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Transitioning to a Bichronous (Synchronous+Asynchronous) ODL Set-Up in High School Education: An Autoethnographic Study

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ABSTRACT

Within the framework of Autoethnography, this study answered the research question: **How did a high school teacher transition from a full face-to-face instruction to a Bichronous (Synchronous +Asynchronous) Online Distance Learning (ODL) Set-up in High School Education during the Covid 19 Pandemic?** The autoethnographic genre of qualitative research enabled the researcher to craft a narrative and arrive with a deeper analysis of this narrative. After analyzing different data set and examination of artifacts such as email, curricular documents, discussion posts, video recordings, a workplace calendar, a personal journal, professional development logs, and personal experience; the study revealed, as reflected by several periods in the findings, that the author's transition includes: (a) structuring the course (designing pedagogy in ODL) – designing the Leanring Contiuity Plan, In-service Training for Teachers, and Designing the Theresian Learner's Study Guide (TLSG); (b) effectively using the ODL technologies to implement a Bichronous ODL set-up – structuring the course in the Learning Management System for the asynchronous mode and conducting real-time teaching using video conferencing tools for the synchronous mode; (c) establishing teacher presence in the asynchronous and synchronous modes; and (d) providing student-support mechanism - cognitive, affective, and systemic. The importance of designing a school's ODL set-up for future remote teaching and learning scenario should be looked into and teachers should receive proper training on ODL Pedagogy and Technologies.

Key Words: distance education, bichronous online teaching and learning, autoethnography, qualitative research

Chapter I

RATIONALE

The Challenge of Covid 19

The world stood still when Covid19 entered the scene. Everyone was not prepared of what was to come – a pandemic so powerful that it shifted the course of education in a global scale.

From the usual conduct of face-to-face classes, all academic institutions globally have resulted in conducting remote teaching and learning to address the sudden disruptions in education. From regular brick-and-mortar type of classes, most schools have migrated to the virtual learning environment and adapted the distance education modalities of teaching and learning. Generally, the education system seems unprepared and may transpire unpredicted consequences during and beyond the crisis (Bozkurt & Sharma, 2020).

Bozkurt et al., (2020) estimated that over 1.5 billion students of all ages, nearly 90% of the global student population, have experienced disruptions in their education (UNESCO, 2020a; b). At the basic education, the Department of Education (DepEd) implemented the Learning Continuity Plan (LCP) which took effect in School Year 2020-2021 and classes opened on August 24, 2020 instead of June 2020 (DepEd, 2020).

Moreover, the education department released a series of DepEd Memoranda (DM) No. 15, 21, 23, 31 and 34 in the first quarter of 2020 entitled "Creation of a Task Force for the Management of Department of Education Response to Novel Coronavirus Acute Respiratory Disease (2019-nCoV ARD)" (DepEd, 2020a). In addition, DepEd launched a learning website called DepEd Commons catering the distance education needs of both

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teachers and students. The online learning hub is available both for public and private schools all over the country. The website aims to reinforce education anytime and anywhere suitable for learners who have access to the internet using smartphones, tablets, laptops, and desktop computers (DepEd, 2020b).

DepEd is in full force to smoothly transition, focusing on how schools are going to deliver the curriculum in different modes except the regular schooling pre-pandemic. Different academic organizations and schools conducted webinars about online teaching techniques, online or distance assessment methods, technology-dependent projects and many more to prepare the teachers in the new normal. This leaves the learners at the space without receiving any training on how they are going to perform as a distance or online learners (Núñez & Villanueva, 2020).

Most of the schools, specially the government-owned k-12 schools, resulted to modular instructions. The school where I am teaching adapted the Online Distance Learning (ODL) as a response to the challenges of fostering continued education in the time of pandemic. Our ODL program uses the bichronous set-up.

Bichronous (Asynchronous + Synchronous) ODL Set-Up as a Practice in Distance Education

Asynchronous online learning refers to a course in which there are no online real-time sessions and all of the content is supplied online, allowing students to participate at any time and from any location (Martin & Oyarzun, 2017). It is possible for students to learn at their own pace with 100 percent asynchronous online learning, and there are no schedule conflicts. However, there are also drawbacks to this type of learning, including delayed time, a lack of instant feedback, and low engagement levels (Martin et al., 2020).

Synchronous online learning, on the other hand, is a course where all of the information is supplied online and students can participate from any location. However, there are concurrent real-time meetings that students must participate in (Martin & Oyarzun, 2017). One hundred percent synchronous online learning has several benefits as a delivery method, such as instant feedback, improved audio-visual engagement and communication, accountability, and chances for students to manage their time and stay motivated. However, there are several drawbacks to this type of learning, including debates that move too quickly for the learners, scheduling problems, potential technical difficulties, and reliance on having access to the internet and technological equipment (Martin & Oyarzun, 2017).

Although the merging of face-to-face and online learning has been studied extensively, Martin et al. (2020) stated that the blending of synchronous and asynchronous online learning has received less attention. We call this combination bichronous online learning, based on the term "chronous," which implies "personification in time."

Bichronous online learning is defined by Martin et al. (2020) as "the blending of both asynchronous and synchronous online learning, where students can participate in anytime, anywhere learning during the asynchronous parts of the course but then participate in real-time activities during the synchronous sessions." The percentage of online learning varies depending on the course and the activities involved.'

Figure 1 depicts Martin et al., (2020) conceptual understanding for bichronous online learning (2020). We think of online learning as a continuum between synchronous and asynchronous learning, and we put bichronous online learning in the middle to show that many existing online learning courses already incorporate elements from both domains.

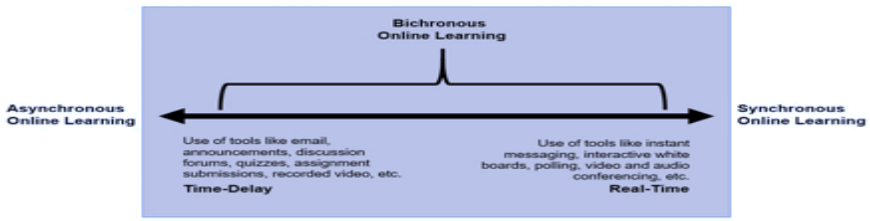

Figure 1. Conceptual model for bichronous online learning

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Bichronous (Synchronous+Asynchronous) ODL Set-up as a Research Focus

Personal narratives can provide deeper understanding of lived experiences (Philipson, 2021). By presenting a component of a teacher's experience, autoethnography can contribute to the study of a Bichronous (Synchronous and Asynchronous) ODL set-up in High School education. The explanation and analysis of experiences can assist educational leaders in making informed judgments by providing a more thorough picture of the consequences of their choices during remote teaching and learning. Additionally, the findings from this research can provide online program directors with unprecedented access to an insider's perspective on the issue being studied (Saldaña, 2011).

This paper wants to contribute:

(a) an organic manifestation of a transition from traditional face-to-face teaching to a Bichronous ODL set-up; and
(b) the particularities and the voice of an individual teacher with his lived experiences, resources and contextual realities adapting a Bichronous ODL set-up.

Chapter II

REVIEW OF LITERATURE

Studies on Bichronous ODL Set-Up

Best, R. (2022) in his autoethnography examined how he experimented within a bichronous learning environment to deliver an online teacher education course during Summer 2022. The rationale was to designate structured time for Zoom video conferencing sessions that would also allow students an opportunity to pose questions about the content and assignments. The structured three hour Zoom sessions allowed him to model good teaching practice and students opportunities to engage with each other in real time. The asynchronous portion of the course included discussion forums where students responded to guiding questions that prompted them to reference the assigned readings.

The learning model adopted by Brzezinska, M. (2022) for Emergency Remote Teaching (ERT) was bichronous, where the asynchronous aspect involved an extensive use of a Learning Management System while synchronous instruction was conducted on the ZOOM platform. His study explained how a university class was provided with a methodologically sound online experience by an instructor with limited knowledge of and skills related to remote teaching.

Alblooshi, E. (2021) also investigated students' reflections of how the shift to bichronous learning has affected their acquisition of 21st century skills. After being introduced to the 21st century skills, 74 students were asked anonymously to answer a reflective open-ended question about the skills they attained during bichronous learning. These reported skills were then categorised under the three essential domains of the 21st century skills; the Learning and Innovation Skills domain, the Career and Life Skills domain, and the Digital Literacy Skills domain.

The incorporation of synchronous aspects in an asynchronous course has been validated by research. J. N. Farros (2019) discovered that synchronous discussions in an asynchronous course could boost learning outcomes—students who engaged in any number of synchronous sessions did better in the course. R. C. Fowler (2019) discovered that when synchronous online course orientations were used instead of asynchronous online orientations in online biological science courses, student success (as measured by grades) was higher; however, the withdrawal rate was 25.5 percent for asynchronous online orientation courses but only 9% for synchronous online orientation courses.

When examining student attitudes, Badawi, N. (2017) discovered that more than half of online students in their study agreed that synchronous events should be included in online courses. These real-time sessions were beneficial for office hours, guest lectures, exam reviews, orientations, and team projects, according to the

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students. Peterson et al. (2018) discovered that synchrony had a favorable impact on students' feelings of belonging, positive emotion, and cognitive processes, while asynchrony has a detrimental impact on the link between cooperative aims and cooperative perceptions.

Zotti, R. (2017), in another investigation, discovered that several instructors emphasized the importance of being flexible while also including a few synchronous sessions. Another student in the study referred to the blending of synchronous and asynchronous as a happy medium—having enough flexibility to participate in the online course while also including some live sessions because they stressed the importance of needing both. Yamagata-Lynch, L. C. (2014) suggests that "the instructor/designer needs to balance the tension between embracing the flexibility that the online space affords to users and designing deliberate structures that will help them take advantage of the flexible space" because "synchronous online whole class meetings and well-structured small group meetings can help students feel a stronger sense of connection to their peers and instructor and stay engaged with course activities."

Overall, research demonstrates that integrating synchronous with asynchronous features makes an online course more engaging, improving learning results, positive attitudes, and retention.

There have also been studies that looked at both AOT and SOT. Those studies that do concentrate on both kinds may do so just in the context of one instrument. Johnson's (2008) research of a group of students' judgments of the 'learning advantage of real-time versus delayed-time text-based communication' is an excellent example of this sort (p. 167). Roblyer et al., (2007) comparison of web-based asynchronous versus synchronous videoconferencing is another example. DiPietro, Ferdig, Black, and Preston (2008), for example, focused on best practices in K-12 asynchronous instruction and are not included in our review.

Bernard et al. (2004) found that asynchronous environments had more favorable effects on achievement and attitude outcomes than synchronous ones. Despite the good outcomes of asynchronous teaching, the authors discovered that asynchronous DE had poorer retention rates and much greater dropout rates than synchronous DE. In synchronous DE, media appeared to be more important, whereas in asynchronous DE, pedagogy proved to be more relevant. Overall, they came to the conclusion that synchronous DE was a "lower-quality imitation of classroom learning" (p. 408).

They claimed that synchronous instruction lacked the flexibility of asynchronous DE in terms of timing, learning location, and individual attention. They questioned teleconferencing' effectiveness, citing instructors' preference for 'lecture-based, instructor-oriented tactics' (Bernard et al, 2004, p. 408). According to the authors, "the structure of synchronous DE may be better suited to their academic timetables and their need for spontaneous instruction and feedback for younger learners" (p. 409). In terms of synchronous versus asynchronous DE, Bernard et al observed that course design quality was more relevant than media features, however interactive media proved to facilitate better attitudes in asynchronous DE. Active learning was associated with improved success and attitude results in asynchronous DE, while communication opportunities benefited students in both DE scenarios.

Hrastinski (2008) examined asynchronous and synchronous online seminars in two postsecondary e-learning classes (n = 8 and n = 19). He also polled students on their feelings on the two types. He used both qualitative and quantitative measures of students' perceived and actual participation in online education employing synchronous communication (chat) as a supplement to asynchronous communication (discussion forum). While the two modes complemented each other, he concluded that asynchronous e-learning better promoted cognitive participation, such as more reflection, while synchronous e-learning better supported increased motivation.

In an earlier paper based on the same research (Hrastinski, 2007), the author classified involvement into two categories: personal participation and cognitive participation. Synchronous communication appeared to promote human participation, including motivation and 'greater convergence on meaning,' social ties, and the transmission of information with a lesser degree of complexity than asynchronous communication. Hrastinski also stated that 'asynchronous communication may elicit more cognitive exertion because students have more

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time for contemplation.' Because of the possibility of receiving quick feedback, synchronous communication may improve motivation and eliminate uncertainty' (p. 45).

Research Gap

Although studies have already centered on comparing synchronous versus asynchronous online learning, the integration of synchronous tools in asynchronous online courses, and the blending of some asynchronous features into synchronous online courses; more studies should look into the “how” and the individual experiences of teachers who transitioned from full face-to-face instructions to a bichronous ODL set-up. Moreover, most of the studies on bichronous ODL set-up were focused on university and college settings. Additional studies should also look into the transition to ODL set-up in a high school education setting.

Chapter III

RESEARCH FRAMEWORK AND RESEARCH QUESTION

Autoethnography as a Research Framework

Autoethnography is the qualitative methodology the researcher used for this study. Although autoethnography is a relatively new method of representing research (Sparkes, 2000), it is being more widely employed by experts in a variety of sectors, including education (Chang, 2008; Jones et al., 2016). (Willis, 2008). According to Ellis (2016), the autoethnographic approach provides value by broadening "study about human experience" (p. 16). This expansion is feasible because the researcher's detailed account and experiences can depict the culture under study in ways that statistics and figures cannot (Ellis, 2004). According to Ellis et al. (2011), autoethnography is "a research and writing technique that tries to describe and systematically analyze (graphy) personal experience (auto) in order to understand cultural experience (ethno)" (p. 273). This method enables me to respond to the research questions. The autoethnographic method enables for in-depth investigation of the phenomenon while safeguarding both student confidentiality and instructor intellectual property.

Autoethnography is a self-narrative that differs from other self-narrative types in that it employs analysis and interpretation (Chang, 2008). This understanding and interpretation are essential for establishing excellence in a self-study (Bullough & Pinnegar, 2001). Autoethnography combines the personal and the cultural by including explanation, taking it beyond a basic autobiography (Chang, 2008; Gill, 2014).

One application of autoethnography is to investigate themes that are sensitive, hidden by other issues, or understudied (Jones et al., 2016). Our application is relevant to this study since teacher recognition of shifting participation in talks as a strategy to manage increased demands is a sensitive topic that could result in negative performance assessments, reputational damage to a company, or job loss. Furthermore, this style is appropriate since it fosters change by challenging readers to rethink situations that they take for granted (Jones et al., 2016).

Autoethnography differs from other types of research in that it does not separate the observer from the observed (Chang, 2016; Saldaa & Omasta, 2018; Sparkes, 2000). Instead, the researcher becomes the subject of investigation (Bullough & Pinnegar, 2001; Ellis & Bochner, 2000; Freebody, 2003). The shift from the periphery to the center is an essential part of fulfilling ethnographers' priorities, which include putting personal experience in research and writing in the foreground, illustrating the sense-making process, using and displaying reflexivity, illustrating insider knowledge of a cultural phenomenon or experience, describing and critiquing cultural norms, experiences, and practices, and eliciting reader responses (Adams et al., 2015).

Autoethnography is chosen by researchers for a variety of reasons. Adams et al. (2015) emphasized the importance of autoethnography in highlighting people as they face challenges and figure out how to deal with them and make their lives better. Other motivations to employ autoethnography include contributing to current research, making research more accessible, and recovering marginalized voices (Adams et al., 2015; Jones et al., 2016). In the context of this study, emphasizing the teacher’s experience in conducting a bichronous

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(synchronous+asynchronous) online teaching and learning is critical for generating understanding that can lead program directors to advocate for changes that improve the satisfaction of instructors who report to them.

Because of the inclusion of subjectivity, several professionals have questioned the reliability of autoethnography (Chang, 2008). However, it should be recognized that a researcher's approach might cover the spectrum between subjectivity and objectivity (Chang, 2008). Instead of avoiding or dismissing subjectivity, emotionality, and the researcher's influence on study, autoethnography recognizes and accommodates these issues (Ellis et al., 2011). Furthermore, because the naturalistic approach claims that relevance is an important part of research, autoethnography achieves a balance between methodological rigor, inventiveness, and emotion (Adams et al., 2015). (Guba, 1981).

Research Question

This study was nonexperimental since experimentation was not practical, and nonexperimental research is the most common type utilized in the social sciences (Reio, 2016). A qualitative technique was appropriate because the major goal was to answer the research question:

How did a high school teacher transition from full face-to-face instruction to a Bichronous (Synchronous + Asynchronous) Online Distance Learning set-up during the pandemic times?

Chapter IV

RESEARCH METHODOLOGY

Data Set

The researcher’s personal experience is the primary data, as is customary in autoethnography (Chang, 2008). Although personal recollection is a good place to start, it is essential to supplement it with additional data sources to allow for triangulation, which increases objectivity and lowers prejudice (Denzin, 2014) while also increasing believability (Johnson et al., 2020).

This study utilized three kinds of resources: self-observational tools (recorded Gmeet sessions, archived Google Classroom classes, screenshots of past online lessons), reflective tools (reflection on classroom events and recall of critical chapters) and external tools (email exchanges and informal talks with colleagues and administration, Learning Continuity Plan (LCP), subject syllabi, Google Classroom posts, and Facebook Page posts) from March 2020 to December 2022. The external data seek to add additional layers to the first author's lived experience and interpretation while the self-observation and self-reflection tools provide a view into the past and present (Lindahl, 2019; Mirhosseini, 2018). (Chang, 2016).

Because self-study in education is often designed to modify what happens in the educational environment, the validity of such investigations is critical (Feldman, 2003). Explaining how data were acquired is an important component of proving validity, which is why a full description of data collecting techniques is essential (Feldman, 2003). However, because it is flexible, reflexive, and reflective, the autoethnographic technique is not constrained by rigid rules for data collection (Ellis, 2016).

Data Collection and Analysis

The use of the research question as a guide for reflection guaranteed that the reflection produced particular responses to the research question. The rigor and quality of the study are improved since the research question focuses on the context and the phenomenon of interest (Johnson et al., 2020). Triangulation was enabled by combining diverse types of data, allowing significant patterns to emerge. These themes centered on my views, feelings, and experiences. Finally, the themes were employed to answer the research question and help me explain my lived experience.

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Following Yazan's (2019b) model for autoethnographic data analysis, I read all the pertinent written sources (such as email correspondence, Google Classroom posts, and pertinent syllabi and learning continuity plan), watched the video recordings (such as recorded lessons), recalled my personal experiences, and made notes of the key points regarding how I transitioned from full face-to-face instruction to adapting a bichronous ODL set-up. I attempted to see the situation from a wider angle in order to identify any variables affecting his transition.

I was able to pinpoint specific areas: (a) Structuring the course (Designing Pedagogy in ODL), (b) Effectively using the ODL Technologies to implement the Bichronous ODL set-up, (c) Establishing Teacher Presence; and (d) Providing Student-support mechanism that I believed were essential for the transition from traditional face-to-face instruction to a Bichronous ODL setup. After identifying and re-interpreting my experiences, I organized my notes (from my reflection logs) into a narrative description that might be considered a common thread among different places. This might be seen as "preliminary analysis" reflection-on-action (Yazan, 2019b, p. 41).

AUTOETHNOGRAPHIC DATA ANALYSIS

Research Title: Transitioning to a Bichronous (asynchronous and synchronous) ODL set-up in High School Education: An Autoethnographic Study

METHODOLOGY: COLLECTION OF DATA (CHRONOLOGY OF EVENTS / EPIPHANIES) – IDENTIFYING CODES FROM THE DATA SET – IDENTIFYING SUBTHEMES AND THEMES TRANSITION – PLAN (INVOLVES TECHNOLOGY) – GUIDANCE (PEDAGOGICAL) - TECHNOLOGICAL – TIME FRAME

DATE	DATA SET	PRECIPITATING EVENTS	CODES	SUB-THEMES	THEMES
MARCH 2020 (national lockdowns were declared)	Google Classroom post (dated March 17, 2020) days after the national lockdowns were imposed	Covid 19 (sudden/emergency transition from f2f to online distance learning (limited to asynchronous ODL set-up)	- Provision of learning competencies - Provision of Internet-based learning resources - Schedule templates - More instructions	ONLINE POST GUIDANCE	STUDENT SUPPORT TEACHER-ONLINE PRESENCE

Figure 2. Qualitative Data Analysis Table A

End of academic year 2019 – 2020 (June 2020)	(Learning Contiuity Plan in General Mathematics adapting a Bichronous ODL set-up)	Designing the Learning Continuity Plan with a Bichronous ODL Set-up	- Designing the Learning Continuity Plan (compliant to the status quo of national lockdowns) - started planning to succeed for a Bichronous ODL set-up.	Planning Pedagogical Design of ODL	PEDAGOGICAL DESIGN OF ODL
June 2020 After the closing of academic year 2019-2020		Preparing for a Full Bichronous (Synchronous + Asynchronous) ODL Set-Up	- designing subject modules that adapt a bichronous ODL set-up was the next big thing - need to offer synchronous learning to complement the asynchronous was seen and given consideration.	MODULE WRITING Bichronous ODL Set-up	PEGADOGICAL DESIGN OF ODL

Figure 3. Qualitative Data Analysis Table B

Assumptions

There were three assumptions made. The first assumption is that I, as the researcher, am capable of reflecting on his experiences successfully. The second assumption is that I can combine reflection with evidence of bichronous (synchronous+asynchronous) online teaching and learning. The third assumption is that the

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previous online courses that I handled during the Covid 19 pandemic represent my regular and routine life on adapting a bichronous ODL set-up without undue influence from other sources.

Chapter V

RESULTS AND DISCUSSION

I am Stephen L. Esber, a full-time faculty member of St. Therese Christian Development Foundation, Inc. (STCDCFI) in Tacloban City. The local of the study (STCDCFI) is a private basic academic institution nestled in the heart of Tacloban City. STCDCFI offers Pre-school to Senior High School programs to selected students who passed the admission process.

In this autoethnography, I gave a detailed description of my experiences in transitioning from full face-to face instruction to a Bichronous (Synchronous+Asynchronous) Online Distance Learning Set-Up in High School Education During the Covid 19 Pandemic in STCDCFI, answering the research question:

How did a high school teacher transition from full face-to-face instruction to a Bichronous (Synchronous + Asynchronous) Online Distance Learning set-up during the pandemic times?

Onset of Covid 19

March - June 2020

The world stood still when Covid 19 entered the scene. It was a game changer because it shifted the course of education in a global scale.

