[1] Ha-Thi Nhu-Xuan
[2] Nguyen-Ngo Ngoc-Huyen

Students' Satisfaction on e-Learning at Faculty of Nursing-Medical Technology of Ho Chi Minh City University of Medicine and Pharmacy

JES Journal of Electrical Systems

Abstract: - This study is conducted to describe the satisfaction on e-learning and identify factors related to the satisfaction on e-learning of students at faculty of Nursing – Medical Technology in a national University of Medicine and Pharmacy. We designed a cross-sectional study with questionnaire collected from 736 nursing students. The participants have high satisfaction with an average mean score of 3.86/5. The criterion with the highest value is Capacity and the lowest is Reliability. Factors related to student satisfaction with e-learning include gender, course, content of course, activities before class, distance education methodology and academic results. This result reinforces previous findings regarding e-learning satisfaction among nursing students in a developing country and contributes to the current systematic studies in this field at the developing countries.

Keywords: e-learning, satisfaction, nursing students, factors.

I. INTRODUCTION

In the past two years in Vietnam, to keep learning uninterrupted during the COVID-19 pandemic, the Ministry of Education and Training has directed to strengthen methods of online education to meet needs of learning in time and flexibility [1]. Previously, Vietnam's Government also encouraged distance education for experience, research to apply recent technologies suitable to our country to lure foreign investment capital in educational institutions [2]. E-learning or online learning is the use of the internet and other computer-based methods (such as smartphones, laptops, and tablets) to deliver education. Either Medical students or students at Faculty of Nursing – Medical Technology, e-learning is an effective method in the Covid-19 pandemic. However, Ho Chi Minh City University of Medicine and Pharmacy (UMP) currently still applies online learning partly after that. Despite some effectiveness and suitability of e-learning in Covid-19 period, medical education has special requirements in learning and in communication especially between teachers and students or between students and patients. There are some factors that could affect the quality and result of students' online learning [3-4].

In the field of Training, the students' satisfaction is as the satisfaction of a true client in Service. The students' satisfaction is "the first students' expectation of school to be compared to the reality that students have at school; the student's ideal university compared to the school currently studying; the satisfaction based on knowledge and experience from evaluating the teaching and supporting services provided by the school in learning" [5-6]. Well-timed support, ability of access, clear expectation and the instructor's enthusiasm plays important roles in students' satisfaction [7].

In contrast, according to some research, lack of communication with instructors and classmates is the main source of dissatisfaction with online courses, about 33,2% [8-9]. The students' satisfaction is considered according to factors related to the e-learning process, including: Reliability, Responsiveness, Capacity, Empathy and Tangibles [10].

A few countries have paid attention to this topic and evaluated the effectiveness of e-learning. In Vietnam, some universities have engaged in this study. For UMP and Faculty of Nursing – Medical Technology, e-learning has been carried out quite synchronously during the Covid-19 pandemic and gradually applied flexibly until now. For an objective evaluation of e-learning, we conducted a survey of students' satisfaction at faculty of Nursing, Midwifery, Anesthesia, Laboratory, Physiotherapy, and Imaging Technology in this research to find out how e-learning could satisfy students of faculty of Nursing – Medical Technology. Based on this research's result, the Board of Directors could consider improving facilities, educational methods and study methods with the goal of improving the quality of patients' care.

That's the reason why authors decided to do this research named "*Students' satisfaction on e-learning at faculty of Nursing - Medical Technology and related factors*".

Objectives:

1. To describe the satisfaction on e-learning of students at faculty of Nursing – Medical Technology.
2. To identify factors related to the satisfaction on e-learning of students at faculty of Nursing – Medical Technology.

II. METHODS

Research Design

Cross-sectional study.

[1] Deputy Head of Nursing Department, Faculty of Nursing, Ho Chi Minh City University of Medicine and Pharmacy, Ho Chi Minh City, Vietnam. xuanha@ump.edu.vn

[2] Faculty of Nursing, Ho Chi Minh City University of Medicine and Pharmacy, Ho Chi Minh City, Vietnam. marsjournal.psy@gmail.com

Participants

Students of faculty of Nursing – Medical Technology using e-learning methods.

Sample size

The employed method is stratified sampling. Estimated sample size as percentage of the number of students studying at the faculty respectively are Nursing 20%, Midwifery 20%, Anesthesia 20%, Laboratory 20%, Physiotherapy 10%, Imaging Technology 10%. Based on the total number of students from 2nd year to 4th year and the stratification rate, there are 736 students at Nursing faculty that took part in this study. First-year students have not been counted in this study because they are studying with other faculties, not at faculty of Nursing – Medical Technology yet.

