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Research Article

ONLINE EDUCATION DURING THE CORONA: A REMEDY OR CREATING DISPARITIES BETWEEN THE STUDENTS

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ABSTRACT

Education is significant in society. It's the reason for the prolongation of culture, for the guidance of people, for the development of society, and different purposes. Suddenly, the Corona virus has changed how lessons are taught far and wide. Those progressions give us a brief look at the educational system during the pandemic. While class terminates, dunks in enrollment at the start of a fresh educational configuration, and annulments could also be momentary, it's tough to anticipate whether the novel coronavirus will end in enduring disturbance to the educational structure. The most terrifying fact is due to the closedown of educational institutes; around 600 million learners across the world will be affected. (10) Closure of educational institutions does not even have short-term effects in India, but can even cause destructive economic and societal consequences. In the light of the disease when the traditional learning facilities are not available, then the online education system seems to be the only way out, which can draw the learners out of the darkness. This study assessed a comparative, statistical, and analytical interpretation of the effect of online education between the urban and rural students of the Rajganj block under the Jalpaiguri district during the Corona situation based on the availability of digital mediums, internet accessibility, and the accessibility of study material.

INTRODUCTION

The pandemic Covid-19[1] has spread over the entire world and constrained human culture to keep up social separating. It has essentially disturbed the training area, which is a basic determinant of a nation's financial future. February 11, 2020, the World Health Organization proposed an authority name of the infection as COVID-19. It was first recognized in Wuhan, China on December 31, 2019. (25) The first demise of COVID 19 was the 61-year elderly person in Wuhan, China 2020. (15) WHO[2] announced COVID-19 as a pandemic in 2020. It has influenced more than 4.5 million individuals around the world (WHO). As per the UNESCO[3] report, it had influenced over 91% of the complete world's understudy populace during mid-April 2020 which is currently diminished to almost 67% during June 2020. (6)(16) The episode of COVID-19 has affected over 120 crores of understudies and adolescents across the planet. According to the UNESCO report, around 14 crores of essential and 13 crores of optional understudies are influenced which are the two most influenced levels in India. (17)

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The UNESCO report assesses that the Covid pandemic will antagonistically influence more than 290 million undergrads all through 22 global areas. (2) The UNESCO gauges that cycle 32 crores undergrads are influenced in India, joining these resources. (5)(23) The freezing and extraordinary effect of COVID-19 has shaken the world to its center. Moreover, the higher a piece of the governments across the globe have immediately shut scholastic foundations endeavoring to involve unfurl of the COVID-19 pandemic. In India as viably, the central government as a feature of the cross country lockdown has shut every scholarly establishment, as a result of which, students going from school-going children to postgraduate undergrads, are influenced. Diverse global areas have applied confined terminations influencing a huge assortment of additional students. UNESCO is supporting global areas of their endeavors to alleviate the fast effect of workforce termination, especially for extra frail and denied networks, and to encourage the intelligence preparing for all uses far off examining.

As indicated by OECD[4] reports, School execution pivots basically on keeping up cozy associations with instructors. (18) This is especially valid for essential and rudimentary level understudies from distraught foundations, which can't have the parental help expected to discover all alone. Working

[1] COVID-19- CO-Corona, V-Virus, D-Disease, 19-2019
[2] WHO- The World Health Organization
[3] UNESCO- United Nations Educational, Scientific and Cultural Organization.
[4] OECD- The Organisation for Economic Co-operation and Development

guardians are bound to miss work when schools near the very edge of the post of their youngsters, bringing about compensation misfortune on numerous occasions, and adversely affecting profitability. School terminations place troubles on schools as guardians and authorities divert kids to open schools. Coronavirus has made many negative effects on training and some of them are pointed underneath-

- Increased responsibility of parents to educate their wards because children have caged inside the house for a long time which can cause severe mental trauma.
- Lack of nutrition due to shut down of Mid-day Meal system along with school closure.
- Unprepared teachers/students for online education as this is a sudden situation.
- It has ruined academic integrity in different places around the globe.
- Covid hampers the mental health of teachers, students.
- Teachers are facing problems in assessment procedures.
- Difficulties are being faced by educators during the bringing up of learners' learning outcomes.
- Access to the digital world has been a major issue as India's digital and internet-related infrastructure is weak.
- Corona hampers the very less advanced inclusive Education.
- Most importantly COVID is creating social disparity based on the availability and affordability of online education.
- The Indian government has taken different measures to cope up with this pandemic and the problems of the educational system. Different online resource websites and mediums are brought in front of students as preventive measures such are as follows- [12]
- The Ministry of Human Resource Development (MHRD) has made several arrangements, including online portals and educational channels through Direct to Home TV, Radios for students to continue learning. During the lockdown, students are using popular social media tools like WhatsApp, Zoom, Google meets, Telegram, YouTube live, Facebook live, etc. for the online teaching-learning system. ICT initiative of MHRD (eBroucher- https://mhrd.gov.in/ict-initiatives) is a unique platform that combines all digital resources for online education.
- PM e-Vidya platform (PM-Pradhan Mantri)
- e-Pathshala
- The examination material has been created in a Digitally Accessible Information System (DAISY), a specialized norm for advanced book recordings, periodicals, and electronic content.
- National Repository of Open Educational Resources (NROER)
- e-PG Pathshala
- Diksha portal
- Mukta Vidya Vani (MVV)
- SWAYAM PRABHA
- Shiksha Vani
- IITPAL (Professor Assisted Learning prepared by the IITs)
- Manodarpan
- New National Curriculum and Pedagogical policy for school
- National Foundational Literacy and Numeracy Mission

But the lethargic pace of progress in scholastic organizations, universally is disastrous, with hundreds of years old, lecture-based ways to deal with teaching and learning, settled in institutional inclinations, and outdated classrooms. However, COVID-19 has become an impetus for instructive foundations worldwide to search for creative measures during a relatively short period. Digital training seems to be a viable reply for make-up for within the shortfall for classroom training for an interval of three to 4 months, whereas limiting the probabilities of any infection to college students until courses resume. Extra significantly, it furthermore presented up to this point fringe issue of advanced preparation in India to the center stage. Going ahead, advanced preparation is bound to be implicit in standard preparation. Furthermore, it's going to present an open door for educators to provide you with custom-made studying solutions for each pupil.

