

CHAPTER 1

INTRODUCTION

The global outbreak of the COVID 19 pandemic has spread worldwide, affecting almost all countries and territories. As a result of the pandemic situation, the near-total closure of schools, universities and colleges worldwide reshaped nearly every aspect of normal life. From primary school to PhD programs, students across the globe are experiencing the altering effects of coronavirus as classrooms move online. Here our study aims to provide a comprehensive report on the impact of COVID 19 pandemic on the educational system. We are mainly focusing on educational status and mental stress or physical illness of students while attending online class, the accessibility of latest technology and its impact on student-teacher interaction etc.

1.1 Motivation for the project

Even though it is mandatory for the graduate students to do project work, as a part of their educational process, we the BSc statistics students decided to do it with a difference. As a very vibrant student community, we presume that it is our duty and obligation to look into some of the socio-economic, health and environmental issues, at least, in and around our locality. So, we decided to go among the students in and around our locality for a comprehensive study on the impact of covid-19 pandemic on education and the effectiveness of online teaching and learning.

1.2 Definition

Statistics is the study of collection, analysis, interpretation, presentation and organization of data. In applying statistics to, e.g. a scientific, industrial or societal problem, it is conventional to begin with the statistical population or

statistical model process to be studied. Populations can be diverse topics such as “all persons living in a country” or “every atom composing in a crystal”. Statistics deals with all aspects of data including the planning of data collection in terms of the design of surveys and experiments. Statistical procedures serve two principle functions:

- They did the scientist in summarizing, interpreting and communicating quantitative information obtained from observations. A statistical procedure, which deals with this function, is referred to as descriptive statistics.
- The second function permits the scientist to go beyond the data gathered from a small no. of subject to reach tentative conclusions about a large group from which the smaller group was derived. These procedures are called inferential statistics.

1.3 Objectives of the study

1. To examine the educational status of students after attending online classes.
2. To study the mental stress of students during online classes.
3. To determine the influence of online education on teacher – student relationships.
4. To trace the correlation between age, duration of study, sincerity in attending online classes / online exams.
5. To study whether all the students are capable of accessing the latest technology irrespective of the internet price and family situations.
6. To seek the opinion of students about continuing with online classes.

1.4 Relevance and scope of the study

Lockdown and social distancing measures due to the COVID-19 pandemic have led to closures of schools, training institutes and higher education facilities in

most countries. There is a paradigm shift in the way educators deliver quality education-through various online platforms. The online learning, distance and continuing education have become a panacea for this unprecedented global pandemic, despite the challenges posed to both educators and the learners. Transitioning from traditional face-to-face learning to online learning can be an entirely different experience for the learners and the educators, which they must adapt to with little or no other alternatives available. The education system and the educators have adopted “Education in Emergency” through various online platforms and are compelled to adopt a system that they are not prepared for.

E-learning tools have played a crucial role during this pandemic, helping schools and universities facilitate student learning during the closure of universities and schools. While adapting to the new changes, staff and student readiness needs to be gauged and supported accordingly. The learners with a fixed mindset find it difficult to adapt and adjust, whereas the learners with a growth mindset quickly adapt to a new learning environment.

The study evaluates the impact of COVID-19 pandemic on teaching and learning process across our locality. The challenges and opportunities of online and continuing education during the COVID-19 pandemic is summarized and a way forward suggested.

1.5 Limitation of the study

- Some of the people were resistant to giving accurate information.
- Time period available for the study was limited.
- The interpretation of data was based on the samples, so the information gathered is subjected to the respondents.

CHAPTER 2

METHODOLOGY

2.1 Introduction

The COVID-19 pandemic has not stopped at national borders. It has affected people regardless of nationality, level of education, income or gender. Education is no exception. Students from privileged backgrounds, supported by their parents and eager and able to learn, could find their way past closed school doors to alternative learning opportunities.

Teachers also had to adapt to new pedagogical concepts and modes of delivery of teaching, for which they may not have been trained. In particular, learners in the most marginalized groups, who don't have access to digital learning resources or lack the resilience and engagement to learn on their own, are at risk of falling behind.

Online education poses a risk of exposure to increased screen time for the learner. Therefore, it has become essential for students to engage in offline activities and self-exploratory learning. Lack of parental guidance, especially for young learners, is another challenge, as both parents are working.

The level of academic performance of the students is likely to drop for the classes held for both year-end examination and internal examination due to reduced contact hour for learners and lack of consultation with teachers when facing difficulties in learning/understanding.

Students have now taken online classes, spending additional time on virtual platforms, which have left children vulnerable to online exploitation. Increased and unstructured time spent on online learning has exposed children to potentially harmful and violent content as well as greater risk of cyberbullying.

As all student's assignments and examinations are carried out from home, it is challenging for educators to find the authenticity of the work and the actual learning taking place.

Population

Population is the aggregate of the objects (animate or inanimate) from which the sample is chosen should be defined in clear and unambiguous terms. Student community is taken as the population in the study. For the study we classified data into five categories. The categories are namely LP section, UP section, HS section, HSS section and Higher studies.

Sample

The best representative part of the population is known as a sample. A sample is a set of individuals or objects collected or selected from a population by a defined procedure.

2.2 Source of data

Student community is taken as the population in the study. For the study we classified the data into five categories. The categories are namely LP section, UP section, High school section and Higher education section.

The study has used primary data. Primary data for the study has been collected from the student community by using pre-prepared questionnaires. The data is collected by telephonic interview.

Primary data

Primary data is data that is collected by a researcher from first hand sources, using methods like surveys, interviews or experiments and telephonic

interviews. It is collected with the research project in mind directly from primary sources

2.3 Sample design

Stratified sampling

For our study the population is divided into five strata, namely LP, UP, HS, HSS, Higher studies. From the total 700 observations almost 140-150 observations are selected to each stratum.

In statistics, stratified sampling is a method of sampling from a population which can be partitioned into subpopulation. In statistical surveys, when subpopulation within an overall population varies, it could be advantageous to sample each subpopulation (stratum) independently.

Stratification is the process of dividing members of the population into homogeneous subgroups before sampling. The strata should define a partition of population. That is, it should be collectively exhaustive and mutually exclusive: every element in the population must be assigned to one and only one stratum. Then simple random sampling is applied within each stratum. The objective is to improve the precision of the sample by reducing the sampling error. It can produce a weighted mean that has less variability than the arithmetic mean of a simple random sample of the population.

2.4 Data preparation

Firstly, data is collected and saved in excel spreadsheets. Then all the data is cleaned and for the final analysis final data is prepared.

2.5 Statistical techniques

Diagrams and graphs

Diagram

A diagram is a symbolic representation of information using visualization techniques. Diagrams have been used since ancient times, but became more prevalent during the Enlightenment. Sometimes the technique uses a three-dimensional visualization which is then projected onto a two-dimensional surface. The word graph is sometimes used as a synonym for diagrams.

There are at least the following types of diagrams:

1. Chart-like diagrams which take a collection of items and relationships between them, and express them by giving each item by a 2D position, while the relationships are expressed as connections between the items or overlaps between the items.
2. Graph-based diagrams display a relationship between two variables that take either discrete or a continuous range of values.

Diagrams may also be classified according to use or purpose.

Graphs

A diagram showing the relation between variable quantities, typically of two variables, each measured along one of a pair of axes at right angles. An example of a graph is a pie chart.

Bar Diagram

Bar diagrams are the most commonly used diagrams. A bar chart or bar graph is a chart or graph that presents categorical data with rectangular bars with heights or lengths proportional to the values that they represent. The bars can be plotted vertically or horizontally. A bar graph shows comparisons among discrete categories. One axis of the charts shows the specific categories being compared, and the other axis represents a measured value. Some bar graphs present bars clustered in groups of more than one, showing the values of more than one measured variable. To avoid any misunderstanding the bars are drawn with same

width and at equal distances, Bar diagrams and are easily understood by a layman. They are easy to construct also.

Pie Diagram

These are very popularly used in practice. It shows the share of components in total division of sum of the many into its components. A pie chart is a circular statistical graphic, which is divided into slices to illustrate numerical proportion. A pie chart is also known as a circle chart. In this case, a circle is the proportions of various sectors representing the proportions of various components. For drawing a pie diagram it is necessary to express the value of each component as in terms of degrees. Pie diagrams are less effective than bar diagrams when considering accurate reading and interpretation but, when differences among the components for the number of components is very large.

