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Identifying Opportunities and Challenges Using Video Conferencing Software in Learning Mathematics

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Abstract*: The principal aim of this study was to recognize the opportunities and challenges that students experience in today's new academic learning process of mathematics online with the use of video conferencing software. A qualitative phenomenological approach was the research method for this study that further focused on detailing the experience of individuals. To achieve this objective, the researchers involved 7 students that range from grade 10 to 12 from Barcelona Academy located in Marilao, Bulacan in the course of the school year 2020-2021. The results garnered from the respondents revealed that the benefits of video conferencing software are: (a) capability to personally record class meetings for future reference, and (b) better comprehension of topics as it is convenient. Whereas the struggles and complications of these software tools for learning are: (a) unstable connection issues and (b) insufficiency in the time and practice examples allotted for mathematics class lectures. Therefore, the researchers conclude that students continue to compete with the difficulties of the current academic practices specifically in math. The study led to recommends methods and other possible approaches that are beneficial for learners to an effective learning journey. They will glean valuable insights from the study's research-based propositions.*

Keywords—Learning, Opportunities, Challenges, Mathematics, Video conferencing, Qualitative Study

1. INTRODUCTION

Mathematics is one of the core subjects that students should learn to master as it affects their daily lives and is significant for their future. The level of difficulty in learning mathematics is evident as we proceed to the next levels of education. As to why mathematics is challenging to learn and teach as it requires greater attention for it should be discussed through and through. Our current situation made schooling much difficult than it already is for educators and students.

Most nations around the world are now battling the coronavirus. Students in primary and secondary schools were reluctant to go to school and are forced to isolate themselves from society. During this pandemic era, researchers worldwide have made effective learning media [1][2][3]. Therefore the learners may as well use technology-based software such as learning videos to support the learning process even at home. Besides, the teachers could still track the students and provide direction and assignments [3].

Education technologies can be used to develop the mathematical skills of learners as effective learning media [3][4][5][6][7]. Videoconferencing software namely Zoom, Microsoft Teams, Google Meet, Skype, GoToMeeting, and others offered assistance for learning. Through these apps, both students and teachers are capable of delivering information no matter whenever and wherever they are with the use of the internet. Although there are few disadvantages that users experiences that will be later explored through this research.

As students ourselves, one of our objectives is to understand the struggles that our co-schoolmates encounter concerning our current state in learning mathematics. While looking at the brighter side, we aim to recognize the advantages that online video conferencing in learning is offering for users. This is to somehow enlighten students that opportunities and advantages do come in this form of system. The motivation for

our exploration is in the observation as well is to know how they cope up with the constant battle and pressure of keeping up and other difficulties that they come across since this is all very new to us. Through their experiences of getting through such challenges helpful suggestions for students can be found

2. RELATED WORKS

Teaching and learning the subject of mathematics has developed over time through methodology changes, evaluations, and advances in technologies. The main difference is that the process of learning and teaching is not anymore a solitary obligation but is shared between educators and students [8]. One of the concerns affecting the world of education during the Covid-19 pandemic is the demand for educators to fulfill their teaching tasks from home [9]. A possible solution to learn this pandemic is online [10] [11] [12]. The mode of schooling was therefore changed into virtual learning in compliance with the government scheme, in such a way that students will still be able to gain knowledge within the safety of their homes [9].

Video-conferencing as a learning instrument is being used extensively among instructors and learners, especially if it is not feasible to use face-to-face means to create effective

communications among themselves [13]. This proves that connections and discussions between faculty, learners, and/or among students are not only accessible at school, but can also be conducted anywhere and at any time [14]. Multiple teachers started using video conferences and the learning management system (LMS) through educational institutes enforcing the learning policy at home that could aid in learning mathematics [12][15][16]. Video-conferencing is known to be one of the most widely used resources to allow students to use technologies in a synchronized mode, whether viewed from the web or the computer [13][17][18].

