

# Effects of Online Learning Capacity on the Academic Stress of Students: A Case Study during COVID-19 Pandemic

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## Abstract

This study aims to determine the effects of the online learning capacity of students on the perceived academic stress of students during the COVID-19 Pandemic. In today's pandemic, the learning setup has been shifted from face-to-face to online learning setup, which led the students and teachers to adjust and adapt to the online learning setup. In this study, the researchers identified factors affecting the online learning capacity of students particularly the duration of the study (online and offline), no. of gadgets used, internet speed, and internet access. Then, using the Perception Academic Stress (PAS) Scale adapted from the study of Bedewy and Gabriel (2015), the perceived stress among university students was measured. In the PAS scale, four subscales measure the academic stress of students, and these are (1) pressure to perform, (2) perception of workload, (3) academic self-perception, and (4) time restraint. The scores gathered from the four subscales in PAS were correlated to the factors on the online learning capacity of students to determine its effect and relationship. The results of the study proved the following: for the duration of the study (online), there is a significant effect on the perception of workload stress subscale ( $r=0.254$ ,  $p=0.11$ ), for the no. of gadgets used, there is a significant correlation to the pressure to perform ( $r=-0.201$ ,  $p=0.044$ ), academic self-perception ( $r=-0.209$ ,  $p=0.036$ ) and time restraint ( $r=-0.441$ ,  $p=0.000$ ) stress subscale, and for the internet speed, there is a significant correlation to the time restraint ( $r=-0.294$ ,  $p=0.003$ ) stress subscale of the students.

## Keywords

Online learning capacity, academic stress, online learning, pandemic

## 1. Introduction

COVID-19 was confirmed and announced in the Philippines on January 30, 2020, with a 38-year old female from Wuhan testing positive for the novel coronavirus. On the same day, on the other side of the world at the WHO headquarters in Geneva, WHO activated the highest alert level by declaring COVID-19 as a public health emergency of international concern. The Philippines implemented various actions, including a community quarantine in Metro Manila that also expanded in the areas of Luzon as well as other parts of the country to avoid close contact with people. (WHO, 2021)

To curb the spread of COVID-19, most governments have opted to employ quarantine protocols and temporarily shut down their educational institutions. As a consequence, more than a billion learners have been affected worldwide. Among this number are over 28 million Filipino learners across academic levels who have to stay at home and comply

with the Philippine government's quarantine measures (UNESCO, 2020). Online learning might be in terms of synchronous, real-time lectures and time-based outcomes assessments, or asynchronous, delayed-time activities, like pre-recorded video lectures and time-independent assessments (Oztok et al., 2013). The learning setup has shifted from face-to-face classes to online learning setup. DepEd sets a distance learning approach that utilizes three methods: (1) delivery of printed modules to students, (2) access to DepEd Commons, an online education platform DepEd developed to support alternative modes of learning, and (3) delivery of lessons or self-learning modules via radio and television. However, the specific guidelines for implementing distance learning are still under review (Magsambol, 2020). Considering that the educational sector has been affected, the students were required to learn at their own pace for their safety and also to avoid close contact with other people since schools are obligated to shift from face-to-face to online learning.

Since online learning has been mandated by the government, the students have been adjusting to the "new normal" setup, which is online learning due to the COVID-19. Students had to stay up late and wake up early to catch up with all the online subjects and assignments that come with delays due to erratic internet connection. The cost for limited internet access was also one of the factors that needed to be considered and can affect the learning of the students. Considering the new online setup, students find online classes tiring than having the more familiar face-to-face setup. Ever since the online class was established, students are experiencing anxiety and a lot of breakdowns regarding the quality of the learning and some students tend to be left behind considering the amount of work to do.

### **1.1 Objectives**

This study aims to determine the effects of the online learning capacity of students on the perceived academic stress of students during the COVID-19 Pandemic. This study will greatly impact today's pandemic since the learning style has shifted from face-to-face to online setup wherein the students and the teachers are adjusting to the new platform. Additionally, it will bring a huge contribution in determining the effect of the students' technological capacity on the academic stress during the COVID-19 pandemic.

