Article

Remaining Motivated Despite the Limitations: Science Teacher's Learning Propensity During the COVID-19 Pandemic in the Developing Country

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ABSTRACT

The COVID-19 pandemic has affected human life at multilevel and is still a tremendous challenge for all sectors of life without exception to education. To cope COVID-19 effects in education, online teaching and learning was adopted. This study explored how science teachers' learning remained motivated to teach, despite all the limitations they encountered and endured during the COVID-19 pandemic. This work was carried out in developing country such as Indonesia, Rwanda, Cambodia and Paraguay. The study examines how science teachers' in developing country have faced obstacle, and meanwhile, despite this, they are still trying their hardest to stay focused on achieving their personal goals during the pandemic. This research is geared by descriptive qualitative approach. Data were collected in series of online survey with thirty nine teachers cross the developing country. The results showed that the science teachers' learning with e-learning was less effective because not all teachers and parents of students understood the internet. During the COVID-19 pandemic, teachers are highly required to develop e-learning science learning that can help achieve learning goals, so that e-learning can satisfy all parties, and can reduce its negative impact. Science learning with e-learning can foster educators in mastering digital technology.

INTRODUCTION

The recent outbreak of the Coronavirus disease (COVID-19) pandemic increased the gaps in the education sector globally. The COVID-19 pandemic has created an extremely fast expanding health crisis with drastic implications throughout 2019-2020. In the beginning of April, the UN Educational, scientific and cultural organization has been announced that 195 countries had implemented national school closures, affecting almost 91.3 percent of the population (UNESCO, 2020). Courses moved from classroom learning to online learning. Predominantly using information and communication technology (ICT)((Evans et al., 2020; Quezada et al., 2020; Sandars et al., 2020; Woolliscroft, 2020). Moreover, some learners and educators were not familiar with the digital platforms and online programs that they were required to use at such short notice (Huber & Helm, 2020; Rasmitadila et al., 2020)

Factually, the closure of millions of schools has led to an emergent distance teaching and learning in higher education as well. Some challenges need to be explored because such mode of delivery is not only an opportunity for the generations who are not familiar with ICT gadgets. UNESCO (2020), confirmed that many countries have resorted to the use of television and/or radio-based programs to implement distance learning where " Africa seems to the most active in the efforts to leverage either TV or radio (70%) while Europe and North America seems to be using less radio than other regions, yet very active in deploying TV-based distance education programmers."

In Rwanda, since the first cases was confirmed the government of Rwanda took decision to close all schools (day and boarding schools), churches, bars, interdicted public transport and motorcycle drivers from carrying passengers. Rwandan population were recommended a home-based work except for critical services, such as shopping, bank transactions and others. However, the government of Rwanda shows a high level of leadership by taking actions of keeping doors open for learning by creating education COVID-19 response plan. The purpose of the plan was to enhance perpetuation of teaching and learning process while protecting the health of students , teachers, parents and their caregivers at home (Mineduc, 2019). Three broad remote learning programmers has been initiated by ministry of education through Rwanda education Board and other partners in education to ensure that learning occurs at home in smooth conditions, so these programme are: a) Radio lessons, b) Audio-visual lessons through television broadcasting, and c) E-learning (Mineduc, 2019).

Rahiem (2021), found that students in Indonesia had paradoxical insight and viewpoints into learning during the COVID-19 pandemic. Students revealed that studying at home provides them the flexibility to manage their own time, which allowed them with additional time for self-care, daily activities at home, and a lot of family time. Simultaneously, they study in an appropriate and quite environment. In other sides, they complained about assignment and technological interference while studying. They felt distracted by their sibling and the noise at home compared to face to face. The study burden that lecturer given was overwhelmed. So it made students difficult to control their time. Additionally, students must spend internet cost and sometimes difficulties accessing learning material during online learning. The study also explained the technology barriers and challenges in using ICT (Information and Communications technology) that the students faced: device issues, internet connectivity, technology costs, and lack of technology skills. Students had problems with incompatible devices, sharing devices with other family members, unstable internet connection, restricted or unavailable internet access, data costs, purchasing new appliances, new programs or apps, inexperience with ICT, lack of ICT skills, and inadequate learning platforms (Researcher Hidden Name, 2020).

