

**INVESTIGATION EFFECT OF ONLINE LEARNING AND
PROPOSE AN IMPROVED ONLINE EDUCATION PROCESS IN
BANGLADESH PERSPECTIVE**

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**MASTER OF SCIENCE IN INFORMATION AND
COMMUNICATION ENGINEERING
NOAKHALI SCIENCE AND TECHNOLOGY
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Investigation Effect of Online Learning and Propose an Improved Online Education Process in Bangladesh Perspective

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for the award of the degree of
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SUPERVISOR'S DECLARATION

We hereby declare that we have checked this thesis and in our opinion, this thesis is adequate in terms of scope and quality for the award of the degree of Master of Science in Information and Communication Engineering.

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I hereby declare that the work in this thesis is my own except for quotations, references and summaries which have been duly acknowledged. This thesis has not been accepted for any degree and is not concurrently submitted for award of other degree.

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ABSTRACT

The physical classroom learning nowadays is no longer applicable during pandemic. Internet and distance learning which is generally known as online education plays a vital role in the education system. Nevertheless, there are also many negative implications from online education. This study examines the implications of online education among students of Bangladesh. Information will be collected through surveys, interviews and together with secondary data. The studies found that there are various serious issues regarding online education and on its effect on the quality of Education System to certain extend. By doing this, it is hoped that this will stimulate an on-going discussion of effective practices that can enhance educational institution success. Online courses have been run in the recent past that has taught many thousands of students in a variety of topics. The human experience of online education is about to change; we should understand the issues behind the phenomena. Technology is touching every aspect of society and changing it dramatically. But there is one very important and indispensable part of the society that has also been tapped by new innovations and discoveries and that is the concept online education. By investigating limitations, we hope that the study may support teachers and decisionmakers in Bangladesh, in making informed decisions to aid the transition into distance education as well as developing prepared plans for future pandemics.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Sudden and unexpected changes to our country may significantly impact critical functions and services especially, education. In the wake of covid-19, many people found themselves in quarantines, working and studying from home using the internet. After overcoming the initial shock, governments decided that, like compulsory education, central functions in society should shift into distance education. By March 18, 107 countries had made country-wide decisions to close schools impacting 861,737,696 learners (UNESCO 2020). Previous research on school closure, and the requirement of transitions into distance learning, has shown that schools interpret the new conditions in various ways, indicating that offices need to prepare for transitions and communicate guidelines with clarity [1]. Bangladeshi teachers have not had any previous experience of pandemics and school responses to build on. While research highlights how critical it is for the educational sector to have preparedness plans to ensure safe and functional education in times of crisis teachers and decision-makers cannot wait until the outbreak is over to make decisions [2]. Education can become transformative when teachers and students synthesize information across subjects and experiences. The information must be distributed promptly to be useful. There have been many powerful debates and thorough studies on the differences between online and traditional classroom teaching, which however is not a focus of this study. Instead, this study's focus is on examining the positive and negative aspects and strategies of the online learning and teaching process and how it has been implemented successfully. The goal here is to provide best practices for those who are planning to develop online courses to make informed decisions in

the implementation process. In doing this, it is hoped that this will stimulate an ongoing discussion of effective practices that can enhance educational institutions' success in transitioning to teaching online. By investigating limitations, we hope that the study may support teachers and decision-makers in Bangladesh, in making informed decisions to aid the transition into distance education as well as developing prepared plans for future pandemics or unwanted situations like strikes or session crises.

1.2 STATEMENT OF THE PROBLEM

Like in many countries, in the fight against COVID-19, educational institutions in Bangladesh have closed and learning is taking place online. The amount of content and online assignments, and much of it without adequate instructions are just some of the problems that young people face in this new learning environment. Attending classes, exams, and labs all the efforts are facing a problem, and the quality of education in this online environment is hampered. There are adaptability issues in online learning, technical issues in online learning, computer knowledge challenge, time management problem, self-motivation challenge, online learning styles issues, communication issues, virtual engagement challenges, Feedback issues, lack of proper teaching methods, and online learning challenges, assessment challenge. Many students apply for unfair means exams during online exams, as a result, the evaluation process of a student can not give proper results. The expectation of having an entire university experience compacted into a personal electronic device is unusual, to say the least. It can be created a question for students who have only ever known traditional classroom settings. A grade of passivity is expected during lectures, particularly when note-taking and listening, while discussion with tutors is allotted a limited time. Online learning demands action, accepting course material in a variety of multimedia formats, and taking part in online discussions which can continue indefinitely. Online learning makes education accessible to students all around the globe. It is a spectacular advantage for online education providers, students in remote locations, and those without the funds to commence traditional campus study programs where fees and student debt frequently take the joy of learning. However, e-learning does require the necessary computer equipment to run online learning

platforms. It can potentially style problems for students and schools with old, outdated hardware and software. To Work towards any goal requires dedication and motivation and, on the face of it, studying online can seem fraught with opportunities to lose these qualities. There is the unlimited distraction of already being on the internet; social media, you-tube, and news websites are as present as your next assignment. A lot of valuable study time can pass if students don't monitor their internet usage closely. Given the abstract nature of online learning, motivation, in particular, can take a hit, especially if you have already spent the day at work in front of a computer screen. Then while learning online offers the ultimate freedom to organize your studies around your private and professional commitments, it can lead to complacency and a false sense of security if the appropriate dedication and time are not set aside for serious study. Online courses are every bit as detailed and demanding as their offline counterparts, though this realization may not be fully formed yet in our time. The intangible, digital nature of e-learning means that bad time management could lead to failure. Teachers and students do not have training on how to take the online exam. These are some different perspectives as well as views on how we can make it work. To improve the quality of distance education in Bangladesh, a proper investigation of the impacts and limitations of online education and the preferences of students and teachers is needed- this is rarely indicated in recent studies.

1.3 SCOPE OF STUDY

Online learning provides the content through the internet to the learners also known as e-learning. However, online education is just one type of "distance learning" the umbrella term for any learning that takes place across distance and not in a traditional classroom. It also bridges the gap between a teacher and a student in two different geographical locations. Gaining development of new technology such as cloud computing, artificial computing, intelligence, cognitive science, etc provides a tool to develop on-demand, interactive, and affordable education models for teaching and learning. I identify the new pedagogy in teaching and learning by E-learning that changed the way of teaching and learning for instructors and learners respectively. Educational institutions have many benefits due to the emergence of the online educational pedagogy model. It opens environments where educational institutes can collaborate with the worldwide education system

and improve their quality of pedagogy teaching and learning system to deliver a good learning path to students in Bangladesh.

1.4 OBJECTIVES

To enhance the quality of learning and teaching, the learning style or needs of students should be changed to improve accessibility and time flexibility. The objectives of this work are mentioned as follows:

- i. To give a comparison between performance and other factors between online and offline classes.
- ii. To depict the effects and limitations of the online class system based on the student's and the teacher's perspectives.
- iii. To analyze features of several online systems that are conducting tests for different purposes.
- iv. To show an effective method and suggestions for online classes, assessments, and labs in the context of Bangladesh.

CHAPTER 2

LITERATURE REVIEW

Over the past years, the internet revolution has made online learning become a popular tool for learning as an alternative to face-to-face learning. The internet has become a medium of delivery for online teaching. Online learning has received considerable attention as a means of providing alternatives to traditional face-to-face, instructor-led education (Douglas & Van Der Ver, 2004). Online teaching offers a vast opportunity to expand the learning environment for diverse student populations [3]. Students will get various instructional aid and communication method from online learning. This is because there is a wide set of technology engaged in online learning including learning, web-based learning, virtual classroom, and digital collaborations. Further, online learning allowed students to participate regardless of geographic location, independent of time and place (Richardson and Swan, 2003) [4]. Online learning is used interchangeably with e-learning. Govindasamy (2002) states that e-learning includes instruction delivered via all electronic media such as the internet, intranets, extranets, and hypertext documents [5]. Although there is some debate about an exact definition of e-learning, or electronic learning, but is accepted that learning content can be offered in different formats, such as text or video images, and electronically delivered via the internet, personal computer, personal digital assistant (PDA) or CD-ROM (Sandars and Langlois, 2005) [6]. As Liaw, Huan, and Chen (2007), e-learning had the following benefits [7]. First, it lowers costs. Second, its content is more time-consuming and dependable. Third, it is a just-in-time learning approach. Fourth, it builds universal communities. And finally, it provides an increasingly valuable learner service. Govindasamy (2002) reported that e-learning is meant for solving authentic learning, e-learning also creates benefits such as reduced costs, regulatory compliance, meeting business needs, retraining employees, low recurring costs, and customer support costs [8]. Cantoni, Cellario, and Porta (2004) asserted that e-learning is less expensive to deliver, it is self-placed (e-learning courses can be taken when they are necessary), it is faster, it provides traditional learning different teachers may teach different material about the

same subject, it works from anywhere and anytime, it can be updated easily and quickly, it can lead to increased retention and a stronger grasp on the subject and can be easily managed for large groups of students [9]. Internet learning environments have to change the way people learn. Learning, discussion, and knowledge sharing that usually happen in face-to-face learning are treated differently in online learning. Yang and Lin (2010) mentioned that learners may perceive the internet differently when they use it [10]. As a result, this raises an issue of learner attitude to e-learning usage.

Sun, Tsai, Finger, Chen, and Yeh (2008) define learner attitude as the "learner impression of participating in e-learning activities through computer usage". To understand what makes learners engage in online learning, the present research believed that learner attitude plays a significant role. This is because an online learning environment allows students to arrange their learning. Students are required to take a more active role in their learning as the online learning environment is not teacher-centered. Students may engage in online learning and control the learning time and procedures by themselves (Liaw, Huang, and Chen, 2007) [12]. Ho and Kuo (2010) argue that learners' computer attitudes play a significant role in the usability of online learning [13]. Prior studies have shown that attitude and self-efficiency have been identified as important factors that affect learners' motivation, interest, and performance in internet-based learning environments (Peng, Tsai, and Wu, 2006) [14]. Sun et.al (2008) cited Piccoli et al. (2001) finding and stated that when learners are not afraid of complexity in information technology (positive attitude), the learner will become more satisfied and effective in online learning [15]. Their review also finds that attitude influences learning interest (Hanaffin & Cole, 1983) [16]. Learner attitude toward online learning also depends on system characteristics. Pituch and Lee (2006) from their empirical studies indicate that learners have a greater intention to use the system if the system is user-friendly [17]. Their research also shows that systems that enable the learner to interact effectively and offer access to course content at the time influence students to use the system for their learning. As noted by Selim (2007), learner attitude to engage in online learning is also related to student's previous knowledge of using computers [18]. In addition, the learner's attitude toward the internet is also important to determine the learner's motivation, interest, and performance in the online learning environment (yang & Lin, 2010) [19]. There are three aspects of learner attitude that link to an online learning environment. First; online learning is a self-paced learning environment as the learner can control their learning time and procedures. Second; an online learning environment

provides learners with various assisted functions such as teacher-made online instruction. These functions offer opportunities for the teacher. Third; online learning provides a multimedia instruction environment because it uses multimedia to support online teaching. Previous research indicates that online learning methods are often less guided and self-directed (Oh & Lim, 2005) [20]. According to the author, direct and guided instruction, thus without proper guidelines, the learner may get lost due to incapability to adapt to the online environment. This study raises the need to engage mentors online to facilitate the student in the online learning environment.

Bierema and Merriam (2002) defined e-mentoring as "a computer-mediated, mutually worthwhile that provides learning, advising, encouraging, promoting, and modeling, that is often boundaryless, egalitarian, and qualitatively different from traditional face-to-face mentoring" [21]. Singer and Muller's (2001) view of e-mentoring is that is the combination of mentoring and electronic communications [22]. As noted by Singer et.al (2001) e-mentoring is a rapport set up between a more senior individual and a lesser skilled individual. By using electronic communications, e-mentoring intends to develop and grow the skills, knowledge, confidence, and cultural understanding of the lesser skilled individual. E-mentoring offers numerous benefits to online learners. Price and Chen (2003) suggest there are six benefits of tele mentoring. First, tele mentoring is available over a vast distance [23]. Online chats and online bulletin boards allow mentors to "talk" to more than one mentee at a time (Adams and Crew, 2004) [24]. Secondly, the mentee has opportunities regardless of time and place. Third; vast guidance and support are available online. Fourth, mentors can contribute and share knowledge among participants in the program. Fifth, it creates collaborative learning between teachers and learners. Sixth, organizations that opt for telementoring can choose the communication methods that are suitable for their use.

Online learners usually experience isolation in an online learning environment because they are at a distance. E-mentoring can be used to facilitate online learning where learners and teachers can interact through e-mail, chat room, bulletin board, forum and discussions regardless of their location. Previous research demonstrated that students reported confusion, anxiety, and frustration due to a lack of prompt or clear feedback from the instructors and ambiguous instructions on the Web site and in e-mail (Hara & Kling, 2001) [25]. In this paper, the experiments are carried out and the results show that the proposed solutions improve the quality of online education in Bangladesh.

