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## **Is online learning still necessary after the pandemic? A study of students' opinions towards factors affecting learning**

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### **ABSTRACT**

When the COVID-19 pandemic began to unravel, educational institutions in Thailand returned to teaching onsite or face-to-face. Both teachers and students had to once again adjust themselves to teaching and learning in the new normal way. However, some students still require online and hybrid learning. This research aims to study factors affecting students' preferences for the three learning formats, which are 1) 100% onsite, 2) 100% online, and 3) hybrid learning. We collected data from 158 undergraduate students in one university in Thailand. The analysis results indicate that students who prefer 100% onsite learning value interactions with their instructors and friends. This group of students feels they cannot concentrate or understand the content when studying online. On the other hand, students who prefer 100% online learning think that travelling to campus wastes time and money. They feel that they can concentrate well when studying online. Also, they believe in online evaluation systems such as online exams. Lastly, students who prefer hybrid learning like to review the courses by watching class recording videos, especially those on theoretical subjects. Moreover, they feel that the faculty and university are ready for hybrid learning in terms of the equipment, tools, and Internet connections.

*Keywords:* Onsite Learning, Online Learning, Hybrid Learning.

### **INTRODUCTION**

During the outbreak of COVID, similar to other types of organizations, educational institutions had to find an approach to continue doing their business. Educational institutions, including schools and universities, must teach 100% online. Both teachers and students had to adapt to the online environment by learning and using all the programs and tools to make online teaching and learning as efficient and effective as possible. For almost two years, teachers and students have been familiar with online education.

After the COVID-19 pandemic began to unravel, some schools and universities in Thailand started their hybrid learning or a mix of onsite and online education. In May 2022, all schools and universities reopened and began teaching and learning 100% onsite. Teachers and students once again had to adjust themselves back to the traditional classroom environment. Chulalongkorn University, Thailand, also announced its 100% onsite education policy at the beginning of the academic year 2022 or in August 2022.

However, after almost two years of online education, students may have different opinions about learning formats due to many factors. Some students are satisfied with studying online, some are eager to come to university to mingle with teachers and friends in onsite learning, and some may enjoy the flexibility of the hybrid learning system.

This research aims to find the answer to whether online learning is still necessary after the pandemic by studying factors affecting students' preferences for the three learning formats, which are 1) 100% onsite, 2) 100% online, and 3) hybrid learning. The factors of interest include 1) students' personal opinions, 2) students' attitudes toward online learning, 3) students' attitudes toward instructors, 4) students' attitudes toward courses, and 5) students' perceptions of faculty and university readiness. Findings from this research will help teachers and educational institutions better understand their students and ultimately provide them with the most suitable learning formats to obtain more efficient and effective outcomes.

### **LITERATURE REVIEW**

#### **Onsite, Online, and Hybrid Learning**

Because of the COVID-19 pandemic, people worldwide must adapt to the new normal way of living, including how we educate our students. Luckily, with the advancement of information technologies, networked technologies, and wireless

connections, teachers and students can interact beyond the traditional classroom environment, or “onsite” learning, via electronic learning, or so-called “online” learning. Instructors can take advantage of online learning to meet the needs of students at all levels of education, especially when the pandemic conditions do not allow students to learn in traditional onsite settings (Teo et al., 2014). Moreover, to take good attributes from both “onsite” and “online” learning, there comes the “hybrid” learning or a mix of onsite and online education.

