ISSN: 0974-5823 Vol. 7 No. 1 January, 2022
International Journal of Mechanical Engineering

Impact of Covid-19 Pandemic on Education in Schools of Kerala State

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Abstract - Covid-19's effect on our society shifts our traditional educational framework to online learning. To complete the educational curriculum, this modern mode of educational system uses a variety of applications such as Microsoft Teams, Zoom, Google
Classroom and others. In this study, we are attempting to determine whether this modern form of online education is beneficial or not. This article is based on the situations during the first phase of Covid-19. We conducted a comprehensive survey of 190 students from high school and higher secondary school to collect data required for the study. The data was then interpreted graphically and statistically using R programming language to provide a simple image of the subject at hand. Through this survey, we infer that online class have both benefits and drawbacks, but the disadvantages outnumber the benefits.

Index Terms - Education system, Google Classroom, Kite Victers, Online and offline classes. R-Programming, Traditional education system, Zoom meeting.

INTRODUCTION

The Covid-19 or Novel Corona Virus is a pandemic that spreads around the world rapidly. It is suspected that the Coronavirus, which spreads around the world, originated from the Chinese market as a newborn virus. In Kerala, the first COVID-19, which was also the first case in India, was registered in Trissur on 30th January 2020. Many people have been killed because of this outbreak, many are infected and then healed, and many committed suicides as they have been singled out from society. The epidemic is causing many problems in the life of the people of all categories. As the epidemic worsens, many individuals have lost their jobs because of the complete shutdown, especially daily wage employees, small-scale businesses, and those who work remotely. The public and private sectors are internationally affected. Tourism, industry, small-scale businesses, automobiles, aviation, last but not least "our education system" are the sectors that are mainly affected. By March 10, 2020, all schools and colleges were shut down by the Kerala government for one month. But the pandemic grew stronger and stronger, leading to a full shutdown. But it went beyond our expectations and the next academic year began, the traditional educational system has changed to the modern platform of education as "Online Classes".
In the first Phase of Covid–19, students of all categories faced difficulties because they are unable to attend vibrant classes due to many reasons. The system of online education is followed by almost all educational institutions with the aid of technology to continue the teaching learning process. Online classes are managed by many e-learning platforms, so that the face-to-face contact with the teacher and student was not possible. This reduced the teacher-student relationships. Today, online sections are conducted via various media such as Zoom, Google classroom, Microsoft teams, WhatsApp, Telegram, etc. and an educational channel called Victers (Versatile ICT Enabled Resource for Students) managed by KITE (Kerala Infrastructure and Technology for Education) controlled by the State government. Victers telecast classes for school students via television and the live broadcast through You Tube channels. In contrast with the traditional education system, parents play a larger role in the modern online education system. Parents of pre-primary and primary students are having a harder time adjusting to the new system because their children require more care and attention than in traditional schooling. To keep the academics system on, some schools offer classes such as daily schooling (morning to evening) through the internet. Since many parents are working, classes for primary students are scheduled around their free time, and some schools provide two or three hours of learning a day.

SIGNIFICANCE

As the learners are unable to attend normal classes at schools during the pandemic situation, the online portal is the only realistic way to keep students on track. In this article we examine the opinions from the students at high school and higher secondary schools to understand whether the online classes are beneficial or causing any difficulties. We are interested to know whether they receive equal care and attention, whether they receive adequate academic knowledge and general awareness, and so on. Our intensions are to know whether the online classes are a better choice than offline classes among high school and higher secondary school students in this situation.

OBJECTIVES

To assess whether online classes are advantageous.
To explore whether students face any kind of difficulties in attending online sections.

To find out if students are having physical issues of some kind.
To monitor whether students during lockdown are getting some relief from online classes.
To check if students are involved in additional curricular activities.

LITERATURE REVIEW

Abbey R. Masonbrink and Emily Hurley (September 2020); Advocating for Children during the Covid-19 School Closures.