As mentioned above several studies have worked with the limitations and effective suggestions for online education in their geographical area, but for a developing country like Bangladesh, the delivered result will not be applicable. Work has been published in India on Students' perception and preference for online education during COVID -19 pandemic [26]. Therefore it is high time we investigated the impacts and procedures of online education in Bangladesh.

Table 2.1: Literature Review Summary

Sl. No.	Paper's Title [Ref no.]	Methodology	Contribution	Limitations	Difference to Us
01	Effectiveness of E-Learning Course Materials for Learning Database Management Systems	Challenges in Learning Database Systems	The authors describe multiple problems in teaching databases	More attention is given to teaching instead of practice	Students are bombarded with information in the teaching process and fail to develop learning initiatives. Our study will suggest the development of the online class. Our study will give suggestions for the development of online classes.
02	The Pedagogical Implications of Implementing New Technologies to Enhance Student Engagement and	To assess the degree to which certain university-supported digital technologies assisted in	Generating a matrix for implementing certain digital technologies that cater to diverse learning styles,	Shows only digital technologies in their undergraduate courses.	Focus on the effects on teaching and learning from implementing a variety of digital technologies in their undergraduate courses.

	Learning Outcomes	promoting student engagement and participation in collaborative learning	and diversely experience an interest in using technology.		we'll organize a system for the lab.
03	Successful implementation of e-Learning Pedagogical considerations	Analysis and synthesis of the principles and ideas by the practicing e-Learning company employing the author presented, in the perspective of deploying an effective Learning Management Systems (LMS).	To identify the pedagogical principles underlying the teaching and learning activities that constitute effective e-Learning	Any procedure for handling online classes or exams is absent.	Focuses on delivering e-Learning content, to managing e-Learning content. We'll organize an appropriate schedule for an online class based on the student's and teachers' preferences.
04	Student Engagement in Online Learning: Learners' Attitude	Consists of Participants, and data analysis. Focus on E-	E-mentoring enables teachers to interact with students	The study aims to identify learners' attitudes	We'll develop a schedule and effective procedure for online classes.

	toward E-Mentoring	mentoring. Factor analysis result. Learner autonomy and teacher as assisted tutors.	through email, online chat, and online bulletin boards. The purpose of this research is to investigate learners' factors toward e-mentoring.	toward e-monitoring but not for any solutions.	
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From the above study, the authors describe multiple problems in teaching databases and make a comparison, identifying the pedagogical principles underlying the teaching and learning activities that constitute effective e-Learning. Any unfear means a free procedure for handling online classes or exams is absent. We'll develop a schedule and effective procedure for online classes. The effect of online education during the pandemic in Bangladesh is also shown in my study. The pros and cons of online and offline education are also shown. To have unfear means free exam and lab exam we will develop procedures.

CHAPTER 3

METHODOLOGY

The study first identifies the related factors of online education in respect of Bangladesh and does the following steps- Identify the factors for preparing questions, make a survey form, Distribution of questions to participants, Analysis of the response data, and formulate the results, make statements and make effective suggestions. In methodology, firstly we must find the present effect of online classes in Bangladesh during the pandemic through a google survey. After having the result of the google survey we'll have the issues that hinder online education. Then we have to solve them. For theoretical class, practical class, and student evaluation there is a proper solution as follows. For online lab classes and lab course evaluations, we find out proper solutions. We also find out the conventional ways of teaching.

3.1 PROCESS FOR LEARNING IN PANDEMIC TIME

The COVID-19 pandemic has affected educational systems worldwide, leading to the near-total closures of schools, early childhood education, and care services, universities, and colleges. Most governments decided to temporarily close educational institutions in an attempt to reduce the spread of COVID-19. New developed online programs have shifted the labor of education from schools to families and individuals, and consequently, people everywhere who relied on schools rather than computers and home life have had more difficulty accessing their education. Early childhood education and care as well as school closures impact not only students, teachers, and families, but have far-reaching economic and societal consequences. For conducting online theoretical and practical classes most universities have their platforms.

3.1.1 PROCESS FOR ONLINE CLASSES FOR THEORETICAL COURSES

An online class is a course conducted over the internet. They are generally conducted through a learning management system, in which students can view their course syllabus and academic progress, as well as communicate with students and their course instructor. Online classes offer an

uninterrupted educational process, and flexibility, cost-effective. Both teacher and students are communicated through a virtual learning platform by using zoom, google meet, and Microsoft teams. By using them teachers can conduct online courses by sharing slides, or verbal speech.

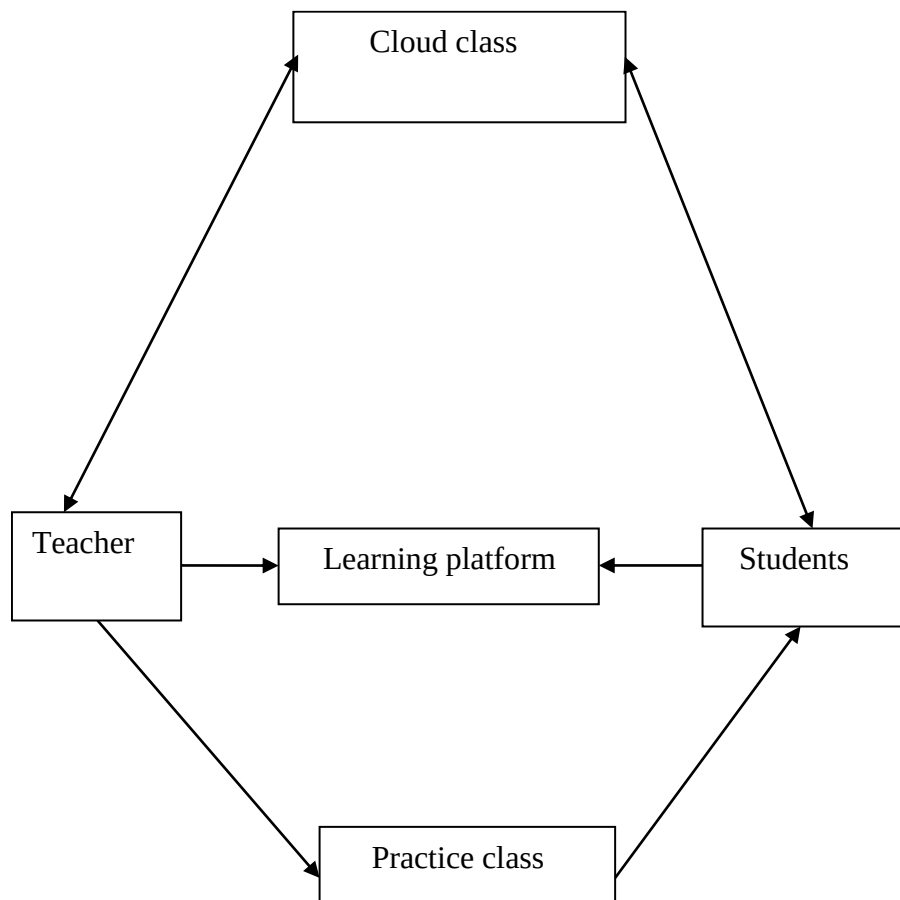


Figure 3.1: Process of online class.

During a pandemic, strike, or unwanted situations online classes are conducted through many learning management systems. The procedures are followed.

(a) Zoom

To start a Zoom Meeting first open the Zoom mobile app and sign in to your account. Click the orange New Meeting icon that appears on your screen. Then Edit meeting settings according to your preferences. When you're done, tap the blue Start a Meeting button. After that to add participants, once the meeting starts, tap the Participant icon in the toolbar at the bottom of your screen to add and manage participants. Then, In the Participants window that opens up, tap on the

Invite option at the bottom left. A teacher can provide links to students. Zoom will now give you the option to share your meeting details via a variety of communication platforms. These include various text, email, and messaging apps on your smartphone. The teacher can share the screen to show the presentation. The limitation of zoom is there are 100 participants maximum of 99 attendees and a host. 40 minutes time limit, but if anyone needs more time, simply start another meeting [27].

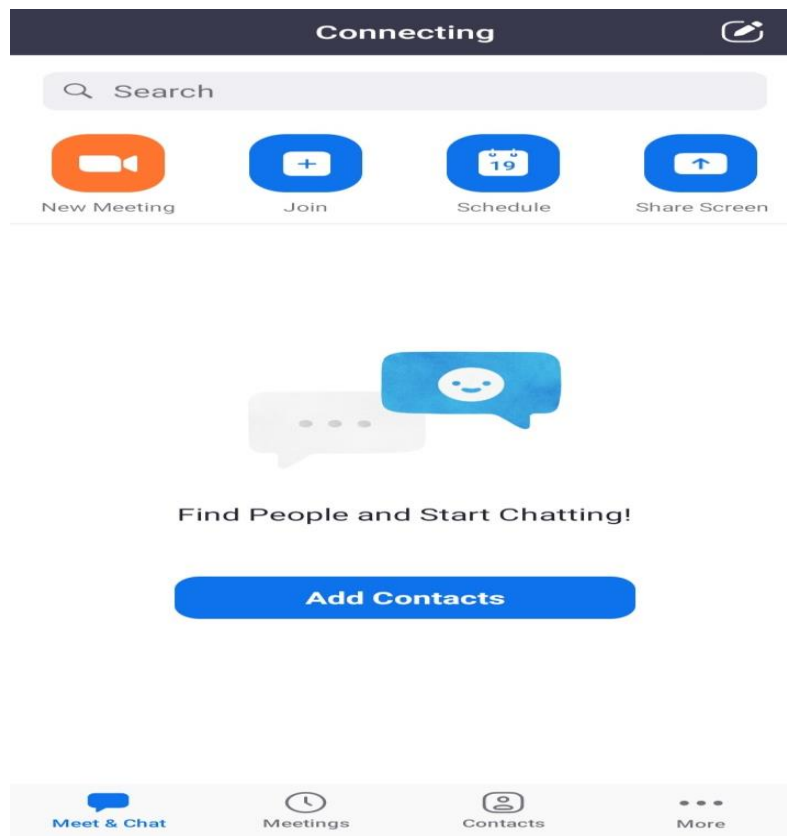


Figure 3.2: Online class in Zoom.

(b) Google Meet

The following procedures are involved to use Google Meet. Go to meet.google.com. Click Start new meeting, or enter your meeting code. Choose the Google account you want to use. Click Join meeting. The Teachers will have the ability to add others to the meeting and connect video and audio, deliver lectures monitoring students' activity. The limitation of google meet is screen sharing restrictions, blank presentation problems, limited features, interoperability service users

are prohibited from joining, display a limited number of participants, users from outside the domain are disallowed and browser freezing problems [28].

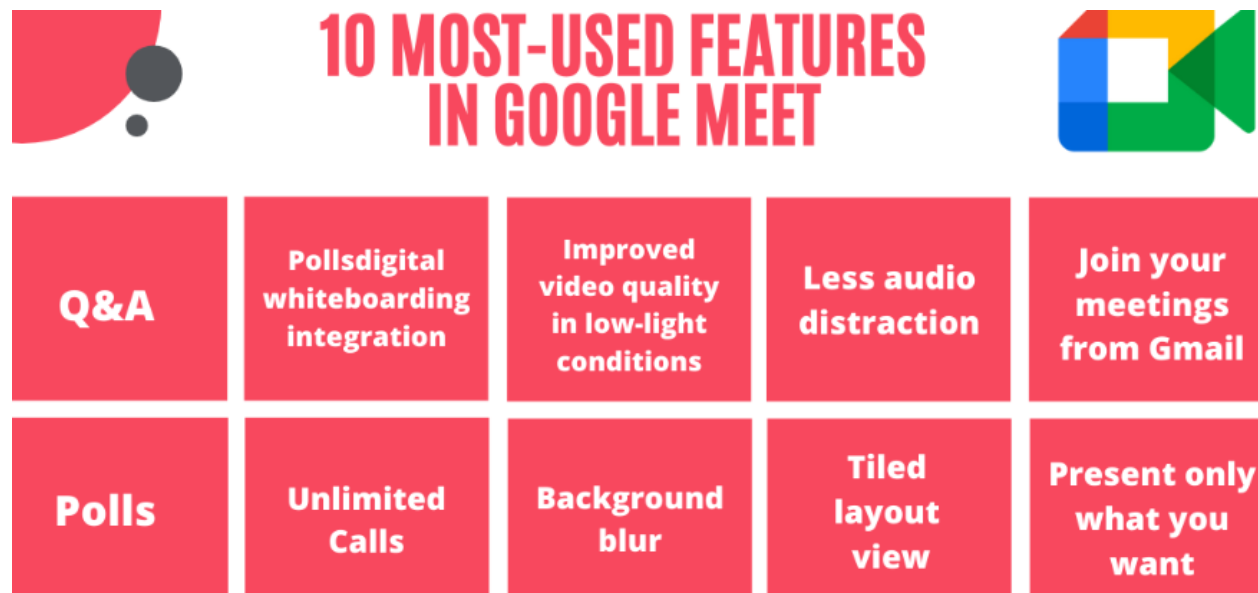


Figure 3.3 Google meet.

