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Impacts of Online Education on Teaching Quality and Satisfaction of Medical Students During Covid-19: A Case Study in a Private University in Vietnam

Phi Nguyen Tran Ngoc¹, Phuong Nguyen Thi Thuy¹, Nhan Pham Nguyen Trong¹, Ta Duc Luan^{2,3},
To Dinh Khuong⁴, Nguyen Huu Vinh⁵

¹ Institute of Interdisciplinary Social Sciences, Nguyen Tat Thanh University, Ho Chi Minh City, Vietnam

² Faculty of Medicine, Nguyen Tat Thanh University, Ho Chi Minh City, Vietnam

³ Department of Anesthesiology, Ho Chi Minh City Orthopedic and Rehabilitation Hospital, Vietnam

⁴ Faculty of Nursing, Nguyen Tat Thanh University, Ho Chi Minh City, Vietnam

⁵ Faculty of Pharmacy, Nguyen Tat Thanh University, Ho Chi Minh City, Vietnam

Correspondence: Phuong Nguyen Thi Thuy. Email: phuongntt@ntt.edu.vn; ntnphi@ntt.edu.vn

Abstract

As a developing countries, Vietnam has been facing a myriad of challenges in various aspects during the Covid-19 pandemic. Educational sector is not an exception as it is currently suffering the heavy consequences of the constant disruptions stemming from the switching to online learning. This study was conducted with the aim of surveying and evaluating the views of students of the Faculty of Medicine at Nguyen Tat Thanh University on the influence of online learning on learning quality. Using data from survey questionnaires, the results show that the online learning has impacted different learning aspects of students such as: time management, online satisfaction, training problems. At the same time, the study also recognizes the contributions of students in improving the quality of online teaching of Nguyen Tat Thanh University.

Keywords: Covid-19 Pandemic, Online Education, E-Learning, Medical Students, Impacts

1. Introduction

In March 2020, the World Health Organization (WHO) declared a worldwide outbreak of COVID-19 pandemic emergency (WHO, 2020). This has caused a huge crisis in all areas of social life, especially in the field of education. More than 190 countries worldwide have had to stop all face-to-face teaching and learning in schools to prevent the spread of the pandemic (UNESCO, 2020). One third of children worldwide cannot accept distance learning when schools are closed for various reasons (UNICEF, 2020).

In Vietnam, the education industry is not immune to obstacles caused by COVID-19. Schools, especially universities, are encouraged to switch to online learning for the 2021-2022 semester (Jamalpur, Chythanya and

Kumar, 2021). It can be seen that online education has now become a widely accepted method of education. Many studies highlight the growing need in implementing online education (or e-learning) (Ramachandran and Dinesh Kumar, 2021). Universities around the world promote this as a future teaching method that is widely available to all learners (Blas and Fernandez, 2009). By choosing the right online learning tools as well as building a reasonable teaching plan, online education can help students be more active and motivated to learn (Azhiimah et al., 2021) thereby helping to improve their learning outcomes and educational quality of the institution (Nugroho et al., 2021). However, for medical students - a field that focuses on experimentation and experience more than some other university training disciplines - there are many difficulties with online education when the curriculum is gradually changed (French and Kennedy, 2016). At this time, medical institutions are in a situation of large-scale social restrictions and that requires educators around the world to rethink how they can continue to deliver. providing high-quality medical education in a time of large-scale social restrictions (Muhammad, Yelvi and Ayu, 2020).

This survey selected Nguyen Tat Thanh University (NTTU) as a case study to review and verify the impact of online education on medical students in the context of the COVID-19 pandemic. By the method of survey by questionnaire survey, the results of the study will be a reference database for NTTU in improving and enhancing the quality of online education. In addition, the lack of opportunities to practice basic skills due to the difficulty of direct access to patients can affect the satisfaction of medical students. This will also strengthen the basis for evaluating the quality of online training at this school (Vogel and Harendza, 2016; Peluso and Hafler, 2011).

2. Methods

2.1 Developing a quantitative survey questionnaire

The quantitative survey questionnaire was built and divided into the following main topics, namely: (1) Time for self-study each day (before Covid19 and during Covid19); (2) Online learning time per day and online instructor time; (3) The distribution between theoretical and practical subjects when learning online; (4) benefits of online learning; (5) The level of satisfaction of the criteria for evaluating the quality of online training; (6) Comparison between online and face-to-face learning; (7) Benefits of virtual medical education for medical students' learning process.