Inclusion and exclusion criteria

Inclusion criteria: Students from year 2 to year 4 at faculty of Nursing – Medical Technology voluntarily took part in the study and joined online courses were included.

Exclusion criteria: Students that made defective surveys or incomplete questionnaires were excluded.

Data collection

Authors asked permission from the Head of Subjects, academic advisors, and staff of class to meet students at class which e-learning was currently applied. And then, the authors gave explanations on research, ways of email connecting and how to participate in the research. Students would receive an email to a Google link that would explain and describe the objectives and significance of the study. This first link is to confirm the consent to participate in the study. After confirmation, students' full name and class should be recorded in a list. Each student listed would receive a link to answer an anonymous set of twenty-seven questions about satisfaction on e-learning.

Data collection

The anonymous set of twenty-seven questions in Google form have two main parts:

Part I: Personal information of participants including Gender, School Year, Majors, Basic and Specialized Courses, Results, e-learning Methods, e-learning class Activities, Software, Time for Preparation.

Part II: Part of survey on Students' Satisfaction on e-learning consists of five main dimensions based on the Servperf scale with a total of twenty-seven questions divided as follows: Reliability (6 questions), Responsiveness (7 questions), Capacity (5 questions), Empathy (4 questions), Tangibles (5 questions). Students' responses were recorded on a 5-point Likert scale from one being strongly disagree to 5 being strongly agree (i.e., Strongly Disagree-1; Disagree-2; Satisfactory-3, Agree-4 and Strongly Agree-5).

Data analysis

Cleaned data will be analyzed by SPSS ver. 20.0. The data of following variables will be presented as descriptive statistics, including Gender, Course, Majors, Basic and Specialized Courses, Academic Results, e-learning Methods, e-learning class Activities, Software, Time for Preparation. Variables related to Students' Satisfaction including Reliability, Responsiveness, Capacity, Empathy, Tangibles were calculated as the mean value. Factors related to e-learning will be conducted by ANOVA test.

After a toolkit to collect data was already built, researchers sent a set of thirty-one questions with five criteria to two experts in distance education at the faculty of Nursing - Medical Technology at UMP to seek for evaluation. In addition, the toolkit was also sent to ten students for feedback in many aspects. After synthesizing opinions from two experts and ten students, the questionnaire was reviewed, analyzed and errors were corrected. The final completed set of questionnaires consists of twenty-seven questions, divided into five main dimensions.

Research ethics

The study is based on the volunteer spirit then participants can stop at any time without any obligation. The questionnaire was designed appropriately with no sensitive personal information. Information of participants and their responses are kept confidential according to the data management policy of the Ho Chi Minh City University of Medicine and Pharmacy. All responses are used for the study only.

The study was approved by the ethics committee of the Ho Chi Minh City University of Medicine and Pharmacy according to Document No. 303/HDDD-DHYD dated May 8, 2020.

III. RESULTS

Characteristics of Students at Nursing – Medical Technology faculty

Number of students participating was 736 that matched the expectations. Of all students participating in the study, nursing students accounted for the highest of 249/736 (33.8%), followed by Anesthesiology of 179/736 (24.3%), blocking other majors with the number of students participating that ranges from 61 to 96 students. Most of the participants are female, accounting for 613/736, which is nearly five times higher than male students. For Course, the number of 2nd and 4th year students participating in the study was equal, 279/736 (37.9%) and 264/736 (35.9%) respectively. Number of 3rd year students is 193/ 736 (26.2%).

The characteristics of students are described in *Table 1. Characteristics of Students at Nursing – Medical Technology faculty specifically* as follows:

Table 1. Characteristics of Students at Nursing – Medical Technology faculty

Characteristics	Frequency (N=736)	Percentage (%)

Characteristics	Frequency (N=736)	Percentage (%)
Gender		
Male	123	16.7
Female	613	83.3
Majors		
Nursing	249	33.8
Anesthesia	179	24.3
Midwifery	96	13.0
Laboratory	83	11.3
Physiotherapy	68	9.2
Imaging Technology	61	8.3
Academic year		
Senior	264	35.9
Junior	193	26.2
Sophomore	279	37.9

Traits of e-learning of Nursing – Medical Technology faculty

By the survey, Traits of e-learning of Nursing – Medical Technology faculty's students are also under consideration. In detail, a combination of theory and practice prevails, accounting for 378/736 (51.4%). Specialized practice is rarely deployed, only accounting for 8/736 (1.1%). Basic and specialized theory courses are the same, accounting for 175/736 (23.8%).

