Unplanned Shifting from Traditional Classroom-Based to Online Distance Learning Due to (COVID-19): Nursing Students' Perception and Achievement

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Abstract

Background: The COVID-19 pandemic forced higher education institutions globally to transition abruptly from traditional classroom learning (TCL) to online distance learning (ODL). Understanding students' perception and achievements is crucial for enhancing learning outcomes. **Aim:** This study aimed to examine the scholarly achievements and learning perceptions of nursing students who learned by online learning with the adoption of the principles of integrated learning theory compared to those who learned through classroom-based learning, as well as assess students' readiness for the online learning. **Methods:** A quasi-experimental research design was employed, involving 649 bachelor's nursing students divided into study and control groups. The study group learned selected courses via ODL, incorporating principles from integrated learning theory, while the control group received TCL for the same courses. Two adopted tools was utilized to measure students' perceptions and students' readiness while scholarly achievement was evaluated through GPA. **Results:** No significant statistical difference was found in overall student learning perceptions between the study and control groups (p = 0.13) with a small clinical effect size (-.082). While there was no significant difference in GPA for clinical courses (p = 0.099), the study group achieved significantly higher GPAs for theoretical courses (p = 0.008). For the students' readiness for ODL the study group demonstrated a neutral (moderate) level, with an overall weighted mean of 3.36 ± 0.86. **Conclusions:** Despite the unplanned transition to ODL during COVID-19, TCL and ODL were perceived similarly by the students when incorporating ODL with the principles of integrated learning theory. ODL positively enhance students' GPA in theoretical courses, but had no significant effect on clinical courses. This suggests that ODL cannot fully replace TCL in nursing education, particularly for clinical courses, which require more virtual clinical simulations. Therefore, blended learning may offer a more effective solution.

Keywords: Classroom-based learning; online learning; Students' readiness; scholar achievement; perception.

Introduction

Due to the coronavirus (COVID-19) pandemic, online learning has replaced classroom-based learning for 421 million students worldwide due to World Health Organization recommendations to avoid spreading the virus as much as possible **(Administrator, 2020)**. Similarly, 2.7 million Egyptian students started utilizing online learning forms at home in 2020 (**UNESCO, 2020**). There has been rapid growth in online learning usage worldwide over the last twenty years. However, the majority of higher education in Egypt remained classroom-based until the COVID-19 pandemic hit the world in early 2020 when faculty members accelerated and were forced to transition to virtual learning. Due to inadequate network infrastructure, a lack of information and communications technology (ICT), and inadequate e-learning content production, Egypt's growth in e-learning may be constrained as a developing country **(Hammad & Zohry, 2020; Mohamed et al., 2022).**

Students who have previously taught classroom-based learning may find the transition to online-only education highly intimidating (**Clinefelter & Aslanian, 2015**). Specific aspects of adult learning theory guided the development of the pedagogical model used to create an adequate online learning environment **(Korhonen et al., n.d.; Merriam**

& Caffarella, 1999). (Johnson, 1997) has proposed a combination of learning theories instead of a confined focus on behavioral, cognitive, or social learning theories. These three theories were synthesized into integrated learning theory (ILT), including seven general principles. (1) Addressing individual differences by providing content in different formats when appropriate (text, video, or audio); (2) Motivating the student by making the students feel the course material is relevant, use multimedia when appropriate; (3) Avoiding information overload by organizing instruction around learning cycles; (4) Creating a real-world context by giving real examples or scenarios; (5) Encouraging social interaction by given feedback and facilitate interaction; (6) Providing hands-on activities, e.g., assignment or pre-post quizzes; and (7) Encouraging student reflection and exchange feedbacks.

Students' learning perceptions are their thoughts, beliefs, and emotions regarding the learning environment and process. There is evidence that students' learning progress is related to their perceptions of the teaching-learning environment **(Parpala et al., 2013; Sadlo & Richardson, 2003).**

Students' academic or scholarly achievement is what the students acquire from educational skills, materials, and knowledge in either the short or long term of studying **(Bolt, 2011).** Despite its limitations, student achievement is measured by grade point average or students' grades as the most objective metric **(Herrmann et al., 2017)**.

