

Comparing Effectiveness of Online and in-class Learning in a Nursing Course During COVID-19

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Abstract

Objectives: Online learning has been applied to replace normal classroom of universities around the globe due to the COVID 19 pandemic. The purpose of this study was to compare the effectiveness of online and in-class learning in a nursing lecture course, and to survey the students' and instructors' satisfaction regarding online learning.

Methods: The comparative study was used. The sample consisted of 277 students enrolled in the course between 2019 and 2021, and 6 instructors who taught both courses. Of the students, 141 were in-class students while 136 were online students. The effectiveness was measured using learning achievement score. The online learning satisfaction of students and instructors were collected at the end of the semester. Data were analyzed using independent t-tests and descriptive statistics.

Results: There is no significant difference in learning achievement between online and in-class learning ($p > .05$). However, the mean course evaluation score of the two groups were found to differ with statistical significance ($p < .05$). Students' satisfaction level was lower than that of instructors. Students were nevertheless highly satisfied with 'provided instructional material' of the course design.

Conclusion: The findings suggest that well-designed online course can provide the online learners with the same efficacy of normal classroom students.

Keywords: Effectiveness of learning, online learning, in-class learning, learning achievement, course evaluation, course satisfaction, COVID 19

Introduction

In the midst of COVID-19, many universities around the globe have increased concentration on the safety of students, faculty members, personnel, and other concerned individuals. A new standard has been set; most universities now offer every lecture course through online learning.

Online learning is being accepted as the optimal learning method to assure high quality interaction when in-person education is unavailable. Online learning model studies have increased in frequency both domestically and internationally. Studies have found many models to be effective; these could facilitate efficient learning. Crawford-Ferre and Wiest¹ concluded that effective and successful online learning required the following three factors: course design, interaction among course participants, and instructor preparation and support. First, the course design should include synchronous learning— instantaneous, *real-time* interactions, using technology like video chat—as well as asynchronous learning—

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using recordings, textbook material, and homework; Second, there must be “*interaction among course participants*”, due to collaboration among students does have learning benefits. Instructors should concern in the system and online classroom which should be easily accessible. They should also facilitate a student-centered environment with respect and emotional integrity and help students to develop positive and productive relationships with one another. Lastly, *instructor preparation and support*, the teacher should be trained in strategically and appropriately utilizing the technology. Technical support should also be readily available to instructors.

In reviewing the literature done on student’s achievement from online learning compared to that of normal learning, it was found that the learners had higher academic achievement when learning in a normal classroom.^{2,3,4} However, there were some studies found no statistical difference between the two groups.^{5,6}

However, the occurrence of the COVID 19 pandemic forced teachers to adjust their style of instruction. This adjustment induced setting up various learning activities and creating new methods of evaluation. Students will also need to adjust their learning and studying methods to fit the new model. Consequently, the researcher has realized the importance of studying the effectiveness of online learning lecture courses amidst the COVID 19 situation in order to develop a more effective online instruction model.

Aim of the study: To compare the effectiveness of online and in-class learning in a nursing lecture course during COVID 19 including the specific objectives as follows:

1) to compare learning achievement scores between online and in-class students,

2) to compare course evaluation scores between online and in-class students,

3) to survey the students’ and instructors’ satisfaction regarding online learning.

Research questions:

1. Were there significant differences in learning achievement between online and in-class students?

2. Were there significant differences in course evaluation between online and in-class students?

3. How satisfied were students and instructors in online learning?

Materials and Methods

Design and setting: This comparative research design was conducted at the Faculty of Nursing of a university in northern Thailand.

Sample: The sample consisted of 277 students enrolled in an Adult Nursing course between 2019 and 2021, and 6 instructors who taught both courses. Of the 277 total students, 141 were in-class students (2019-2020) while 136 were online students (2020-2021).

The in-class students were taught two hours per week on campus. Learning activities included lectures, case study discussions, question & answer sessions, and flipped classes. Instructors provided teaching materials, videos and other multimedia to students through the *KC-Moodle* portal before class. The learning achievement was evaluated from class participation, quiz completion, quiz scores, and exam scores. The online class covered the same content as the in-person class but was done fully online. The lectures were taught via Zoom and when the class were over, the zoom recording files were delivered to students via the *KC-Moodle*.