LITERATURE REVIEW

F-test

F-Test is used to test if the variances of two populations are the same. This test is often a two-tailed test or a one-tailed test. The two-tailed adaptation tests against the electorate that the variances are not the same. The one-tailed form just tests a solitary way, that is the variance from the first population is either more essential than or not actually (yet not both) the second population variance. The choice is directed by the issue.

A Statistical F Test utilizes an F Statistic to think about two variances, s_1 and s_2, by separating them. An outcome is consistently a positive number (since variances are consistently certain).The formula is- $F= s^2_1 / s^2_2$ [8]

If the variances are equivalent, the ratio of the variances will approach 1. For instance, if there were two datasets with a sample 1 (variance of 10) and a sample 2 (variance of 10), the ratio would be 10/10 = 1.

Generally, it is tested that the population variances are equivalent when running an F Test. All in all, the general expectation is that the variances are equivalent to 1. Therefore the null hypothesis will consistently be that the variances are equivalent.

A few suppositions are made for the test. Your population should be roughly normally distributed to utilize the test. Additionally, the samples should be independent. Also, a few significant focuses are as follows-

- The bigger variance ought to consistently go into the numerator (the top number) to force the test into a right-tailed test. Right-tailed tests are simpler to figure.
- For two-tailed tests, partition alpha by 2 before finding the right basic worth.
- If standard deviations are given, they should be squared to get the variances.
- If degrees of freedom aren't recorded in the F Table, utilize the bigger basic worth. This assists with keeping away from the chance of Type I errors.

Chi-square test

A chi-square ($\chi 2$) statistic is an analysis that measures how a model contrasts to actual observed data. The data utilized in calculating a chi-square statistic should be random, raw, mutually restrictive, drawn from independent variables, and drawn from a large enough sample. For example, the aftereffects of tossing a fair coin meet these criteria. Chi-square tests are often utilized in hypothesis testing. The chi-square statistic compares the size of any discrepancies between the normal outcomes and the actual outcomes, given the size of the sample and the number of variables in the relationship. For these tests, degrees of freedom are used to decide whether a certain invalid hypothesis can be dismissed based on the total number of variables and samples in the test. As with any statistic, the larger the sample size, the more reliable the outcomes are.

Central issues

- A chi-square ($\chi 2$) statistic is a measure of the contrast between the observed and anticipated frequencies of the results of a bunch of occasions or variables.
- $\chi 2$ relies upon the size of the distinction among actual and observed values, the degrees of freedom, and the sample size.
- $\chi 2$ can be utilized to test whether two variables are related or independent from each other or to test the goodness-of-fit between an observed distribution and a theoretical distribution of frequencies.

The Formula for Chi-Square Is $\chi_c^2 = \Sigma\,(Oi-Ei)^2/Ei$ (11)
Where: c=Degrees of freedom, O=Observed value(s), E=Expected value(s)

There are two primary sorts of chi-square tests: the test of independence, which poses an inquiry of relationship, is utilized to decide whether there is a significant relationship between two nominal (categorical) variables. The frequency of each category for one nominal variable is analyzed across the classifications of the second nominal variable. The data can be shown in a contingency table where each row speaks to a classification for one factor and every column speaks to a classification for the other variable. Also, the goodness-of-fit test, a non-parametric test utilized to discover how the observed value of a given phenomenon is altogether not quite the same as the expected value. In the Chi-Square goodness of fit test, the term goodness of fit is utilized to contrast the observed example distribution and the expected probability distribution. Chi-Square Goodness of fit test decides how well the hypothetical distribution, (for example, normal, binomial, or Poisson) fits the empirical distribution. In the Chi-Square goodness of fit test, sample data is separated into intervals. At that point, the quantities of focus that fall into the interval are looked at, with the expected quantities of focus in every interval.

Linear regression test

Linear regression endeavors to display the connection between two variables by fitting a linear equation to observed data. One variable is viewed as an explanatory variable, and the other is viewed as a dependent variable. For instance, a researcher should relate loads of people to their statures utilizing a linear regression model. Before endeavoring to fit a linear model to observed data, a researcher should initially decide if there is a connection between the variables of interest. This doesn't infer that one variable causes the other, yet that there is some critical relationship between the two variables. A scatter plot can be a useful apparatus in deciding the strength of the connection between two variables. On the off chance that there gives off an impression of being no relationship between the proposed explanatory and dependent variables (ex- the scatter plot doesn't show any expanding or diminishing patterns), at that point fitting a linear regression model to the data likely won't give a helpful model. An important mathematical proportion of the relationship between two variables is the correlation coefficient, which is an incentive between - 1 and 1 demonstrating the strength of the relationship of the observed data for the two variables. (14)

The regression equation is expressed as Y = a + bX +e (24)

- Y- The value of the Dependent variable (Y), what is being predicted or explained
- a or α- A constant; equivalents the value of Y when the value of X=0
- b or β- The coefficient of X is the slope of the regression line; how much Y alters for each one-unit change in X.
- X- The value of the Independent variable (X), what is predicting or elucidating the value of Y
- e- The error term; the error in envisaging the value of Y, given the value of X

A. ***Shapiro-Wilk test***

The Shapiro–Wilk test is an assessment of normality in statistics. It came in print in 1965 by Samuel Sanford Shapiro and Martin Wilk, which computes a W measurement that tests whether a random sample, x1, x2,…,xn comes from (explicitly) a typical appropriation. More modest estimations of W are proof of takeoff from normality and percentage points for the W measurement. This test concentrates very well in correlation with other goodness of fit tests.