### Research on Online Learning in Thailand

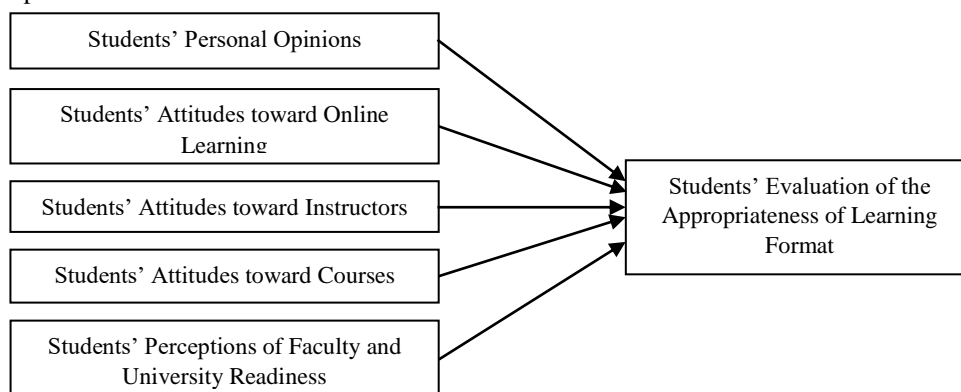
There are many studies concerning online learning in Thailand (Teo et al., 2014; Olivier, 2017; Elango et al., 2018), especially during the COVID-19 pandemic. For example, Maneewongse (2021) did research on behaviors and success factors of online teaching with LINE Application during COVID-19. Lertsakornsiri et al. (2021) examined factors affecting the students’ learning behaviors in online learning during the pandemic. Kornpitack and Sawmong (2022) studied factors influencing student satisfaction with online learning during the COVID-19 pandemic.

In online learning studies, researchers usually examine students’ adaptation and attitudes toward online learning, instructors’ behaviors, online learning environmental factors, and infrastructure readiness (Lertsakornsiri et al., 2021). Teo et al. (2014) studied tutor quality, perceived usefulness, and facilitating conditions in online learning. The study by Kornpitack and Sawmong (2022) examined performance expectancy, effort expectancy, social influence, learner interaction, facilitating conditions, behavioral intention, actual use, and student satisfaction. Moreover, Alqahtani and Rajkhan (2020) researched student characteristics, instructor characteristics, learning environment, instructional design, support, information technology, technology knowledge, course, and level of collaboration, while Elango et al. (2018) studied factors such as social influence, information quality, system quality, and function quality on usage intention of online education. Also, Khasasin et al. (2021) researched instructor, student, educational environment, and technology factors.

In this study, we decided to examine 32 factors from previous research, grouping them into five groups of factors which are 1) students’ personal opinions, 2) students’ attitudes toward online learning, 3) students’ attitudes toward instructors, 4) students’ attitudes toward courses, and 5) students’ perceptions of faculty and university readiness.

### RESEARCH QUESTION AND HYPOTHESES

As mentioned earlier, this research aims to answer whether online learning is still necessary after the pandemic by studying factors affecting students’ preferences for the three learning formats, which are 1) 100% onsite, 2) 100% online, and 3) hybrid learning. This study tested hypotheses for the correlations between 32 learning factors and students’ evaluation of the appropriateness of each of the three learning formats in the post-pandemic situation. We categorized the 32 factors into five groups, five factors in the “students’ personal opinions” group, twelve factors in the “students’ attitudes toward online learning” group, six factors in the “students’ attitudes toward instructors” group, four factors in the “students’ attitudes toward courses” group, and five factors in the “students’ perception of faculty and university readiness” group. All the factors are shown in Table 1, and Figure 1 presents the research framework.



Source: This study.

Figure 1: Research Framework.

### RESEARCH METHODOLOGY

#### Research Tool

An online questionnaire via Google Forms is the primary research tool in this study. The developed questionnaire has three parts. In the first part, students were asked to give demographic data such as gender, class year, and study major. In the second part, the 32 learning factors were listed in five groups, as shown in Table 1. the students rated their opinions on those factors by scoring from 1 (strongly disagree) to 10 (strongly agree). In the last part, the students gave appropriateness scores (from 1 to 10) on the three learning formats: 1) 100% onsite, 2) 100% online, or 3) hybrid learning. The first draft of this questionnaire was sent to eight students to test its validity and comprehensibility. Interviews with these eight students afterward indicated that the questionnaire was straightforward, easy to understand, and ready for data collection.

