

# COVID 19: Impact, Mitigation, Opportunities and Building Resilience *From Adversity to Serendipity*

Perspectives of global relevance based on  
research, experience and successes  
in combating COVID-19 in Sri Lanka

*Volume 01*

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## COVID 19: Impact, Mitigation, Opportunities and Building Resilience

*“From Adversity to Serendipity”*

*Perspectives of global relevance based on research, experience and successes in combating COVID-19 in Sri Lanka*

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## Preface

The COVID-19 pandemic is one of the most defining moments of our times and it has upended life and established systems across the globe with devastating and far-reaching impacts not only on health, but on the economy, society, multilateral trade, cooperation and aid. While those disruptions have been destabilizing, they have also provided opportunities to discover and develop new models and pathways in many areas, including health, education, business, agriculture and trade. As Winston Churchill once said, “A pessimist sees the difficulty in every opportunity; an optimist sees the opportunity in every difficulty”. Prof. Mehmet Yildiz says adversity is a blessing in disguise because it helps to create new neural pathways in the brain, which is an essential factor for neuroplasticity and resilience.

In the course of combatting COVID-19 in Sri Lanka, a wide range of lessons were learnt, many best practices were identified and new knowledge, insights, competencies and experiences were gained. They ought to be further studied, refined, analysed, interpreted and documented for the benefit of posterity. This should be done without delay, lest a lot of the valuable information gathered and the knowledge gained is lost forever.

In this decisive and critical hour, scientists and professionals in the country have an inescapable responsibility and a profound moral obligation to support the nation and its people. It is in this context, that the National Science Foundation, the premier national institution mandated to promote S&T for socio-economic development of the country and wellbeing of its people, organized a 2-day national conference on 27<sup>th</sup> and 28<sup>th</sup> January 2021. It was entitled “COVID-19: Impact, Mitigation, Opportunities and Building Resilience” and the theme of the conference was “From Adversity to Serendipity”. It brought together scientists, academics, professionals, economists, planners, and policy makers, as well as movers and shakers of industry. They deliberated on how best to tackle high priority health, economic, social and environmental issues emanating from the global pandemic while minimizing its impact on the economy and people of Sri Lanka. This endeavor was augmented by drawing upon the knowledge, expertise and insights of top-flight Sri Lankan scientists across the globe, i.e. in Asia, Africa, Europe Oceania and North America, thereby giving the event an international dimension.

Immediately after the conference, editors and associate editors of the volume swung into action, calling for full papers of selected abstracts. The submissions were processed swiftly with the support of a panel of competent international and national reviewers. In addition, scholarly contributions were invited from renowned local scientists to complement and supplement the proceedings. The outcome is a comprehensive volume of more than 730 pages with 65 papers, including keynote and plenary speeches and invited and technical papers, collating local and global perspectives of combatting the COVID-19 pandemic.

The volume comprises nine sections, i.e. six themes namely Health, Mental Health and Wellbeing, Economy, Environment (Natural and Built), Resilience and Society and Education and three cross-cutting themes, namely Governance, Supply Chain, and Research and Inventions. Each section has an Introduction which provides a brief overview on the relevance, scope of papers, their salient points, gaps and areas for future research investigations. This obviated the need to include a separate chapter on Conclusions and Future Perspectives at the end.

COVID-19 emerged as an outbreak in the Wuhan Province in China in December, 2019 and spread rapidly across the globe becoming a pandemic. Thus far, there have been three waves in some countries including Sri Lanka and further waves are likely if the pandemic is not brought under control swiftly. Besides, more virulent variants of COVID-19 with greater transmissibility and severity have been recently identified in several parts of the world which has made combatting the pandemic more challenging and complex. The papers in this publication, i.e. Volume 1, have mainly

focused on the management and impact of COVID-19 in relation to the first wave and it is intended to produce more volumes in the future.

Climate change will exacerbate not only extreme weather conditions and the prevalence of vector-borne diseases such as dengue, chikungunya and zika, but also zoonotic diseases such as COVID-19. Therefore, SARS and COVID-19 may not be the end of the line, but the beginning of the line of increased zoonotic diseases.

Health experts from around the world have been using Sri Lanka's healthcare system as a case study since the 1980s. During the first wave, high testing rates and mobility restrictions coupled with the established surveillance and primary health care network in Sri Lanka have kept COVID-19 mortality at bay in comparison to more advanced healthcare systems in the world. Therefore, this landmark volume will be valuable not only to Sri Lanka, but also to the rest of the world for coping with and mitigating such pandemics in the future.