In general, there are four teaching methods, in which the Traditional Teaching Method (TT) accounts for 84/736 (11.4%), more than 3 times higher than Task-Based Teaching Method (TBT) and Problem-Based Teaching Method (PBT), almost 6 times higher than the Case-Based Teaching Method (CBT) while the combination of four methods (MTT) gives the highest result of 592/736 (80.4%).

Before class, students often prepare assignments in group or by individual, but each of these activities accounts for a relatively low proportion of 63/736 (8.6%) and 52/736 (7,1%) respectively, while the combination of both accounts for an outstanding rate of 621/736 (84.4%).

In the class session, there are two main learning activities. Each isolated activity accounts for a low proportion. Student-center-flip classrooms (in which students present and discuss with friends and teacher) take up 16/736 (2.2%). Whereas the teacher-centered classroom (in which, teacher takes the role of presenting, giving the questions and the students would answer) accounts for 74/736 (10.1%). The performance of the merged method still accounted for the highest proportion of 646/736 (87.8%) again.

Each student has a different amount of time to prepare lessons before class, the most common is the 30-minute period accounting for 262/736 (35.6%), followed by the 60-minute period accounting for 191/736 (26%), then 15-minute and 120-minute period, respectively, and finally the lowest is the 180-minute period, accounting for only 43/736 (5.8%).

In terms of academic results, UMP divided into 5 levels, in which, the majority of students with Rather Good results accounted for 447/736 (60.7%), students with Average results accounted for about a third of the total respectively 225/736 (30.6%), students with Good results accounted for quite a few 52/736 (7.1%) while only a few students with Excellent or Below Average performance.

The most popular software for Se-learning is Microsoft Team with an almost absolute rate of 721/736 (98%) while the rest use Zoom meeting software, only one uses Google class or other software. In addition, students also use other supporting software for learning, in which most students using Zalo software account for 600/736 (81.5%), and a few other software such as KaHoot, facebook, Polleverywhere, some students often use a combination of software. The traits of e- learning process of students is presented in detail in Table 2.

Table 2. Traits of e-learning process of Nursing – Medical Technology faculty

Parameters	Frequency (N=736)	Percentage (%)
Content of course		
Basic Theory	175	23.8
Specialized Theory	175	23.8
Specialized Practice	8	1.1
Theory and Practice	378	51.4
Teaching method		
Traditional Teaching Method (TT)	84	11.4

Parameters	Frequency (N=736)	Percentage (%)
Task-Based Teaching (TBT)	23	3.1
Problem-Based Teaching (PBT)	22	3.0
Case-Based Teaching (CBT)	15	2.0
Multi-method - (MTT)	592	80.4
Activities in classroom		
Student Centre-Flip Classroom	16	2.2
Teacher Centre Classroom	74	10.1
Combined Classroom	646	87.8
Preparation time before class		
15 minutes	154	20.9
30 minutes	262	35.6
60 minutes	191	26.0
120 minutes	86	11.7
180 minutes	43	5.8
Student's preparation before class		
Group	63	8.6
Individual	52	7.1
Both	621	84.4
Academic results		
Excellent	3	0.4
Good	52	7.1
Rather Good	447	60.7
Average	225	30.6
Below Average	9	1.2
E-learning software		
Microsoft Team	721	98.0
Zoom meeting	13	1.8
Google class	1	0.1
Other	1	0.1
Supporting software		
Polleverywhere	16	2.2
KAHoot	47	6.4
Zalo	600	81.5
Facebook	23	3.1
Combination	50	6.8

Satisfaction on e-learning

This study tried to identify students' satisfaction regarding the teaching process in the online environment by five dimensions: Reliability, Responsiveness, Capacity, Empathy and Tangibles. In general, the mean scores of each dimension do not differ too much. The highest is Capacity with an average score of 3.98 ± 0.58 and the lowest one is Reliability with the mean value of 3.79 ± 0.58. The others are arranged in ascending order as shown in Table 3.