The W statistic is assessed as follows:

$$W=(\sum_{i=1}^{n} a_i x_{(i)})^2 / (\sum_{i=1}^{n} (xi-\dot{x})^2$$

Where the $x_{(i)}$ are the planned sample values ($x_{(1)}$ is the smallest) and the a_i are constants created from the means, variances, and co-variances of the request measurements of a sample of size n from a normal distribution. (3)

The test dismisses the hypothesis of normality when the p-value is not exactly or equivalent to 0.05. Struggled the normality test permits to express that 95% confidence the data doesn't fit the normal distribution. Breezing through the normality assessment just permits to express that no critical departure from normality was found.

***Q–Q (quantile-quantile) plot –* (21)**

In statistics, a Q–Q (quantile-quantile) plot is a probability plot, which is a graphical method for comparing two probability distributions by plotting their quantiles against each other.[1] First, the set of intervals for the quantiles is chosen. A point (x, y) on the plot corresponds to one of the quantiles of the second distribution (y-coordinate) plotted against the same quantile of the first distribution (x-coordinate). Thus the line is a parametric curve with the parameter which is the number of the interval for the quantile.
If the two distributions being compared are similar, the points in the Q–Q plot will approximately lie on the line $y = x$. If the

distributions are linearly related, the points in the Q–Q plot will approximately lie on a line, but not necessarily on the line *y* = *x*. Q–Q plots can also be used as a graphical means of estimating parameters in a location-scale family of distributions.

A Q–Q plot is used to compare the shapes of distributions, providing a graphical view of how properties such as location, scale, and skewness are similar or different in the two distributions. Q–Q plots can be used to compare collections of data or theoretical distributions. The use of Q–Q plots to compare two samples of data can be viewed as a non-parametric approach to comparing their underlying distributions. A Q–Q plot is generally a more powerful approach to do this than the common technique of comparing histograms of the two samples, but requires more skill to interpret. Q–Q plots are commonly used to compare a data set to a theoretical model. This can provide an assessment of "goodness of fit" that is graphical, rather than reducing to a numerical summary. Q–Q plots are also used to compare two theoretical distributions to each other. Since Q–Q plots compare distributions, there is no need for the values to be observed as pairs, as in a scatter plot, or even for the numbers of values in the two groups being compared to be equal.

Histogram

The method that almost everyone knows is the histogram. The histogram is a data visualization that shows the distribution of a variable. It gives us the frequency of occurrence per value in the dataset, which is what distributions are about. [13] The classical bell-shaped, symmetric histogram with most of the frequency counts bunched in the middle and with the counts dying off out in the tails. From a research point of view, the normal distribution is that distribution that occurs most often in nature. If the histogram indicates asymmetric, moderate tailed distribution, then the recommended next step is to do a normal probability plot to confirm approximate normality. If the normal probability plot is linear, then the normal distribution is a good model for the data. [1]

Normal probability plot

The normal probability plot is a graphical technique to identify substantive departures from normality. This includes identifying outliers, skewness, kurtosis, a need for transformations, and mixtures. Normal probability plots are the building up of raw data, residuals from model fits, and estimated parameters. In a normal probability plot, the sorted data are plotted vs. values selected to make the resulting image look close to a straight line if the data are approximately normally distributed. Deviations from a straight line suggest departures from normality. The normal probability plot is a special case of the Q–Q probability plot for a normal distribution. The theoretical quantiles are generally chosen to approximate either the mean or the median of the corresponding order statistics. [26]

T-test for Unequal Variances (Welch's Test)

The t-test is any statistical hypothesis test in which the test statistic follows a Student's t-distribution under the null hypothesis. A t-test is the most commonly applied when the test statistic would follow a normal distribution if the value of a scaling term in the test statistic were known. When the scaling term is unknown and is replaced by an estimate based on the data, the test statistics (under certain conditions) follow a Student's t distribution. The t-test can be used, for example, to determine if the means of two sets of data are significantly different from each other. [27]

Welch's Test for Unequal Variances is a modification of the Student's t-test to see if two sample means are significantly different. The modification is to the degrees of freedom used in the test, which tends to increase the test power for samples with unequal variance. Welch's t-test, unlike Student's t-test, does not have the assumption of equal variance (however, both tests have the assumption of normality). When two groups have equal sample sizes and variances, Welch's tends to give the same result as Student's t-Test. However, when sample sizes and variances are unequal, the Student's t-test is quite unreliable; Welch's tends to perform better. However, it isn't as simple as choosing Welch's test when your samples have unequal variances. Some authors caution against testing for variance equality and then choosing the test. We should always use Welch's when comparing central tendency for two unrelated samples. [9]

MATERIALS AND METHOD

1. The Questionnaire made by the researcher
2. F-test
3. Chi-square test
4. Linear regression test
5. Shapiro-Wilk test
   - Q–Q (quantile-quantile)plot
   - Histogram
   - Normal probability plot
6. T-test for Unequal Variances (Welch's Test)