My journey to transitioning from a face-to-face instruction to a bichronous ODL set-up happened when the national lockdown for Covid 19 was declared in March 2020. It was a surreal episode. Everyone thought that it would just last for a couple of weeks and then we could all go back to normal.

But as days turned to weeks and weeks to months, we all started to accept the brutal fact – everything isn't going back to normalcy anytime soon and that we need to embrace living with the inconvenience and the unbecoming choreography of the pandemic.

When lockdowns were declared in the entire country, STCDCFI immediately utilized the full potentials of the Google Classroom. All teachers including myself migrated our classes online. Students and parents were enrolled in different classes and teaching and learning instructions (asynchronous) were immediately given.

Since Covid 19 started during the last quarter of academic year 2019-2020, the main purpose of utilizing Google Classroom was to finish the 4th quarter academic instructions online (asynchronously) and conduct assessments as proofs of learning and skills mastery.

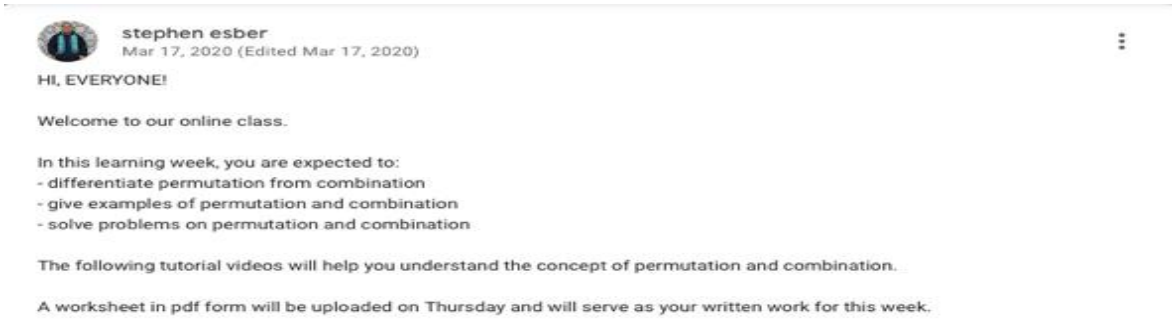

Figure 4. Google Classroom post dated March 17, 2020)

Figure 2 shows my Google Classroom post right after the lockdown was declared. My main purpose was to give first the learning objectives and provide internet-based resources the students could use in understanding

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the concepts highlighted for the learning week. Moreover, an advanced note was also given informing the students that a worksheet would be uploaded as a form of written assessment. It is also evident that I wasn't really expecting that the lockdown would last for several months and that face-to-face classes would not be possible for the next two pandemic school years.

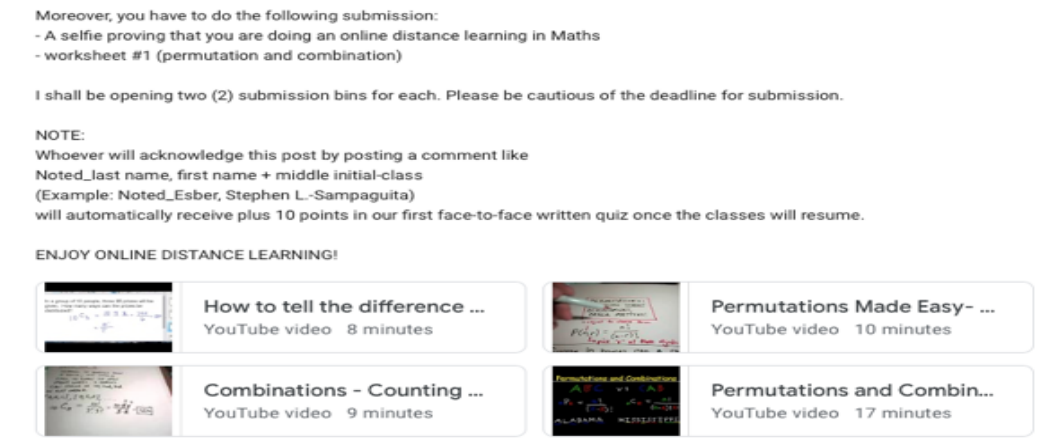

Figure 5. Continuation of Google Classroom post dated March 17, 2020)

Figure 3 shows the internet-based resources (tutorial videos) I posted on the Learning Management System (Google Classroom) to aid the students in understanding the concepts. It is also evident in the post that I asked the students to submit an evidence (a selfie) of their self-directed learning. I also gave an advanced note about the opening of submission bins for turning in of outputs.

Moreover, there were also attempts of doing synchronous teaching instructions but would always fail because of restrictions and poor data bandwidth in Tacloban City and nearby municipalities and towns. Aside from which, teacher training on synchronous online teaching and live video conferencing was still on process.

The future is now here. We have no other means but be one with the signs of times. My friend from Japan taught me Zoom and Peack Deck. They are very effective screen sharing online teaching. Please have time to explore this week. Moderators, I urge you to follow up your teachers. If internet connection is scarce, Abucay and Real campuses has wifi. Just avoid crowded areas and sanitize. Thank you! Stay safe, God bless! (Message from the Academic Coordinator posted on the Faculty Association FB page dated March 15, 2020)

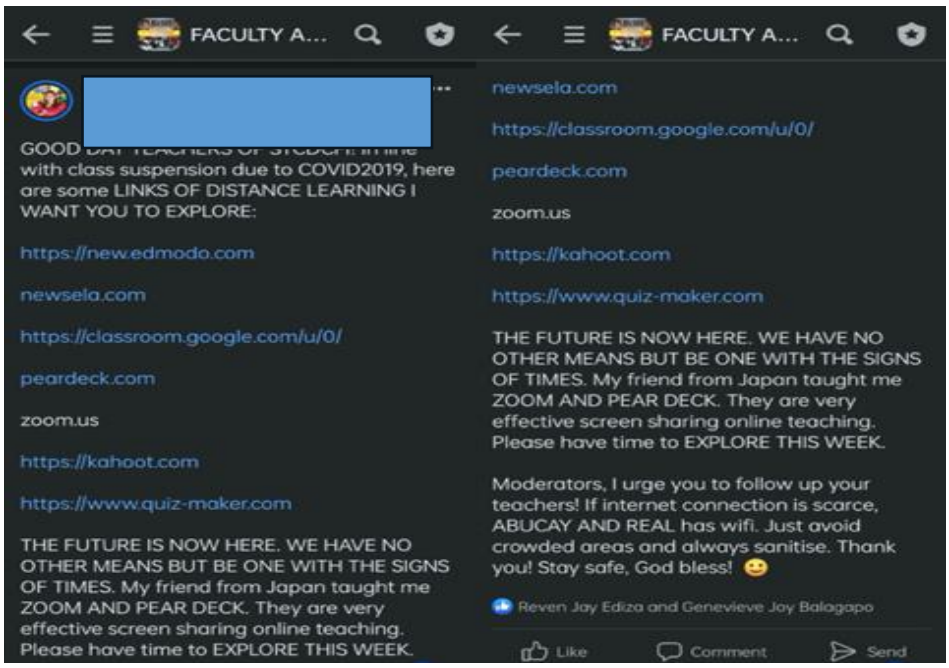

Figure 6. Academic Coordinator's Post on Teachers' Page

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Figure 4 shows the post of our academic coordinator on the FB teachers' page encouraging us to explore on some online distance learning platforms available. She also highlighted Zoom as a video conferencing tool and Pear Deck as teacher's aid in producing powerful online contents. She also gave a powerful note on being one with the signs of times as Covid 19 would require teachers to explore and find ways to deliver the teaching and learning process in ways we haven't thought of in the past.

For four (4) months, STCDCFI has survived the last stretch of the academic year 2019-2020 because even before the pandemic happened teachers and students were already using the Google Classroom as a platform for blended learning where teachers post homework and supplementary learning materials to complement with the face-to-face instructions.

It was really challenging how to migrate f2f classes to ODL. However, I really am appreciative to STCDCFI for adopting Google classroom and Phoenix Aralinks even before the pandemic happened. Transitioning from f2f to Online Distance Learning (ODL) was not too burdensome because we were taught with the technical know-how of the Learning Management System and Online Learning even before the pandemic happened. (based on personal reflection shared during the end of AY 2019-2020).

Designing the Learning Continuity Plan with a Bichronous ODL Set-up

Towards the end of Academic year 2019-2020, our Academic Coordinator required all the teachers to make our own Learning Continuity Plan (LCP) per subject handled. I immediately created my LCP adapting a Bichronous ODL set-up.

Why did I decide to adapt a bichronous ODL set-up in my LCP? During the pandemic, I wasn't just in a context of being a high school teacher but also a Master of Distance Education (MDE) student of the University of the Philippines Open Univeristy (UPOU). I was deeply inspired to apply my learning and help the school transition with the best that I could.

My main consideration in designing the Learning Continuity Plan was to teach the subject using a Bichronous ODL set-up. In a week, there are days allotted for asynchronous and synchronous learning.

During asynchronous learning, students were provided with internet-based resources where they can discover and learn the lesson on their own pacing. Worksheets will be provided as practice exercises for the competencies being mastered. Once a week, I would do real-time online synchronous teaching to give the students the chance to deepen their learning and gain understanding of the lessons they consider hard to master.

Here's a sample part of my Learning Continuity Plan in General Mathematics.

MATRIX OF LEARNING ACTIVITIES

Topic	Time allotment	Course Support (2)	Individual Learning Activity (3.1)	Communication Tools (3.2)	Course Collaboration (3.3)
UNIT 1 FUNCTIONS AND THEIR GRAPHS After completing this unit, learners should be able to: - accurately construct mathematical models to represent real-life situations using functions; - accurately formulate and solve real-life problems involving rational functions; and - apply the concepts of inverse functions, exponential functions, and logarithmic functions to formulate and solve real-life problems with precision and accuracy.					
KEY CONCEPTS OF FUNCTIONS 1. represent real-life situations using functions, including piece-wise functions 2. evaluate a function 3. perform addition, subtraction, multiplication, division, and composition of functions 4. solve problems involving functions	Weeks 1,2 Sync. : 2 Asynch : 6 Week 1 Sync : 1 Async : 3 Week 2 Sync : 1 Async : 3	Asynchronous Discussion: Functions in real-life situations with guide questions from the teacher Synchronous Discussion: Operations and composition of functions	• Download the online topic/module guide from the Google Classroom • Download the learning materials (online PDF) from the Google Classroom • View the tutorial videos related to the topic • Do the practice exercises in the topic worksheets • Revise for the quiz • The Online Quiz Online Sources: Tutorial Video 1 Algebra Basics: What Are Functions? - Math Antics https://www.youtube.com/watch?v=S2tpYI2iTok Tutorial Video 2 Functions in Real Life Situations and Examples https://www.youtube.com/watch?v=Jz16ZRioUgs e-lesson: Evaluating and Solving Functions by lumenlearning https://courses.lumenlearning.com/waymakercollegealgebra/chapter/evaluate-and-solve-functions/ e-lesson: Operations with Functions by Mathspadilla.com	Google Classroom Google Meet	Performance Task / Group Project The learners will be grouped (5 members per group). Each group will be creating a *Pecha Cucha* about the applications of Mathematical Functions in our lives. Each group will be given a specific Mathematical Function to discuss. In two months, each group is expected to do group chat (synchronous and asynchronous), decide for the final output of the group, and upload their final output in the Google Classroom.

Figure 7. Learning Continuity Plan

Figure 5 shows a sample of my learning continuity plan (lcp). The main topic is chunked into several subtopics and each subtopic is given an allotted time for synchronous and asynchronous learning. Why do I need to allot

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a specific number of time for asynchronous learning when the students are just at home and can do self-directed learning anytime? My main consideration was to provide the students with clear and specific scheduling of tasks which would also be reflected on the Theresian Learner's Study Guide (TLSG). Students should know when to do the asynchronous tasks provided for them because there could be conflict of schedules and priorities knowing that they have a lot of subjects to give focus on.

Preparing for a Full Bichronous (Synchronous + Asynchronous) ODL Set-Up

"Hope is being able to see that there is light despite all of the darkness."

– Desmond Tutu

Academic year 2020-2021 in STCDCFI has become more structured in terms of offering Online Distance Learning. Teachers underwent skills development training and workshops to equip them with the necessary technical know-how in conducting online classes.

The clear layout of STCDCFI's Bichronous ODL modality came during the In-Service Training of Teachers before the start of Academic Year 2020-2021. The first successful move was the creation of the Learning Continuity Plan leading to designing of modules that adapt a Bichronous ODL set-up.

In the first pandemic in-service training for teachers, the Academic Coordinator encouraged everyone to focus on module-making (highlighting the most essential learning competencies per subject) as part of the individual learning continuity plan of each teacher. She has provided some exemplars which we can use as templates in designing our own modules. The inset was divided into several sessions mostly in webinar form.

Dear ma'am Annie and Teachers: As July is fast approaching, it is high time that we all get engrossed in the design of module-making. There may be a lot of online learning resources, but we want to generate our own content as Theresian educators based on DepEd Most Essential Learning Competencies. You may use online resources as aid and support to your own designed learning module. Attached herewith are the following modules you can use as a guide for STCDCFI modules for academic year 2020-2021. Please use this as your standard or you may generate an even better version. Just make sure to have pre-test, introduction, development, exercise and summative activity per lesson. (email from the Academic Coordinator dated June 23, 2020)

Figure 8. Academic Coordinator's Email on Module Making

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In the said email, the academic coordinator shared my own learning continuity plan that adapts a bichronous ODL modality.

When asked why adapt a bichronous ODL set-up in the subject modules, I replied:

It's because modular instructions should be supplemented with online video conferencing (real time online teaching) to maximize students learning. Written instructions and rich internet-based resources provided in the module should be supplemented with real-time online teaching to give students the chance to ask teachers about some gray areas or parts of the lesson which they have difficulty with. (personal recollection of the author shared to the Academic Coordinator)

Aside from which, the Academic Coordinator and School Principal, having known that I am taking my MDE in UPOU, consulted me in one of the sessions.

What I really appreciate about all our classes in UPOU is the structure and content. In the LMS that we are using, everything is provided – the learning materials, the instructions, the calendar of activities, deadlines, submission bins, and a lot more. The students need to navigate the learning materials and resources based on the calendar of lessons and syllabus. Most of our classes are asynchronous in nature, but there are also FICs (faculty-in-charge) who require us to go online for synchronous discussions. In almost all subjects, we are also provided with weekly / bi-monthly learner's guide that help us navigate the learning materials successfully. (based from personal recollection of the author)

I was asked by the Academic Coordinator to help in framing the structure and template of the school's official subject module to be adapted in academic year 2020-2021.

Figure 9. Screenshots of Webinars

Figure 7 shows the screenshots from one of the webinars the school conducted to capacitate the teachers on the basics of online distance learning. The series of webinars made us confident to face Academic Year 2020-2021

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with knowledge and technical-know-how on Distance Learning. We also heard success stories of teachers on how they were able to finish the last quarter of Academic Year 2019-2020 when lockdowns were proclaimed. The best part of the webinars was the creation of online module to be given to students as a tool to help them navigate the synchronous and asynchronous learning. The modules contain all the essential elements for students to successfully do self-directed learning (asynchronous mode) and participate actively during the live video conferencing (synchronous mode). The creation of the student's module and study guide was one of the key factors why the students were able to maneuver the pandemic school years triumphantly.

Figure 10. In-Service Training Photos

Figure 8 shows the on-site in-service straining for teachers. When the local government already allowed small group gathering with restrictions, the school decided to conduct our on-site in-service training. We still focused on the creation of the Theresian Learner's Study Guide (TLSG) and also explored on content creation to provide the students with custom-fit online contents to be incorporated in the TLSG.

Coming Up with the the Theresian Learnner's Study Guide (TLSG)

"There are always new things to find out if you go looking for them"

– David Attenborough

The Theresian Learners' Study Guide is a comprehensive document (in pdf) uploaded in the Google Classroom and given to students bi-monthly that guides them how to navigate each learning week, both asynchronously and synchronously.

The Introductory Parts of the TLSG:

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- **Topic / Big Ides** – The general topic of the week
- **Key Concepts** – The key subtopics
- **Learning Targets** – The objectives
- **Dates Covered /Time Table** - The dates for Synchronous sessions and important submissions

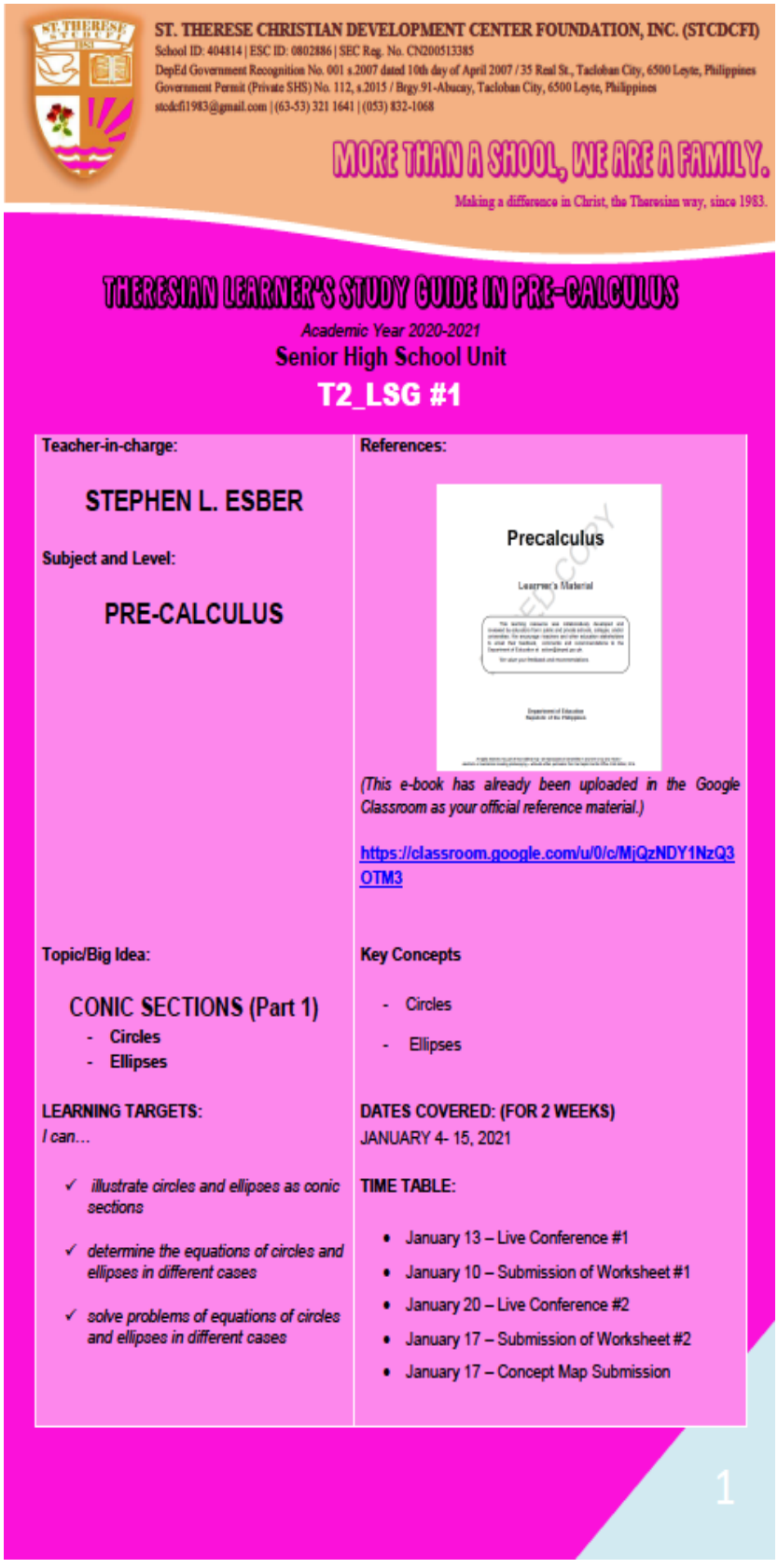

Figure 11. Introductory Parts of the TLSG A

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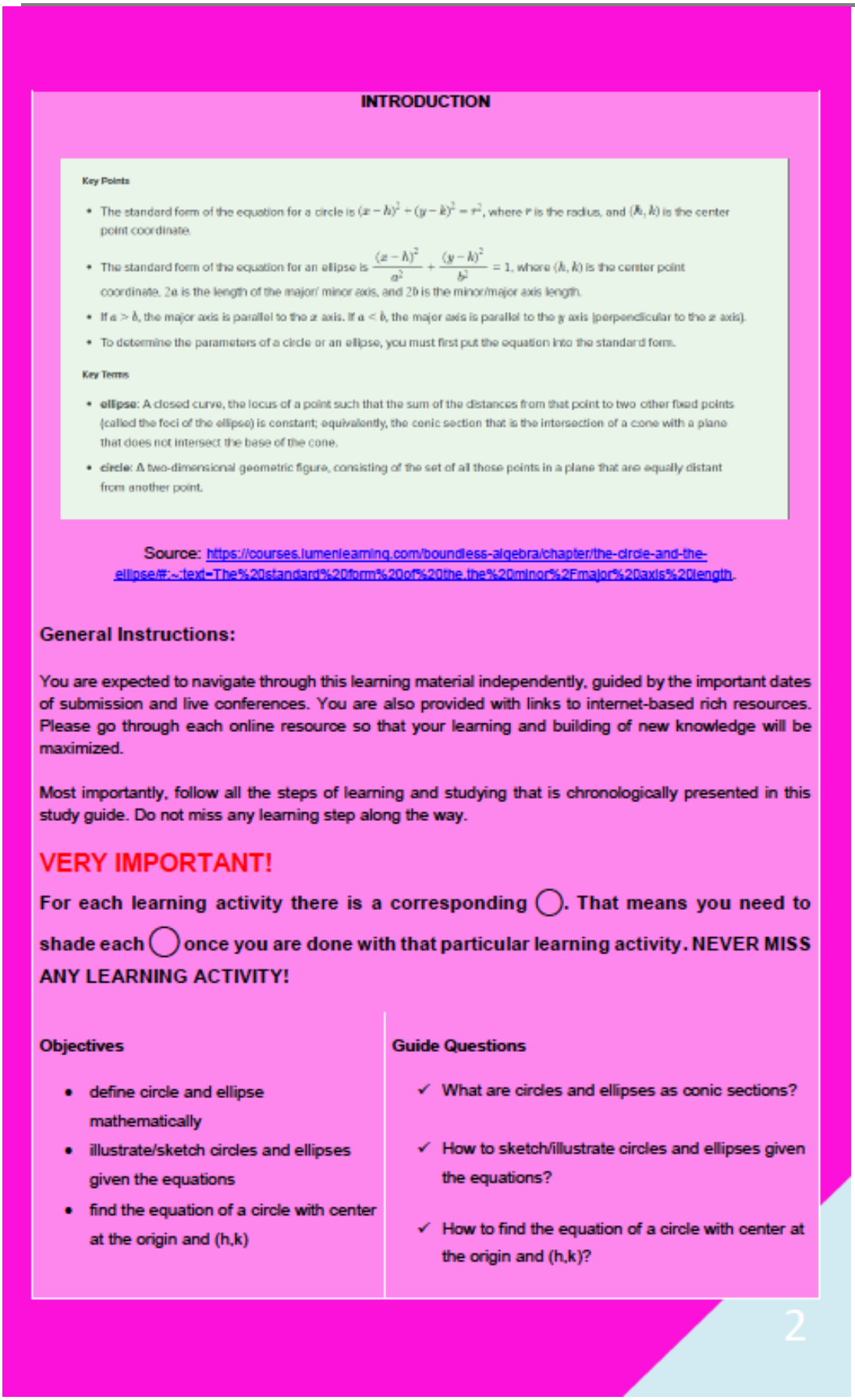

INTRODUCTION

Key Points

- The standard form of the equation for a circle is $(x-h)^2+(y-k)^2=r^2$, where r is the radius, and (h,k) is the center point coordinate.
- The standard form of the equation for an ellipse is $\frac{(x-h)^2}{a^2}+\frac{(y-k)^2}{b^2}=1$, where (h,k) is the center point coordinate, $2a$ is the length of the major/ minor axis, and $2b$ is the minor/major axis length.
- If $a>b$, the major axis is parallel to the x axis. If $a<b$, the major axis is parallel to the y axis (perpendicular to the x axis).
- To determine the parameters of a circle or an ellipse, you must first put the equation into the standard form.