(c) Microsoft Team

The following steps are involved to operate Microsoft teams. Firstly, open the Microsoft Teams app. Then tap on the Teams icon at the bottom of the screen, then an icon of two people, and a plus sign in the top right. You should reach the manage team page. To create your new team, give it a name, add a description and set the privacy settings. 1000 participants can be added to Microsoft teams at the same time [29].

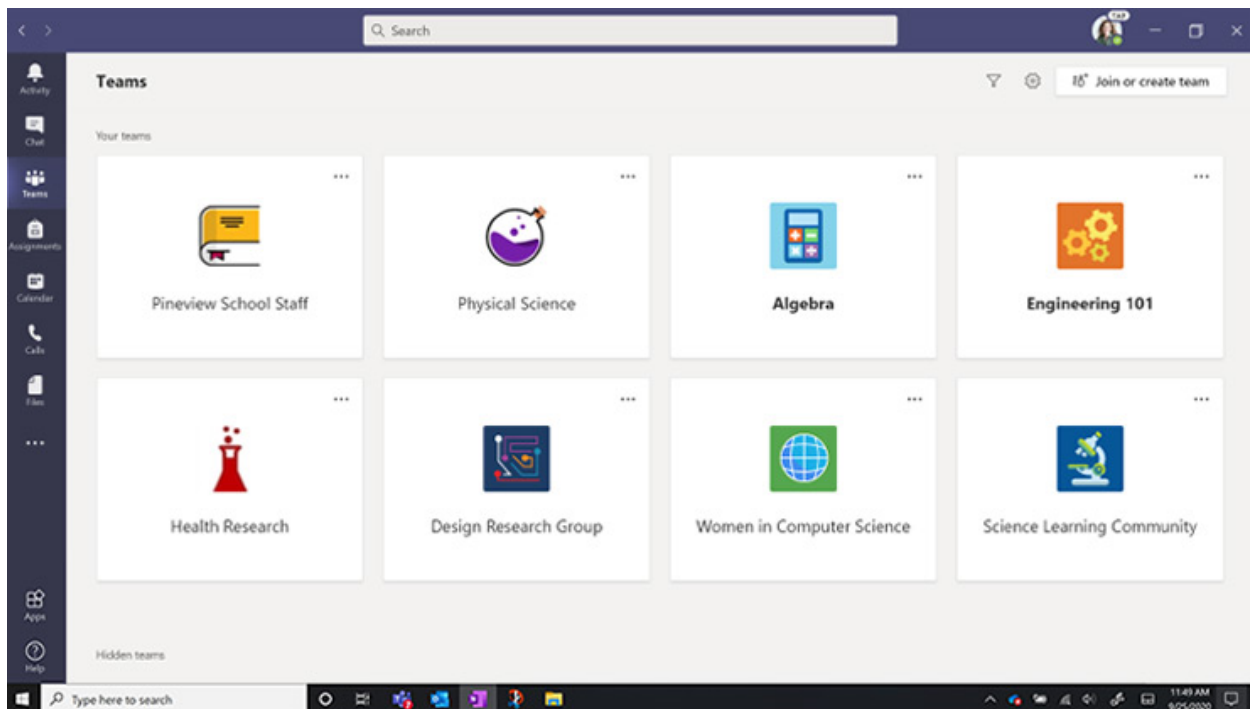


Figure 3.4: Microsoft team.

3.1.2 ONLINE CLASS OF PRACTICAL COURSES

To conduct online classes through zoom, meet, and Microsoft team, the whole course cannot be explained properly. Students must have questions about a critical topic. During offline class, a student can easily ask and the teacher should explain it on board.

3.1.3 STUDENT EVALUATION

Evaluation serves various purposes and success in education. First, it is used to rank the quality of students' performance. The face-to-face end-of-teaching period examination is instrumental in achieving this destination. Because of the supervised nature of exams, they serve as reliable and fair processes and minimize student unfair means. Subjective exams at the end of the teaching

period create anxiety for students. Examinations are also not only able to measure all the learning outcomes of a course but do not mirror real-life tasks or real-life conditions and are thus regarded as less authentic. Secondly, it provides evidence or certification. The first and second purposes have a summative function and are often referred to as assessment of learning properly. Summative assessments can provide a stimulus for students to engage in learning tasks and to perform at their best and are used extensively in education.

Continuous Assessment

The course volume was designed earlier concerning traditional classrooms. But with the shift to online learning, requires redesigning courses which can take a considerable amount of time and experience. In most cases, these courses work well in traditional classrooms but go flat in online learning. It happens when there are no content-related organized activities, assignments, or projects that can be done online. Students must understand the course content and ways to fit it into their online course. They modify some changes in terms of activities and assignments for a better understanding of the concepts.

Regular assessment can be taken by dividing the courses through a class test, quiz, and assignments.

(a) Class Test

To conduct an online exam candidate has to complete registration, the authority stores the candidate details, and generates the exam link details. Then the teachers schedule the test time and verified candidate details in the exam room software. They set up and maintain a fair examination and get feedback from the candidate.

(b) Quiz Test

The students have their exams by live tests & quizzes. Teachers create a new assessment, add a question, and set the general question options periodically. They choose the number of correct responses for multiple choice or enter the answer choices for multiple choice. Choose whether or not to randomize answers for multiple choice. For quiz test crowdsignal, google classroom is used most.

(c) Assignment

An assignment is a piece of academic work. It ensures opportunities for students to learn, practice, and demonstrate they have achieved their learning goals. It provides evidence for the teacher that the students have achieved their goals. Assignments can be created and stored by the following procedure. The manual process of assignment submission online is not suitable to justify students' quality. The present process is to write the assignment on paper and then click a picture and send it to a teacher. Here students' handwriting is not checked properly. Student can complete their assignment with another person. They can also copy them. To recover the drawbacks a teacher must take assignments on spot by monitoring students' activity. The teacher must have students' handwriting format. The teacher must check students' laptops through TeamViewer software. Teamviewer is a type of software by which a teacher can access students' laptops remotely. Through this teachers can improve the evaluation process.

CAMSCANNER

To make a clear pdf and document is beneficial. Type “cam scanner” and select “open” or “update” for the below application, open the application and will see this as your main screen. Click the camera icon on the bottom to start taking pictures. You may have to "accept access to your camera" first to proceed. Select "batch" if you have multiple pages in your document. When you are ready, hit the camera icon to take the picture. If you have more than one page to scan and have selected “batch” this will be your next screen. Click on the white square circled below in red and repeat step 4 for each additional page. Once you have completed taking pictures of all of the pages of your document, you will have an opportunity to edit it to ensure it is usable. Click on each photo and then click re-edit. Then adjust the perimeter to ensure your entire photo will be captured in your pdf document. After that Click “next step” once the perimeter is set. Repeat with all of your other photos. Be sure to click “save” each time to ensure your edits are updated. You may have multiple pages included in a single pdf document. You will now want to select which photos you will turn into your pdf document. Tap the check box on the top of the screen and then select each photo that you have finished editing – then click “email.” Once you have selected “email” you will be prompted to do many things [30].

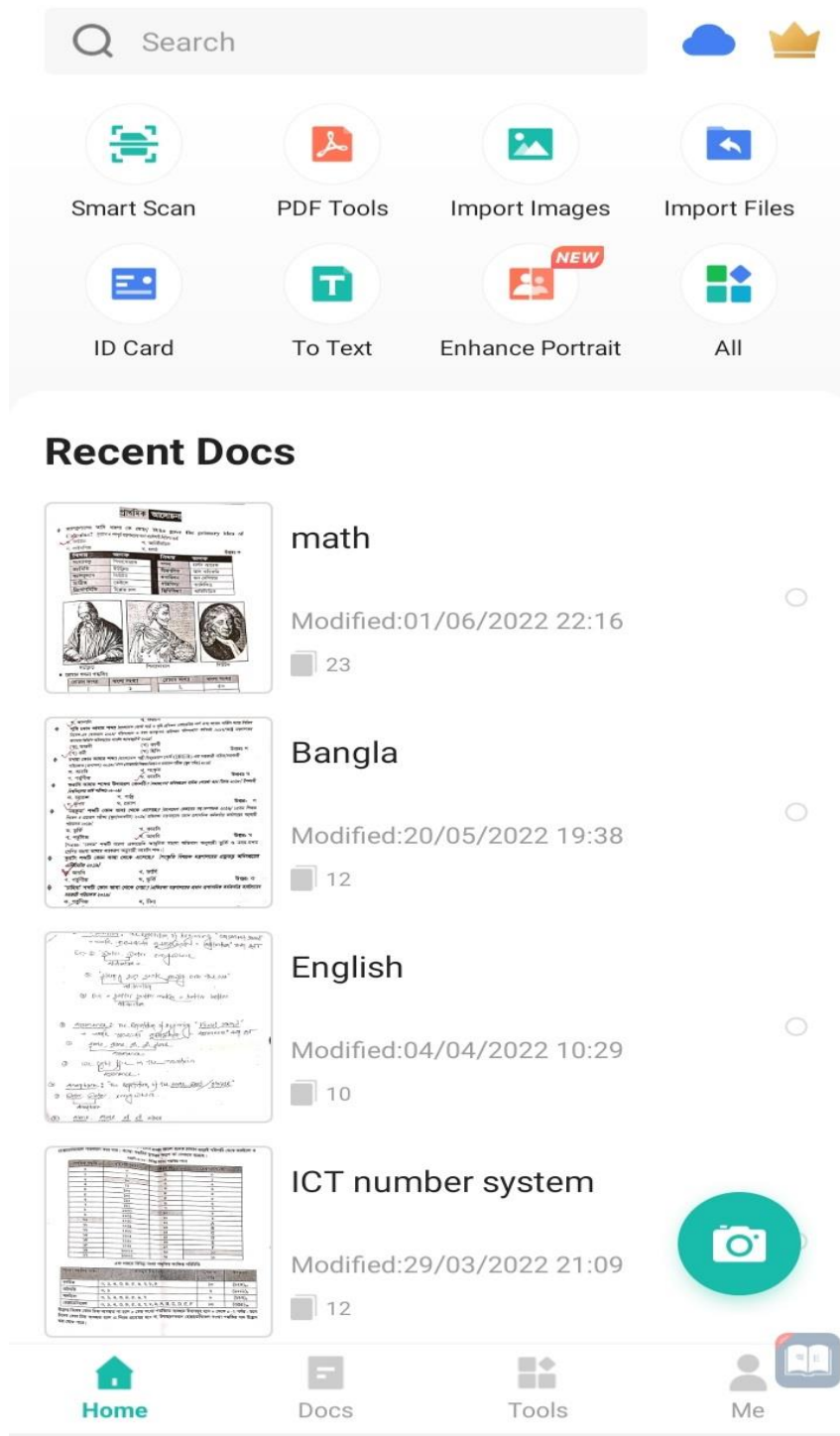


Figure 3.5: CAMSCANNER.

Final Assessment

A final assessment refers to the task that evaluates students' progress in a course. This is a way for students to recognize their weaknesses and for instructors to understand where they have excelled and where improvement is needed when teaching.

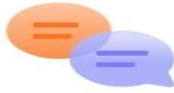
(a) ZOOM

It is used to monitor students during an exam, an examiner can observe the students by emotion prediction and movement. The examinee must show their exam paper as well as their face. Two devices can be used in this regard, one camera is for monitoring the whole interface, and the other camera is for showing the answer script. By making a pdf through a cam scanner students can submit the paper in a short period.

(b) MICROSOFT TEAMS

The following steps are involved to operate Microsoft teams, open the Microsoft Teams app. Tap on the Teams icon at the bottom of the screen, then an icon of two people and a plus sign in the top right. You should reach the manage Teams page. To create your new team, give it a name, add a description and set the privacy settings.

Welcome to Teams



Chat with anyone

Send anyone a message, even if they don't have Teams.



Video calls and meetings

Connect over one to one or group video calls.



Files and photos

Share unlimited files and photos over chat.



Privacy

We will never sell or share your data with other apps or services.

[Learn more](#)

Get started

Figure 3.6: Features of Microsoft teams for online class.

