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Enhancing the Effectiveness of E-learning for Grade IX Students through Synchronous and Asynchronous Methods

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Abstract

The purpose of this action research was to examine the effectiveness of E-learning for grade IX students by using Google Meet and Google Classroom as synchronous and asynchronous mode respectively. A convenience sampling was used to select 100 students (43 male and 57 female). The lesson was taught using a combination of Google Meet and Google Classroom app followed by online test using Google Form. Using the explanatory sequential mixed method approach, the baseline and post-intervention data were used to analyze the relationship between students' perception towards E-learning, accessibility of technology and skill in technology. The findings of the study showed that 71.4% of students received limited access to internet through their mobile data. Both quantitative and qualitative data showed that students' attitude towards BBS E-learning were mostly negative. Students had moderately positive attitude towards Google Classroom for accessibility of learning material and for submitting assignments. They also had positive attitude towards Google Meet for learning purpose due to its good functionality of virtual interaction through video conferencing. The study provides some recommendations for promotion of E-learning in Bhutan.

Keywords: E-learning, Asynchronous, Synchronous, Google Meet, Google Classroom

Background

The first case of a new infectious respiratory disease called COVID-19 caused by coronavirus was reported in Wuhan, China in December 2019. The World Health Organization (WHO) declared the outbreak a pandemic on 11th March, 2020 (Cucinotta & Vanelli, 2020). In order to slow the advance of pandemic, many governments ordered to cease face-to-face instruction for most of their students, requiring them to switch, almost overnight, to online teaching and virtual education (Daniel, 2020). As a result, there was a sudden paradigm shift in teaching and learning scenario i.e., from face-to-face teaching to E-learning.

The moment Bhutan registered the first COVID-19 case on 5th March 2020, the Prime Minister issued a directive to close all educational institutes in Paro, Thimphu, and Punakha beginning 6th March 2020 for two weeks. Further, with surge in Covid cases worldwide and in the region, all educational institutes in the country were closed from 18th March 2020.

However, in order to ensure continuity in students' learning the Ministry of Education (MoE) in collaboration with Royal Education Council (REC) and Bhutan Council for School Examinations and Assessment (BCSEA) developed a prioritized curriculum. The curriculum was planned to be delivered through different platforms such as broadcast media (TV and radio), YouTube, Google Classroom, WeChat and messenger.

The MoE also launched Bhutan E-learning Program on 26th March 2020 on BBS Television. The lessons were delivered by Volunteer Teachers of Bhutan (VTOB) and the recorded versions were aired through Bhutan Broadcasting Service channels BBS 1 and 2. The delivery of lessons is done as per the key stages I-V for classes PP-XII. The lesson presenters gave competency-based questions during or at the end of every lesson.

With the advancement of computer, multimedia, and network technologies, E-learning is being explored as an effective way of delivering materials to previously unreachable students with previously unavailable access and presentation methods (Horton, 2000). However, in Bhutan, unlike the formal mode of lesson delivery in classroom, eLearning platform was new for students as well as for teachers. Bhutan being a developing country, the traditional methods are widely used in teaching and learning (Andersson & Gronlund, 2009). In the study by Maxwell et al, (2016), monasteries were the only centres of learning in Bhutan until the advent of Western-styled 'modern' education in the late 1950s. The transition from monastic system to secular school education system took place during the reign of 3rd King in the early 1960s. The country initially adopted the Indian education system and it has only been in the last 20 years that the Bhutanese

education system has become largely independent from India. REC has developed textbook less curriculum for some subjects that provides both teachers and students to use internet extensively but this practice is never akin to E-learning.

Study Site – Thrimshing Central School

It is a boarding school located almost at the heart of Thrimshing Gewog, which is about 14 Kilometers from Kharungla - a junction between Wamrong and Khaling in Trashigang Dzongkhag. It has an approximate altitude of 1990m.

The Internet facility is made available to both staff and students through Wi-Fi and landline connections on their smart phones, personal laptops and desktops in offices and computer lab. However, the internet accessibility to students is restricted only to computer lab and during class hours. The existing ICT facility in the school was hardly used for the promotion of E-learning in the school by teachers and students.

It is important to study the challenges and opportunities faced by students in the implementation of E-learning. Apart from this it is also important to know about their attitude towards E-learning, its effectiveness and in turn find practical solutions to make E-learning in Bhutan more effective.

Objectives

The purpose of this study was to investigate the effectiveness of E-learning for grade IX students through synchronous and asynchronous methods. Therefore, the main objectives were to:

1. Examine the effectiveness of E-learning for grade IX students through synchronous and asynchronous methods.
2. Investigate the grade ninth students' perception towards E-learning by incorporating synchronous and asynchronous methods.
3. Examine pragmatic interventions to make E-learning an effective option to deliver lessons in times of education in emergencies.

Research Questions

Based on the literature on asynchronous and synchronous methods to enhance the effectiveness of E-learning, this action research posed the following question:

1. How can synchronous and asynchronous methods be used to enhance the effectiveness of E-learning for grade IX students?

2. What is the grade IX students' perception towards E-learning carried out by incorporating synchronous and asynchronous methods?

What is E-learning?

According to Cheng (as cited in Li, et al, 2014), E-learning is referred to as online learning or electronic learning, delivered, enabled, or mediated by electronic technology for explicit purpose of learning. Castle and McGuire (2010) suggest that "E-learning" can improve learning experience because students can learn anywhere and under any conditions with the help of the device used to connect the internet without having to follow face-to-face interaction. Bates (2005), believes that there are four reasons for using technology in education:

- To improve the quality of learning;
- To improve access to education and training; and
- To improve the cost-effectiveness of education.