Key Terms

- **ellipse**: A closed curve, the locus of a point such that the sum of the distances from that point to two other fixed points (called the foci of the ellipse) is constant; equivalently, the conic section that is the intersection of a cone with a plane that does not intersect the base of the cone.
- **circle**: A two-dimensional geometric figure, consisting of the set of all those points in a plane that are equally distant from another point.

Source: https://courses.lumenlearning.com/boundless-algebra/chapter/the-circle-and-the-ellipse/#:~:text=The%20standard%20form%20of%20the,the%20minor%2Fmajor%20axis%20length.

General Instructions:

You are expected to navigate through this learning material independently, guided by the important dates of submission and live conferences. You are also provided with links to internet-based rich resources. Please go through each online resource so that your learning and building of new knowledge will be maximized.

Most importantly, follow all the steps of learning and studying that is chronologically presented in this study guide. Do not miss any learning step along the way.

VERY IMPORTANT!

For each learning activity there is a corresponding ◯. That means you need to shade each ◯ once you are done with that particular learning activity. NEVER MISS ANY LEARNING ACTIVITY!

Objectives

- define circle and ellipse mathematically
- illustrate/sketch circles and ellipses given the equations
- find the equation of a circle with center at the origin and (h,k)

Guide Questions

- ✓ What are circles and ellipses as conic sections?
- ✓ How to sketch/illustrate circles and ellipses given the equations?
- ✓ How to find the equation of a circle with center at the origin and (h,k)?

2

Figure 12. Introductory Parts of the TLSG B

Under Learning Activities, there are four (4) major stages/parts:

- **Discover**

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Students are expected to do Self-Regulated or Self-Directed Learning through the internet-based introductory resources provided. For each sub-topic presented, students are provided also with guide questions to help them focus on the most-essential learning competencies needed for each subtopic. e-worksheets are also provided as practice exercises towards mastery of the skills and competencies.

- **Discuss**

After successfully navigating through the Discovery Stage and answering the practice exercise, students are expected to participate in a discussion forum (on the LMS) about the topic being discussed. In the discussion forum, the teacher provides several questions (essential questions) that students need to answer.

- **Deepen**

In the deepening stage, students are given the chance to deal with real-life applications of the concept, either the teacher giving real-life problem applications of the concept or the students creating their own.

- **Demonstrate (Create)**

The last stage of the learning process is the demonstrating. Students are expected to create output that shows acquisition of learning.

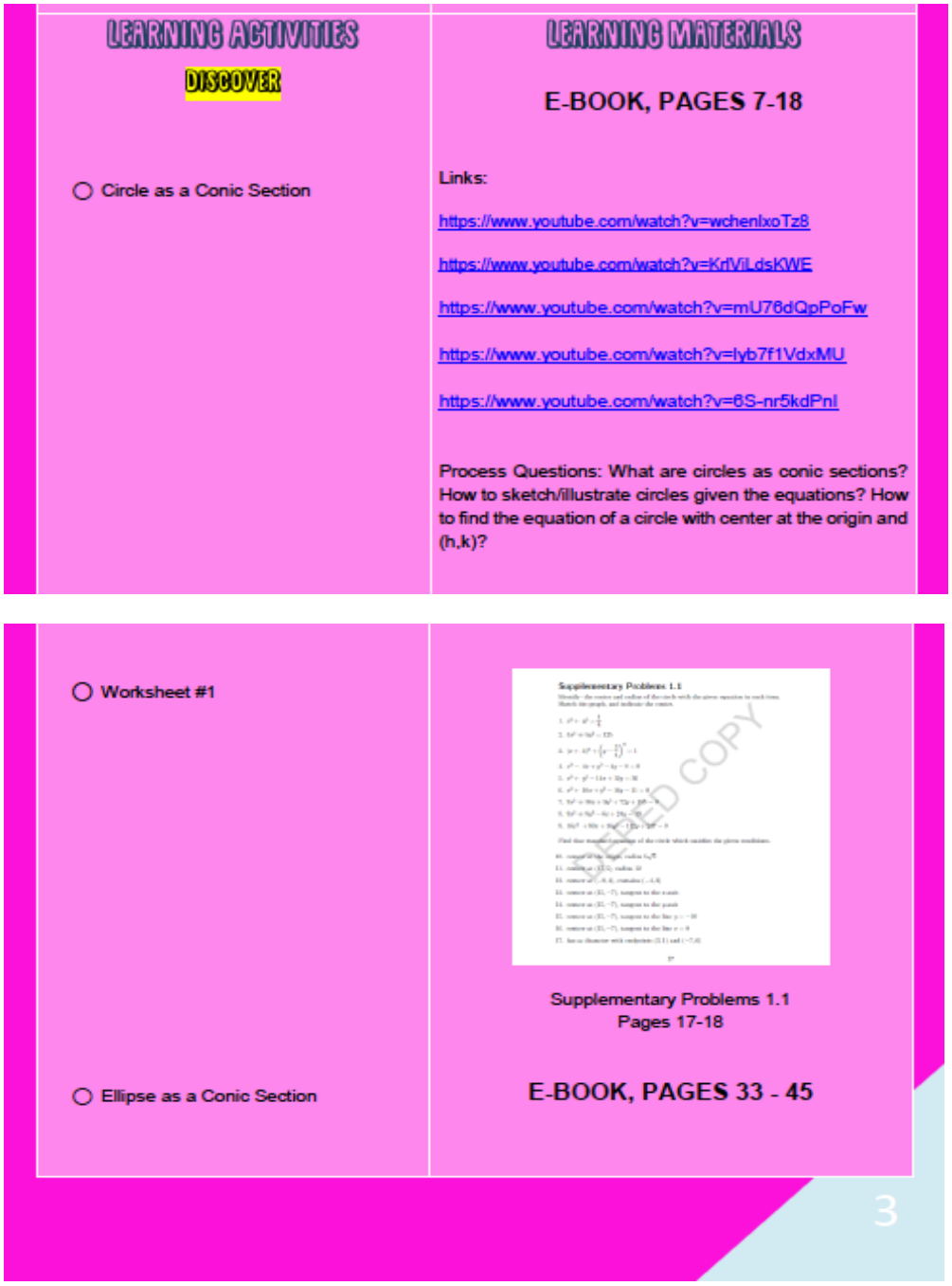

Figure 13. Discovery Part of the TLSG

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Figure 11 shows that for every subtopic I provide the students with internet-based resources which they can use while doing self-directed learning on the asynchronous part of the learning process. I also provide process / guide questions to provide the students with the clear parameters and target competencies. A worksheet is also provided to help the students assess their own learning.

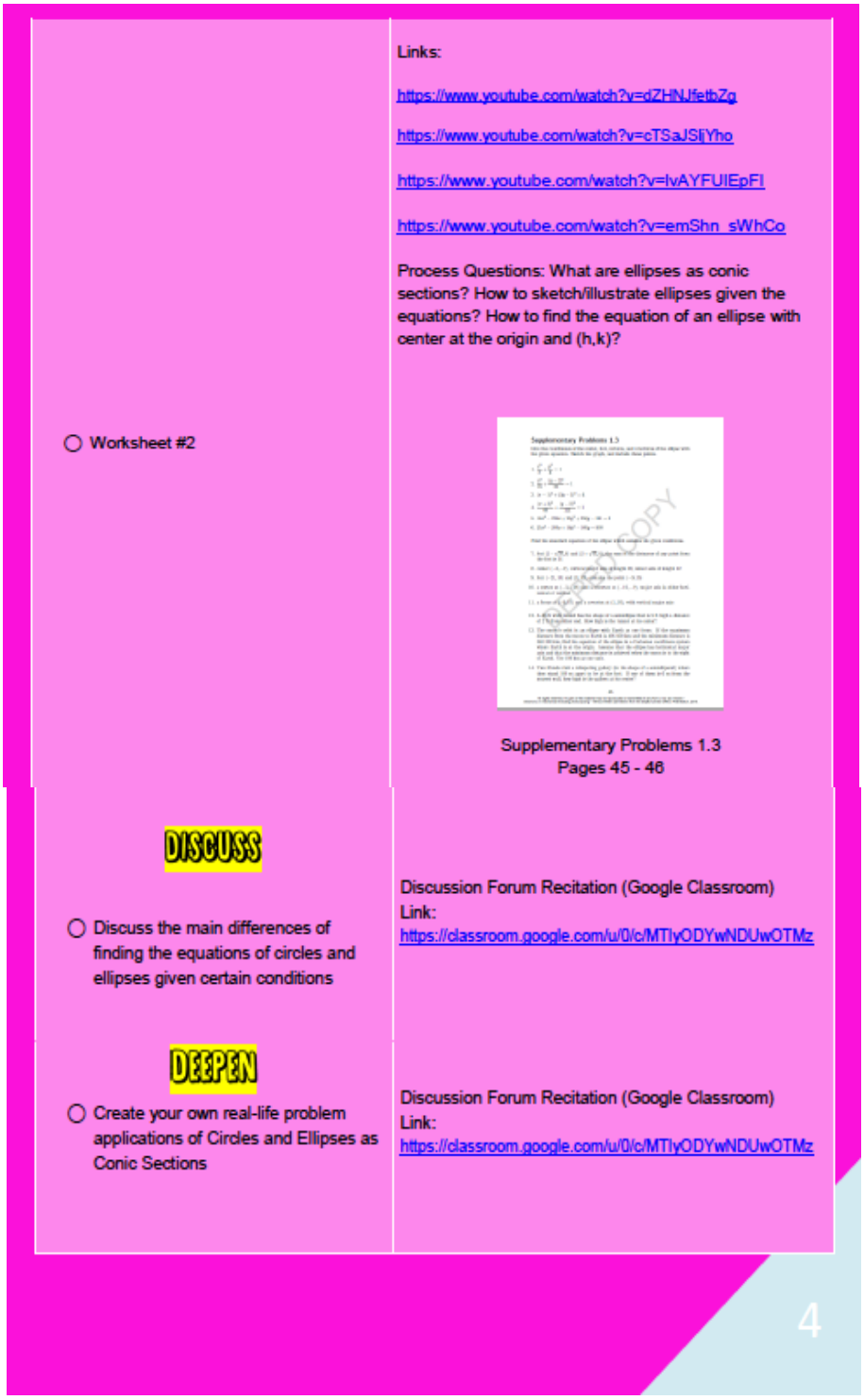

Figure 14. Discussion and Deepening Parts of the TLSG

In the discussion part, I provide the students with a discussion question where they are all required to post their answers as part of the discussion forum on the learning management system. For the deepening part, I required them to create real-life problems anchored on the topic being discussed. They are required to post their output on the learning management system provided the link for submission. For the demonstration part, the students are provided with output-based submission as proof of learning.

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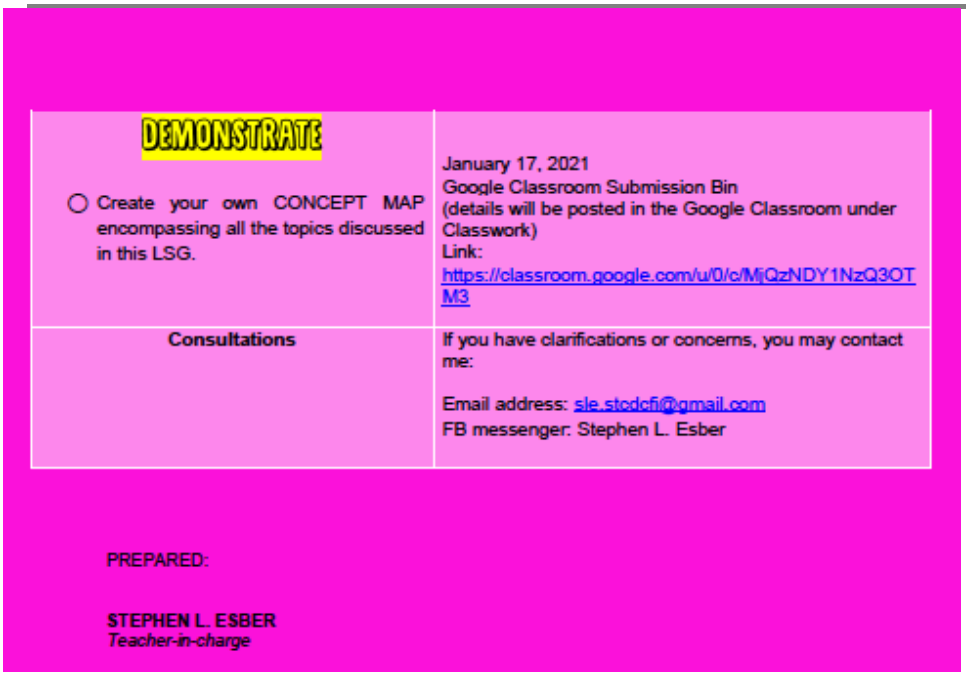

DEMONSTRATE	
○ Create your own CONCEPT MAP encompassing all the topics discussed in this LSG.	January 17, 2021 Google Classroom Submission Bin (details will be posted in the Google Classroom under Classwork) Link: https://classroom.google.com/u/0/c/MjQzNDY1NzQ3OTM3
Consultations	If you have clarifications or concerns, you may contact me: Email address: sle.stodcfi@gmail.com FB messenger: Stephen L. Esber

PREPARED:

STEPHEN L. ESBER
Teacher-in-charge

Figure 15. Demonstration Part of the TLSG

In the last part of the TLSG, I also provide my email and FB messenger account to allow students and parents to do school-related consultations.

Figure 16. Student consultation dated September 18, 2021

On the most important provisions incorporated in the TLSG is the consultation with the teacher. Figure 14 shows one of the consultations I had with a student dated Sept. 18, 2021. In the said conversation, the student wanted to check if the graph he did was correct. Even if the consultation was done beyond the working hours and during late night, I still responded to the need of the student. I believe that real-time feedback is essential in distance learning and teachers should need to go beyond our comfort zones at times.

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Most of the consultations were done through Facebook Messenger because of the following reasons:

- Easy access and ease of use
- Provision of free data usage (we can still chat using free data)
- data provision allows real-time audio call and video conferencing

Reflecting on the significance of providing consultation time with the students, I believe the during difficult times and scenario, if possible, we should always allow free and easy conversation with our students, allowing them to express their difficulty and giving them the chance to be heard. However, at some unavoidable circumstances, I also couldn't respond to the requests and questions of the students on time. With the soonest time possible, I respond and give my reasons. I also believe that students felt important if we apologize and do our best to reconnect with them.

The consultation part has also created a culture of care. Other teachers reported that some of them dealt with difficult consultation hours with students undergoing mental health issues. Some of the them went far and beyond the duties of ordinary teachers, most specially the class advisers, by handling cases through constant communication with the parents and students with difficult cases.

Implementing the Bichronous ODL Set-Up in the TLSG

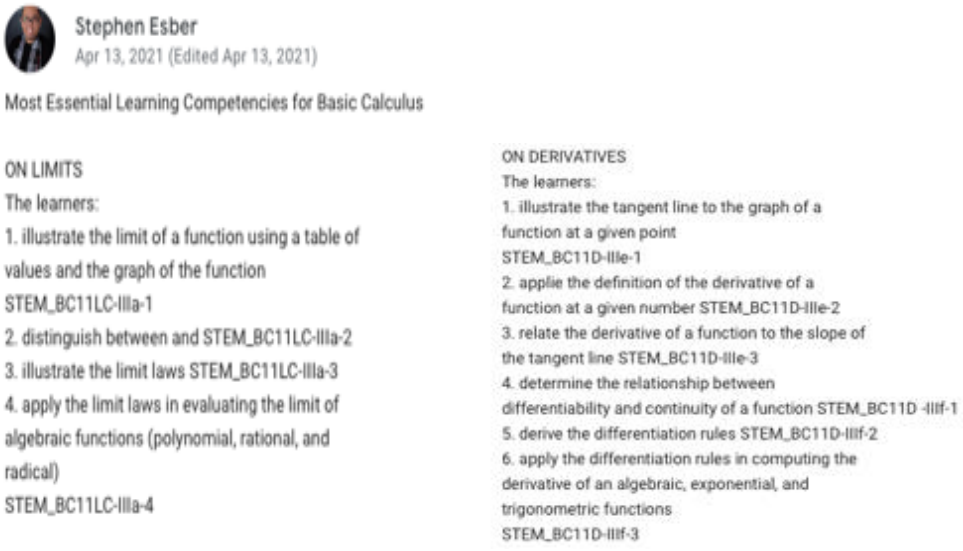
"Some people want it to happen, some wish it would happen, others make it happen." – Michael Jordan

When the TLSG was introduced to students and parents during the orientation for Academic Year 2020-2021, there was a sea of positive feedbacks. They were already provided with clear schedules when to do self-directed learning (asynchronous) using the internet-based resources and e-worksheets, when to turn in their submissions for worksheets and performance tasks, and when to go online for video conferencing (synchronous) with the subject-teacher explaining the concept.

Structuring the Learning Management System (Google Classroom) for Asynchronous Learning

"Every student can learn, just not on the same day, or the same way." – George Evans

In structuring the course in the Learning Management System (Google Classroom), my first consideration is the provision of the Most Essential Learning Competencies (MELCs) set by the Department of Education for the subject being taught. Why is there a need to provide the students with the MELCs? The MELCs give the students a bird's eye view of the topics to be covered and the skills they needed to master.



Stephen Esber
Apr 13, 2021 (Edited Apr 13, 2021)

Most Essential Learning Competencies for Basic Calculus

ON LIMITS
The learners:
1. illustrate the limit of a function using a table of values and the graph of the function STEM_BC11LC-IIIa-1
2. distinguish between and STEM_BC11LC-IIIa-2
3. illustrate the limit laws STEM_BC11LC-IIIa-3
4. apply the limit laws in evaluating the limit of algebraic functions (polynomial, rational, and radical) STEM_BC11LC-IIIa-4

ON DERIVATIVES
The learners:
1. illustrate the tangent line to the graph of a function at a given point STEM_BC11D-IIIe-1
2. applie the definition of the derivative of a function at a given number STEM_BC11D-IIIe-2
3. relate the derivative of a function to the slope of the tangent line STEM_BC11D-IIIe-3
4. determine the relationship between differentiability and continuity of a function STEM_BC11D -IIIf-1
5. derive the differentiation rules STEM_BC11D-IIIf-2
6. apply the differentiation rules in computing the derivative of an algebraic, exponential, and trigonometric functions STEM_BC11D-IIIf-3

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ON INTEGRATION
The learners:
1. illustrate an antiderivative of a function STEM_BC11I-IVa-1
2. compute the general antiderivative of
polynomial, radical, exponential, and
trigonometric functions
STEM_BC11I-IVa-b-1
3. compute the antiderivative of a function using
substitution rule and table of integrals (including
those whose antiderivatives involve logarithmic
and inverse trigonometric functions)
STEM_BC11I-IVb-c-1
4. solve separable differential equations using
antidifferentiation STEM_BC11I-IVd-1
5. solve situational problems involving exponential
growth and decay, bounded growth, and logistic
growth
STEM_BC11I-IVe-f-1
2. formulate and solve
accurately real-life
problems involving
areas of plane regions
6. approximate the area of a region under a curve
using Riemann sums: (a) left, (b)right, and (c)
midpoint
STEM_BC11I-IVg-1

Figure 17. Google Classroom post dated April 13, 2021

After the Most Essential Learning Competencies are given to the students, the next entry in the LMS is the Theresian Learners' Study Guide (TLSG). As mentioned, the provision of the TLSG uploaded on the LMS gave the students clear instruction mechanism on how to navigate the asynchronous and synchronous parts of the lesson for two weeks. They need to follow the chunking and scheduling of lessons as well as the specific dates for submissions. All the essential elements of the two-week learning process are provided for them on the TLSG.