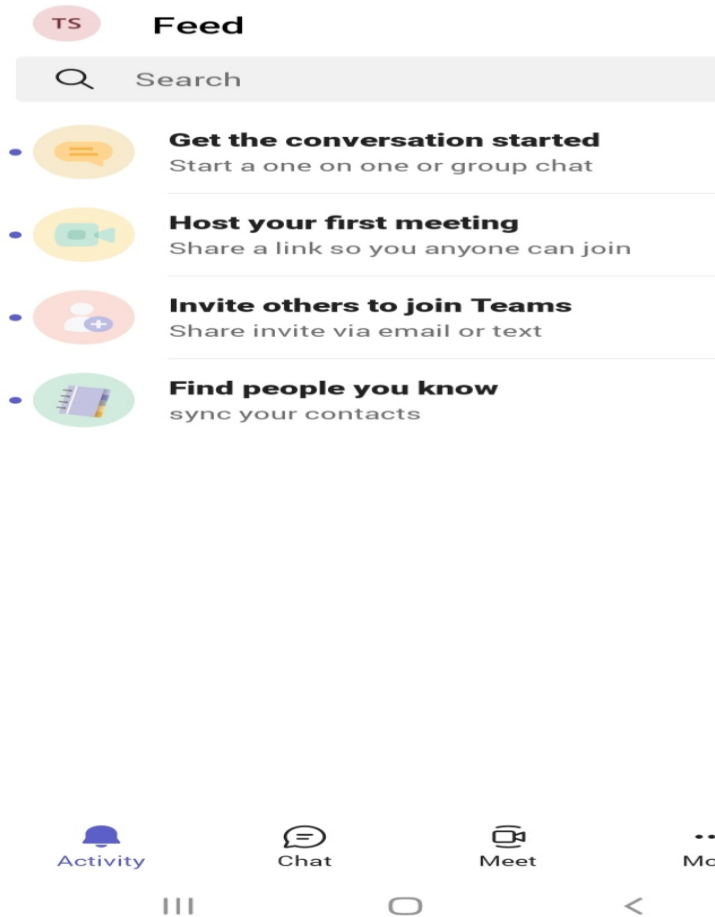


Figure 3.7: Microsoft teams feed for online class.

3.2 COMPARISON BETWEEN ZOOM, GOOGLE MEET, AND MICROSOFT TEAM

Table 3.1: Comparison

ZOOM	GOOGLE MEET	MICROSOFT TEAM
Zoom provides a lower quality of video because of poor lighting and video noise from small image sensors.	Google Meet provides a higher quality too.	Microsoft team provides a higher quality of video audio.
Zoom's free tier allows Unlimited one-on-one meetings but limits group sessions to 40 minutes and 100 participants.	It has a very light, fast interface that enables you to easily manage up to 250-person meetings.	In terms of video conferencing, it can host calls with up to 10,000 members. There is a freemium version of the service that includes support for up to 300 people.
It is costly, paid plans start at \$15/£12 per month per host. Zoom Rooms require an additional subscription on top of a subscription and is more a of solution for larger companies.	The cost is average, plans include access to Google Meet and start at \$8 a user per month for the Basic tier.	It is cost-effective, Microsoft Teams is included with all Microsoft 365 plans (which start at \$5 a user per month)
The storage is 5GB.	The duration of a call is unlimited (up to 24 hours)	Key features like 10,000 searchable messages, 10

		app integrations, and 5GB of file storage.
--	--	--

From the above table we can see among them MICROSOFT TEAM is best.

The challenges of ZOOM, GOOGLE MEET, and MICROSOFT TEAM are the following :

1. Adaptability issues in online learning.
2. Technical issues in online learning
3. Computer knowledge challenge in online learning.
4. Time management problem in online learning.
5. Self-motivation challenge in online learning.
6. Online learning challenges – learning styles.
7. Communication issues in online learning.
8. Virtual Engagement challenge in online learning.
9. Feedback issue during an online class.
10. Lack of proper teaching methods in online learning.
11. Online learning challenges – fear of cheating.
12. Assessment challenge in online learning.

Improvement Of Online Class Effectiveness

A creative and effective approach, utilizing multimedia tools in lectures, respond to regular feedback are essential for the improvement of an online class. A Learning Management System (LMS) can help synchronize the virtual learning process by bridging the communication gap between teachers and students.

1. Nowadays adaptive learning is using artificial intelligence to adjust the content according to individual needs and experience. It helps in providing personalized courses to identify their weaknesses and strengths for better learning outcomes and responses.

2. Students need to find a high-speed internet connection at their home to resolve the internet connection problem in the online class. They can get technical support for your connection and other technical issues related to software and tools for effective learning.
3. Students should know the factors that can affect their timings during the learning process such as avoiding distractions, creating a to-do list, seeking help, etc.
4. To recover self-motivation challenges in online learning involve themselves, schedule time for learning, stay positive, and work properly.
5. To ensure a better learning response, it is important to understand the learning styles. Students can learn through interaction, visual presentations, audio classes, or written notes. Following your learning style helps in enhancing your learning experience better.
6. Students can communicate with their teachers in private to clear doubts either through virtual learning platforms or calls. They can also take extra time with teachers and friends after the online classes for a better understanding of the course.
7. Teachers can give personalized guidance for improvement and identify weaknesses and strengths. They can improve your learning pattern based on the feedback. Unless you receive feedback from teachers, there are chances of less improvement in your learning.

3.3 EFFECT OF ONLINE LEARNING

The effect of online learning is measured by survey.

Survey Method

The technique of gathering data by asking questions from people who are thought to have the desired information is called the survey method. It can be defined as: "gathering information about a large number of people by interviewing a few of them." It can be modified by stating that collecting information with other data collection alternatives available to the survey researcher in addition to interviewing i.e questionnaire, personal observation, etc. In the case of descriptive research, surveys are conducted with the help of questionnaire techniques is the most appropriate

approach. The type of survey research studies usually has a larger sample in the questionnaire. In this way, survey variables that exist or have already occurred are selected and observed in the

3.3.1 SAMPLE SIZE

The sample size is determined as 138 respondents' opinions from the students and 9 respondents' opinions from teachers who presently have online classes. The sample size required for qualitative research is often smaller than the sample size required for quantitative research. Smaller sample size is required for qualitative research as in-depth information can be gathered to understand the research problem.

3.3.2 USE OF GOOGLE SURVEY

One of the simple and frequently used online forms is the google form. The creation of online surveys and questionnaires is a well-known tool. The google form is used in this paper because of its interface visualizing the outcomes in a simplified manner

Data Collection

A purposive gathering of information relevant to the subject matter of the study from the units under research data collection. I have randomly selected my sample. My sample is all the people who know about the internet, are active on social networking sites, and have a little bit of knowledge on online learning. Most of my sample are university students.

Questionnaire

The questionnaire has a list of questions to be asked and spaces in which the respondents record their answers. It is either printed or typed in a definite order on a form or set of forms. Each question is worded exactly as it is to be asked; also the questions are listed in an established sequence. The questionnaire incorporated questions related to students' preference for online marketing and other traditional mediums for getting awareness of various brands and making

purchase decisions. An online examination survey to understand the latest situation in the education ecosystem during the COVID-19 pandemic.

A. Category: Students

1. How would you describe the impact of COVID-led disruption on the examination schedule of your institution?

Both Semester and Entrance Examinations were disrupted

No Disruption faced yet as my institution had already conducted the exams online during lockdown

2. What is your strategy in dealing with COVID-led disruption of the examination schedule?

Postpone the examinations until the situation is under control

Cancel the examinations and promote the students based on the performance of the previous exams

Scout for online-based solutions to conduct examinations

Wait for the guidelines from the UGC (University Grants Commission) and other such relevant authorities to decide on the next steps

3. How would you describe the existing mode of conducting all major semester examinations in your institution?

Exams are computer-based and administered at an invigilated examination hall

Exams are Paper/OMR-based and administered at an invigilated center/examination hall

Exams are administered online and can be attempted by students online remotely with remote invigilation or proctoring

4. What are your significant challenges in exploring an online examination solution?

Preventing students from indulging in cheating

Creating and scheduling exams

Assuring seamless user experience for examiners and students alike

Accessibility and connectivity, even in the remote areas

Missing the human factor

capabilities of students and faculty

Legal implications and data protection

5. When are you planning to implement online examinations in your institute?

Already implemented

In the next 5-6 Months

In the next academic year

Not planned yet

7. Choose the most important features when evaluating the anti-cheating solution for an online exam

The ability to remotely proctor the candidate manually

The ability to view and record candidates' screen

Strong candidate authentication system to avoid impersonation

Describe the challenge faced by students in taking an online exam

Accessibility to computers

Internet/broadband connectivity

8. What is the biggest argument against shifting the exams online?

Maintaining academic integrity and preventing cheating

The ease of use for students, particularly for complex question types and courses

Accessibility to laptops/computers

Internet/broadband connectivity

9. Students believe online learning will not be disrupted by learning activities.

Agree

Disagree

10. Can you handle waiting a few hours or maybe even a few days between asking the teachers a question and getting a response?

Yes

No

11. Can you stick to a study schedule at home?

Yes

No

12. Do You face the lacking of quiet space, technical issues, and load shedding problems during online classes?

Agree

Disagree

13. How was the teacher's feedback?

Good

Average

Bad

14. Which do you use most for an online class?

15. Give your opinion to conduct cheating free online exams and labs?

B. Category: Teachers

1. Are you satisfied with the technology and software you are using for online teaching?

Yes

No

2. Students are stressed while learning remotely during the COVID-19 pandemic?

Agree

Disagree

3. What kind of response have you got so far from your students?

Good

Average

Poor

4. Has the online class and exam changed accreditors within the last 2 years?

Yes

No

5. What are your significant challenges in exploring an online examination solution?

Preventing students from indulging in unfair means

Creating and scheduling exams

Assuring seamless user experience for examiners and students alike

Accessibility and connectivity, even in the remote areas

Missing the human factor

Capabilities of students and faculty

Legal implications and data protection

6. How do the outcomes for students?

Good

Average

Poor

7. Have the teachers received training on how to conduct cheating-free online exams?

Yes

No

8. Which software do you prefer most for an online class, quiz, exam, and lab?

9. How can you proctor the behavior issues of students for the class?

By using AI software

Monitoring the activities

By checking attendance

10. Give your opinion on a sustainable system to conduct cheating unfear means free online exams and lab.

3.4 PROPOSED MODEL

Blended system and hybrid system are proposed method for online education. The models are bellow:

3.4.1 Blended System

During strikes or unwanted situations, a teacher can take a course by combining both online and offline classes. To reduce session complexity teachers can take make-up the class online during holidays. Blended learning models usually leverage a combination of in-person instruction techniques, teacher-led online modules, and self-paced learning.

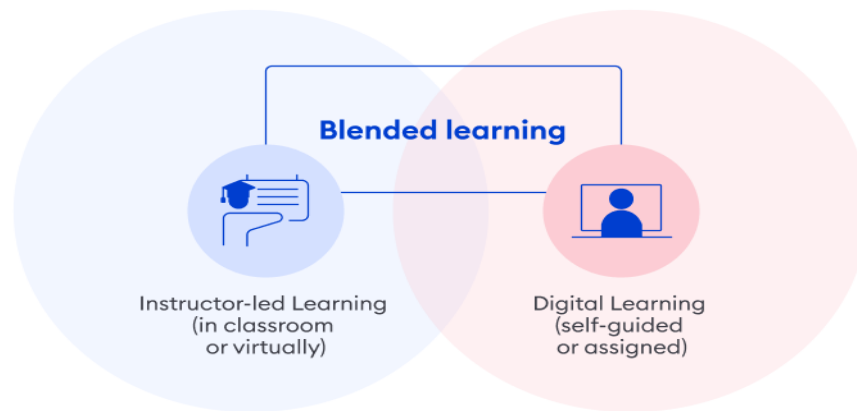


Figure 3.9: Type of blended learning.

We must understand the concept of blended learning and its characteristics of blended learning, role of teachers and students in blended learning classroom, the importance of blended learning, and obstacles that are faced by the institutions for implementing it in regular classroom learning settings. The role of teachers and students in Blended Learning is very important. The classroom teacher should have depth knowledge about content so that they can teach various subjects. They should also be able to differentiate between various instructions based on students' needs. Students should also be able to demonstrate through various aids as and when required. The teacher continues to encourage and motivate, guide and monitor progress, give feedback, boost confidence, and maintain motivation. Teacher and student roles are much interconnected. With the use of technology in the teaching and learning process student participation has increased. Students in blended learning work as partners of teachers. Now the new role of the teacher is facilitator and guide. The basic requirement of students is to understand the unit of the subject so their participation is necessary, teacher motivates students to increase their confidence so that they can develop critical thinking and analysis. The most important role played by the teacher is in keeping the students digitally safe. The use of blended learning technology in classroom teaching and learning processes is an innovative method. It combines the quality of both online learning and classroom method. It not only creates interest in learning through audio-visual aid but also develops better understanding and group feeling among students [31].

To develop a blended system we need the following characteristics.