The students' readiness is used to describe the academic knowledge, skills, and motivation a student must possess in order to enroll in and succeed in a specific educational program **(Lindstrom et al., 2020)**. Students' readiness is a predictor of success and the key that enables learners to acquire new information and initiate behavior change **(Dray et al., 2011).** Due to the fact that students' readiness, learning perception, and achievement are rarely described in developing countries such as Egypt, it was necessary to investigate and comprehend these factors in order to accommodate students' learning preferences and modify the teaching methods that lead to successful learning outcomes **(Diaz & Cartnal, 1999)**.

Significance of the study

Some previous researchers have reported on Egyptian undergraduates' new online learning experience and their preference for face-to-face learning **(Goodwin et al., 2022; Refaat & Said, 2021)**. However, not all previous studies have consistently indicated that face-to-face learning is superior to online learning, with strong evidence **(Pei & Wu, 2019)**. Online learning has the potential to improve the knowledge and abilities of undergraduates if it is effectively implemented based on theoretical principles **(Hamdan & Amorri, 2022; Pei & Wu, 2019)**. Johnson (2003) proposed that the ILT serves as a valuable framework for online learning, providing an effective strategy to improve the effectiveness of online learning experiences **(Johnson & Aragon, 2003)**.

Aim of the study

The current study aimed to examine the scholarly achievements and learning perceptions of nursing students who learned by online learning with the adoption of the principles of integrated learning theory compared to those who learned through classroom-based learning, as well as assess students' readiness for the online learning as a confounding factor.

Objectives

1. Compare the scholarly achievements of nursing students who participated in online learning adopting the principles of integrated learning theory (ILT) with those who engaged in classroom-based learning.
2. Compare the learning perceptions of nursing students in online learning (adopting ILT principles) versus classroom-based learning.
3. Assess the influence of nursing students' readiness for online learning as a confounding factor on their scholarly achievements and learning perceptions.

Hypotheses

To achieve this aim we hypothesized that (1) The learning perception of nursing students who learned by online learning using the principles of ILT $(\mu1)$ is superior to that of those who learned by classroom-based learning $(\mu2)$, $(H1: \mu1 > \mu2)$. (2) Scholar achievement of nursing students who learned clinical courses by online learning using the principles of ILT $(\mu1)$ is superior to that of those who learned by classroom-based learning $(\mu2)$, $(H1: \mu1 > \mu2)$. (3) Scholar achievement of nursing students who learned theoretical courses by online learning using the principles of ILT $(\mu1)$ is superior to that of those who learned by classroom-based learning $(\mu2)$, $(H1: \mu1 > \mu2)$. Furthermore, the research question needs to be answered: to what extent are students ready for online learning?

Theoretical framework

The pedagogical model that was utilized to create the ODL environment was developed using specific features of adult learning theory **(Bandura, 1971; Cross, 1981; Knowles, 1984 Merriam & Caffarella, 1999)**. Instead of being limited to one favored perspective, such as behavioral, cognitive, or social learning theories, **(Johnson, 1997)** advocates combining these three theories to form an integrated learning theory. The behavioral learning theory should be incorporated into high-quality ODL settings, such as repetition and positive reinforcement. Cognitive learning theory is concerned with; addressing many senses, presenting information in motivating ways, and linking new information to past experiences. Moreover, social learning theory encourages group interaction, peer assessment, and personal feedback. The current study used the Input-Process-Output (IPO) Model to illustrate the adopted theoretical framework Figure (1). The (IPO) Model examines performance and processing systems that assume causative and stimulating variables (inputs) are managed and manipulated by internal system processes (process) to generate dependent outcomes (output) **(Johnson & Aragon, 2003).**
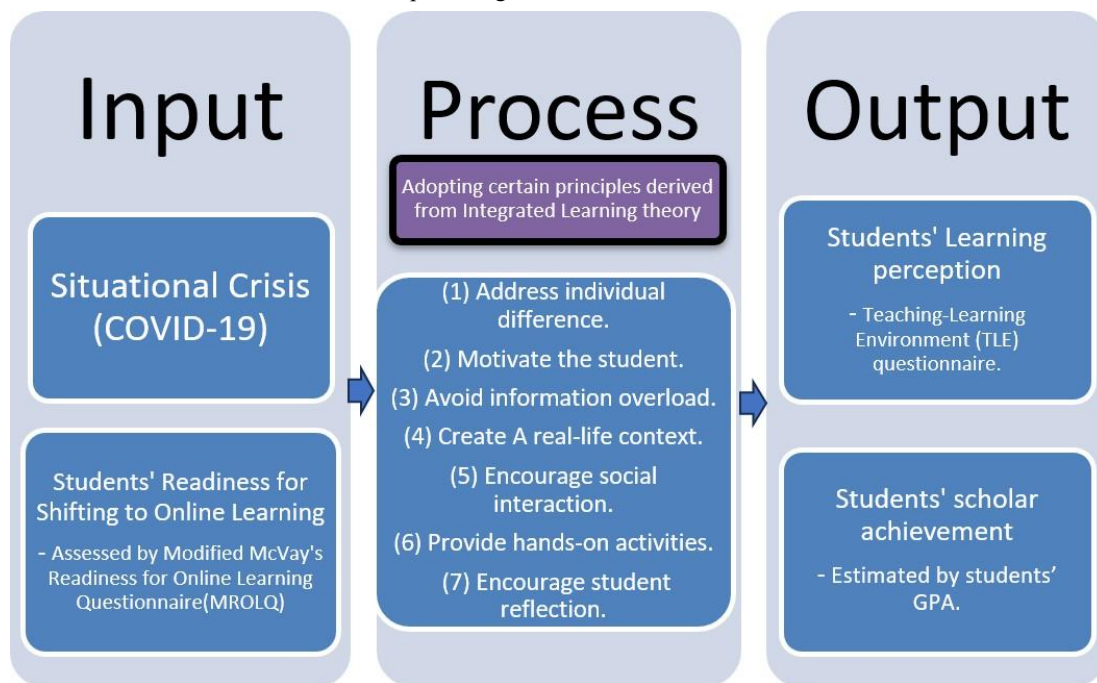

