Analyzing the effectiveness Of Online School Education System Using Cloud Computing Services during Pandemic

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Abstract: Recently, the Global Covid-19 pandemic has extensively impacted human lives resulting cease of routine activities, including education institutes. The main objective of this research is to conduct study on the effectiveness of online education during Covid-19 through teachers and students interaction in the country of Pakistan. For this purpose, questionnaire survey was created through Google form which comprises of students from sixth to eight grade classes and teachers. The online classes were conducted through Google classroom and Google meet. The outcomes obtained by students from different classes revealed that majority of students were quite satisfied with online education. This survey reveals that online education can be beneficial for teachers and students to provide continuous education without depending upon physical class.

1. INTRODUCTION

Education sector is most powerful sector of every country. During pandemic COVID-19, all educational sectors are highly affected. All the countries managed their pandemic situation according to available resources. Government has taken decision on preventive steps to break the spread of the COVID-19 disease based on shut-off all educational Institutions, Offices, Industries and Malls managing social distancing and reduced the spread of the COVID-19 virus [1]. In this challenging time students loss their study and at the same time teachers unable to educate their student because of pandemic. In such situation Government has the responsibility to continue Education in schools for teaching and learning methodologies to switch from traditional face to face system towards online learning education platform with the help of emerging technologies [2] like Cloud Computing. During COVID-19 Pandemic, our aim is to provide quality education and to utilize the time of students and teachers in positive way through which we are planned to move online classes with the help of latest cloud technology through which we move steps towards automation with the help of different tools of Google Cloud Services [3] that has been developed with new era of teaching and replaces traditional teaching practice and changes the infrastructure of the school education system.

The successful execution of this pilot opportunities which is based on Cloud Computing and all the relevant information are saved on cloud services. Online teaching uplifts the Quality of Education and also increases the management efficiency through intellectual ability and best way to focus on different way of learning like online reading, online classes, online assignments for assessment and also discuss on some topics for creating strong collaboration with each other [4]. For the data collection process, we select one random school from many schools which have number of participants like students and teaching staff describe in the following tables 1.

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Table 1- Participants of data collection

PARTICIPANTS	COUNTS
Teaching staff	15
Students	200

The basic concept regarding cloud computing, Google Classroom, Google Drive and Google Meet describe below:

1.1 Cloud Computing

Cloud Computing means a boundary in which we store, manage and process data on remote server to access using Internet. Platform of Cloud Computing supports user to access ubiquitously.

1.1.1 Cloud Computing Model:

There are two different models of cloud computing which are listed below,
- I. Service Model
- II. Deployment Model

Service Model: Service model consume Software-As-A-Service (SAAS), Host like Infrastructure-As-A-Service (IAAS) and Build like Platform-As-A-Service (PAAS). In this paper we use Platform-As-A-Service (PAAS) where we use Google Drive and Software-As-A-Service where we use Google Classroom through which different students and teaching staff can access these tools.

Deployment Model: Deployment model based on Public, Private, Community and Hybrid but in this pandemic time we use hybrid model, because it is used online teaching from School side where we can purchase or freely use all services from the cloud provider [5] . Overall shape of Cloud computing are summarized in a fig.1.
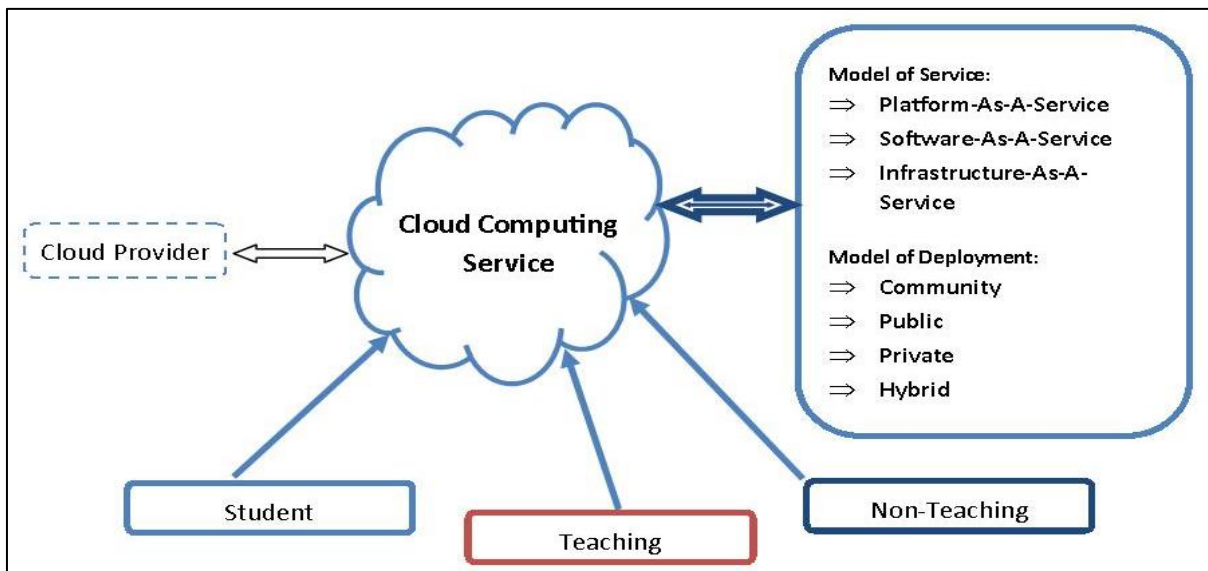

Fig.1. Cloud computing services in school education system

In this paper, we basically used Google Cloud Computing service for initiating online education learning platform. Therefore, we used different resources of Google Cloud with the help of these resources we build string bonding between teachers and students so that they could share their teaching material and ideas where student learn from those material and ask more queries to solve their learning problems which can be organized, analyzed then save into Google cloud. The platforms give us good active atmosphere and positive result towards teaching and learning method. Parents are happy to see teachers have effort to teach their children in a positive manner. There are many tools to use but we used following

tools for Online School Education System of Google Cloud Computing Service.