Histogram

A histogram is a plot that lets you discover, and show, the underlying frequency distribution(shape) of a set of continuous data. This allows the inspection of the data for its underlying distribution (e.g., normal distribution), outliers, skewness, etc. Histogram is an appropriate representation of the distribution of numerical data. It was first introduced by Karl Pearson. One of the several methods of presenting frequency distribution graphically is the most popular and widely used in practice. The statistical meaning of histogram is that it is the graph that represents class frequencies in a frequency distribution by vertical adjacent class intervals taken along X-axis and frequencies on Y- axis. The area of the histogram represents total frequency.

Frequency Polygons

Frequency polygons are a graphical device for understanding the shapes of distribution. They serve the same purpose as histogram but are especially helpful in comparing multiple sets of data. A frequency polygon can be constructed by using lines to join the midpoints of each interval, or bin. The heights of the points represent the frequencies. It can be created from histogram or by calculating the midpoints of the bins from the frequency distribution table. Sometimes, it is beneficial to show the histogram and frequency polygon together. In addition, histograms tend to be rectangles while frequency polygons resemble line graphs.

Frequency table

A frequency table is an organization of measure or an observation into data classes along with frequency of each class. A frequency table represents data in concise and order form, from that we can interpret data very clearly.

Chi-Square Test for Independence

The Chi-Square Test of Independence determines whether there is an association between categorical variables. The frequency of each category for one nominal variable is compared across the categories of the second nominal variable. The data can be displayed in a contingency table where each row represents a category for one variable and each column represents a category for the other variable. The null hypothesis for this test is that there is no relationship between the variables.

For testing the independence of two attributes using Chi-square test, first we have to calculate the expected value of the two nominal variables. We can calculate the expected value of the two nominal variables by using this formula:

$$E_{ij} = \frac{A_i \times B_j}{N}$$

Where A_i is the i^{th} row total and B_j is the j^{th} column total.

After calculating the expected value, we will apply the following formula to calculate the value of the Chi-Square test of Independence:

$$\chi^2 = \sum_{i=1}^r \sum_{j=1}^s \frac{(O_{ij} - E_{ij})^2}{E_{ij}}$$

If we have r rows or categories corresponding to the attribute A and s columns or categories corresponding to B.

Degree of freedom is calculated by using the following formula:

$$DF = (r-1)(s-1) ; r - \text{number of rows} ; s - \text{number of columns}$$

Null hypothesis: Assumes that there is no association between the two variables.

Alternative hypothesis: Assumes that there is an association between the two variables.

Hypothesis testing: Hypothesis testing for the chi-square test of independence as it is for other tests like ANOVA, where a test statistic is computed and compared to a critical value. The critical value for the chi-square statistic is determined by the level of significance (typically .05) and the degrees of freedom using the chi-square statistical table. The degrees of freedom for the chi-square are calculated using the following formula: $df = (r-1)(s-1)$ where r is the number of rows and s is the number of columns. If the observed chi-square test statistic is greater than the critical value, the null hypothesis can be rejected.

Chapter 3

PRELIMINARY ANALYSIS

3.1 Statistical methods adopted

The main objective of our study is to understand the impact of covid-19 on the educational system. The data collection, analysis and interpretation are based on the statistical methods. Analysis is made mainly with the help of Microsoft Excel. The main characteristics under consideration are age, gender, educational level, internet price, internet connectivity, home environment, teacher-student relationship, mental stress of students, duration of study before and after online education, sincerity in attending online class or online exams, capability of teachers and students in accessing latest technology, lack of interest during online class. The study also includes students' opinions about continuation of online class in the future.

3.2 Diagrams, Graphs and Frequency tables

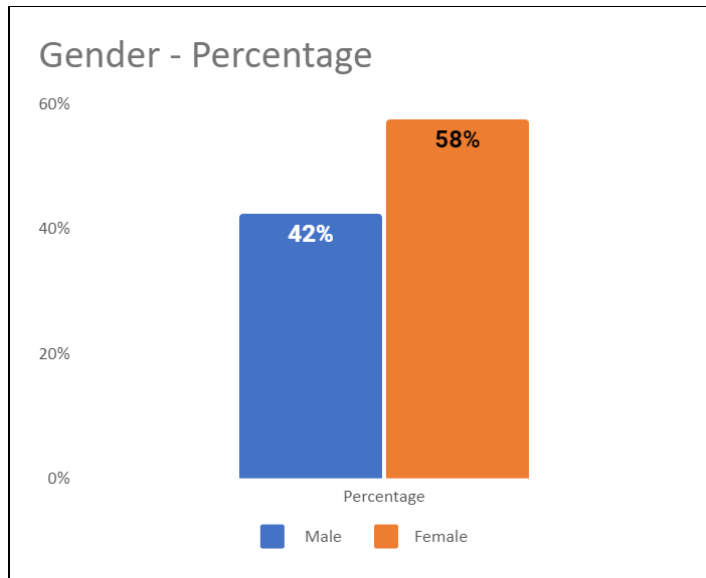
Diagrams are pictorial representation of statistical data. They are more attractive and informative than a set of numerical data. We construct diagrams, graphs and frequency tables on the base of the variables that we use for the study. It helps for understanding the overall idea about the data. So we can understand the trend, frequency and average of the data.

Age	Frequency	Percentage
5	4	1%
6	16	2%
7	29	4%

8	45	6%
9	41	6%
10	31	4%
11	45	6%
12	57	8%
13	36	5%
14	39	6%
15	55	8%
16	61	9%
17	71	10%
18	29	4%
19	22	3%
20	70	10%
21	40	6%
22	10	1%
30	1	0%
Total	702	100%

The data covers students whose age ranges from 5 to 30. From the above table, we can conclude that the majority of them are in the age group of 17 and 20 with frequencies 71 and 70 respectively. Least number of students are in the age of 5 and 30 with frequencies 4 and 1 respectively.

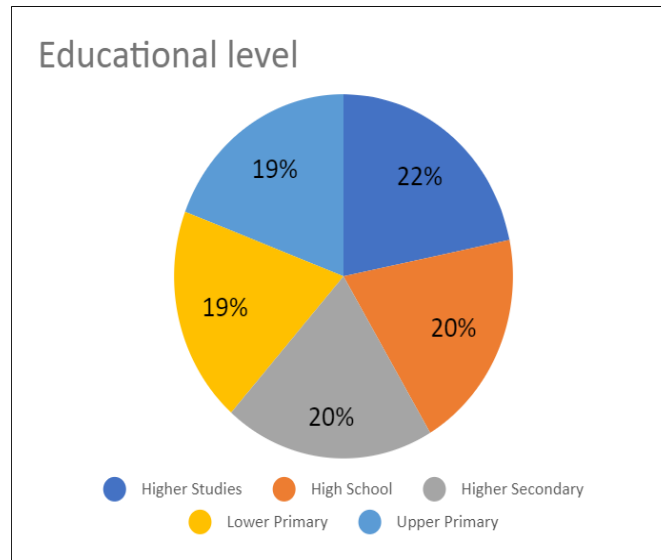
Gender	Frequency	Percentage
Male	298	42%
Female	404	58%
Total	702	100%



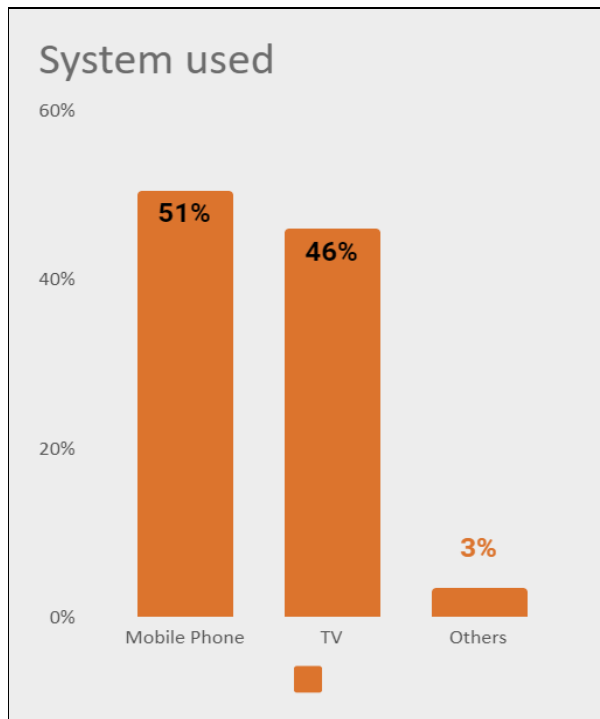
From the above mentioned table and graph, there is no significant difference between female and male population. We understood that it is important to understand the strength and weakness of both male and females equally. Here, 58% of the data are from the female population and remaining 42% are from the male population.