Synchronous E-learning

Synchronous E-learning is live, real-time (and usually scheduled), facilitated instruction and learning-oriented interaction (Shahabadi & Uplane, 2014). Through the use of a virtual classroom, the teacher and student can converse with one another by phoning, video conferencing and chat. The study by Weissman (2017) showed that students who participated in the live online synchronous sessions exhibited more positive perceptions of social and cognitive presences than those who viewed a recording of the session.

Video conferencing has been acknowledged as a successful delivery method in remote education for synchronous E-learning. Despite the bandwidth restriction, many academics concur that video conferences reduce the psychological distance between students and offer a personal touch to online learning (Lim, et al, 2012).

Asynchronous E-learning

In Asynchronous E-learning, there is no requirement for live teacher-student contact. It uses online learning resources to make it possible for a network of people to share information without being constrained by time or place (Shahabadi & Uplane, 2014). Using Google Classroom for asynchronous E-learning truly helps teachers learn and communicate material clearly and accurately to students (Hakim, 2016). Teachers can benefit from a number of Google Classroom services, including the assignments, grading, communication, and mobile applications (Fauzan & Arifin, 2019).

Absorb, Do, & Connect Method

The effectiveness of E-learning constituting of synchronous and asynchronous mode can be enhanced by using Horton's Absorb, Do and Connect activities. According to Horton (2012), learning activities can be classified into three key types: Absorb, Do, and Connect. These activities make it easy to come up with an effective E-learning workout.

Students are introduced to the subject through absorb activities which includes reading, listening and watching reading material in the form of lectures, anecdotes, hyperlinks, and video examples. They spend up to 50% of their time participating in these activities during the "Do" phase. Applying knowledge through various exploratory activities, including simulations, role-playing scenarios and games will help learners retain more information and gain a wider understanding of the subject area. The "connect" phase emphasizes linkages to the real world and directs pupils toward higher order thinking through group discussions and rhetorical questions (Horton, 2012).

Challenges of E-learning

As per the study conducted by Fahad et al. (2016), several academics have addressed the idea that blended learning and online education can be just as effective as conventional classroom models. Despite the potential benefits of E-learning, some developing nations, like Botswana, view the technology-based tools for E-learning as a disruption to the conventional class that have been cherished for generations (Brown et. al. as cited in Rhema & Miliszewska, 2014). In addition, Shalini (2008) explained that the developing nations find the traditional means of learning more reliable and sustainable. Students' computer experience including perceived self-efficacy, enjoyment, and usefulness of using e- learning also plays a vital role in student attitudes towards the subject matter (Liaw & Huang, 2011).

In Bhutanese context, there is a mixed response regarding E-learning from all sections of the society including teachers, students, and parents. The studies by Dorji (2021) revealed that teachers favored classroom instruction over online instruction since classroom instruction is more comfortable, authentic and accessible. The Education in Emergencies (EiE) during COVID-19 Report revealed that most of the students believed that compared to traditional classroom instruction, online learning was less efficient and more expensive. Additionally, parents claimed that contact instruction can never be effectively replaced by online instruction (Education

Monitoring Division, 2021). On the other hand, according to the research by Wangmo et al. (2020), students consider E-learning useful and participatory provided they have proper interaction with teachers and peers.

Contrarily, in 2003, E-learning was used intensively for teaching and learning during the SARS (severe acute respiratory syndrome) crisis in Hong Kong (Kinley, 2009). While Lee (2004) and Chan et al. (2007) concluded that E-learning during SARS was ineffective in terms of lowering anxiety or enhancing knowledge, Wong (2004) found that it was ineffective when compared to traditional classroom learning. The closure of schools due to COVID-19 pandemic has impacted more than 1.57 billion students worldwide. Thus, it is important to find the strategies to enhance the effectiveness of E-learning for students' education. Therefore, this research examined students' accessibility to technology, their skill in using smartphone/tab for E-learning, their satisfaction with E-learning platforms and their perception towards E-learning.

Ethical Clearance

Prior to doing the research, the ethical approval was sought from the Cluster Research committee. Since this research involved interviews, online video and audio recording, the consent of participating students was taken. To maintain confidentiality no names of the students are reflected in the report.

Research Design

An action research design was used as an appropriate research method for this study. A sequential explanatory mixed method was used whereby the quantitative data collection and analysis was followed by the qualitative data collection to substantiate the result of the initial quantitative data. This method was used because it focusses on understanding not just whether an intervention is effective but also for whom, under what conditions, and why an intervention did (or did not) have the desired effects on all topics for which mixed methods techniques are well-suited (Gallo et al., 2015). This method is used to estimate the causal impact of an intervention on its target population (to test causal hypotheses), without random assignment (White & Sabarwal, 2014).

Population and Sample

Total population comprised of 100 students (43 male and 57 female) of ninth grade at Thrimshing Central School under Trashigang Dzongkhag, Bhutan. From 100 students, only 60 had access to smart phone and internet. Since the research was done during the first lock down, only 20 students used to send assignments through Google Classroom and also used to watch BBS VTOB lessons.

The rest of the students were inactive in Google Classroom and did not submit assignments. The researcher used purposive sampling to select from those active students. The “Survey on E-learning” using google form was sent to 20 students. However, only 14 students had responded to “Survey on E-learning” google form.

Data Collection

The quantitative data were collected from the survey questionnaires using Google forms, online assignments and online test. The survey questionnaires included close-ended questions developed based on Five Point Likert Scale. The quantitative data were used to find the relation between the dependent variable “students’ attitude towards technology and E-learning” and independent variable “accessibility of technology”, “skill in technology” and “ease and usefulness of Google Meet”. The reliability of quantitative data in this study was determined by finding Cronbach’s Alpha by using SPSS v22 (see Table 1).