Research Instruments:

1. A learning achievement assessment form which was developed by the course committee using the framework of the Thai higher education standards. This form consisted of three categories: 1) Morality and ethics—which was evaluated from class participation and quiz completion; accounting for 5% of the overall achievement score, 2) Knowledge – this evaluated the ability of students to memorize and understand content. This category represented 57% of the overall achievement score, and 3) Intellectual skills – evaluated students' ability to apply the knowledge gained during the course. Intellectual skills accounted for 38% of the overall achievement score. Knowledge and intellectual skills were evaluated from quiz scores, and exam scores.

2. A student course evaluation form created by the university. This form was used to evaluate student perception towards course instruction. It consists of seven items. The items were rated on a 5-point Likert scale from 1 (very bad) to 5 (very good).

3. An online learning satisfaction assessment form. This form was created by the researcher to assess the learners' and teachers' satisfaction. It consisted of ten items classified into three groups: learning management model, usage of the university's provided internet network, and benefits of online instruction. The items were rated on a 5-point Likert scale ranging from 1 (very dissatisfied) to 5 (very satisfied). Score for each item was calculated using the mean. Mean score 1-1.49 represents satisfaction in lowest level, 1.50-2.49 represents satisfaction in low level, 2.50-3.49 represents satisfaction in moderate level, 3.50-4.49 represents satisfaction in high level, and 4.50-5.00 represents satisfaction in highest level. Content validity was verified by three experts and a CVI of 1.00. In this study, the reliability was tested with 10 pilot students and instructors. These were

found to be $\alpha = 0.91$ and 0.93 , respectively.

Data Collection:

The end of the first semester of academic year 2019 and 2020, the learning achievement scores of sample students were obtained from the course committee. The student course evaluation was obtained from the Education Service of the University (ESU). The course committee and the ESU released the scores to the researcher.

The online learning satisfaction forms were administered to voluntary students enrolled in online class and voluntary instructors who taught in online class. Both instructors and students were asked to complete the form and sent back to the research assistant.

Data Analysis:

The statistic package was used for statistical analysis and the significant level set at $\alpha = 0.05$. An independent t-test was used to compare the mean score of the learning achievement and the mean score of the course evaluation among online and in-class students. Descriptive statistics were used to analyze the responses to the learners' and teachers' satisfaction with online learning.

Results

When comparing the mean learning achievement score, the data showed that students of both groups varied with no statistical significance ($p > .05$). Those who learned online had a mean learning achievement score of 74.39 with a SD of 7.31. The group of in-class learners had a mean learning achievement score of 73.83 and SD of 5.80. The mean course evaluation score of the two groups were found to differ with statistical significance ($p < .05$). Online learners had a lower course evaluation score, on average, than in-person learners ($\bar{X} = 4.34$, $SD = .05$ and $\bar{X} = 4.51$, $SD = .06$, respectively) (Table 1).

Table 1 Comparing learning achievement score and course evaluation score of online students and in-class students.

Variable	Online students (n = 136)		In-class students (n = 141)		T	p-value
	X̄	SD	X̄	SD		
Learning achievement score	74.39	7.31	73.83	5.80	-.699	.485
Course evaluation score	4.34	0.05	4.51	0.06	3.803	.019*

* p<.05

Concerning online course student satisfaction, 122 responses out of 136 were received from students (89.71%), comprised of 111 (90.99%) female and 11 (9.01%) male students. The study found that the overall mean satisfaction score for online learning was at a moderate level ($\bar{X} = 3.19$, $SD=0.33$). Satisfaction with the course design was at a moderate level ($\bar{X} = 3.28$, $SD=0.22$) while satisfaction with

provided instructional material was at a high level ($\bar{X} = 3.55$, $SD=0.87$). Satisfaction with the usage of the university's provided internet network, and the benefits of online instruction were at a moderate level ($\bar{X} = 2.76$, $SD=0.69$ and $\bar{X} = 3.23$, $SD=0.20$, respectively). Satisfaction with the system stability during use was at the lowest level compared to other items ($\bar{X} = 2.27$, $SD=0.89$) (Table 2).