Figure (1): A proposed theoretical framework for Online Learning Environments.

Methods

Study design

The current study adopted a quasi-experimental comparison of two study groups, which lacked randomization. Quasi-experimental research involves manipulating an independent variable without utilizing random assignment of participants or including a control group (**Siedlecki, 2020**). The current study followed the Transparent Reporting of Evaluations with Nonrandomized Designs (TREND) Statement Checklist when reporting its findings. This study was registered with Clinical Trials.gov (Registration # NCT04372693), and Official IRB approval for the study's execution was obtained at the faculty of nursing - Cairo University (CU), Egypt (approval # 2020-28) in May 2021.

Subjects and setting

The study was conducted at the Faculty of Nursing, Caito University, Egypt. A purposive sample of 649 bachelor's nursing students participated in the study. The inclusion requirements for recruiting included students enrolled in a full-time program, age >18, signing up for the course for the first time, and having never taken an online course.

Sample size calculation

The estimated sample size was 589 students using G power software V.3.1.9.4 (Psychonomic Society, Madison, Wisconsin, USA) α = 0.05, Power (1-β) = 0.95, 2-tailed test, and a balanced allocation ratio 1:1, with an effect size of 0.3, which aligns with the effect sizes reported in previous studies (**Brashear, 2020; Shachar & Neumann, 2010**). The dropout rate was assumed to be 10%. The total analyzed sample size was 649 for both intervention and comparison. According to previous research, this sample size was deemed adequate.

Measurement tools

Two instruments were employed to collect the pertinent data for the present study:

1- Teaching-learning environment (TLE) questionnaire developed by (**Entwistle & McCune, 2004**). The TLEQ is a widely utilized tool that measures students' learning perception and experiences toward the learning process and environment (**Ngugi et al., 2020**). Internal reliability was measured, indicated by a Cronbach's Alpha of 0.76. (**Herrmann et al., 2017**) It contains 22 items measuring six various aspects (Teaching for understanding, Alignment, Staff enthusiasm & support, Interest & relevance, Constructive feedback, and Support from other students). (**Entwistle, 2009; Parpala et al., 2013; Postareff et al., 2018**). The maximum score for this tool is 110. Students with perception scores ranging from 110–75 were considered to have a high level of perception, Moderate (74–37) or Low (<37). The tool consists of two parts: the first part addresses students' characteristics, including age, gender, and academic level, while the second part focuses on items related to students' learning perceptions.

2- The Modified McVay's Readiness for Online Learning Questionnaire (MROLQ): A 27-item scale with a Cronbach's Alpha of 0.82 was established by (**Watkins et al., 2004**) how used participant attitudes and behaviors as predictors of students' readiness for online learning environments. The questionnaire has six subscales; the maximum score for this tool is 135 scores. The scoring level was divided into three categories: High (135-90), Moderate (98-45), and Low (<45).