## **2. Literature Review**

Over the first half of 2020, the world has been seized by a pandemic. It was initially identified as a novel coronavirus (severe acute respiratory syndrome coronavirus 2 or SARS-Cov-2) before being renamed as Coronavirus Disease-19 or COVID-19 (Qiu et al., 2020). Coronavirus disease (COVID-19) is a public health emergency that has altered everyone's life and perceptions. Hui et al. (2020) stated that the COVID-19 was initially discovered near Wuhan, China's Hubei province capital, last December 2019. Since then, it has expanded worldwide, resulting in the continuing pandemic happening until now. In addition, a total lockdown happened all over the world to prevent the spread of the virus. Businesses, schools, community centers, and nongovernmental organizations (NGOs) have been forced to close, mass gatherings have been banned, and lockdown measures have been imposed in several countries, restricting travel to basic needs only (Brodeur, Islam, Gray, & Bhuiyan, 2020). This catastrophe has shaken the education industry, and this fear is likely to reverberate across the world's education system. According to United Nations Educational, Scientific, and Cultural Organizations, 138 countries have imposed nationwide school closures, while several other countries have instituted regional or local closures. These school closures have a negative impact on the education of approximately 80% of students worldwide (Lancker & Parolin, 2020).

The novel coronavirus disease, or COVID-19 as it is more commonly referred to, has impacted education at all levels in the Philippines. Since March 2020, when local transmission of COVID-19 was confirmed, the government has implemented pandemic-related policy measures that have impacted the basic education sector (*Impact of Coronavirus Pandemic on Education*, 2020). School closures at all levels and the economic crisis caused by the COVID-19 pandemic are educational shocks that will increase learning inequality, decrease student attachment to school, deteriorate student nutrition, degrade student mental health, increase student vulnerability, increase drop-out rates, particularly among the disadvantaged, decline quality of education, and decline teaching quality. In the long run, this will increase by learning poverty, a decline in human capital, an increase in overall poverty, an increase in inequality, an increase in social unrest, and a perpetuation of the intergenerational poverty cycle (Fontanos et al., 2020)

In light of rising concern about the current COVID-19 pandemic, a growing number of universities across the world have either postponed or canceled all campus events such as workshops, conferences, sports (both intra and inter universities), and other activities. Universities have moved rapidly to transition various courses and programs from face-to-face to online delivery mode. (Sahu, 2020) Efforts to reduce the spread of the COVID-19 virus among the younger and adult populations have prompted the widespread closure of schools, colleges, universities, and other educational institutions in many countries. As of March 25, 150 countries have closed schools and educational institutions nationwide, impacting over 80% of the world's student population. Several countries have implemented localized school closures and those closures are expected to be nationwide. (UNESCO, 2021) According to Friedman (2020), most institutions shifted to online learning as a solution to address COVID-19 restrictions and avoid time wastage since the disease cases are ever-increasing. However, recent studies have revealed that online learning due to Covid-19 has been curtailed under multiple challenges that impact students' performance.

Technical issues have been a significant challenge to online learning due to COVID-19. Over the past months of the COVID-19, numerous students have reported technical issues while taking online classes (Adedoyin, OB. & Soykan, E., 2020). Sometimes, students experience spotty Wi-Fi connections making it difficult for students to attend the lesson consistently which means technical issues are a significant challenge for distance learning that require immediate solutions during this pandemic.

In addition to that, distractions and poor time management is a severe issue with distance learning due to COVID-19. Usually, online learning due to COVID-19 is carried out from home since students cannot meet at school. However, whenever students are at home, they experience multiple distractions, especially when balancing home chores and learning (Friedman, 2020).

On the other hand, staying motivated during online learning has been reported to be a minimum. Most students do not get the appeal of getting started with coursework. Sometimes, others feel that home is not the best environment to study. Hence, many students are struggling to create a mindset that home is a place to learn. As such, students may fail to concentrate on online lessons. Moreover, understanding course expectations have been a considerable challenge among many students taking online learning due to COVID-19. Finally, adapting to unfamiliar technology has been a significant issue with distance learning. Previously, not all students and instructors could use digital devices and technologies to convey a message to other people.

The COVID-19 pandemic creates a negative impact on the essence of education in terms of group learning and classroom activities for both students and educators (Chandra, 2020). Students experience academic stress due to the factors such as study workload, peer pressure, financial burdens, scholarship requirements, and family-related pressures resulting in low self-esteem and lack of concentration that negatively impact their academic performance. Based on the study, academic stress also affects their well-being where they experience anxiety and depression, as well as difficulty in making decisions and managing their activities as they are experiencing a high level of stress. Online learning has its benefits for some students, however, there are also cases where students end up spending most of their time on social media rather than doing their online activities as they consider it as their coping mechanism for academic stress.