Research was carried out primarily on the health and other needs of children belonging to families that are economically backward. The analysis indicates that the school's sudden closure causes difficulties for students, such as lower knowledge achievement, reduced earning ability, leading to a lower ranking. Low-income families cannot afford internet access and associated accessories to help the education of their children, while parents face other crises due to the pandemic, such as unemployment. And, during these emergencies, these persons do not get special funds. The authorities do not carry out appropriate steps that have to be taken before re-opening the school, such as classroom adjustment, proper scheduling, etc.
Children with disabilities must be recognized and need support from others. Children who need more mental and behavioral health care, 80 percent of whom rely on school facilities. These students lose their vital resources when schools are closed, including contact with qualified teachers and a friendly learning atmosphere. In this pandemic scenario, parents of such children often suffer as they cannot coordinate resources for their children. Overall, plans should be coordinated to safely repeat one-to-one experiences with children with disabilities and to include serviceable home devices such as visual or hearing-impaired equipment.
As a result of school closing, children who are on the poverty line lack nutrition. Many of these children depend on schools and childcare centers to meet today's vital nutritional requirements. Several services are included, such as delivery of school meals and family nutrition programs such as SNAP (Supplemental Nutrition Assistance Program). However, poverty-level children remain inadequate and surveys report that 11 percent of newly unemployed families who report access to meals and 35 percent of households with children under the age of 18 are now still food insecure. And we can eventually notice the rational effect on children of this crisis. There can be several compact conditions such as stress, anxiety, and distinct behavioral disorders in such a crisis. Due to primary attitudinal stress such as home instability, children on the poverty line are at danger.
And there are secluded reports of increased child violence as if the pandemic began; and several states are announcing threatening reductions in child protection program reports that can be referred to as unknown. Educators, psychologists, social workers, as now, have many limits on contacting or communicating with children. They should strive to express emotional support to students as they are the essential source to assist them. Due to the loss of critical school-based services, we should support intentional instantaneous long-term response measures to balance adverse effects on children.

Dr Ram Mehar and Neelu Arora; Impact of Covid-19 Pandemic on Higher Education.

Higher education and the Covid-19 pandemic are the subjects of the study materials. The virus epidemic had a global effect, affecting a wide range of industries. The education industry was the hardest hit. Educational facilities are suffering detrimental repercussions because of abrupt closures. The pandemic has impacted approximately 1.725 billion students worldwide.
The abrupt closure would influence the system of education and learning, including teaching and evaluation methods. The pandemic has also wreaked havoc on higher education, a crucial strand of the country's economic future. Institutions have been ingesting with organizational triage because of the Covid-19 outbreak. They cancelled study abroad plans, shortened athletic courses, and asked students to leave campus for a half-way period.
The steep drop in higher education enrollments is counter-cyclical, but how it will play out in this recession is uncertain. Institutions may face additional financial difficulties because of refunds related to lodging, dining, and online learning, as well as revenue losses from cancelled university programs and events and higher operating costs.
Many institutions' student retention rates may drop for a variety of reasons, including a weaker emotional grip on remote students, subpar remote learning for many, and parents and students seeing their current institution as an unnecessary privilege. Distance learning, unequal access to technology, unequal access to educational services, and other factors all contribute to the closing of institutions.
Similarly, several difficulties exist, such as difficulty in completing syllabuses, practical topics, research work, rural area accessibility, hostel and library facilities, and the need for teacher orientation and preparation to become Techno-Savvy, and others.
The authors may suggest concepts such as assessing preparation and selecting the most appropriate resources, ensuring distance learning induction, protecting data privacy and protection, preparing research schedules, providing advice to teachers and parents on the use of digital tools, creating communities and enhancing connections, and so on.

RESEARCH METHODOLOGY

The quantitative analysis is focused on statistically expressing and elucidating items with numbers. Quantitative research lines up through statistics and numerical variables to elucidate the information gathered for the situation. In quantitative analysis, numerical and statistical methods of analysis are also included. To perform the study, we chose the quantitative survey process.

Survey is a study tool used to gather data from a predefined class of appellants to gain knowledge and insights into several topics of interest. To collect data, an extensive questionnaire was prepared and circulated online among high school (HS) and higher secondary school students (HSS). Then we got 190 responses through the survey that is taken as the key results. We would like to compare the opinions gathered from students at high school and higher secondary schools about the functioning of online classes and the advantageous or disadvantageous are common for both the groups. Based on the goals, the data we obtained through the survey were classified tabulated, and then the information is interpreted. The ANOVA and T-tests are used for the study. The R programming language was used to generate the graph and the result.

R-Programming

R is a programming language for mathematical computation and graphics and is free software. For the development of statistical software and data analysis, the R language is commonly used by statisticians and data miners. It involves algorithms for machine learning, linear regression, time series etc., to name a few, statistical inference.