Although it is not as easy and efficacious to execute e-learning as it is abruptly implemented. Schools with little to no knowledge in electric learning face a series of issues particularly when instructors lack familiarity with using such applications online [12][19]. If the instructor can become a competent facilitator, educational goals and objectives can be obtained. So teachers must be mindful of the value of math challenges and be confident when collaborating with their students on difficult mathematical assignments [20][21]. It is assumed that problem posing is a teaching strategy wherein the more skilled the better for student engagement. [21][22]. The online discussion platforms are used to develop the students their knowledge of mathematical concepts. The role of the teachers is very crucial in the process as each teacher works as a mediator so that everyone is focused on the particular subject and maintains the online conversation going [14].

Numerous barriers such as systems, media and so forth exist in online learning. Which doesn't help students concentrate on studying far more. Well-connected and effective communication impacts learners' performance in their studies [9]. It should be acknowledged, fortunately, that video-conferencing systems have advanced dramatically in the last decade, especially web-based systems similar to Zoom, Skype, Teams, and What's App. The new technology produces high-quality images, sounds, and communications and reduces to 300 ms the time difference between picture and sound [23][24].

One of the researchers in a study states that math is not a verbal lesson that you teach orally and trying to use a cursor like a pen is very tough [25]. Screen sharing, application sharing, and transfer of documents, which give educators a variety of ways to exchange and distribute education content, are enabled by Zoom, Skype, and Team. Zoom breakout rooms with online assistance for small group live and group activities. Skype chat provides both animated, static, and short video image files. This feature strengthens and enhances contact with teachers and students and between learners [24].

However, silence at synchronous videoconferencing lectures (SVLs) takes on a different aspect, since, on the contrary, the communications channels are limited, and the interest of the educator and learner is mostly concentrated on the chat; if the silence of the learners is much too long, repair techniques, including the inspections that there are no technical issues, are much more important than in-class lectures. [26][27]. A research finding indicated that limited internet data services are indeed a hurdle to online learning [28][14]. Then again, teachers ought to take into consideration two different audiences: those who study live-virtually, as well as those who view the lesson asynchronously, as they watch the video clip afterward [27].

3. STATEMENT OF THE PROBLEM

The primary goal of this study was to determine the opportunities and challenges that students experience in learning the subject of mathematics via video conferencing software. The study strives to answer the following questions:
1. What are the opportunities students encounter in using video conferencing software in learning mathematical topics?
2. What are challenges do students face in learning the subject of mathematics in an online setup through video conferencing?
3. What coping mechanisms do they use in dealing with this issue?
4. What are their suggested improvements and/or solutions in overcoming these difficulties?

4. METHODOLOGY

This study focused on identifying and understanding perceptions, experiences, and other aspects that relate to the topic using a qualitative study type of approach. The general aim of this study is to determine the opportunities and challenges that students come across with the use of video conferencing software in learning mathematics.

The researchers explained rather than analyzing the collected data. The explanatory process described consists of five steps or phases: (1) bracketing and phenomenological reduction, (2) delineation of meaning units, (3) classification of meaning units to form themes, (4) summarization of every interview, and (5) extracting general and unique themes from all interviews and creating a complete synthesis of them in a well-built theoretical context.

With the use of the purposive sampling technique as the key instrument to collect data in this study. Grade 10, 11, and 12 students from Barcelona Academy are the chosen respondents in this study.

In this research, participants were selected to fulfill three significant criteria for the study: first, 16-18 of age students; and second, currently studying in Barcelona Academy.

Series of questions are made to gather relevant data that concern this study. Letters will be sent to chosen participants through messaging platforms where they will be informed about the topic and purpose of the said interview. This is also to prepare themselves in sharing their personal experiences and insights regarding this matter as students.

The set of guide questions were:

1. What are the opportunities do you, as a student, encounter in using video conferencing software in learning mathematical topics?

2. What are challenges do you face in learning the subject of mathematics in an online setup through video conferencing?

3. What coping mechanisms do you use in dealing with this issue?

4. What are your suggested improvements and/or solutions in overcoming these difficulties?

Interviews then are held by researchers to collect and dissect data from respondent's own experiences as high school students to support this research.