The Geographical Area of Research

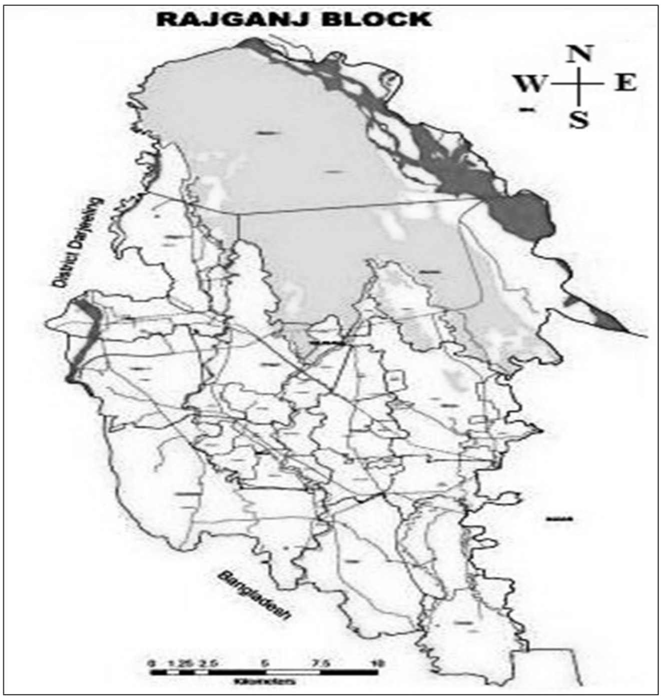

Figure 1 Map of Rajganj block (Area of research) prepared by NRDMS (Natural Resources Data Management System [22]

Questionnaire

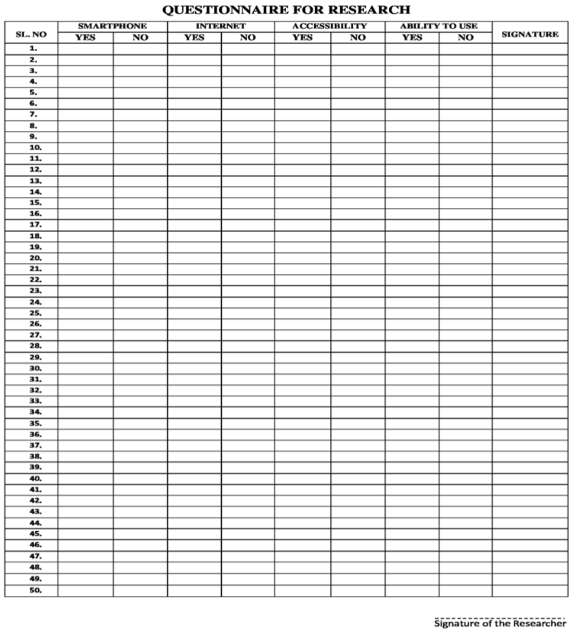

Figure 2 Questionnaire used in data collection for the Research

Hypotheses of the study

1. H_0 (null hypothesis) - There is no significant difference between the ability of people to use the internet and the area. Precisely the ability of people to use the internet doesn't differ by area.
2. $H_{0.1}$ (null hypothesis) - There is no significant difference between having an internet facility and the ability of people to use the internet in respect of the area. Precisely the ability of people to use the internet doesn't differ by internet facility in respect of area.
3. $H_{0.2}$ (null hypothesis): $Y = b_0$ The linear regression model without intercept, $Y = bX$, doesn't offer a better fit than the model devoid of the independent variable ensuing in, $Y = b_{0,}$ and the data is not normally distributed.
4. $H_{0.3}$ (null hypothesis): The samples belong to a normal distribution
5. $H_{0.4}$ (null hypothesis): There is no significant difference between having an internet facility and the ability of people to access the study material in respect of the area. Precisely the ability of people to access the study material doesn't differ by internet facility in respect of area.

RESULT AND DISCUSSION

Data acquired from the questionnaire:

Table 1 Represents the comparison between Families having a Smartphone and Families not having a Smartphone in respect of the area

Rural area		
Total number of Families (n)	Families having a Smartphone	Families Not having a Smartphone
50	40	10
50	37	13
Total 100	77	23
Urban area		
Total number of Families (n)	Families having a Smartphone	Families Not having a Smartphone
50	45	5
50	46	4
Total 100	91	9

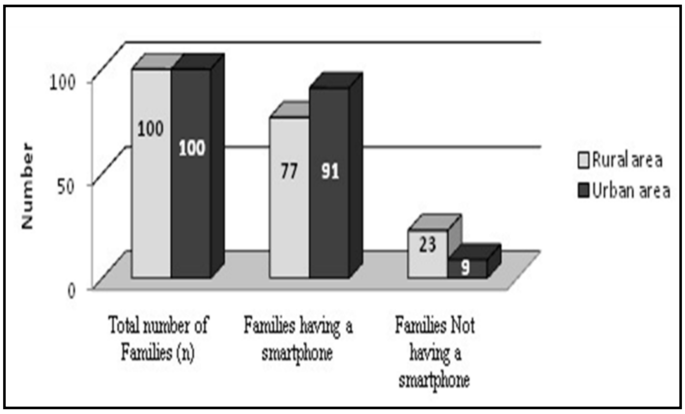

Figure 3 Graphical presentation of the comparison between families having a smartphone and families not having a Smartphone in respect of the area.

Interpretation

Table-1 and figure-3 represent the comparison between Families having a Smartphone and Families not having a Smartphone in respect of the area. The numerical and graphical result deduces that the accessibility of Smartphone varies by the region and urban people have greater accessibility of Smartphone which encourages the people to be progressively solid about the innovation and the online educational framework as it is known that Smartphone is a far superior medium than the ordinary phone to access the internet and the online study material too. On the other hand, rural people aren't privileged to get the Smartphone because they don't have such great monetary conditions.