    I.   Classroom service of Google
    II.   Drive service of Google
    III.   Meet service of Google.

Google Classroom:

Google Classroom was first introduced in 2014 which is paperless platform. It has many benefits like no cost of services, user friendly environment where support numbers of Google services related to cloud are interconnected. It is also called Virtual Classroom. Complete relevant information about lectures, assignment and discussion about topics are saved centrally. We can access these types of information anywhere and anytime according to their need which is easily accessible using different portable devices like Laptop, mobiles and tablet. Discussion regarding online class should be saved on Google classroom [6]. School management is created Google classroom with the help of class teacher Gmail Identification (ID). Teachers and student have the facility to avail relevant services of Google classroom. Classroom of Google is also called as Learning Management System (LMS) which offers innovative experiences of teacher and students. Teacher and Students are created positive and active learning environment also explore number of new process regarding Google classroom.

Google Drive:

The Cloud storage service of Google is Google Drive where it can share number of file and directory of document with different students and teacher and also interconnect with Google classroom for storage of any kind of material. When subject teacher uploads any lectures and assignment it automatically saves in Google Drive has the same name which created a class, Students have facility to upload their assignment which is saved on storage platform. It can accommodate any file format like PDF files, Microsoft Office files, videos, image files, and so on. Teachers and students can be download their file from Google classroom or Google drive anywhere and anytime to download by using applications on smart devices or access via Google classroom Gmail ID.

Google Meet:

Google Meet is cloud based video conferencing software solution, we utilize it Online Education to conduct online classes of student like Real time environment. Google Meet is also Integrate with Google classroom; when create online class it schedule from Google calendar directly so their link of Inline class can send to Google classroom where all the student which are registered in that classroom can received email about scheduled classes. Video Meeting in Google Meet support approximately 100 members and duration of meeting is approximately 60 minutes without any charge but if we need to increase number of participants and meeting time then we purchase paid Google Cloud service. Through Google Meet, we connect and collaborate with teaching, non-teaching and students in real time environment. They have recording option to record our online class and also share their recording in Google classroom so that those students have not access at that time. It is easily learned again if any query it can be discuss in the Google classroom panel. Online School Education System basically based on Google Cloud computing service Google classroom, Google Drive and Google Meet [7] so that this system to achieve a learning goal within a time frame.

The main task is to motivate the student to utilize their proper time in education for learning using online learning platform achieves their curriculum [8]. We used different number of methodology or strategies to engaging our teachers and student in an effective way. One of the important problems that can be highlighted here is that a new system which no one can have sufficient knowledge to operate this system, but there is the best way to train all who use this system. The role of teachers and parents are most important to motivate the student for education [9]. In this section we completely describe Online School Education System that is Google cloud based and mostly number of services is used like homework assignment, grading, attendance control, automation of timetable, email and real time chatting means video meeting. Users like Students and Staffs of School can access the Google Classroom as learning management system [10] through Gmail Id is registered. This Gmail Id can be created by School Management and provide to all teaching and non-teaching staffs which is based on Personal Number and students with General Register (GR) Number. The good

relationship between teachers and parents are necessary to educate their students or children through different learning methodology during the time of pandemic COVID-19 [11]. Teachers have the main role in online school education system for that they have to gain knowledge of internet media resources to conduct online classes [12]. It is necessary to evaluate teacher's perspective about experience on online education using quantitative approach [13].

The goal of the paper is to collect information of the students and teaching staff and utilized their time in learning process towards active learner during the pandemic. Online School Education System basically provides user friendly and a flexible learning environment towards Quality of Education like a Green Project on Education.

2. LITERATURE REVIEW

Previously research papers have been proposed on the basis of Cloud Computing, Google Classroom, Google Drive and Google Meet which are discussed below. The paradigm of education system is highly affected by COVID-19.