Table 1: English Version of the Questionnaire.

Factor Group		Factor
<b>Students' Opinion</b>	<b>Personal</b>	P1 - Traveling to study on campus is a waste of expenses.
		P2 - Traveling to study on campus is a waste of time.
		P3 - Traveling to study on campus is risky to contract COVID-19.
		P4 - Face-to-face interaction with friends is not important.
		P5 - Face-to-face interaction with teachers is not important.
<b>Students' toward Learning</b>	<b>Attitudes Online</b>	O1 - You are familiar with online learning.
		O2 - You can concentrate on studying when studying online.
		O3 - You can understand the content when studying online.
		O4 - You can follow the content when studying online.
		O5 - You can ask questions to instructors conveniently when studying online.
		O6 - You can contact instructors easily when studying online.
		O7 - You believe in the assessment system in online learning.
		O8 - You have no problem doing group work with friends online (e.g. via Zoom).
		O9 - You have the equipment and tools needed for online learning.
		O10 - You have network readiness for online learning (e.g. connection to the Internet).
		O11 - You have places to use for online learning, such as having rooms that are appropriate for studying online.
		O12 - You do not need to find accommodation in Bangkok (e.g. dormitories) when studying online.
<b>Students' toward Instructors</b>	<b>Attitudes</b>	I1 - Instructors use appropriate tools and teaching materials when teaching online.
		I2 - Instructors have appropriate teaching methods and practices when teaching online.
		I3 - Instructors can fully convey knowledge content when teaching online.
		I4 - Instructors organize teaching activities appropriately when teaching online.
		I5 - Instructors evaluate students appropriately when teaching online.
		I6 - You receive proper care from instructors in online learning.
<b>Students' toward Courses</b>	<b>Attitudes</b>	C1 - It is necessary to study theoretical courses onsite at the university.
		C2 - It is necessary to review the theoretical courses by watching video lectures.
		C3 - It is necessary to study practical/laboratory courses onsite at the university.
		C4 - It is necessary to review the practical/laboratory courses by watching video lectures.
<b>Students' of Faculty and University Readiness</b>	<b>Perceptions</b>	U1 - The faculty and university have the readiness in terms of software and systems for online learning.
		U2 - The faculty and university have provided sufficient equipment and tools for students who needed them for online learning.
		U3 - The faculty and university have provided sufficient Internet connections for students who needed them for online learning.
		U4 - The faculty and university have the readiness in terms of equipment and tools for Hybrid learning.
		U5 - The faculty and university have the readiness in terms of Internet connections for Hybrid learning.
<b>Students' on the Appropriateness of Learning Format</b>	<b>Evaluation</b>	E1 - 100% onsite learning is appropriate for the current situation.
		E2 - 100% online learning is appropriate for the current situation.
		E3 - Hybrid learning is appropriate for the current situation.

Source: Adapted from Alqahtani and Rajkhan (2020), Elango et al. (2018), Khasasin et al. (2021), Kornpitack and Sawmong (2022), Lertsakornsiri et al. (2021), Teo et al. (2014).

## Population and Data Collection

We decided to base our study on students in the Department of Statistics, Chulalongkorn Business School, Thailand. This group of students has similar educational backgrounds and has to take similar groups of courses. For the academic year 2022, there are 463 students (131 first-year students, 125 sophomores, 101 juniors, and 106 seniors). One hundred fifty-eight students, or about 34.1% of the total, participated in the data collection via Google Forms during the first two weeks of September 2022, one month after the beginning of the academic year 2022. In other words, it is about one month after returning to onsite learning at the university. Table 2 shows the summary information of these 158 students. There are 63.3% females, 32.9% males, and 3.8% unidentified. The respondents are 29.1% freshmen, 31.0% sophomores, 15.8% juniors, and 24.1% seniors. 42.4% have a statistics/data science major, 29.7% have a Business IT major, and 27.9% have an insurance major. Regarding their preferred learning format, 27.8% chose 100% onsite learning, 28.5% chose 100% online learning, and 43.7% preferred hybrid learning.