ANOVA

The analysis of variance (ANOVA) is a statistical method that divides a data set's observed aggregate variability into two parts: systematic factors and random factors. Random factors have no statistical effect on the given data collection, whereas systemic factors do. In a regression analysis, researchers use the ANOVA test to assess the effect of independent variables on the dependent variable.

T-test

Under the null hypothesis, a t test is any statistical hypothesis test in which the test statistics obey a student's t-distribution.

RESULTS AND DISCUSSION

Among the collected data, 78 students are from high school, and 112 students are from higher secondary schools. They adopt various curricula for education, such as the CBSE, ICSE and Kerala syllabus. From the high school students, 48 are from CBSE, 6 from ICSE and 24 from the Kerala syllabus. Likewise, among the higher secondary students, 49 of them are studying CBSE, 62 of them are studying Kerala syllabus, and only one is from ICSE. 89 percent of the total respondents attend online sections while 11% of those respondents are not attending due to unresolved problems. Among 89% many of them have physical (eye problem, headache) and other problems (like poor connection, lack of gadgets, etc.). Based on the collected data, we are trying to find analyze the answers to the following questions.

To assess whether online classes are advantageous.

The collected data is classified and tabulated according to the objectives and analysis is done to check whether online classes support students at high school and higher secondary schools in their studies.

Table 1. Percentage benefit on online classes.

Percentage of benefit	HS	HSS
80 – 100%	11	9
50 – 80%	38	39
30 – 50%	22	43
Below 30%	7	21

Table 1 shows how online classes support students in high school and higher secondary classes. We assume the null hypothesis as there is no significant difference between the students at high school and higher secondary schools in getting benefits by attending online classes. The ANOVA method is used here, and the results are obtained using R programming.

R code for Plotting Graph

```
x=matrix(c(11,38,22,7,9,39,43,21), nrow=4)
row.names(x)=c('Below 30%',’30-50%’,’50-80%’,’80-100%’); col.names(x)=c('HS','HSS')
total=margin.table(x); total; x
barplot(t(x),beside = TRUE,col=c('red','blue'),xlab = 'Percentage benefit',ylab = 'No of students',legend.text = (c('HS','HSS')))
```

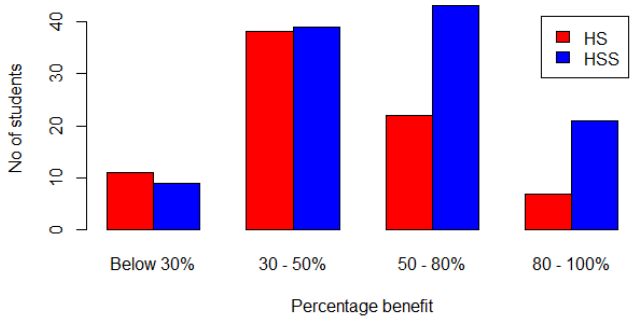

Fig 1. Percentage benefit and number of students.

Interpretation: The above graph indicates the percentage benefit of students from HS and HSS through online courses. Among 190 respondents, 10 percent of respondents have an advantage of 80-100 percent, 41 percent of respondents have an advantage of 50-80 percent, 34 percent of respondents have an advantage of 30-50 percent and 15 percent of respondents have an advantage of less than 30 percent. So, from this table we understand that almost 51 percent find it is better to attend at least online class than sitting without any activities. At least they will be involved in academic matters even though it will not support the teaching learning process in full strength when compared with the traditional system.

R Code for ANOVA

```
HS=c(11,38,22,7); HSS=c(9,39,43,21)
combined_groups=data.frame(cbind(HS,HSS));  combined_groups
summary(combined_groups); stacked_groups=stack(combined_groups); stacked_groups
anova_results=aov(values~ind,data = stacked_groups);summary(anova_results)
```

Table 2. ANOVA table.

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
ind	1	144.5	144.5	0.65	0.451
Residuals	6	1333.0	222.2		

Since the p value is greater than level of significance, the hypothesis is accepted. So, the above ANOVA table conveys that there is a no significant difference between the students of both the sections in receiving benefits while attending online classes in terms of how well students understand and concentrate on their studies. Even though in online classes the physical presents of teachers and students are not possible, the students are receiving better knowledge and ideas via online classes like Victors.