Items measuring students' evaluations of online learning due to the COVI-19 pandemic (from items 5-7) are designed according to a Likert scale with 5 levels from strongly disagree to strongly agree. The purpose of this measurement is to give students an opportunity to reflect on their feelings and to indicate their level of agreement if they are satisfied or dissatisfied with the assessed issues. In this study, the predictive constructs measured were: compare the average rating of students with a given neutral level of 3 for items 5,6,7. If the average value obtained is 3 or higher, students will tend to rate positively with the problems that the survey raises. On the contrary, if the mean is less than 3, this indicates that students are not satisfied with the above problems.

2.2 Data collection from survey questionnaire

Data was collected from 350 medical students of Nguyen Tat Thanh University through an online survey with the Google Forms application.

2.3 Data processing

Survey data were collected and analyzed using Statistical Package for the Social Sciences (SPSS) software. By analytical techniques such as: Descriptive statistics, Chi-squared Test, One-sample T-Test, ..., the software provides the necessary data for this research. The results obtained will be the basis for evaluating the quality of online training of Nguyen Tat Thanh University.

3. Result and discussion

3.1 Respondent's profile description

On the basis of the standard sampling method and the population of undergraduate students from the Faculty of Medicine, Nguyen Tat Thanh University, Ho Chi Minh City, Vietnam, 350 students were randomly selected to participate in the survey. All the responses obtained were all valid. The respondents are from 1st to 5th year students (due to the unique nature of the medical faculty) and are described in Table 1 below:

Table 1: Description of respondents

		Frequency	Percent
Gender	Male	114	32.6
	Female	236	67.4
	Total	350	100.0
Student	1 st year	155	44.3
	2 nd year	91	26.0
	3 rd year	23	6.6
	4 th year	50	14.3
	5 th year	31	8.9
	Total	350	100

Source: Primary Data

3.2 Student's learning time

During the outbreak of the Covid-19 pandemic, the study habits of university students have been changed a lot. This makes a difference in student self-study time before and during the ongoing pandemic. To prove it, Asanov et al. (2021) examined how Ecuadorian students aged 14 to 18 spend their time studying during the COVID-19 quarantine. Although most of the students surveyed had similar time spent in distance learning, different patterns in the use of time for education habits may appear depending on gender, wealth status and time spent on household chores.

Going back to the data obtained from medical students of Nguyen Tat Thanh University. With the hypothesis H0 that there is no relationship between student's learning time before the COVID-19 pandemic and during the COVID-19 pandemic, the chi-square test is fully expressed. see Table 2 below:

Table 2: Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	176,849 ^a	9	.000
Likelihood Ratio	129,688	9	.000
Linear-by-Linear Association	104,655	1	.000
N of Valid Cases	350		

a. 7 cells (43.8%) have expected count less than 5. The minimum expected count is ,90.

Source: Primary Data

The analysis results show that the value of asymptotic significance (2 sides) of the Pearson Chi-Square row is less than 0.05 ($0.00 < 0.05$). Therefore, we reject the hypothesis H0, that is, students' self-study time before and during the COVID-19 pandemic is related. This proves that COVID-19 has changed students' learning behavior based on the time factor.

Table 3: Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.711	.000
	Cramer's V	.410	.000
N of Valid Cases		350	

Source: Primary Data

Besides, the Value index of Cramer's V has a value of 0.410, equivalent to 41.0%, showing that there is a high correlation between these two variables.

Changing the form of education from face-to-face to online makes the study time of university students and the teaching time of lecturers subject to change. Figure 1 below shows the distribution of students' online learning time and the amount of time students receive instruction from instructors:

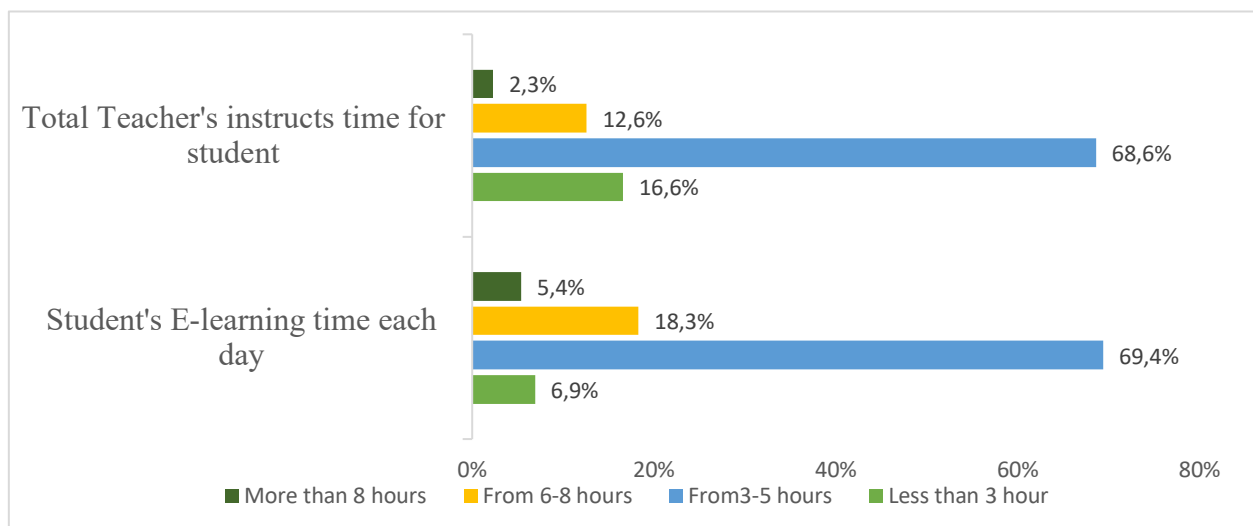


Figure 1: Graph of students' online learning time and the duration of student instruction from instructors.

According to the results from Figure 1, up to 69.4% of medical students at Nguyen Tat Thanh University responded that they spend 3-5 hours a day studying online during the ongoing COVID-19 pandemic, accounting for the proportion the highest among the answers and completely outperformed the percentage of students participating in online learning less than 3 hours in 1 day (6.9%). This proves the fact that the time spent studying online can also be equivalent to the time in face-to-face despite being heavily affected by COVID-19. In addition, up to 68.6% of students who responded to the survey said that they receive 3-5 hours of instruction per day from instructors when participating in online learning. This result shows that even though students had to switch to online learning due to COVID-19, they still received dedicated support and guidance from lecturers during class time. This will also be one of the factors that will improve the quality of online learning at NTTU.

Table 4: Learning Tools

Learning Tools	N	Responses	
		Percent	
Zoom	23	4,3%	
LMS	166	31,2%	
ClassIn	1	0,2%	
Google Meet	338	63,5%	
Microsoft Teams	4	0,8%	
Total	532	100%	

Source: Primary Data

With Table 4 above, we can see that Google's Meeting and Learning Management System - LMS are the two tools most commonly used by Medical students of Nguyen Tat Thanh University for online learning, with a ratio of 63.5% and 31.2% respectively. Meanwhile, Zoom - an online learning tool that is always rated as simpler and more accessible than LMS, has a rather low selection rate of 4.3%. Google Meet is one of the simple learning tools and it is becoming more and more popular and widely used in online learning at universities, so that can explain the high rate that Google Meet gets. But, for the two tools Zoom and LMS, this difference is a very interesting ratio. To explain this amazing rate, David et al. (2016) in a study on Learning Management Systems (LMS) showed that it is the ability to update and develop The LMS's ongoing feature development has made it effective and popular among students. In addition to the remote connection between people for online teaching and learning like Zoom, LMS also has additional features such as: View timetables, exam preparation plans; Look up academic results, curriculum, student results, even update school announcements and more. This helps maximize student support during the COVID-19 pandemic when just sitting at home and using a few small interactions with electronic devices can get information.

Table 5: Ratio between theory and practical subjects

Ratio		Responses	
		N	Percent
100/0		40	11.4%
90/10		22	6.3%
80/20		33	9.4%
70/30		54	15.4%
60/40		32	9.1%
50/50		119	34.0%
40/60		23	6.6%
30/70		19	5.4%
20/80		8	2.3%
Total		350	100%

Source: Primary Data

Next, Table 5 shows us that when students of the Faculty of Medicine of Nguyen Tat Thanh University participate in online training due to the COVID-19 pandemic, the learning of theoretical subjects and practical subjects are ensured balance with each other (with the rate of 34.0% of students choosing). The COVID-19 pandemic poses a huge challenge to ensuring the quality of training for a hands-on education such as Medicine (e.g. suspension of face-to-face instruction, lack of autopsies and practice/experiment session). In response to that, many Medical institutions have successfully introduced the novel culture of "online learning at home" using technology-driven innovations (Uma et al., 2020). The use of emerging technology (e.g., artificial intelligence for adaptive learning, virtual simulation, and telehealth) for Medical education will be a transformative change to address the balance issue between theory and practice in medical training. The results obtained from the above table show that at present NTTU can ensure teaching and learning for students of the Faculty of Medicine.