Table 1: *Reliability of survey items*

Scale	No. of Survey Items	Cronbach’s Alpha
Accessibility to Technology	4	0.66
Skill in Technology	10	0.91
Students attitude towards technolog	17	0.96
Ease and usefulness of Google Meet	13	0.85

The Cronbach’s Alpha value for quantitative data ranges from 0.66-0.96 which is acceptable to excellent value (Konting et al, 2009). This indicates that the above-mentioned scales are reliable.

The qualitative data were collected from the semi-structured interviews with 10 of the participating students. While conducting the interviews, consent of students was taken. They were called individually in IT lab and were informed that the interview was for research purpose. Students preferred for audio recording over video recording. Instead of students’ name, they are labelled as S1 for student 1, S2 for student 2 and so on till S10.

Baseline Data

1. Access to Technology

Accessibility to technology in the form of gadgets and internet plays a significant role in shaping students’ attitude towards E-learning. According to the finding, only 14.3% of the participating students had laptop and tab, in addition to smartphones. A total of 71.4% of students had received

limited access to internet (mobile data) and only 28.6% of students had received good access to internet. However, 92.9% of the students had no access of Wi-Fi connection.

2. Skills in Technology

To measure the student’s skill in use of technologies for various purposes, they were asked to apply rating scale (from “1” ‘not skilled at all’ to “5” ‘very skilled’). The overall mean of 2.64 indicates that the students were ‘not very skilled’ in using technology for various purposes (see Table 2).

Table 2: Mean value for Students’ skill in use of smartphone (n =14)

Statements	Mean	SD
Use smartphone to play games	2.00	0.96
Use internet to play online games	1.86	1.03
Use internet to send or receive email	2.64	1.08
Use smartphone for photography	2.86	1.41
Use smartphone for making videos	2.79	1.31
Use social media platforms such as Facebook and WeChat for chatting	2.79	1.31
Use social media platforms such as Facebook and WeChat for sharing photos and videos	2.86	1.03
Use internet to make audio call and video call	2.64	1.28
Use smartphone to listen to radio FM	2.57	1.22
Use smartphone to send text message to people	3.43	1.16
Weighted Mean	2.64	1.18

Students’ perception towards technology and E-learning

An item analysis of responses to the survey was conducted by collapsing the two measures of ‘strongly agree’ and ‘agree’, and ‘strongly disagree’ and ‘disagree’. Considering ‘agree’ statements as indicators of positive attitudes, the range of percentages under the ‘agree’ category was 14.3-64.3% as compared to 0-35.7% under the ‘disagree’ category. This indicates that the students’ overall responses to the attitude scale were moderately positive. About 57.2% of the participating students wanted the E-learning to continue even after pandemic, 64.3% of them found it convenient and 42.8% of them opined that E-learning increases the quality of learning (see Table 3).

Table 3: *Students' perception towards technology and E-learning*

Statements	SD	D	N	A	SA
E-learning should be continued even after this pandemic for learning purposes.	0	3 (21.4)	3 (21.4)	4 (28.6)	4 (28.6)
I believe that convenience is an important feature of E-learning	0	3 (21.4)	2 (14.3)	6 (42.9)	3 (21.4)
I use instant messaging chat such as Facebook Messenger "Class IX Physics (2020)" group chat to communicate or collaborate with my friends to ask doubts to my subject teachers.	2 (14.3)	1 (7.1)	3 (21.4)	2 (14.3)	6 (42.9)
I receive my grades/marks from my subject teachers in Google Classroom.	4 (28.6)	0	2 (14.3)	2 (14.3)	6 (42.9)
Every time I submit my assignment, I receive comments and feedbacks from my subject teachers in Google Classroom.	2 (14.3)	1 (7.1)	2 (14.3)	6 (42.9)	3 (21.4)
Household chores and other responsibilities at home interfere with E-learning	2 (14.3)	4 (28.6)	1 (7.1)	3 (21.4)	4 (28.6)
I use instant messaging chat such as Facebook Messenger "Class IX Physics (2020)" group chat to communicate or collaborate with my friends to ask doubts to my subject teachers.	2 (14.3)	1 (7.1)	3 (21.4)	2 (14.3)	6 (42.9)

Note: **SD= Strongly Disagree** **D=Disagree** **N=Neutral** **A=Agree** **SA=Strongly Agree**

Numbers in brackets indicate percentage

4. Assignments on BBS lesson.

After the BBS lesson on “Work, Power and Energy”, an assignment was given to the students on the same topic via Google Classroom. It was found out that 12 out of 14 students scored less than 4 out of 8 marks indicating that they did not understand the lesson well.

Intervention

The baseline data revealed that students had negative attitude towards E-learning through BBS E-learning programme and moderately positive attitude towards Google Classroom. Therefore, two interventions were used to see its effect on students’ attitude towards E-learning as mentioned below:

- i. **Use Google Meet app for synchronous E-learning:** According to Stefan (2008), synchronous communication allows for the monitoring of the receiver's response to a message, increasing the receiver's commitment to and motivation for reading. It raises students' motivation and excitement. Therefore, the Google Meet app was used for synchronous online learning.
- ii. **Use Google Classroom app for asynchronous E-learning:** Stefan (2008) stated that when communicating asynchronously, the receiver has more time to comprehend the message, since the sender does not expect an immediate answer. Thus, it increases the ability to process information. Therefore, for asynchronous E-learning, Google Classroom app was used.

The participating students were oriented on the installation and usage of Google Meet app. Since the topic taught through BBS E-learning programme for key stage 4 was more of class X syllabus, class X topics were taught so that students can understand the topic well. Three Google Meet classes were conducted to the class IX participating students on the topic “Principle of Moments”, “Ohm’s Law” and “Work, Power and Energy.” The lesson was made following the Absorb, Do and Connect formula. Apart from that, the recorded video of E-learning on Google Meet app was shared with the students through Google Drive for ready reference.

