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COVID-19 pandemic and online learning of UG students: An analytic study using python libraries.

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ABSTRACT

The present study was conducted to study the impact of COVID-19 pandemic on online learning of undergraduate college students of RGM Govt, College Joginder Nagar. The sample of the study consisted of 526 students. The data was collected by using self-made google form questionnaire. Data was filtered, processed and analyzed by using python Libraries. After the analysis and interpretation of data it is found that 60 percent of the students are using their own mobile phone for online study while 40 percent students are either sharing or using their family members phones for study purpose. Further it is also found that rural students are facing more network related problems as compared to urban students. Study also found that 54 percent students has reported no data cost related problems while 46 percent students are unable to afford monthly expenditure on data. It was also observed that in overall rating for online and offline learning the students has preferred offline learning over online learning.

1.0. Covid-19

Coronavirus disease 2019 (COVID-19) is a contagious disease caused by severe acute respiratory syndrome coronavirus. According to various media reports the first case of COVID-19 was identified in Wuhan, China, in December 2019. The World Health Organization (WHO) has declared the coronavirus disease 2019 (COVID-19) a pandemic. According to WHO latest report 181930736 confirmed cases of COVID-19 have been reported all over world till end of June 2021. This deadly virus has taken 2842135 lives till date. Main symptoms of COVID-19 include fever, cough, fatigue, breathing difficulties, and loss of smell and taste. Millions of people have been affected due to this fast-spreading disease. COVID-19 Pandemic is a communicable disease and has resulted in severe social, economic, educational, impacts all over the world. At present near about 3945832 Individuals has lost their lives.

1.1. Python

Python is an interpreted, high-level and general-purpose programming language. It supports multiple programming paradigms, including structured, object-oriented, and functional programming. Python was developed by Guido van Rossum. It is first released in 1991. The greatest strengths of python is it's large standard library. In present investigation Python Libraries has been used for analyzing and visualization of data. Python works with standard libraries that makes python more favorite among many programmers. Some of the libraries used here for data analyzing and visualization are as following:

1. **Numpy:** Numpy is a library for the python programming language. It adds support for large, multi-dimensional arrays and matrices, along with a large collection of high-level mathematical functions to operate on these arrays. numpy is open-source software and has many contributors. Travis Oliphant is a primary developer of numpy
2. **Pandas:** In computer programming, pandas is a software library written for the Python programming language for data manipulation and analysis. In particular, it offers data structures and operations for manipulating numerical tables and time series
3. **Matplotlib:** Matplotlib is a multi-platform data visualization library built on numpy arrays. One of the greatest benefits of visualization is that it allows us visual access to huge amounts of data in easily digestible visuals. Matplotlib consists of several plots like line, bar, scatter, histogram etc. Matplotlib was originally written by John D. Hunter in 2003
4. **Seaborn:** Seaborn is a python data visualization library based on matplotlib. It provides a high-level interface for drawing attractive and informative statistical graphics. It is built on the top of matplotlib library and also closely integrated to the data structures from pandas. Seaborn provides different types of plot for visualizing the relationship between variables. Those variables can be either be completely numerical or a category like a group, class or division. Seaborn provides different plots like Relational plots, Categorical plots, regression plots, Matrix plots etc.

1.2. Objectives of the study:

Following are the main objectives of the study

1. To study the availability of smart mobile phones for online learning.
2. To study network issues faced by student during online classes.
3. To study the data related problems faced by student during online classes.
4. To study student's satisfaction towards online teaching.

1.3. Hypothesis of the study:

Following are the main hypothesis of the study:

1. Smart phones will be available to all the students for online classes.
2. Students of rural areas will face more network issues as compared to their counterparts.
3. Students will face problems to get data for their online learning.
4. Students will be less satisfied towards online teaching as compared to offline teaching.

1.4. Sample of the study: Total Sample of the study consisted of 526 (309 male and 217) students studying in under graduate classes of RGM Govt. College Joginder Nagar H.P., India. Sample is obtained by using purposive sampling technique. Responses of the students are obtained by using google form.