To explore whether the students face any kind of difficulties in attending online sections.

Table 3. Difficulties encountered in online classes.

Difficulties faced	HS	HSS
Lack of gadgets	8	6
Power loss	6	6
Poor internet connection	47	69
None	22	26

Table 3 depicts the issues experienced by the students during online sections. Here we would like to compare whether the students at high school and higher secondary school students are facing same issues in attending online classes or not. From the table around 26. 5% of students from HS and 25% of students from HSS are not facing many issues and the remaining students have problems like lack of gadgets, poor net connections etc. The null hypothesis states that there is no significant difference between the students of HS and HSS in problems faced by the students in attending online classes. The ANOVA method is used here, and the results are obtained using R programming.

R Code for Plotting Graph

```
a=matrix(c(8,6,47,22,6,6,69,26),nrow = 4)
row.names(a)=c('Lack of gadgets','Power loss','Poor internet connection','None')
colnames(a)=c('HS','HSS')
total=margin.table(a,1)
total
a
pie((total),col = c('red','blue','orange','skyblue'))
```

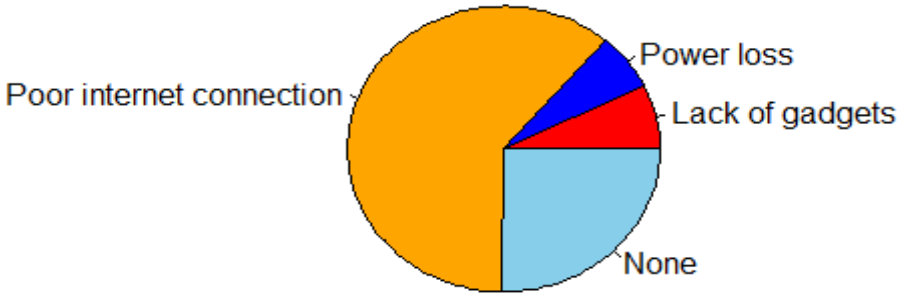

Fig 2. Difficulties during online classes.

Interpretation**:** The above graphs display the difficulties experienced during online sections by students. While considering the percentage of students having common issues of both the sessions, about 62 percent of students face poor internet connectivity among 190 respondents, 7 percent of them has no gadgets available, 6 percent of students face power loss as a concern, and 25 percent of them have no difficulties.

R Code for ANOVA

```
HS=c(8,6,47,22); HSS=c(6,6,69,26)
combined_groups=data.frame(cbind(HS,HSS)):combined_groups; summary(combined_groups)
stacked_groups=stack(combined_groups);stacked_groups; anova_results=aov(values~ind,data = stacked_groups);
summary(anova_results)
```

Table 4. ANOVA table.

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
ind	1	72	72.0	0.116	0.745
Residuals	6	3718	619.6		

Here we assume that there is no significant difference in students facing difficulties in attending online classes with HS and HSS. As the p-value is greater than the level of significance (5%), the hypothesis is accepted. So, the above ANOVA table shows that the students face difficulties in attending online classes.

To find out if students are having physical issues of some kind.

Table 5. Physical issues.

Responses to physical problems	HS	HSS
Yes	35	54
No	23	28
Maybe	20	30

Table 5 shows the details of physical issues that students face when attending an online class. Around 27 percent of the students from both the courses are not facing many issues, but 73 percent has physical issues in attending online classes. The null hypothesis is that there is no significant difference between students of HS and HSS in facing physical issues by attending online classes. The ANOVA method is used here, and the results are obtained using R programming.

R Code for Plotting Graph

```
z=matrix(c(35,23,20,54,28,30),nrow = 3)
row.names(z)=c('Yes','No','Maybe')
colnames(z)=c('HS','HSS')
total=margin.table(z)
total;z
barplot(t(z),beside=TRUE,col=c('skyblue','green'),xlab = 'Status of students',ylab = 'No of students',legend.text = c('HS','HSS'))
```