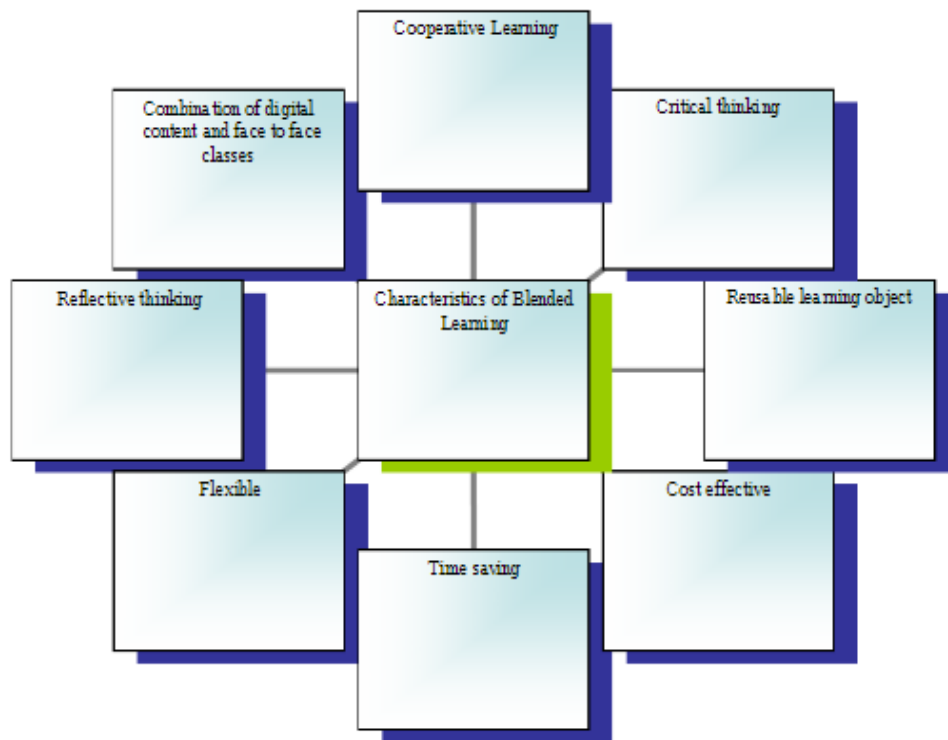


Figure 3.10: Characteristics of blended learning.

Blended learning should have the following:

1. Keep traditional teaching methods.
2. Switch to digital assessments for instant feedback.
3. Set digital revision tasks. then use the results to inform class schedules.
4. Explore group projects that utilize multimedia tools.
5. Incorporate technology for reinforcement.
6. Try new teaching techniques.
7. Vary Your Assessments.

8. Mix up Group work styles.

The traditional class can be taken online but the assessment would be done offline. To reduce session crisis assessment should be done on holidays by using zoom.

The importance of blended learning can be pointed out as:

- Helps students to develop project and time management skills.
- Integrate appropriate technology and manage it effectively throughout courses.
- Cost benefits increased access to educational opportunities, the flexibility of workforce deployment, and so on.
- Opportunities to create course experiences that are personal, relevant, and engaging.
- Support the provision of information and resources to students
- Engage and motivate students through interactivity and collaboration.
- Synchronous technologies allow students to communicate and collaborate outside of the classroom.
- Improved pedagogical practices
- Speedier performance was detected on real-world tasks.
- Ability to use the web for the classroom has the potential to serve any student at any time, in any place
- Develops a stronger sense of community among students than either traditional or fully online courses.

Online classes must be taken by using blended learning. Blended learning has two procedures. Synchronous online class and asynchronous online class.

Synchronous learning provides the students in the course to engage with the course content at the same time, but from different locations. The teacher interacts with students in real-time using tools such as Microsoft team to live stream audio, video, and presentations to hold live classes or meetings, chat feature to engage in live conversations, google docs to simultaneously edit documents, add documents, and more.

Asynchronous learning ensures the students in the course all engage with the course content at different times and different locations. The teacher provides students with a sequence of units that the students move through as their schedules permit. Each unit might make use of assigned readings or uploaded media, online quizzes, discussion boards, and more. A teacher may record a full class and then show it to the audience. The teacher guides the students, provides them with feedback, gives instruction, and assesses them as needed [32].

Blended Learning Models

There are 4 models.

(i) Rotation model

A program in which within a given course or subject (e.g., math), students rotate between learning modalities, at least one of which is online learning. Other modalities might include activities such as small-group or full-class instruction, group projects, individual tutoring, and pencil-and-paper assignments.

(ii) Flex model

A program in which online learning is the backbone of student learning, even if it directs students to offline activities at times. Students move on an individually customized, fluid schedule among learning modalities, and the teacher of record is on-site. The teacher provides face-to-face support on a flexible and adaptive as-needed basis through activities such as small-group instruction, group projects, and individual tutoring. Some implementations have substantial face-to-face support, and others have minimal. Some flex models may have face-to-face certified teachers

(iii) A La Carte model (formerly Self-Blend model)

A program in which students take one or more courses entirely online with an online teacher of record and at the same time continue to have brick-and-mortar educational experiences.

(iv) Enriched Virtual model

A whole-school experience in which within each course (e.g., math). Many Enriched Virtual programs began as full-time online schools and then developed blended programs to provide students with brick-and-mortar school experiences. The Enriched Virtual model differs from the Flipped Classroom because, in Enriched Virtual programs, students seldom attend the brick-and-mortar campus every weekday. It differs from the A La Carte model because it is a whole-school experience, not a course-by-course model [33].

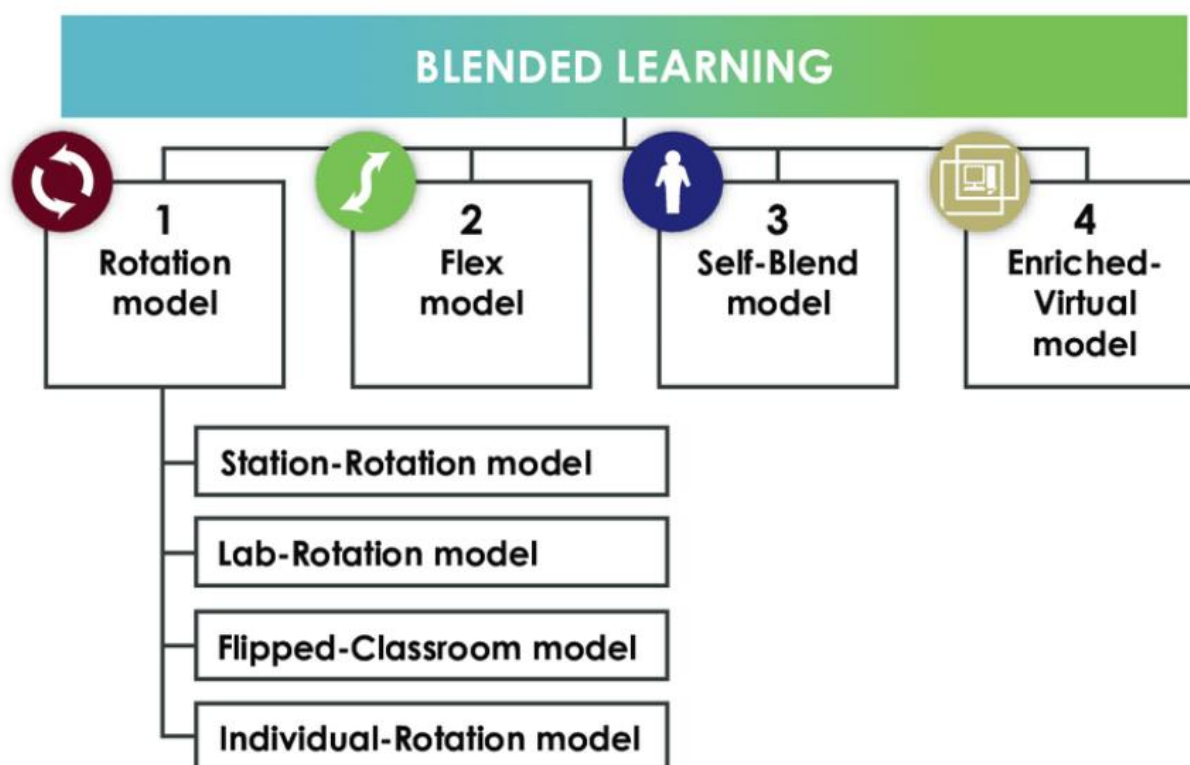


Figure 3.11: Model of blended system.

3.4.2 HYBRID SYSTEM

Hybrid learning can be defined as teachers taking both online and offline classes simultaneously for the students. Some students attend the classes in person while some attend virtually. It was

seen that the effect size of the hybrid learning on the academic achievement of the students was at a high level. In line with the results obtained, it was deemed appropriate to make the following suggestions:

As a result of the analysis, it was understood that the hybrid learning had a large effect on the academic achievement of the students. For this reason, the use of hybrid learning in educational environments should be encouraged, and the necessary infrastructure and facilities should be provided.

It was understood that the discipline was a distinctive variable in the academic achievement of hybrid learning. It was found that studies applied to the disciplines of biology and science had higher effect sizes. For this reason, it can be suggested that the application of the hybrid model in biology and science classes should be encouraged.

This meta-analysis study focuses on publication type, education level, duration of intervention, and discipline as moderator variables. Future studies can focus on different aspects [34].

(a) Theoretical and practical Courses

The Teacher can take theoretical and practical courses online and offline. They can take classes using Zoom.

Zoom

To start a Zoom Meeting first open the Zoom mobile app and sign in to your account. Click the orange New Meeting icon that appears on your screen. Then Edit meeting settings according to your preferences. When you're done, tap the blue Start a Meeting button. After that to add participants, once the meeting starts, tap the Participant icon in the toolbar at the bottom of your screen to add and manage participants. Then, In the Participants window that opens up, tap on the Invite option at the bottom left. A teacher can provide links to students. Zoom will now give you the option to share your meeting details via a variety of communication platforms. These include various text, email, and messaging apps on your smartphone. The teacher can share the screen to show the presentation. The limitation of zoom is there are 100 participants maximum of 99 attendees and a host. 40 minutes time limit, but if anyone needs more time, simply start another meeting.

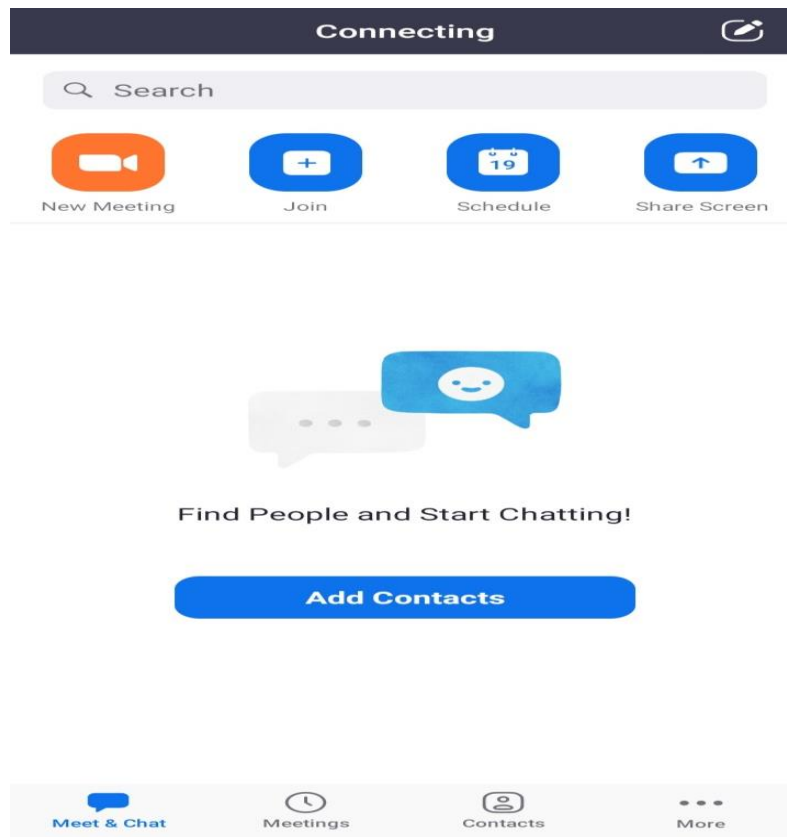


Figure 3.11: Online class in ZOOM.

(b) Theoretical and Practical Exams

Theoretical and practical exams are taken offline, in a classroom

CHAPTER 4

IMPLEMENTATION AND ANALYSIS

After getting the result of questionnaire a proper study is analyzed here. The effect of online learning in Bangladesh is shown.

4.1 EFFECT OF ONLINE LEARNING

One of the simple and frequently used online forms is the google form. The creation of online surveys and questionnaires. The google form is used in this paper because of its interface visualizing the outcomes in a simplified manner.

ACCORDING TO STUDENTS

Classify Audience

Which class do you read in?
137 responses

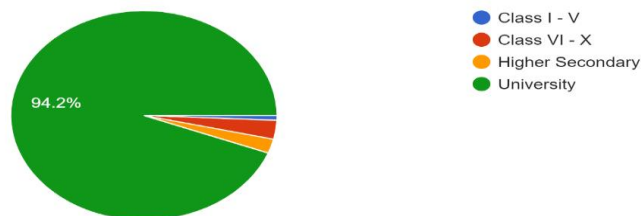


Figure 4.1: Category.

Findings analysis and result: From the figure, it is seen that most theme of students is university students whose response are 94.2%The range of class i-v response are very minimum and class vi-x and higher secondary are very narrow response.

Disruption

How would you describe the impact of COVID-led disruption on the examination schedule of your institution?

136 responses



Figure 4.2: Knowledge.