Baticulon et al. (2021) stated the barriers of online learning experienced by medical students in the Philippines, among these are difficulty adjusting learning styles, doing chores at home, poor communication, or lack of clear directions from educators. Based on the online survey, fast and reliable data is one of the biggest concerns of the respondents and it is also mentioned that mental health difficulties are also common. The results showed that there are students who don't own a computer while some students only used prepaid mobile data to do their online school activities. Students are having difficulties in adjusting to self-directed learning as some of the teachers are only providing handouts and PowerPoint files without narration which is not the usual learning style that students are used to. Many respondents confessed that they lacked self-discipline and motivation to study which makes it hard for them to cope up with online learning.

### 3. Methods

To attain the objectives of the study, statistical tools were utilized in analyzing the data gathered such as T-Test and correlation analysis. The t-test was used to determine if there is a significant difference between the means of the two variables of each factor in the academic stress. The factors considered used in the T-Test are gender, age, duration of

study online and offline, no. of gadgets used, internet speed, and internet access. In addition, correlation analysis was also employed to determine the relationship of the factors in the online learning capacity of students to the perceived academic stress. The independent variables considered in the analysis are age, duration of study online and offline, no. of gadgets used, internet speed, and internet access while dependent variables are the scores from PAS scale classified into subscales such as pressure to perform, perceptions of workload, academic self-perception, and time restraint.

#### **4. Data Collection**

An online survey questionnaire was made to collect data from the respondents through the use of Google Survey. The survey questionnaire is composed of three sections, Section 1 for the demographic profiling of respondents such as age, gender, educational level, and average household monthly income. Section 2 consists of the questions about the online learning capacity of respondents such as duration of the study (online and offline), type of gadget used during online class, no. of gadgets used, type of internet access, speed of internet access, and no. of devices used during an online class. Lastly, Section 3 consists of questions about the perceived academic stress of students using the Perception of Academic Stress (PAS) scale. In the PAS scale, four subscales measure the academic stress of students, and these are (1) pressure to perform, (2) perception of workload, (3) academic self-perception, and (4) time restraint. The items related to these academic stresses were converted into an 18-item, 5-point Likert-type questionnaire to measure perceptions of academic stress and its sources. To test the validity and consistency of the responses in the questionnaire, a Cronbach's alpha test was used having internal consistency reliability of 0.7. Respondents were asked to rate on a 5-point Likert-type scale (from 1 = strongly disagree to 5 = strongly agree) their perceptions and experiences about each item in measuring sources of academic stress.

### **5. Results and Discussion**

#### **5.1. Summary of Respondents' Profile**

In this study, the demographic profile of the students was collected to determine the distribution of respondents who took part in the study. Furthermore, data on online learning capacity factors were also gathered from the respondents. Based on the result of the survey as shown in Table 1, the majority of the respondents were female with a percentage of 59.41. For the age, the majority of the respondents are 19-23 years old with a percentage of 73.37. For the educational level, most of the respondents were college students with a percentage of 90.10, and lastly, for the household monthly income, most of the respondents' household monthly income ranges from 20,000 to 40,000 with a percentage of 34.65. It was found out that the majority of the respondents' studies online for 8 hours and above with a percentage of 35.64 and studies offline for 3-4 hours with a percentage of 51.49. Most of the respondents use mobile phones in online learning with a percentage of 85.15. For the type of internet access, most of the respondents are using unlimited data which is postpaid with a percentage of 85.15. For the speed of internet access, most of the respondents have a fair internet speed of 5-10 Mbps with a percentage of 38.61. It was also discovered that the majority of the respondents are using 2 devices at a time during online learning with a percentage of 66.34 and lastly, for the online capacity of the school, the majority of the students are with LMS with a percentage of 98.02.