5. RESULTS AND DISCUSSIONS

I. Opportunities Students Encounter in Using Video Conferencing Software in Learning Mathematics

A. Ability to Record Lecture Materials Presented

Mathematics is one of the subjects that are difficult to learn and may cause confusion if not properly discussed but according to students 1, 3, and 7 through video conferencing software, in particular Zoom and Google Meet, they are able to record and take screenshots of the lessons which are beneficial for personal use and review afterward.

B. For Better Comprehension

As claimed by students 1, 4, and 6 they can grasp and analyze the topics well enough since they possess multiple materials they can base from. Student 1 observed that they have a clear focus in classes. Since we are learning online pupils have the advantage to control their time as per student 3.

II. Challenges Students Face in Learning Mathematics in an Online Setup through Video Conferencing Software

A. Conflicts with the Connection

Unfortunately, some aspects interfere with the learning process of students given that our current situation is sudden and new to all. As stated by student 4, "Sometimes the internet connection is not that strong so there is a lag or even worse when disconnected from class. This will interrupt my listening and understanding the lesson.", a struggle that students 1 and 7 also experience. I have mentioned earlier that mathematics is a complex subject and with accordance to that student 5 shared, "Whenever I experience disconnection of the internet or unstable internet during a math lesson, It is hard for me to follow or catch up the lesson or part of the lesson I missed, so I sometimes end up self studying the lesson which is very hard for me since it is math.", one moment missed can cause misperception to learners.

B. Lack of Application Samples and Time

Owing to the fact that the time and materials given to educators are limited they can only present a few examples and illustrations and so they lack in effectively explaining the lecture which later affects their capability of applying their learnings on assigned homework, quizzes, and exams, an opinion from student 2. In harmony with that student 7 said that answers to these samples are only viewed through pictures, whiteboards, etc. which are most likely to be less comprehensible than personally witnessing the process. However as claimed by student 6, "I don't see any serious challenges faced in learning mathematics in an online set up because there are already apps or tools that can be used for that designated subject. I can even search on the internet for more basis or rewatch the recorded meeting until I catch up. But maybe, the interaction with the teacher and classmates were less appreciated in an online setup since the intimacy is not that great than in a face-to-face setup."

III. Coping Mechanism Students Used in Dealing with Their Struggles

A. Solution to Connection Struggles

On the brighter note, there are various ways to cope up with the hardships students meet in the present online learning practices. Since student 1 has encountered issues with their connection they answered that by saving load credits to convert to data as a preparation in case such interruptions strike.

B. Other Possible Resources

Due to the deficiency of examples that can support the lecture student 2 shared a solution that is, "The coping mechanism I used is just using the videos on the internet as reference for the lesson. Because it will probably be a good solution to the lack of examples and materials the teacher has given.", which is a convenient and suitable aid to the problem for internet offers loads of useful contents.

C. Help From Individuals

As specified by students 5, 6, and 7 with the help of their classmates they can understand more the challenging topics. They ask professors their concerns regarding the subject as well as recorded videos of the lecture, which are practical assistance when reviewing for application activities. These are accomplished by delivering messages through social media communication apps.

IV. Suggested Improvements and Solutions in Overcoming These Difficulties

A. Recommendations for Teachers an Effective Learning Experience

In every matter there is always room for improvements and learning and teaching are not an exception for that. As stated by student 3, "The pandemic, as well as online classes, was new for all of us. I believe that learning throughout this pandemic was both a teacher and a student effort. As that being said, for slow learners in mathematics like me. I suggest that given time and effort in understanding more of the topics discussed by the teachers by visiting the videos posted or make use of the consultation time to ask the teacher questions that may help you understand the topic more." In

congruence to that student 1 shared that their teacher practices uploading the recorded lecture on Youtube where it is accessible anytime that successfully help their studying process. Student 5 proposed that more educational apps should be developed that are handy and extremely helpful for pupils.