1.5. Data collection and Tool Used: a self-made questionnaire was prepared on google form to study the problems faced by students during online learning in this pandemic period of covid-19. Google form Link was sent to the students. Students filled the data and submitted their responses through link provided to them.

1.6. Python IDE used: In this workfor processing, interpretation, analyzation and visualization of student responses using python we used PyCharm IDE. The community version of PyCharm can be freely downloaded from <https://www.jetbrains.com> .

1.7. Operational Definitions of key terms used:

COVID-19 Pandemic: COVID-19 Pandemic refers to the corona virus disease that occurred in December 2019.

Online Learning: The term online learning refers to the mode of learning through which the student receives lecture and other necessary instructions, information and study material from their concerned teachers with the help of google meet, webex app, You tube, whats app skype etc.

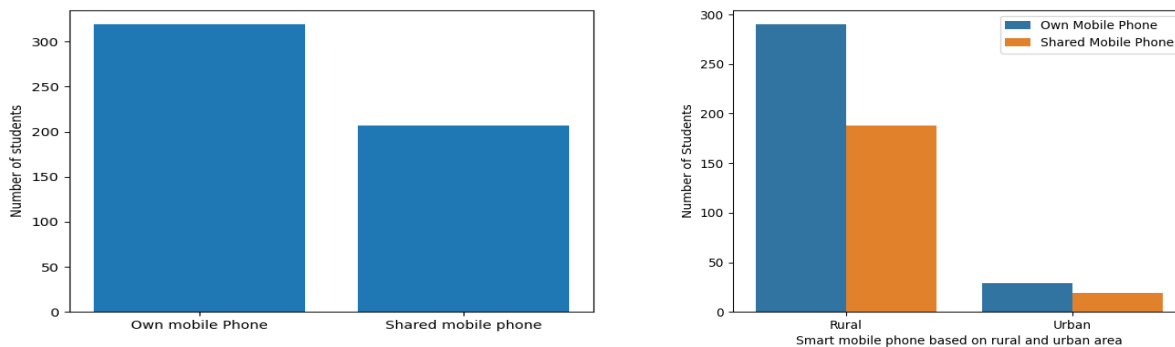
Python Library: python library is a collection of related functionality of codes that allows us to perform many tasks without writing the code. It is a reusable code that we can use by importing it in our program, we can just use it by importing that library and calling the method of that library.

UG Students: those students who are pursuing their three-year undergraduate degree from Rajiv Gandhi govt. degree college affiliated to Himachal Pradesh University Shimla.

PyCharm: PyCharm is an integrated development environment (IDE) used in computer programming, specifically for the Python language. It was developed by JetBrains.

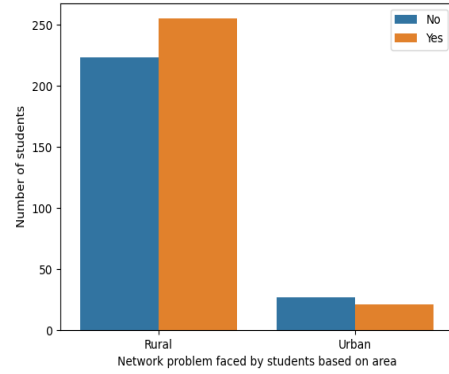
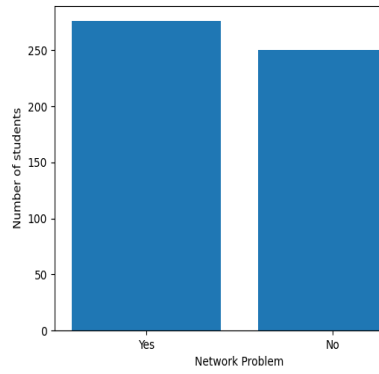
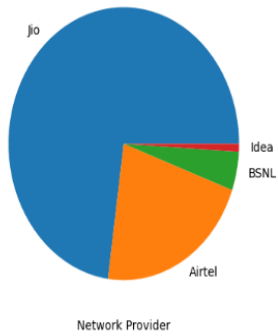
1.8. Analysis and interpretation of the data:

1.8.1. Analysis of Availability of smart phones: It is found that out of 526 students 319 students are using their own smartphone and 207 students are using their family members smart phone for study. Further, it is also found that in rural area 290 students have their own smart phone and 188 students are using their family members smart phone for study. On other hand out of 48 urban students 29 are using their own personal smart phone while 19 students are sharing family member mobile phone.