Table 1. Summary of Respondents' Profile

Respondents' Profile	Category	N	%
Gender	Male	41	40.59
	Female	60	59.41
Age	13-15 y/o	8	7.92
	16- 18 y/o	11	10.89
	19-23 y/o	74	73.27
	24 and above	8	7.92
Educational Level	Junior HS	7	6.93
	Senior HS	3	2.97
	College	91	90.1
Household monthly income	10,000 and below	8	7.92
	10,000 to 20,000	13	12.87
	20,000 to 40,000	35	34.65
	40,000 to 70,000	19	18.81
	70,000 to 130,000	9	8.91
	130,000 to 200,000	8	7.92
	200,000 and above	9	8.91
Duration of study (online)	3-4 hrs	24	23.76
	5-6 hrs	22	21.78
	6-7 hrs	19	18.81
	8 hrs and above	36	35.64
Duration of study (offline)	3-4 hrs	52	51.49
	5-6 hrs	20	19.8
	6-7 hrs	19	18.81
	8 hrs and above	10	9.9
Type of gadget used in online learning	laptop computer	80	79.21
	desktop computer	27	26.73
	mobile phone	86	85.15
	tablet	21	20.79
Type of internet access	Unlimited data (postpaid)	86	85.15
	Limited data (prepaid)	15	14.85
Speed of internet access	Poor (below 5mbps)	6	5.94
	Fair (5-10 mbps)	39	38.61
	Moderate (10-20 Mbps)	30	29.7
	Fast (20 Mbps and above)	26	25.74
No. of devices use during online learning	1 device at a time	22	21.78
	2 devices at a time	67	66.34
	3 devices at a time	12	11.88
The online capacity of school	with LMS	99	98.02
	no LMS	2	1.98

## 5.2. Summary of Perceived Academic Stress (PAS) Scale

Table 2 presents the summary results of the Perceived Academic Stress (PAS) Scale. The data collected from the respondents were analyzed using a frequency table, percentage, and mean. Based on the 5-point Likert scale a mean of 2.5 was taken as the minimum acceptable mean score which an item will score before it is accepted. Any mean below 2.50 will be rejected while a mean from 2.50 and above will be accepted.

Based on the results, almost all of the factors are significant to the academic stress the students are experiencing during an online class. For the first factor which is the Pressure to Perform, the average number of the respondents finds it

academically stressful when there is pressure applied to their performance and as to what the people around them expect out of them. For the second factor which is the Perception of workload, the average number of respondents finds the amount and difficulty of workload academically stressful. For the third factor which is Academic Self Perception, the average number of respondents finds their own Academic Perception to be academically stressful. Lastly, for the fourth factor which is the Time Restraints, the average number of respondents said that the time allotted for classes and academic work is enough but there is not enough time to relax after work, examination time is short for them to complete the answers, they are unable to catch up if they get behind the work and that teachers have unrealistic expectations of them.

Table 2. Summary of Perceived Academic Stress (PAS) Scale

Factors	Items	Mean	Std. Dev.	Range	Remarks
Pressure to Perform	The competition with my peers for grades is quite intense.	3.24	1.37	1-5	Significant
	Unrealistic expectations of my parents stress me out.	3.38	1.3	1-5	Significant
	Examination times are very stressful to me.	4.38	0.98	1-5	Significant
	I think that my worry about examinations is a weakness of character.	3.45	1.27	1-5	Significant
	My teachers are critical of my academic performance.	3.75	1.02	1-5	Significant
Perception of Workload	I believe that the amount of work assignments is too much.	4.41	0.81	2-5	Significant
	The size of the curriculum (workload) is excessive.	4.3	0.94	2-5	Significant
	Even if I pass my exams, I am worried about getting a job after graduation.	4.34	1.13	1-5	Significant
	The examination questions are usually difficult.	4.3	0.84	2-5	Significant
Academic Self Perception	I am confident that I will be successful in my future career.	3.69	1.18	1-5	Significant
	I am confident that I will be a successful student.	3.73	1.08	1-5	Significant
	I fear failing courses this year.	4.29	1.23	1-5	Significant
	I can make academic decisions easily.	3.25	1.07	1-5	Significant
Time Restraints	I have enough time to relax after work.	2.43	1.44	1-5	Not significant
	The time allotted to classes and academic work is enough.	2.54	1.29	1-5	Significant
	Teachers have unrealistic expectations of me.	3.8	0.98	1-5	Significant
	Examination time is short to complete the answers.	4.14	1.08	1-5	Significant
	I am unable to catch up if I get behind the work.	3.56	1.19	1-5	Significant

