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# The Use of Video Conferencing Applications Facilitating Behavioral Engagement during Synchronous Learning in the Time of Pandemic

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**Abstract:** Behavioral engagement in an online setting can be described as an on-task performance done by the students (Moser & Smith, 2015). This refers to how active the students are during synchronous learning using the features of the video conferencing applications such as opening their camera, speaking through the microphone, screen sharing contents, and using the chat box to answer and respond to questions (Al Mamun et al, 2016; Park & Bonk, 2007). This study describes the use of video conferencing applications in facilitating behavioral engagement during synchronous learning. 462 Grades 11 and Grade 12 students and five (5) teachers were invited to answer a self-report questionnaire. The results indicated that teachers provided opportunities for behavioral engagement to happen during synchronous learning by making the features always available for the students to use. Further, the study showed a very weak relationship between the challenges encountered by the students and the students' perception of the use of video conferencing applications contradicting other literature suggesting that the two variables affect each other. Moreover, this study found out a moderately strong relationship between the frequency of use of the features and the students' perception on the use of video conferencing application during synchronous learning.

**Keywords:** Technology integration, behavioral engagement, Philippines, video conferencing application

## 1. Introduction

The sudden surge of Coronavirus Pandemic (COVID-19) in the Philippines has greatly affected the education system. In the past year, the Department of Education (DepEd) has been implementing various modes of learning to augment traditional face-to-face teaching and learning to resolve the needs and the challenges of the current situation in the education sector (DepEd, 2020), applying two modes of teaching and learning: Asynchronous and Synchronous.

Finol (2020) described asynchronous learning where teachers provide students the materials to use during learning, such as printed modules, educational videos, PowerPoint files, documents, etc. In short, students learn the same content at their own pace. On the other hand, synchronous learning is when teachers and students interact over a video conferencing application and participate in learning discussion mimicking a traditional face-to-face classroom (Masa, Diaz, Delgado, & Esteban, 2014).

Schools in the Philippines have utilized video conferencing applications, such as Zoom, Google Meet, and Microsoft Teams to conduct synchronous learning classes. However, internet stability, lack of digital resources of teachers and students, and lack of training and material production for teachers are major concerns when conducting synchronous learning (May, 2020; Bott, 2020). Additionally, students' disengagement to the learning discussion being a significant challenge for teachers and school administrators (Hartwell, 2017; Bernard et al, 2004).

Behavioral engagement in an online setting does not differ from behavioral engagement constructs in the classroom as articulated by Fredrick, Blumenfeld, & Paris (2016). Literature have defined behavioral engagement as an on-task behavior and performance which includes students utilizing the chat function, activating their microphone, opening their video camera, and using virtual raised hands to be recognized, making this type of engagement the easiest one to observe (Moser & Smith, 2015; Al Mamun et al, 2016).

Teachers may be able to integrate audio, video, chat rooms, and other student response systems which will make the students active participants in the learning discussion. However, some instances where teachers and students encounter technical problems, such as distorted audio and video quality, internet instability, and power outage.

In this study, the researcher described the use of video conferencing application facilitating students' behavioral engagement during synchronous learning of senior high school students at Polytechnic University of the Philippines (PUP), Manila during the 1st semester, AY. 2020-2021.

PUP is a state university in the Philippines that houses almost 70,000 students from its twenty-two campuses nationwide. It continues to become the Philippines' partner in improving the plight of the poor, developing students holistically, and alleviating poverty amongst its students and the marginalized community.

Specifically, this study sought to answer the following research questions:

1. Is there a significant relationship between teachers providing opportunities for behavioral engagement and the students' frequency of use of the features of video conferencing applications?
2. Is there a significant relationship between the challenges encountered by the students and their perception on the use of video conferencing applications during synchronous learning?
3. Is there a significant relationship between the frequency of use of the features and the perception of the students on the use of video conferencing applications?

## 2. Methodology

In this section, the target participants, instruments, and procedures conducted in the study will be discussed thoroughly.