A Google Meet link was distributed to the students via Messenger group chat on the day of Google Meet class. Some of the students were unable to attend the first class since they did not know how to open Google Meet. Following the first class, students were instructed on how to launch the Google Meet app. The class was then taken the next day.

The Google Meet class was conducted using laptop with Wi-Fi. Before taking the Google

Meet class, ground rules were set for conducive learning environment. The teacher researcher muted the microphone of all the participating students so that there would not be any disturbance while teaching. After explaining the topic for about 10-15minutes, the students were given chance to ask doubts if they had any either through unmuting their mic or by chatting. The class was taken for about 40-50mins. However, when there was internet problem from students' side or when students asked many doubts, the class used to last for about one and half hours.

Diagrams showing real-world applications of the Principle of Moments, PhET simulations of see-saw and steps to solve the numerical problems using the formulae were included as part of "Absorb activity" for the topic "Principle of Moments." Questions related to the topic were randomly asked to the student as part of "Do activity." "Connect activity" included a follow up activity for them to submit after 2 days on Google classroom.

Absorb Activities

Figure 1 Introduction of the topic

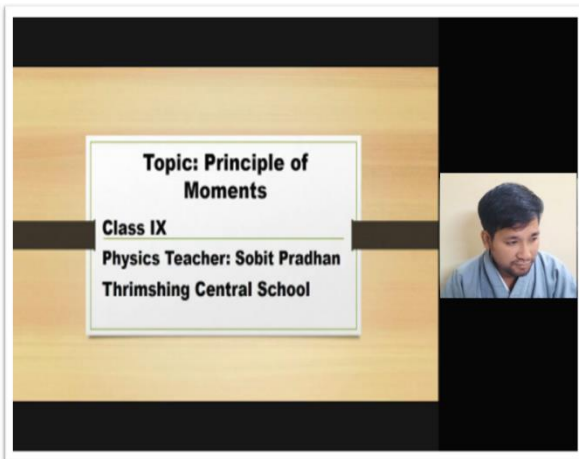


Figure 2 Real life applications of Principle of moments

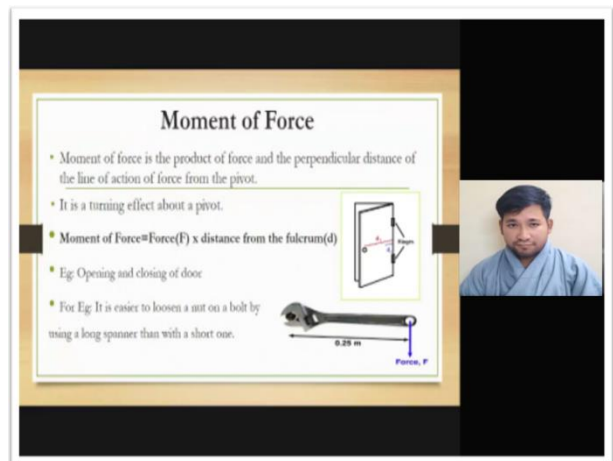


Figure 3 Explain numerical problem

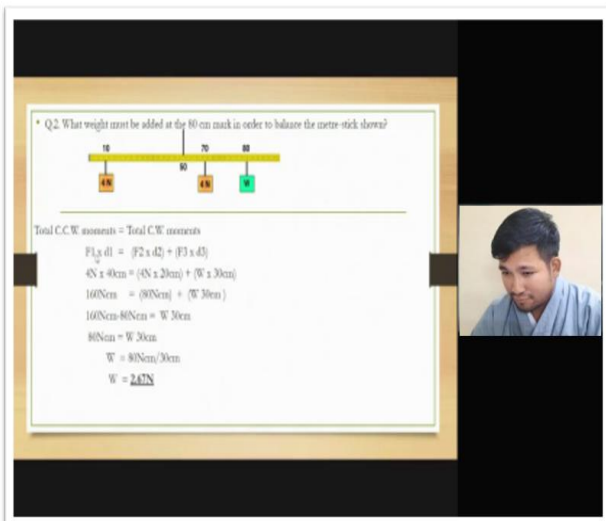


Figure 4 Formula and steps to solve numerical problems

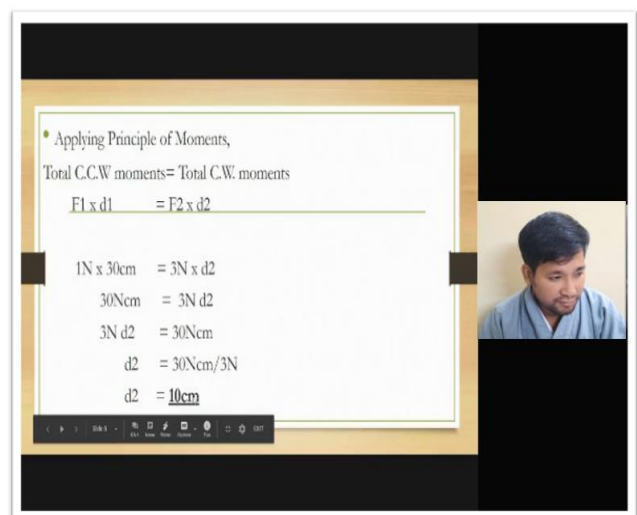
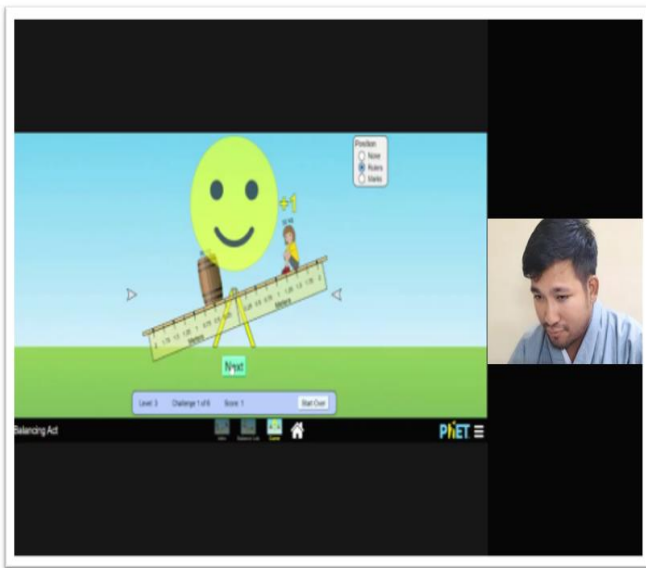