Findings analysis and result: There are large numbers of activities that can be done using the internet and so it is very important. 77.2% of students say that both semester and entrance examinations are disrupted. 22.8% of students face no disruption.

Strategy

What is your strategy in dealing with COVID-led disruption of the examination schedule?

135 responses



Figure 4.3: Strategy

Findings analysis and result: From the figure, it is seen that 40% of the students want to scout for online-based solutions. The lowest response is for the cancellation of the exam. 23% of students want to postpone the exam. 33.3% of students want the guidelines from UGC.

Existing Mode

How would you describe the existing mode of conducting all major semester examinations in your institution?
135 responses

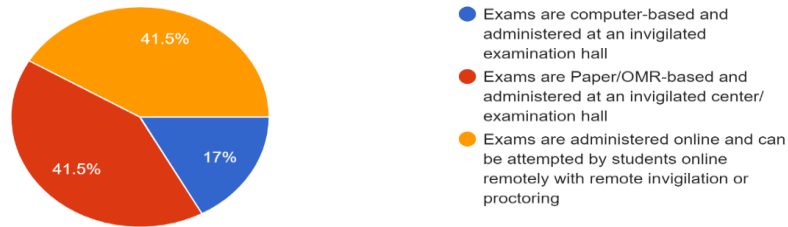


Figure 4.4: Existing mode.

Findings analysis and result: From the figure, it is seen that 41.5% of students want paper-based administered at an invigilated center. 41.5% of students who want examinations are administrated online. 17% of students need exams that are computer-based at an invigilation examination hall.

Challenges

What are your significant challenges in exploring an online examination solution?
134 responses

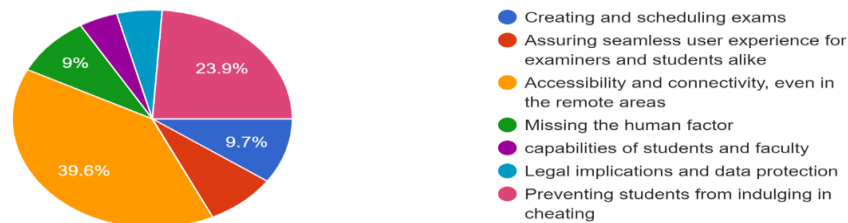


Figure 4.5: Challenges.

Findings analysis and result: From the figure, it is seen that 39.6% of students face problems with accessibility and connectivity. 23.9% of students think indulging in cheating may hinder student quality. 9.7% of students find problems creating and scheduling exams. 9% of students think missing the human factor is also a challenge for online exams. A Narrow response is for legal implications and data protection and also for creating and scheduling exams.

Planning

When are you planning to implement online examinations in your institute?
136 responses

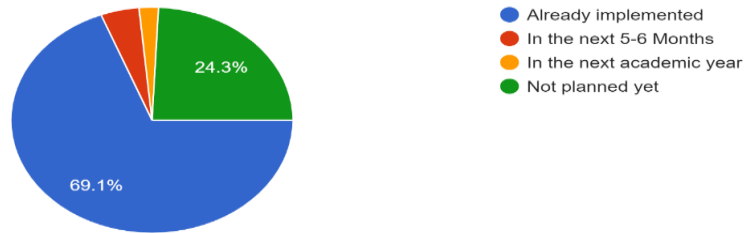


Figure 4.6: Implementation.

Findings analysis and result: From the figure, it is seen that 69.1% of students have already implemented plans for online exams. 24.3% of students do not implement planning yet. The low response is for the next academic class and the next 5-6 months.

Solution

Choose the most important features when evaluating the anti-cheating solution for an online exam
136 responses

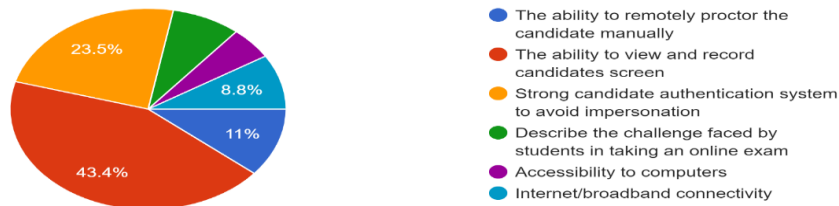


Figure 4.7: Features.

Findings analysis and result: From the figure, it is seen that 43.4% of students need the ability to record and view screens by their teachers. 23.5% of students need a strong authentication system. 11% of students want the ability to remotely proctor their activity by teachers. 8.8% of students need internet connectivity to the internet to have special proctoring software.

Arguments

What is the biggest argument against shifting the exams online?
135 responses

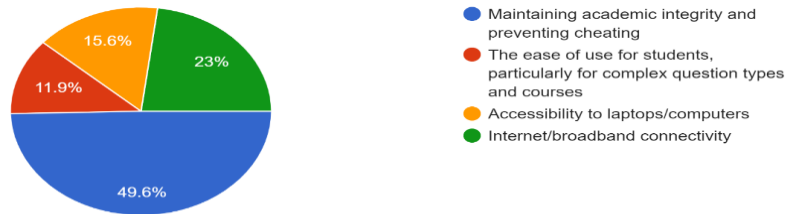


Figure 4.8: Implementation.

Findings analysis and result: From the figure, it is seen that 49.6% of students need to maintain academic integrity. 23% of students have a broadband issue. 15.6% of students have accessibility issues.

Disruption

Students believe online learning will not be disrupted learning activities.
134 responses

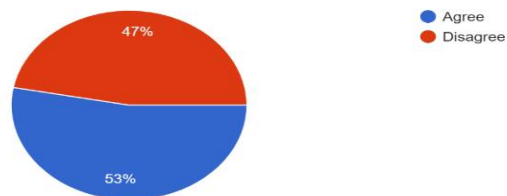


Figure 4.9: Disruption.

Findings analysis and result: From the figure, it is seen that 52% of students think online will not be disrupted learning activities. 47% of students think online learning will disrupt learning activities.

Response

Can you handle waiting a few hours or maybe even a few days between asking the teachers a question and getting response?
135 responses

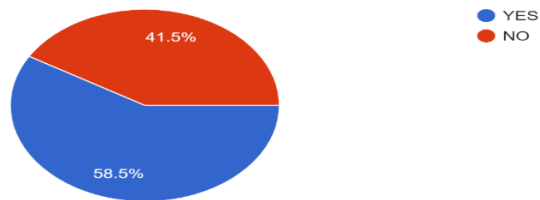


Figure 4.10: Response.

Findings analysis and result: From the figure, it is seen that most students can handle waiting a few hours or days to ask a question getting a response.

Issues

You face the lacking of quiet space, technical issues, load shedding problem during online class?
134 responses

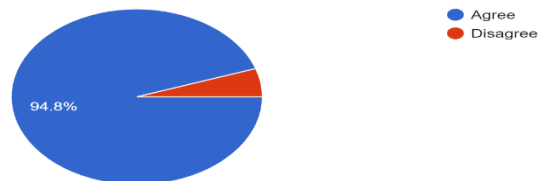


Figure 4.11: Issues.

Findings analysis and result: From the figure, it is seen that most of the students have issues such as technical, space, load-shedding, etc,

Feedback

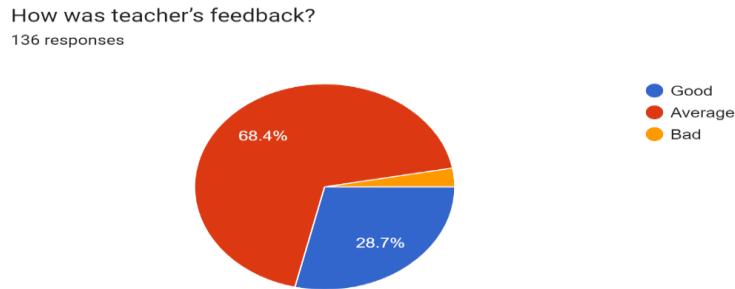


Figure 4.12: Teachers' feedback.

Findings analysis and result: From the figure, it is seen that most of the students get average feedback from teachers during an online class. The lower response is for bad feedback.

Opinion

Which software do you use most for online class?

126 responses

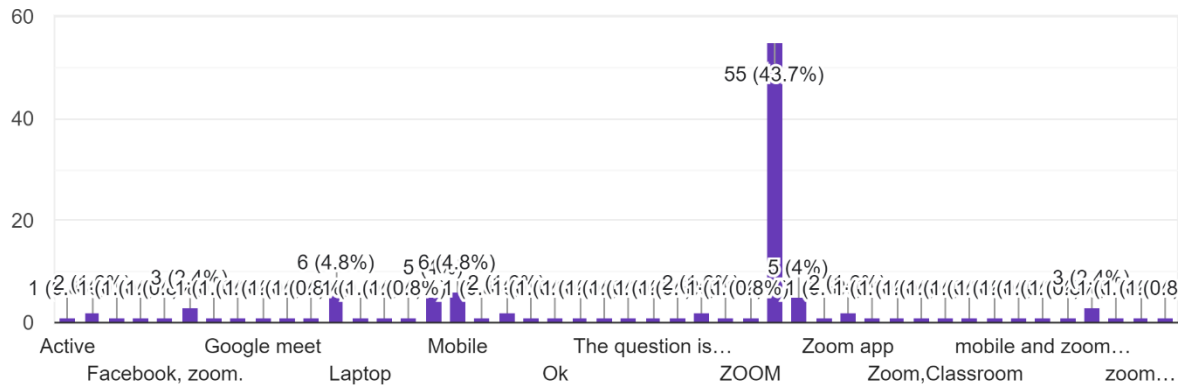


Figure 4.13: Opinion.

Findings analysis and result: From the figure, it is seen that most of the student uses zoom for an online class.

ACCORDING TO TEACHERS

Satisfaction

Are you satisfied with the technology and software you are using for online teaching?
9 responses

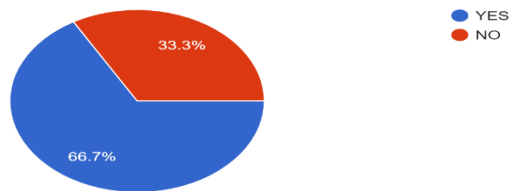


Figure 4.14: Satisfaction.

Findings analysis and result: From the figure, it is seen that most of the teachers are satisfied with the technology used for online teaching.

Student Condition

Students are stressful while learning remotely during the COVID-19 pandemic?
9 responses

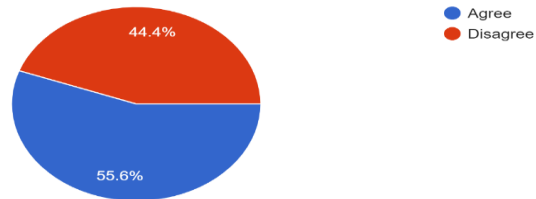


Figure 4.14: Condition.

Findings analysis and result: From the figure, it is seen that most of the students are stressed while learning remotely.

Response

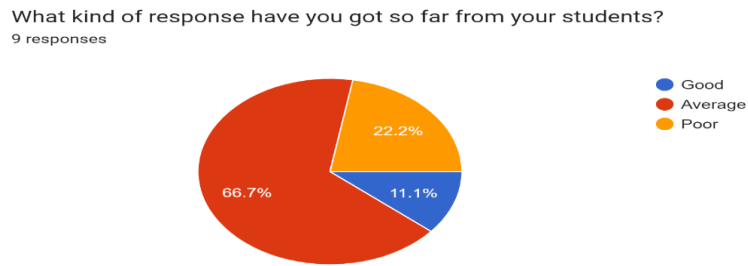


Figure 4.15: Response.

Findings analysis and result: From the figure, it is seen that most of the students give average feedback. 22.2% of students have poor responses during online learning.

Accreditors

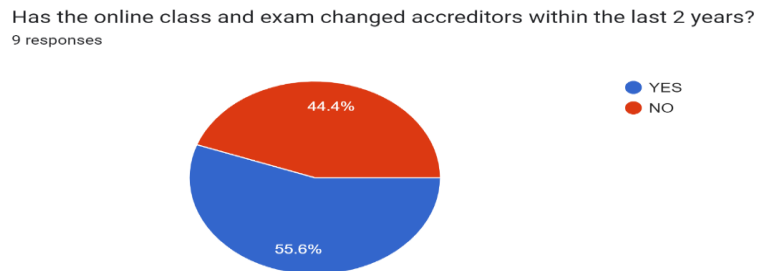


Figure 4.16: Accreditors.

Findings analysis and result: From the figure, it is seen that 55.6% of teachers think online classes and exams changed accreditors within the last 2 years. 44.4% of teachers think that the accreditors did not change.

Challenges

What are your significant challenges in exploring an online examination solution?
9 responses



Figure 4.17: Challenges.

Findings analysis and result: From the figure, it is seen that 44.4% of teachers need accessibility and connectivity even in a remote areas. 22.2% of teachers think that preventing students from indulging in unfair means is also challenging. 11.1% of teachers think the challenge is the capability of students and faculty. 11.1% of teachers think that student human factors are missing. 11.1% of teachers want user experience for examiners and students.