*Participants* – this study consists of 462 (179 Grade 11, 283 Grade 12) Science and Technology, Engineering, and Mathematics (STEM) senior high school students (SHS) who took up General Chemistry 1 and General Physics 1 and the five (5) teachers handling these subjects.

*Instrument* – The researcher used the instruments provided by Abaci & Goodrum (2015). It was modified to fit the criteria for other video conferencing applications and to make it more specific for teachers and students. Two (2) versions of the questionnaire were produced – Teacher's Questionnaire and Student's Questionnaire. In the teacher's questionnaire, the availability of the features of the video conferencing applications and how frequent do students use these features during synchronous learning were asked. In the student's questionnaire, items such as the video conferencing application they use in class, the availability of the features of the video conferencing applications, frequency of use of these features, challenges encountered, and their perception on using video conferencing applications were also included.

*Procedures* – The researcher translated the questionnaire into a Google Form format since classes in PUP are conducted online. The researcher asked assistance from the PUPSHS administrators to disseminate the Google Form link to the teachers and to the students through their group chats, Facebook groups, or virtual classrooms. Informed consents were also obtained from the participants.

## 3. Results and Analysis of Data

### *3.1 Participant's Demographics*

The researcher invited 462 SHS STEM students and their teachers to answer the survey questionnaire.

Table 1. *Summary of Participants' Demographics*

| | | Students | | Teachers | |
|---|---|---|---|---|---|
| Video Conferencing Applications | Google Meet | 242 (52.4%) | | 2 (40%) | |
| | Microsoft Teams | 173 (37.4%) | | 2 (40%) | |
| | Zoom | 47 (10.2%) | | 1 (20%) | |
| Device/s Used | Smartphone | 289 (61.9%) | Often | 0 | Sometimes |

| | | | | | |
|---|---|---|---|---|---|
| and Frequency of Use | Tablet/iPad | 45 (9.6%) | Never | 1 (20%) | Rarely |
| | Laptop Computer | 287 (61.7%) | Sometimes | 5 (100%) | Always |
| | Desktop Computer | 83 (17.8%) | Rarely | 0 | Rarely |
| Internet Connection | Yes | 428 (92.6%) | | 5 (100%) | |
| | No | 34 (7.4%) | | 0 | |

The participants mentioned that most of their synchronous learning classes are conducted using Google Meet (52.4%/40%) or Microsoft Teams (37.4%40%) video conferencing applications. Additionally, students often use their smartphones (61.9%) to attend the synchronous learning since this device is not only for educational purposes, but practically for personal use as well. Teachers use laptop computers (100%) to easily navigate the video conferencing application.

When asked about the available internet connection at home, 428 students (92.6%) and all teachers (100%) are subscribed to an internet service provider. The other students rely on their network's mobile data and from their neighbor's/relative's internet connection.

### *3.2 Teachers Providing Opportunities for Behavioral Engagement during Synchronous Learning and Students' Frequency of Use of the Features of Video Conferencing Applications*

This section discusses the teachers providing opportunities for behavioral engagement to happen during synchronous learning. Thus, by making the features available to the students to use, they also allow opportunities for behavioral engagement to happen during synchronous learning.

Table 2. *Summary of the Availability of the Features of Video Conferencing Application as Provided by the Teachers during Synchronous Learning and the Students' Frequency of Use of these Features*

| Features of Video Conferencing | Teachers | | | Students | | |
|---|---|---|---|---|---|---|
| | *M* | *SD* | Description | *M* | *SD* | Description |
| Group messaging | 3.80 | 1.79 | Often | 3.68 | 1.19 | Often |
| Screen sharing | 4.60 | 0.89 | Always | 3.22 | 1.42 | Sometimes |
| Recording of video and shared content | 4.40 | 0.89 | Always | 3.29 | 1.37 | Sometimes |
| Emojis/Virtual raised hands as signal | 4.20 | 0.84 | Always | 3.38 | 1.23 | Sometimes |
| Microphone | 4.60 | 0.89 | Always | 3.97 | 1.37 | Often |
| Video Camera | 4.60 | 0.89 | Always | 3.38 | 1.23 | Sometimes |