Many researchers focus on outbreak of COVID – 19 all over the world, most of the sectors are affected, one of them are education sector. Main challenges are bring the students towards education. Government of this country play an important role for primary and secondary education so that it engages all students using e-learning by lectures on television to get their education in positive manner so that they access their resources using different smart devices [1]. One of the researcher focus on higher education that is mostly affected in COVID-19. It basically gives the solution of those issues arises in the current pandemic like mental health and add health related topics in curriculum to aware students and teachers, scale up teachers with the help of training and upgrade the education area to further focus on distance learning method [2]. Moreover, the quality of the online education learning which needs to focus on present and future study during COVID – 19 pandemic. So that it moves from traditional classroom education towards online education using emergence technologies but they focus on conducting online classes using different services of Microsoft, Google and other services of application through which we achieve education goal [3]. After that we go towards the improvement of Quality of Education and also increase the efficiency of management through the decision making ability through the different layers of strategies and learning process like class discussion, lectures and assignment using distance online learning [4]. The use of a cloud computing platform can provide a good online education learning interactive system in real time. The system can provide considerable shared resource storage support. It gives overall overview of Cloud computing about service model and deployment model. They are focus on online education of students where we built our own cloud computing online education learning platform based on the Google cloud platform. This platform direct on idea of interaction between teacher– students which is very useful. The learning environment of the classroom very active and goes towards positive method of teaching [5]. Google Classroom which is increases teacher and student engagement. All the information we needed were in one place and we were able to access that information as well as contribute to discussion through this medium. It can be accessed through different smart devices. Teachers and Students also identified that the use of Google Classroom changed the nature of the classroom in a positive fashion. Teachers and Students liked that it made the learning atmosphere more relaxed as it allowed them to interact dynamically with classroom content, but also more focused on the learning experiences. Google Classroom was most satisfactory: both the students and the teachers found Google Classroom quick to learn and easy to use in Online School Education System platform [6]. The researchers talk about shut-off all education institutes where it could change from Classical learning to online education learning where discuss on Google Cloud computing services such as Gmail, Google Classroom, Google Drive, Google Meet and all are free where increase number of participation and meeting lengths then put pay services from Google and others too. All of the products were used to get positive and satisfied response from teachers and students. Online education learning platform is usage is increased during pandemic which is really a reliable [7]. The learning experience during pandemic in based on online which able to give environment to students to learn independently. They focus on structured interview for collected data from students and teachers using Google form. They used different learning platform like as zoom meeting and whatsApp media for conducting lectures and sharing of curriculum and lectures slides. The motivation of students during online is more complicated task few are motivated and major task to motivate another students to overcome on online learning track [8]. During pandemic the role of teachers is most important to motivate the student and their parents for online education to cover their curriculum without any delay. Many problems arise but the passion of teacher is that to solve relevant problem with management and to educate student

with the same pace as earlier can do [9]. Finally, education systems move from physical to online based classrooms on this pandemic. The main task is to engage student towards learning's. The main tool for learning is Google classroom which is user friendly and easily be used. Mostly numbers of students show positive response towards education and those students describe as active learners in this online education system. The entire relevant task like assignments, quiz and question are managed easily during Google classroom. Google classroom is a reliable solution for online education [10]. It is fact that teachers and parents more focus about their students or their children for proper utilization of time on online learning. It shows strong bonding between teachers and parents to save the education on pandemic situation [11]. In online learning the main fundamental pillars of education are Teachers. Teachers increase their skills on online learning through different resources over the internet to implement their skills for conveying their lectures on online classes by online learning [12]. At the last, The feedback regarding online learning is most important from the teachers perspective from the way to explore online learning to conduct online classes are reliable or not to implement in future for education. The scope of this literature does not focus to students and parents for feedback. Teachers feedback data was collected from online survey questionnaire form follow quantitative approach and the result of the data extracted with the help of SPSS software tools [13].

3. METHODOLOGY

During COVID-19 pandemic, the study of teaching and learning basically based on Online School Education System from Traditional school system as follows:

a) Traditional School system education is basically contains subjects books, mostly teachers used to teach students for writing their notes on whiteboard or blackboards in education system for every classroom.

b) Nowadays, the use of information and communication technology for online education system to develop and share knowledge using different Google cloud services when increase positive response and high quality in the field of online school education system.

First, we use different methodologies to work on online School Education Systems. Our main focus is based on Quantitative methodology that is used survey methods. Throughout the learning and teaching process, by dividing the target population into two groups, first student and second belongs to teacher. We used survey techniques to open ended question for collect the data from the Google form and these data are saved in Google sheet for analyzing the data we use software tool that is Microsoft Excel.

Questions are highlighted below.

i.   Are you satisfied from online education learning?
ii. Are you ever used smart communication devices for online education learning?

After analyzing of different Question 90% of student response is YES and other 10% response is NO similarly response from teacher side is 100% YES because they want to educate their students during pandemic time. The Online School Education System Using Google Cloud Computing Services to support their Student, Staff and parents of the students to utilize student time towards learning side to achieve their curriculum.

Finally received successful collections of result from two different methodologies where used Agile methodology to process step by step method to completely discussed with Google Cloud Computing Services are listed below.

1. Google Classroom - used as Cloud Computing Software-As-A-Service
2. Google Drive - Used As Cloud Computing Platform-As-A-Service
3. Google Meet - used as Cloud Computing Software-As-A-Service

3.1. Google Classroom

Google Classroom is online platform there is no cost where the subject teacher have the responsibility to form virtual classroom for individual class to access material or notes of particular class. We have the option to add or request send

for invitation for students and teachers to join in this groups and also it is a paperless platform.

Google Classroom is divided into two major portions which are listed below.