### 5.3. Result of 2-Sample T-Test

Table 3 presents the summary result of the 2-sample t-test to measure the significant difference in the respondents' mean score of PAS based on gender, age, duration of the study (online), duration of the study (offline), no. of gadgets used, internet speed, and internet access. Based on the results regarding gender, the academic performance of the respondents is not affected by stress regardless of their gender. In terms of age, the results show that age is a significant factor of academic stress in which the majority of students who are 19 and above (which are commonly college students) are more stressed than those who are 18 and below. This implies that college students have a lot of workloads

than younger students. Based on the duration of the study (online), the majority of the respondents find it academically stressful when they are studying for 6 hours and above. When it comes to the amount of time spent studying offline, the results show that the respondents do not experience stress academically. Meanwhile, it was found that the number of gadgets used for studying do not contribute to or cause academic stress to the respondents. For internet speed and internet access, the results show that the majority of the respondents who experience poor to fair internet connection and have limited access are prone to academic stress.

Table 3. Result of 2-Sample T-Test

Factor	Variable	Mean	Std. Dev	SE Mean	dF	t-value	p-value	Remarks
Gender	Male	15.67	2.43	0.54	31	-0.03	0.978	no significant difference
	Female	15.69	1.5	0.33				
Age	18 and below	14.37	1.43	0.33	33	3.74	0.001	there is a significant difference
	19 and above	16.53	2.13	0.48				
Duration of study (online)	6 hrs and below	13.51	1.28	0.29	33	-7.11	0.000	there is a significant difference
	6 hrs and above	17.16	1.91	0.43				
Duration of study (offline)	6 hrs and below	15.49	1.66	0.37	37	-0.3	0.766	no significant difference
	6 hrs and above	15.65	1.77	0.4				
No. of gadget used	1 device	15.44	1.38	0.31	31	-0.03	0.980	no significant difference
	more than 1 device	15.45	2.22	0.5				
Internet Speed	Poor to Fair	16.61	1.24	0.28	37	8.05	0.000	there is a significant difference
	Moderate to Fast	13.58	1.14	0.26				
Internet Access	Limited	17.2	2.17	0.48	25	7.86	0.000	there is a significant difference
	Unlimited	13.083	0.888	0.2				

#### 5.4. Result of Correlation Analysis

Table 4 shows the correlation result of the factors according to age, duration of study online and offline, number of gadgets used, internet speed, and internet access. Considering these factors, there are four variables to be determined which are the pressure to perform, perceptions of workload, academic self-perception, and time restraint. The sample size was determined to be 101 respondents. The Pearson Correlation and the p-value were determined.

For the factor of age, the pressure to perform has a moderately significant correlation with the academic stress of students with a Pearson correlation of 0.318. While for the perceptions of workload, there is a highly significant correlation with a Pearson correlation of 0.672. However, the academic self-perception has a very small significant correlation with a Pearson correlation of 0.016, and time restraints have a small significant correlation to the academic stress of students with a Pearson correlation of 0.137.

For the factor of the duration of the study (online), the pressure to perform has a Pearson correlation of 0.011 and the time restraint has a Pearson correlation of -0.076 which has a very small significant correlation to the academic stress

of students. Meanwhile, the perception of workload has a Pearson correlation of 0.253 and academic self-perception has a Pearson correlation of 0.136 which means there is a minor significant correlation to the academic stress of the students.

For the factor duration of the study (offline), pressure to perform with a Pearson correlation of 0.165 and perceptions of workload with a Pearson correlation of 0.106 has a minor significant correlation to the academic stress of students. Meanwhile, the academic self-perception with a Pearson correlation of -0.055 and time restraint with a Pearson correlation of -0.028 has a very small significant correlation to academic stress.

For the number of gadgets used by the students, the variables such as pressure to perform with a Pearson correlation of -0.201, perceptions of workload with a Pearson correlation of -0.14, academic self-perception with a Pearson correlation of -0.209, and time restraints with a Pearson correlation of -0.441 have a very small significant correlation to the academic stress of the students.

For the internet speed, the variables such as pressure to perform with a Pearson correlation of -0.01, perceptions of workload with a Pearson correlation of -0.093, academic self-perception with a Pearson correlation of -0.134, and time restraints with a Pearson correlation of -0.294 have a very small significant correlation to the academic stress of the students.

For internet access, the variables such as pressure to perform with a Pearson correlation of -0.063, academic self-perception with a Pearson correlation of -0.006, and time restraints with a Pearson correlation of 0.027 have a very small significant correlation to the academic stress of the students. However, the perception of workload with a Pearson correlation of 0.148 has a minor significant correlation to academic stress.