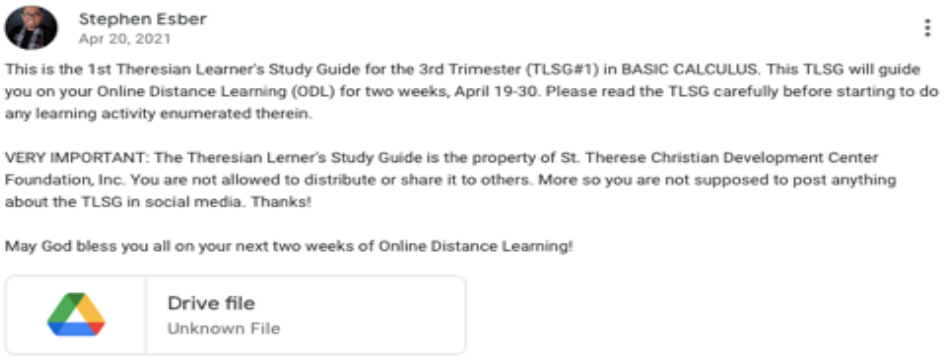

Figure 18. Classroom post dated April 20, 2021

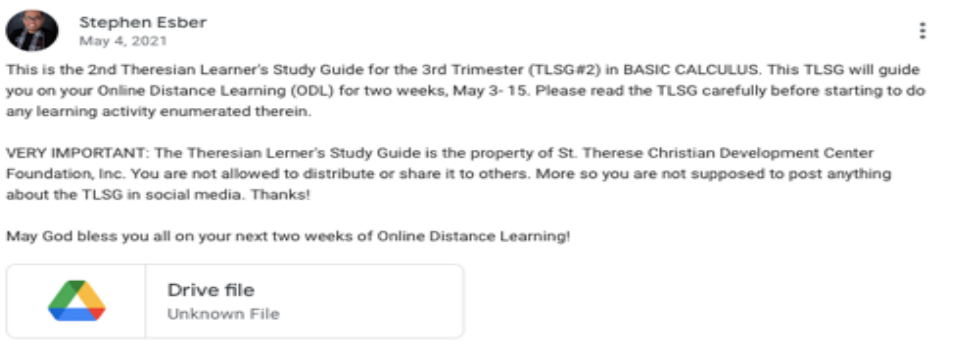

Figure 19. Google Classroom post dated May 4, 2021

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Figures 15 and 16 show the uploaded TLSG on the Google Classroom. As stated, each TLSG has a time allotment of 2 weeks to guide the students how to navigate the synchronous and asynchronous parts of learning.

After the TLSG was uploaded on the LMS, another important part of structuring the course is the provision of internet-based resources that will supplement the students' independent learning guided by the TLSG.

(Note: This screenshot was taken from a different Google Classroom, thus the dates may not follow the previous screenshots.)

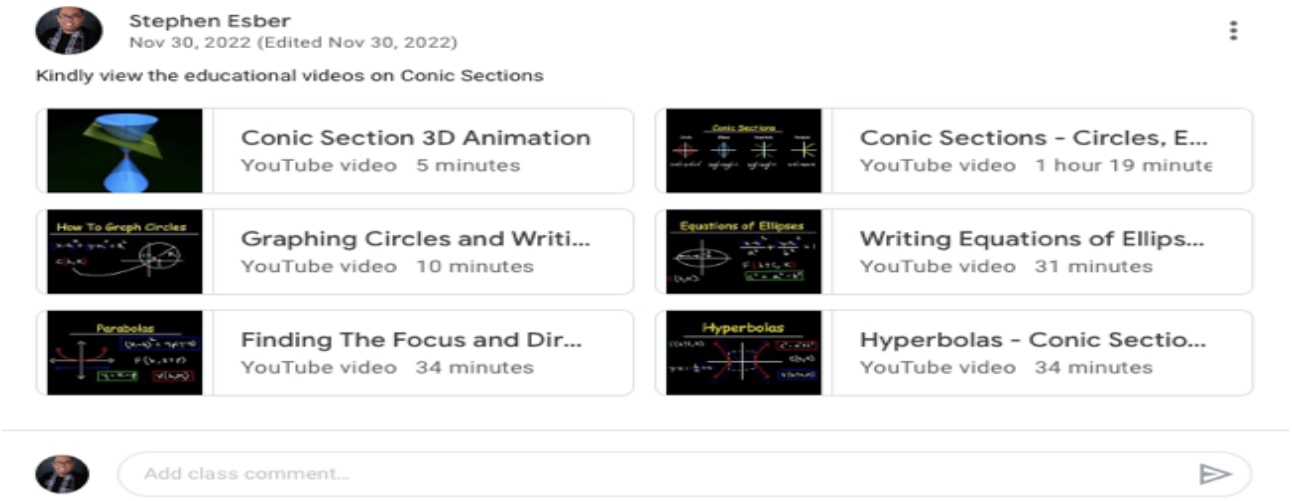

Figure 20. Google Classroom post dated Nov. 30, 2022

Figure 17 shows the internet-based resources (tutorial videos) I posted on the Learning Management System. In choosing what resources to be given to the students for their self-directed learning, my main consideration is the clarity and vividness of how the concept is taught in the said resources. Most of these tutorial videos are found in Youtube and I just needed to search and choose the best ones to be given to the students. Since process/guide questions are given to the students after viewing the resources, it is important to note that these recourses should be anchored on the Most Essential Learning Competencies (MELCs).

Since the TLSG adapts a bichronous ODL set-up, the author provides the Google Meet link for the scheduled synchronous online conferencing. After the conduct of the synchronous online conferencing, the author posts the recorded video on the LMS for students to use during revision for summative assessment.

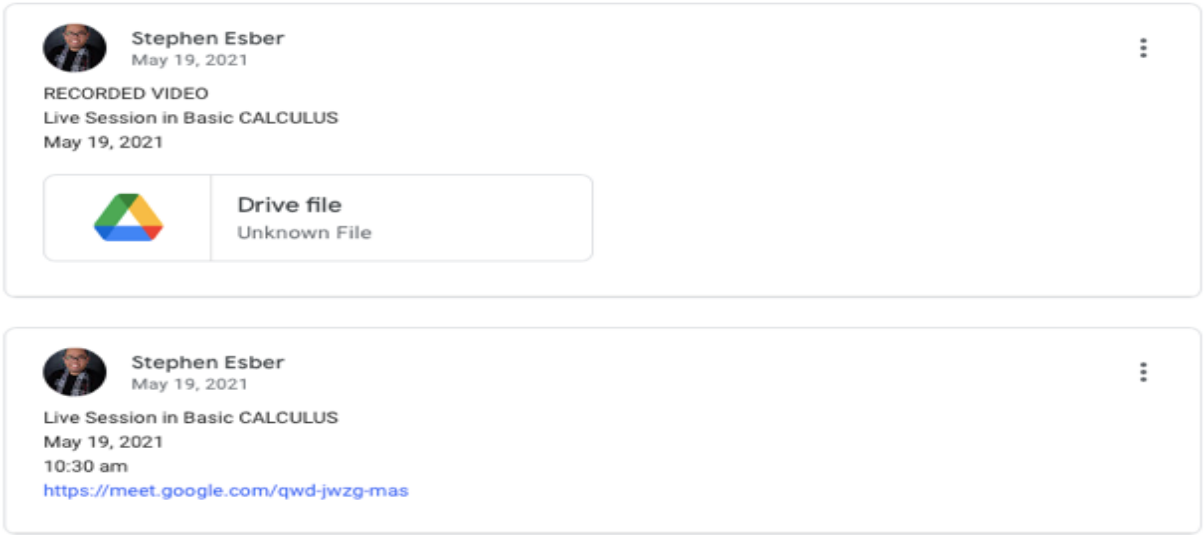

Figure 21. Google Classroom post dated May 19, 2021

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It is very important to note that in conducting live teaching sessions, and if the circumstances and recourses would allow, the entire session should be recorded and shared to the students to give them the chance to review and prepare for assessment. Another reason why live sessions should be recorded is to give chance to those who weren't present to know what transpired and how the teacher taught the lesson.

In cases wherein the circumstances won't allow full video recording, I provide screenshot of the synchronous online discussion. The students feel confident in understanding the concepts when I provide solutions and answers to the sample worksheets provided for them. Moreover, I provide detailed solutions to some problems they have difficulty in solving.

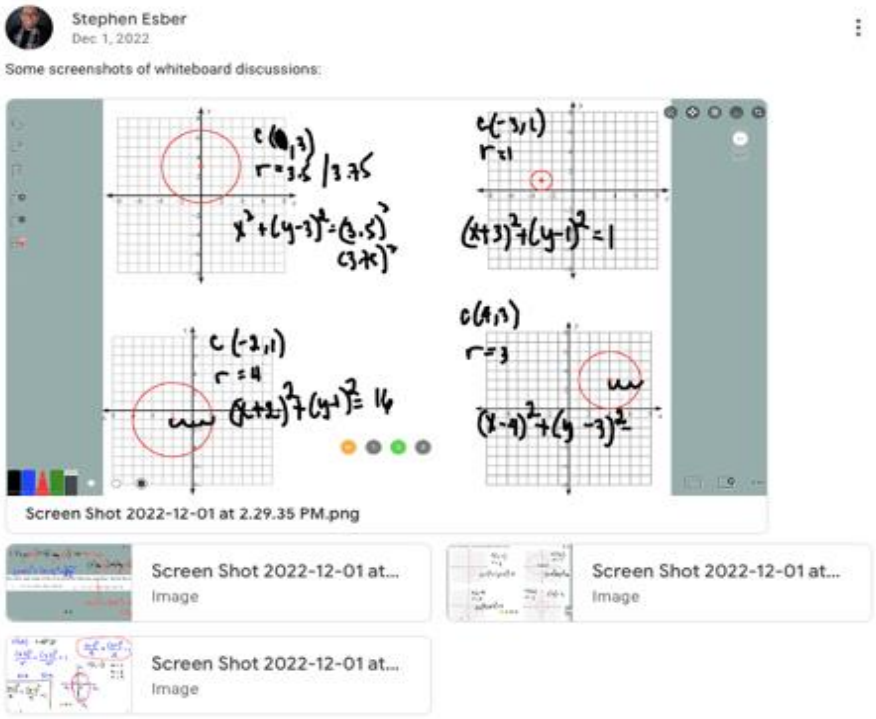

Figure 22. Google Classroom post dated December 1, 2022

Before a summative assessment is given, the author gives the parameters of the assessment on the LMS. It is important to note that even if the learning objectives and processed questions are already provided in the TLSG, it is still necessary for teachers to post the coverage of the assessment on the LMS to guide the students during their revision and review.

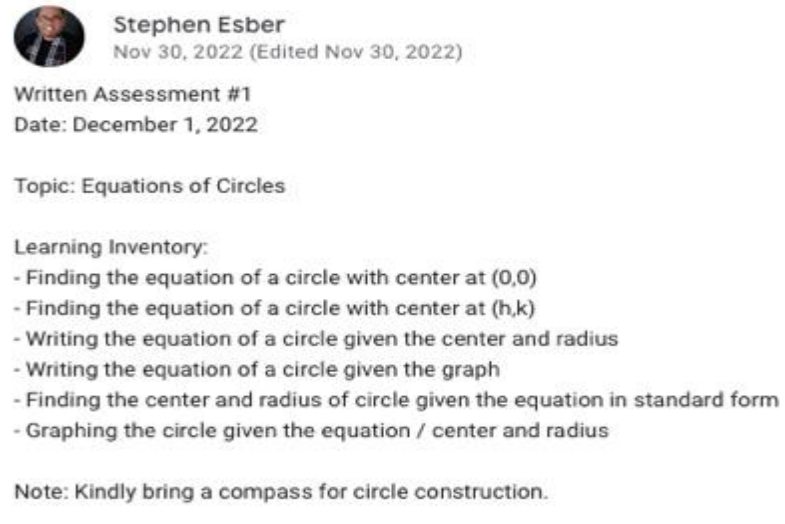

Figure 23. Google Classroom post dated November 30, 2022

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I also provide worksheets as practice exercises for the summative assessment. Students find it helpful when I provide them with sample questions about the topic/s incorporated in the assessment. They can practice solving similar problems on their own and re-align their review to the MELCs.

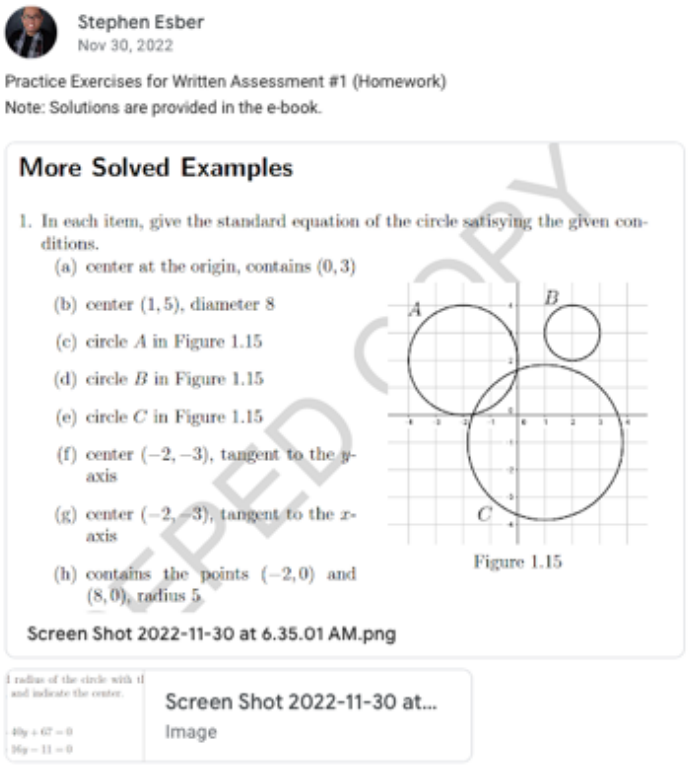

Figure 24. Google Classroom post dated November 30, 2022

I also arranged the submission bins chronologically on the LMS. This is to provide the students with the list of all the required submissions. They can also check which ones have they complied already as well as the deadline for each submission.

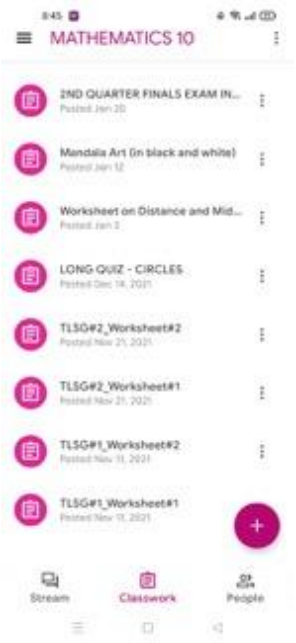

Figure 25. Google Classroom post – Submission Bin

For some performance tasks that require other forms of submission (other than the submission folder), I post a new thread on the LMS.

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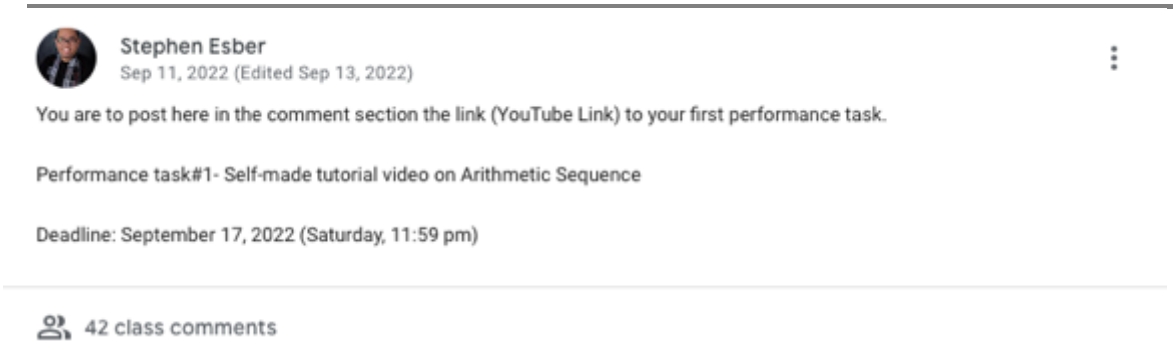

Figure 26. Google Classroom post dated September 11, 2022

Figure 23 shows the submission of performance task #1 for grade 10 Mathematics. For this specific performance task, students were asked to make their own tutorial video on Arithmetic Sequence. If I would require the students to submit the raw files on a new submission folder, my google account data storage would be immediately consumed so I just required the students to post the link to their video files on the comment section.

Conducting the Synchronous Online Sessions

"We need to bring learning to people instead of people to learning." – Elliot Masie

As stated, my main consideration in designging my Learning Continuity Plan with a bichronous ODL set-up was to supplement modular instructions and asynchronous learning with online video conferencing (real time online teaching) as a form of synchronous learning. Written instructions and rich internet-based resources provided in the module should be supplemented with real-time online teaching to give students the chance to fully understand the topic through the real time online instruction of the teacher. Aside from which, students can also ask teachers about some gray areas or parts of the lesson which they have difficulty with.

Conducting the synchronous video conferencing is similar to conducting an actual face-to-face instruction. Routines and rules are needed for a successful conduct of a synchronous online class.

I open Gmeet and start accepting students 15 minutes before the start of the class. I always start the class with an opening prayer which is a recorded video. After which, I introduce a new lesson in Mathematics using PowerPoint, Geogebra, and/or WhiteBoard. After introducing the lesson, I give the students several items to practice solving. I also give time to students to ask questions and clarify some areas they have difficulty with. Before ending the class, I explain the online tasks and worksheet provided in the TLSG. The class ends with a closing prayer. (personal recollection of the author in conducting online synchronous sessions)

Most of the time, I use the White Board or Powerpoint while doing the synchronous online sessions. In the given screenshots, I used PowerPoint presentation in teaching Cumulative Frequency to Grade 10 students.

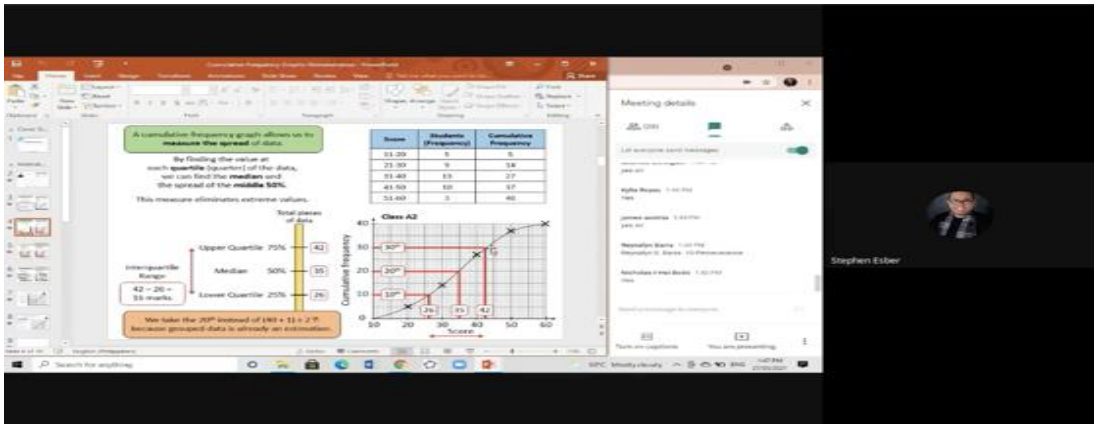

Figure 27. Gmeet Recording dated May 27, 2021

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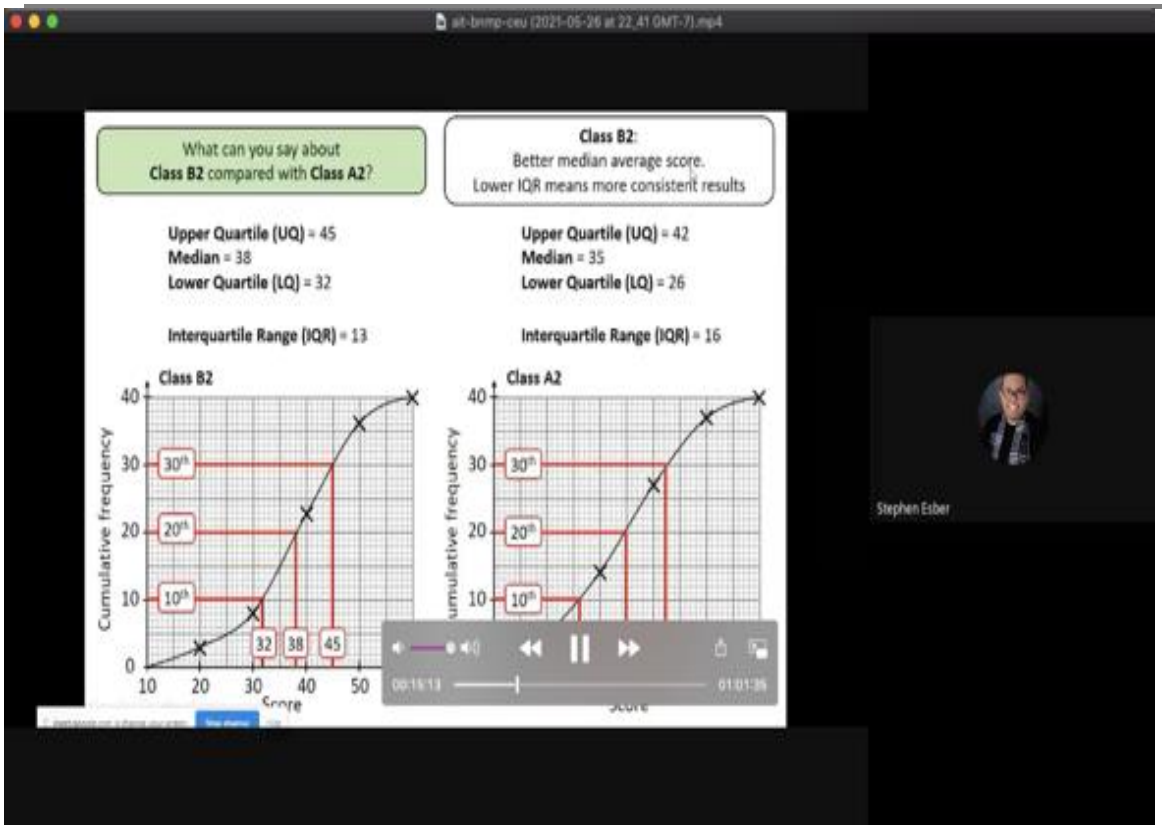

Figure 28. Gmeet Recording dated May 26, 2021

If I am not using PowerPoint in presenting the lesson to the students, I use the White Board. In the given screenshots, I taught Trigonometric Identity to grade 11 students using the White Board. As an online Math teacher during the pandemic, I preferred using the White Board because it gave me the provision of freehand writing similar to using the regular boards present in the classrooms.