Legend: 4.20-5.00 = Always, 3.40-4.19 = Often, 2.60-3.39 = Sometimes, 1.80-2.59 Rarely, 1.00-1.79 = Never

Teachers confirmed that the features of the video conferencing applications, such as screen sharing, microphone, and video camera (M=4.60; SD=0.89) are always available for the students to use during synchronous learning. Hence, teachers do allow their students to share their screens to present PowerPoint slides, especially when proposing a plan, presenting an idea, or the activities.

With 0.05 level of significance, the obtained p value=0.00, presenting a substantial relationship, therefore rejecting the null hypothesis that there is no significant relationship between the availability of the features of the video conferencing applications and the students' frequency of use of these features.

This result suggests that students have more opportunities to be active participants during synchronous learning by using communication channels, such as the microphone, group messaging, and screen sharing features. Additionally, researchers found that students make use of these features to interact and participate in the learning discussion by asking questions, sharing ideas, and discussing with their classmates (Andrew, Maslin, & Ewens, 2015; Hudson, Knight, & Collins, 2012). More so, these students tend to be motivated to learn and possess higher order thinking particularly when teachers embed interactive software, audio, and video in the learning discussion (Armstrong & Thornton, 2012).

Therefore, when teachers allowed their students to maximize the use of the features of the video conferencing applications, most possibly, students would be able to freely provide their thoughts and ideas on the topics being discussed and share their experiences.

### *3.3 Challenges Encountered by the Students and the Students' Perception on the Use of Video Conferencing Applications during Synchronous Learning*

The stability of the internet connection is essential for the video conferencing application features to work properly, if not, certain technical difficulties may be encountered during the conduct of synchronous learning which may have an impact on students' learning and engagement.

Most students complained that they often experience lagging screen sharing (*M*=3.42; *SD*=1.10) during synchronous learning when teachers are moving to succeeding slides of their PowerPoint or when playing video. Other students sometimes encounter distorted audio (*M*=3.00; *SD*=0.98) and video (*M*=3.16; *SD*=1.07) and trouble joining the meeting (*M*=2.89; *SD*=1.08) possibly because of internet instability. More so, students rarely experience insufficient bandwidth (*M*=2.97; SD=1.21) and power outage (*M*=2.23; *SD*=0.99).

Table 3. *Summary of the Students' Perception on the Use of Video Conferencing Applications Facilitating Behavioral Engagement during Synchronous Learning*

| Students' Assessment on the Use of Video Conferencing Applications | *M* | *SD* | Description |
|---|---|---|---|
| It helped me… | | | |
| to communicate with my teacher. | 4.09 | 0.93 | Agree |
| to collaborate with my classmates. | 3.92 | 1.03 | Agree |
| to feel a sense of community and social presence | 3.79 | 1.07 | Agree |
| to attend class meetings remotely. | 4.16 | 0.94 | Agree |
| to learn the course materials/content. | 3.99 | 0.99 | Agree |
| to study for quizzes/exams. | 3.71 | 1.09 | Agree |
| to be in control of my learning in the course. | 3.84 | 1.07 | Agree |
| Overall, | | | |
| the video conferencing applications allowed me to express myself in new ways. | 3.86 | 0.98 | Agree |
| the video conferencing application was beneficial to my overall learning. | 3.57 | 1.08 | Agree |

Academic institutions, teachers, and students relied on video conferencing applications to support virtual face-to-face classes being the substitute for students to communicate with their teachers (*M*=4.09; *SD*=0.93) and to attend classes remotely (*M*=4.16; *SD*=0.94). Students also agreed that the video conferencing applications helped them to feel a sense of community and social presence in the course (*M*=3.79; *SD*=1.09). Overall, using video conferencing applications allowed them to express themselves in new ways (*M*=3.86; *SD*=0.98) and were beneficial for their learning (*M*=3.57*; SD*=1.08).