Table 2 Represents the comparison between Families that have an internet connection and Families that don't have an internet connection in respect of the area

Rural area		
Families having a Smartphone	Families have an internet connection	Families don't have an internet connection
40	35	5
37	31	6
Total 77	66	11
Urban area		
Families having a Smartphone	Families have an internet connection	Families don't have an internet connection
45	41	4
46	43	3
Total 91	84	7

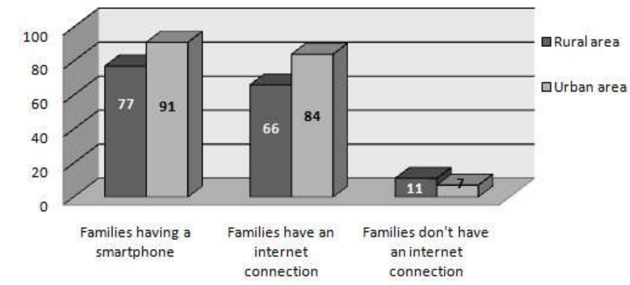

Figure 4 Graphical presentation of the comparison between families that have smartphones, families have an internet connection and don't have internet connection in respect of the area.

Interpretation

Table-2 and figure-4 Represent the comparison between Families that have an internet connection and Families that don't have an internet connection in respect of the area. The numerical and graphical result construes that the accessibility of web contrasts by the region and urban people have greater accessibility of internet which causes the people to be progressively solid about the innovation and the online educational framework as we know that Internet is the most required choice to get the online educational instructions. Without the internet, the entire online training framework will be inundated by obscurity.

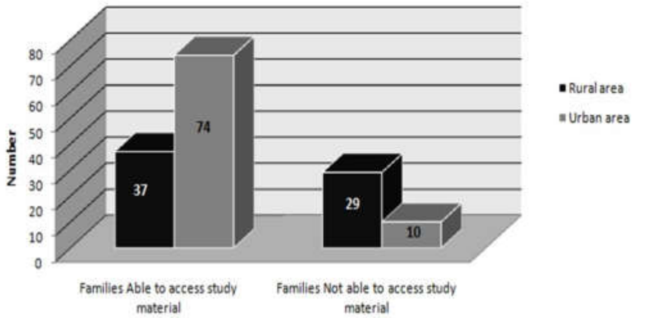

Figure 5 Graphical presentation of the comparison between families able to access online study material and families not able to access online study material in respect of the area.

Table 3 Represents the comparison between Families Able to access online study material and Families Not able to access online study material in respect of the area.

Rural area		
Families have an internet connection	Families Able to access online study material	Families Not able to access online study material
35	17	18
31	20	11
Total 66	37	29
Urban area		
Families have an internet connection	Families Able to access online study material	Families Not able to access online study material
41	35	6
43	39	4
Total 84	74	10

Interpretation

Figure-5 and Table-3 Represent the comparison between Families Able to access online study material and Families Not able to access study material in respect of the area. Here we can envision that many families can't get to the online study material however they have the web association perhaps in light of the fact that they are fit to utilize a couple of social networking sites yet not very productive to download the study material. The numerical and graphical result presumes that again the Urban families are remaining ahead in wording to get to the study materials among the families those are having internet facilities.

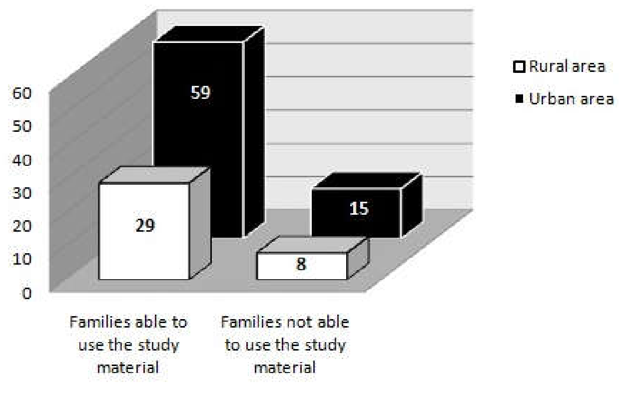

Figure 6 Graphical presentation of the comparison between families able to use online study material and families not able to use online study material

Table 4 Represents the comparison between Families able to use the online study material and Families not able to use the online study material in respect of the area

Rural area		
Families Able to access online study material	Families able to use the online study material	Families not able to use the online study material
17	12	5
20	17	3
Total 37	29	8
Urban area		
Families Able to access study online material	Families able to use the online study material	Families not able to use the online study material
35	28	7
39	31	8
Total 74	59	15

Interpretation

Figure-6 and Table-4 Represent the comparison between Families able to use the online study material and Families not able to use the online study material in respect of the area. From here and past datasheets we can get a visual and numerical interpretation that the rural families are confronting the outcomes of not having a Smartphone, legitimate web availability, or capacity to experience the online educational instructions and as the outcome, the vast majority of the rural family vitally the rural kids can't utilize the study material and deprived of having the education during the lockdown on account of the Covid-19 pandemic.

F test for variances, using F distribution (two-tailed)

Hypothesis

H_0 (null hypothesis) - There is no significant difference between the ability of people to use the internet and the area. Precisely the ability of people to use the internet doesn’t differ by area.

H_1 (alternative hypothesis) - There is a significant difference between the ability of people to use the internet and the area. Precisely the ability of people to use the internet differs by area.

Table 5 Represents data for the F test using the F distribution

Description	Rural Population	Urban Population
Population size (n)	100	100
Sample Standard deviation (S)	32.19	39.37

Table 6 represents the significance label, p-value, F value of the test

Significance level (α)-0.05	
p-value	0.0437386
F value	0.665132
The result is significant at $p < 0.05$	

Interpretation- Based on data acquired from Table 5 and 6

1. H_0 hypothesis- Since p-value < α, H_0 is rejected. The sample standard deviation (S) of the rural population is measured to be not equal to the sample standard deviation (S) of the urban population. In other words, the difference between the sample standard deviation (S) of the Rural and Urban populations is large enough to be statistically significant.
2. H_1 hypothesis- p-value equals 0.0437386, p ($x \le F$) = 0.0218693). This means that the possibility of type1

error (discarding a correct H_0) is small: 0.04374 (4.37%). The smaller the p-value the more it supports H_1.