Figure
PhET

4

5

Simulation of See-saw



Do Activities

Figure 6 Numerical problem 1 for the students to solve

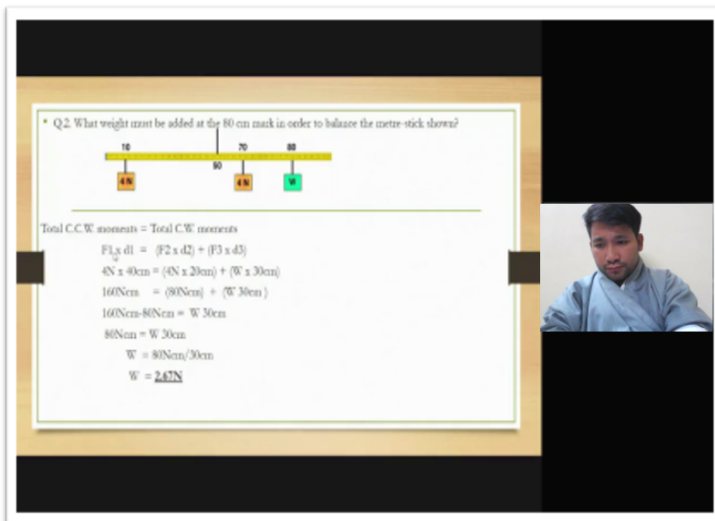


Figure 7 Numerical problem 2 for the students

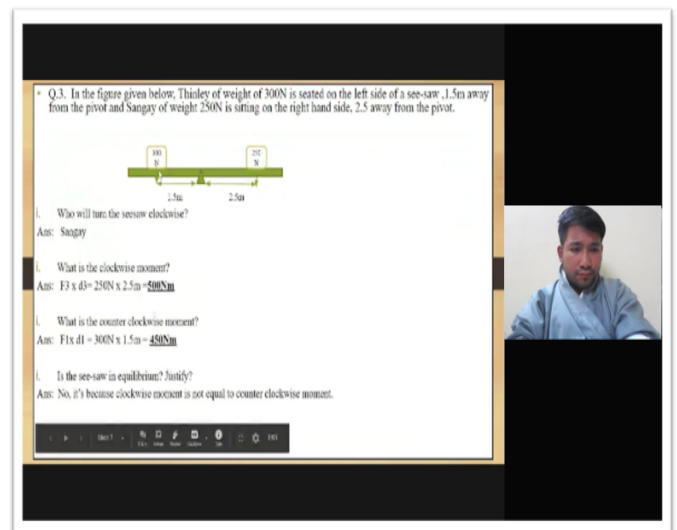
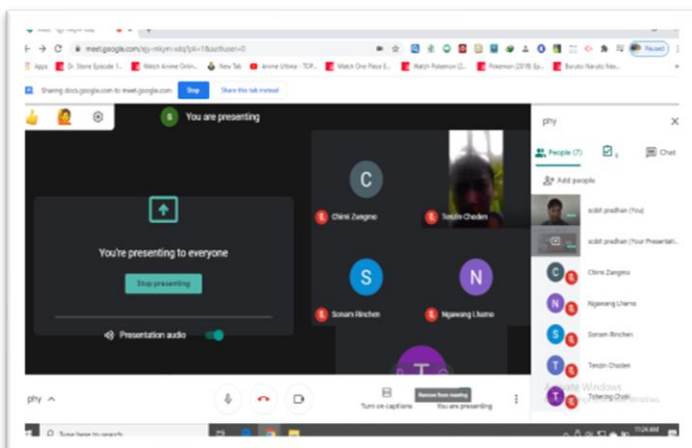
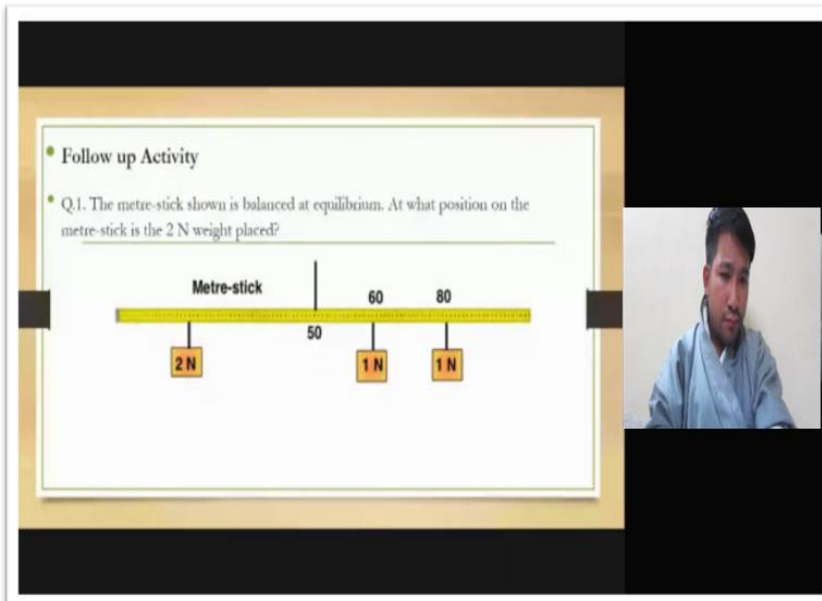