The computed Pearson correlation coefficient presents a very weak relationship between the challenges encountered by the students and the student's perception of the use of video conferencing applications during synchronous learning. With 0.05 level of significance, the obtained p value=0.096, therefore accepting the null hypothesis that there is no significant relationship between the challenges encountered by the students during synchronous learning and the students' perception of the use of the video conferencing application.

Students who participated in this study have stated that they have an available and stable internet connection at home, however, they often encounter lagging screen sharing and sometimes distorted audio and video quality. In addition, teachers are also allowing the students to record the synchronous learning to cater to those students who struggled from technical difficulties or those students under correspondence mode. As a solution, teachers are distributing reading materials, PowerPoint files, and other educational materials to look back whenever they experience technical difficulties. With these strategies, students can still follow and learn the course content which contributes to a very weak relationship between the technical difficulties and the students' assessment on the use of video conferencing applications.

### *3.4 Relationship between the Frequency of Use of the Features and Students' Perception on the Use of Video Conferencing Applications during Synchronous Learning*

The computed Pearson correlation coefficient presents a moderately strong relationship between the frequency of use of the features and the students' perception on the use of video conferencing applications during synchronous learning. This may imply that when students have increased frequency of use, they will most likely be an active participant. With 0.05 level of significance, the obtained *p* value=0.00, therefore rejecting the null hypothesis that there is no significant relationship between the frequency of use of the features and the students' perception on the use of video conferencing applications.

Studies have shown that class conducted in synchronously has increased students' engagement brought by screen sharing feature and enhanced creativity when used with constructivist methods. Further, the use of video conferencing applications develops students' urge to collaborate with their classmates and teachers with the use of virtual whiteboards, group messaging, and shared notes following the instructions of their teachers in the synchronous learning (Samson, 2020; Zuo, Yang, Wang, & Lou, 2020). Therefore, student engagement is arguably vital to effective learning especially in synchronous learning using video conferencing application (Dixson, 2015).

## 4. Conclusion and Recommendation

This study aimed to describe the use of the video conferencing application facilitating behavioral engagement of the senior high school students of PUP Manila during synchronous learning of General Chemistry 1 and General Physics 1.

The result showed that teachers allow the opportunities for behavioral engagement to happen during synchronous learning by making all the features of the video conferencing applications available for the students to use. Hence, the use of a microphone and group messaging for students to participate in the learning discussion tends to be the most used feature to respond to the teacher's question or ask questions. Although, students encounter lagging screen sharing when teachers present their presentations or when playing videos from their files or from video-sharing websites during synchronous learning.

In terms of the student's perception of the use of video conferencing applications, it allowed them to attend classes remotely, communicate with their teachers, collaborate with their teachers, and learn the content of the course. Moreover, it helped them to present themselves in a new and in creative way as it is beneficial for their overall learning in the time of the pandemic.

However, the result showed a weak and very low significant relationship between the challenges encountered by the students and the students' perception on the use of video conferencing applications during synchronous learning notwithstanding the evidence of some studies presented in this study that technical issues and glitches in an online setup affect students' learning. Most likely, the teachers are providing alternative ways of delivering the learning content to students through distributing reading materials, recorded sessions, or educational videos to reduce the impacts of technical problems on students' learning and engagement.

Conversely, the result also presents a moderately strong relationship between the students' frequent use of the features of the video conferencing applications and the student's perception of the use of video conferencing applications during synchronous learning – when there is an increased frequency of use of these features, most likely students are active participants. It implies that students maximizing the use of the features of video conferencing application promotes active participation, engagement, and social learning.

However, this study was conducted nearly the end of the semester and not during the actual synchronous learning session of the students. Therefore, the result of the study is not generalizable and conclusive.

It is further recommended that the researcher conducts an observation in synchronous learning with video conferencing applications where a teacher delivers the learning content to the students. The researcher may ask the teacher to implement certain lessons and activities and describe how often do the students interact in the learning discussion to substantially gather credible evidence of behavioral engagement happening in an online setting.

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