension of face-to-face lessons and clinical training.

Given the imperative for nursing students to practice their skills in the clinical setting, implementing an approach to teaching and learning that meets this need is critical. BL caters to this need, as it allows the development of technological skills while also accommodating students' diverse learning styles.

It is possible that students were worried about developing their clinical skills during the pandemic (Dreidi et al., 2024). Nursing students may also experience stress when they lack application skills because they are unsure how, when, or where to obtain additional training to compensate for the shortfall. Therefore, a shift to BL during the pandemic was considered a suitable approach. BL offers a "rich" learning environment with a range of technology-enabled communication modes for both in-person and remote instruction created via technology. Students utilize this technology to become more adept at self-directing their learning. They also use learning technologies to build stronger student collaborations and communities, all of which have an impact on how well students learn. (Lubis et al., 2022; Singh et al., 2021; Ughade et al., 2020). BL has been positively received by nursing students, especially during the COVID-19 pandemic. Studies have shown that students appreciate the flexibility and accessibility of BL but emphasize the need for clear subject design and instructor support to enhance learning outcomes (Khalil et al., 2020).

In the last few years, the use of BL has become increasingly common in educational settings (Liu & Yodmongkol, 2023). Recent research has demonstrated that educational interventions based on the BL approach can be successfully integrated into nursing curricula to enhance learning outcomes (Li et al., 2025). This approach supports the development of essential competencies such as collaboration, creativity, independent research, and personalized learning. For example, Oh and Yang (2019) reported that nursing students engaged in BL environments presented improved critical thinking and problem-solving skills ,indicating that BL can be an effective method for advancing student learning in nursing education (Oh & Yang, 2019).

According to McCutcheon et al's. (2015) review, BL and e-learning are just as successful at increasing nursing students' knowledge as conventional approaches. The authors state that by combining theory and practice through adaptable and interactive teaching strategies, BL in particular has a great deal of promise to advance clinical abilities. These findings support the argument that BL is not only a viable alternative but may also offer pedagogical advantages over traditional methods. However, despite these benefits, the McCutcheon et al., review called for more context-specific

research to explore students' satisfaction, engagement, and learning outcomes, particularly within different cultural and institutional settings (McCutcheon et al., 2015).

A more recent experimental study reported preliminary findings that BL, when combined with problem-based learning, supports successful learning among nursing students (Govindan et al., 2023). Through flipped classroom activities, project-based learning, and the integration of multimedia and interactive content, BL was implemented using a learning management system and hypermedia resources that captured students' and teachers' learning behaviors and provided students with a secure environment for productive learning (Sáiz-Manzanares et al., 2020; Tayyib et al., 2020a). Owing to the students' use of project-based learning, which encouraged communication and collaboration, the study demonstrated that interaction within the BL environment was effective. While the findings highlighted improvements in student engagement and peer interaction, the study did not directly assess the overall effectiveness of BL as a comprehensive instructional approach. Therefore, these results should be interpreted specifically with respect to the interaction dimension of BL rather than as evidence of its general effectiveness.

According to previous studies, students in mixed learning contexts such as BL perform better on exams than their counterparts in traditional settings. This academic success is a result of the BL model's ability to successfully combine the advantages of in-person engagement with online learning. Through the simultaneous provision of the flexibility of e-learning and the depth of interpersonal engagement, this combination helps to improve academic accomplishment (Pereira et al., 2007; Xiong et al., 2020).

Another study conducted by Aladwan et al. (2018) revealed that students reported having favorable experiences with BL. Hasan et al. (2022) demonstrated that knowledge management strategies such as content curation, sharing best practices, collaborative learning tools, and digital resource organization can be used in conjunction with BL, particularly during times of crisis or educational disruption, because they include integrated tasks as well as online and electronic learning. On the other hand, a study conducted by Surahman and Sulthoni (2020) revealed that the majority of respondents expressed greater satisfaction with face-to-face learning than with online learning and reported lower levels of enthusiasm toward fully online formats. This suggests that while students may value the structure and engagement of traditional classroom settings, they may be less motivated in purely virtual environments. These findings highlight the potential value of BL, which combines the strengths of face-to-face interaction with the flexibility of online components, offering a balanced approach that can enhance student engagement and satisfaction.

This study explores satisfaction with the BL environment among nursing students at Palestinian universities, with particular focus on knowledge management strategies. It focuses on tools such as content curation, collaborative platforms, and digital resource organization, and how these tools influence student engagement and satisfaction. The central research question is as follows: How do knowledge management strategies affect students' experiences and outcomes in a BL environment?