Educational level	Frequency	Percentage
Higher Studies	153	22%
High School	138	20%
Higher Secondary	141	20%
Lower Primary	135	19%
Upper Primary	135	19%
Total	702	100%

By considering the educational level we categorize the population into 5 sections as higher studies, higher secondary, high school, upper primary and lower primary. We collected data by taking more or less 20% of observations from all the sections.

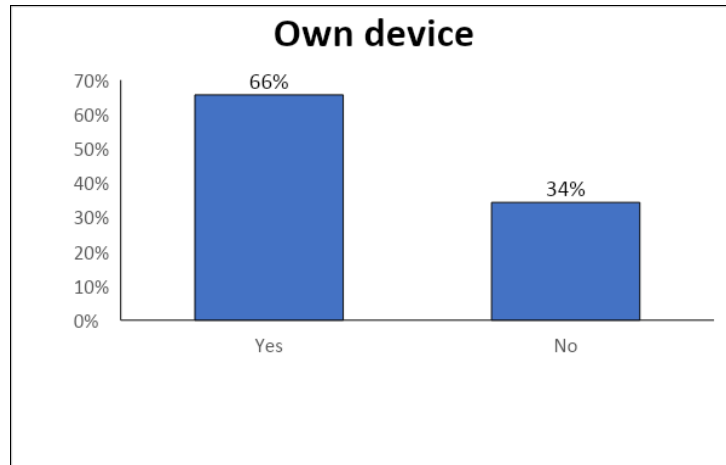


System used	Frequency	Percentage
Mobile Phone	355	51%
TV	323	46%
Others	24	3%
Total	702	100%



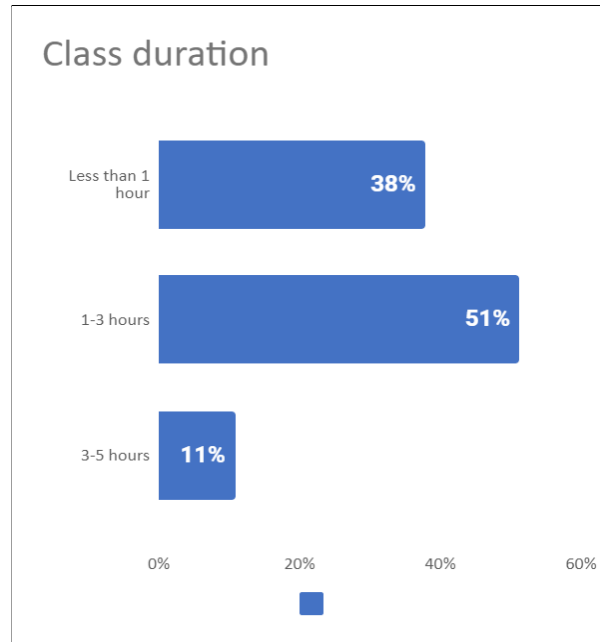
From the above table and graph 51% of students use Mobile phones, 46% of students use TV and the remaining 3% of students use other devices.

Have their own device	Frequency	Percentage
Yes	461	66%
No	241	34%
Total	702	100%



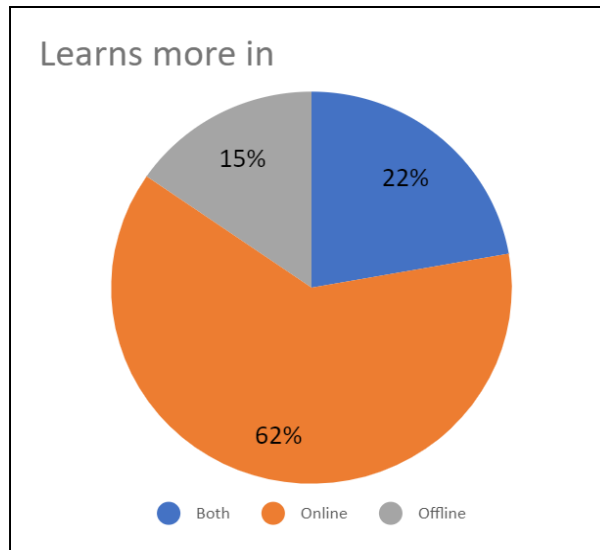
From the above table and graph 66% of students have their own device to attend the class and remaining 34% do not use their own device.

Class duration	Frequency	Percentage
Less than 1 hour	266	38%
1-3 hours	360	51%
3-5 hours	76	11%
Total	702	100%



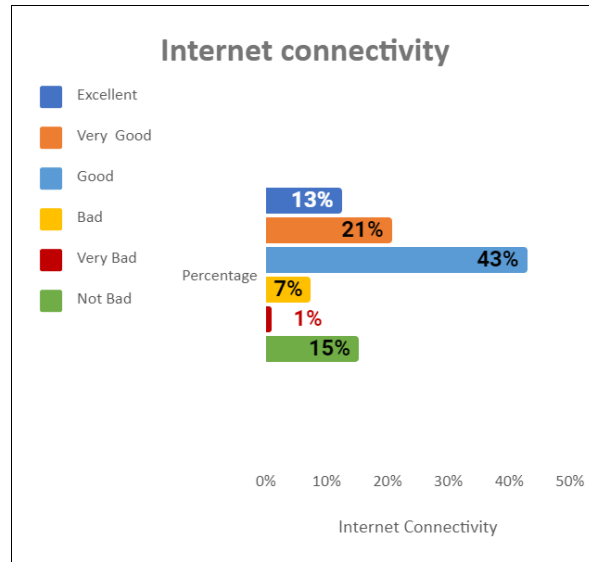
From the above table and graph, we can conclude that 51% of students have 1-3 hours of class, 38% have less than 1 hour of class and the remaining 11% have 3-5 hours of class.

Learns more in	Frequency	Percentage
Both	156	22%
Online	438	62%
Offline	108	15%
Total	702	100%



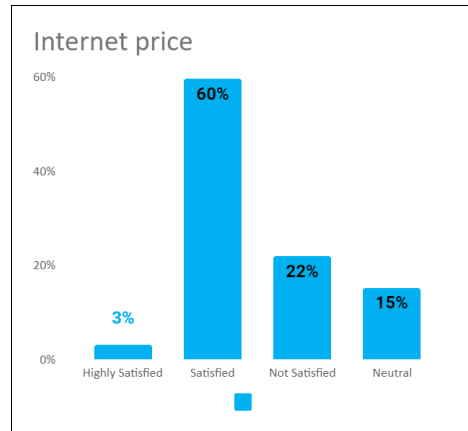
From the above table and graph, 62% of students say that they can learn more through offline classes, 15% of students learn more in online classes and 22% of students prefer both offline and online classes.

Internet connectivity	Frequency	Percentage
Excellent	88	13%
Very Good	146	21%
Good	302	43%
Bad	52	7%
Very Bad	6	1%
Not Bad	108	15%
Total	702	100%



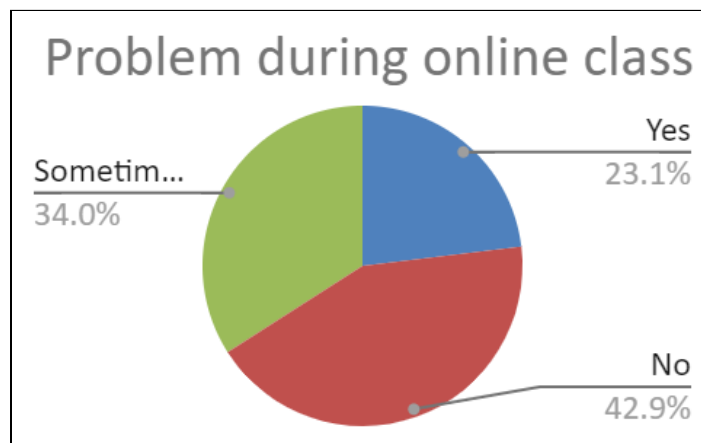
By considering internet connectivity, we conclude that 43% of students experience good internet connectivity, 21% of students have very good internet connectivity, 7% and 1% students have bad and very bad internet respectively.