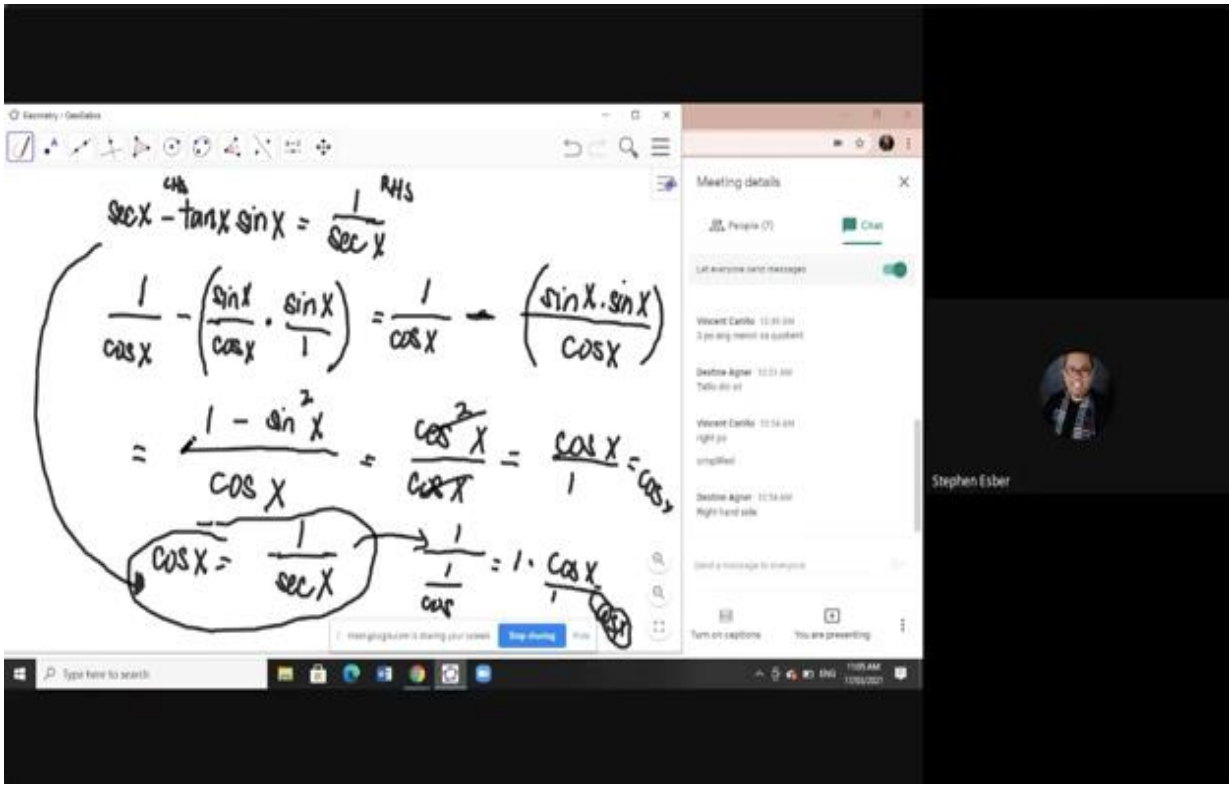

Figure 29. Gmeet Recording dated March 17, 2021

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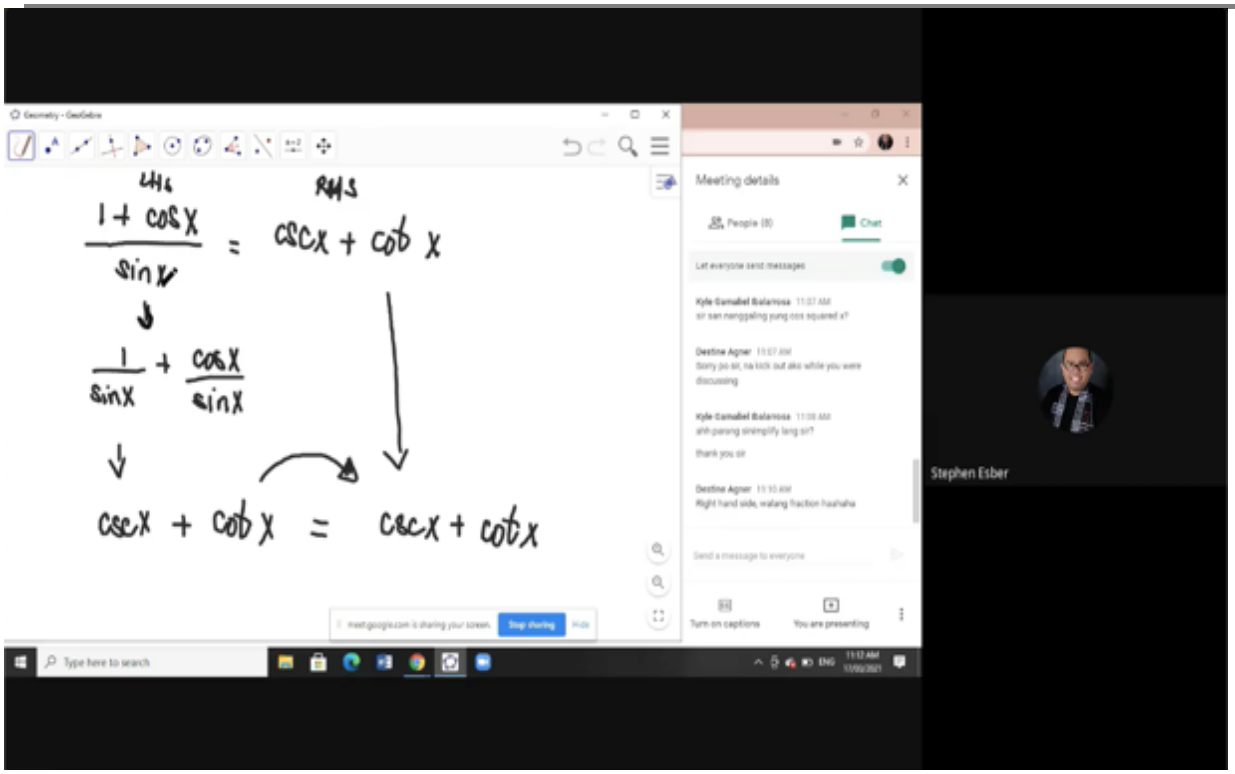

Figure 30. Gmeet Recording dated March 17, 2021 A

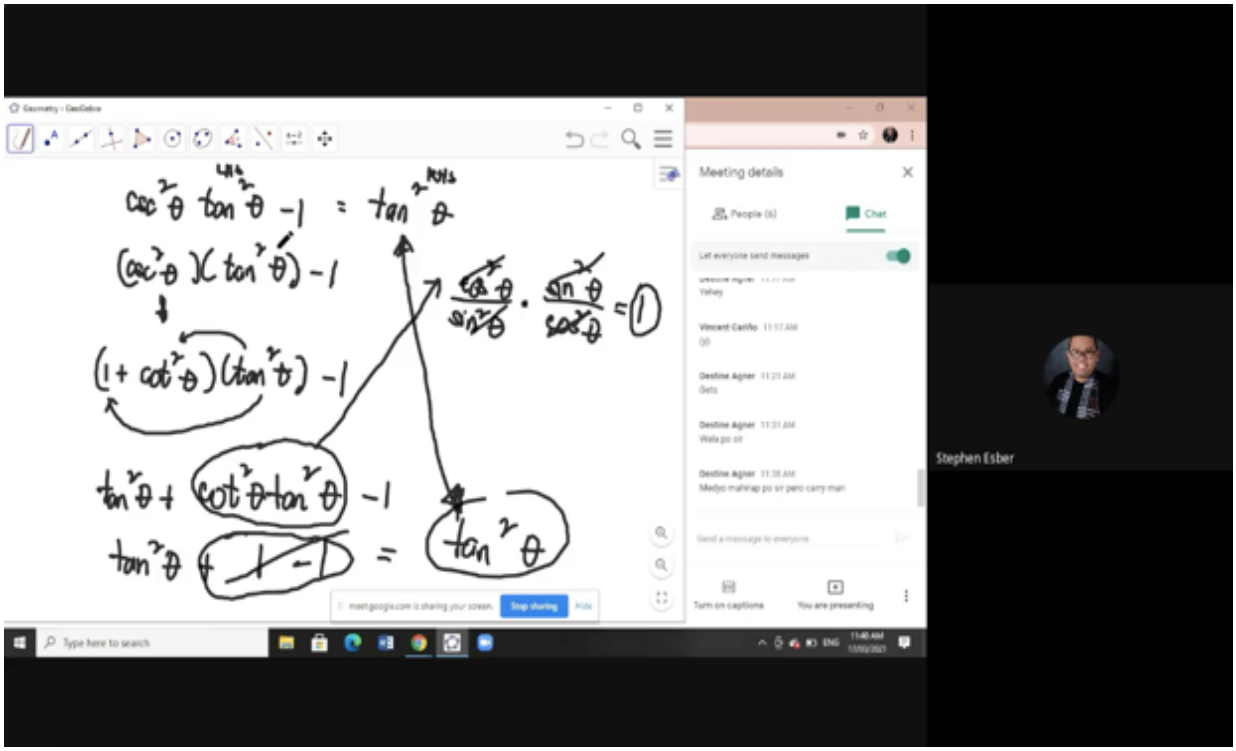

Figure 31. Gmeet Recording dated March 17, 2021 B

Another important reason why I prefer using the White Board because it allowed me to present detailed solutions to the problem. Unlike in pdf or ppt, some of the solutions to the problems are already simplified which confused some students who were looking for step-by-step solutions.

Using the White Board also, I can take screenshots of supplementary problems provided in the e-book (pdf form) and paste it on one of the pages and show the detailed solution to the students. This following are screenshots of the synchronous online sessions in Mathematics 10 conducted through Google Meet.

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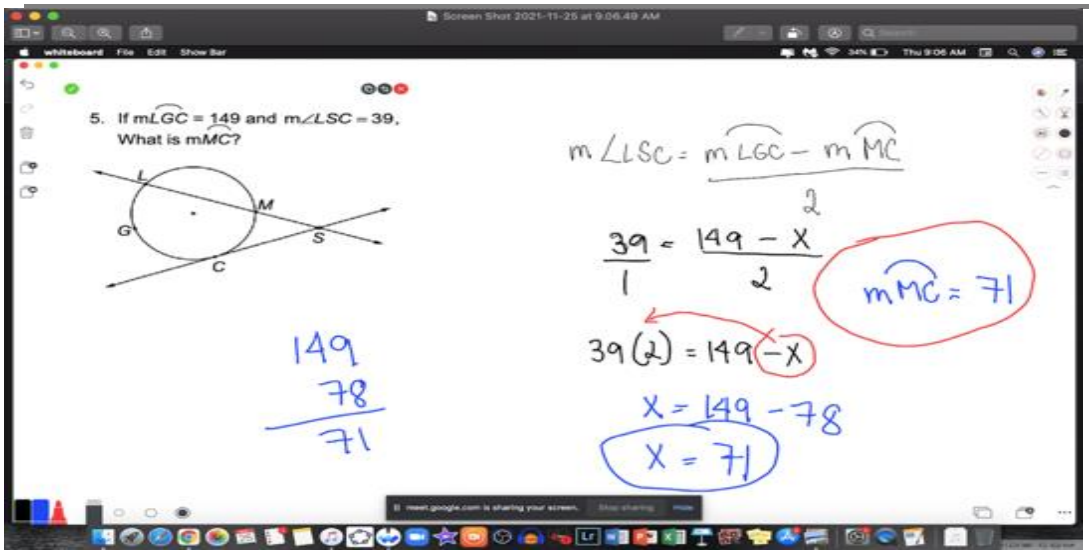

Figure 32. Screenshot dated 2021-11-25, 9:06 AM

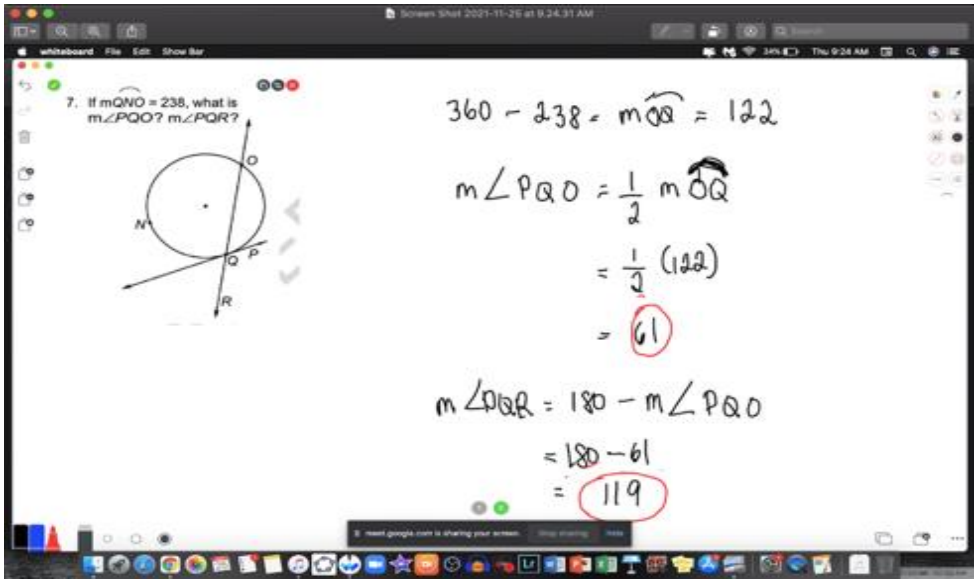

Figure 33. Screenshot dated 2021-11-25, 9:24 AM

During synchronous online sessions, students are also given the chance to present and share their knowledge, understanding, and reflection on topics being discussed. The following are screenshots of synchronous online session with students sharing and discussing their thoughts and reflections.

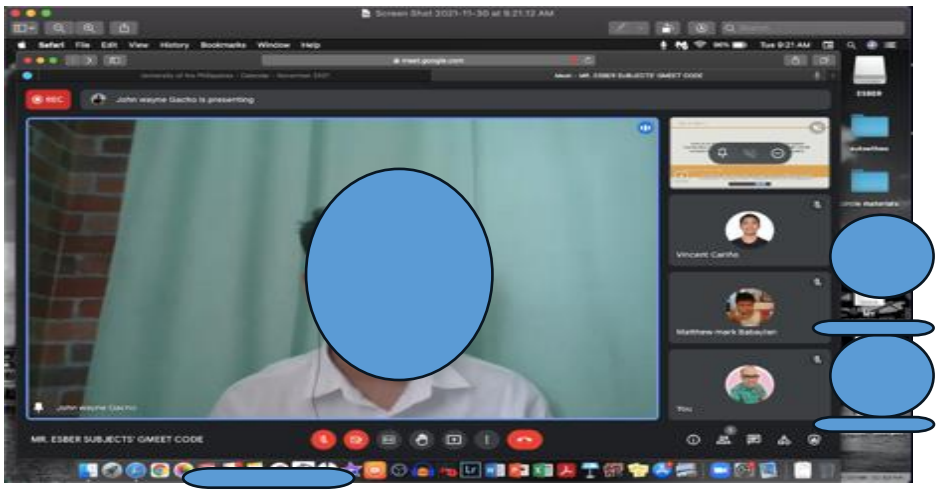

Figure 34. Screenshot dated 2021-11-30, 9:21 AM

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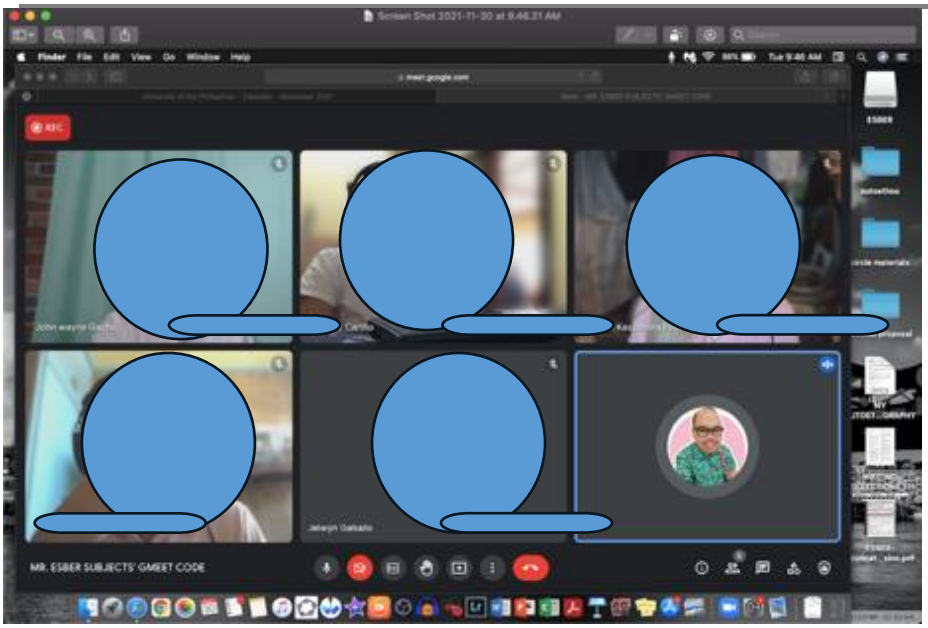

Figure 35. Screenshot dated 2021-11-30, 9:46 AM

As what has been mentioned, the beauty of conducting synchronous sessions is the provision of real-time conversation between the teacher and students. Through video conferencing, the students can directly ask questions from the teacher and receive immediate feedback which is very crucial in distance learning. Most of the time, I allow the microphones of the students to be opened during the open forum where they are free to ask questions related to the topic being discussed.

In cases wherein the students aren't comfortable to open their microphones and camera, they can use the chat box to interact with the teachers and posts questions.

In the given screenshot, the students post answers to some questions I asked during the conduct of synchronous online discussion using the chat box.

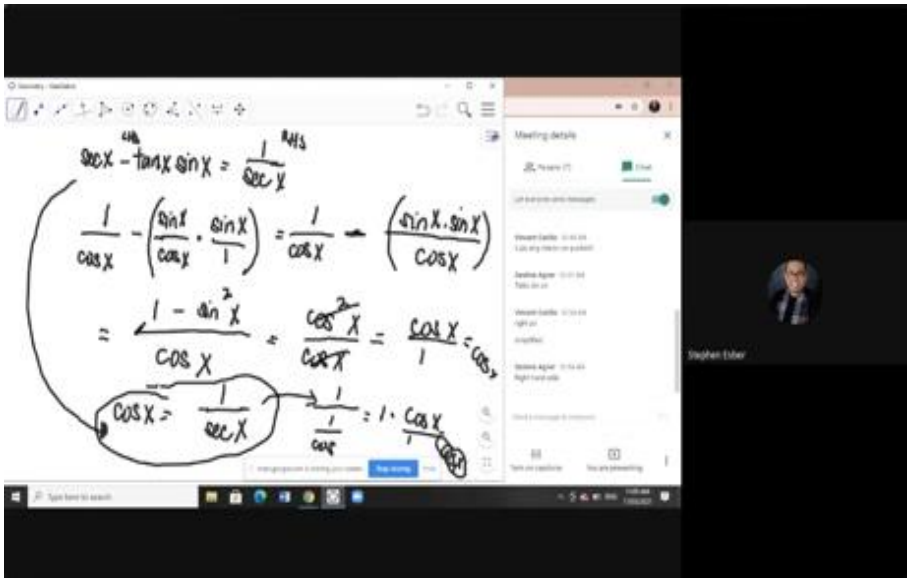

Figure 36. Gmeet Recording dated March 17, 2021

DISCUSSION

"Obstacles don't have to stop you. If you run into a wall, don't turn around and give up. Figure out how to climb it, go through it, or work around it." – Michael Jordan

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The present study aimed to highlight a HS teacher's shift from full face-to-face instruction to a Bichronous (Synchronous + Asynchronous) ODL set-up during the pandemic. As revealed by several periods in the findings, the author's successful transition includes:

A. Structuring the course (Designing Pedagogy in ODL)
B. Effectively using the ODL Technologies to implement the Bichronous ODL set-up
C. Establishing Teacher Presence
D. Providing Student-support mechanism

Looking into the Subsystems in Distance Education:

- Structuring the course (Designing Pedagogy in ODL) falls under the **Course Design and Development Subsystem** (a subsystem that structures materials and activities for students);
- Effectively using the ODL Technologies to implement the Bichronous ODL set-up and Establishing Teacher Presence fall under the **Teaching and Learning Subsystem** (a subsystem that delivers the courses to learners through media and technology); and
- Providing Student-support mechanism falls under the **Learner Support Subsystem** (a subsystem that encompasses all of those interactive activities and services in education intended to support and facilitate the learning process. This includes: Tutoring and Teaching Counselling and Advising Administrative Services)

Structuring the Course (Designing Pedagogy in ODL)

Structuring the course to custom fit a bichronous ODL set-up was the first consideration of the author in transitioning from face-to-face to online distance learning. The process included:

Designing the Learning Continuity Plan (LCP)

The LCP provides a framework where it can be gleaned that it has three important elements – the learner, the school and the home. Both the school and the home support the learner, who is considered as the most important element in the teaching and learning process (Arrieta, 2020). A plan of action should be created and put into effect using the school's alternate delivery modality and basic education learning continuity policies (Kilag et. al, 2023).

The Learning Continuity Plan was designed with a legal framework responsive to the COVID-19 pandemic, keeping in mind the constitutional mandate to uphold the right of learners to quality education at all times.

In designing the Learning Continuity Plan, I reflected on the **Equivalency Theory (Simonson)** which assumes the following:

- DE learners should be given equivalent learning experiences that are provided by face-to-face instruction;
- instructional experiences are vital for the success of each individual learner and that no learner, regardless of study modes, should be forced to endure lesser instructional experience; and
- the goal is to provide equivalent learning experience

As mentioned, my main consideration in designing the Learning Continuity Plan was to teach the subject using a Bichronous ODL set-up. In a week, there were days allotted for asynchronous and synchronous learning. During asynchronous learning, through the TLSG, students were provided with internet-based resources where they can discover and learn the lesson on their own pacing. Worksheets were provided as practice exercises for the competencies being mastered. Once a week, I did real-time online synchronous teaching to give the students the chance to deepen their learning and gain understanding of the lessons they consider hard to master.

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Inset on module writing

To mitigate the dilemma that the teachers experience in delivering instruction amid COVID-19, educational institutions switched to digital technologies to empower the teachers as frontline workers during the pandemic. As a result, the teachers in most countries throughout the world are undergoing training through webinar technology. Holding webinars to train the teachers can pave the way to address the challenges in remote teaching while simultaneously preventing the spread of the novel coronavirus (Toquero & Talidong, 2020).

As mentioned, the inset provided the teachers a clear layout of the Bichronous ODL set-up what would be implemented for AY 2020-2021. The school decided to adapt a bichronous ODL set-up to provide the students quality ODL experience.