Outcome

How do the outcomes for students?
9 responses

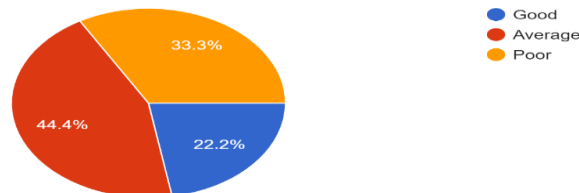


Figure 4.18: Outcomes.

Findings analysis and result: From the figure, it is seen that most of the outcomes of the student are average. 33.3% of students give an outcome and 22.2% of students have a good outcome.

Training

Have the teachers received training on how to conduct cheating free online exam?
9 responses

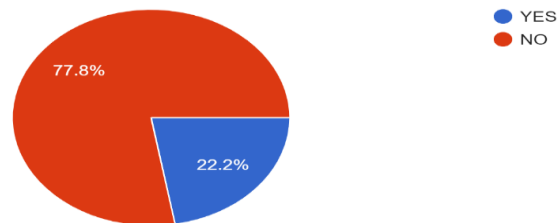


Figure 4.19: Training.

Findings analysis and result: From the figure, it is seen that most of the teachers do not have any training to conduct unfair means free exams.

Opinion

Which software do you prefer most for online class, quiz, exam and lab?

9 responses

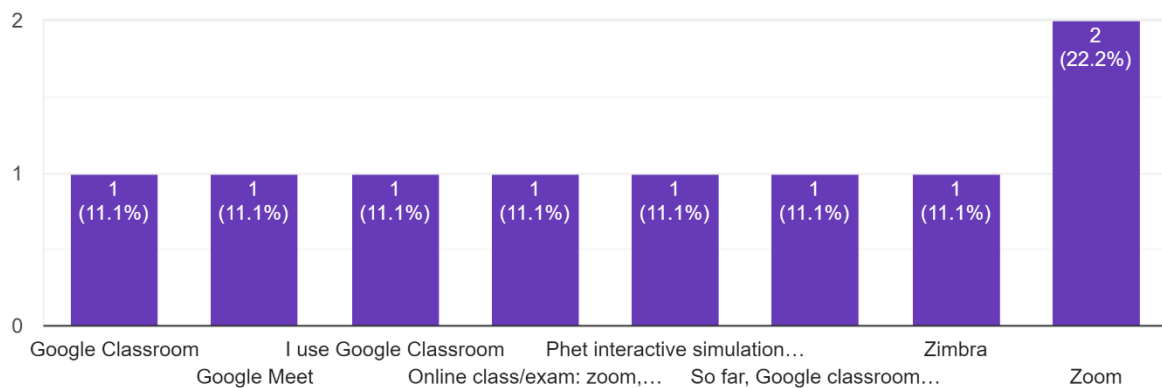


Figure 4.20: Opinion.

Findings analysis and result: From the figure, it is seen that most of the teachers use zoom for online classes, quizzes, and labs.

Proctoring Behavior Issue

How can you proctor the behavior issues of students for the class?
9 responses

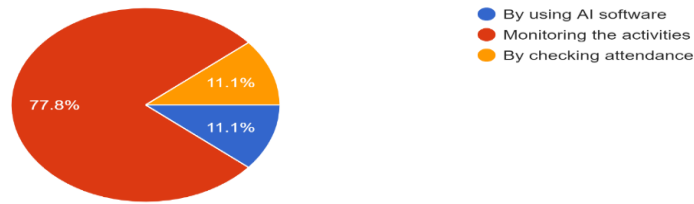


Figure 4.21: Behavior issue.

Findings analysis and result: From the figure, it is seen that most teacher monitors student activities to identify behavior issues.

After the completion of the survey, I proposed a blended system for online education.

4.2 PROPOSED MODEL

Blended System

Blended learning is the term given to the educational practice of combining digital learning tools with more traditional classroom face-to-face teaching.

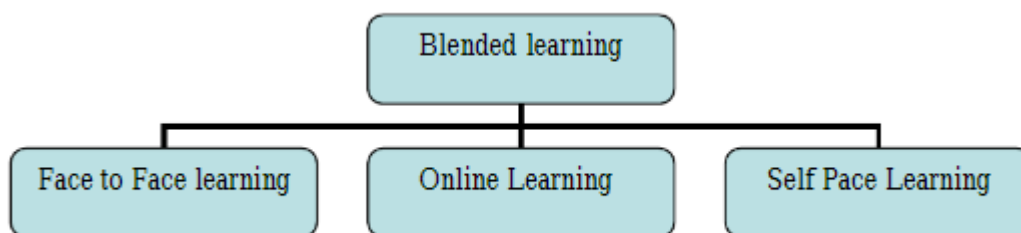


Figure: 4.22 Blended system.

(i) Face-To-Face Learning

The face-to-face model of blended learning is to use online resources to train and educate individuals who may require additional assistance on specific issues. Simultaneously, the mainstay of the teaching is conducted by the teacher presenting to the entire group.

(ii) Online Learning

A formal education program that's made up of in-person classroom time as well as individual study online using e-learning software. It is a type of multichannel method that incorporates tutor-led activities, images, video, digital tasks, and face-to-face discussion.

(iii) Self Pace Learning

Self-paced learning means the students can learn in their own time and schedule. They don't need to complete the same assignments or learn at the same time as others. They can proceed from one topic or segment to the next at your speed.

We must understand the concept of blended learning and its characteristics of blended learning, role of teachers and students in blended learning classroom, the importance of blended learning, and obstacles that are faced by the institutions for implementing it in regular classroom learning settings. The role of teachers and students in Blended Learning is very important. The classroom teacher should have depth knowledge about content so that they can teach various subjects. They should also be able to differentiate between various instructions based on students' needs. Students should also be able to demonstrate through various aids as and when required. The teacher continues to encourage and motivate, guide and monitor progress, give feedback, boost confidence, and maintain motivation. Teacher and student roles are much interconnected. With the use of technology in the teaching and learning process student participation has increased. Students in blended learning work as a partner of teachers. Now the new role of the teacher is facilitator and guide. The basic requirement of students is to understand the unit of the subject so their participation is necessary, teacher motivates students to increase their confidence so that they can develop critical thinking and analysis. The most important role played by the teacher is in keeping the students digitally safe. The use of blended learning technology in classroom teaching and learning processes is an innovative method. It combines the quality of both online learning and classroom method. It not only creates

interest in learning through audio-visual aid but also develops better understanding and group feeling among students.

(a) Online Class

Online classes must be taken by using blended learning. Blended learning has two procedures. Synchronous online class and asynchronous online class.

Synchronous learning

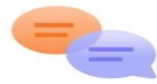
Synchronous learning provides the students in the course to engage with the course content at the same time, but from different locations. the teacher interacts with students in real-time using tools such as Microsoft team to live stream audio, video, and presentations to hold live classes or meetings, chat feature to engage in live conversations, google docs to simultaneously edit documents, add documents, and more.

By using Microsoft team, Facebook, and zoom teachers can take classes at the same time.

Microsoft Teams

The following steps are involved to operate Microsoft teams, open the Microsoft Teams app. Tap on the Teams icon at the bottom of the screen, then an icon of two people and a plus sign in the top right. You should reach the manage Teams page. To create your new team, give it a name, add a description and set the privacy settings. 1000 participants can be added to a meeting.

Welcome to Teams



Chat with anyone

Send anyone a message, even if they don't have Teams.



Video calls and meetings

Connect over one to one or group video calls.



Files and photos

Share unlimited files and photos over chat.



Privacy

We will never sell or share your data with other apps or services.

[Learn more](#)

Get started

Figure 4.23: Features of Microsoft Teams for online class.

Pen Digitizer

Pen Digitizer gives you the flexibility to write, draw, design, interact with the Graphical User Interface and perform other input-related tasks in a very user-friendly manner. With the help of a pen digitizer, a teacher can explain lab exam topics through specific drawings. By using virtual lab simulation software students can find it easily. By we can overcome the limitations and challenges and improve the effectiveness of current processes.



Figure 4.24: Pen digitizer.

Student Attentiveness

By identifying students' attendance charts and facial expressions, a teacher may detect student attentiveness. By using the expression AI app, a teacher can understand whether a student is neutral, guilty, confused, or happy.



Figure 4.25: Finding of emotion by using Expression AI.

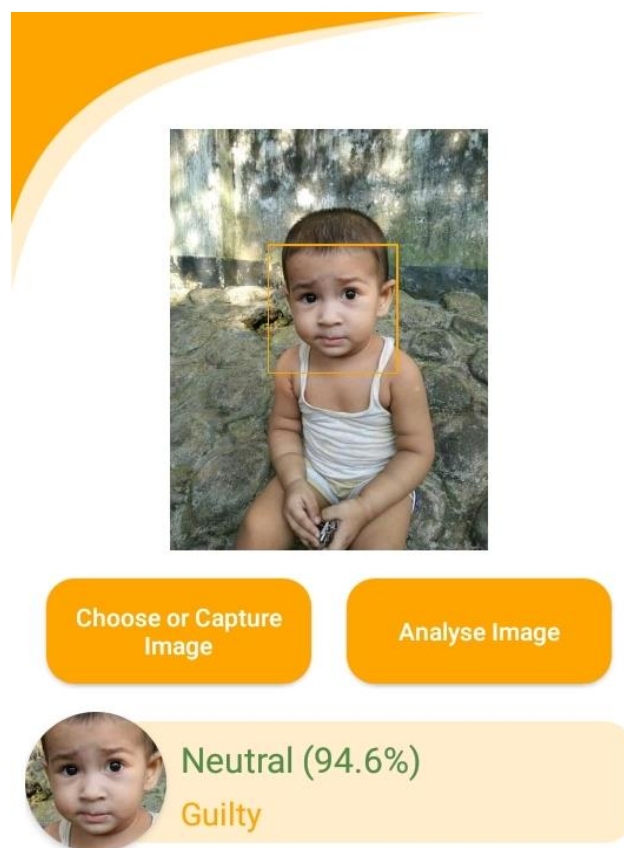


Figure 4.26: Finding of emotion by using of Expression AI.

Asynchronous learning

Asynchronous learning ensures the students in the course all engage with the course content at different times and different locations. The teacher provides students with a sequence of units that the students move through as their schedules permit. Each unit might make use of assigned readings or uploaded media, online quizzes, discussion boards, and more. A teacher may record a full class and then show it to an audience. The teachers must record the whole class and send it to the students in different locations.

(b) Online Course Evaluation

For course, evaluation quiz tests must be taken by using poll everywhere. For the theoretical exam, the students have to join a live stream with pen and paper. The whole interface should be recorded or shown by another camera. To avoid unfair means during an exam, the students must give a mock viva about their answer script that they wrote immediately.

POLL EVERYWHERE

Assessment tool Poll everywhere offers to power hybrid work. Engage audiences across hybrid workspaces through live online polling, surveys, Q&As, quizzes, word clouds, and more. Let us create a feedback poll or ask questions and see results in real-time. Enables students to respond in various ways. With open-ended questions, you can capture data and spin up tag clouds to aggregate responses. The following procedures are included to have a quiz exam. The students Join their presence with a google account. The teachers prepare a question and distribute them. They can see the response over time. The benefits of the crowd signal are many. It provides actionable team insights, visualizes employee feedback in real-time with a variety of activities, then measure engagement, follows up on feedback, and uncovers the next steps. In polls everywhere, candidates must and during a short period.

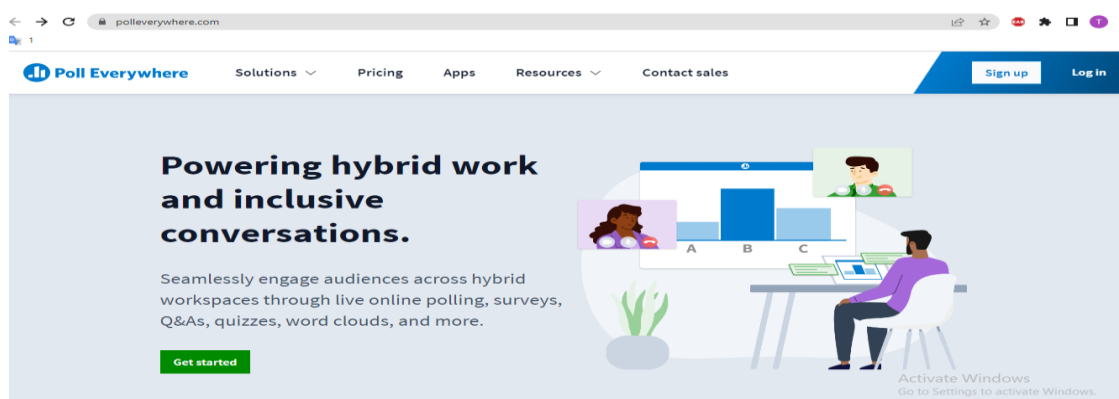


Figure 4.27: Poll Everywhere For online quiz.