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# Impact of COVID-19 pandemic on education and mental health of physical science undergraduates in the Faculty of Science, University of Kelaniya

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## ABSTRACT

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The novel coronavirus disease (COVID-19) was a pandemic identified in Wuhan, China in late 2019, which was a huge outbreak around the world including Sri Lanka. This work focuses on identifying the effect on education and mental health from the COVID-19 pandemic on physical science undergraduates of the Faculty of Science, University of Kelaniya, Sri Lanka. Chi-Square and post hoc tests with Bonferroni adjustment were employed to identify associations among considered factors while k-means clustering was applied in the detection of distinct groups among undergraduates. Undergraduates' preference was in-house lectures and practical sessions before the pandemic while Zoom lectures and screen-recordings were during the pandemic. The loss of jobs of family members was the major cause for the lower lecture attendance. Concerning mental healthiness, suicidal thoughts and home violence were prominent. Cluster analysis resulted in three and four clusters respectively when considering the impacts on education and mental health separately. It is noteworthy that undergraduates in Cluster 2 experienced major negative impacts on education while Cluster 1 experienced minor impacts. Identified Cluster 2 by considering the mental perception exhibits that most of the undergraduates' pessimistic thoughts whereas the majority of the students were first-year and female. In conclusion, this study evidence that there is a huge impact on education and the mental perception of undergraduates due to the COVID-19 outbreak. The findings of this study can be utilized by higher authorities of education to lend a helping hand for undergraduates to minimize the effect of COVID-19 on education and mental health.

**Key words:** Bonferroni adjustment, Chi-square test, K-means clustering, Covid – 19, Post hoc test

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## 1. INTRODUCTION

The novel corona virus disease (COVID-19) was a pandemic identified in Wuhan, China in late 2019, which was a huge outbreak around the world. It has rapidly spread across the world including Sri Lanka causing a vast change in our everyday lifestyles. There were major impacts for Sri Lanka regarding the economy, physical and mental

health, education and many other areas. When considering the education sector, the pandemic has a higher potential to affect university students physically, academically, mentally and financially. As a remedy for the prevention of the spread of the COVID-19 among university students, many countries have switched from in-house lectures to the online platforms. In a short period of time, the university student's lives changed as they were asked to leave the

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university and adapt to the online platform. Many studies have been conducted to find out the influence of the COVID-19 pandemic on the education sector including university education.

Different previous studies focus on this disease as it was the most recent issue raised globally. Among them, noteworthy attention is paid to university students all around the world. The study of Cao et al., 2020, focused on the mental status of the undergraduates of Changzui in China. The selected students using the clustering sampling technique were asked to fill a questionnaire created according to the generalized anxiety disorder scale. The results indicated 24.9% were involved in anxiety during this period and they claimed it is required to observe the mental well-being of the students during this hard period. Further, Grubic et al., 2020 and Kecojevic et al., 2020 have conducted similar studies.

Chaturvedi et al., 2021 have conducted a cross-sectional survey with a sample size of 1182 students in various educational institutes in New Delhi. They have identified the following as the impact of COVID-19 on the students of different age groups; the time spent on online classes and self-study, the medium used for learning, sleeping habits, daily fitness routine, and subsequent effects on social life, and mental health. Some other challenges are included as concerns about their health, the health of family members, and worry about finances. Significantly, the university students' mental health has been affected vastly by this pandemic.

Aucejo et al., 2020 addressed the experiences and the expectations of the students on higher education in the United States and the results conclude many pessimistic outcomes as loss of jobs, internships and delayed graduation. Moreover, one of their major findings was that, lower-income students, 55% more likely to delay graduation compared to high income counterparts. Likewise, Choi et al., 2020 explored the disruptions from the prevailed COVID-19 situation on examinations and

placements on medical students in the United Kingdom.

Sahu in 2020, discussed the challenges faced by the universities during this epidemic. They were online education, exams and evaluations, travelling limitation, mental well-being, international students and support services. He indicated the priority of the universities should be to inform the students and staff about the situation with proper learning sources and counseling services. Similar studies were conducted by Savage et al., 2020 on Vietnam and van et al., 2020 on UK university students.