During the entire conduct of the in service training, we reflected on the **Transactional Distance Theory (Moore)** which assumes the following:

- when an instructional designer makes decisions, these decisions will result in a certain amount of structure, dialog and autonomy.
- these amounts can be either unwitting consequences of the instructional design process, or the result of conscious instructional design decisions.

Looking into the Transactional Distance, we carefully planned and structured our respective courses considering the following:

- the contents to be uploaded on the LMS and the essential parts to be incorporated in the TLSG;
- the kind of dialogue that would exist between teacher-student, student-student, student-content; and
- the amount of student autonomy present as they navigate through the asynchronous parts of the TLSG

Through webinars and exemplars, we were guided on module making: basic parts of a learning module, translating learning plans to learning modules, selecting resources for module making, etc.

Most importantly, during the inset, we decided to create a module template (learner's study guide) that is uniquely STCDCFI's – the Theresian Learner's Study Guide (TLSG).

Designing the Theresian Learner's Study Guide (TLSG)

During school lockdowns, the teachers made adjustments in teaching and learning designs guided by the policies implemented by the institution. (Dayagbil et. al., 2021). The learning atmosphere and teacher creative teaching are essential factors improving student creativity. The most critical teaching equipment affecting the learning atmosphere are **student module creation**, teaching method, and classroom comprehensiveness (Badia & Becerril, 2016).

While designing the TLSG, we looked into the **Constructivist Learning Theory (Bruner)** which assumes that learners are capable of constructing knowledge by themselves and that teachers/instructors have three roles in distance learning:

- translate information to be learned into a format appropriate to the learner's current state of understanding.
- encourage students to construct hypotheses, makes decisions, and discover principles by themselves.
- organize it in a spiral manner so that the student continually builds upon what they have already learned.

As mentioned, The Theresian Learners' Study Guide is a comprehensive document (in pdf) uploaded in the Google Classroom and given to students bi-monthly that guides them how to navigate each learning week, both asynchronously and synchronously. Designing TLSG was designing the teaching and learning process that would cater to a bichronous ODL set-up.

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Effectively using the available ODL Technologies to implement the bichronous set-up

Existing and emerging e-learning technologies are having intense, immediate, and disruptive transformations on education systems (Archer, Garrison & Anderson, 1999).

Through the available ODL technologies, the author was able to transition from face-to-face instruction to a bichronous ODL set-up by:

Structuring asynchronous learning through Google Classroom Posts (with internet-based resources) + TLSG

Perhaps more important is the ability of asynchronous communication technologies to give students equal opportunities to contribute. When facilitated effectively by the teacher, this can result in a democratic learning environment for all students. Further, given that the teacher's role is to organize, stimulate, instigate, and evaluate the highly complex process of education, as well as to be a helper, consultant, and/or encourager, e-learning technologies can be very effective at facilitating this kind of environment because they effectively facilitate a learner-centered environment (Kanuka, 2008).

While we were structuring the course on the Learning Management System, we reflected on the **Independent Study and Learning Theory (Wedemeyer)** which assumes the following:

- that learners should be given the opportunity to study anytime, anywhere whether or not the teacher is present at the same time or place;
- learners should take a greater responsibility in the learning process; and
- learners should be self-directed learners and should be given the chance to make decisions and choices about his/her learning

The following are evident as part of the asynchronous set-up the author has provided the learners:

- Keeping students informed by posting general and advanced announcements, activity details, and instructions
- Providing clear instruction architecture by posting learning goals and schedule guide
- Providing tools for self-directed learning through internet-based resources
- Giving students choices by providing multiple learning resources they can choose from posted on the Google Classroom and incorporated on the TLSG
- Giving students opportunities to plan, pace themselves, and revise their work by providing worksheets and assessment materials
- Training students to develop critical thinking by providing questions that bring about clarity and focus on the topic or issue

Conducting synchronous learning through real-time teaching (Google Meet)

One of the main considerations why we needed to conduct synchronous teaching through the available video conferencing tool is to give the students the opportunity to ask questions and other matters related to the lesson. We provided the students the chance to express their difficulty and freely ask questions on parts they have difficulty with.

On conducting synchronous sessions, we reflected on the **Guided Didactic Conversation Theory (Holmberg)** which assumes the following:

- that learning in Distance Education is compared to a 'friendly conversation' between the teacher and the learner;
- the success of a DE course offering depends on the course designer/course writer to simulate a two-way communication process embedded in the industrialized instructional materials; and
- this two-way communication is both real and simulated

The following are evident as part of the synchronous set-up the author has provided the learners:

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- Giving clear instruction architecture
- Providing visual learning prompts through geogebra app, graphs and diagrams, ppt, pdf, whiteboard, real-time illustration, etc.
- Giving the students opportunities to clarify and deepen learning
- Giving students a voice by allowing the students to comfortably discuss their ideas and challenges
- Being transparent by providing students clear mechanics and marking system

Establishing Teacher Presence

Another crucial element in establishing a successful online distance learning experience is teaching presence. In their 2000 paper, Garrison et al. stated that although participant interactions online must be both social and content-related, these interactions alone cannot guarantee successful online learning. Because of this, it is thought that guiding these encounters requires a strong teaching presence. Teaching presence is referred to as "the 'methods' that instructors use to create the quality online instructional experiences that support and sustain productive communities of inquiry" (Bangert, 2008, p. 40).

Design and organization, direct instruction, and facilitating discourse are three categories of teaching presence behaviors that are used by online instructors. Design and organization refers to the planning and design of the course's structure, process, interaction, and evaluation. Direct instruction is the instructor's provision of intellectual and scholarly leadership, which includes sharing subject-matter expertise with the students. The fourth category, assessment, is more recent and encompasses "both formative and summative assessment across a broad range of instructor and student activities that occur within an online course" (Shea et al., 2010, p. 134).

All throughout the learning process, the author has established teacher presence by:

Asynchronous Presence (Google Classroom Posts and Instructions)

- Keeping students informed by posting general and advanced announcements, activity details, and instructions
- Providing clear instruction architecture by posting learning goals and schedule guide
- Providing tools for self-directed learning through internet-based resources
- Giving students choices by providing multiple learning resources they can choose from posted on the Google Classroom and incorporated on the TLSG
- Giving students opportunities to plan, pace themselves, and revise their work by providing worksheets and assessment materials
- Training students to develop critical thinking by providing questions that bring about clarity and focus on the topic or issue

Synchronous Presence (Gmeet realtime teaching)

- Giving clear instruction architecture
- Providing visual learning prompts through geogebra app, graphs and diagrams, ppt, pdf, whiteboard, real-time illustration, etc.
- Giving the students opportunities to clarify and deepen learning
- Giving students a voice by allowing the students to comfortably discuss their ideas and challenges
- Being transparent by providing students clear mechanics and marking system

Providing student-support mechanism

The student-support mechanism is categorized as following :

Cognitive Support is described as material support through providing well developed course materials and learning resources:

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- Provision internet-based resources
- Provision of the Theresian Learner's Study Guide (TLSG)
- Provision of tutorial videos
- Providing copy of the recorded Gmeet session

Affective Support provides an environment that support students, creates commitment and enhances self-esteem:

- Providing consultation time (as reflected on the TLSG)
- Encouraging students to share their thoughts and feelings during discussions
- Encouraging students to ask questions both in the asynchronous and synchronous set-up

Systemic Support promotes establishing administrative process and Information Management System which are effective, transparent, and overall learner friendly:

- Structuring the course in the learning management system (Google Classroom) for an effective asynchronous learning and to perfectly blend with the contents of the Theresian Learner's Study Guide (TLSG)

In the end, this study also affirms what transpired in the literature:

- Designating structured video conferencing sessions allowed the students to pose questions about the content and the assignment as well as providing discussion forums where students respond to guided questions as reflected in the study of Best, R. (2022) and Brzezinska, M. (2022);
- Students' participation, both in the asynchronous and synchronous modes, significantly increased as reflected in the study of J. N. Farros (2019);
- Students' attitude towards online distance learning significantly improved when real-time teaching through video conferencing sessions were provided to complement the student-led asynchronous mode of learning as reflected in the study of Badawi, N. (2017);
- Students felt positive about the presence of an online classroom and the provision of online real-time discussion gave the students positive feelings of belongingness as reflected in the study of Peterson et al. (2018);
- In synchronous mode, the right choice of technology in conducting live and real-time video conferencing sessions appeared to be more important; whereas in asynchronous mode, structuring the course in the learning management system using relevant ODL pedagogies proved to be more relevant as reflected in the study of Bernard et al. (2004); and
- Active learning was associated with improved success and attitude results in asynchronous DE because of poor bandwidth provision in some areas. However, communication provision, both in the asynchronous and synchronous modes, significantly helped the students to achieve better learning outcomes as reflected in the study of Bernard et al. (2004).

Chapter V

RESEARCH SUMMARY, CONCLUSION, AND IMPLICATIONS

Summary

This study employed a qualitative autoethnographic method which provided a detailed description of the researcher's experiences in transitioning from face-to-face instructions to conducting a Bichronous (Synchronous +Asynchronous) ODL set-up in High School Education during the Covid 19 Pandemic. A researcher journal was created by an examination of artifacts such as email, discussion posts, recorded video lessons, curricular documents, a workplace calendar, a personal journal, professional development logs, interviews, and personal experience. The study revealed, as reflected by several periods in the findings, that the author's successful transition was caused by:

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A. Structuring the course (Designing Pedagogy in ODL)
B. Effectively using the ODL Technologies to implement the Bichronous ODL set-up
C. Establishing Teacher Presence
D. Providing Student-support mechanism

Conclusion

Transitioning from full face-to-face instructions to a bichronous ODL set-up requires:

- **Pedagogical Knowledge on Online Distance Learning**

An effective pedagogy for a bichronous ODL set-up requires proper structuring of the course in the Learning Management System (LMS) for asynchronous learning and effective conduct of online real time discussions for synchronous learning. The purpose of structuring the course in the Learning Management System is to give chance to the learners to be self-directed at their own pacing. Asynchronous learning should be supplemented with real-time discussions using available videoconferencing tools because studies have shown that integrating synchronous with asynchronous features makes an online course more engaging, improving learning results, positive attitudes, and retention.

- **Technical know-how on the technologies used in Online Distance Learning**

A quality bichronous ODL teacher acquires efficient and effective technical know-how on the varied and readily available technologies to enhance the effective delivery of the course content. By utilizing these technologies for online distance learning, the online teacher can provide a quality educational learning experience that will help the learners acquire the learning competences set for their level even in a remote teaching and learning set-up.

Technologies in online distance learning are more than following trends; instead, they are powerful tools that can enrich the teaching and learning process, most specially during challenging times wherein face-to-face instructions are impossible to occur. The use of ODL technologies in remote teaching and learning scenarios has revolutionized learning even during trying times.

- **Strong and effective teacher presence across the learning process**

Designing, facilitating, and guiding cognitive and social processes with the goal of achieving personally meaningful and educationally valuable learning outcomes is what is "teaching presence." Teachers must establish a social presence in the online course for a successful delivery of online teaching and learning. A teacher who is actively engaged in the virtual classroom (both in the asynchronous and synchronous learning process) can better maintain student connections and engagement, establish open channels of communication, and offer assistance and direction when necessary.

According to Anderson, Rourke, Garrison, and Archer (2001), the three crucial roles of teachers towards establishing teaching presence are: (a) plan and organize the learning experience, which takes place before the course begins and during its duration; (b) come up with, carry out, and oversee activities that promote interaction and communication between students, teachers, and content resources. (c) use direct instruction to share their academic expertise and pertinent experiences.

- **Provision of student-support mechanism across the learning process**

Student-Support is one of the crucial elements of online students' success. Online distance learning should provide student support to facilitate, engage and motivate students to learn.

During emergency remote teaching and learning scenarios just like what happened during the Covid 19 pandemic, student-support doesn't have to be highly technical and complex. Student-support in this study simply meant giving free time consultation when students are having difficulty with the lessons, structuring

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and organizing the Learning Management System (LMS) to foster a smooth asynchronous self-directed learning, and providing ample time for real-time synchronous online discussions to help them fully understand the lessons being taught.

In the end, whether in-person or online teaching, teachers should provide student-support in various forms and styles to help the students achieve maximum learning.

Implications

Furthermore, this study seems to uncover several implications for teachers and schools:

(a) The importance of designing a school's ODL set-up for future remote teaching and learning scenario should be looked into. Education faces a lot of threats and continuity of teaching and learning should be assured at all cost;
(b) Teachers should receive enhanced training on ODL technologies and how to structure courses during remote teaching scenario, in which one of the options is through a bichronous ODL set-up;
(c) Future research can investigate the extent to which students learn and acquire the learning competencies in a bichronous learning environment in comparison to traditional face-to-face classroom learning;
(d) In order to help teachers who have no prior experience teaching online become effective ODL teachers, it is crucial for school administration and educational leaders to grasp the obstacles faced by these teachers;
(e) In order to determine how the pandemic has affected students' readiness to adjust to the bichronous ODL set-up in the post-Covid-19 era, it is also important to look into how well both synchronous and asynchronous learning are perceived by students and how their difficulties were addressed; and
(f) Actively gathered student input should also be carefully considered while creating online courses or improving/refurbishing those that were converted from the traditional format to the remote one in order to increase student enthusiasm and collaboration.

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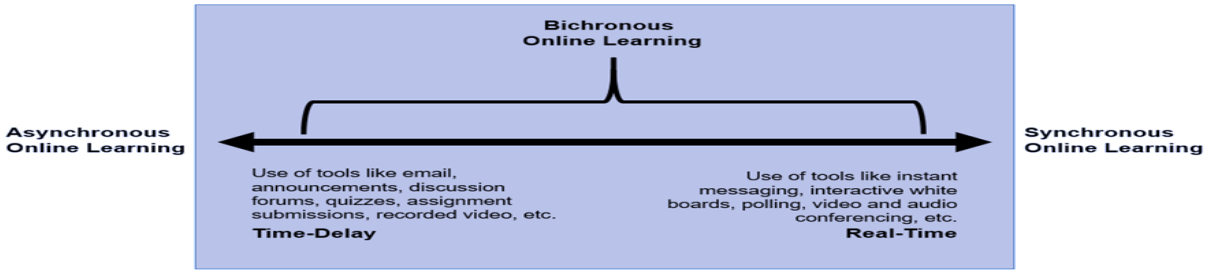
APPENDIX 1

Conceptual model for bichronous online learning



APPENDIX 2

Qualitative Data Analysis Table A

AUTOETHNOGRAPHIC DATA ANALYSIS
Research Title: Transitioning to a Bichronous (asynchronous and synchronous) ODL set-up in High School Education: An Autoethnographic Study

METHODOLOGY: COLLECTION OF DATA (CHRONOLOGY OF EVENTS / EPIPHANIES) – IDENTIFYING CODES FROM THE DATA SET – IDENTIFYING SUBTHEMES AND THEMES TRANSITION – PLAN (INVOLVES TECHNOLOGY) – GUIDANCE (PEDAGOGICAL) - TECHNOLOGICAL – TIME FRAME

DATE	DATA SET	PRECIPITATING EVENTS	CODES	SUB-THEMES	THEMES
MARCH 2020 (national lockdowns were declared)	Google Classroom post (dated March 17, 2020) days after the national lockdowns were imposed	Covid 19 (sudden/emergency transition from f2f to online distance learning (limited to asynchronous ODL set-up)	- Provision of learning competencies - Provision of Internet-based learning resources - Schedule templates - More instructions	ONLINE POST GUIDANCE	STUDENT SUPPORT TEACHER-ONLINE PRESENCE

APPENDIX 3

Qualitative Data Analysis Table B

End of academic year 2019 – 2020 (June 2020)	(Learning Contiuity Plan in General Mathematics adapting a Bichronous ODL set-up)	Designing the Learning Continuity Plan with a Bichronous ODL Set-up	- Designing the Learning Continuity Plan (compliant to the status quo of national lockdowns) - started planning to succeed for a Bichronous ODL set-up.	Planning Pedagogical Design of ODL	PEDAGOGICAL DESIGN OF ODL
June 2020 After the closing of academic year 2019-2020		Preparing for a Full Bichronous (Synchronous + Asynchronous) ODL Set-Up	- designing subject modules that adapt a bichronous ODL set-up was the next big thing - need to offer synchronous learning to complement the asynchronous was seen and given consideration.	MODULE WRITING Bichronous ODL Set-up	PEGADOGICAL DESIGN OF ODL

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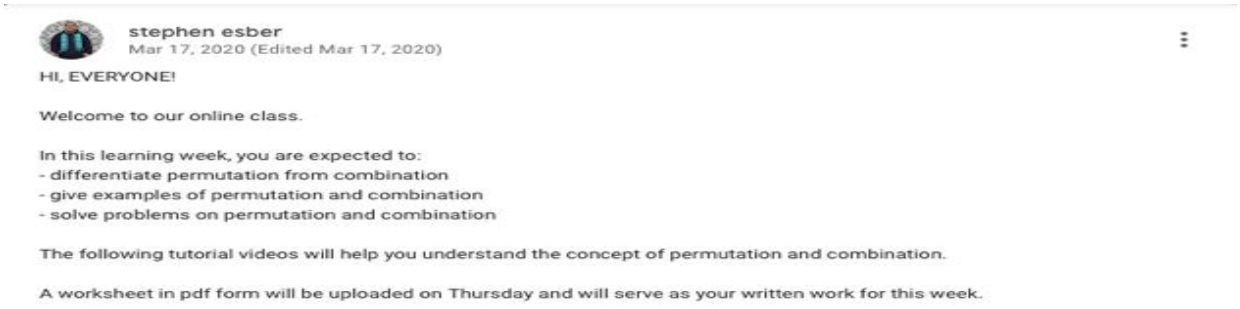
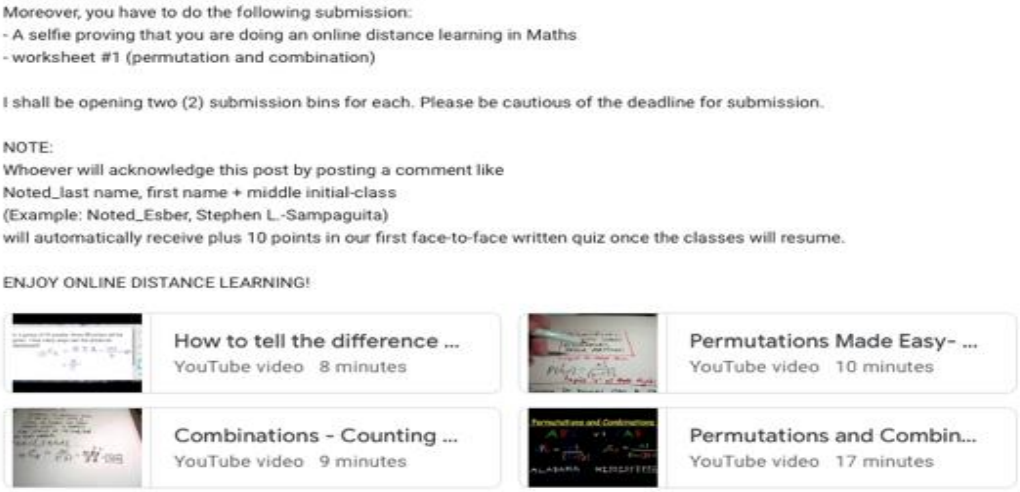
APPENDIX 4

Google Classroom post dated March 17, 2020



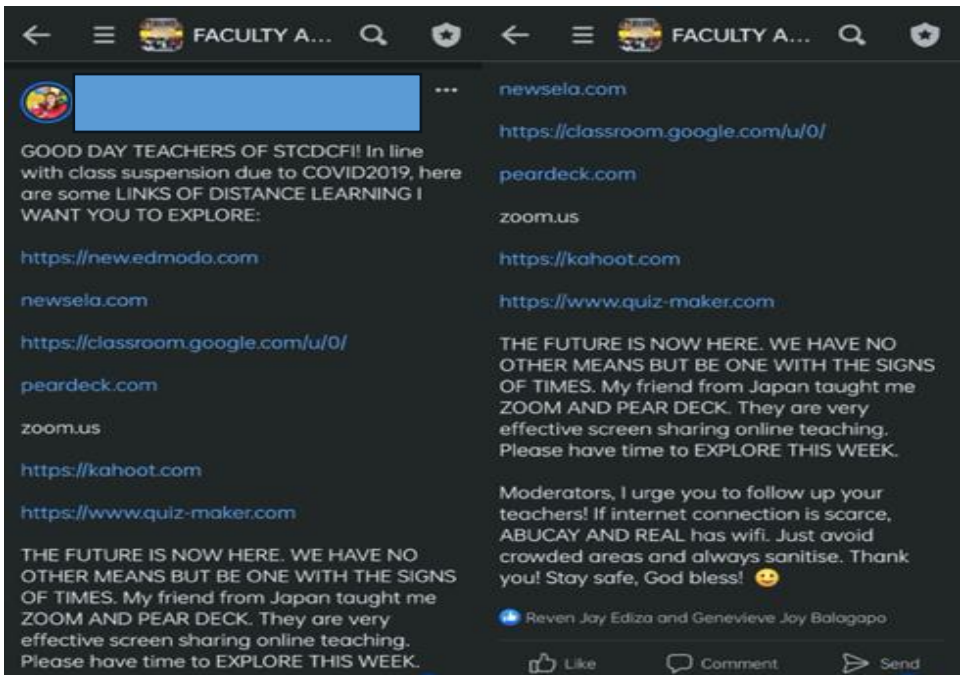
APPENDIX 5

Continuation of Google Classroom post dated March 17, 2020



APPENDIX 6

Academic Coordinator's Post on Faculty Page



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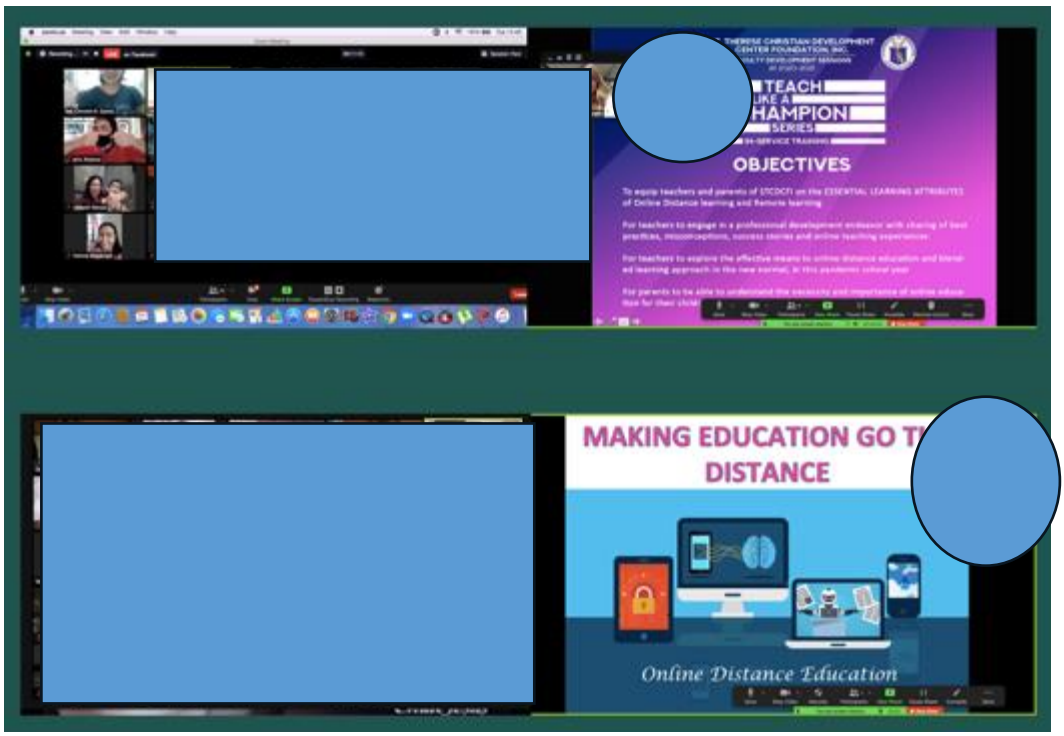
APPENDIX 7