To ensure alignment with the research objectives, it is necessary to clarify why BL was chosen as an alternative instructional approach in the context of Palestinian nursing schools during the COVID-19 pandemic. This study provides an overview of the educational landscape during the pandemic, highlighting the specific challenges faced by nursing institutions and the rationale for implementing BL over other methods. By doing so, this study aims to explore nursing students' satisfaction with the BL approach and provide insights into their perceptions, which may inform its future use in academic curricula, particularly given the need to continue using BL in the current Palestinian context.

Methods

Research design and setting

This study utilized a cross-sectional descriptive-correlational study design to collect data at a single point in time. The target population consisted of undergraduate junior and senior nursing students

from five Palestinian universities. Students pursuing master's or doctoral degrees, as well as diploma nursing students, were excluded.

Research methods

A structured questionnaire was administered to the nursing students to evaluate their satisfaction with the BL approach. All the subjects included in the study were taught entirely in a BL format, covering a range of specialized nursing subjects, including Fundamentals of Nursing, Health Assessment, Medical-Surgical Nursing, Critical Care Nursing, and other core clinical topics.

Sampling Method and Sample Size

Convenience sampling, a nonprobability approach, was used in this study. The Ministry of Higher Education in Palestine reported that 3,000 nursing students were enrolled in the academic year 2021- 2022. G power was used to calculate the sample size; the recommended sample size for a 95% confidence level was 250. After allowing for a 20% nonresponse rate, the final sample size was 300 people, which is considered large enough to limit the effect of type II error (Faul et al., 2009).

Structure of the questionnaire

To achieve the objectives of the study, the researchers used a preexisting validated 35-item questionnaire developed by Tayyib et al. (2020b) to assess student satisfaction with BL (Tayyib et al., 2020b). The decision to use the 35-item questionnaire by Tayyib et al. (2020b) was based on its strong relevance to nursing education and its appropriate focus on the BL experience. The original study confirmed excellent internal consistency, reporting an overall Cronbach's alpha exceeding 0.90, indicating high reliability of the scale (Tayyib et al., 2020a).

The survey had two sections: the first asked about the respondents' sociodemographic information, including their age, year of study, level of education, gender, and number of subjects taken. The second included five areas of BL satisfaction: interaction, instruction, instructor, management, and technology. 35 statements made up the questionnaire: 9 items for the interaction domain, 12 for the instruction domain, 5 for the instructor domain, 3 for the management domain, and 6 for the technology domain. There were 28 positive and seven negative phrases. For positive statements, the responses ranged from strongly agree (5), agree (4), neither agree nor disagree (3), disagree (2), and strongly disagree (1). Each item required a response on a 5-point Likert scale, and the responses for negative statements went in the opposite direction. The estimated satisfaction level of the sample responses was represented by the following scales, which the researchers used when examining the data: less than 69% indicated poor satisfaction, 70–79% indicated moderate satisfaction, and more than 80% indicated a high satisfaction level. These classifications were directly adopted from the original questionnaire used in this study.

Participant recruitment

Nursing students were recruited by advertising through Facebook groups dedicated to nursing students. With permission from group administrators, the researchers shared an information sheet that outlined the purpose of the study, eligibility criteria, and assurances that all the data would be collected anonymously. No personal contact details were collected through Facebook. Participation was voluntary, and informed consent was obtained electronically by asking participants to read the information sheet and complete the Google Form after accessing the provided link.

Data analysis

The collected data were assessed via SPSS version 26. T tests were used to compare the means of two groups (age and gender) to identify significant differences. ANOVA was used to assess differences between three or more groups, whereas post hoc tests were used after ANOVA to pinpoint which specific groups differed. A significance threshold of ≤0.05 was used to assess the study's importance.

Ethical Consideration

With reference number BZUPNH 2108, it was authorized by the Institutional Review Board Committee at Birzeit University in Palestine. Each participant signed an informed consent form and gave their free will to participate in the study.

Results

As shown in Table 1, a total of 300 nursing students participated in the study; 39.3% of them were men, and 60.7% were women. The participants' ages ranged from 18 to 25 years, with 48.7% aged 20 years or younger and 51.3% older than 20. In terms of academic performance, most students reported a cumulative grade average between 70–79% ("good") (45%) and 80 –89% ("very good") (44.7%) based on the percentage grading system commonly used in the region. Additionally, 40% of the participants had completed more than ten subjects that incorporated BL strategies.