Affordability of internet	Frequency	Percentage
Highly Satisfied	22	3%
Satisfied	419	60%
Not Satisfied	154	22%
Neutral	107	15%
Total	702	100%



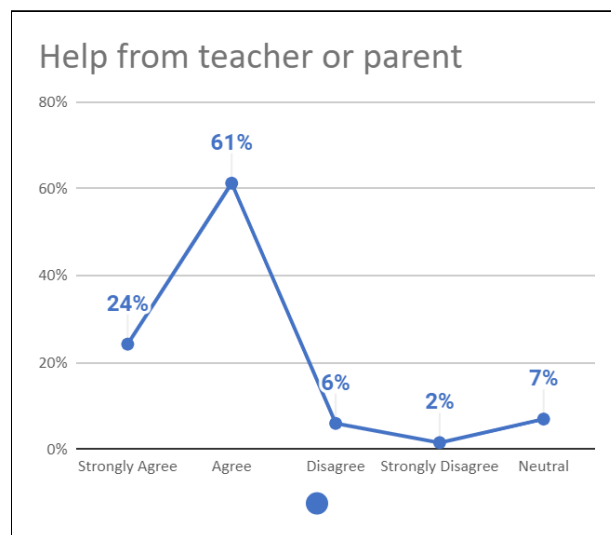
By considering the affordability of the internet, we understand that 60% of the students are satisfied with the internet price, 22% of students are not satisfied, only 3% of students are highly satisfied and 15% of students have no particular opinion about internet price.

Problems during online classes	Frequency	Percentage
Yes	162	23%
No	301	43%
Sometimes	239	34%
Total	702	100%



By analyzing the problem during online class, 43% of students didn't face any problems, 34% students had problems sometimes and the remaining 23% faced a lot of problems.

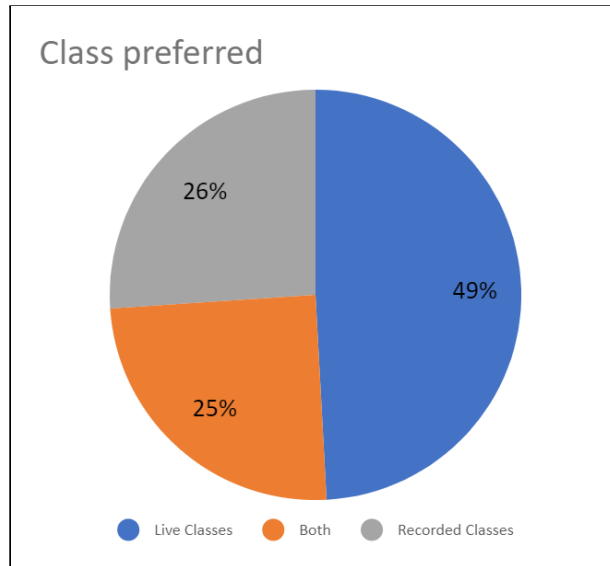
Getting help from teacher or parent	Frequency	Percentage
Strongly Agree	170	24%
Agree	430	61%
Disagree	42	6%
Strongly Disagree	11	2%
Neutral	49	7%
Total	702	100%



The above data shows that 61% of students get help from teachers or parents for their studies and 2% of students didn't get any help from teachers or parents.

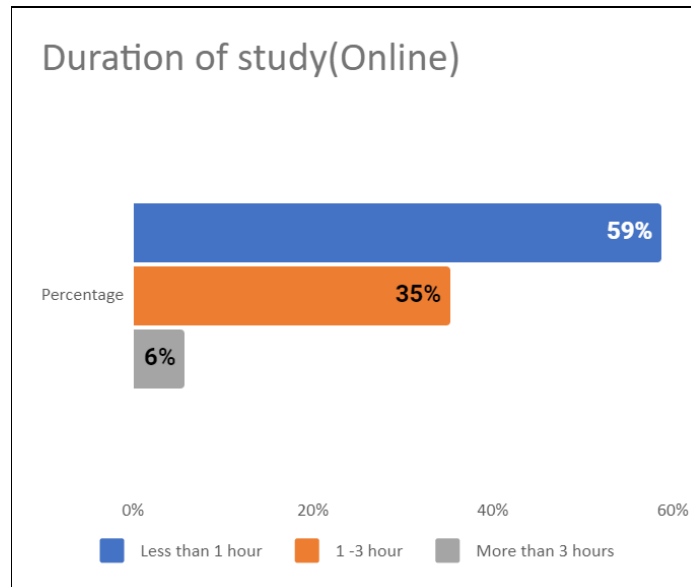
Class preferred	Frequency	Percentage
Live Classes	345	49%
Both	174	25%

Recorded Classes	183	26%
Total	702	100%



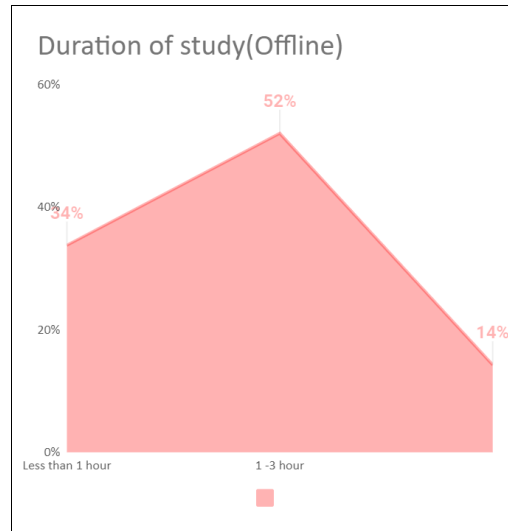
From the above table and graph, we conclude that 49% of students prefer live class, 25% of students prefer both live class and recorded class and remaining 26% of students prefer recorded class.

Duration of study (Online)	Frequency	Percentage
Less than 1 hour	413	59%
1 -3 hour	248	35%
More than 3 hours	41	6%
Total	702	100%



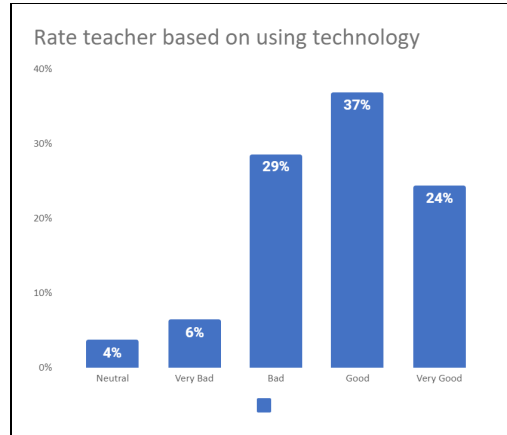
From the above table and graph, 59% of students' study less than 1 hour after attending online class, 35% of students study 1-3 hour and the remaining 6% of students study more than 3 hours.

Duration of study (Offline)	Frequency	Percentage
Less than 1 hour	237	34%
1 -3 hour	365	52%
More than 3 hours	100	14%
Total	702	100%



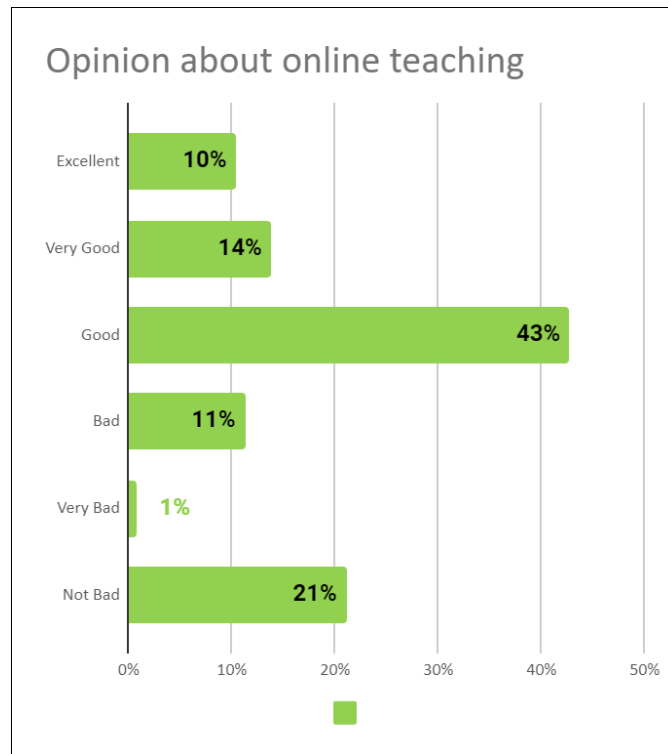
By considering the duration of study after attending offline class, we conclude that 52% of students' studies 1-3 hour, 34% of students study less than 1 hour and the remaining 14% of students study more than 3 hour.