The study of Neuburger and Egger investigated the relationships between traveling habits, travel risk perception and COVID-19 perception in the DACH region for two selected time periods during the pandemic. There was a significant growth of the considered features over time. To identify distinct groups among travelers based on their perception of COVID-19 for the two periods, they applied the cluster analysis. Numerous studies were based on cluster analysis to explore the insights of the data in the pandemic. Some of them are Mulenga et al., 2020, Rahman et al., 2020, Bodrud-Doza et al., 2020 and etc.

No past studies were found which were aimed at identifying the impact of COVID-19 on the Undergraduates of Sri Lanka. This work focuses on identifying the effect on education and mental health from the COVID-19 pandemic on physical science undergraduates of the Faculty of Science, University of Kelaniya, Sri Lanka and identifying different clusters based on the impact of COVID-19. The findings of this study will lead to detect the potential impact of the terrible COVID-19 on university education and to recommend solutions for the identified problems.

Outline of this article is as follows: Section 2 consists with the methodology while Section 3 illustrates results and discussion. Finally, the conclusion section concludes the article.

## 2. METHODOLOGY

Two main approaches to the research problem with their methodologies are discussed here: Cross-sectional analysis by using the Chi-square association test was used to identify the relationships between the considered factors and further associations were examined using the post hoc test. K-means clustering was employed to detect groups with distinctive characteristics among the respondents.

### 2.1. Data collection

Data collection was done through an online survey questionnaire and it was carried out for the students in the Physical Science stream in the Faculty of Science, University of Kelaniya. The questionnaire was designed to meet the research objectives and it addresses the different dimensions related to the university students' experience during the COVID-19 pandemic: impact on education, health, economy, and mental perception (refer to the Annex 1).

Based on the data from the pilot survey, stratified sampling was used in calculating the sample size using Equation (1).

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}} \text{ where } n_0 = \frac{z^2 p(1-p)}{e^2} \quad (1)$$

Where  $n$  is sample size,  $N$  is Population size,  $z$  is confidence level,  $p$  is population proportion and  $e$  is marginal error.

Figure 1 represents the details of the stratified sampling technique employed in the study. (For the stratum  $i$ ;  $N_i$  - Population size,  $n_i$  - Sample size,  $M_i$  - Male Population size,  $m_i$  - Male sample size,  $F_i$  - Female population size,  $f_i$  - Female sample size where  $i = 1, 2, 3, 4$ )

### 2.2. Chi-Square Test of Independence and the Post Hoc Tests

The Chi-Square Test of Independence determines whether there is an association between categorical variables. For a chi-square independence test, the null hypothesis is that the two variables are not associated; the alternative hypothesis is that the two variables are associated.

The test statistic for the Chi-Square test of Independence is given by the Equation (2).

$$X_c^2 = \sum \frac{(O_i - E_i)^2}{E_i} \quad (2)$$

where  $c$  is degree of freedom,  $O$  is Observed value,  $E$  is Expected value. The number of degrees of freedom is  $(r-1)(c-1)$ .

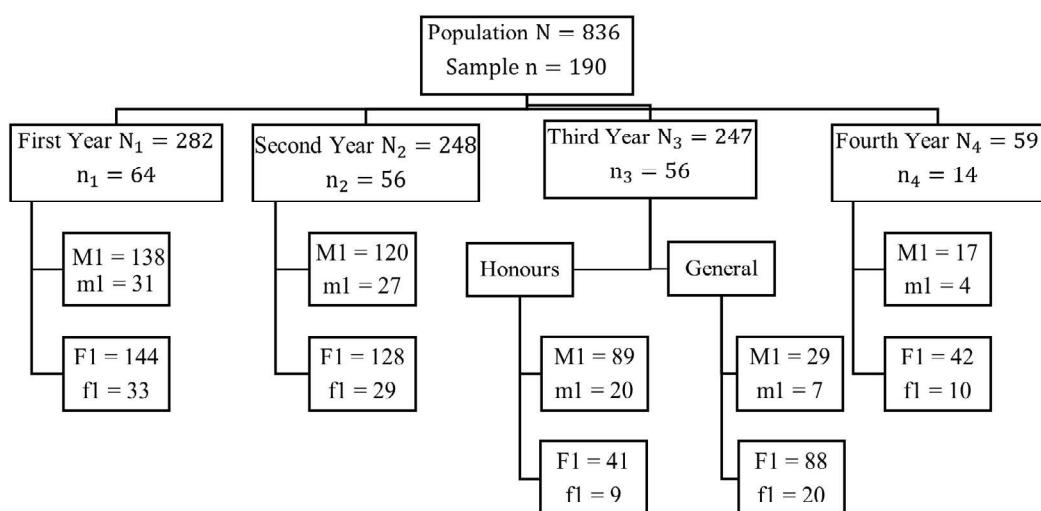


Figure 1. Sample calculation using the stratified sampling technique

where  $r$  and  $c$  are the number of possible values for the two variables under consideration.