The utilized tools consisted of a 5-point Likert-type scale response format (1 = strongly disagree to 5 = strongly agree).

Reliability and validity

The face validity of the three adopted tools was evaluated to determine whether they measure what they are intended to measure and to ensure that the adopted tools align with the research objectives. Additionally, internal consistency (Cronbach's alpha) was used to evaluate the internal reliability, and it was> .70 for the adopted tools.

Intervention experiment for the intervention group

Two courses were chosen for the interventions: one clinical course (health assessment) and one theory course (research in nursing). The intervention was implemented while online learning for the selected courses was processed during the regular study. All virtual materials, including videos, website links, and online books, were specified. The course content remained unchanged in accordance with the endorsed course specifications. Interventions were delivered by the regular teachers and followed up by the Principal Investigator. The time and duration of online lectures were managed according to the regular schedule administrated by the faculty administration office.

Data collection procedure

An electronic platform (Jotform) was used to collect participant data, with both questionnaires uploaded to the platform for ease of access. After obtaining ethical and administrative approval, data collection commenced by gathering the contact information of the enrolled students in the selected courses from students' affairs of the faculty. Data were retrospectively collected from the comparison group, which consisted of students who completed their studies using classroom-based learning in the autumn of 2019, using only Tool 1.

For the study group, which began online learning in the autumn of 2020 due to COVID-19-related measures, both Tool 1 and Tool 2 were administered directly after completing the semester. Data collection was conducted after verifying that the inclusion criteria were met. To ensure consistency, the same instructors taught both the comparison and intervention groups, and invitations to participate along with links to the questionnaires, were emailed to students.

Ethical consideration

Official approval for conducting the study was obtained from the relevant authorities, and the research protocol was reviewed and approved by the Research Ethics Committee. Participants were provided with a detailed explanation of the study's objectives, methodology, and potential benefits. They were informed of their right to withdraw from the study at any time without any consequences. Written informed consent was obtained from all participants prior to their inclusion in the study. To ensure anonymity and confidentiality, all data were coded and securely stored. Furthermore, the original authors secured the necessary permissions to use the three adopted tools employed in this research.

Data analysis

Data analysis was performed using IBM SPSS Statistics version 20, employing both descriptive and inferential statistical methods. The normality of the variables was assessed using the Shapiro-Wilk test, histograms, and Q-Q plots. As the variables were found to be non-normally distributed, non-parametric tests were applied. The Mann- Whitney U test (Z) was used to compare the learning perception questionnaire scores between the study and control groups. A p-value of ≤ 0.05 was considered statistically significant.

Result

A total of 961 students were evaluated for eligibility, with 312 students excluded for various reasons outlined in Figure 2. Ultimately, 649 students were analyzed for the study. Of these, 329 students had previously completed the selected courses through classroom-based instruction, and their responses to the study instruments served as baseline data. In contrast, 320 students were taught the same courses online, with prospective data collected for the intervention group.

Table 1 outlines the participants' characteristics, including age, gender, study courses, and academic level, which were comparable between the study and control groups with no significant difference (p > 0.05).

Table 2 presents the overall mean of student responses to the TLE questionnaire that measure students' learning perception and experiences toward the learning process and revealing no significant statistical differences between the study and control groups (p =