B. Advices for Students that Leads to a Fruitful Academic Learning

For students who struggle with attentively focusing in online classes student 4 advise that it is best to reduce the usage of social media therefore learners can absorb all the essential and valuable information. By approaching straight to professors for your troubles, answers that you seek can be provided by them since they are much experienced with the subject as mentioned by student 6. Lastly, allotting extra time to studying by yourself is recommended by student 7 as it will support in understanding the lectures more and strengthen one's knowledge.

For all, the continuation of classes was a major challenge and concern. Students need to learn and adjust to changes in forms of learning so that their education can progress even through the pandemic [29]. Video conferencing software is one of the new tools used in performing virtual academic learning today in which the researchers discuss the advantages and disadvantages of them which can serve as guidance for improvement in the following school years.

As stated by the consequential of the study, students find factors that lead to their convenience through video conferencing meetings in learning mathematics. However, there are series of complications that they encounter that construct their learning process. Despite these struggles, they still found solutions by being resourceful and through assistance from others. The outcome also shows that through said proposals for improvement and other approaches academic learning experience can be enhanced.

6. CONCLUSIONS

Based on the study's findings, the researchers speculated the following conclusions: (1) since learners can record the lectures they can use these for further studying and can grasp well with the topics through video conferencing meetings, (2) unstable connection is a major reason why learning mathematical topics are difficult to comprehend since they encounter delays and miss few parts of the lecture, (3) and there is the absence of more materials that can help students understand the lessons better, (4) the dearth of time allotted for learning is an issue as well.

7. RECOMMENDATIONS

The following are proposed by the researchers based on the findings and conclusion of the study: (1) Farther attention should be lent in learning the subject mathematics as it is complicated hence, allocating additional time is favorable for students, (2) providing supplementary examples and materials are truly effective for studying, (3) posting videos of the meetings in any platforms is beneficial for learners being as they can review specific portions of the discussions, (4) consultation hours can be useful particularly for clarification and questions regarding certain topics, (5) discipline oneself is important in learning and so students are advised to avoid unnecessary activities during classes, (6) organizing a space for classes wherein no distractions are present and stable connection, (7) obtaining proper rest is assured to maintain focus on absorbing lessons.

For the limitations of the study, the respondents are exclusive from a certain school only so academic practices from others are not considered. Merely chosen grade levels are requested for the survey questionnaire thus researchers should include experiences of more students.

REFERENCES

[1] Kerres, M. (2020). Against all odds: Education in Germany coping with Covid-19. Postdigital Science and Education, 2(3), 690-694. https://doi.org/10.1007/s42438-020-00130-7

[2] Peters, M. A., Wang, H., Ogunniran, M. O., Huang, Y., Green, B., & Chunga, J. O. (2020). China' s Internationalized Higher Education During Covid-19 : Collective Student Autoethnography. Postdigital Science and Education. https://doi.org/10.1007/s42438-020- 00128-1

[3] Tanu Wijaya, T. (2020). How chinese students learn mathematics during the coronavirus pandemic. IJERI: International Journal of Educational Research and Innovation, (15), 1–16. https://doi.org/10.46661/ijeri.4950

[4] Al-Mashaqbeh, I. F. (2016). IPad in elementary school math learning setting. International Journal of Emerging Technologies in Learning, 11(2), 48–52. https://doi.org/10.3991/ijet.v11i02.5053

[5] Chotimah, S., Bernard, M., & Wulandari, S. M. (2018). Contextual approach using VBA learning media to improve students' mathematical displacement and disposition ability. Journal of Physics: Conference Series, 948(1). https://doi.org/10.1088/1742- 6596/948/1/012025

[6] Suan, L., Ying, Z., & Wijaya, T. T. (2020). Using hawgent dynamic mathematics software in teaching arithmetic operation. International Journal of Education and Learning, 2(1), 25–31. https://doi.org/10.31763/ijele.v2i1.97