Table 4. Result of Correlation Analysis

Factors	Variable	n	Pearson Correlation	p-value	Remarks
Age	Pressure to perform	101	0.318	0.001	significant
	Perceptions of workload		0.672	0	significant
	Academic self- perception		0.016	0.876	not significant
	Time restraint		0.137	0.173	not significant
Duration of study (online)	Pressure to perform	101	0.011	0.91	not significant
	Perceptions of workload		0.253	0.011	significant
	Academic self- perception		0.136	0.174	not significant
	Time restraint		-0.076	0.449	not significant
Duration of study (offline)	Pressure to perform	101	0.165	0.099	not significant
	Perceptions of workload		0.106	0.291	not significant
	Academic self- perception		-0.055	0.587	not significant
	Time restraint		-0.028	0.783	not significant
No. of gadgets used	Pressure to perform	101	-0.201	0.044	significant
	Perceptions of workload		-0.14	0.164	not significant
	Academic self- perception		-0.209	0.036	significant
	Time restraint		-0.441	0	significant
Internet Speed	Pressure to perform	101	-0.01	0.917	not significant
	Perceptions of workload		-0.093	0.357	not significant
	Academic self- perception		-0.134	0.181	not significant
	Time restraint		-0.294	0.003	significant
Internet Access	Pressure to perform	101	-0.063	0.529	not significant
	Perceptions of workload		0.148	0.138	not significant
	Academic self- perception		-0.006	0.953	not significant
	Time restraint		0.027	0.792	not significant



## 6. Conclusion

In conclusion, the results of the perceived academic stress questionnaire aid the researchers to determine the significant factors that affect academic performance and the academic stress as perceived by the students. These factors are pressure to perform, perception of workload, academic self-perception, and time restraints. By correlating these factors with the use of the chosen statistical tool by the researchers it was concluded that in terms of age, there is no correlation between the age of the respondents to the academic self-perception and time restraint, but there is a correlation between age of the respondents to the pressure to perform and perceptions of workload. In terms of the duration of the study (online), there is no correlation between the duration of the study (online) to the pressure to perform, academic self-perception, and time restraint. But there is a correlation between the duration of the study (online) to the perceptions of workload. In terms of duration of the study (offline), there is no association between duration of the study (offline) to all factors affecting academic stress such as pressure to perform, perceptions of workload, academic self-perception, and time restraint. In terms of the number of gadgets used by the respondents, there is a correlation between the number of gadgets to the pressure to perform, academic self-perception, and time restraint. However, there is no correlation between the number of gadgets used to the respondents' perceptions of workload. In terms of internet speed, there is a correlation only to the time restraint, and the rest, such as pressure to perform, perceptions of workload, and academic self-perception does not correlate to the internet speed. Lastly, in terms of internet access, there is no correlation between internet access to the pressure to perform, perceptions of workload, academic self-perception, and time restraint.

In addition, based on the T-test results, it was concluded that there is no significant difference in the academic stress of the respondents based on gender, duration of the study (offline), and the number of gadgets used. However, there is a significant difference in the academic stress of the respondents based on age, duration of the study (online), internet speed, and internet access.

Upon analyzing the gathered data, the majority of the respondents answered that they are experiencing poor to fair internet speed and have limited access to the internet. Following the T-test results, the internet speed and the internet access contributed a lot to the stress level of the students in an online setup. In line with this, it justifies that these technological challenges affect the students' performance in engaging and collaborating in the new learning style.

## 7. Recommendation

As the online setup continuously changes, Students and Faculties aim to adapt to these changes as quickly as they can. However, there is still a lot to be improved in the current setup of online learning. With that, the following recommendations have been made:

- The faculty workforce of universities should cooperate for the improvement of their e-learning knowledge through training in terms of the technological aspects required in an online learning setup.
- To get consistent results for online learning, the government should cooperate by providing enough internet support for the Faculty workforce.
- Students must understand that instructors will most likely be flexible in scheduling lectures and meetings. Similarly, the school department leaders must be honest about the resources they need in an online setup.
- Faculty must have open line communication so they can address the problems they encounter when doing online classes without being fear of being judged negatively.
- Both course and program must be aligned with the development of online learning.