1. Teacher Portion
2. Student Portion

3.1.1. Teacher Portion

In fig. 2, Class teachers of Class Six to Eight have the responsibility to create their own class. The First step is to create a Google Classroom which contain Class name, Section, Subject and room # which is listed below then create a click button and Google Classroom is created.
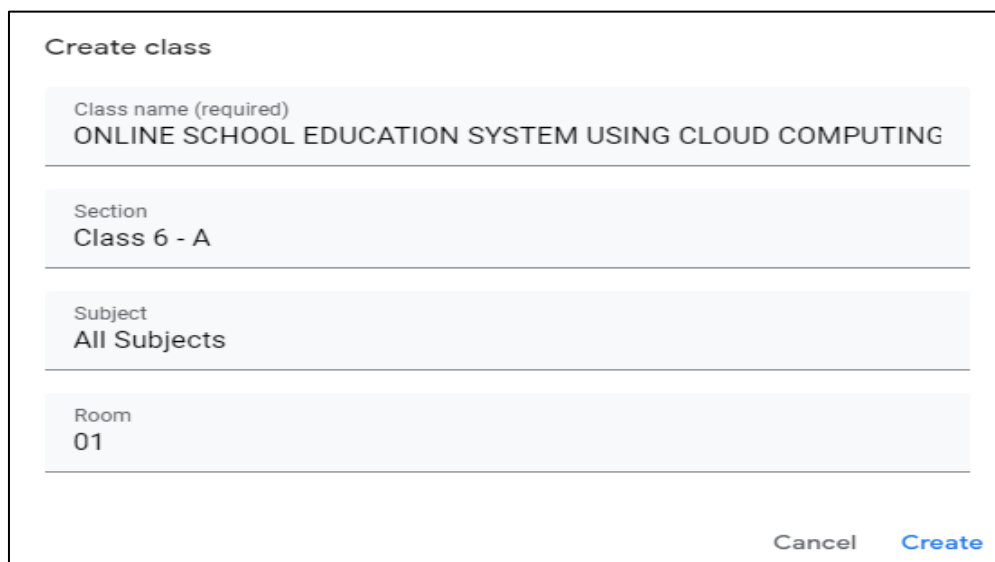
Fig.2. Create Google Class

In fig. 3, After Successfully created a Google Classroom, The Google classroom show four section which are listed below

 i.   Stream – Main Page that contain all Information about Classwork, comments and others.
 ii. Classwork – we create all subject portion then we upload subject material, assignment etc.
 iii. People – portion we add number of students and teachers
 iv. Marks – when student completed their assignment and submit it. Teacher given marks of specific assignment which is assigned.
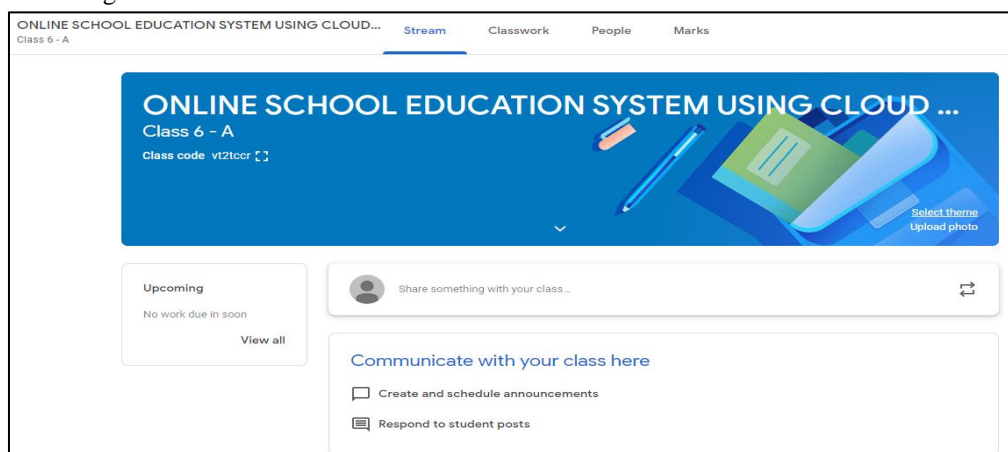

Fig.3. Google Classroom Sections

In **PEOPLE section** it is easily add number of subject teachers at Teacher portion using their Teacher Email ID and also add student is the classroom using Student Email Id or Invite through class code (example – "abctccr"). Therefore, we invited a subject teacher and student. After Successful Invitation send, waiting here to join a student or subject teachers to accept or join a class request or deny the request.

STREAM section shows a complete dashboard which is visible to all students and subject teachers where all teaching material, assignments, general post like messages to all students or any other class or school related tasks like class schedule time, parents teachers meeting time, upcoming events with date and time.

In **CLASSWORK section**, we CREATE a button that shows some dropdown menu then select a TOPIC and ASSIGNMENT option to create all subjects which are mentioned in timetable, subject teachers which are add in this class have right as an owner of the class. Subject teachers can create different list of subjects like English, Drawing, Mathematics and Science. In CLASSWORK section: two more options are present which are Google Calendar and Class Drive Folder. In Google Calendar, We add Task, Events and Remainder facility where it can be added Schedule class of student in every week except Sunday where only mention days and time of subject according to Time Table with the help of Google Meet. With the help of Event, we schedule meeting with parents also. Google Drive also contain Class Drive Folder with Class Name was given by class teacher that store all files of teachers and students.

After successful submission of assignment from the students side are mentioned in MARKS section, teachers check the assignments done by students then given them marks. If they contain any mistake then teacher also highlight and give comments to students about assignment like Good work or need correction. After comments of need correction, students correct the mistakes and then resubmit the same.

3.1.2. Student Portion:

In the fig. 4: After accepting the join classroom request, students have the access to the main page that contains three sections.