[7] Wijaya, T. T., Purnama, A., & Tanuwijaya, H. (2020). Pengembangan Media Pembelajaran Berdasarkan Konsep Tpack pada Materi Garis dan Sudut Menggunakan Hawgent Dynamic Mathematics Software. JPMI –Jurnal Pembelajaran Matematika Inovatif, 3(3), 205–214. https://doi.org/10.22460/jpmi.v1i3.205-214

[8] Krishnan, S. (2018). Students' perceptions of learning mode in mathematics. MOJES: Malaysian Online Journal of Educational Sciences, 4(2), 32-41 Retrieved from https://eric.ed.gov/?id=EJ1096003

[9] Ginting, B. W. B. (2021, January) The Effectiveness of Online Mathematics Learning on Students' Communication Skills and Students' Mathematical Problem Solving Ability in the Era of Pandemic Covid.

https://www.researchgate.net/publication/348297057
[10] Basilaia, G., & Kvavadze, D. (2020). Transition to Online Education in School during a SARS-CoV-2 Coronavirus (COVID-19) Pandemic in Georgia. Pedagogical Research, 5(4), 1-9. https://doi.org/10.29333/pr/7937
[11] Taha, M. H., Abdalla, M. E., Wadi, M., & Khalafalla, H. (2020). Curriculum delivery in Medical Education during an emergency: A guide based on the responses to the COVID-19 pandemic. MedEdPublish, 9. https://doi.org/10.15694/mep.2020.000069.1
[12] Irfan, M., Kusumaningrum, B., Yulia, Y., & Widodo, S. A. (2020). Challenges during the pandemic: Use of e-learning in mathematics learning in higher education. Infinity, 9(2), 147-158. https://doi.org/10.22460/infinity.v9i2.p147-158
[13] Al-Samarraie, H. (2019). A Scoping Review of Videoconferencing Systems in Higher Education: Learning Paradigms, Opportunities, and Challenges. International Review of Research in Open and Distributed Learning, 20 (3). https://doi.org/10.19173/irrodl.v20i4.4037
[14] Abidin, Z., & Saputro, T. M. E. (2020, June). Google classroom as a mathematics learning space: potentials and challenges. In Journal of Physics: Conference Series (Vol. 1567, No. 2, p. 022094). IOP Publishing. https://iopscience.iop.org/article/10.1088/1742-6596/1567/2/022094/pdf
[15] Gunawan, G., Suranti, N. M. Y., & Fathoroni, F. (2020). Variations of Models and Learning Platforms for Prospective Teachers During the COVID-19 Pandemic Period. Indonesian Journal of Teacher Education, 1(2), 61-70. Retrieved from https://journal.publication center.com/index.php/ijte/article/view/95
[16] Dwi, S., Prima, S. R., Nur, F., Dikdik Baehaqi Arif, D. B. A., & Fuad, S. (2020). Learning analytics to predict student achievement in online learning during Covid-19 mitigation. International Journal of Psychosocial Rehabilitation, 24(10), 1844-1861. http://eprints.uad.ac.id/id/eprint/18917
[17] Fischer, A. J., Collier-Meek, M. A., Bloomfield, B., Erchul, W. P., & Gresham, F. M. (2017). A comparison of problem identification interviews conducted face-to-face and via videoconferencing using the consultation analysis record. Journal of School Psychology, 63, 63-76. https://doi.org/10.1016/j.jsp.2017.03.009
[18] Reese R.J., Chapman N. (2017) Promoting and Evaluating Evidence-Based Telepsychology Interventions: Lessons Learned from the University of Kentucky Telepsychology Lab. In: Maheu M., Drude K., Wright S. (eds) Career Paths in Telemental Health. Springer, Cham. https://doi.org/10.1007/978-3-319- 23736-7_26
[19] Zaharah, Z., & Kirilova, G. I. (2020). Impact of Corona Virus Outbreak Towards Teaching and Learning Activities in Indonesia. SALAM: Jurnal Sosial Dan Budaya Syar-I, 7(3), 269–282. https://doi.org/10.15408/sjsbs.v7i3.15104
[20] Leikin, R., & Elgrably, H. (2019). Problem posing through investigations for the development and evaluation of proof-related skills and creativity skills of prospective high school mathematics teachers. International Journal of Educational Research, Vol. 102, 101424. pp. 0883-0355. https://doi.org/10.1016/j.ijer.2019.04.002