Figure 8 Clear students' doubts



Connect Activity

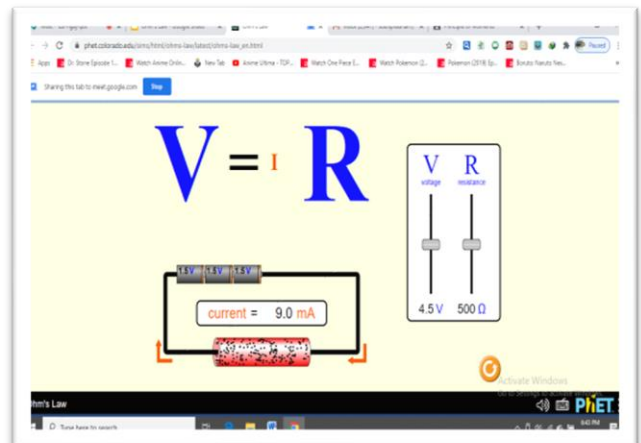
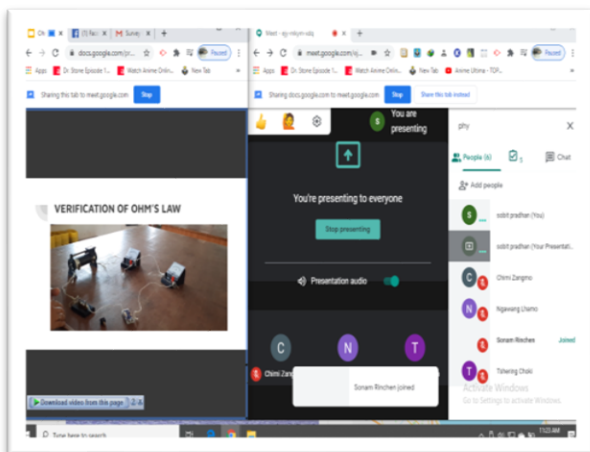
Figure 9. Follow up Activity



A video on “Verification of Ohm’s Law” experiment was made and uploaded in Google Classroom. Students were asked to watch the video to get the gist of the topic. This was part of Absorb activity. The next day, Google Meet class was done on the same topic with diagrams and Phet simulations of Ohm’s Law.

Figure 10 Verification of Ohm’s Law

Figure 11 PhET simulation of Ohm’s



A 20-point online test on the topic "Work, Power, and Energy" was given a week after assignments were due. The "Quilgo" Google Chrome extension, which provides camera

recording, cheating prevention measures, and clock countdown tracking for Google forms, was used. Quilgo's free version which did not have camera recording feature was used. One hour was allotted for the online test, which had nine multiple-choice questions and one short response question. Students received instructions on how to access the Google form for the online test before beginning the test.

Figure 12 Pictorial example of the topic 'workdone'

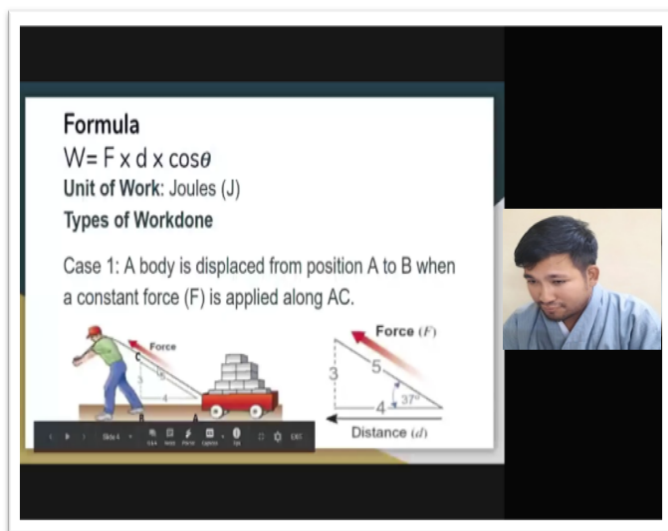
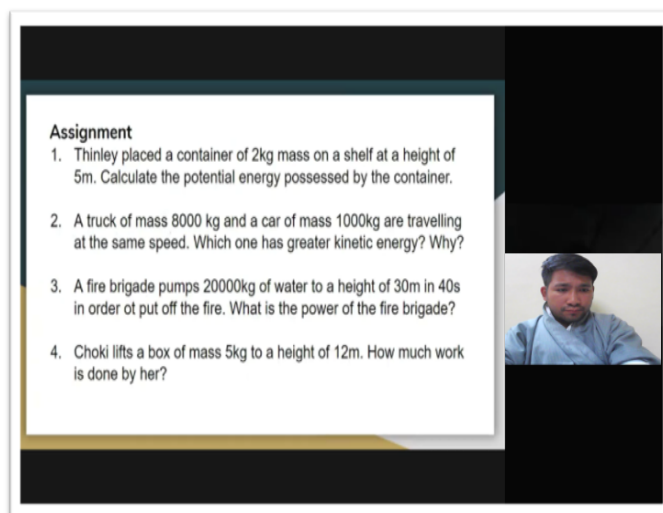


Figure 13 Assign assignment



Post intervention

Students were assessed based on their performance in assignment and online test on the topic "Work, Power and Energy." It was followed by Google Meet survey for perceived ease of use and usefulness for students.