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## Biographies

**Ma. Janice J. Gumasing** is a Professor of the School of Industrial Engineering and Engineering Management at Mapua University, Philippines. She has earned her B.S. degree in Industrial Engineering and a Master of Engineering degree from Mapua University. She is a Professional Industrial Engineer (PIE) with over 15 years of experience. She is also a professional consultant of Kaizen Management Systems, Inc. She has taught courses in Ergonomics and Human Factors, Cognitive Engineering, Methods Engineering, Occupational Safety and Health, and Lean Manufacturing. She has numerous international research publications in Human Factors and Ergonomics.

**Angelica R. Barcelon** completed her secondary education at Malayan Colleges Laguna. Currently, she is pursuing her Bachelor of Science degree in Industrial Engineering at Malayan Colleges Laguna as a 3rd-year college student. As a college student, she is engaged in some extracurricular activities such as a 3rd year representative in the student council of Mapua Institute Technology at Laguna (MITL) and an active member of the Philippine Institute of Industrial Engineers - Operations Research Society of the Philippines (PIIE-ORSP) MCL Student Chapter. In addition, she is a granted scholar of Laguna since the year 2018. Soon, she aims to have her own business and travel the world as she practices the skills she learned throughout her college years.

**Kyla Clarrizze M. Enriquez** completed her secondary education at Malayan Colleges Laguna (MCL) in Cabuyao. Ever since she was in senior high school, it was already her ambition to be a successful Industrial Engineer in the future. Currently, she's pursuing a degree in Bachelor of Science in Industrial Engineering under the department of Mapua Institute of Technology Laguna at the same school as a 3rd-year student. Additionally, she also engages actively in organizational activities as a member and a Director for the Publicity Committee of the Philippine Institute of Industrial Engineers (PIIE) and Operations Research Society of the Philippines (ORSP) MCL Student Chapter. She aims to venture in different fields of Industrial Engineering to upgrade her knowledge and skills.

**Nhea Mica M. Llasos** is a third-year student currently taking Bachelor of Science in Industrial Engineering in Malayan Colleges Laguna under Mapua Institute of Technology at Laguna. She finished her junior high school at Maranatha Christian Academy and graduated in senior high school at the University of Perpetual Help System-Delta Calamba. Ever since she was in high school, she dreamed of becoming an Industrial Engineer because her father is a successful Engineer himself. Even if taking an Engineering program is hard, she knows that there is no easy way out when it comes to achieving a successful career and it is only fulfilling if she overcomes the challenges by pushing her limits and breaking the boundaries she set for herself. She believes that there is always room for improvement and that her weakness and failures will be the driving force for her to be a better version of herself.

**Pia Alexis C. Lomague** is currently a 3rd-year student in Malayan Colleges Laguna under the College of Mapua Institute of Technology at Laguna taking up a Bachelor of Science in Industrial Engineering. She finished her primary and secondary education in Mater Ecclesiae School. She took up Industrial Engineering because there are a lot of opportunities to explore and work in different job roles. She is always open to learning new things to discover and increase the amount of knowledge and create possibilities to enhance her capabilities.

**Mary Abcdee C. Remoquillo** is a third-year B.S. Industrial Engineering student in Malayan Colleges Laguna. She finished her Junior High School education in Panorama Montessori School and then graduated Science, Technology, Engineering, and Mathematics in Malayan Colleges Laguna. The field of Engineering taught her to study very well and to always consider the advantages of choosing this program since Industrial Engineers are flexible that they are responsible for lowering manufacturing costs, increasing overall efficiency, improving the property and quality of goods and services, ensuring worker safety, and preserving the environment, among other things. She always considers failure as positive since she can learn from this experience and this can help her in the future especially when she is in the workplace.

**Jenelle E. Silverio** is a third-year Bachelor of Science in Industrial Engineering student at Malayan Colleges Laguna under the department of Mapua Institute Technology at Laguna (MITL). She took her secondary education at Mary Help of Christians College, Inc. When she was in Senior High School, the course of Industrial Engineering was never in her options, but it turns out that this is where she is meant to be. Currently, she is an MITL SSC Representative and Internal Relations Associate in the Supreme Student Council. Additionally, she is also an active member of the Philippine Institute of Industrial Engineers - Operations Research Society of the Philippines (PIIE-ORSP) MCL Student Chapter. Soon, she intends to work in a company where she can utilize her skills and learnings to become even better at it, both personally and professionally.