Rate teacher based on using latest technology	Frequency	Percentage
Poor	26	4%
Average	45	6%
Good	201	29%
Very Good	259	37%
Excellent	171	24%
Total	702	100%



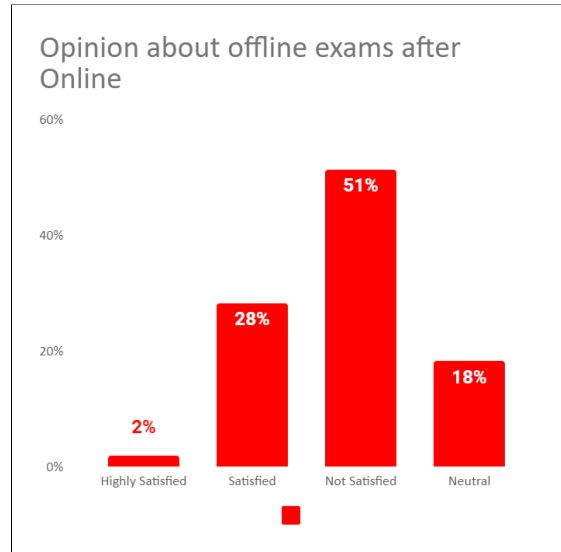
From the above table and graph, we understand that the most of the teachers offer more diverse platforms for students to overcome the new situations with new technologies. 37% of students says that the teachers are able to adopt or access the latest technology very well, 4% of students says that the teachers are very bad in accessing the latest technology.

Opinion about online teaching	Frequency	Percentage
Excellent	73	10%
Very Good	97	14%
Good	300	43%
Bad	79	11%
Very Bad	5	1%
Not Bad	148	21%
Total	702	100%



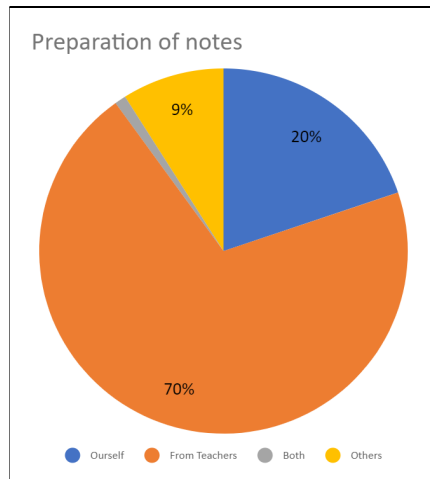
From the above mentioned data, we can easily conclude that 43% of the students are comfortable with online teaching. 11% of students face a bad online learning experience.

Opinion about offline exams after online class	Frequency	Percentage
Highly Satisfied	14	2%
Satisfied	199	28%
Not Satisfied	361	51%
Neutral	128	18%
Total	702	100%



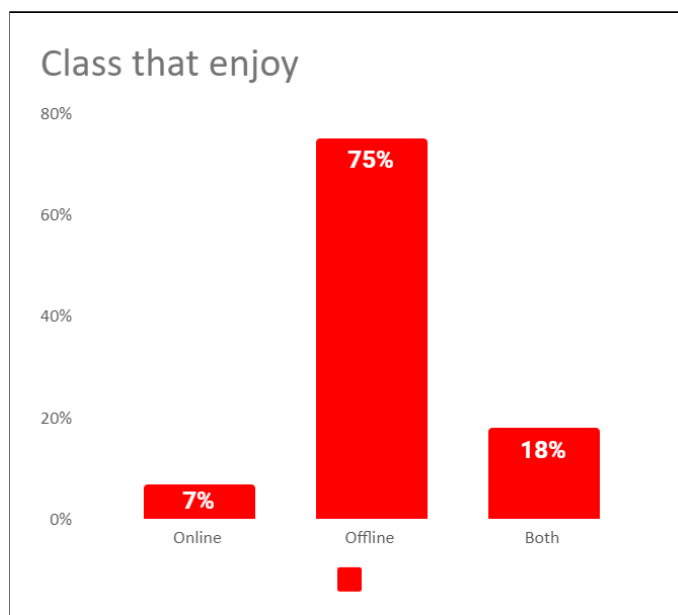
From the above table and graph we can conclude that 51% of students are not satisfied with the offline exam after attending online class. Only 2% of students are highly satisfied with attending offline exams after their online mode of class and 18% of students have no particular opinion about attending offline exams.

Preparation of notes	Frequency	Percentage
Ourself	139	20%
From Teachers	493	70%
Both	7	1%
Others	63	9%
Total	702	100%



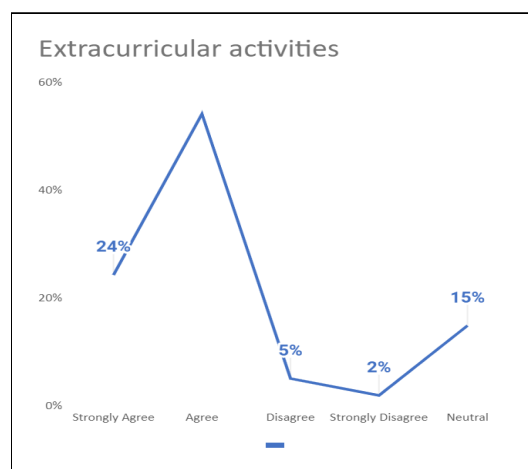
By analyzing the above graph and table, we can easily say that 70% of students prepare their notes from teachers. Only 20% of students prepare notes themselves. 9% of students use other sources to prepare notes.

Class that enjoy	Frequency	Percentage
Online	50	7%
Offline	526	75%
Both	126	18%
Total	702	100%



From the graph we can conclude that 75% of students enjoy the offline class, only 7% of students enjoy the online class and 18% of students are happy with both online and offline class.

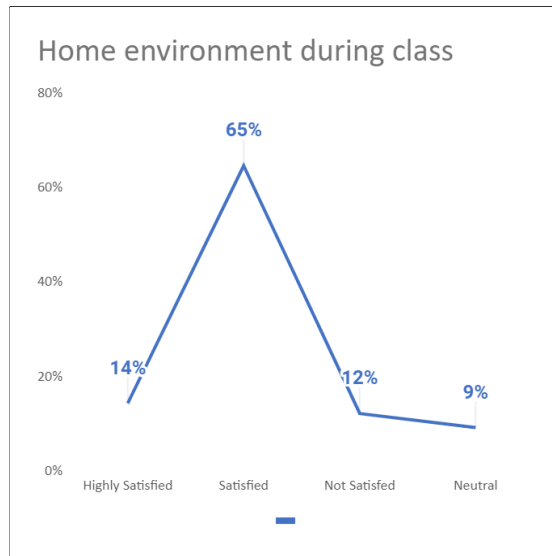
Online class decreases extracurricular activity	Frequency	Percentage
Strongly Agree	170	24%
Agree	380	54%
Disagree	35	5%
Strongly Disagree	13	2%
Neutral	104	15%
Total	702	100%



From the opinion of students about the reduction of extracurricular activities in online mode, 54% of students agree with the statement, 2% of students strongly disagree and 15% of students have no comments.

Opinion about home environment during class	Frequency	Percentage
Highly Satisfied	100	14%

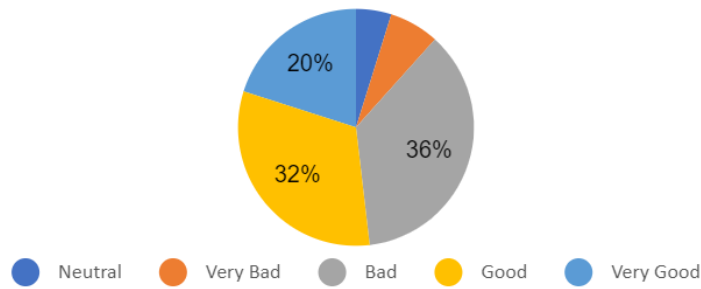
Satisfied	453	65%
Not Satisfied	85	12%
Neutral	64	9%
Total	702	100%



Home environment is one of the most important factors of students for their online class. From the data, 65% of students are satisfied with their home environment, 12% of them are not satisfied with their home environment and 9% of students have no particular opinion about it.