Post Intervention Data analysis

The quantitative data were analyzed through descriptive statistics using SPSS v22. Conversely, pie diagrams and bar graphs were prepared using Microsoft excel. The data collected from participants' semi-structured interviews were analyzed and interpreted using a thematic approach (Cresswell & Cresswell, 2018).

Findings & Discussion

The results of the quantitative data and qualitative data are combined and discussed under five different themes.

1. Effective E-learning platform for understanding (EPU)

The participants were of the opinion that they learnt the lesson better through Google Meet as it was a kind of face-to-face teaching like the regular class. They were able to ask doubts to their

subject teachers in real time. The multimedia such as pictures, videos, power point presentations, brain break videos, simulations made the lesson interesting as expressed below:

Through Google Meet, teacher explains the topic with pictures, videos and brain break videos and thus I'm able to understand the lesson well. (EEPUS2)

In class, I used to hesitate to ask question due to crowd. But through Google Meet, I'm able to ask my doubts to subject teachers. (EEPUS10)

Google Meet looks like regular class as I can ask questions directly to my teacher. (EEPUS7)

This finding was supported by quantitative data which indicates that students' attitude towards E-learning have improved from moderately positive to highly positive. It was discovered that 86% of the class were able to understand the lesson through live video lectures in Google Meet and found it simple to use for interacting with their classmates and subject teacher. Furthermore, 79% of the students agreed that Google Meet has a potential as an instructional tool. The overall mean responding either agree or strongly agree to all the 13 statements is 4.46 (See Table 4). Similar study by Mannong (2020) highlighted that students understand the given materials and assignment instruction easily through Google Meet. It also made students enthusiastic in teaching and learning process.

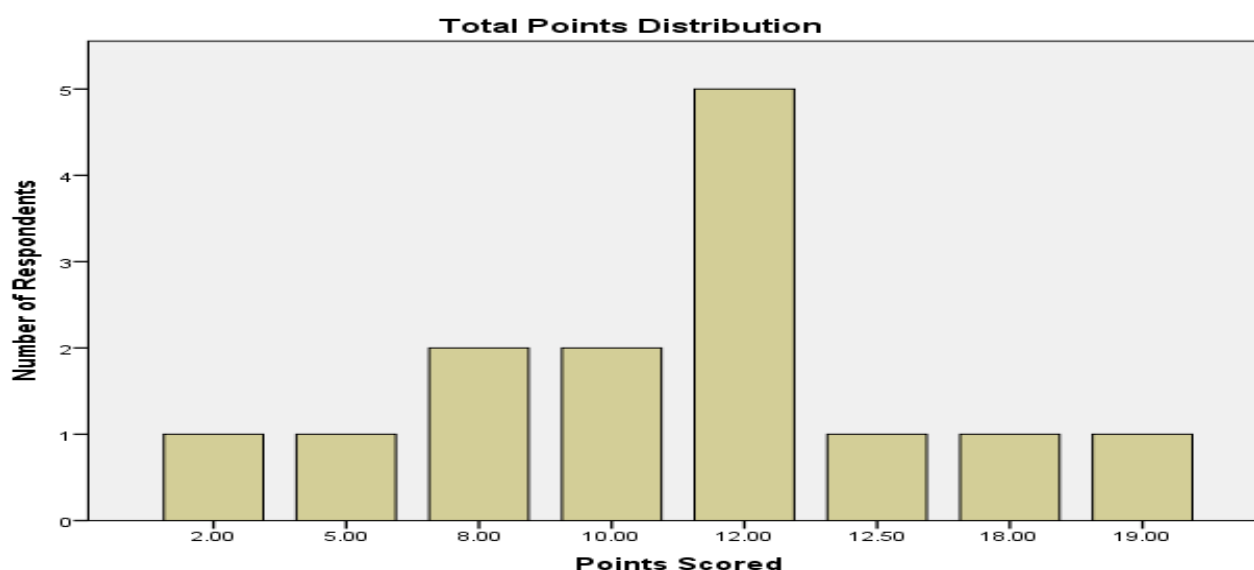
Table 3: *Google Meet survey for perceived ease of use and usefulness for students*

Statements	SD	D	N	A	SA
My interaction with Google Meet is clear and understandable	0%	0%	86%	7%	7%
Interaction with Google Meet does not require a lot of my mental effort.	0%	0%	14%	14%	72%
I find Google Meet easy to use	0%	0%	7%	14%	79%
Learning how to perform tasks using Google Meet is easy.	0%	0%	14%	36%	50%
Google Meet is a good medium to clear our doubts	0%	0%	0%	43%	57%
Google Meet has good functionalities	0%	0%	14%	29%	57%
Live video lectures using Google Meet helps me to learn the topic well.	0%	0%	14%	36%	50%
Google Meet helps to increase interaction with my classmates	0%	0%	14%	14%	72%
Google Meet makes online collaboration enjoyable	0%	0%	0%	14%	86%
Google Meet has a potential as an instructional	7%	7%	7%	14%	65%

With an average point of 11 out of 20 i.e 55% and 12 out of 14 students getting above pass percentages, the online test result shows that students have learnt the lesson well through Google

Meet (See Figure 14).