3. The statistics- The test statistic F equals 0.665132, is not in the 95% critical value accepted range: [0.6728: 1.4862]. S1/S2=0.82, is not in the 95% accepted range: [0.8200: 0.004911]. As the result describes that the Null hypothesis is rejected and the Alternative hypothesis is accepted which means there is a significant difference between the ability of people to use the internet and the area. Precisely the capability of people to use the internet differs by area.

Chi-Square test

Hypothesis

$H_{0.1}$ (null hypothesis) - There is no significant difference between having an internet facility and the ability of people to use the internet in respect of the area. Precisely the ability of people to use the internet doesn't differ by internet facility in respect of area.

$H_{1.1}$ (alternative hypothesis) - There is a significant difference between having an internet facility and the ability of people to use the internet in respect of the area. Precisely the ability of people to use the internet differs by internet facility in respect of area.

Table 7 Represents the significance label and (n) value of the test

Significance level (α)	**0.05**
The sample population in each row (n)	50

Table 8 The contingency chart offers the following information: the observed cell totals, the predicted cell totals, and the chi-square statistic for each cell.

Area type	**Have internet facility**			**Able to use the internet**			**Not able to use the internet**			**Total**			**Row totals**
	OCT	ECT	CSS	OCT	ECT	CSS	OCT	ECT	CSS	OCT	ECT	CSS	
RURAL	35	35.62	0.01	17	26.36	3.33	18	9.26	8.24	120	118.75	0.01	190
RURAL	31	32.62	0.08	20	24.14	0.71	11	8.48	0.75	112	108.75	0.10	174
URBAN	41	40.12	0.02	35	29.69	0.95	6	10.43	1.88	132	133.75	0.02	214
URBAN	43	41.62	0.05	39	30.80	2.18	4	10.82	4.30	136	138.75	0.05	222
Column Totals	150			111			39			500			800(Grand Total)

OCT -Observed Cell Totals, ECT -Expected Cell Totals, CSS - Chi-Square Statistic

Table 9 States the chi-square statistic and the p-value of the test.

The chi-square statistic	**22.6838.**
The p-value	0.006947
The result is significant at $p < .05$.	

Interpretation- Based on data acquired from table 8 and 9

A chi-square test of independence was executed to examine the relationship between having an internet facility and the ability of people to use the internet in respect of the area.

Table 10 Represents the Significance level, constant value, and the value of Y

Significance level (α)	**0.05**
Constant	Zero
Total population	X=100, Y= 100
$Y = 0.000+1.1211X$	

1. $H_{0.1}$ hypothesis- The relation between these variables was significant at 0.05 level of significance which means the $H_{0.1}$ hypothesis is rejected since p-value < α.
2. $H_{1.1}$ hypothesis- p-value equals 0.006947. This signifies that the chance of type1 error (rejecting a correct $H_{0.1}$) is small: 0.006947 (0.6947%). The smaller the p-value the more it supports $H_{1.1}$.

As the result describes that the Null hypothesis is rejected and the Alternative hypothesis is accepted which means there is a significant difference between having an internet facility and the ability of people to use the internet in respect of the area. Precisely the ability of people to use the internet differs by internet facility in respect of area.

Linear Regression of the sample

Hypothesis

$H_{0.2}$ (null hypothesis): $Y = b_0$ (The linear regression model without intercept, $Y = bX$, doesn't offer a better fit than the model devoid of the independent variable ensuing in, $Y = b_0$.)
$H_{1.2}$ (alternative hypothesis): $Y = b_0 + b_1X$ (The linear regression model without intercept, $Y = bX$, offers a better fit than the model devoid of the independent variable ensuing in, $Y = b_0$.)

Table 11 Represents the Linear Regression Test data (F-statistic value and P-value)

Source	**df**	**Sum of Square**	**Mean square**	**F statistic**	**P-value**	**R Square(R^2)**
Regression ((between $\hat{y}_i$ and 0)	1	20820.9093	20820.9093			
Regression (between y_i and $\hat{y}_i$)	4	1811.0907	452.7727	45.9853	0.002469	0.9200
Total (between y_i and 0)	5	22632.0000	4526.4000			

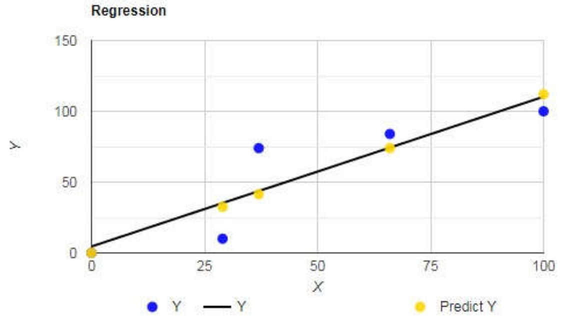

Figure 7 Graphical presentation of the regression data from the linear regression test

Interpretation- Based on Table 10, Table 11, and Figure 7

1. Y and X relationship: R Square (R^2) equals 0.9200. Which implies that 92.0% of the variability of Y is elucidated by X. Correlation (R) equals 0.9391. It states that there is a very strong direct relationship between X and Y.
2. Goodness of fit: Overall regression: right-tailed, F (1, 4) = 45.9853, p-value = 0.002469. Since p-value < α (0.05), we reject the $H_{0.2}$ (null hypothesis), which infers the linear regression model without intercept, Y = bX, offers a better fit than the model without the independent variable resulting in, Y = b_0.