Table 2: Respondents' Summary Information.

Demographics	Distribution
Gender	52 (32.9%) Male 100 (63.3%) Female 6 (3.8%) Unidentified
Class year	46 (29.1%) Freshman 49 (31.0%) Sophomore 25 (15.8%) Junior 38 (24.1%) Senior
Study major	67 (42.4%) Statistics/Data Science 47 (29.7%) Business IT 44 (27.9%) Insurance
The most preferable learning format	44 (27.8%) 100% Onsite learning 45 (28.5%) 100% Online learning 69 (43.7%) Hybrid learning

Source: This study.

## RESEARCH RESULTS

### Descriptive Statistics

Table 3 presents descriptive statistics of each factor presented earlier in Table 1. The mean values and standard deviation of each factor are calculated for each learning format. Mean values range from 2.16 to 9.57, while standard deviation values range from 0.90 to 3.29.

Table 3: Descriptive Statistics of Each Factor.

	Onsite		Online		Hybrid	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
<b>Students' Personal Opinions</b>						
Traveling to study on campus is a waste of expenses.	6.75	2.66	7.58	2.39	7.13	2.53
Traveling to study on campus is a waste of time.	6.02	3.03	6.56	2.83	7.03	2.43
Traveling to study on campus is risky to contract COVID-19.	6.34	2.43	6.87	2.52	6.94	2.36
Face-to-face interaction with friends is not important.	2.32	1.87	2.16	1.89	2.36	1.57
Face-to-face interaction with teachers is not important.	2.80	2.29	2.73	2.24	3.06	2.02
<b>Students' Attitudes toward Online Learning</b>						
You are familiar with online learning.	7.30	2.67	7.64	2.40	8.13	1.82
You can concentrate on studying when studying online.	5.18	3.20	5.67	3.18	5.99	2.76
You can understand the content when studying online.	6.73	2.63	6.80	2.32	6.88	2.25
You can follow the content when studying online.	8.14	2.22	8.07	2.15	8.44	1.84
You can ask questions to instructors conveniently when studying online.	5.68	2.85	5.96	2.86	6.51	2.27
You can contact instructors easily when studying online.	5.32	2.74	6.44	2.42	6.41	2.17
You believe in the assessment system in online learning.	6.11	2.85	6.02	3.29	6.12	2.54
You have no problem doing group work with friends online (e.g. via Zoom).	6.55	2.75	6.29	3.29	6.71	2.53
You have the equipment and tools needed for online learning.	8.80	1.46	8.76	1.96	8.90	1.32