In Cambodia, for example, teachers and students, particularly in rural areas, do not have reliable internet access and are not capable of using emerging technology, making online learning a difficult, if not frustrating, experience for many (Flynn & Himel, 2020). Despite the efforts by the Ministry of Education, Youth and Sport (MoEYS) to provide online learning opportunities by disseminating video lessons through television and other online platforms such as MoEYS Facebook page, YouTube channel, and e-learning website, the number of students who have had access to online learning is still low (UNESCO, 2020).

Most government around the world have temporarily shut down educational institutions in an attempt to contain the spread of the COVID-19 pandemic. This condition also happened in Paraguay. Teaching and learning process had shifted being digitalized rather than classroom learning. This is one of the best way to hold up the spread of COVID-19. In Paraguay, at the point of time are facing challenges, some studies examine the blended learning, which offers a new frame of reference or an educational implementation. In general,

mastering and using e-learning is very importance. However, using the e-learning is still as challenges for many of teachers and the necessary standards of excellence did not meet yet in the best way (Angela; Alexandra; Marcela, 2021).

This study also examines the education background of Paraguay. Education in Paraguay during the COVID-19 pandemic has shifted into digital tools. The research conducted by Valentine Canese (2021) shown the result reflect challenges related to access to technological resources, training in the use of ICT, and difficulties in carrying out school activities. These show evidence of the need to improve access to technology to guarantee equal educational opportunities in the country.

Paraguay has been announced the Presidential Decree No. 34456) on March 6, 2020, which was followed by the imposition of a 24 hours of restriction on movement order on March 2. Self-quarantine at home is the most effective method to prevent the spread of infectious diseases, it is highly perhaps impact both physical and psychological problems will arise. According to the Kim et al (2021) show that public officials reported a high level of depressive symptoms with a high level of apprehension in early stage of COVID-19. The study also revealed that during the self-quarantine period the level of depressive feelings also increased. So that, Paraguayan government should develop a program for the delivery of mental health care and services to public officials in COVID-19 pandemic period.

Against this background, the present study intends to explore the science teachers perception and challenges encountered in online learning during COVID-19 pandemic and discusses what we can be done for effective learning science via online learning in the development countries.

METHODS

The purpose of this survey study is to explore science teachers' propensity of online learning delivery, as well as instructors' and school support during the pandemic COVID-19 pandemic. It also aims to interviewing the science teachers' motivation using online platforms and methods of learning.

Research design

This research is qualitative research with type of case study. The cases studied are the challenges faced by some science teachers in developing countries in implementing online learning during a pandemic and what their perception to keep the motivation up during the limited facilities. In line with (Creswell, 2021a; 2021b), qualitative research is exploratory in nature, which helps researchers to find out more about the challenges faced by science teacher during the Pandemic in teaching and learning activities. This research cannot help in making a decision or coming to a conclusion (generalization). However, this research can help understand how science teacher in developing country experience obstacles in undergoing teaching and learning activities using e-learning during the Pandemic. Also, how they keep motivated during the inadequate resources.

Participants

Random sampling was used in this study. This is because the researcher cannot control who and from the institution, the respondent is from. Researchers only limit and ensure that the subjects used in this study are science teachers in developing countries such as Indonesia, Cambodia, Paraguay, and Rwanda. Researchers do not limit whether they are from State school or private schools, respondent's age, length of work, and gender. The research involved 39 teachers from some schools in Indonesia, Cambodia, Paraguay and Rwanda.

Data collection and Analysis

Data was collected using an online survey. Online surveys are used for reasons of the flexibility of compatibility with science teachers' online work during a pandemic. Also, online surveys are easily managed and accessed using various devices (Fraenkel et al., 2012).

Furthermore, online surveys are disseminated through WhatsApp, e-mails, and also Facebook in April 2021. Google form was chosen by the researcher to make an online survey because of its ease of use. The data obtained then analyzed based on the questions in the survey and continued for interpreted and described by researchers.

RESULTS AND DISCUSSION
Teachers' perception of the COVID-19 Crisis.