Screenshots of Webinars



APPENDIX 8

In-Service Training Photos

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APPENDIX 9

Learning Continuity Plan

MATRIX OF LEARNING ACTIVITIES

Topic	Time allotment	Course Support (2)	Individual Learning Activity (3.1)	Communication Tools (3.2)	Course Collaboration (3.3)
UNIT 1 FUNCTIONS AND THEIR GRAPHS **After completing this unit, learners should be able to:** - accurately construct mathematical models to represent real-life situations using functions; - accurately formulate and solve real-life problems involving rational functions; and - apply the concepts of inverse functions, exponential functions, and logarithmic functions to formulate and solve real-life problems with precision and accuracy.					
KEY CONCEPTS OF FUNCTIONS 1. represent real-life situations using functions, including piece-wise functions 2. evaluate a function 3. perform addition, subtraction, multiplication, division, and composition of functions 4. solve problems involving functions	**Weeks 1,2** Sync – 2 Asynch – 6 Week 1 Sync – 1 Async – 3 Week 2 Sync – 1 Async – 3	**Asynchronous Discussion:** Functions in real-life situations with guide questions from the teacher **Synchronous Discussion:** Operations and composition of functions	• Download the online topic/module guide from the Google Classroom • Download the learning materials (online PDF) from the Google Classroom • View the tutorial videos related to the topic • Do the practice exercises in the topic worksheets • Revise for the quiz • The Online Quiz Online Sources: Tutorial Video 1 Algebra Basics: What Are Functions? - Math Antics https://www.youtube.com/watch?v=62bpY12tTqk Tutorial Video 2 Functions in Real Life Situations and Examples https://www.youtube.com/watch?v=Jz16ZRlsiUgs e-lesson: Evaluating and Solving Functions by lumenlearning https://courses.lumenlearning.com/waymakercollegealgebra/chapter/evaluate-and-solve-functions/ e-lesson: Operations with Functions by Mathspadilla.com	Google Classroom Google Meet	**Performance Task / Group Project** The learners will be grouped (5 members per group). Each group will be creating a ***Pecha Cucha*** about the applications of Mathematical Functions in our lives. Each group will be given a specific Mathematical Function to discuss. In two months, each group is expected to do group chat (synchronous and asynchronous), decide for the final output of the group, and upload their final output in the Google Classroom.

APPENDIX 10

Academic Coordinator's Email on Module Making

STCDCFI JUMPSTART ON IN-SERVICE TRAINING 2020: MODULE-WRITING WITH SAMPLES 4

Yahoo/Inbox

Tue, Jun 23, 2020 at 3:35 PM

[redacted]

STC

June 23, 2020

RE: MODULE-WRITING/ LEARNING CONTINUITY PLAN FOR BASIC EDUCATION TEACHERS

DEAR MAAM ANNIE AND TEACHERS: AS JULY IS FAST APPROACHING, IT IS HIGH TIME THAT WE ALL GET ENGROSSED IN THE DESIGN OF MODULE- MAKING. THERE MAY BE A LOT OF ONLINE LEARNING RESOURCES, BUT WE WANT TO GENERATE AND CREATE OUR OWN CONTENT AS THERESIAN EDUCATOR BASED ON THE DEPED MOST ESSENTIAL LEARNING COMPETENCIES. YOU MAY USE ONLINE RESOURCES AS AID AND SUPPORT TO YOUR OWN DESIGNED LEARNING MODULE. ATTACHED HEREWITH ARE THE FOLLOWING MODULES YOU CAN USE AS A GUIDE FOR STCDCFI MODULES FOR ACADEMIC YEAR 2020-2021. PLEASE USE THIS AS YOUR STANDARD OR YOU MAY GENERATE AN EVEN BETTER VERSION. JUST MAKE SURE TO HAVE PRE-TEST, INTRODUCTION, DEVELOPMENT, EXERCISE AND SUMMATIVE ACTIVITIY PER LESSON.

BELIEVE ME, THIS IS VERY FULFILLING! THE ATTACHED FILES ARE SAMPLES I MADE WAY BACK IN COLLEGE, AND SOME UPDATED LCP OF TEACHERS TODAY (MR. ESBER AND MS. ESTRADA). Thank you for your early submission! ☺

Challenging all teachers in your own learning area. FOCUS ON ONE SUBJECT AT A TIME. It doesn't have to be long. START TODAY, CHALLENGE YOURSELF NOW.

ATTACHMENTS:

- ORGANISMIC BIOLOGY MODULE – Tissues, Glands and Membranes (Gradeschool to JHS) by Ms. Christelle Corpin
- General Chemistry 1 Module 1, Lesson 1- States and Classification of Matter (JHS/SHS) – Ms. Christelle Corpin and Ms. Maria Lourdes Punay (UST)
- Science 9 Learning Module- Impulse and Momentum (JHS)
- Mathematics 9 MODULE- Introduction to Math 9 (Intermediate- JHS) by Ms. Elegene Estrada
- Learning Continuity Plan/ Syllabus – Pre- Calculus (SHS) by Mr. Stephen Esber

Thank you!

Christelle Angelica C. Corpin, MA.Ed.
Incumbent Academic Coordinator

CC: School Head and President
Unit Moderators
Administrative Officer

Christelle Angelica C. Corpin
BSE - Biological Sciences, UST

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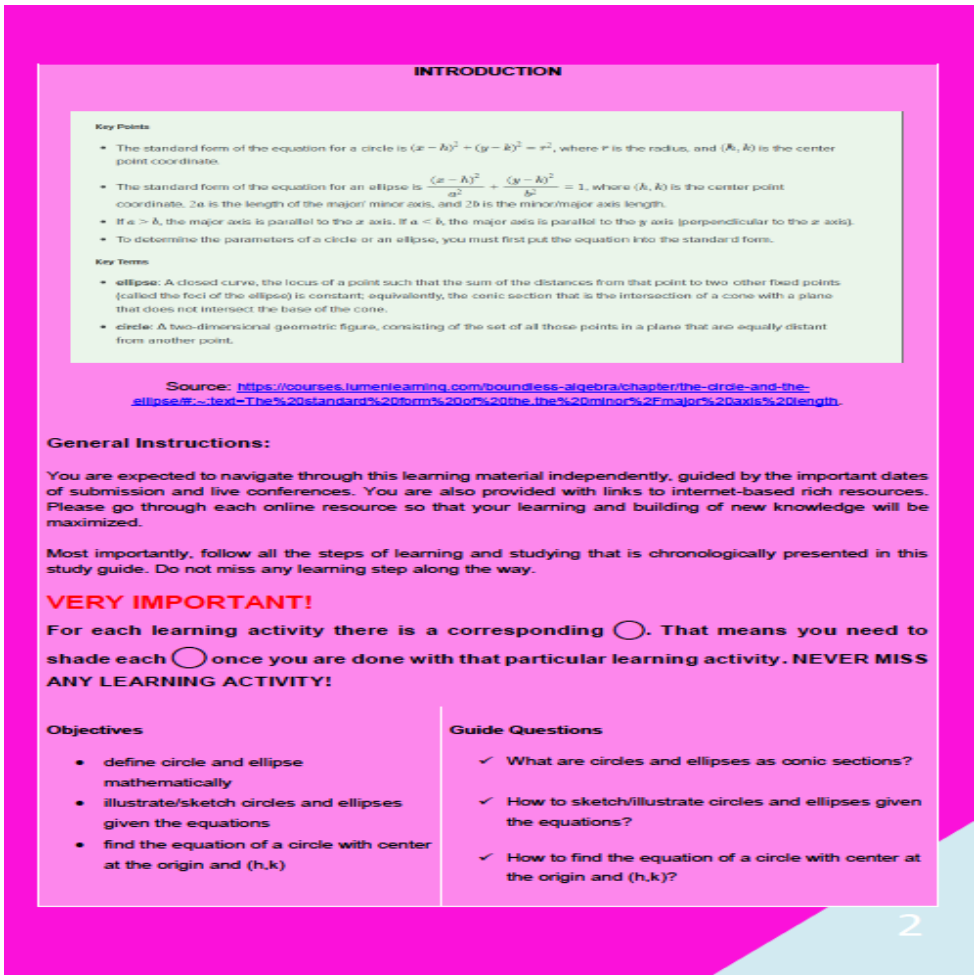
APPENDIX 11

Introductory Parts of the TLSG A

APPENDIX 12

Introductory Parts of the TLSG B



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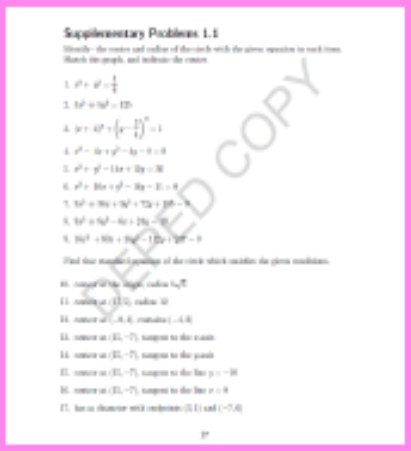
APPENDIX 13

Discovery Part of the TLSG

LEARNING ACTIVITIES	LEARNING MATERIALS
DISCOVER ○ Circle as a Conic Section	E-BOOK, PAGES 7-18 Links: https://www.youtube.com/watch?v=wchenlxoTz8 https://www.youtube.com/watch?v=KrlViLdsKWE https://www.youtube.com/watch?v=mU76dQpPoFw https://www.youtube.com/watch?v=lyb7f1VdxMU https://www.youtube.com/watch?v=6S-nr5kdPnI Process Questions: What are circles as conic sections? How to sketch/illustrate circles given the equations? How to find the equation of a circle with center at the origin and (h,k)?
○ Worksheet #1 ○ Ellipse as a Conic Section	 Supplementary Problems 1.1 Pages 17-18 E-BOOK, PAGES 33 - 45

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APPENDIX 14

Discussion and Deepening Parts of the TLSG

	Links: https://www.youtube.com/watch?v=dZHNJfetbZg https://www.youtube.com/watch?v=cTSaJSljYho https://www.youtube.com/watch?v=IvAYFUIEpFI https://www.youtube.com/watch?v=emShn_sWhCo Process Questions: What are ellipses as conic sections? How to sketch/illustrate ellipses given the equations? How to find the equation of an ellipse with center at the origin and (h,k)?
○ Worksheet #2	 Supplementary Problems 1.3 Pages 45 - 46
DISCUSS ○ Discuss the main differences of finding the equations of circles and ellipses given certain conditions	Discussion Forum Recitation (Google Classroom) Link: https://classroom.google.com/u/0/c/MTIyODYwNDUwOTMz
DEEPEN ○ Create your own real-life problem applications of Circles and Ellipses as Conic Sections	Discussion Forum Recitation (Google Classroom) Link: https://classroom.google.com/u/0/c/MTIyODYwNDUwOTMz

4

APPENDIX 15

Demonstration Part of the TLSG

DEMONSTRATE ○ Create your own CONCEPT MAP encompassing all the topics discussed in this LSG.	January 17, 2021 Google Classroom Submission Bin (details will be posted in the Google Classroom under Classwork) Link: https://classroom.google.com/u/0/c/MjQzNDY1NzQ3OTM3
Consultations	If you have clarifications or concerns, you may contact me: Email address: sle.stcdcfi@gmail.com FB messenger: Stephen L. Esber

PREPARED:

STEPHEN L. ESBER
Teacher-in-charge

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APPENDIX 16

Consulation Time dated September 18, 2021

APPENDIX 17

Google Classroom post dated April 13, 2021

Stephen Esber
Apr 13, 2021 (Edited Apr 13, 2021)

Most Essential Learning Competencies for Basic Calculus

ON LIMITS
The learners:
1. illustrate the limit of a function using a table of values and the graph of the function STEM_BC11LC-IIIa-1
2. distinguish between and STEM_BC11LC-IIIa-2
3. illustrate the limit laws STEM_BC11LC-IIIa-3
4. apply the limit laws in evaluating the limit of algebraic functions (polynomial, rational, and radical) STEM_BC11LC-IIIa-4

ON DERIVATIVES
The learners:
1. illustrate the tangent line to the graph of a function at a given point STEM_BC11D-IIIe-1
2. applie the definition of the derivative of a function at a given number STEM_BC11D-IIIe-2
3. relate the derivative of a function to the slope of the tangent line STEM_BC11D-IIIe-3
4. determine the relationship between differentiability and continuity of a function STEM_BC11D -IIIf-1
5. derive the differentiation rules STEM_BC11D-IIIf-2
6. apply the differentiation rules in computing the derivative of an algebraic, exponential, and trigonometric functions STEM_BC11D-IIIf-3

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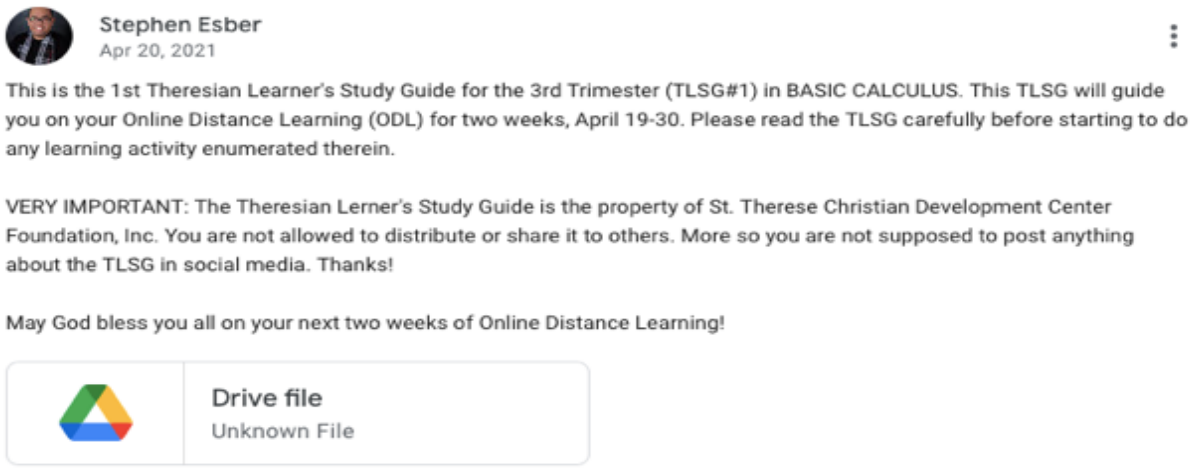
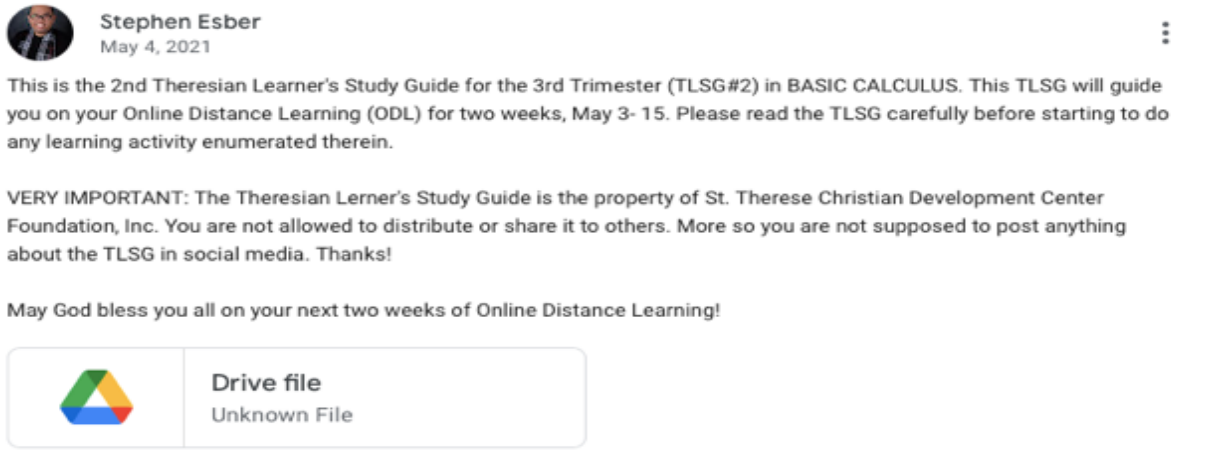
APPENDIX 18

Google Classroom post dated April 20, 2021



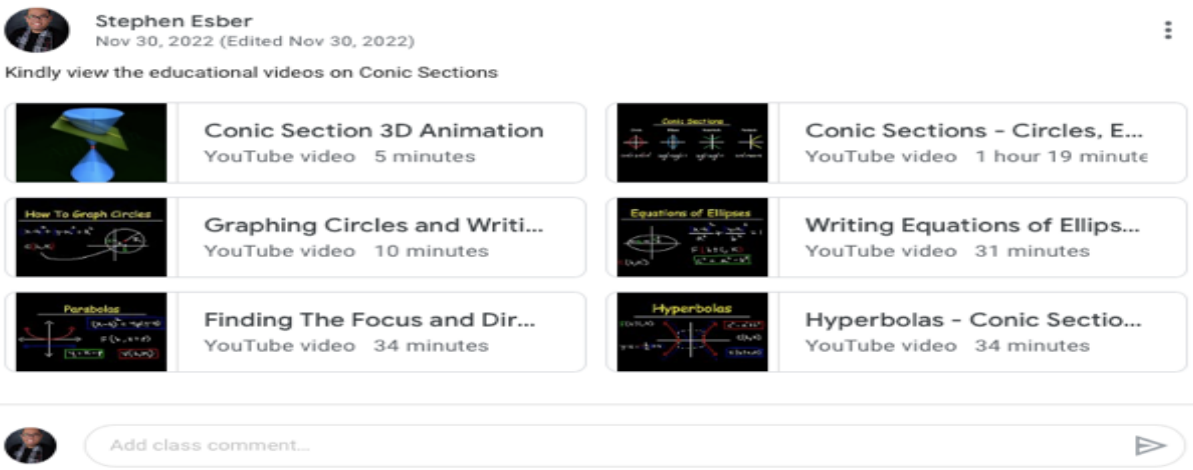
APPENDIX 19

Google Classroom post dated May 4, 2021



APPENDIX 20

Google Classroom post dated Nov. 30, 2022



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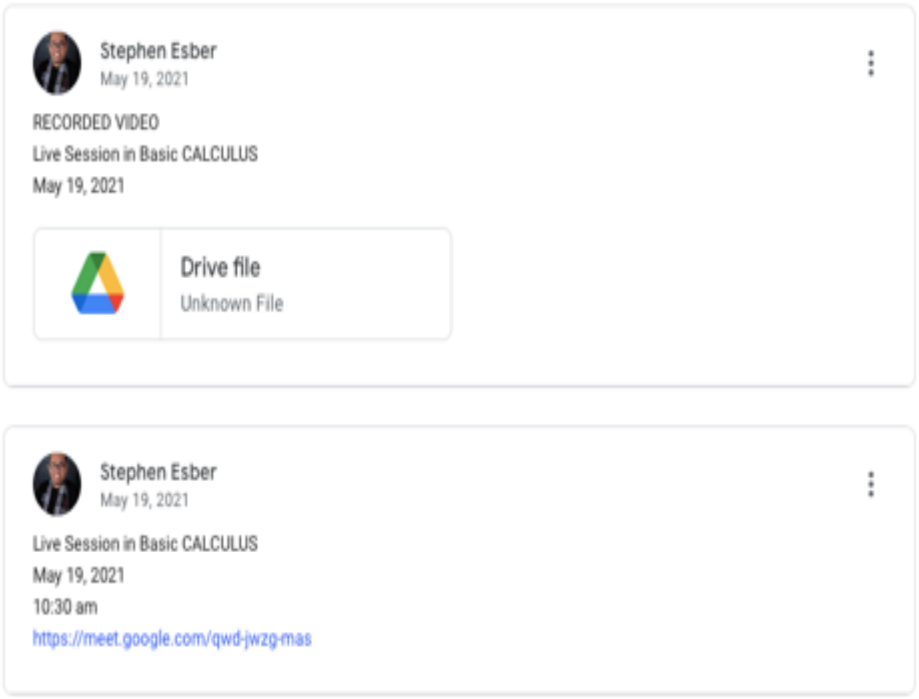
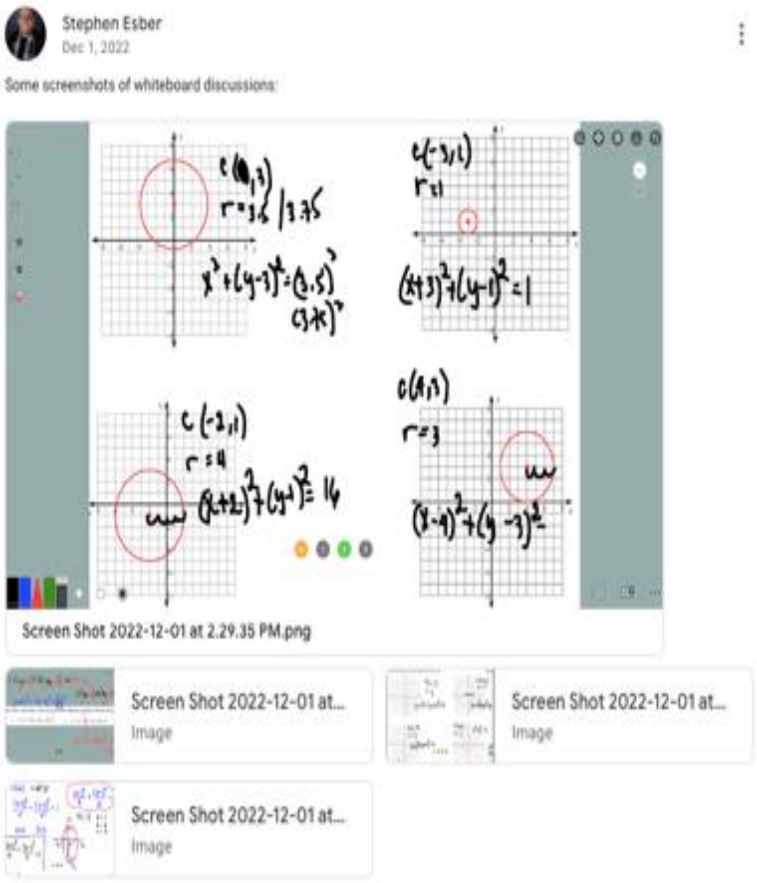
APPENDIX 21

Google Classroom post dated May 19, 2021



APPENDIX 22

Google Classroom post dated December 1, 2022



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APPENDIX 23

Google Classroom post dated November 30, 2022

Stephen Esber
Nov 30, 2022 (Edited Nov 30, 2022)

Written Assessment #1
Date: December 1, 2022

Topic: Equations of Circles

Learning Inventory:
- Finding the equation of a circle with center at (0,0)
- Finding the equation of a circle with center at (h,k)
- Writing the equation of a circle given the center and radius
- Writing the equation of a circle given the graph
- Finding the center and radius of circle given the equation in standard form
- Graphing the circle given the equation / center and radius

Note: Kindly bring a compass for circle construction.