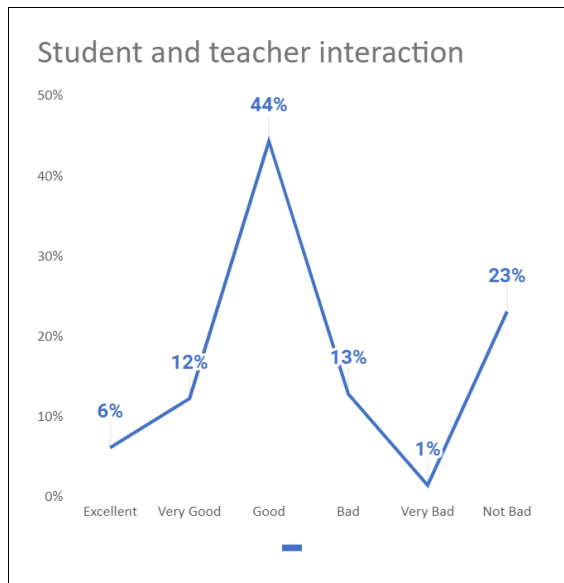
Lack of interest during online class	Frequency	Percentage
Strongly Disagree	34	5%
Disagree	48	7%
Neutral	256	36%
Agree	223	32%
Strongly Agree	141	20%
Total	702	100%

Interest in online class



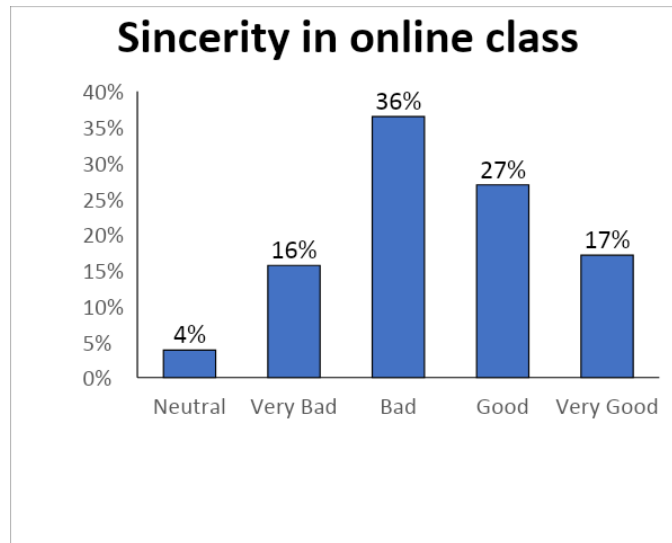
Above data shows that, for students who are used to learning inside the classroom, the complete shift to online learning may be challenging. Here almost 32% of students have a lack of interest in online classes and only 7% of students are interested in it.

Student and teacher interaction	Frequency	Percentage
Excellent	43	6%
Very Good	86	12%
Good	311	44%
Bad	90	13%
Very Bad	10	1%
Not Bad	162	23%
Total	702	100%



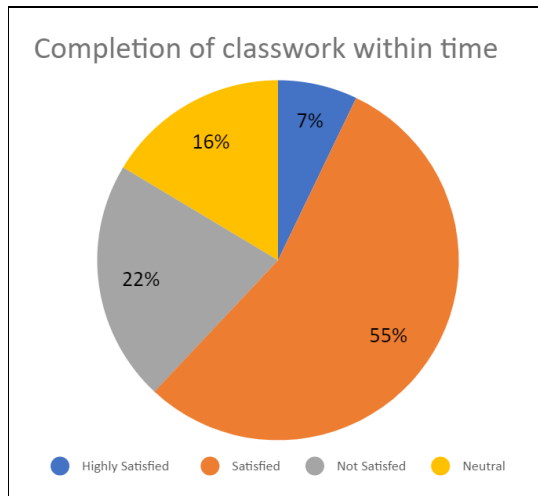
Above data emphasize the fact that, even the face-to-face interaction between students and teachers at an online learning mode is limited, 44% of students find a good interaction with their teachers and 13% of students find difficulties in online interaction.

Sincerity while attending online class	Frequency	Percentage
Poor	27	4%
Average	110	16%
Good	256	36%
Very Good	189	27%
Excellent	120	17%
Total	702	100%



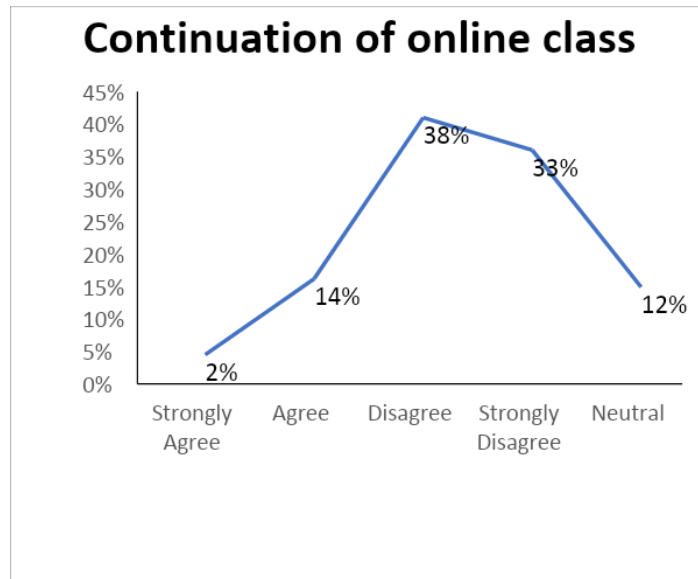
By summarizing the data we conclude that most of the students failed to adapt and attend online classes with sincerity. 36% failed to show sincerity in online class as well as exams. 17% of the total students attended classes with sincerity.

Completion of class work within time	Frequency	Percentage
Highly Satisfied	50	7%
Satisfied	385	55%
Not Satisfied	152	22%
Neutral	115	16%
Total	702	100%



As mentioned above we can conclude that, only 7% of the students are able to complete their classwork on time and 55% of total students are satisfied with it. 22% find it difficult to submit their works on time.

Continuation of online class	Frequency	Percentage
Strongly Agree	14	2%
Agree	96	14%
Disagree	270	38%
Strongly Disagree	235	33%
Neutral	87	12%
Total	702	100%



By summarizing the above data 16% of them agree to continue online class. 12% had no special opinion. Nonetheless, the graph and table clearly shows that more than half of the respondents are not interested in continuing online classes.

Chapter 4

STATISTICAL ANALYSIS

4.1 Chi-Square Test

Pearson's chi-squared test is used to determine whether there is a statistically significant difference (i.e., a magnitude of difference that is unlikely to be due to chance alone) between the expected frequencies and the observed frequencies in one or more categories of a so-called contingency table.

The purpose of the test is to evaluate how likely the observed frequencies would be assuming the null hypothesis is true.

4.2 Analysis

4.2.1 Association between Gender and Educational Level

Gender Vs Educational level						
Gender	Educational level					Grand Total
	Higher Studies	High School	Higher Secondary	Lower Primary	Upper Primary	
Female	95	78	75	73	83	404
Male	58	59	60	61	62	298
Grand Total	153	138	141	135	135	702

The cross frequency for Gender and Educational level is given as follows

Here we want to test the association between gender and education level using the chi-square test. Here the null hypothesis for checking the association between the gender and education is

H_0 : Gender is independent with Educational level

Calculation criteria is given below

O _i	E _i	C _i =O _i -E _i	C _i ²	C _i ² /E _i
95	88.05	6.95	48.28	0.55
78	79.42	-1.42	2.01	0.03
75	81.15	-6.15	37.76	0.47
73	77.69	-4.69	22.02	0.28
83	77.69	5.31	28.17	0.36
58	64.95	-6.95	48.28	0.74
59	64.95	-5.95	35.39	0.54
60	59.85	0.15	0.02	0.00
61	57.31	3.69	13.63	0.24
62	57.31	4.69	22.02	0.38
			Chi-Square	3.60

Tabled	9.488
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Chi-square	Df	P-value
3.596	4	0.463

Since the P-value is greater than 0.05. We accept the null hypothesis. Hence we conclude that gender is independent of educational level.