After finding that there is an association between the two variables by a Chi-Square test, post hoc tests can be conducted to identify the differences between factor levels of the two variables. This post hoc approach used in this study is also known as the Bonferroni Adjustment. The goal of using the Bonferroni Adjustment is to consider the maximum overall type 1 error rate.

### 2.3. K-means Algorithm

Moreover, to classify the students into groups with similar characteristics a clustering technique was addressed in the study. K-means clustering which is a technique of iterative refinement was employed as the algorithm is computationally fast, producing tighter and high intra-clusters than other algorithms (Narang et al., 2016).

For a set of  $k$  means, the algorithm is implemented alternating two steps until convergence is achieved as below (Narang et al., 2016).

Step 01: Each observation is assigned to a cluster with the least sum of squares for the nearest mean.

Step 02: Calculate the new centroids of each observation in the updated clusters.

Moreover, to identify the optimal number of clusters used the trial and error method (Pham et al., 2005) and minimum convergence iterations (Hung et al., 2005).

## 3. RESULTS & DISCUSSION

This study was conducted with a sample of 190 respondents, including 53.2% of females and 46.8% of males representing all four years of the physical science stream.

### 3.1. Cross-Sectional Analysis

Usually, the type of residence of 17.4% of students, were boarding places and it was reduced to 1.6% during the pandemic. Most of the students were at home during the COVID-19 period.

Concerning the impact of education and mental health of undergraduates during the COVID-19 pandemic, a cross-sectional analysis was carried out using the Chi-square test and Table 1 illustrates prominent results. Further explored the associations using post hoc tests and only significant associations with respective p-values are illustrated in Table 2.

According to Table 1 and Table 2, it is clear that the majority of the students preferred in-

Table 1. Results of the Chi-square Test

No.	Variable 01	Variable 02	p-value
1		Preferred methods for university education before the COVID-19 pandemic	0.023
2	Year of the study	Methods used to continue university education during the pandemic	0.000
3		Method of participation in the lectures during the pandemic	0.000
4		Average attendance for online courses	0.004
5		Most convenient way to engage in practical sessions	0.000
6	Gender	Most convenient way to engage in lectures	0.004
7		Difficulty in concentration on studies	0.049
8	Average attendance for the online courses	Type of effect on family economy from the pandemic	0.037
9	Having suicidal thoughts	Unfamiliar with the online platform	0.000
10	Home violence/	Parents are alive or not	0.023
11	Roughness/ Cruelty	Current employment sector of the mother	0.009
12		Type of effect on the family economy from the pandemic	0.001

Table 2. Results of the Post hoc Tests

No.	Significant factor levels		p-value
	Factor 1	Factor 2	
1	Fourth year students	CAL, In-house workshops, Email, Social media	0.00000
	First year students	CAL	0.0004
2	Fourth year students	CAL, Online lectures, Online workshops, Online courses (Coursera), Email, Social media	0.0000
	Fourth year	through online Zoom lectures and By referencing the lecture notes	0.0000
3	Second year students	referencing the screen recordings and By referencing the lecture notes	0.0000
	First year students	80%-100% attendance	0.0012
4	Second year students	80%-100% attendance	0.0012
	Female/Male students	Lectures in the lecture hall with the Lecturer	0.0000
5	Female/Male students	Through online lectures	0.0031
	Female/Male students	Lectures in the lecture hall with the Lecturer	0.0006
6	Female/Male students	Low difficulty in concentration on studies	0.0024
	Average attendance 0-20%	lost jobs of family members	0.0000
7	High suicidal thoughts	Very high unfamiliarity with online platform	0.0001
	Moderate suicidal thoughts	moderate unfamiliarity with online platform	0.0001
8	Very high home violence	Only father alive	0.0005
	Very high home violence	Lost jobs of family members	0.0000

house lectures as the most convenient methods to engage in lectures and practical sessions. Nevertheless, online lectures via zoom and screen recordings were identified as the most preferred methods during the pandemic. Moreover, the time taken to adapt to online education was less than a week, but the majority of the first-year students have taken 2 weeks. According to the post hoc tests, the majority of both male and female students have low difficulty in concentration on studies during the pandemic. As well as the loss of jobs of the family members has significantly affected the lower attendance of the online lectures by the undergraduates.