Table 2 Mean, standard deviation, and level of online course students' satisfaction (n=122)

Items	X̄	SD	Level
1. Course Design			
1.1 Zoom Lectures	2.86	0.75	moderate
1.2 Instructional Video Clips	3.23	0.91	moderate
1.3 Online Learning Activities (Q&A, flipped class, case study)	3.26	0.78	moderate
1.4 Method of Evaluating Learning Outcomes	3.40	0.87	moderate
1.5 Provided Instructional Material	3.55	0.87	high
Total	3.28	0.22	moderate
2. Usage of the University's Provided Internet Network			
2.1 User-friendly	3.25	1.03	moderate
2.2 System Stability During Use	2.27	0.89	low
Total	2.76	0.69	moderate
3. Benefits of Online Instruction			
3.1 Increased Responsibility with Lecture Attendance and quiz Completion	3.46	0.82	moderate
3.2 Increased Participation in Online Learning Activities	3.14	0.84	moderate
3.3 Increased Knowledge and Understanding of Course Contents	3.10	0.92	moderate
Total	3.23	0.20	moderate
Overall Satisfaction	3.19	0.33	moderate

Concerning online course satisfaction of instructors, six responses were received from instructors (100%). The overall mean satisfaction score for online learning was at a high level (\bar{X} =4.15, SD=0.29). Satisfaction with the course design, and the usage of the university's provided internet network were at a high level (\bar{X} =4.10, SD=0.22 and \bar{X} =3.84,

SD=0.23, respectively) while satisfaction with the benefits of online instruction were at the highest level (\bar{X} =4.50, SD=0.17). Creating instructional material and acquired ability to create online courses which enhance learners' participation yielded the highest level of satisfaction (\bar{X} =4.56, SD=0.52 and \bar{X} =4.67, SD=0.52, respectively) (Table 3).

Table 3 Mean, standard deviation, and level of online course instructors' satisfaction (n=6)

Issues	\bar{X}	SD	Level
1. Course Design	4.17	0.41	high
1.1 Zoom Lectures			
1.2 Instructional Video Clips	4.00	0.63	high
1.3 Online Learning Activities (Q&A, flipped class, case study)	4.11	0.59	high
1.4 Method of Evaluating Learning Outcomes	3.92	0.52	high
1.5 Creating Instructional Material	4.56	0.52	highest
Total	4.10	0.22	high
2. Usage of the University's Provided Internet Network			
2.1 User-friendly	4.00	0.63	high
2.2 System Stability During Use	3.67	0.52	high
Total	3.84	0.23	high
3. Benefits of online instruction			
3.1 Increase Knowledge and Skills on Using Online Media	4.50	0.55	high
3.2 Acquired Ability to Create Online Courses Which Enhance Learners' Participation	4.67	0.52	highest
3.3 Acquired Ability to Design Online Learning Achievement Evaluation	4.33	0.82	high
Total	4.50	0.17	highest
Overall Satisfaction	4.15	0.29	high

Discussion

From the research question 1, there was no statistically significant difference in learning achievement between online and in-class students ($p > .05$).

This online learning course have been set during COVID 19 pandemic for responding the University's policy to keep social distancing. The instructor group have tried to design the course to overcome the weakness of traditional distance education lacking in student-teacher interaction as well as student-student interaction. This seems to support the theory that learning is indeed a social process. A lack of social presence would negatively affect the students' learning achievement.^{7,8} With existing technological advances, it is easy to engage online students in various learning activities with a similar experience to in-class students those who interact more often with their peers and instructor(s) during online discussions will engage more in the course material and achieve higher learning achievement scores.

In this study, the lectures were taught via Zoom, which is a synchronous communication platform, and could replace the face-to-face classroom instruction normally carried out.⁹ Once the lecture finished, the instructor would manually the zoom recording file to the KC-Moodle portal as well as various learning materials which provided before class. These would enable learners to maximize their interaction with provided materials. This is congruent to the conceptual framework of long-distance education proposed by Moore¹⁰ who believed that the success of long-distance education could occur if the teacher had arranged opportunity for the learners to interact with various instructional media. Moore came up with three types of interactions: student-content interaction, student-teacher interaction, and student-student interaction. This conceptual framework had

been verified by a set of studies and could support the conclusion that if there existed an online education system that provided opportunity for learners who have high level of an interaction in just one type (S-C, S-T, or S-S), the learning could be achieved according to the course objectives.^{1,11,12}

Research question 2, the results of the study revealed there was statistically significant difference in course evaluation between online and in-class students ($p < .05$).