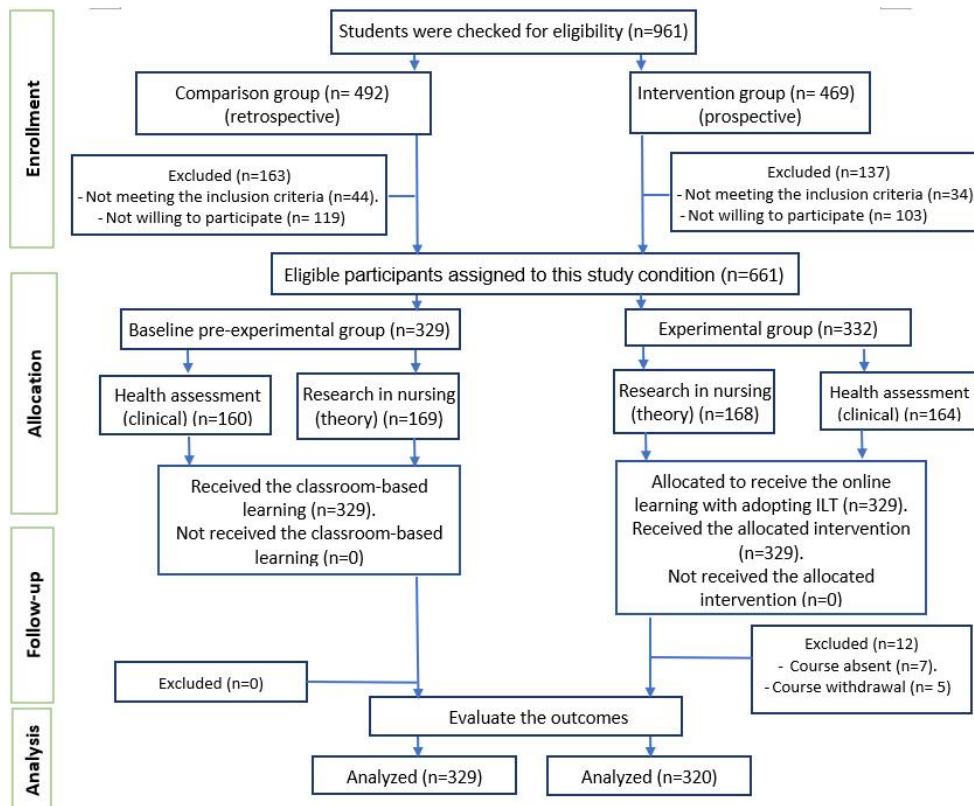0.13), with a small clinically relevant effect size (-0.082) based on Cohen's criteria (1988).

Figure 2 flow chart of participant enrolment in the current study.

Table 1: Students characteristics of the studied participants at baseline (n=649).

	Groups		*p*
	Comparison (329) n (%)	**Intervention (320)** n (%)	
Gender:			
Male	157 (47.7)	146 (45.6)	0.593 [a]
Female	172 (52.3)	174 (54.4)	
Studied courses:			
Research in Nursing (theory)	169 (51.4)	161 (50.3)	0.788 [a]
Health Assessment (clinical)	160 (48.6)	159 (49.7)	
Academic level:			
2nd Level	167 (50.8)	163 (50.9)	0.964 [a]
3rd Level	162 (49.2)	157 (49.1)	
Age (years old):			0.296 [b]
Mean $\pm$ SD	20.15 $\pm$ 0.89	20.07 $\pm$ 0.98	

[a] Chi-square test.

[b] Independent Samples t test

Table 2: Differences Between Study and Control Groups regarding to overall Students' Learning Perception Measured by TLE Questionnaire (n=649).

	Weighted Mean ± (SD)		Mann Whitney U- test		Effect size
	Control N = 329	Study N =320	U value	Z value (p)	
Students' learning perception	3.11 ± (0.869) c	3.18 ± (0.828) c	49057.5	-1.50 (.13)	-.082

c According to weighted mean for 5-point Likert Scales (2.60 – 3.39) considered as not sure response

In relation to students' learning perception for each item of TLE questionnaire, the majority of the measured averages ranged from 2.60 to 3.39, representing a "neutral" or "not sure" response. Notable exceptions were the study group's responses to items 6 and 18 (mean 3.46 ± 1.32) and the control group's response to item 10 (mean 3.47 ± 1.33), which fell within the range of 3.40 to 4.19, indicating an "agree" response. Items 5, 6, 8, and 10 were deemed clinically relevant, showing moderate effect sizes of -0.567, -0.420, 0.580, and 0.417, respectively (Table 3).

The most frequent GPA for both the study and control groups for both clinical and theory courses was "C" However, for the control group studying the theory course, the most frequent GPA was "D". As shown in Figure 3, the GPA distribution was bell-shaped and symmetrical, clustering tightly around "C." There was no statistically significant difference between the study and control groups regarding the clinical course (p = 0.099), although the study group's GPA was slightly higher. Conversely, a statistically significant difference was observed between the study and control groups for the theory course (p = 0.008) (Figure 3).

Table 3: Differences Between the Study and Control Groups Regarding Learning Perception for Each Item as Perceived by the Students.