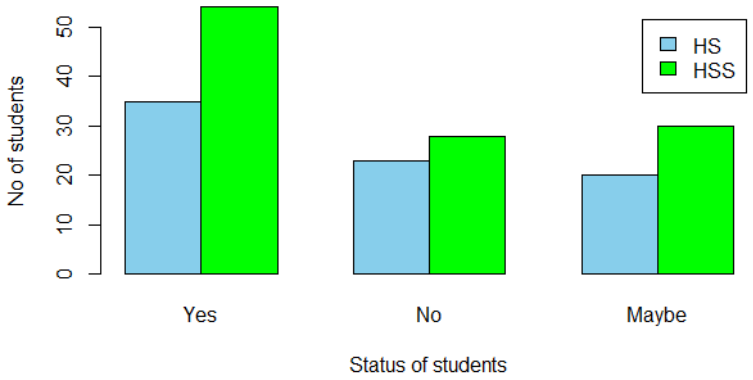

Fig.3 Physical issues during online classes.

Interpretation: It can be analyzed from the above graph that 47 percent of 190 respondents have physical problems, 27 percent do not have physical problems, and 26 percent have physical problems, but not always. It can be seen from the above graph that, while attending online classes, most students have physical issues. Consequently, we can infer those physical concerns are a downside to the online education system.

R Code for ANOVA

```
HS=c(35,23,20);HSS=c(54,28,30); combined_groups=data.frame(cbind(HS,HSS))
combined_groups;summary(combined_groups);
stacked_groups=stack(combined_groups)
stacked_groups;
anova_results=aov(values~ind,data=stacked_groups);
summary(anova_results)
```

Table 6. ANOVA table.

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
ind	1	192.7	192.7	1.415	0.3
Residuals	4	544.7	136.2		

As the p value is greater than the level of significance (5%), the hypothesis is accepted. Above ANOVA table shows that there is no difference in students of both the sections in facing difficulties while attending online classes.

To monitor whether students are getting some relief from online classes during lockdown.

Table 7. Relief from online classes.

Response to online classes providing relief	HS	HSS
Yes	32	39
No	46	73

Table 7 shows whether online classes are providing some benefit or relief to students during the pandemic. Among the students from both HS and HSS, 37 percent says that they are getting some relief in online classes, but 63 percent says that they are not getting any relief from online classes. Hypothesis states that there is no significant difference between students of HS and HSS getting relief from online classes.

R Code for Plotting Graph

```
y=matrix(c(32,46,39,73),nrow=2)
row.names(y)=c('Yes','No')
col,names(y)=c('HS','HSS')
total=margin.table(y,1)
total
y
barplot(t(y),beside = TRUE ,col = c('Yellow','green'),xlab = 'Status of students',ylab = 'No of students', legend.text = c('HS','HSS'),args.legend = list(x='top'))
```

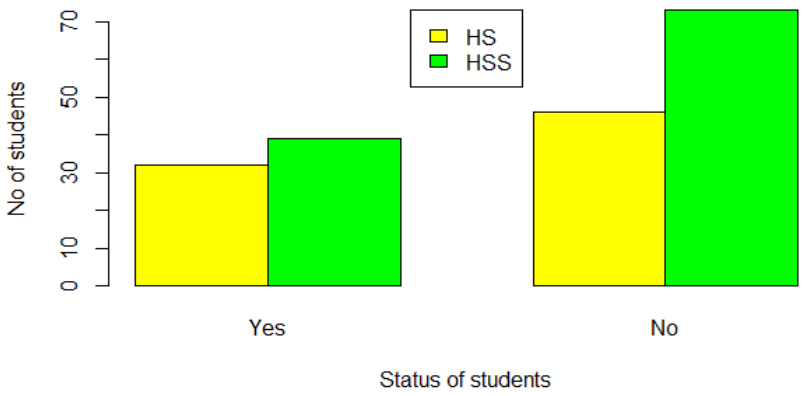

Fig.4 Getting any kind of relief through online classes during this worst condition.

Interpretation: The above graph shows how much relaxation is earned by students through online classes during the lockdown period. Out of 190 respondents, only 37 percent said it was a relief. On the other hand, 63 percent says that during these times, online classes do not provide any relief. When comparing the data, only a small percentage of students feel relief. To test whether there is any significant difference between the students of HS and HSS in comparing the relief acquired from online classes. It is tested using T test by R programming.