4.2.2 Association between Educational Level and Duration of Study (Online)

The cross frequency for Educational level and Duration of study (Online) is given below

Educational level Vs Duration of study (Online)				
Educational level	Duration of study(Online)			Grand Total
	1-3 hours	Less than 1 hour	More than 3 hours	
Higher Studies	60	84	9	153
High School	70	64	4	138
Higher Secondary	58	72	11	141
Lower Primary	25	103	7	135
Upper Primary	35	90	10	135
Grand Total	248	413	41	702

Here we want to test the association between education level and duration of study after online class using chi-square test. Here the null hypothesis for

Checking the association between the education level and duration of study after online class is

H_0 : Education level is independent with duration of study after online class

Calculation criteria is given below

O _i	E _i	C _i =O _i -E _i	C _i ²	C _i ² /E _i
60	54.05	5.95	35.39	0.65
70	48.75	21.25	451.47	9.26
58	49.81	8.19	67.04	1.35
25	47.69	-22.69	514.94	10.80
35	47.69	-12.69	161.09	3.38
84	90.01	-6.01	36.15	0.40
64	81.19	-17.19	295.43	3.64
72	82.95	-10.95	119.97	1.45
103	79.42	23.58	555.87	7.00
90	79.42	10.58	111.87	1.41
9	8.94	0.06	0.00	0.00
4	8.06	-4.06	16.48	2.04
11	8.24	2.76	7.64	0.93
7	7.88	-0.88	0.78	0.10
10	7.88	2.12	4.47	0.57
			Chi-Square	42.97

Tabled	15.507
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Chi-square	df	P-value
42.971	8	0.000

Since P-value is less than 0.05, we reject the null hypothesis. We conclude that education level is dependent with duration of study after online class.

4.2.3 Association between Educational Level and Duration of Study (Offline)

The cross frequency for Educational level and Duration of study (Offline) is given below

Educational level Vs Duration of study (Offline)				
Educational level	Duration of study(Offline)			Grand Total
	1-3 hours	Less than 1 hour	More than 3 hours	
Higher Studies	80	33	40	153
High School	87	30	21	138
Higher Secondary	79	35	27	141
Lower Primary	43	88	4	135
Upper Primary	77	51	7	135
Grand Total	366	237	99	702

Here we want to test the association between education level and duration of study after offline class using chi-square test. Here the null hypothesis for checking the association between the education level and duration of study after offline class is

H_0 : Education level is independent with duration of study after offline class

Calculation criteria is given below

O _i	E _i	C _i =O _i -E _i	C _i ²	C _i ² /E _i
80	79.77	0.23	0.05	0.00
87	71.95	15.05	226.54	3.15
79	73.51	5.49	30.11	0.41
43	70.38	-27.38	749.92	10.65
77	70.38	6.62	43.76	0.62
33	51.65	-18.65	347.97	6.74
30	46.59	-16.59	275.22	5.91
35	47.60	-12.60	158.82	3.34
88	45.58	42.42	1799.72	39.49
51	45.58	5.42	29.41	0.65
40	21.58	18.42	339.41	15.73
21	19.46	1.54	2.37	0.12
27	19.88	7.12	50.63	2.55
4	19.04	-15.04	226.16	11.88
7	19.04	-12.04	144.92	7.61
			Chi-Square	108.84

Tabled	15.507
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Chi-square	Df	P-value
108.837	8	0.000

Since P-value is less than 0.05, we reject the null hypothesis. We conclude that education level is dependent with duration of study after offline class.

4.2.4 Association between Class Duration and Physical Illness

The cross frequency for class duration and physical illness is given below

Class duration Vs Physical illness				
Class duration	Physical illness			Grand Total
	Yes	No	Sometimes	
1-3 hours	82	143	135	360
3-5 hours	25	16	35	76
Less than 1 hour	55	142	69	266
Grand Total	162	301	239	702

Here we want to test the association between class duration and physical illness using the chi-square test. Here the null hypothesis for checking the association between class duration and physical illness is

H_0 : Class duration is independent with physical illness

Calculation criteria is given below

O _i	E _i	C _i =O _i -E _i	C _i ²	C _i ² /E _i
82	83.08	-1.08	1.16	0.01
25	17.54	7.46	55.67	3.17
55	61.38	-6.38	40.76	0.66
143	154.36	-11.36	129.03	0.84
16	32.59	-16.59	275.13	8.44
142	114.05	27.95	780.97	6.85
135	122.56	12.44	154.65	1.26
35	25.87	9.13	83.27	3.22
69	90.56	-21.56	464.89	5.13
			Chi-Square	29.59

Tabled	9.488
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Chi-square	Df	P-value
29.592	4	0.000

Since P-value is less than 0.05, we reject the null hypothesis. We conclude that class duration is dependent on physical illness.

4.2.5 Association between Educational Level and Teacher Interaction

The cross frequency for educational level and teacher interaction is given below

Educational level Vs Teacher interaction					
Educational level	Teacher interaction				Grand Total
	Excellent	Good	Bad	Not Bad	
Higher Studies	7	56	28	52	153
High School	22	69	15	32	138
Higher Secondary	19	68	18	36	141
Lower Primary	37	59	18	21	135
Upper Primary	44	59	11	21	135
Grand Total	139	311	90	162	702

Here we want to test the association between educational level and teacher interaction using the chi-square test. Here the null hypothesis for checking the association between educational level and teacher interaction is

H_0 : Educational level is independent with teacher interaction

Calculation criteria is given below

O _i	E _i	C _i =O _i -E _i	C _i ²	C _i ² /E _i
7	30.29	-23.29	542.65	17.91
22	27.32	-5.32	28.35	1.04
19	27.92	-8.92	79.55	2.85
37	26.73	10.27	105.46	3.95
44	26.73	17.27	298.23	11.16
56	67.78	-11.78	138.82	2.05
69	61.14	7.86	61.83	1.01
68	62.47	5.53	30.63	0.49
59	59.81	-0.81	0.65	0.01
59	59.81	-0.81	0.65	0.01
28	19.62	8.38	70.30	3.58
15	17.69	-2.69	7.25	0.41
18	18.08	-0.08	0.01	0.00
18	17.31	0.69	0.48	0.03
11	17.31	-6.31	39.79	2.30
52	35.31	16.69	278.63	7.89
32	31.85	0.15	0.02	0.00
36	32.54	3.46	11.98	0.37
21	31.15	-10.15	103.10	3.31
21	31.15	-10.15	103.10	3.31
			Chi-Square	61.67

Tabled

21.026

Chi-square	Df	P-value
61.672	12	0.000

Since P-value is less than 0.05, we reject the null hypothesis. We conclude that the educational level is dependent on teacher interaction.

4.2.6 Association between Internet Price and Duration of Online Class

The cross frequency for internet price and duration of online class is given below

Internet price Vs Duration of online class				
Internet price	Duration of online class			Grand Total
	1-3 hours	3-5 hours	Less than 1 hour	
Highly Satisfied	12	1	9	22
Neutral	56	20	31	107
Not Satisfied	79	23	52	154
Satisfied	213	32	174	419
Grand Total	360	76	266	702

Here we want to test the association between internet price and duration of online class using the chi-square test. Here the null hypothesis for checking the association between the internet price and duration of online class is

H_0 : Internet price is Independent with duration of online class

Calculation criteria is given below

O _i	E _i	C _i =O _i -E _i	C _i ²	C _i ² /E _i
12	11.28	0.72	0.52	0.05
56	54.87	1.13	1.27	0.02
79	78.97	0.03	0.00	0.00
213	214.87	-1.87	3.50	0.02
1	2.38	-1.38	1.91	0.80
20	11.58	8.42	70.83	6.11
23	16.67	6.33	40.04	2.40
32	45.36	-13.36	178.54	3.94
9	8.34	0.66	0.44	0.05
31	40.54	-9.54	91.09	2.25
52	58.35	-6.35	40.36	0.69
174	158.77	15.23	232.06	1.46
			Chi-Square	17.79

Tabled	12.592
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Chi-square	Df	P-value
17.791	6	0.007

Since P-value is less than 0.05, we reject the null hypothesis. We conclude that internet price is dependent on the duration of the online class.