	Onsite		Online		Hybrid	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
You have network readiness for online learning (e.g. connection to the Internet).	8.50	1.90	8.51	1.50	8.57	1.71
You have places to use for online learning, such as having rooms that are appropriate for studying online.	7.80	2.43	7.87	2.63	7.99	2.21
You do not need to find accommodation in Bangkok (e.g. dormitories) when studying online.	8.75	2.54	7.96	3.07	8.38	2.35
<b>Students' Attitudes toward Instructors</b>						
Instructors use appropriate tools and teaching materials when teaching online.	8.23	1.85	8.27	1.53	8.12	1.56
Instructors have appropriate teaching methods and practices when teaching online.	8.07	1.87	7.91	1.58	8.10	1.46
Instructors can fully convey knowledge content when teaching online	7.09	2.31	7.38	2.07	7.41	1.74
Instructors organize teaching activities appropriately when teaching online.	7.84	1.98	7.42	2.08	7.62	1.70
Instructors evaluate students appropriately when teaching online.	7.66	1.90	7.33	2.60	7.77	1.62
You receive proper care from instructors in online learning.	6.93	2.19	7.27	2.02	7.15	1.75
<b>Students' Attitudes toward Courses</b>						
It is necessary to study theoretical courses onsite at the university.	5.61	3.20	5.20	2.74	4.39	2.63
It is necessary to review the theoretical courses by watching video lectures.	8.93	2.07	9.16	1.58	9.42	1.19
It is necessary to study practical/laboratory courses onsite at the university.	8.64	2.23	8.47	2.35	8.86	1.43
It is necessary to review the practical/laboratory courses by watching video lectures.	7.89	2.66	8.20	2.29	8.35	2.16
<b>Students' Perceptions of Faculty and University Readiness</b>						
The faculty and university have the readiness in terms of software and systems for online learning.	8.55	1.36	7.71	2.37	8.25	1.71
The faculty and university have provided sufficient equipment and tools for students who needed them for online learning.	7.66	2.08	7.44	2.25	7.73	1.98
The faculty and university have provided sufficient Internet connections for students who needed them for online learning.	7.77	2.09	7.40	2.06	7.59	1.82
The faculty and university have the readiness in terms of equipment and tools for hybrid learning.	7.98	2.15	8.47	1.73	8.30	1.74
The faculty and university have the readiness in terms of Internet connections for hybrid learning.	8.11	2.08	8.18	2.08	7.97	1.99
<b>Students' Evaluation on the Appropriateness of Learning Format</b>						
100% onsite learning is appropriate for the current situation.	6.18	2.85	5.91	2.56	5.10	2.58
100% online learning is appropriate for the current situation.	5.43	2.78	5.80	2.87	5.04	2.34
Hybrid learning is appropriate for the current situation.	8.73	1.53	9.27	1.45	9.57	0.90

Source: This study.

### Hypothesis Testing

For hypothesis testing, we performed correlation analysis for each of the 32 factors in the five groups against students' evaluation of each learning format. The factors include E1 (100% onsite learning is appropriate for the current situation), E2 (100% online learning is appropriate for the current situation), and E3 (hybrid learning is appropriate for the current situation). The Pearson's correlation coefficients are shown in Tables 4 to 8, with hypothesis testing results at 95% and 99% confidence levels.

Table 4: Correlation Coefficients between Students' Personal Opinions and Evaluation of Each Learning Format.

Students' Personal Opinion	Onsite	Online	Hybrid
Traveling to study on campus is a waste of expenses.	-0.194*	0.454**	0.081
Traveling to study on campus is a waste of time.	-0.369**	0.425**	0.159*
Traveling to study on campus is risky to contract COVID-19.	-0.189*	0.281**	-0.041
Face-to-face interaction with friends is not important.	-0.492**	0.304**	-0.040
Face-to-face interaction with teachers is not important.	-0.497**	0.311**	-0.015

Source: This study.

\* significant at 95% confidence level

\*\* significant at 99% confidence level

For factors in the "Students' Personal Opinions" group, Table 4 indicates that for students who prefer 100% onsite learning, face-to-face interactions with teachers and friends are significantly important to them. They do not think travelling to university wastes time or money, and it is not risky to contract COVID-19, which is the opposite of those who prefer 100% online learning.

Table 5: Correlation Coefficients between Students' Attitudes toward Online Learning and Evaluation of Each Learning Format.