Items	Weighted Mean ± (SD)		Mann Whitney U- test		Effect size
	Control N = 329	Study N =320	U value	Z value (p)	
Clear learning expectation	2.94 ± (1.09)c	3.36 ± (1.13)c	40850.5	-5.11 (.00)	-.372
Receiving a course topic to concentrate on	3.35 ± (1.13)c	2.95± (1.09)c	41236.0	-4.94 (.00)	.357
Learning expectations and what we are taught align.	2.92 ± (1.09)c	3.34 ± (1.14)c	40969.0	-5.05 (.00)	-.366
Most of what we learn is relevant.	3.36 ± (1.12)c	2.96 ± (1.26)c	41236.0	-4.94 (.00)	.357
Courses gain a sense of this field's evolution	2.65 ± (1.15)c	3.39 ± (1.33)c	35989.5	-7.15 (.00)	-.567
I learn more about the evidence while teaching.	2.94 ± (1.09)c	3.46 ± (1.32)d	40118.0	-5.39 (.00)	-.420
The teaching inspires me to apply what I have learnt to issues.	2.93 ± (1.10)c	3.35 ± (1.15)c	41279.0	-4.92 (.00)	-.362
I can rely on my other students for help when I need it.	3.35 ± (1.13)c	2.66 ± (1.14)c	34768.5	-7.69 (.00)	.580
Topics I have learnt in classes is interesting.	3.35 ± (1.13)c	2.96 ± (1.10)c	41236.0	-4.94 (.00)	.357
Teachers try to convey their passion to us.	3.47 ± (1.33)d	2.95 ± (1.09)c	40127.5	-5.39 (.00)	.417
Students' discussion helps better understanding.	3.35 ± (1.13)c	2.95 ± (1.10)c	41236.0	-4.94 (.00)	.357
Teachers patiently explain difficult subjects.	3.35 ± (1.13)c	2.97 ± (1.11)c	41236.0	-4.94 (.00)	.357
I enjoy participating in courses.	2.93 ± (1.09)c	3.36 ± (1.14)c	40659.0	-5.19 (.00)	-.380
Teachers assist us in learning the topic and how.	3.35 ± (1.13)c	2.95 ± (1.09)c	41236.0	-4.94 (.00)	.357
I can generally work comfortably with students.	3.36 ± (1.12)c	2.94 ± (1.10)c	41236.0	-4.94 (.00)	.357
Courses provide a chance to discuss vital deas.	2.94 ± (1.09)c	3.36 ± (1.13)c	40850.5	-5.11 (.00)	-.372
I received sufficient feedback.	2.92 ± (1.09)c	3.35 ± (1.15)c	41020.5	-5.03 (.00)	-.371
Methods of evaluation are clear (i.e., final exam).	3.35 ± (1.13)c	3.46 ± (1.32)d	49261.5	-1.45 (.14)	-.086
Assignments and learning expectations are relevant.	2.93 ± (1.10)c	3.35 ± (1.15)c	41279.0	-4.92 (.00)	-.362
Received feedback improves my learning ways.	2.92 ± (1.09)c	3.35 ± (1.15)c	41020.5	-5.03 (.00)	-.371
Given assignments help to connect what I learn with my existing knowledge.	2.92 ± (1.10)c	3.34 ± (1.14)c	40969.0	-5.05 (.00)	-.366
Assignments-related feedback explains unclear topics.	2.94 ± (1.09)c	3.36 ± (1.13)c	40850.5	-5.11 (.00)	-.372

a (1- 1.79) Strongly disagree, b (1.80 -2.59) Disagree, c (2.60 -3.39) Not sure, d (3.40 -4.19) Agree, e (4.20 -5) Strongly agree
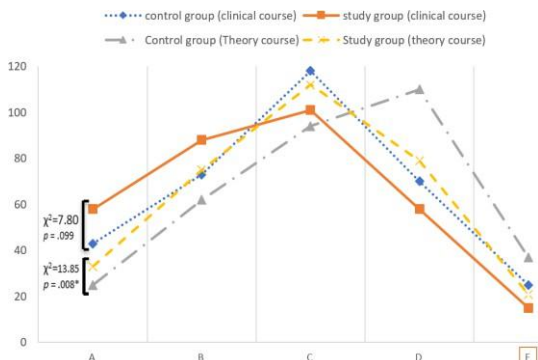
Figure 3: Distribution of GPA for the Study and Control Groups of Students Pertinent to the Studied Clinical and Theory Courses.