[21] Indiati, I., Supandi, S., Ariyanto, L., & Kusumaningsih, W. (2021). The effectiveness of the problem-posing method based on android applications in mathematics learning. Ilkogretim Online, 20(1), 1440-1450. http://ilkogretim-online.org
[22] Xu, B., Cai, J., Liu, Q., & Hwang, S. (2020). Teachers' predictions of students' mathematical thinking related to problem posing. International Journal of Educational Research, 102, 101427. https://doi.org/10.1016/j.ijer.2019.04.005
[23] Smith. E. (2020, March 11). Why conference call technology never works. Motherboard Tech by Vice. https://www.vice.com/en_us/article/y3mxyw/why conference-call-technology-never-works
[24] Correia, A. P., Liu, C., & Xu, F. (2020). Evaluating videoconferencing systems for the quality of the educational experience. Distance Education, 41(4), 429-452. https://doi.org/10.1080/01587919.2020.1821607
[25] Orhan, G., & Beyhan, O. (2020). Teachers' perceptions and teaching experiences on distance education through synchronous video conferencing during Covid-19 Pandemic. Social Sciences and Education Research Review, 7(1), pp 30.
Retrieved from https://www.researchgate.net/profile/Sigridur_Olafsdottir2/publication/344025173
[26] Kozar, O. (2016). Teachers' reaction to silence and teachers' wait time in video and audioconferencing English lessons: Do webcams make a difference?. System, 62, 53-62. https://doi.org/10.1016/j.system.2016.07.002
[27] Querol-Julián, M., & Arteaga-Martínez, B. (2019, April). Silence and engagement in the multimodal genre of synchronous videoconferencing lectures. Engagement in Professional Genres, 301, 297. https://doi.org/10.1075/pbns.301.16que
[28] Abidin, Z., Mathrani, A. and Hunter, R. (2018), "Gender-related differences in the use of technology in mathematics classrooms: Student participation, learning strategies and attitudes", International Journal of Information and Learning Technology, Vol. 35 No. 4, pp. 266-284. https://doi.org/10.1108/IJILT-11-2017-0109
[29] Jacinto, M. A. P., Molina, K. S. S. J., Jungco, J. S., Cardaño, A. B., Berboso, J. A., Vargas, A. J. V., Bautista, J. P. P., Espinosa, R. G. V., Francisco, C. D. C. (2021, January).
Social Media Platform and its Impact on the Academic Performance of Senior High School Students in the New Normal Learning System. http://ijeais.org/wp content/uploads/2021/1/IJAMR210107.pdf
[30] Francisco, C. (2020). Effectiveness of an online classroom for flexible learning. International Journal of Academic Multidisciplinary Research (IJAMR), 4(8), 100-107.

[31] Francisco, C. D. (2021). The Learning Style of Students and Its Effect on Their Metacognitive Awareness during COVID-19 Pandemic. Learning, 5(1), 123-129.

[32]Francisco, C.D. C., & Celon, L.C. (2020). Teachers' instructional practices and its effects on students' academic performance. International Journal of Scientific Research in Multidisciplinary Studies, 6(7), 64-71. http://dx.doi.org/10.21474/IJAR01/987.

[33]Francisco, C. D. C., & Barcelona, M. C. (2020). Effectiveness of an online classroom for flexible learning. International Journal of Academic Multidisciplinary Research (IJAMR), 4 (8),100-107. http://ijeais.org/wp-content/uploads/2020/8/IJAMR200813.pdf.

[34]Paragas, J. P., Francisco, C. DC. (2020). Utilizing Social Media in Improving Creative Writing Skills of Grade 7 Students in English. International Journal of Academic Multidisciplinary Research, 4(10), 4-7. https://hcommons.org/deposits/objects/hc:33222/datastreams/CONTENT/content