Students' Attitudes toward Online Learning	Onsite	Online	Hybrid
You are familiar with online learning.	-0.369**	0.367**	0.052
You can concentrate on studying when studying online.	-0.458**	0.477**	0.042
You can understand the content when studying online.	-0.414**	0.354**	0.046
You can follow the content when studying online.	-0.278**	0.232**	0.140
You can ask questions to instructors conveniently when studying online.	-0.256**	0.279**	0.055
You can contact instructors easily when studying online.	-0.230**	0.244**	0.087
You believe in the assessment system in online learning.	-0.257**	0.468**	0.061
You have no problem doing group work with friends online (e.g. via Zoom).	-0.161*	0.366**	0.007
You have the equipment and tools needed for online learning.	-0.199*	0.290**	0.137
You have network readiness for online learning (e.g. connection to the Internet).	-0.094	0.284**	0.098
You have places to use for online learning, such as having rooms that are appropriate for studying online.	-0.157*	0.311**	0.057
You do not need to find accommodation in Bangkok (e.g. dormitories) when studying online.	-0.029	0.149	0.078

Source: This study.

\* significant at 95% confidence level

\*\* significant at 99% confidence level

For factors in the "Students' Attitudes toward Online Learning" group, Table 5 shows that students who prefer 100% onsite learning have significantly negative attitudes toward online learning in almost all aspects. On the other hand, students who prefer 100% online learning have significantly positive attitudes toward online learning. Interestingly, for students who prefer hybrid learning, factors in this group do not significantly affect their choice of learning format.

Table 6: Correlation Coefficients between Students' Attitudes toward Instructors and Evaluation of Each Learning Format.

Students' Attitudes toward Instructors	Onsite	Online	Hybrid
Instructors use appropriate tools and teaching materials when teaching online.	-0.009	0.247**	0.128
Instructors have appropriate teaching methods and practices when teaching online.	0.011	0.279**	0.008
Instructors can fully convey knowledge content when teaching online.	-0.270**	0.391**	0.083
Instructors organize teaching activities appropriately when teaching online.	-0.047	0.338**	-0.032
Instructors evaluate students appropriately when teaching online.	-0.121	0.407**	0.109
You receive proper care from instructors in online learning.	-0.133	0.370**	0.066

Source: This study.

\* significant at 95% confidence level

\*\* significant at 99% confidence level

Table 6 indicates that students who prefer 100% online learning have significantly positive attitudes toward their instructors teaching online. In comparison, students who like 100% onsite learning feel that their instructors cannot fully convey the knowledge content when teaching online.

Table 7: Correlation Coefficients between Students' Attitudes toward Courses and Evaluation of Each Learning Format.

Students' Attitudes toward Courses	Onsite	Online	Hybrid
It is necessary to study theoretical courses onsite at the university.	0.483**	-0.222**	-0.100
It is necessary to review the theoretical courses by watching video lectures.	-0.145	0.109	0.352**
It is necessary to study practical/laboratory courses onsite at the university.	0.187*	-0.328**	-0.032
It is necessary to review the practical/laboratory courses by watching video lectures.	0.161*	0.048	0.150

Source: This study.

\* significant at 95% confidence level

\*\* significant at 99% confidence level

The results in Table 7 indicate that students who prefer 100% onsite learning want to study all courses on campus (both theoretical and practical/laboratory). Similarly, students who prefer 100% online learning want to study all courses online. Students who prefer hybrid learning feel it is essential to review the theoretical courses by watching video lectures.

Table 8: Correlation Coefficients between Students' Perceptions of Faculty and University Readiness and Evaluation of Each Learning Format.

Students' Perceptions of Faculty and University Readiness	Onsite	Online	Hybrid
The faculty and university have the readiness in terms of software and systems for online learning.	0.030	0.173*	0.140
The faculty and university have provided sufficient equipment and tools for students who needed them for online learning.	0.117	0.197*	0.074
The faculty and university have provided sufficient Internet connections for students who needed them for online learning.	0.060	0.189*	0.100
The faculty and university have the readiness in terms of equipment and tools for hybrid learning.	-0.043	0.112	0.289**
The faculty and university have the readiness in terms of Internet connections for hybrid learning.	0.012	0.197*	0.275**

Source: This study.