Table 1:

Sociodemographic characteristics of the participants (N=300)

Sociodemographic Characteristics	Frequency (%)
Age (in years)	
20 or less	146(48.7)
More than 20	154(51.3)
Gender	
Male	118(39.3)
Female	182(60.7)
Academic level	
First Year	20(6.7)
Second year	87(29)
Third year	100(33.3)
Fourth Year	93(31)
Academic achievement - GPA (Percent Grade)	
Less than 69	9(3)
69-79	135(45)
79-89	134(44.7)
90 and more	22(7.3)
Number of subjects that incorporated BL strategies	
Less than 5 subjects	72(24)
5-10 subjects	108(36)
More than 10 subjects	120 (40)

Table 2 shows that the overall percentage of satisfaction with BL among nursing students was 71%, which represents a moderate degree of satisfaction, while the highest mean was given to the Management domain (M = 2.92), and the lowest was for the Interaction domain (M = 2.78). The five assessed domains included Interaction (communication and engagement between students and instructors or peers), Instruction (clarity and organization of teaching materials), Management (subject organization, scheduling, and structure), Technology (use and accessibility of online learning tools), and Instructor (preparedness and support provided by the instructor).

Table 2:

Means, standard deviations, and estimated levels of satisfaction with blended learning among nursing students.

Number	Domains	M	SD	Percentage Satisfaction Agree and strongly agree	Percentage Dissatisfaction Disagree and strongly disagree
1	Interaction	2.78	0.40	69.5%	31.5%
2	Instruction	2.82	0.31	70.5%	29.5%
3	Management	2.92	0.51	73%	27%
4	Technology	2.84	0.53	71%	29%
5	Instructor	2.84	0.34	71%	29%
Total		2.84	0.33	71%	29%

The percentages of students who agreed or strongly agreed with the satisfaction items regarding BL ranged from 63.5% to 77.0%. The item from the instruction domain, "The use of BL technology in this subject encouraged me to learn independently, scored the highest percentage, whereas the item from the interaction domain, "Having students from the opposite gender on the other side of the BL classroom listening to what I say might restrict my participation," received the lowest percentage, as demonstrated in Table 3.

Table 3:

Percentage responses to individual items concerning satisfaction with BL among nursing students.

No.	Item	%	%
	Interaction Domain	**Agree/strongly agree.**	**Disagree/strongly disagree.**
1.	A blended learning session keeps me always alert and focused.	69.3	30.7
2.	Interaction is adequately maintained with the lecturer when he/she is on the other side of the blended learning classroom.	68	32
3.	Having students from the opposite gender on the other side of the blended learning classroom listening to what I say might restrict my participation.	63.5	36.5
4.	A blended learning subject makes it more important for students to visit the lecturer during office hours.	73.8	26.2
5.	I cannot interrupt the lecturer to ask a question when he/she is on the other side of the blended learning classroom.	65	35

6.	I am satisfied with the quality of interaction between all involved parties	69.8	30.2
7.	I am dissatisfied with the process of collaboration activities during the subject.	65	35
8.	I am satisfied with the way I interact with other students.	73.8	26.2
9.	I am satisfied with my participation in the class	73.5	26.5
	Instruction Domain		
10.	The use of blended learning technology in this subject encourages me to learn independently.	77	23
11.	My understanding has improved compared to similar subjects courses I studied before	70.8	29.2
12.	My performance in exams has improved compared to similar subjects I studied before.	67.3	32.7
13.	I am satisfied with the level of effort this subject required.	70.8	29.2
14.	I am dissatisfied with my performance in this subject.	65.8	34.2
15.	I believe I will be satisfied with my final grade in the subject	70.5	29.5
16.	I am satisfied with how I can apply what I have learned in this subject	72.3	27.7
17.	Had I known this was a blended learning class, I would not have taken it if a face-to-face subject had been available.	66.3	33.7
18.	I am willing to take another subject using the blended learning delivery mode	67	33
19.	I am satisfied enough with this subject to recommend it to others.	67.3	32.7
20.	Compared to face-to-face subject settings, I am less satisfied with this learning experience	71	29
21.	I enjoy working on assignments by myself.	68.8	31.2
	Instructor Domain		
22.	The instructor makes me feel that I am a true member of the class	70.5	29.5
23.	I am dissatisfied with the accessibility and availability of the instructor	67.8	32.2
24.	The instructor uses blended learning technology appropriately	73	27
25.	Class assignments were communicated to me	73	27
26.	Feedback on the evaluation of tests and other assignments was given promptly	70	30
	Management Domain		