The assessment of readiness for ODL in the study group revealed that technology access had the highest mean (3.43 ± 0.94), indicating an "agree" or influential response. In contrast, the motivation subcategory received the lowest mean (3.12 ± 1.03), reflecting a "neutral" or "not sure" response. The overall weighted mean was 3.36 ± 0.86, indicating a neutral response from students (Table 4). Additionally, a significant statistical difference was found in the weighted means of the subcategories, driven by the variance in motivation, as tested by the Tukey post hoc test. A strong, positive, and statistically significant correlation was found between students' readiness for ODL and their responses to the TLE questionnaire, as perceived by the students, with a coefficient of determination ($R^2 = 0.796$) and a p-value of < 0.001 (Figure 4).

Table (4): Readiness for Online Learning as Perceived by the Study Group (N = 320).

Subcategory of the Questionnaire	No. of Items	Mean ± (SD)	F	P	Post-hoc test
Technology Access	3	3.43 ± (0.94)[d]			
Online Skills and Relationships	9	3.40 ± (0.86)[d]			
Motivation	3	3.12 ± (1.03)[c]			(Motivation) < (other subcategories) *
Online Audio/Video	3	3.41 ± (0.85)[d]	4.72	.00	
Internet Discussions	4	3.42 ± (0.90)[d]			
Importance to your success	5	3.38 ± (0.93)[c]			
Total Weighted Mean	27	3.36 ± (0.86)[c]			

According to the weighted mean for 5-point Likert Scales: [c] (2.60 – 3.39) is considered as not sure or neutral response, [d] (3.40 -4.19) is considered as an agree or influential response
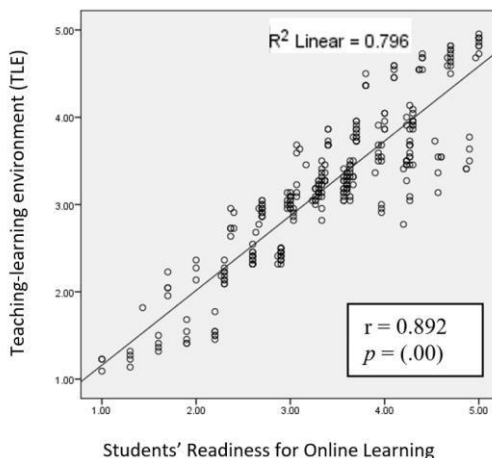* $p < 0.05$

Figure (4): Correlations between perceived teaching-learning environment (TLE), and students' readiness for online learning for the study group (No. 320).

Discussion

The current study is the first in Egypt to compare the learning perceptions and scholarly achievements of nursing students who switched to online learning due to COVID-19 with those who learned in a classroom setting. In contrast, online learning became a requirement, and we embraced it by adopting ILT principles to make it more efficient and assessing students' readiness for online learning as a confounding variable.

Despite Egypt 1985 starting to invest in constructing its (ICT) infrastructure to facilitate e-learning activities **(El-Khouly, 2018)**, e-learning in Egypt had limited growth until the COVID-19 pandemic hit the world in early 2020, when the transition to virtual learning was expedited and inevitable by faculty members. Simultaneously, the current study induced an ODL approach for nursing students in both their chosen theoretical and practical courses by adopting certain principles derived from integrated learning theory. Then, students' achievement, perception, and readiness for ODL were measured and compared to TCL.

In relation to the students' learning perception, the current study found that there is neither significant statistical nor clinical relevance between the study and comparison groups regarding their overall learning perceptions indicated by (TLE) questionnaire.

Hence, the first hypothesis of this study was rejected. This finding converges with (**Bączek et al., 2021; Neuhauser, 2002),** who indicated no significant differences between students' perceptions of online or face-to-face learning methods. In fact, (40%) of nine items in the TLE questionnaire were perceived by TCL as higher than the ODL group with a highly significant statistical difference at the item level, such as students recognizing the relevance of what they are taught, students' discussion helps better understanding, and teachers patiently explain difficult subjects. However, (55%) of 12 items perceived from the ODL group as higher than TCL, such as learning expectations and what we are taught align, received sufficient feedback. This may be why no significant statistical differences were detected even though the averages of the online group were higher.

Although many studies show that TCL is perceived better than ODL (**Harefa & Sihombing, 2021)**, other studies show the opposite result, indicating that ODL cannot completely replace TCL (**Almahasees et al., 2021).**

The most frequent GPA for the study and control groups of the students pertaining to the studied clinical and theory courses was (C), with a symmetrical distribution bell-shaped. These results are consistent with the result of (**Hung & Young, 2021),** who showed that the students' average means score was around 72%, which is equivalent to GPA (C). The normal disruption of students' scores may be interpreted that the utilized test was a reliable and standardized testing method.