Table 3. Mean of dimensions on Satisfaction (N=736)

Dimensions	Mean ± Std.
Reliability	3.79 ± 0.58
Empathy	3.81 ± 0.64
Tangibles	3.83 ± 0.64
Responsiveness	3.91 ± 0.58
Capacity	3.98 ± 0.58
Overall Satisfaction	3.86 ± 0.58

Students' satisfaction on e-learning on basis of characteristics

Results of students' satisfaction on e-learning are described by three levels: *Dissatisfied*, *Satisfied* and *Highly Satisfied*. In terms of Gender, 66.7 percent of male respondents are *Satisfied*, and 29.3 percent are *Highly Satisfied* while the rest are *Dissatisfied*. Meanwhile, results of 70.3 percent of female students are Satisfied with e-learning,

the rest are *Highly Satisfied* and there are no *Dissatisfied*. The level of satisfaction with e-learning in each Majors has a different distribution, specifically: while Nursing, Midwifery and Imaging Technology have a *Satisfied* rating of over 65% and the rest are rated as *Highly Satisfied*, the Anesthesiology, Physiotherapy, Laboratory majors all had a rating of over 70% *Satisfied*, *Highly Satisfied* over 20% and a small minority expressed an opposing viewpoint of *Dissatisfied*. The results are presented in detail in Table 4.

Table 4. Distribution of Satisfaction under characteristics

Characteristics	Satisfaction (%, N =736)		
	Dissatisfied	Satisfied	Highly satisfied
Gender			
Male	4.1	66.7	29.3
Female	0.0	70.3	29.7
Majors			
Nursing	0.4	66.7	32.9
Midwifery	0.0	67.7	32.3
Anesthesia	1.7	70.9	27.4
Physiotherapy	0.0	76.5	23.5
Imaging Technology	0.0	68.9	31.1
Laboratory	1.2	73.5	25.3

Mean value of five dimensions of Reliability

Satisfaction on Reliability

Satisfaction on Reliability is assessed through six survey questions, the mean value of all survey questions is below 4. The highest mean value of 3.90 ± 0.69 is the result conducted from "*Teacher ensures the lectures plan during e-learning process*". The lowest one is "*Student plays an active role in the online learning process*" with a mean of 3.63 ± 0.77. The remains have values ranging from 3.63 to 3.90 as shown in Table 5.

Table 5. Mean value of Reliability (N=736)

Survey question	Mean ± Std.
E-learning system could provide information/ response timely	3.79 ± 0.69
E-learning system could provide information/ response accurately	3.85 ± 0.69
Teacher could clearly understand students' need in the teaching process in the online environment	3.77 ± 0.73
Teacher could recognize students' requirements in the teaching process in the online environment	3.76 ± 0.71
Teacher ensures the lectures' plan during e-learning process	3.90 ± 0.69
Students take the active role in the e-learning process	3.63 ± 0.77

Satisfaction on Empathy

Sympathy has been evaluated by four survey questions. There is no result of mean value exceeding four. The highest one is "*Online learning system that stores and records students' questions*" with value of 3.90 ± 0.72. The lowest mean value of 3.60 ± 0.83 is "*E-learning system could record students' questions*". Others have values of 3.85 ± 0.76 and 3.88 ± 0.76, respectively, to show in Table 6.

Table 6. Mean value of Empathy (N=736)

Survey question	Mean ± Std.
Time arrangement of e-learning is convenient for students	3.88 ± 0.76
The e-learning system creates a connection between teachers and students	3.60 ± 0.83
E-learning system could record students' questions	3.90 ± 0.72
Teacher pays attention on e-learning conditions	3.85 ± 0.76

Satisfaction on Tangibles

There are five survey questions of Tangibles. In which, there are three questions with the same mean value and it is also the lowest value of 3.78, including: "*Students could access e-learning system easily*", "*E-learning system is compatible with all devices of students*" and "*Interface of e-learning system is attractive with colorful design, easy to follow, convenient interaction*" while the standard deviation ranges from 0.73-0.81. The highest mean value of "*E-learning system has no limit of teaching time*" is 3.94 ± 0.71. The last one has a value of 3.88 ± 0.71, also shown in Table 7.

Table 7. Mean value of Satisfaction on Tangibles (N=736)

Survey question	Mean ± Std.

Students could access e-learning system easily	3.78 ± 0.77
E-learning system is latest, modern	3.88 ± 0.71
E-learning system is compatible with all devices of students	3.78 ± 0.81
Lecture time is unlimited on e-learning system	3.94 ± 0.71
Interface of e-learning system is attractive with colorful design, easy to follow, convenient interaction	3.78 ± 0.73

Satisfaction on Responsiveness

There are seven survey questions for Satisfaction on Responsiveness. Only three of seven questions have mean value of above 4. The most prominent are "*The lecturer promptly answered students' questions satisfactorily*" and "*Teachers give lectures dedicatedly for students*", which value 4.04 ± 0.67 is the greatest one. The smallest mean value belongs to "*The material in the online learning system meets the learning needs of students*" with 3.77 ± 0.73. The remaining questions have obvious differences as shown in Table 8.