Unfortunately, 14.2% of the undergraduates have undergone suicidal thoughts due to this hazard and according to Table 2, the unfamiliarity of the online platform has a significant effect on it and this should be addressed by providing proper training and online facilities. The pre-existing depression of the students was not considered when performing this analysis. However, with consideration of a factor like pre-existing depression will improve the analysis with more relative outcomes. The suicidal intensity was assessed with the five-point Likert scale which allowed the student to express the nature of

their suicidal thoughts compared to normal lifestyle and no standard clinical assessment tools were used.

A foremost finding is, home violence has been identified among 40.5% of students of the sample during the pandemic and losing the jobs of the family members, only having a single parent, specifically only father in the family were identified as the underlying main reasons.

### 3.2. Cluster Analysis

The k-means clustering technique was applied to identify distinct groups among undergraduates based on the impact of the pandemic on the education and mental perception separately.

Three clusters were identified by considering the impact on education and Cluster 1 consists of 68 students, Cluster 2 of 70 and Cluster 3 of 52. In Cluster 1, the majority of students followed the online available courses with high average attendance from Gampaha and Kandy districts. However, in Cluster 2, several students did not participate in the online lectures because of poor connection, engage in essential activities like jobs and cultivation and

unavailability of internet facilities from few districts. From all the 3 clusters, the majority response was for the most convenient way to engage in lectures and practical sessions were in-house lectures. Most of the undergraduates from Cluster 1 adopted for the online lectures during less than a week while the majority from Cluster 2 adopted for the online lectures after a period of one month. A lot of students from Cluster 2 did not inform the difficulties in engaging in lectures and submitting tutorials online to the academic staff. Nevertheless, students from Cluster 1 inform the difficulties in engaging in lectures and it is noteworthy that they all received solutions from the academic staff of the Faculty.

Considering the impact on the mental perception of undergraduates, four clusters were recognized. Cluster 1 includes 13 students while Cluster 2, 3 and 4 consists of 71, 37 and 69 students. In Cluster 2 most of the undergraduates felt more nervous, anxious, suicidal thoughts, depressed, worried about the effect of COVID-19 in themselves and their family's health and education. Similarly, they lost interest in extra activities, increased in sleeping hours, high appetite, difficulty in concentrating in studies. In the same time, students in Cluster 2 faced home violence during this epidemic compared to other clusters. Most of the students in this cluster were female and first-year undergraduates. As they are freshmen it is hard to adjust quickly to a changing and new environment without support. Most of the students were from Gampaha and Kaluthara districts. A moderate amount of students felt isolation in Clusters 2, 3 and 4. However, some of the students in this cluster indicated that they received support from family and friends to overcome the loneliness feeling and to continue the education. Cluster 3 and 4 mainly consists of opposite features discussed related to Cluster 2. Moreover, overall IT knowledge has risen in all the students except for few students.

The government and the higher education authorities can take many actions based on the findings of this study in order to help the university students. Some suggestions include,

helping students to overcome mental health problems by counselling, increasing knowledge of online platforms, providing loan facilities to buy laptops and online connecting devices and organizing awareness workshops.

The findings of this study are limited to the physical science undergraduates of the Faculty of Science, University of Kelaniya. As a further study, same techniques can be applied by considering a wider audience to cover all 16 Universities in Sri Lanka.

#### 4. CONCLUSION

In conclusion, this study evidence that there is a huge impact on education and mental health of undergraduates due to the COVID-19 outbreak. Therefore, students have to adapt to a new environment with a lot of difficulties. Even though the students have adapted the online learning environment, majority prefer in-house lectures and practical sessions. Loss of jobs of family members during the pandemic can be highlighted as a major problem faced by students which affected both education and mental healthiness. The students are in their youth and it is fair to have depressed thoughts as indicated in the study. Outcomes of this study can be considered by higher authorities of education to lend a helping hand for undergraduates to minimize the effect of COVID-19 on education and mental health.