   i.   Stream
  ii.   Classwork
 iii.   People
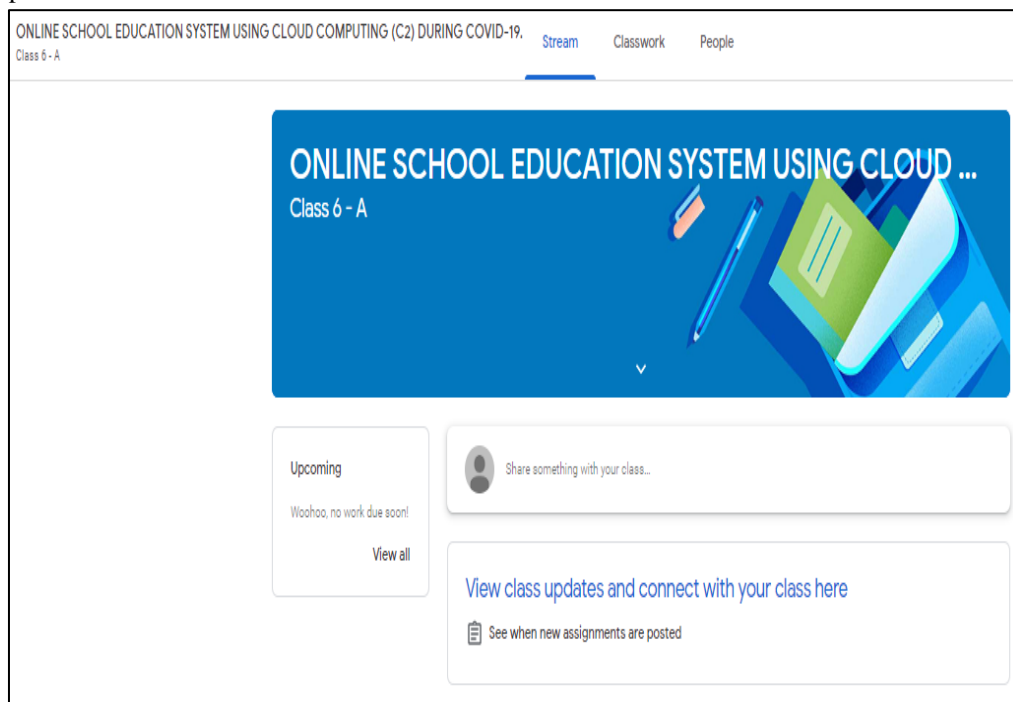

Fig.4. Google Classroom Sections of Student

In **STREAM section**, Main Page that contain all Information about Classwork, after uploading material, assignment and comments uploaded by teachers for students.

PEOPLE section contains only information about their subject teachers.

CLASSWORK section contains student's views, all material like lectures and assignments uploaded by subject teachers. When assignments are checked by teachers and assign marks to them. Students go to CLASSWORK section then select a particular assignment then "view assignment tab" or "turned status" that shows graded or marks obtained by teachers.

3.2. Google Drive:

In the education system we mainly focus on Google Drive for cloud storage service that store different material of lecture and other stuff directly or indirectly from Google classroom in the format of images or documented file for notes or assignment, videos or audios for lecture. We can also share document from Google drive to specific user directly with the help of Gmail ID.

In the fig. 5 shows that Google drive integrates with Google Classroom when we create a Google classroom it automatically create a same name which mention in it. It contains all the assignment and lectures are uploaded by student and teachers which are stored there. When click the any file from Google drive it shows complete detail like File Name, Owner name may be student/Teachers name, Last modified date and with file size.
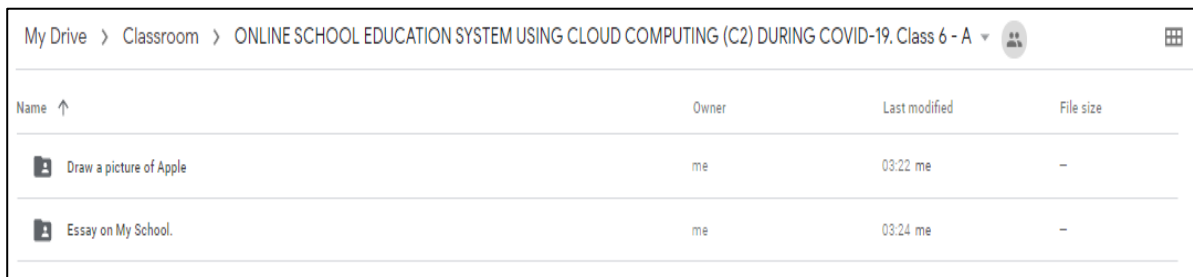

Fig.5. Integration of Google Drive with Google Classroom

3.3. Google Meet:

During the COVID – 19 pandemic, Google Meet is cloud based video conferencing tools, we utilize it online education learning to conduct online classes of students and may schedule any meeting with students' parents in real time environment. Google Meet is also integrating with Google classroom; we create online scheduled classes with the help of Google calendar that directly shown in CLASSWORK section mention in the fig. 6.