Shapiro-Wilk Test: Residual normality determination of data distribution

Hypothesis

$H_{0.3}$ (null hypothesis): The samples belong to a normal distribution

$H_{1.3}$ (alternative hypothesis): The samples do not belong to a normal distribution

Table 12 Represents the data obtained from Shapiro-Wilk Test (p and W value)

Significance level (α) –0.05						
Sample size (n)	**Mean**	**Standard deviation (S)**	**Skewness**	**Kurtosis**	**p- value**	**W- value**
5	1.581360	21.204881	0.596780	-1.721	0.996424	0.976601

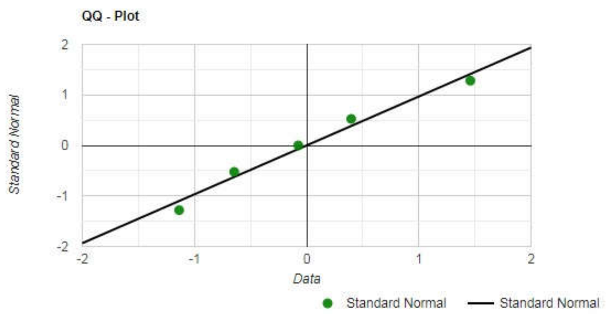

Figure 8 Q-Q plot

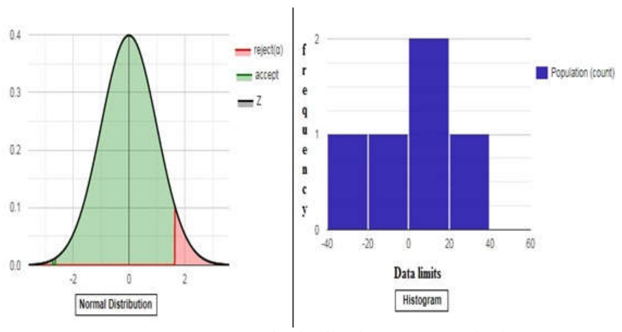

Figure 9 Represents Normal Distribution Curve and Histogram

Interpretation: Based on the data from Table12 and Figure- 8, Figure- 9

1. $H_{0.3}$hypothesis Since p-value>α, we accept the H0.3 (null hypothesis). It is assumed that the data is normally distributed. In other words, the dissimilarities between the data sample and the normal distribution are not adequately big to be statistically significant.
2. P-value
The p-value is 0.996424, hence, if we would reject $H_{0.3}$ (null hypothesis), the chance of type1 error (rejecting a correct null hypothesis) would be too high: 0.9964 (99.64%). The larger the p-value, the more it supports $H_{0.3}$ (null hypothesis) and not supports $H_{1.3}$ (alternative hypothesis)
3. Q-Q PLOT, Normal distribution curve, and histogram
The normal Q-Q plot comparing randomly produced. Independent standard normal data and standard normal population were placed on the vertical axis and horizontal axis respectively.
Here in the Q-Q plot, we can visualize that the linearity of the points is maintained which means points are distributed very close to the diagonal line. So, it supports $H_{0.3}$ that the data set is normally distributed.
The normal distribution curve and histogram also helps to infer that the data set creates a potentially symmetrical; Mesokurtic, single-peaked (unimodal) bell-shaped curve, and data are distributed within the acceptance range of the curve which supports $H_{0.3}$ that the data set is normally distributed.
4. The statistics
W is 0.976601 and W is very close to 1, indicating that data are normally distributed and supports $H_{0.3}$ (null hypothesis). It is also in the 95% critical value accepted range: [0.7508: 1.0000].

T-test for Unequal Variances (Welch's Test)

Hypotheses

$H_{0.4}$ (null hypothesis): There is no significant difference between having an internet facility and the ability of people to access the study material in respect of the area.

Table 13 Inequality in between people of Urban and Rural areas people in respect of having an internet facility and ability to use online Study material.

Population type	**Families have an internet connection**	**Able to use the study material**
Urban area	41	28
	43	31
	Families have an internet connection	Able to use the study material
Rural area	35	12
	31	17

Table 14 represents the Variance, Standard deviation, Calculated t-Value, and Calculated p-Value of the T-test for Unequal Variances (Welch's Test).

Significance level (α)	**0.05**			
Area	Sample size (n)	Mean	Variance	Standard deviation
Group 1 (Urban area)	4	37.5	30.3333	5.5076
Group 2 (Rural area)	4	22	80.6667	8.9815
Calculated t-Value-2.9424		Calculated p-Value-0.0323507		

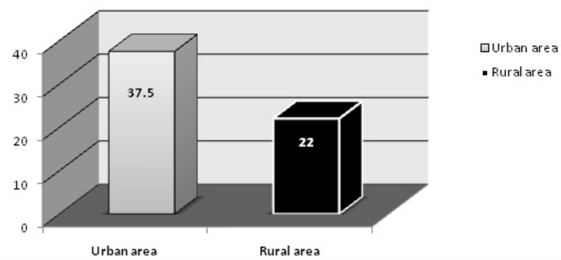

Figure 10 Graphical representation of mean difference resulted from Two-sample t-test for Unequal Variances (Welch's Test)

Precisely the ability of people to access the study material doesn't differ by internet facility in respect of area.

$H_{1.4}$ (alternative hypothesis): There is a significant difference between having an internet facility and the ability of people to access the study material in respect of the area. Precisely the ability of people to access the study material differs by internet facility in respect of area.