4. Impact of online education on medical students of Nguyen Tat Thanh University during the covid-19 pandemic

4.1. Benefits of online learning

Research on the impact of online education on students should first let students self-assess about the benefits that online learning brings to them. Although this study was based on a very small group, the inclusion of diverse interests may provide another insight into the type of content better suited to online learning environments (Brittany, 2016). The benefits of online learning that are explored in this part of the study are mainly based on the features of the tools that serve the online form of teaching that medical students are using. The specific results are presented in Table 6 below:

Table 6: Benefits of online learning

		Responses	
		N	Percent
Benefits	1. Access to open source material	211	20.5%
	2. Self-coordination and time management skills.	206	20.0%
	3. Personalization	146	14.2%
	4. Knowledge of online behavior culture	145	14.1%
	5. Instructor support, assignment, and feedback	142	13.8%
	6. Human-to-human interaction	113	11.0%
	7. Communication skills	67	6.5%
Total		1030	100%

Source: Primary Data

According to the results from Table 6, “Access to open source documents” and “Skills of self-coordination and time management” are two benefits that Medical students of Nguyen Tat Thanh University evaluate will obtained when participating in online education with the choice of 20.5% and 20.0% respectively (out of 350 students participating in the survey). This proves that students of the Faculty of Medicine at Nguyen Tat Thanh University have very high requirements for collecting learning materials as well as managing their learning for online education. The two issues mentioned above coincide with two features that Google Meet and LMS implement very effectively. Therefore, it can be understood why the percentage of these two tools chosen by students is so high. On the contrary, very few respondents think that online learning will help their communication skills much, with only 6.5% choosing rate, a very low number. Online education forces human-to-human communication to be done from long distances, and ensuring that communication is fully transmitted while online training depends on It depends on a lot of factors, for example: equipment, network connection, etc. Therefore, it makes it very difficult to supplement "Communication skills" while learning online and also explaining for a low selection rate for this benefit.

4.2. Quality of online education

The quality of online education is guaranteed to be the basis for students to get the best benefits from it. For this issue, the study uses One Sample T-Test to compare the average satisfaction of medical students of Nguyen Tat Thanh University with the quality of online education with test value = 3. Accordingly:

Hypothesis H0: The average score of medical students on the online education quality assessment criteria is 3 (If the obtained mean is greater than 3, students would tend to be satisfied with the quality of the online education. Conversely, if the mean is less than 3, this indicates that students are not satisfied with the online education quality brings.)

The study identified the following evaluation criteria for the quality of online education: TN1: Online learning applications that the Faculty of Medicine is applying

TN2: Competency assessment criteria (scores) during online learning

TN3: The level of interaction during online learning (with instructors, with classmates)

TN4: Online teaching materials and methods

TN5: Practical subjects but must be learned online

Table 7: One-Sample Test

Test Value = 3						
t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference		
				Lower	Upper	
TN1	9,739	349	,000	,4371	,349	,525
TN2	6,921	349	,000	,3000	,215	,385
TN3	8,641	349	,000	,3714	,287	,456
TN4	5,028	349	,000	,2543	,155	,354
TN5	-3,485	349	,001	-,1886	-,295	-,082

Source: Primary Data

Table 8: One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
TN1	350	3,437	,8398	,0449
TN2	350	3,300	,8109	,0433
TN3	350	3,371	,8042	,0430
TN4	350	3,254	,9461	,0506
TN5	350	2,811	1,0122	,0541

Source: Primary Data

Looking at the sig value of the t-test in Table 7, it can be seen that all sig values are less than 0.05. Therefore, we reject the initial hypothesis H₀, that is, the mean score of medical students for the other online education quality assessment criterion 3. Therefore, we will use the results from Table 8 for further review. The results from the one-sample statistical table show that, the average value of the indicators from TN1 to TN4 in the test ranges from 3.25 to 3.44, both are greater than 3. Thus, medical students are agreeing with the quality of online education above neutral 3 on four criteria from TN1 to TN4 Only criterion TN5: Practical subject but must be learned online is only valuable, with the mean is 2.811, lower than the neutral of 3. This means that students are not satisfied with this evaluation criteria. Student dissatisfaction can be explained by the obstacle of the COVID-19 pandemic. To prevent the spread of the pandemic, medical students' practical activities in laboratories or clinics were forced to postpone, and having to study those subjects online exposes for students many problems in acquiring knowledge.