Table 8. Mean value of Satisfaction on Responsiveness (N=736)

Survey question	Mean ± Std.
There are enough materials for students to study and research on e-learning system	3.78 ± 0.75
Materials on e-learning system meet students' needs	3.77 ± 0.73
The e-learning system informs students of the timelines in the course: schedule, start time, examination time, time of start and end	3.90 ± 0.77
The lecturer promptly answered students' questions satisfaction	4.04 ± 0.67
Teachers are always looking for ways to support students at the highest level	4.03 ± 0.68
Teachers give lectures dedicatedly for student	4.04 ± 0.67
E-learning system provides materials tailored to students' learning style	3.80 ± 0.72

Satisfaction on Capacity

The assessment of this dimension has five survey questions. Three of five questions are above 4 on average. The highest one is "*Lecturers have strong technical baseline skills to use e-learning platforms for online courses*" with a value of 4.07 ± 0.68. The content with the lowest value was "*The school's e-learning policy is well-arranged*" with 3.81 ± 0.73. The remaining questions have relatively high values of 4.02 and 3.97, to show in Table 9.

Table 9. Mean value of Satisfaction on Capacity (N=736)

Survey question	Mean ± Std.
Lecturers have strong baseline technical skills to use e-learning platforms	4.07 ± 0.68
Lectures are updated on the e-learning system	4.02 ± 0.70
Lectures are suitable for online education	3.97 ± 0.68
The online education plan is well-arranged	3.81 ± 0.73
Multiple way of videos or images to deliver lectures	4.02 ± 0.70

Factors related Satisfaction on e-learning

Among the factors related to student satisfaction on e-learning, we found that there are Gender, Course, Year, Basic or Specialized Courses, Activities Before Class, Online Education Methodology, and Academic Result related to e-learning satisfaction. Besides, the factors of Activity in the Classroom, Self-study Time Before Class, Online Learning Support Software are not.

Table 10. Factors related Satisfaction on e-learning

Parameters	F	p
Gender	81.378	0.007
Majors	304.103	0.041
Course	165.617	0.000
Basic or Specialized Courses	231.100	0.021
Activity in the Classroom	133.769	0.107
Activities Before Class	137.818	0.006
Distance Education Methodology	271.457	0.024
Self-study Time Before Class	242.144	0.124
Academic results	387.654	0.000
Online Learning Support Software	447.110	0.147

Note: Fisher's extract test

IV. CONCLUSION

Students at Faculty of Nursing – Medical Technology have high satisfaction with an average score of 3.86 out of 5. The criterion with the highest value is Capacity with an average score of 3.98 ± 0.58. The criterion with the

lowest value is Reliability which has an average value of 3.79 ± 0.58. Factors related to student satisfaction with online learning include Gender, Course, Year, Content of course, Activities Before Class, Distance Education Methodology and Academic Results.

REFERENCES

[1] Ministry of Education and Training. Online conference on Covid-19 prevention and control and online teaching guide. 2020.
[2] Vietnam Prime Minister. Decision No. 112/2005/QD – TT dated 18/05/2005 of the Prime Minister approving the Project on Building a Learning Society in the 2005-2010 period. 2005.
[3] Long N Q. Research on student satisfaction with online training services at Duy Tan University. Master thesis, Da Nang University. 2015.
[4] Hieu D T L. Principles and trends of developing world E-learning technology and lessons learned for higher education in Vietnam. Hanoi University of Science and Technology. 2017.
[5] Trong H, Thao H T P. Value and quality of services in higher education from the perspective of students in the case of the Ho Chi Minh City University of Economics. Economic Development Journal. 2007; 5:38-43.
[6] Michele TC, Daniel JS, Swartz LB. Online Instruction, E-Learning, and Student Satisfaction: A Three-Year Study. Robert Morris University, United States. 2014.
[7] Jackson LC, Jones SJ, Rodriguez RC. Faculty actions that result in student satisfaction in online courses. Journal of Asynchronous Learning Networks. 2010;14(4):78–96.
[8] O'Doherty D, Dromey M, Lougheed J, Hannigan A. Barriers and solutions to online learning in medical education – an integrative review. BMC. 2018; 10.
[9] Mukhtar U, Anwar S, Ahmed U, Baloch MA. Factors effecting the service quality of public and private sector universities comparatively: an empirical investigation. Arts, Science & Commerce. 2015: 132-142.
[10] Mohd Adil, Odai FM, Al Ghaswyneh, Alaa MA. SERVQUAL and SERVPERF: A Review of Measures in Services Marketing Research. Global Journal of Management and Business Research. 2013;8(13):65-75.