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Annex 1. Impact of COVID-19 Pandemic on Education and Mental Health of Physical Science Undergraduates in the Faculty of Science, University of Kelaniya

You are an important student in the University of Kelaniya, and we thank you for giving your valuable time to complete this survey. Your participation in the survey is completely voluntary and all of your responses will be kept confidential. Your responses to this survey will help us to evaluate the effectiveness of the Mental Health and Quality of life among University Students during the COVID-19 pandemic.

#### **Basic data**

1. Gender?
  - Male
  - Female

2. Year of the study?
  - 1<sup>st</sup> year
  - 2<sup>nd</sup> year
  - 3<sup>rd</sup> year
  - 4<sup>th</sup> year
3. Degree type
  - General degree
  - Honours degree
4. If general, major subjects (You can select more than 1 option)
  - Statistics
  - Computer Science
  - Computer Studies
  - Physics
  - Chemistry
  - Pure mathematics

- Applied mathematics
- 5. If Honours, major subject
  - Statistics
  - Computer Science
  - Pure Mathematics and Statistics
  - Computer Studies
  - Physics
  - Chemistry
  - Pure and Applied Mathematics

the COVID-19 pandemic? (You can select more than 1 option)  
Lecture sessions (In-house lectures)

- CAL
  - Discussions
  - Practical sessions
  - In-house workshops
  - Email
  - Social media (Whatsapp, Viber, You tube)
- .....

#### ***Home situation***

- 6. District, where you live permanently
- 7. Living district before the pandemic  
Type of residence – Home, apartment, Hotel, boarding, shared accommodation, Hostel, Other
- 8. Living district during the pandemic  
Type of residence – Home, apartment, Hotel, boarding, shared accommodation, Hostel, Other

9. Are your parents alive?

- Both
- Only mother
- Only father
- None

10. What is the current employment sector of your father? (You can select more than 1 option)

- Not employed
- Government
- Semi-government
- Private
- Self-employed
- Not applicable

11. What is the current employment sector of your mother? (You can select more than 1 option)

- Not employed
- Government
- Semi-government
- Private
- Self-employed
- Not applicable

#### ***Education impact***

12. Your preferred methods to continue the university education before

- the COVID-19 pandemic? (You can select more than 1 option)  
Lecture sessions (In-house lectures)
- CAL
  - Discussions
  - Practical sessions
  - In-house workshops
  - Email
  - Social media (Whatsapp, Viber, You tube)
- .....

13. Methods that you have used to continue the university education during the pandemic? (You can select more than 1 option)

- CAL
  - Online lectures (ZOOM, Google meet, Microsoft Team)
  - Online workshops
  - Online courses (Coursera)
  - Email
  - Social media (Whatsapp, Viber, You tube)
- .....

14. Percentage of the online availability of lectures for your registered courses during the pandemic?

- 0% - 20%
- 20% - 40%
- 40% - 60%
- 60% - 80%
- 80% - 100%

15. Did you follow all the courses via online for this semester?

- Yes
- No

16. Your average attendance for the courses via online for this semester?

- 0% - 20%
- 20% - 40%
- 40% - 60%
- 60% - 80%
- 80% - 100%

17. Your method of participation in the lectures during the pandemic? (You can select more than 1 option)
- Through online Zoom lectures
  - By referencing the screen recordings
  - By referencing the lecture notes
  - Submitting the answers for Tutorials and assignments
  - Forums
  - Other methods .....
18. Reasons for not participating in the lectures during the pandemic (You can select more than 1 option)
- Unavailability of internet facilities
  - Poor connection
  - Unavailability of resources (Laptops/tabs/desktops/mobile phones)
  - Having the resources but in not reachable (Ex: Laptops are forgotten in the boarding house)
  - Unavailability of the lecture materials
  - Engaged in essential activities like jobs and cultivation
  - Other .....
19. Most convenient way for you to engage in lectures
- Through online lectures
  - By referencing the screen recordings
  - By referencing the lecture notes
  - Lectures in the lecture hall with the Lecturer
  - Social media
  - Email
  - .....
20. Most convenient way for you to engage in lectures during the pandemic
- Through online lectures
  - By referencing the screen recordings
  - By referencing the lecture notes
21. Most convenient way for you to engage in practical sessions
- Through online lectures
  - By referencing the screen recordings
  - By referencing the lecture notes
  - Lectures in the lecture hall with the Lecturer
  - Social media
  - Email
  - .....
22. Most convenient way for you to engage in practical sessions during the pandemic
- Through online lectures
  - By referencing the screen recordings
  - By referencing the lecture notes
  - Social media
  - Other .....
23. Reason for choosing your answer in part 18 and 20? (You can select more than 1 option) (see table for q 23)
24. Did you experience any difficulty when engage in lectures via Zoom/ Google meet/ Microsoft Team?
- Yes
  - No
25. If yes, what are the difficulties?
- The lecture is not clearly audible due to poor internet connection.
  - Disconnection problems
  - Poor video quality
  - Sense of isolation (No external support)
  - Other.....