Figure 14. Online Test result



Ineffective E-learning platform (IEP)

The participants were not too satisfied with the BBS E-learning programme. Two of the participants did not watch BBS E-learning programme as they did not have TV. Three of them expressed that they understood the lesson little bit through BBS E-learning. Rests of them were of the opinion that they did not understand the topic well through BBS E-learning. This indicates that there was lack of understanding of the topics taught. For instance, the following excerpts revealed:

It was difficult to understand numerical problems. (IEPS3)

The topics taught through BBS are not there in our text book. (IEPS7)

Since there is no face-to-face teaching like in regular teaching, when there is doubt; I could not clear my doubts. (IEPS1)

As per the survey, only nine students (64.3%) watched the BBS E-learning programme. Out of the nine students, only 21.4% of the students understood the concept better through BBS E-learning than through regular teaching. These findings are in line with the findings of Kado et. al. (2020) which highlighted that there was less interaction between teachers and students during BBS lessons, and learning was not as successful as it was during contact teaching.

2. *Effective E-learning platform for assignment (EEPA)*

The participants were of the opinion that sending assignments through Google Classroom was not tough though for few assignments they had to type using their mobile phones which was time consuming. However, all of them were of the opinion that Google Classroom is not suitable for

learning the topics taught in BBS as expressed below:

It was easy to send assignment through Google Classroom. (EEPAS1)

It was difficult for me to type assignment in mobile. (EEPAS5)

I was not able to understand the topic well through Google Classroom as there was only questions given for assignments. (EEPAS7)

The survey shows that 57.2% of the students find it easy to submit assignment through Google Classroom. With 64.3% of the students agreeing on receiving the feedback from their subject teachers for their assignment, 57.2% of the students' assignments being graded and 50% of the students being satisfied with the online interaction with subject teacher through Google Classroom; it indicates that students have moderately positive attitudes towards E-learning through Google Classroom. This is in line with the findings of Sibuea (2018) which stated that students find online assignment as the best feature of Google Classroom and they find Google Classroom easy to use.

3. Skill in technology, accessibility of gadgets and internet connection (SAI)

The participants were of the opinion that the internet connection was good to average. Especially during bad weather, the net connection dropped but on fine days, the net connection was good (SAIS2). Another student mentioned that, "I had good 4G connection (SAIS6).

The students who had laptop/tab and good internet connection showed stronger positive attitude towards E-learning. Hence the students' attitude towards E-learning to some extent was affected by their skill in technology and the accessibility to gadgets and internet connection. This is consistent with the findings of Rhema and Miliszewska (2014) which highlighted that along with technological aptitude, there was statistically significant association between students' attitude toward technology and their amount of access to various technologies. Similar results were observed by Kado et al (2020) that students who did not have smart gadgets such as smartphones/tab/laptop, inaccessibility of internet data and internet connection found it difficult to submit assignments through Google Classroom.

4. Preference of E-learning platform (PEP)

Majority of the participants were of the opinion that they would prefer to use both Google Meet and Google Classroom for learning the lesson and for submitting the assignment respectively. However, few students would prefer to have the combination of BBS E-learning programme, Google Meet, and Google Classroom. Following are the excerpts of the interview:

Since we can have face-to-face interaction with our subject teachers in Google Meet, we are able to understand the lesson well. Through Google Classroom, we are able to submit assignment. (PEPS2)

I would prefer to have BBS E-learning, Google Meet and Google Classroom together. (PEPS10)

Since we got skill of using Google Meet and Google Classroom, in future we are confident to learn the topics well through these E-learning platforms. (PEPS3)

The study revealed that the combination of synchronous and asynchronous method helps in enhancing the effectiveness of E-learning for grade IX students. The result of this study is in line with the findings of Borup et.al, Heeyoung and Johnson (as cited Kobayashi, 2015) “both synchronous and asynchronous online tools have positive impacts on students’ learning”. Similarly, the study by Lalap Jr (2021) states that students were highly satisfied with the use of Google Classroom and Google Meet followed by Google form as these Google applications are user friendly, affordable and easy to use. Apart from that there was significant effect on using these apps to the academic performance of class VII students learning social studies (Lalap Jr, 2021).

Recommendations

In order to have a better E-learning experience for teachers and students nationwide, the following recommendations are provided:

- The Teacher Professional Support Division (TPSD) should organize PD programs for the teachers on the use of Google Meet app for teaching purpose and Google form for preparing questionnaires and conducting test.
- The Ministry of Education can avail the paid version of Quilgo website for all the teachers to use in conducting a cheating-free test like in real exam.
- The school should then give the orientation on the use of Google Meet app and online test using Google form and Quilgo for all the students nationwide.
- The VTOB lessons aired through BBS as part of E-learning can be effective if the lessons are taught class wise rather than key stages.
- The Department of Curriculum and Professional Development (DCPD) should frame a curriculum whereby E-learning is integrated in the syllabus as blended learning for the effective teaching and learning process to take place. This will ensure the continuity of education even during the pandemic

Conclusion

Though E-learning is new in Bhutan, the pandemic was a blessing in disguise for the curriculum developers, teacher educators, teachers and learners nationwide. It is because the pandemic was an eye opener for all the stakeholders related to education in the sense that we should be ready for E-learning platform during emergencies. The study showed that in E-learning, “instructors and students” must depend on technology for effective communication with each other as stated by Kobayashi (2015). Students’ attitude towards E-learning depends upon the accessibility to required gadgets and internet, skill in technology and satisfaction with E-learning platforms. Apart from that choosing the right technology plays a vital role in making E-learning a fruitful experience for both teachers and students.

The two E-learning platforms namely Google Meet and Google Classroom overall have positive changes in students’ attitude towards E-learning. The positive attitudes and willingness of students to learn through E-learning platforms suggests that future E-learning initiatives have good potential in Bhutan.

Limitations

The size of the sample was small and it is based on the study done on students of Thrimshing Central School. The Google Meet feature “Raise your hand” and “Break out room” were not used as it was a new feature which was not available during the time of this research. There is a scope for the researchers to do further research with bigger sample size using the new features of Google Meet.

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