4.2.7 Association between Home Environment and Duration of Online Class

The cross frequency for home environment and duration of online class is given below

Home environment Vs Duration of online class				
Home environment	Duration of online class			Grand Total
	1-3 hours	3-5 hours	Less than 1 hour	
Highly Satisfied	51	10	39	100
Neutral	30	13	21	64
Not Satisfied	46	6	33	85
Satisfied	233	47	173	453
Grand Total	360	76	266	702

Here we want to test the association between home environment and duration of online class using chi-square test. Here the null hypothesis for checking the association between home environment and duration of online is

H_0 : Home environment is independent with duration of online class

Calculation criteria is given below

O _i	E _i	C _i =O _i -E _i	C _i ²	C _i ² /E _i
51	51.28	-0.28	0.08	0.00
30	32.82	-2.82	7.96	0.24
46	43.59	2.41	5.81	0.13
233	232.31	0.69	0.48	0.00
10	10.83	-0.83	0.68	0.06
13	6.93	6.07	36.86	5.32
6	9.20	-3.20	10.25	1.11
47	49.04	-2.04	4.17	0.09
39	37.89	1.11	1.23	0.03
21	24.25	-3.25	10.57	0.44
33	32.21	0.79	0.63	0.02

173	171.65	1.35	1.82	0.01
			Chi-Square	7.46
Tabled	12.592			

Chi-square	Df	P-value
7.460	6	0.280

Since P-value is greater than 0.05, we accept the null hypothesis. We conclude that the home environment is independent with the duration of online class.

4.2.8 Association between Educational Level and Continuation of Online Mode

The cross frequency for educational level and continuation of online mode is given below

Educational level Vs Continuation of online mode					
Educational level	Continuation of online mode				Grand Total
	Agree	Neutral	Disagree	Strongly Disagree	
Higher Studies	19	24	45	65	153
High School	22	15	58	43	138
Higher Secondary	21	9	54	57	141
Lower Primary	25	19	55	36	135
Upper Primary	23	20	58	34	135
Grand Total	110	87	270	235	702

Here we want to test the association between educational level and continuation of online mode using the chi-square test. Here the null hypothesis for checking the association between educational level and continuation of online mode is

H_0 : Educational level is independent with continuation of online mode

Calculation criteria is given below

O _i	E _i	C _i ²	C _i ² /E _i
19	23.97	24.74	1.03
22	21.62	0.14	0.01
21	22.09	1.20	0.05
25	21.15	14.79	0.70
23	21.15	3.41	0.16
24	18.96	25.39	1.34
15	17.10	4.42	0.26
9	17.47	71.81	4.11
19	16.73	5.15	0.31
20	16.73	10.69	0.64
45	58.85	191.72	3.26
58	53.08	24.24	0.46
54	54.23	0.05	0.00
55	51.92	9.47	0.18
58	51.92	36.93	0.71
65	51.22	189.94	3.71
43	46.20	10.22	0.22
57	47.20	96.02	2.03
36	45.19	84.50	1.87
34	45.19	125.27	2.77
		Chi-Square	23.82

Tabled	21.026
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Chi-square	Df	P-value
23.822	12	0.022

Since P-value is less than 0.05, we reject the null hypothesis. We conclude that the educational level is dependent on the continuation of online mode.

4.2.9 Association between System Used and Physical Illness

The cross frequency for system used and physical illness is given as follows

System used Vs Physical illness				
System used	Physical illness			Grand Total
	Yes	No	Sometimes	
Mobile Phone	75	129	148	352
Others	4	3	16	23
TV	83	169	75	327
Grand Total	162	301	238	702

Here we want to test the association between the system used and physical illness using the chi-square test. Here the null hypothesis for checking the association between system used and physical illness is

H_0 : System used is independent with physical illness

Calculation criteria is given below

O _i	E _i	C _i =O _i -E _i	C _i ²	C _i ² /E _i
76	81.23	-5.23	27.36	0.34
4	5.31	-1.31	1.71	0.32
83	75.46	7.54	56.83	0.75
129	150.93	-21.93	480.87	3.19
3	9.86	-6.86	47.08	4.77
169	140.21	28.79	828.90	5.91
147	119.34	27.66	765.13	6.41
16	7.80	8.20	67.28	8.63
75	110.86	-35.86	1286.17	11.60
			Chi-Square	41.93

Tabled	9.488
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Chi-square	Df	P-value
42.063	4	0.000

Since P-value is less than 0.05, we reject the null hypothesis. We conclude that the system used is dependent on physical illness.

4.2.10 Association between Gender and Class That Enjoy

The cross frequency for gender and class that enjoy is given as follows

Gender Vs Class that enjoy				
Gender	Class that enjoy			Grand Total
	Both	Offline	Online	
Female	74	307	23	404
Male	52	219	27	298
Grand Total	126	526	50	702

Here we want to test the association between gender and class that enjoy using the chi-square test. Here the null hypothesis for checking the association between gender and class that enjoy is

H_0 : Gender is independent with class that enjoy

Calculation criteria is given below

O _i	E _i	C _i =O _i -E _i	C _i ²	C _i ² /E _i
74	72.51	1.49	2.21	0.03
52	53.49	-1.49	2.21	0.04
307	302.71	4.29	18.38	0.06
219	223.29	-4.29	18.38	0.08
23	28.77	-5.77	33.35	1.16
27	21.23	5.77	33.35	1.57
			Chi-Square	2.95

Tabled	5.991
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Chi-square	Df	P-value
2.945	2	0.229

Since P-value is greater than 0.05, we accept the null hypothesis. We conclude that gender is independent with class that we enjoy.

4.2.11 Association between Gender and Internet Price

The cross frequency for gender and internet price is given as follows

Gender Vs Internet Price					
Gender	Internet price				Grand Total
	Highly Satisfied	Satisfied	Neutral	Not Satisfied	
Female	9	256	62	77	404
Male	13	163	45	77	298
Grand Total	22	419	107	154	702

Here we want to test the association between gender and internet price using the chi-square test. Here the null hypothesis for checking the association between gender and internet price is

H_0 : Gender is independent with internet price

Calculation criteria is given below

O _i	E _i	C _i =O _i -E _i	C _i ²	C _i ² /E _i
9	12.66	-3.66	13.40	1.06
13	9.34	3.66	13.40	1.44
256	241.13	14.87	221.00	0.92
163	177.87	-14.87	221.00	1.24
62	61.58	0.42	0.18	0.00
45	45.42	-0.42	0.18	0.00
77	88.63	-11.63	135.18	1.53
77	65.37	11.63	135.18	2.07
			Chi-Square	8.25

Tabled	7.815
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Chi-square	df	P-value
8.253	3	0.041

Since the P-value is less than 0.05, we reject the null hypothesis. We conclude that gender is dependent on internet price.

CONCLUSION

The current COVID-19 crisis has obliged most education systems to adopt alternatives to face-to-face teaching and learning . Education systems moved activities online to allow instructions to continue despite school closures. Teaching learning in the times of COVID- 19 pandemic needs to be revamped in order to follow horns of social distancing. Therefore, online classes are necessity now. As a result, education has changed dramatically with the distinctive rise of e learning where by teaching is undertaken remotely and on digital platforms. Even before this pandemic situation there was already growth and adoption in education technology, and overall market for online education projected to high reach now.

For those who do have access to the right technology, there is evidence that learning online can be more effective in a number of ways. But some had difficulty accessing online education.

The Effectiveness of online classes varies amongst age groups. The general consensus on children, especially younger ones, is to not attend classes like offline classes because they are easily distracted. Parents and teachers play a fundamental role in supporting students to develop these crucial attitudes, targeted policy interventions should be designed with the aim of reducing the burden on parents and help. Some students have raised concerns about online learning because of the availability of internet connection. Main students face such problems mostly in rural areas.

Concern which has arisen is that online learning is only available to children that have access to a broadband connection at home that is fast enough to support online. Only below average have high internet facilities. The fact that the effectiveness of online learning might have been hindered, In many cases due to the lack of basic skills of digital technology among students and teachers, making them unprepared to adapt to the new situations. Family and teachers play a crucial role that families and teachers play in the context of school closures and can spar their effective arrangement. Online learning is only effective to students who have the right access to the facilities and making e learning effective. Majority of them were mostly likely to go back to their school going days, which is more effective.