There is no statistically significant variance between the study and control group that is pertinent to their achievement in the clinical course, as indicated by GPA. However, the study group's GPA was a little greater than the control group. That means the second hypothesis of this study was rejected. The current study's findings matched with (**Mahrous et al., 2015),** who showed no statistically significant difference between traditional and E-learning in practical nursing courses related to academic achievement. This finding may be due to a lack of interaction in ODL with the teacher, colleagues, clinical instruments, real clinical environment, and

teacher-dependency in clinical courses. However, some earlier research found that e-learning increased students' success more than face-to-face learning (**Goldberg & McKhann, 2000).**

On the other hand, there is a statistically positive significant difference between the study and control groups of the students pertaining to their achievement in the theoretical course indicated by GPA. This result indicates that the third hypothesis of this study was accepted. Congruently, (**El Refae et al., 2021)** indicated that the student performance was better in the distance education module. On the other side, this finding is divergent with (**Paul & Jefferson, 2019)**. Such a result of the current study may be due to the satisfactory, interest, and flexibility of ODL while learning theoretical courses. Also, we have to deliberate the susceptibility to fraud while online testing is going on, which may be one reason that explains the preference for online testing. Hence, the examiner should be given a good measure of expected skepticism.

In response to the research question, the study found that the majority of students exhibited a neutral to moderate level of readiness for online learning. Such a finding could be explained by the students' lack of ODL experience and their feelings of uncertainty. This finding is congruent with (**Ranganathan et al., 2021).** Moreover, technology access was perceived as the highest students' response. Such findings may be due to the widespread use of and access to electronic materials and activities that can now be included in ODL experiences. This finding is consistent with (**Akdogan, 2021)**, who reported that technology access was perceived as the highest readiness response.

Conversely, the motivation subcategory was perceived as the lowest part of the online readiness assessment. The student may fear the new learning experience and the expected problems they could meet such as lack of internet connectivity in some locations. On the same line, (**Saadé et al., 2007)** described the students' motivation for ODL as the weakest dimension.

A positive, strong, statistically significant correlation was found between students' readiness for ODL and the perceived response of students' (TLE). Consistently, (**Wei & Chou, 2020)** who found that ODL perceptions were influenced moderately by students' ODL readiness. This

result seems reasonable to suppose that the readiness of ODL enhances the interest in the learning experiences, increasing the perception and satisfactory level.

Limitation

The statistics represent only nursing students' perspectives, which may differ from those of instructors and administrative staff. The sample was collected from only two bachelor's degree levels. In addition, the fact that retrospective data collection for the comparison group frequently relies on participants' memories may be considered a research limitation. In addition, it was difficult for us to recruit participants at random which may affect the generalization of the finding. Future research should incorporate a randomized study to increase the reliability of the data. Using a self-reported instrument may have also affected the outcomes. Future research must be assessed with greater objectivity.

Conclusion

The study found no statistically or clinically significant differences between the study and control groups in terms of overall learning perceptions, as measured by the TLE. However, a significant difference was observed in the students' GPAs between the study and control groups for the theoretical course, but not for the clinical courses. Also, the study revealed a neutral to moderate response in students' readiness for ODL, with notable variation in specific sub-items, such as a positive readiness for technology access and a low response to the motivation for ODL. Additionally, a strong, positive, statistically significant correlation was found between students' readiness for ODL and their perceptions of it.

Recommendation

Based on the study's findings, it is recommended that institutions ensure reliable access to technology and provide technical support. Given the success of ODL in theoretical courses, a blended approach should be considered for clinical courses. Further research is needed to explore students' perceptions of ODL, and clear policies along with continuous faculty training should be

implemented to improve the quality of online instruction.

The current study suggests that ODL cannot fully replace traditional classroom learning (TCL), particularly in nursing clinical courses, which require more virtual clinical simulations. Therefore, blended or hybrid learning may be beneficial. Additionally, it is important to periodically investigate and analyze students' perceptions of all dimensions of learning environments, focusing on an entire study program rather than just one course. To enhance students' readiness for online distance learning (ODL), it is essential to provide additional training, improve access to resources, and foster positive attitudes. Efforts should also focus on enhancing student motivation through engaging content and feedback.

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