Fig.6. Class Schedule

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In the fig. 7, the link of schedule online class can send to Google classroom where the entire students who are registered in that classroom can receive email about schedule class and also share the class teacher on STREAM section of Google classroom.
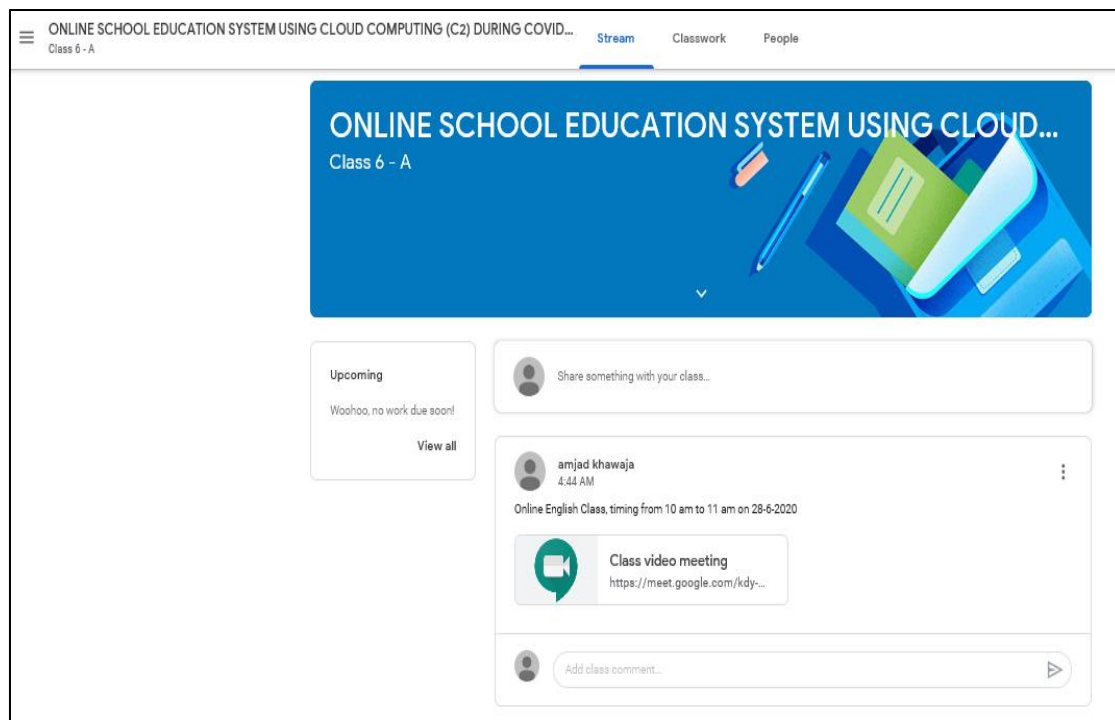

Fig.7. Class schedule link on Stream Section

In the fig. 8, we mention alternative way to start online class with the help of hyperlink http://meet.google.com using web pages and to Start Meeting or Enter meeting code choice. You are invited with the help of request to join the online class then front screen that shows in today's meeting with mention title and time with option to join are shown. When student join the online class then class teacher who schedule this online class, has the right to admit or deny their request and also add number of student from the PEOPLE section.
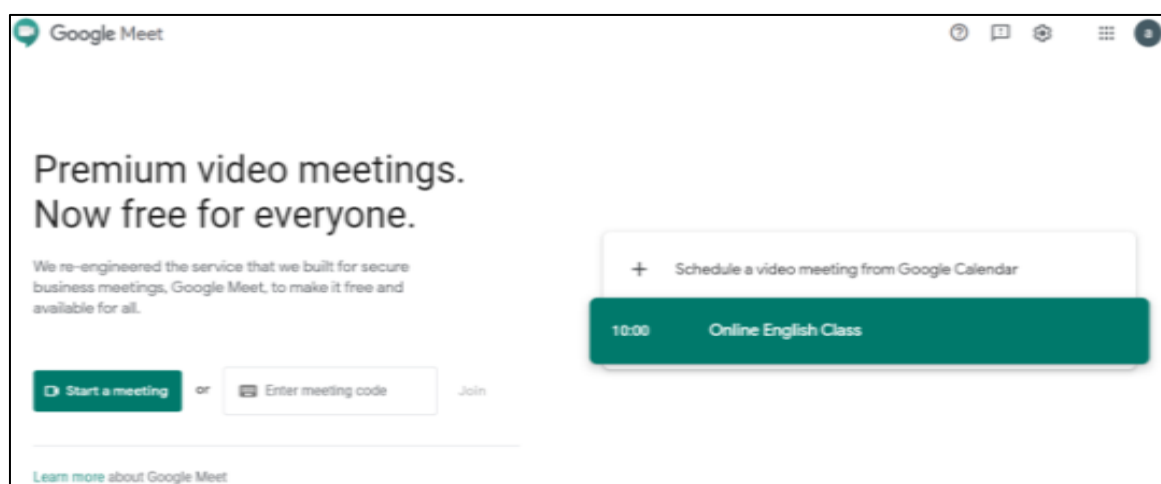

Fig.8. Start a Class

In fig. 9, after successfully joining the specific class, the user has the option to setting microphone and camera according to their smart devices. Subject teacher as a presenter has different option to share their screen according to criteria mentioned entire screen or particular window of the selected lectures and also users have the rights to share their

screen when needed. During online class, teachers give the answer of the student's questions and also provide solution on chat window in parallel. The online class URLs is not always same so that students and teachers have the option to rejoin the online class based on specific time range
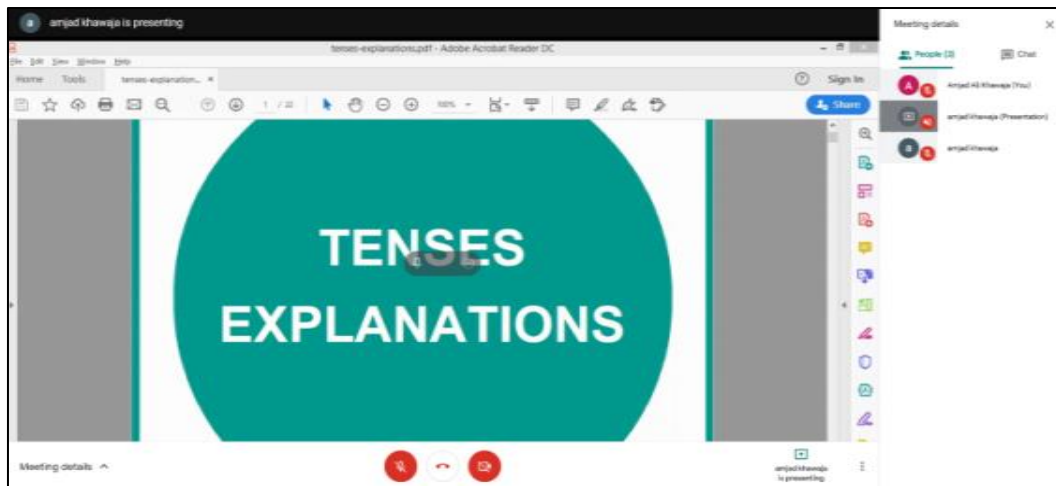

Fig.9. Lecture screen

4. RESULTS AND DISCUSSIONS

Education system was partially changed during pandemic COVID-19. Where the students are out of the classrooms so that their education system will moves towards online learning platform that basically provides a service with no cost with the usage of Google Cloud Computing Service. There are many challenges to overcome faced during online education learning in which the mostly unavailability of electricity, unavailability of internet access and also financial issues of the students to purchase the devices.