R Code for T test

```
a=c(32,46); b=c(39,73); combined_groups=data.frame(cbind(a,b)); combined_groups
summary(combined_groups); result=t.test(a,b,paired = TRUE,alternative = 'two.sided'); result
```

T Test Result

```
Paired t-test; data:  a and b; t = -1.7, df = 1, p-value = 0.3385
Alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval: -144.062    110.062
Sample estimates: mean of the differences -17
```

As the p value is greater than the level of significance (5%), the hypothesis is accepted. Above result shows that both sections have same opinion in getting relief from online classes.

To check if students are involved in additional curricular activities.

Usually in traditional system, the students used to get many opportunities to explore their co-curricular, extra-curricular and sports activities. So, we like to check whether the students receive any such opportunities to show their talents via online classes.

Table 8. Involvement of students in extracurricular activities.

Extracurricular activities response	HS	HSS
Yes	12	16
No	66	96

Table 8 shows whether online classes offer a forum for students to develop their skills. Hypothesis states that there is no significant difference between the students from both the sections in receiving the opportunities to develop their talents by online classes.

R Code for Plotting Graph

```
p=matrix(c(12,66,16,96),nrow = 2); row.names(p)=c('Yes','No'); colnames(p)=c('HS','HSS')
total=margin.table(p); total; p
barplot(t(p),beside = TRUE ,col = c('orange','red'),xlab = 'Status of students',ylab = 'No of students',legend.text = c('HS','HSS'),args.legend = list(x='top'))
```

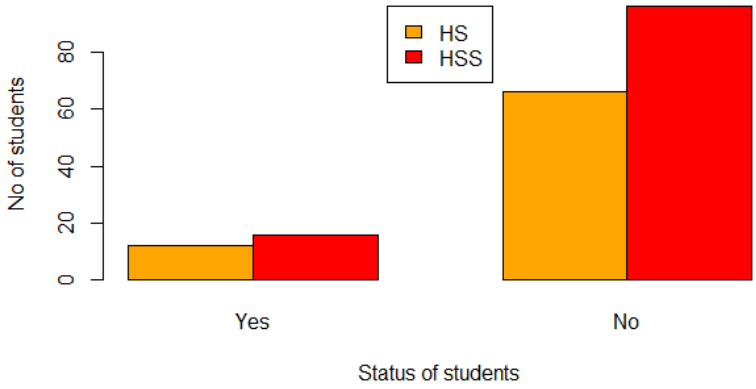

Fig.5 Extracurricular activities through online classes.

Interpretation: The above graph depicts whether students have any online sections to improve their extracurricular activities. Of 190 respondents, 15% of students receive such sections, while 85% do not receive any such sections. The data indicates that there is no forum for students to share their talents. When comparing the online and conventional education systems, we can infer that student in traditional system may have more opportunities to develop their skills, than with our new online system.

R Code for T Test

```
a=c(12,66);b=c(16,96);combined_groups=data.frame(cbind(a,b)); combined_groups
summary (combined_groups); result=t.test(a,b,paired = TRUE, alternative = 'two.sided'); result
```

T Test Result

```
Paired t-test; data:  a and b; t = -1.3077, df = 1, p-value = 0.4156
Alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:  -182.1807  148.1807
Sample estimates:  mean of the differences -17
```

As the p value is greater than the level of significance (5%),
the hypothesis is accepted.

Above result shows that there is no significant difference between the students of both sections in terms of student's ability to improve their individual skills. The students are not getting any chance to develop their extracurricular activities as most of the schools are not conducting any activities as online.

CONCLUSION

Covid-19 is a pandemic which may last for long days, and we realize that an alternate procedure is needed for our educational system, to keep the students of all categories in touch with the educational system. Of course, the future of all students is very important and needs some measures to maintain the academic system and the possible measure is "online classes". But still, it has many negative impacts in student's understanding and performance level.

Based on the data we have collected, and, on our findings, we may conclude that online and offline classes are not equivalent. In the worst scenario, online classes are the only way to continue academics, but they do not offer a significant benefit to students. Students who took online classes became more reliant on electronic devices, resulting in a less environmentally friendly atmosphere. In contrast to offline classes, which provide positive engagement and satisfaction between students and between students and teachers, students in online classes feel more anxious, depressed, and mentally drained. Furthermore, many students believe that they are unable to attend online classes physically, because they follow the same schedule every day and they always must be in front of any sort of gadgets. Due to the online classes most students are facing many physical and mental issues. According to this study both high school and higher secondary school students have common opinion that even though they are facing many issues, online classes can be a better choice to be online with the academic system.

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