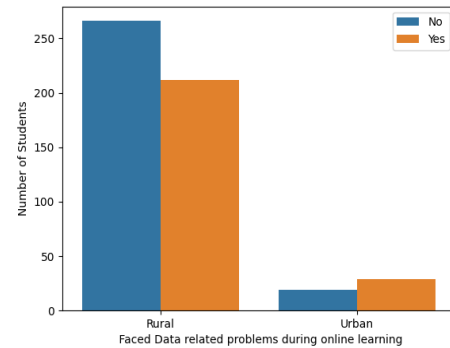
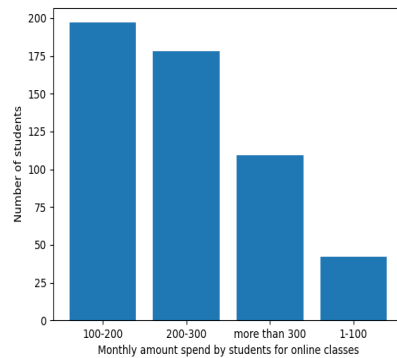
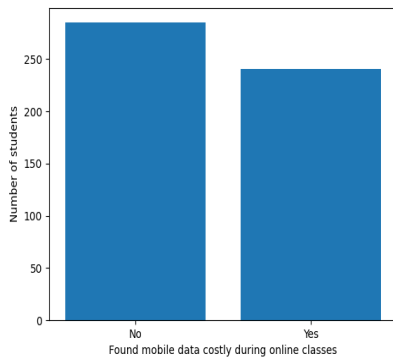
1.8.2. network issues faced by student during online classes:

It is found that out of 526 students 250 students has reported network problem during online classes while 276 students have reported no network issues. In rural area 53% percent students has reported network issues while in urban area 43% should has reported network issues. It is also observed that maximum of the students i.e. 73 percent of the students are using JIO as an internet service provider while 21.5 percent are using Airtel. Very few students i.e. 5.5 percent are using BSNL and Idea.



1.8.3. data related problems:

In data related problem it is found that out of whole selected sample only 241 student faced problem on monthly expenditure on data while 285 students were able to afford the monthly expenditure. Further it is also observed that 8 percent of the students are spending less than 100 rupees per month on data, 37.5 percent students are spending between 100 to 200 rupee per month. It is also found that 34 percent of the students are spending between 200 to 300 rupee and 20.5 percent students are spending more than 300 rupees per month as data expenditure for online classes.