Table for q.23

<b>Online Zoom/Google meet lectures / Team viewer</b>	<b>Screen recordings</b>	<b>lecture notes</b>
Live interaction	Accessible at any time	Accessible at any time
Convenient in practical session	Easy to explain in detail	Wide range of content
Recording facility	Wide range of content	
Easily screen share facility	Proper organization	
Live chat facility		
Managing subject matters of the students		
Virtual lecture hall		
.....	.....	.....

26. Did you experience any difficulty when submitting tutorial/assignment answers during the pandemic?

- Yes
- No

27. If yes, what are the difficulties?

- Can't understand the lecture properly
- Heavy workload
- Lack of knowledge for the online submission
- Unavailability of the electronic devices
- .....

28. Did you inform the difficulties faced in lectures and tutorials to the academic staff during the pandemic?

- Yes
- No

29. Did you get solutions after discussing the difficulties with the academic staff?

- Yes
- No
- Not applicable
- If yes, what are the solutions?  
Mind making
- Providing devices
- Deadline extension
- Further explanation of lectures and tutorials
- Not applicable
- .....

30. Time taken for you to adapt to the online education system during the pandemic

- Less than a week
- Less than 2 weeks
- Less than a month
- More than a month

#### ***Health impact***

31. Did you/ anyone lived/stayed in your residence imposed to the medically approved quarantine?

- Yes
- No

32. If yes, what is the place of Quarantined?

- Home
- Quarantine centers

33. Please specify the center

- .....

34. Did you had any other illness during the pandemic?

- Dengue
- Chickenpox
- Leptospirosis
- None
- .....

35. If you had an illness, did you recover?

- Yes
- No
- Not applicable

#### ***Mental perception***

36. Rate the following thoughts during the pandemic compared to your normal life style (see table for q.36)

#### ***Economic impact***

37. What kind of economic impact has the pandemic had on your family?

- No impact
- Lost savings
- Lost jobs
- Reduced the income
- Threat to the self-employments

38. Did you engaged in a job before the pandemic?

- Yes
- No

39. If yes, how did you work during the pandemic?

- In the office
- Work from home
- Lose the job
- .....

40. Did you have a requirement to do a job during the pandemic?

- Yes
- No

41. If yes, how did you work?

- In the office
- Work from home

Table for q.36

Thoughts	Very high	High	Moderate	Low	Very low
Feeing more nervous, anxious					
Worrying too much about the effect of Covid 19 on your health and safety					
Worrying too much about the effect of Covid 19 on your family's health and safety					
Worrying too much about the effect of Covid 19 on your education					
Getting easily annoyed or irritable					
Losing interest or pleasure in doing extra activities					
Gaining interest or pleasure in doing extra activities					
Increase in sleeping hours					
Overeating (High appetite)					
Difficulty in concentration on studies					
Feeling down, depressed or hopeless					
Feeling helpless or frustrated					
Sharing feelings with the family members					
Support from friends					
Feeling isolated					
Not familiar with the online platform					
Frustration due to unavailability of resources to continue studies					
Reluctance to adapt to new environment					
Unnecessary fear (confusion)					
Home violence/ roughness/cruelty					
IT knowledge and skills					
English knowledge					
Support from family and friends to overcome the loneliness feeling					
Support from friends to continue the education					
Feeling of give up on university education					
Financially unstable					
Depress due to the economic problems					
Suicidal thoughts (negative thoughts)					

42. If yes, what are the reasons?
- Financial issues in the family
  - Lose of the jobs of parents
  - To earn more money
  - To spend time more useful way
  - Other.....
43. Rate the following expenses during the pandemic compared to your normal life style

Expenses	Unchanged	Increased	Decreased	No cost
Boarding fees				
Travelling costs				
Cost for meals				
Cost for education				
Cost for clothing				
Other expenses..... (Please specify)				