During the online education learning in a school we focus around 200 students and 15 teachers to train them about Google cloud service like Google classroom, Google Drive and Google Meet to familiar them their environment if we increase the number of participants there is no impact on result because parents of the students want to engage their children to utilized the time on learning path. When we create a virtual class with the help of Google classroom, the school management sent link/invitation to join their online classes by emailing teachers, students and their parents. The timetable is already being given to teachers and students who could join a class on their schedule time. Google classroom is centralized system in which teachers share their lectures and assignments so that students can easily access in Google classroom by registering themselves with their Email Ids. Students solve their assignments and then upload the same in the Google classroom. When conducting online classes teachers use Google Meet where they join online classes and discuss queries with teachers and it is their responsibility to answer their queries or type their answers at chat box. During online education learning, numbers of lessons have been covered according to curriculum so the learning and teaching of students do not disturb. Mostly different students and teachers have different devices to connect over the online education learning session. It is clear that the quality of good teachers throughout society can in great measure be shaped by our educational institutions. So that we can collect the information from the participants and analyze the information we use by different software tools. For the data collection, we create online survey forms by using Google form tool and data is stored automatically in Google sheet tool of Google platform. After successful collection of data from different participants we analyze that data using Microsoft Excel tools. To summarize information about communication devices used in online education learning during Online School Education System refer following table 2 and Fig.10 show graphically representation of communication devices.

Table 2. Summary of communication devices.

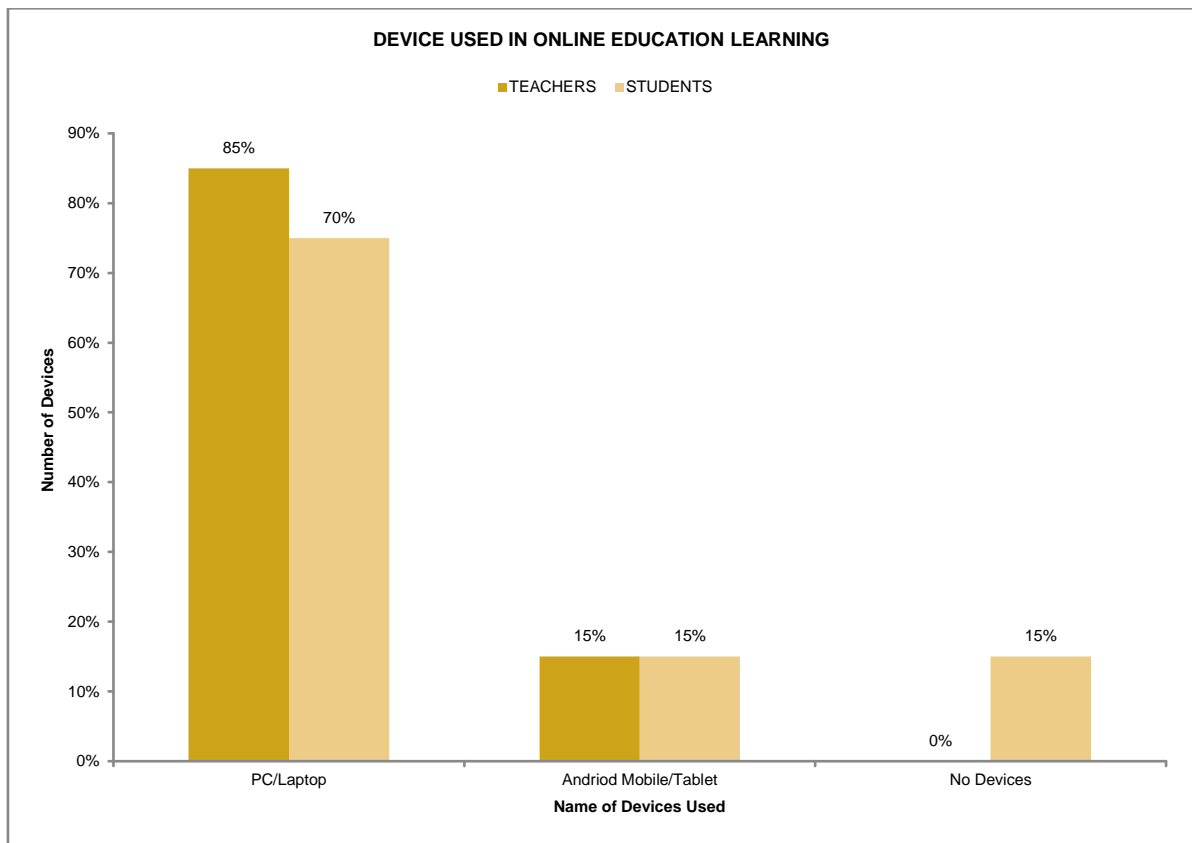| TYPE OF DEVICES USED	TEACHERS	STUDENTS
PC / Laptop	85%	70%
Android Mobile / Tablet	15%	15%
No Devices	0%	15%

Fig.10. Graphically representation of communication devices

In the pandemic, the duration of every online class is around 40 minutes so that every class smoothly work till the pandemic situation ends. During that time teachers have the responsibility to start class on time so that schedule of online classes should be completed within time frame. Teachers have the right to increase the time of the online classes according to the queries of the students. Attendance on the online classes has been managed by the subject teacher and the same has been shared on Google classroom and also with their parent through email.