Interpretation: Based on the data from Table- 13, Table- 14, and Figure- 8

1. $H_{0.4}$ hypothesis: Since p-value < α and the calculated t-value exceeds the critical value at 0.05 level of significance, $H_{0.4}$ is rejected. The average of the urban area's population is measured not to be equal to the Rural area's population.
2. In other words, the difference between the average of the urban area and rural area populations is adequately big to be statistically significant.
3. P-value and H $_{1.4}$ (alternative hypothesis): p-value equals 0.0323507, [p(x≤T) = 0.983825]. This states that the chance of type1 error (rejecting a correct H0.4) is small: 0.03235 (3.24%). The smaller the p-value the more it supports H1.4, which infers there is a significant difference between having an internet facility and the ability of people to access the study material in respect of the area. Precisely the ability of people to access the study material differs by internet facility in respect of area.
4. The statistics: The test statistic T equals 2.942377, is not in the 95% critical value accepted range: [-2.5742: 2.5742]. x_1-x_2=15.50 is not in the 95% accepted range: [-13.5600: 0.3163].so, the null hypothesis is rejected.
5. T Distribution curve and mean difference graph: The T Distribution curve exhibits the probability of observing a divergence from the null hypothesis that is at least as intense as the difference present in our sample data while assuming that the null hypothesis is correct or true. Our t-value doesn't fall within these regions and it's adequately enough to reject the null hypothesis using the common significance level of 0.05.

Two sample t-tests - Mean difference graph shows a visual difference between the two sample-mean which supports the statistical interpretation of the test.

Outcome

- Urban peoples are more privileged to have electronic contraptions, for example, mobile, PC, laptops, tab over the rural territory people groups. During the Coronavirus pandemic, affordable construction has separated in rural. Due to that situation, the rural territory learners couldn't benefit themselves from the devices and co-up with the advanced learning wave.
- Internet facility is more accessible and simple to access for the urban and semi-urban people groups. That is the reason the digital education drive has come at the edge of the precipice in the instances of rural regions and students have confronted digital disparity during this Coronavirus pandemic.
- Urban or semi-urban people groups are more proficient to utilize contraptions and the internet than rural people groups.
- As guardians need to do difficulties to acquire the morsel for the family, they can't guide their kids as the urban people can do. By and large, rural people are dependent on school or private tutors. But in this pandemic, the school and the private tutor facility are not in the count, so for the students, it is next to impossible to carry on their studies.

Suggestions

School closures in various nations to contain the spread of COVID-19 are upsetting the training of millions of learners across the globe. UNESCO is sharing 10 suggestions to ensure that learning stays continuous during this period. [4]

- Examine the readiness and choose the most relevant tools.
- Ensure inclusion of the distance learning programs.
- Protect data privacy and data security.
- Prioritize solutions to address psychosocial challenges before teaching.
- Plan the study schedule of distance learning programs.
- Provide support to teachers and parents on the use of digital tools.
- Blend appropriate approaches and limit the number of applications and platforms.
- Develop distance learning rules and monitor students' learning process.
- Define the duration of distance learning units based on students' self-regulation skills.
- Create communities and enhance connection.

Except for these recommendations, some more strategies can be made. Such as are follows- [19]

- India ought to create innovative techniques to guarantee that all kids should have practical admittance to getting the hang of during pandemic COVID-19. The Indian approaches should incorporate different people from assorted foundations, including far-off districts, minimized, and minority bunches for successful conveyance.
- Govt. and instructive establishments should plan to proceed with the instructive exercises keeping up social separating. 50% of learners and teachers may go to schools/universities in two shifts each day to carry on instructive exercises by submitting to rules for COVID-19.
- On current occasions, admittance to innovation and the web is an earnest prerequisite. Thus, the computerized capacities and the necessary framework should reach the remotest and least fortunate networks to encourage the learners to proceed with their schooling during the pandemics. There is a need to send public assets to fix the internet gap and guarantee that learners keep on adapting carefully. The state governments/private associations should concoct thoughts to address this issue of the digital educational drive.
- Some huge issues related to distance learning procedures like the accessibility and admittance to computerized gadgets with web network, the requirement for safe learning spaces, making capacities for teachers, families, and learners to work and explore advanced gadgets, and drawing in exercise plans for

impaired learners and other minimized gatherings ought to be tended to by Govt. Furthermore, the partners.

CONCLUSION

Coronavirus sway on the instruction area has left them in a difficult situation as economies keep on being under lockdown. Dealing with the expectation to absorb information, contacting each student, and establishing a protected far-off learning climate is a portion of the current difficulties. Furthermore, educational institutions confronting monetary troubles which will require a significant period to reestablish regularity. A 16-year-old kid (class 10 student), from an exceptionally helpless family, ended his life since he didn't have a cell phone to go to online classes and assessments coordinated by his school in the Chirang locale of Assam in India (The Hindustan Times, June 24, 2020). [20] A tenth standard young lady student ended it all at Bali in 7 West Bengal since she had not had the option to go to online classes and feared bombing her tests (Dalit Camera, June 19, 2020). [7] Accordingly, the pandemic has uncovered the profoundly established imbalance and pecking order between the rich and poor in the Indian training framework. It very well may be contended that the computerized partition contrarily influences the enlistment in advanced education organizations and the absence of computerized admittance further pushes out understudies from schools and colleges in India.

Regardless of whether the COVID-19 emergency extends longer, there is a critical need to take endeavors on greater use of online stages, with the goal that understudies not, just complete their degree in this scholastic year yet, besides, to prepare for the future computerized arranged climate. The idea of "Study from home" has more noteworthy significance in such pandemic circumstances to decrease the spread of COVID-19. As online education is profiting the understudies monstrously, it ought to have proceeded after the lockdown. Further point by point factual investigation might be attempted to investigate the effect of COVID-19 on the education system of India but the government should take the tea-garden laborers, tribes, migrant workers under the limelight of social and educational progress as they are the weaker sections of the society, cannot afford the costly and advance educational facilities over the battle of life.

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