(c) Online Practical/Lab Class

Programming-based labs can be taken easily online. For other labs, the following software can be used.

Pen Digitizer

Pen Digitizer gives flexibility and ease to write, draw, design, interact with the Graphical User Interface and perform other input-related tasks in a very user-friendly manner. With the help of a pen digitizer, a teacher can explain lab exam topics through specific drawings. By using virtual lab simulation software students can find it easily. By we can overcome the limitations and challenges and improve the effectiveness of current processes.

PHYSICS LAB

Virtual lab simulations allow the students to complete laboratory experiments online and abstract concepts and complex theories without stepping into a physical science lab. Then engage students in science through interactive learning scenarios. Simulate experiments, train lab techniques, and unique models, and teach theory through visual experiences that enhance long-term learning outcomes.

1. About 250+ Web-based simulations that can be played on laptops without installing any software
2. Teacher show dashboard to automate grading and track student progress.
3. Embedded quizzes to help students master science content.
4. There is a Library of learning resources, lab reports, videos, theory pages, graphics, and more.

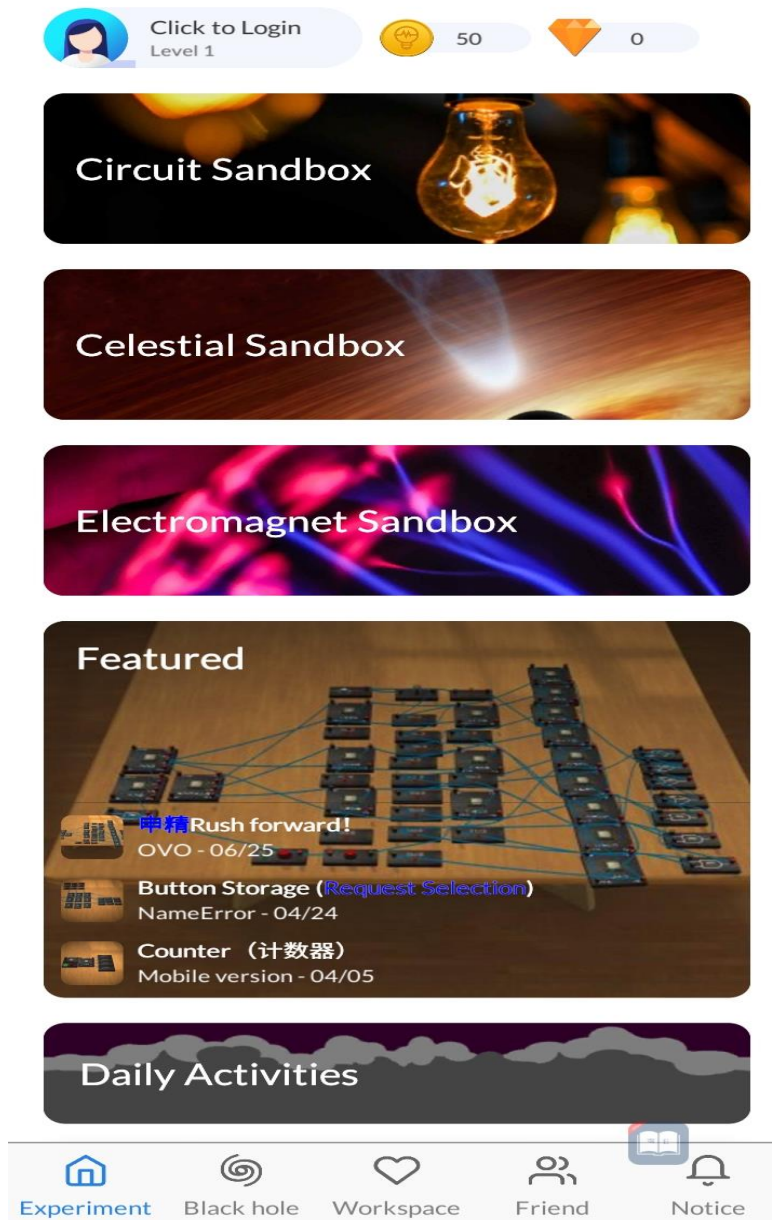


Figure 4.28: Lab Simulations for Physics Lab.

LABINAPP

It provides a multi-platform for a lab. It also has a multi-curriculum and 550+ simulations. LABINAPP enables virtual simulation of lab equipment and experiments without requiring an expensive laboratory setup. For more than 5000 schools leverage the startup's solution. The app also ensures learning content in the form of 3D/2D interactive simulations which helps students grasp tough concepts better. A computer graphic engine used to build games on desktops and

mobile devices is the core technology that powers these virtual lab science experiments. These simulations cover concepts across physics, chemistry, biology, and mathematics, and are supported across platforms of windows, android, and the web.

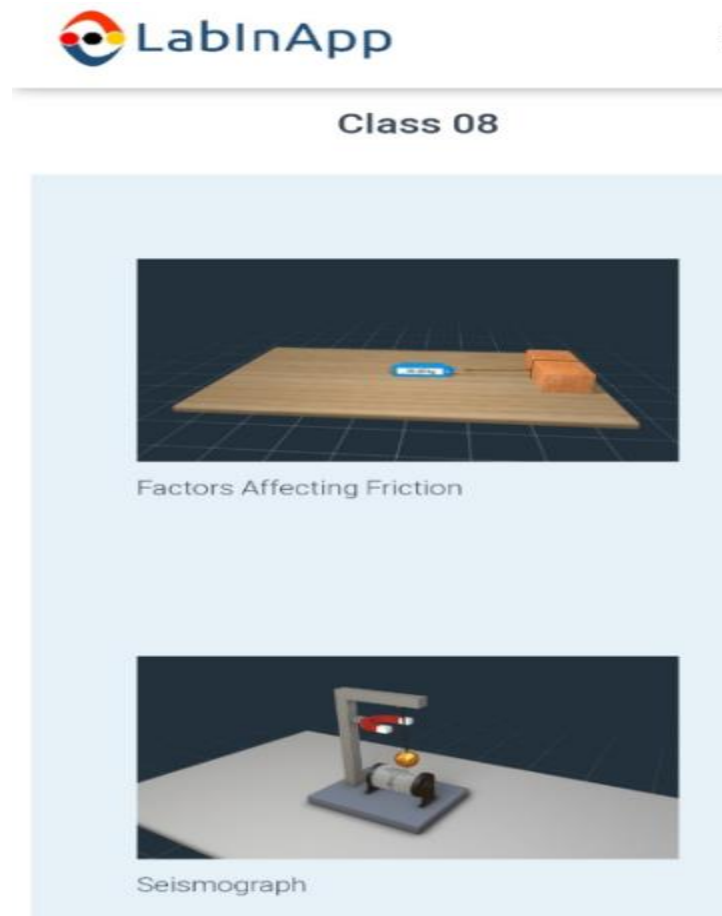


Figure 4.29: Virtual Lab Experiment view in LABINAPP.

PHET INTERACTIVE SIMULATION

Virtual lab platform PHET simulations provide funny, interactive research-based simulations. The teacher can show video clips of PHET simulations in the online classroom lectures. Students' activity can be measured through lab quiz tests. It provides

1. It makes learning goals and paths clear to students.

2. It uses deliberate practice and mastery learning strategies.
3. Also provide prompt, constructive feedback.
4. Ensures a balance of challenge and support.
5. Elicit active, critical reflection.
6. Make link inquiries to issues of high interest to the learners.

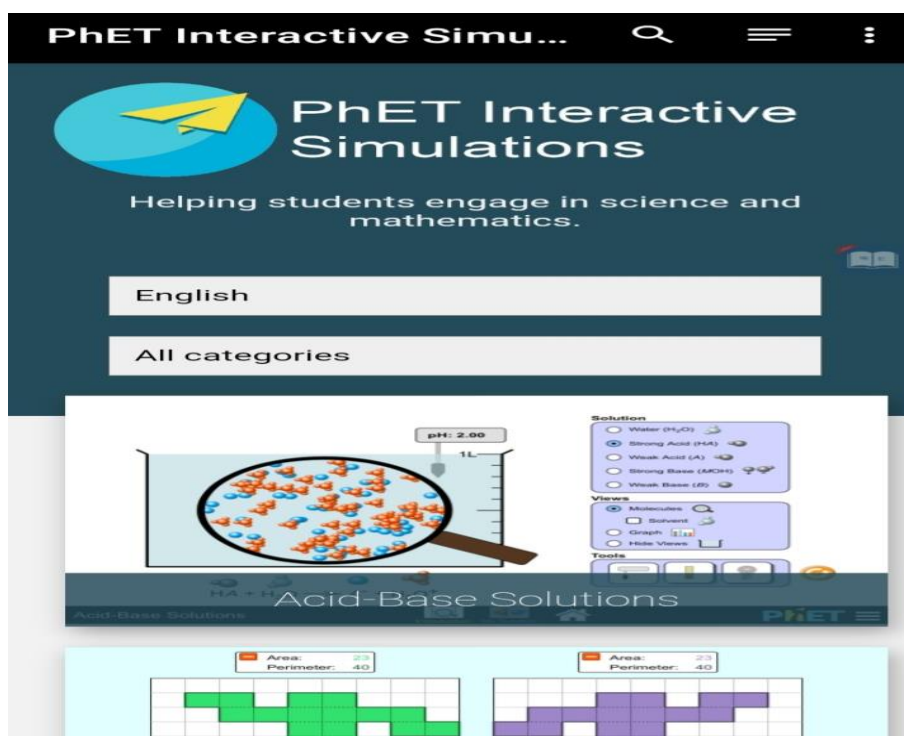


Figure 4.30: Lab Simulations in Phet Interactive Simulations.

Providing Lab Kit

In some programs, online engineering students fulfill laboratory course requirements through in-person lab work conducted in their own homes. The school may make a lab kit part of the required course materials. Students purchase such a kit just like they purchase textbooks and then use the components to conduct the lab work assigned by instructors.

(d) ONLINE LAB COURSE EVALUATION

Online lab courses can be taken by dividing the whole procedure into different sections. Such as quizzes, mock tests, and assignments.

4.3 TEST RESULT

By measuring student performance by a test, a good software platform is found. Test Result means the measurable and objective findings obtained from the evaluations. Here are four major components that should include when writing a test report.

(i) Test objective: The test objective is what type of testing the team and its testers executed. Here a good platform is built by gaining opinions from students.

(ii) Test cases (test coverage and execution details): Several types of software are used to identify the best solution.

(iii) Defect counts: Defect counts can be used as indicators of process quality.

(iv) Platform and test environment configuration details:

Table 4.1: Students opinion

Student Name	Class	Quiz	Assignment
MIFTA	MICROSOFT TEAM	POLL EVERYWHERE	THINKLINK
TITHY	MICROSOFT TEAM	POLL EVERYWHERE	THINKLINK
NISHAT	MICROSOFT TEAM	POLL EVERYWHERE	CROWEDSIGNAL
SADIA	ZOOM	GOOGLE FORM	THINKLINK
MIM	MICROSOFT TEAM	POLL EVERYWHERE	CROWEDSIGNAL
SIYAM	MICROSOFT TEAM	POLL EVERYWHERE	CROWEDSIGNAL
FARJANA	ZOOM	GOOGLE FORM	THINKLINK
RIMA	ZOOM	GOOGLE FORM	THINKLINK

LAMIA	MICROSOFT TEAM	POLL EVERYWHERE	CROWEDSIGNAL
TAMANNA	MICROSOFT TEAM	POLL EVERYWHERE	THINKLINK

From the above test, for taking class we can use Microsoft team as it can join more participant, about 300. For premium version of MICROSOFT-TEAMS it can add 1000 participants. For quiz, POLL EVERYWHERE is used because teacher can set time for one question, after completion of one question the other is given. For having assignment THINGLINK is used for multi-purpose.

CHAPTER 5

CONCLUSION AND FUTURE WORK

5.1 CONCLUSION

The purpose of this study is to visualize the current status, effects, limitations, ways, and probable improvements of online education during the pandemic situation in Bangladesh. It tries to identify different aspects of online classes and suggest a long-term, robust, and most effective workaround to overcome the limitations of continuing online classes during the pandemic situation. We hope that the statistical result from this study will further help to improve the performance and effectiveness of online education during the pandemic situation.

5.2 FUTURE WORK

For future studies, it will be recommended that further research can be conducted in several developing countries to generalize the findings of this research. The institute should develop its private platform to conduct online exams. More variables can be added to the study and the study can be conducted focusing on both primary and secondary level students. A university can develop its platform to take online evolution. Moreover, a qualitative study of students and teachers can be done to make the results more detailed and clarified.

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WORK SCHEDULE (GANTT CHART)

Activities	May 2021	June 2021	July 2021	August 2021	Sep. 2021	Oct. 2021	Nov. 2021	Dec. 2021	Jan. 2022	Aril 2022	August 2022
Identify Research Area											
Formulate Research Question											
Formulate Research Strategy											
Literature Review											
Methodolo gy											
Implement ation											
Result Analysis											
Write First Draft											
Review & Improve Writing											
Write Final Draft											