This should be discussed that the online learning was chosen as a possible solution to the COVID 19 situation. This forced students to quickly acclimate to a completely new learning model (online). Many of these students had no experience with online learning or internet self-sufficiency. These students were more likely to be dissatisfied with online instruction and rate the course in a low level.^{13,14} Another possible reason may be the dissatisfaction with the instability of the internet system. This study also found that online students mean satisfaction score was moderate. The list item: "System Stability During Use" had the low satisfaction score of the list. These findings are congruent to the study by Tungpantong¹⁵ who found that the system quality, as well as the given information had impact on the operation and satisfaction of the system users. This causes students evaluated online course lower than in-class course.

Research question 3, how satisfied were students and instructors in online learning? The students were *moderately* satisfied with online learning in general, whilst instructors were *highly* satisfied. These results are congruent to those of Elshami et al.¹⁶ who studied satisfaction of students and teachers with online learning. They found that only 41.3% of students were satisfied while 74.3% of instructors were satisfied. One factor that contributed to the satisfaction disparity was the sudden shift in framework—from

in-person to online. Students and instructors were especially dissatisfied with three main components of this sudden shift: inadequate preparation time, stressful pandemic conditions, and a lack of prior online learning experience.¹⁷ In the present study, students were dissatisfied with the internet stability during use. This finding agrees with the study of Wingo, Peters, Ivankova, and Gurley¹⁸ which reported that technology-related factors might impact student satisfaction with online learning, including the level of technical support they can rely on and the user-friendliness of the technological infrastructure of courses.

The current study reported that instructors were highly satisfied with online learning; especially with the acquired ability to create online courses which enhance learners' participation as well as creating instructional material. This satisfaction could be due to the support and advice from the TLIC set by the University to support and encourage instructors to design their courses. All this support could help reduce instructors' stress and increase their satisfaction with online teaching. Online learning has been widely regarded as the best mechanism to develop *information and communication technological skills*—for both the students and teachers.¹⁹ Teachers agreed that online instruction would facilitate enhanced learning.

This study also revealed that students and teachers were least satisfied with 'system stability during use' of the 'University's Provided Internet Network'. This finding is congruent to that of many studies which similarly pointed out that the employment of synchronous and asynchronous learning in online instruction could increase the learner's satisfaction. Nonetheless, occurrence of technical difficulties could reduce satisfaction levels.^{4,13,17}

Conclusion

The research has shown that online learning

course designed to enable learners to access learning media via modern technology could enable learners to learn with the same efficacy of a normal classroom. To assure the effectiveness of online learning, the administration must keep the systems up-to date as well as maintain a stable internet connection. This assurance will allow instructors to develop and maintain a productive online course. Even when the pandemic is over, the university might still offer the course since it was so successful during the pandemic times.

Implications for nursing education:

1. Concerned individuals should apply this online learning model designed for this course to other lecture courses to assure the desirable learning outcomes for the learners. This could yield higher satisfaction rates and learning achievement scores than normal classroom lectures.

2. Potential instructors should set up an orientation plan for students who are registered to take the online course. This should ensure students' understanding of all necessary procedures and systems. Students should be able to easily access all learning media for the course.

Recommendations for further research:

1. The researcher should study course designs using different systems—not just zoom. Examples could include VROOM, Google Meet, Microsoft Teams, and Facebook Messenger.

2. The concerned individuals should study the effectiveness of online learning in other course types, not just lectures. Examples could include practicum courses, discussion courses, and lab courses.

Conflict of Interest: The authors declare no conflict of interest to report.

Ethical Considerations: This research was approved by the Institute Research Board of the Faculty of Nursing, (No.2563-122), Chiang Mai University, Thailand. Participants were informed that participation in this study was voluntary, they could withdraw at any time without identifying a reason and without any consequences. The researcher collected research data without any identification of the participants. The findings would be presented anonymously without disclosure of any specific information. Written informed consent of participants had to be given prior to participation.

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