27.	Discipline is highly observed when the lecturer is on the other side of the blended learning	76.8	23.2
28.	The lecturer/supervisor always takes attendance	71.8	28.2
29.	I attend discussion board classes the same way I attend face-to-face classes	70.3	29.7
	Technology Domain		
30.	The instructor's voice is audible	73.5	26.5
31.	The subject content shown or displayed on the smart board is clear	73.5	26.5
32.	The microphone is in good working condition	72	28
33.	The image is clear and comprehensive when the lecturer is on the other side of the blended learning classroom	71.3	28.7
34.	Technical problems are not frequent, and they do not adversely affect my understanding of the subject	65.3	34.7
35.	The technology used for blended teaching is reliable	71.3	28.7

Post hoc tests were used to investigate whether there were any associations between student variables (e.g., gender, GPA, and number of BL subjects taken) and their level of satisfaction with BL. The analysis revealed a significant relationship between students' satisfaction with BL and their academic year ($p = 0.039$). The least significant difference (LSD) post hoc test revealed that senior students were significantly more satisfied with BL than junior students were. Furthermore, a statistically significant difference was attributed to students' academic achievement ($P < 0.001$). The LSD post hoc test revealed that students with an average grade of 90% or higher reported significantly greater satisfaction with BL than did students with lower grade averages (i.e., ≤69%, 70–79%, and 80–89%). Gender was also significant ($P = 0.006$), with males exhibiting a higher level of satisfaction with BL than females did (M = 2.9 and M = 2.8, respectively). Finally, a significant association was found with the number of BL subjects ($P < 0.001$). LSD post hoc tests revealed that there are differences between 5–10 subjects and fewer than 5 or more subjects in favor of 5–10 subjects, as shown in Table 4.

Table 4:

Correlations between the sociodemographic characteristics of nursing students and their level of satisfaction with BL

Socio-Demographic Characteristics		Mean (SD)	Mean Difference	F/T value	*P* value
Age (in years)	20 and less	2.82(0.32)	0.04	T=2.76	*P* = 0.06
	More than 20	2.86 (0.33)			
Gender	Male	2.90(0.33)	0.10	T=2.75	*P* <0.001
	Female	2.80(0.32)			
Academic level	First year	2.80(0.26)	0.13	F=2.82	*P* = 0.039

	Second year	2.90(0.33)			
	Third year	2.77(0.32)			
	Fourth year	2.87(0.33)			
Academic achievement - GPA (Percent Grade)	Less than 69	2.59(0.28)	0.52	F=7.33	*P* <0.001
	69-79	2.81(0.29)			
	80-89	2.84(0.34)			
	90 and more	3.11(0.32)			
Number of subjects that incorporated BL strategies	Less than 5 subjects	2.81(0.33)	0.19	F=9.78	*P* <0.001
	5- 10 subjects	2.95(0.29)			
	More than 10 subjects	2.76(0.33)			

Note: SD is the standard deviation, and the P value category indicates P ≤0.05, which is significant. T = independent samples t-test; F = one-way ANOVA

Discussion

This study aimed to assess nursing students' satisfaction with BL and explore how different variables influence their responses. This aligned with the research objectives, which were to explore nursing students' satisfaction with the BL approach and provide insights into their perceptions, in order to inform its future use in academic curricula. The findings revealed a moderate level of satisfaction (71%) among the nursing students, with the highest mean in the Management domain (M = 2.92) and the lowest in the Interaction domain (M = 2.78). These results suggest that, overall, students have moderately positive perceptions of BL, especially in aspects related to subject organization, whereas interaction and peer engagement may need further attention. This finding is consistent with prior studies (Finlay et al., 2022; Fisher et al., 2018; Wang et al., 2019). However, it disagrees with other studies that reported lower student satisfaction levels with BL. This may be due to different educational contexts or student readiness (Cao, 2023).

This study revealed a statistically significant relationship between student satisfaction and academic level (*P* value = 0.039) and revealed that senior students are more satisfied with BL than junior students are. It is believed that students in the latter years may be better equipped to learn more independently (Hassan et al., 2024) This result is in line with the results of a study conducted by Hasan et al. (2022), which revealed a significant relationship between the level of satisfaction and the level of study.