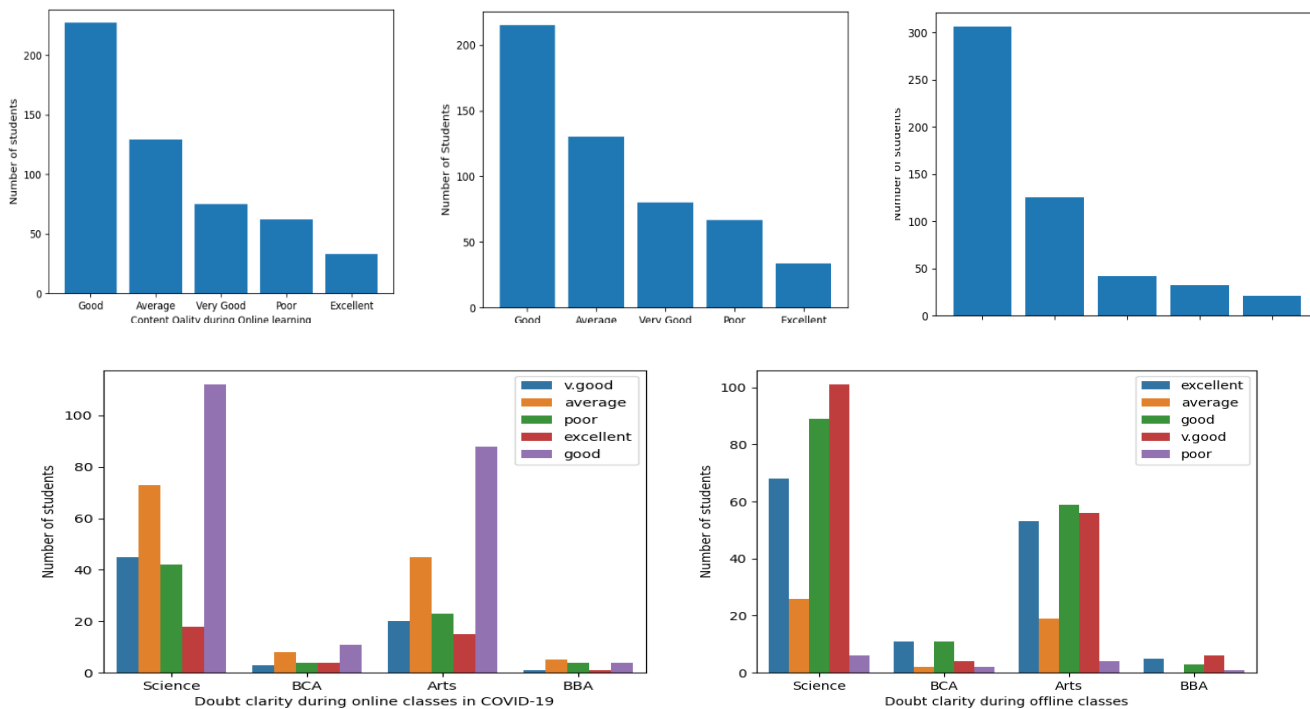
1.8.4. Students Satisfaction:

For analyzing students satisfaction students responses are compared as follow:

1 Comparison of rating for overall online and offline study			
Students Rating	No. of students (overall online study)	No. of students (overall offline study)	
Poor	67	13	
Average	130	47	
Good	215	162	
Very Good	80	167	
Excellent	34	137	
2 Comparison of rating for doubt clarity during online and offline study			
Students Rating	No. of students (clarity of doubt during online study)	No. of students (clarity of doubt during offline study)	
Poor	73	10	

	Average	131	50
	Good	215	152
	Very Good	69	170
	Excellent	38	144
3	Rating of students for audio- video quality during online study		
	Students Rating	No. of students (audio-video quality during online study)	
	Poor	32	
	Average	125	
	Good	306	
	Very Good	42	
	Excellent	21	

It is evident from the above table that in overall rating for online teaching learning out of 526 maximum students has rated online learning as good and average while on other hand maximum students has rated offline learning as good, very good and excellent, which means students are more satisfied toward offline learning as compare to online learning. In doubt clarity comparison same results has been revealed. Further it is also found that only 12 percent students has reported audio-video quality as very good and excellent, 81.5 percent has reported it as good and average while 6.5 percent of the students has reported audio and video quality as poor. Audio and video quality plays an important role in online learning Hence, improvement in this area is highly required. The data for better understanding is presented in figural as follow:



Results and conclusions: Study reported that out of 526 total students 60 percent of the students are using their own mobile phone while 40 percent students are either sharing or using their family member’s phones for online learning during COVID-19 Lockdown. Further, it is also reported that rural students are facing more network related problems as compared to their counterparts. Study also found that 54 percent students has reported no data

cost related problems while 46 percent students are unable to afford monthly expenditure on data. Hence, some special data plan/ packages should be introduced for the students to carry out their online studies successfully. Along with this it has also been observed in the present investigation that some of the students are facing problems in attending online classes as they don't have their personal smartphones hence, government should distribute free mobile phones for the needy students. It was also observed that in overall rating for online and offline learning the students has preferred offline learning over online learning. Hence, steps should be taken to improve the network quality specially in rural areas so that the audio-video quality can be improved which will provide more student friendly environment for online learning.

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