\* significant at 95% confidence level

\*\* significant at 99% confidence level

Since the beginning of the COVID-19 pandemic, Chulalongkorn University has provided students and instructors with tools and services for online and hybrid learning. These include Learning Management Systems such as Blackboard and myCourseVille, as well as online meeting services such as Zoom Cloud Meeting, Microsoft Teams, and Google Meet. Moreover, Chulalongkorn University has arranged computers and notebooks for students to borrow for online and hybrid learning. Concerning the faculty and university readiness, Table 8 indicates that students who prefer hybrid learning feel that the faculty and university are ready for hybrid learning in terms of equipment, tools, and Internet connections.

Table 9 to Table 11 show the top most related factors to each learning format. In this case, we consider both negative and positive correlation coefficient values.

Table 9: Top 5 Most Related Factors to Appropriateness of 100% Onsite Learning.

Factors Most Related to 100% Onsite Learning	Correlation Coefficient
P5: Face-to-face interaction with teachers is not important.	-0.497**
P4: Face-to-face interaction with friends is not important.	-0.492**
C1: It is necessary to study theoretical courses onsite at the university.	0.483**
O2: You can concentrate on studying when studying online.	-0.458**
O3: You can understand the content when studying online.	-0.414**

Source: This study.

\* significant at 95% confidence level

\*\* significant at 99% confidence level



For 100% onsite learning, Table 9 shows that students' personal opinions (P5 and P4) are the most related factors to their preferences for onsite learning. They value face-to-face interactions with teachers and friends. Moreover, they feel they cannot concentrate or understand the content when studying online (O2 and O3).

Table 10: Top 5 Most Related Factors to Appropriateness of 100% Online Learning.

Factors Most Related to 100% Online Learning	Correlation Coefficient
O2: You can concentrate on studying when studying online.	0.477**
O7: You believe in the assessment system in online learning.	0.468**
P1: Traveling to study on campus is a waste of expenses.	0.454**
P2: Traveling to study on campus is a waste of time.	0.425**
I5: Instructors evaluate students appropriately when teaching online.	0.407**

Source: This study.

\* significant at 95% confidence level

\*\* significant at 99% confidence level

The findings in Table 10 indicate that the most related factors to students' preferences of 100% online learning are mostly students' personal opinions (P1 and P2) and attitudes toward online learning (O2 and O7).

Table 11: Top 4 Most Related Factors to Appropriateness of Hybrid Learning.

Factors Most Related to Hybrid Learning	Correlation Coefficient
C2: It is necessary to review the theoretical courses by watching video lectures.	0.352**
U4: The faculty and university have the readiness in terms of equipment and tools for hybrid learning.	0.289**
U5: The faculty and university have the readiness in terms of Internet connections for hybrid learning.	0.275**
P2: Traveling to study on campus is a waste of time.	0.159*

Source: This study.

\* significant at 95% confidence level

\*\* significant at 99% confidence level

The need to review the theoretical courses by watching video lectures (C2) is the most related factor for preferences for hybrid learning. Also, factors in the "Students' Perception of Faculty and University Readiness" (U4 and U5) appear in the second and third ranks.

## DISCUSSION AND CONCLUSION

It can be concluded from the study that even after the situation of the COVID-19 pandemic begins to unravel and the learning format is back to a 100% onsite-classroom environment, some students still prefer 100% online learning. Findings from this study indicate that factors related to preferences for online learning are mostly students' personal concerns about expenses and time to travel to study on campus. This group of students can concentrate and understand the content well when studying online, and they do not value interactions between students and teachers or friends. On the other hand, students who do not want online learning cherish interaction among teachers and friends. They want to understand the content of courses and believe they cannot achieve it when they study online. For hybrid learning, most students feel it is something nice to have. The primary purpose of hybrid learning is to revise the course content by watching video lectures. The findings of this study can be used as guidelines for teachers and educational institutions to gain more understanding of their students and ultimately provide them with the most suitable learning formats. Future research can be conducted with students in different faculties and groups. Details analysis by gender and study major are also interesting.

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