The analysis of variance revealed a statistically significant relationship between students' academic achievement (GPA) and their satisfaction with BL (p < 0.001). Satisfaction scores demonstrated a clear positive trend, increasing consistently with higher GPA categories. Students in the highest academic tier (90% and above) reported the highest mean satisfaction score (M = 3.11, SD = 0.32). (Lim et al., 2020; Şentürk, 2021). This finding could be explained by the fact that BL gives the students the flexibility to watch recorded lectures whenever it is convenient for them, in addition to attending discussion lectures that complement the main lectures. This provides students with a wealth of information they can review at any time. Support from the teaching staff remains available through scheduled office hours and established communication channels. This provides the student with a wealth of information. Additionally, the students can review the material whenever it is convenient for them in coordination with the subject lecturer or teaching assistant.

The current study also revealed a statistically significant relationship between student satisfaction and gender (*P*<0.001), which agrees with other study findings (Ekawati et al., 2018; Hasan et al., 2022; Yu, 2021). This may be because, in Palestine, many male students must work and study simultaneously to reduce their university costs for tuition and living (Barakat & Meler, 2024). This may make attending face-

to-face lectures difficult, restricting their ability to undertake paid work and raising their travel costs to and from university, in addition to making them live in university housing and paying for living expenses there. When BL is used, the costs for students are significantly reduced because it allows students to review the recorded study material whenever and wherever it is convenient for
them.

Finally, this study revealed a significant relationship between student satisfaction and the number of subjects they had completed using BL strategies ($P < 0.001$). Students with moderate BL exposure (5-10 subjects) reported the highest satisfaction (M=2.95, SD=0.29), while both lower (<5 subjects) and higher (>10 subjects) exposure groups demonstrated comparatively lower satisfaction scores (M=2.81, SD=0.33 and M=2.76, SD=0.33, respectively). This suggests that optimal satisfaction occurs with balanced, rather than minimal or extensive, implementation of BL strategies. This finding can be explained by the nature of different subject components: theoretical lectures are well-suited for online delivery, allowing flexibility and self-paced learning, which enhances student satisfaction (Means et al., 2013; Owston et al., 2013). However, clinical or practical lectures such as microbiology labs, fundamentals of nursing, and health assessment labs require in-person attendance to ensure that students fully benefit from hands-on experience and correctly acquire practical skills (Bliuc et al., 2011; McCutcheon et al., 2015). Therefore, subjects that combine both theoretical and practical elements benefit most from a blended approach, which aligns with students' preferences and satisfaction levels.

Limitations

This study has several limitations. First, the sample was drawn entirely from one country, which may limit the generalizability and transferability of the findings to nursing education systems in other countries with different educational structures, resources, and cultural contexts. Second, although the study included a variety of subjects, the number of BL subjects completed by students may have varied widely in content and design, potentially influencing satisfaction levels. Third, practical or clinical components such as microbiology labs, fundamentals of nursing, and health assessment labs require face-to-face interaction to ensure skill acquisition and hands-on experience, which may affect students' overall satisfaction with BL, depending on the subject type.

Implications

These findings suggest that optimal satisfaction in nursing education requires balanced BL implementation, as excessive exposure (>10 subjects) correlates with decreased satisfaction, indicating a need for strategic curriculum integration. This finding supports the early integration of BL strategies, particularly for theoretical components that are suitable for online delivery, as they offer flexibility and convenience. This blended strategy can also help accommodate students who face challenges attending campus regularly due to work or financial constraints. This study highlights BL function as a viable long-term approach as part of usual practice and during emergencies, such as pandemics and wars. To guarantee adaptability and resilience in higher education, investments in faculty training and digital infrastructure are crucial. Under uncertain circumstances, BL may support students' academic and professional development in nursing programs by protecting both theoretical and clinical learning.

Conclusion

The study revealed that the overall percentage of satisfaction with BL among students was 71%, while the highest mean was for the management domain (M = 2.92), and the lowest was for the interaction domain (M = 2.78). Additionally, the total degree of satisfaction with BL among the students ranged from 63.5% to 77%. This study revealed many significant differences, such as differences in the level of satisfaction with BL among nursing students in terms of gender, academic level, academic achievement (GPA), and the number of subjects that incorporated BL strategies. While theoretical lectures can be effectively delivered online, clinical lectures and laboratory sessions should be conducted in person to ensure that students gain the full benefit of hands-on learning. To continually monitor and improve students' satisfaction with BL, regular surveys should be implemented. Additionally, further research is necessary to evaluate the

effectiveness of remote education under varying conditions to ensure consistently positive outcomes. In this context, BL has proven to be an important alternative, providing flexibility and continuity by mixing online components with limited in-person activities and protecting students' academic progress and professional growth during times of crisis and political upheaval.

Acknowledgments

Conflict of interest

The authors declare that they have no conflicts of interest.

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