Online Study of School Education System improves the overall performance in the field of teaching and learning areas. Those students who do not perform well in traditional teaching system due to lack of confidence to ask questions from teachers face to face but their performance improves in this online education system where students progress well towards teaching and learning area. At the last, teachers and parents of student are also happy towards Online School Education System because the time of students does not waste. This system follows the latest trends of the technologies. Student and Teachers learn a lot of and also show active participation in learning online education system. Mostly the outcomes of different participants like students, teachers and parents about online education learning have been summarized in table 3 and in Fig.11 show graphically representation of online education learning from survey Google forms.

Table 3. Outcomes of online education learning.

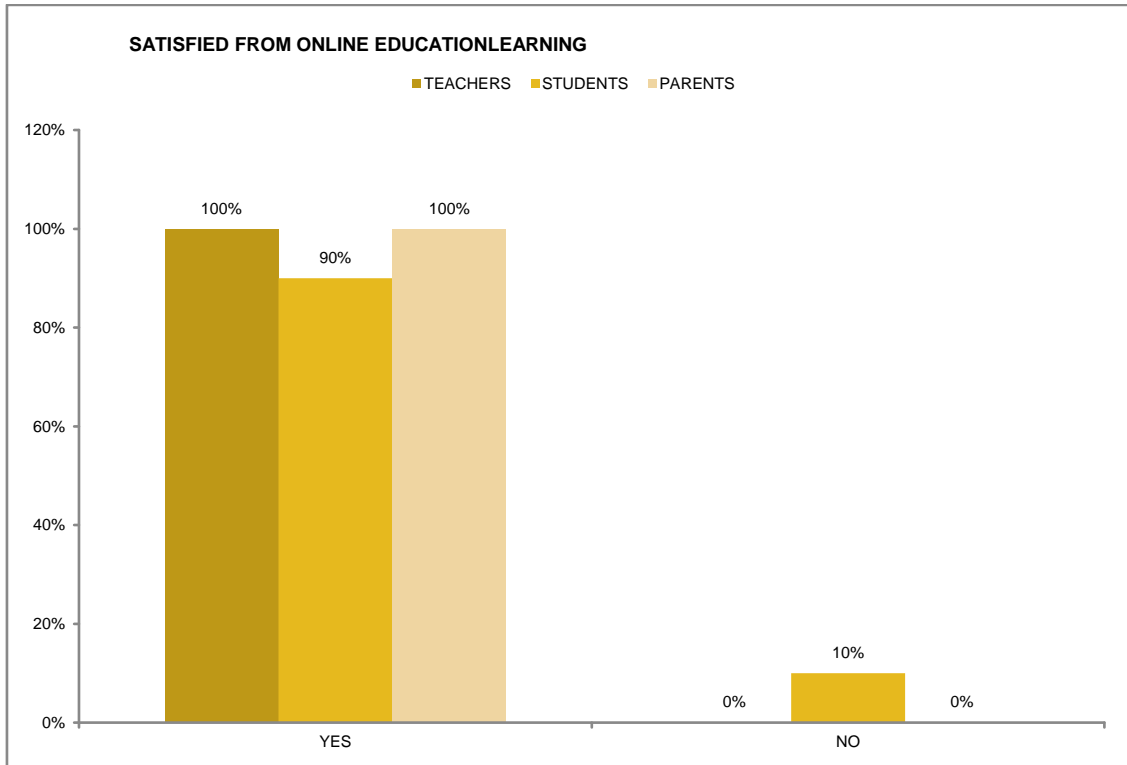| ARE YOU SATISFIED FROM ONLINE EDUCATIONLEARNING?	TEACHERS	STUDENTS	PARENTS
YES	100%	90%	100%
NO	0%	10%	0%

Fig.11. Graphically representation of online education learning.

Overall, the result and discussion is focused on pandemic time period so that we connect all resources of traditional system into online system to save the education of our students and motivate them to engage their time for learning with the help of highly hard working and respected teachers. Online platform will be of educational value so the responsibility of teachers and parents to help encourage and develop students in the field of education who see the world through the lens of education.

5. CONCLUSION

During any pandemic like COVID-19, mostly number of countries prefers highly flexible learning and teaching environment in system of education so that we focus on distance education means online education system which are logical boundaries their we used different Google cloud based services like Google Meet, Google Drive and Google Classroom. In this paper, we have briefly introduced the importance of online school education system. In this platform using services we save large amount of relevant data and connect with other service resource on the cloud. Through Online School Education System give platform to students and teachers integrate with each other and exchange their thoughts that are highly useful. Online platform supports students and teachers provide suitable excellent environment to become positive and active participation on teaching and learning method with strong bonding with each other. Students

have increased their skills and teachers perform their duties well positively and with timely manners. Parents of the students are very happy due to engaging their children in teaching and learning process, covered their curriculum and also aware the performance of their children through email on timely basis during pandemic of COVID-19.

Success of this online learning process is determined by the positive thoughts of participants towards new era of learning for the quality of education.

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