APPENDIX 24

Google Classroom post dated November 30, 2022

Stephen Esber
Nov 30, 2022

Practice Exercises for Written Assessment #1 (Homework)
Note: Solutions are provided in the e-book.

More Solved Examples

1. In each item, give the standard equation of the circle satisfying the given conditions.
   (a) center at the origin, contains $(0, 3)$
   (b) center $(1, 5)$, diameter 8
   (c) circle A in Figure 1.15
   (d) circle B in Figure 1.15
   (e) circle C in Figure 1.15
   (f) center $(-2, -3)$, tangent to the y-axis
   (g) center $(-2, -3)$, tangent to the x-axis
   (h) contains the points $(-2, 0)$ and $(8, 0)$, radius 5

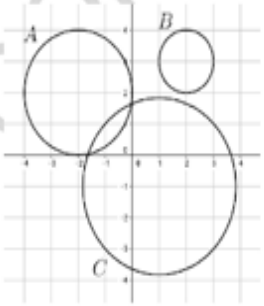
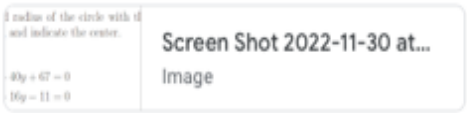


Figure 1.15

Screen Shot 2022-11-30 at 6.35.01 AM.png



Screen Shot 2022-11-30 at...
Image

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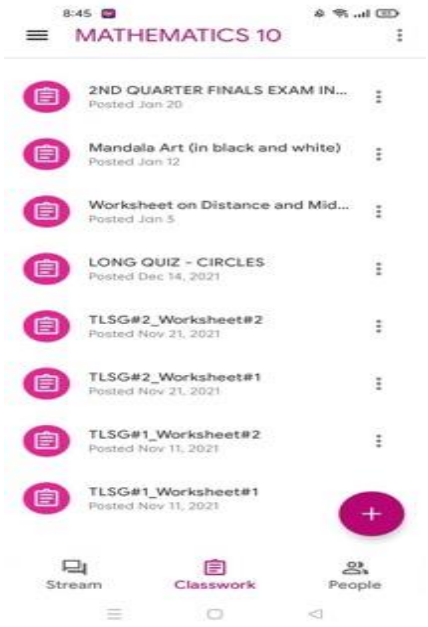
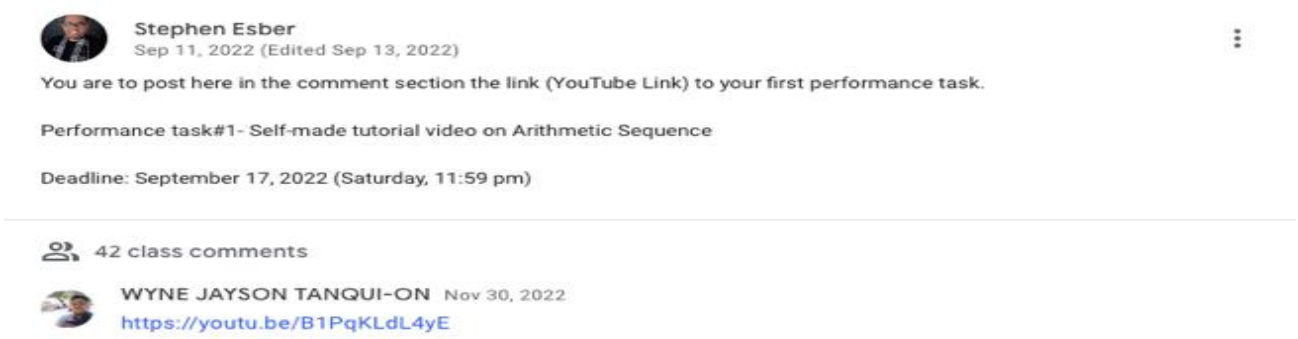
APPENDIX 25

Google Classroom post – Submission Bin



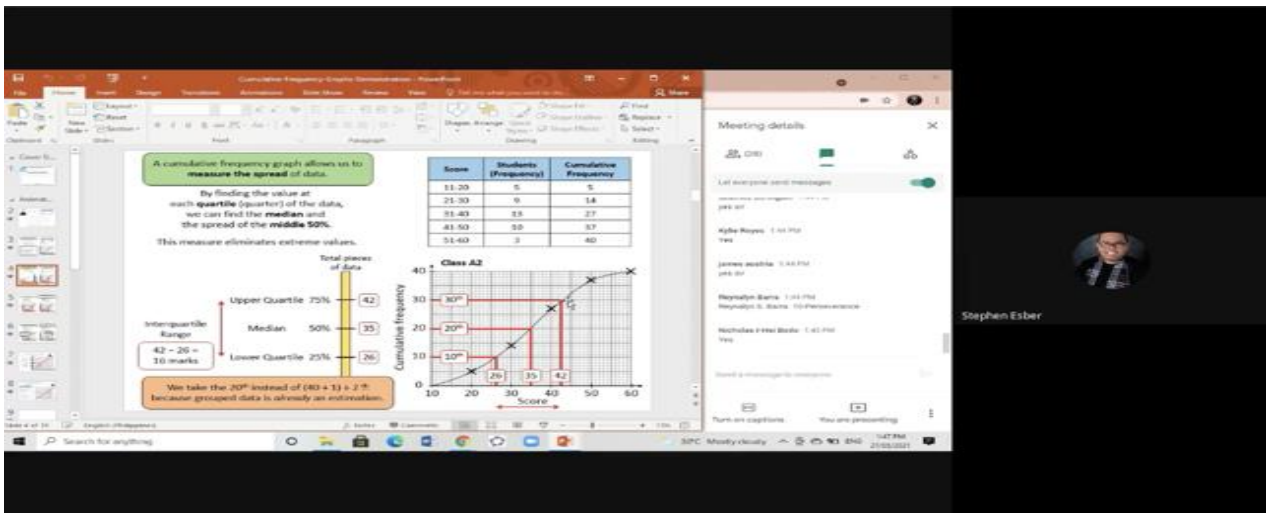
APPENDIX 26

Google Classroom post dated September 11, 2022



APPENDIX 27

Google Meet Recording dated May 27, 2021



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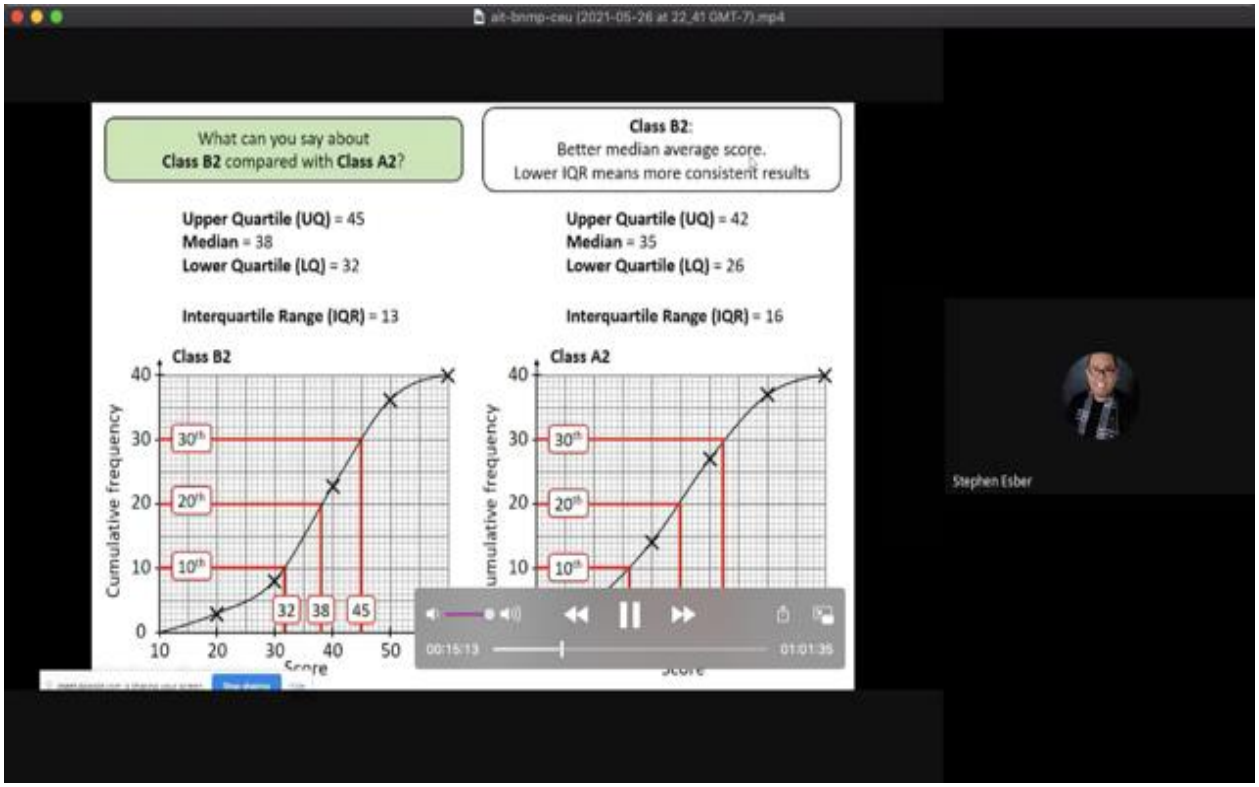
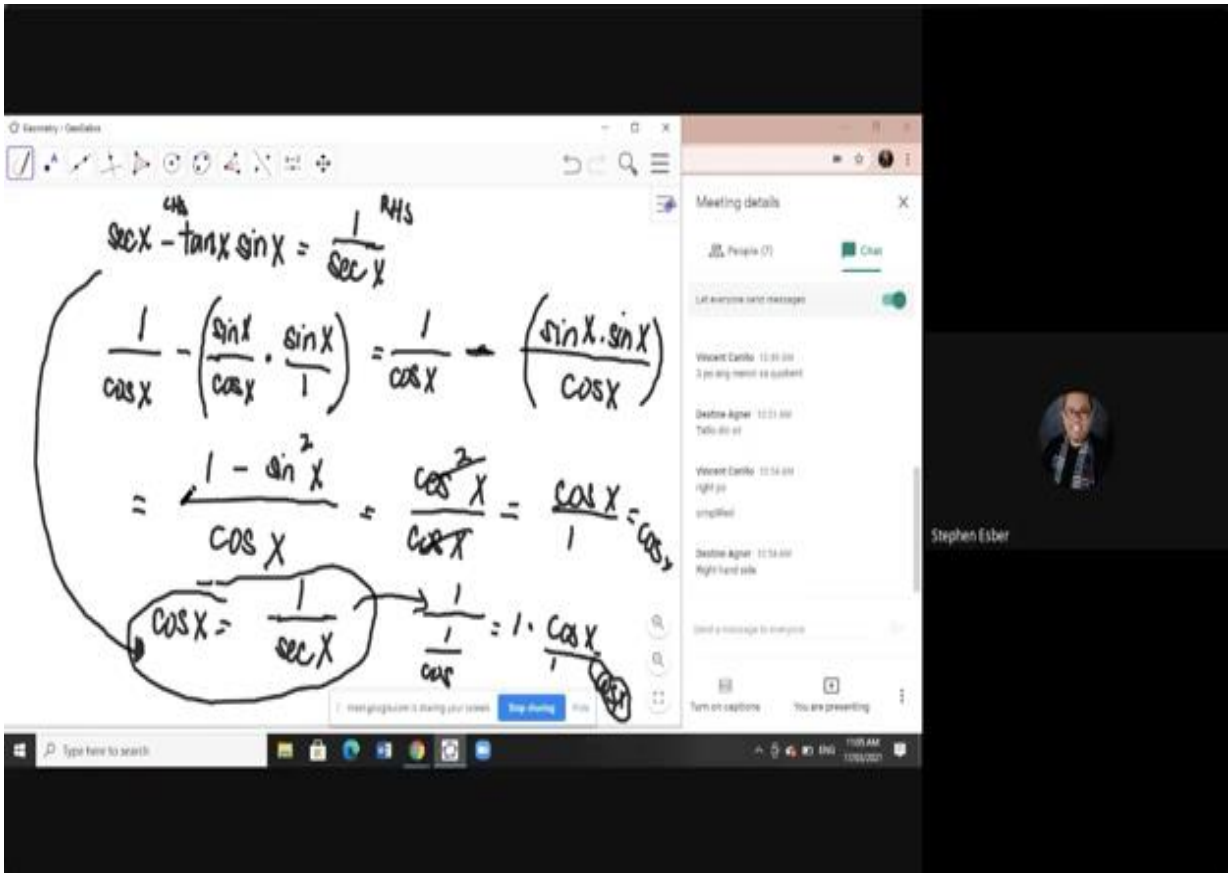
APPENDIX 28

Google Meet Recording dated May 26, 2021



APPENDIX 29

Google Meet Recording dated March 17, 2021



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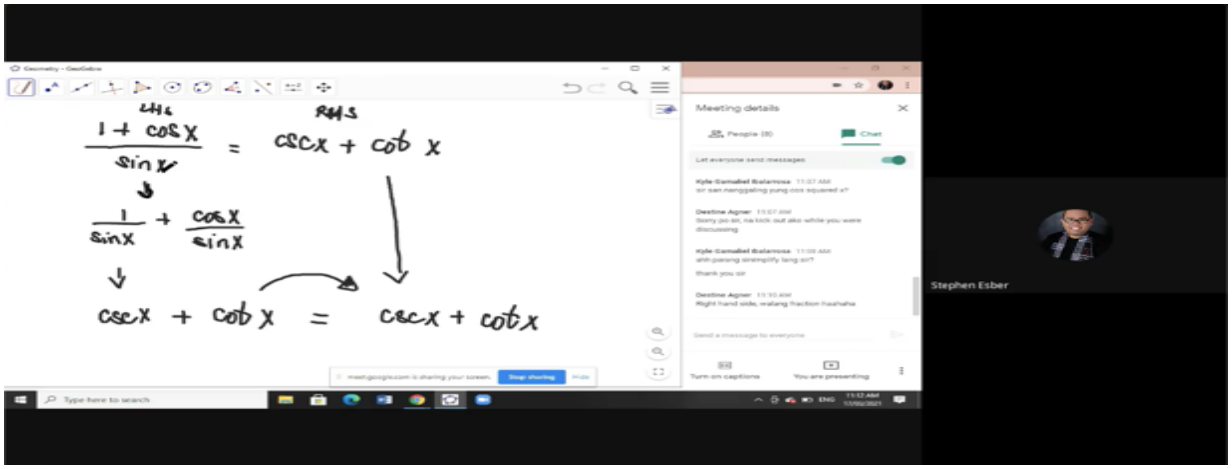
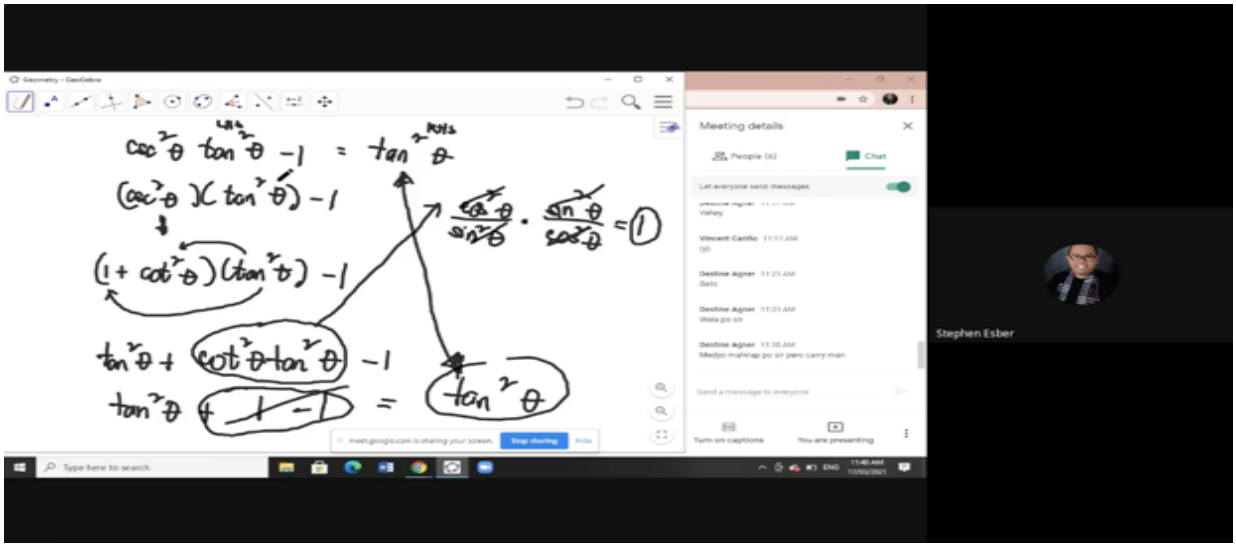
APPENDIX 30

Google Meet Recording dated March 17, 2021 A



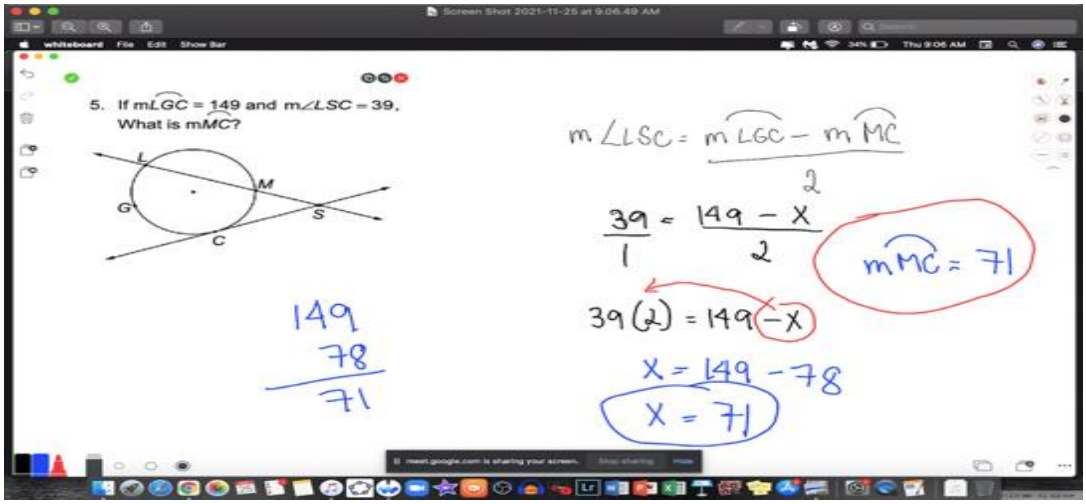
APPENDIX 31

Google Meet Recording dated March 17, 2021 B



APPENDIX 32

Screenshot dated 2021-11-25, 9:06 AM



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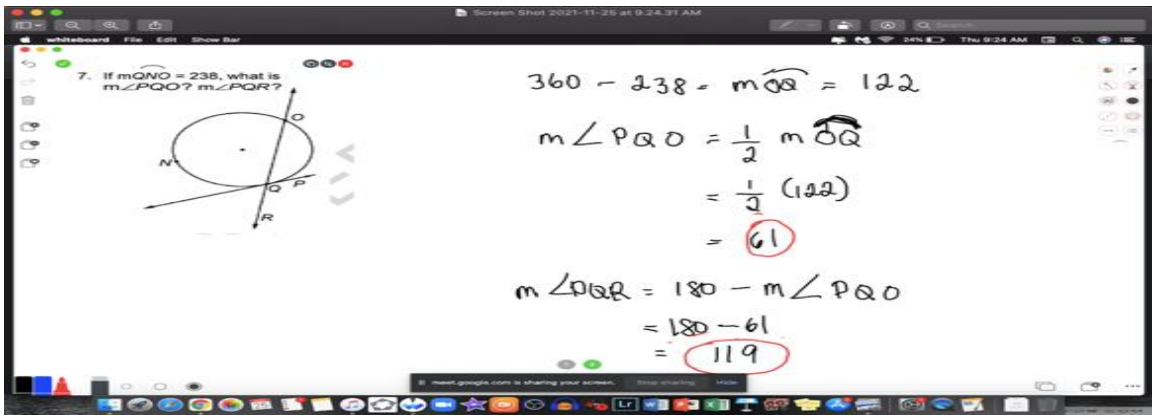
APPENDIX 33

Screenshot dated 2021-11-25, 9:24 AM



APPENDIX 34

Screenshot dated 2021-11-30, 9:21 AM

APPENDIX 35

Screenshot dated 2021-11-30, 9:46 AM