4.3. Compare with the traditional form of education

Assessing the impact of online learning on students during the COVID-19 period, we should have a comparison between the two forms of education, online and in-person. To do this, the survey builds some values on the elements that make up education so that respondents self-assess whether online learning delivers those values in a more positive or negative way compared to traditional learning. Values include: HD1: Practical applicability

HD2: Soft skills

HD3: Time

HD4: Learning environment

HD5: Thinking ability

HD6: Creativity

HD7: Proactivity Still continue to use One Sample T-Test to compare the average assessment of Medical students of Nguyen Tat Thanh University about the values that online education brings compared to face-to-face education . With test value = 3.5, The study builds the following hypothesis:

(Based on a Likert scale with a value from 1.5 to 5.5, where: 1.5 means "Much worse" and 5.5 means "Much better")

Table 9: One-Sample Test

	Test Value = 3.5					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
HD1	-18,493	349	,000	-,8200	-,907	-,733
HD2	-11,175	349	,000	-,5086	-,598	-,419
HD3	-3,382	349	,001	-,1486	-,235	-,062
HD4	-11,511	349	,000	-,5257	-,616	-,436
HD5	-7,206	349	,000	-,2914	-,371	-,212
HD6	-7,197	349	,000	-,3143	-,400	-,228
HD7	-2,189	349	,029	-,1029	-,195	-,010

Source: Primary Data

Table 10: One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
HD1	350	2,680	,8295	,0443
HD2	350	2,991	,8514	,0455
HD3	350	3,351	,8219	,0439
HD4	350	2,974	,8544	,0457
HD5	350	3,209	,7566	,0404
HD6	350	3,186	,8170	,0437
HD7	350	3,397	,8792	,0470

Source: Primary Data

Based on Table 9, it can be seen that all sig values are less than 0.05. Therefore, we reject the initial hypothesis H0, that is, the average score of medical students at Nguyen Tat Thanh University for values other than 3.5. Next, the results from Table 10 show that the mean value of the factors included in the test is less than the neutral value of 3.5. Thus, students of the Faculty of Medicine of Nguyen Tat Thanh University think that online learning brings them values built from the survey somewhat worse than face-to-face teaching. Bali and Liu (2018) also show in their research that students' perceptions of face-to-face learning are higher than online learning in terms of social presence, social interaction and satisfied. Although, online learning actually has some advantages for students.

4.4. Virtual medical with medical students in online education

The COVID-19 pandemic has caused a lot of difficulties for the education industry in general and medical education in particular. In response to that, medical education has undergone changes and adjustments to maintain standards in medical education as well as minimize disruptions in knowledge training (Tabatabai, 2020). As an educational discipline that requires a lot of experimentation, medical education in the context of the COVID-19 crisis has highlighted the need to develop online learning and virtual education (Emmanuelle et al., 2021). For VR in the medical field, users have a visual impression of their experience. This technology can make up for many lacking resources and equipment and improve traditional teaching methods. VR compromised many features ideal for surgery simulation training, rehabilitation, pain management, behavioral therapy, such as: VR medical care training, allowing users to interact with VR, as if immersing in the actual scene, can reduce the Health Care technical operation due to negligence. Using VR to build virtual organs or tissues can assist doctors in their work, allowing doctors and nurses to communicate more effectively with their patients, enhancing their ability to diagnose diseases, provides information about their illness and surgical progress, and is low-cost, non-invasive, and discharges assessment, treatment training and technical training will not present any real risk to the patient (Min-Chai and Jia-Jin, 2018). VR is a powerful educational tool for defined learning goals, and its practice is growing worldwide (Jack, 2019). Returning to the subject of the study, a student of the Faculty of Medicine of Nguyen Tat Thanh University in the context of the 4th wave of the COVID-19 pandemic in Vietnam, Figures 3 below show a simulation result. General description of survey respondents' participation in virtual medical education:

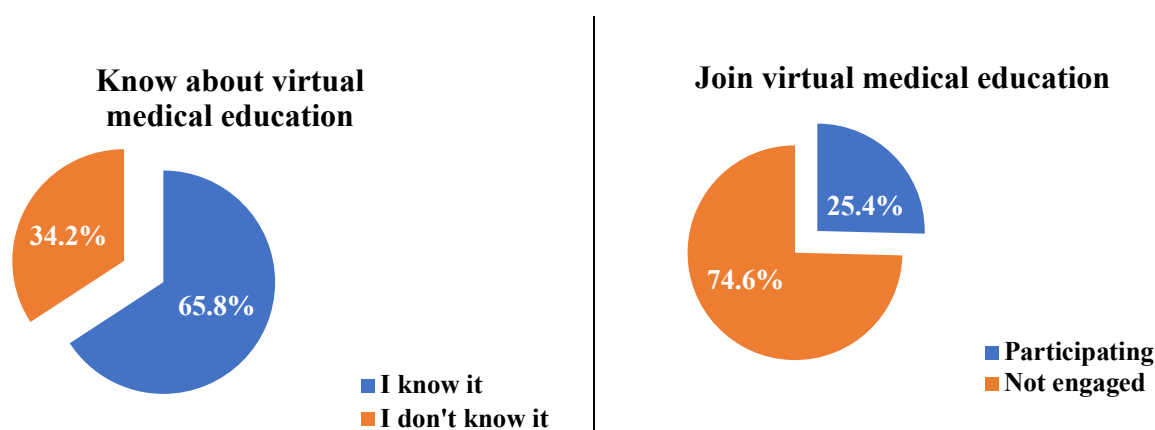


Figure 3: Virtual Medical Education

The results showed that 65.8% of the students answered that they knew about virtual medical education, a fairly high rate showing the curiosity and the spirit of market demand of medical students at Nguyen Tat Thanh University. However, the survey results show that only 25.4% of medical students are allowed to participate in subjects with virtual reality (VR) applications in teaching and practice when learning online (not yet exploiting what specific activities in the application of VR in medical education at NTTU) in the context of the COVID-19 pandemic, a low percentage compared to the number of students who know about it. That shows the low level of exposure of students to virtual medical education.. This can be seen as a rather remarkable indicator when Nguyen Tat Thanh University always focuses on improving the quality of online training in the context of the COVID-19 pandemic.

However, Nguyen Tat Thanh University in general and the Faculty of Medicine in particular also need to be very careful in applying Virtual Reality (VR) to medical training programs, especially during the COVID-19 pandemic. Because, despite the benefits of using virtual reality (VR) in medical education, a number of challenges and limitations lead to the technology becoming useless or abused. Accordingly, the main challenges of developing and using VR with medical education goals include reducing face-to-face communication, education, cost challenges, user attitudes, and other challenges such as designing, safety considerations, side effects of VR, and evaluation and validation of VR applications (Tayebeh, Seyed and Niloofar, 2020). Those challenges or limitations can completely negatively affect the quality of the school's online education, which is undesirable in a difficult period due to the impact of the pandemic.

5. Conclusion and contributions

Collecting data from 350 students of the Faculty of Medicine at Nguyen Tat Thanh University, the study can somewhat generalize the impacts that online education brings to medical students in a private university in Vietnam. In the context of the fourth wave of the COVID-19 pandemic in Vietnam. Specifically, online education contributes to changing students' living habits, transforming the learning environment and affecting students' objective perceptions. However, the results obtained from the study also provide an extremely positive situation of Nguyen Tat Thanh University in general and the Faculty of Medicine in particular. Students' study time with the guidance of lecturers is always guaranteed at the necessary level. Not only that, for a practice-intensive discipline like Medicine, the amount of time students are trained between theory and practice is assessed at a balanced level. Besides, the quality of online education after being tested by the research also shows that it is rated above neutral by students. However, it seems that for a specific discipline like Medicine, the conversion of training to online learning is still not appreciated by students as bringing more value than face-to-face training. Another problem that the survey has exploited is that the application of virtual reality technology (VR) in medical training programs has not been focused despite the students' objective assessments of the benefits.

In summary, the impact of online education on students is quite clear, especially during the COVID-19 pandemic outbreak. With the analysis and evaluation of those impacts on medical students of Nguyen Tat Thanh University, the study will be a reference for NTTU in particular and universities in general in the quest to improve the education quality.

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