Because of the COVID-19 pandemic, the teaching and learning of science has changed as teachers could not meet their students in compiliance with the measures to figth the spread of the pandemic. For some teachers, online learning was challenging as they were facing this method in unusual teaching and learning process before. Further, practical works or simulations which are the foundation fo deep understanding of scientific concepts were not performed.

Besides practical works, participants confirmed to have received many online excercises to work on. Event though the online learning emphasizes chat and discussions, a limited knowledge sharing and constrution through collaborative learning on the structured excercises was reported. According to the survey, the government in the developing countries have been succesfully protecting its society and well managing also good in controling in appropriate way. The data have been shown that the participant argue neutral opinion. It means they do not feel any burden to face the pandemicin education sector. The educator can handle the teaching and learning activities during the COVID-19 pandemic. Moreover the government also gives adequate solutions to prevent the spreading of COVID-19 in the education sector. The result from the first question in the survey is the government is succesfully protecting its population and properly regulate and control isolation measures.

The teacher's view on learning science during lockdown period.

The COVID-19 pandemic has affect many sector especially the education sector. Schools and higher institution are forced to close due to COVID-19 outbreaks around the world. Currently, restrictions movements in developing countries have promoted distance learning at all levels of education. In conjunction with high participation in online learning, new approaches are now being ventured mainly to preserve the learning environment and improve communication among the members. Synchronous online class is now an ideal option for instructors as the virtual presence supports teaching practice in the field setting.

The second question on the online survey is regarding to the government institutions were delayed and insufficient for facing COVID-19. Most of participants agree that the goverment services duing the COVID-19 pandemic was slowly and insufficient. It could be happened by followed many factors. Although in the question before they said that anykind of education activities can be handle by in the border of government protection its still require educator or science teachers struggle to keep education running properly.

The third question is about the decreasing of students-teacher interaction during the pandemic. The biggest result is the respondents strongly agree that during the pandemic they have not adequate occoasion to interact with their students. As many as 14 teachers said that they argue strongky agree. This happen because several factors such as, the students are living in the area of signal limitation, unadequate facilities, and the limitation to pay monthly payment for charging their ponsel data or connection access.

The next result is regarding to the fouth question about effectiveness of science learning through e-learning and its security. As many as 13 teachers act neutral ragarding this question. It means that they can not conclude yet if science teaching and learning during the pandemic is effective or not. Hence, the pandemic is not dissapear yet so most of science teacher are still struggle to find the best method for finding the comfy teaching and learning activities.

Another question is about the science teachers opinion on comparing the using of e-learning or e-teaching method is better than traditional teaching. Most participant choosed strongly agree. It means that there were large gap between e-teaching and traditional teaching. The participants revealed during the pandemic COVID-19 indirectly most of educator learn how to teach more effectively and effeciently. Meanwhile, they are facing the difficulty of controling students during online learning hence of distance learning.

As most countries have opted to ensure educational continuity through online recources, the internet presents and tecnology facilites should be prepraed. It is not deny that the access of internet during the pandemic was rising in various countries including Indonesia, Cambodia, Paraguay, and Rwanda. In the medium and long term, preparing to bridge this wider digital divide creates virtuos synergies of educator, students, parents and all level of education element.

Based on this survey the result show that most of participants strongly agree that the place where they worked provide adequate facilities to support the teaching and learning activities during the pandemic COVID-19 pandemic. Teachers and education staff as a whole have played a key role in the response to the COVID-19 pandemic and have had to face a number of different emerging demands during the social and health crisis.

In addition, the new circumstances have meant teachers have to virtual platforms and methodologies with which they may not be familiar. According to a the survey, there are several stakeholder not internet literate such as parents and teachers. Because for some pupils, online learning still need parents accompaniment of their need. In performing their teaching and meeting these new demands theachers often times find themselves with inadequate training and resources to address the challenges of adapting teaching content and formats to pupils in disvantaged situations.

The influence of online learning during the pandemic into science teaching.

While online teaching is not a new pedagogical method and has been used for many years in various fields. This research has identified numerous challanges thought to affect learning within an online learning environment. It is proven by the surey that most of participant said neutral regarding the quality of online teaching's satisfactory. These influenced by several challenges such as lack of internet acces, low quality of online instructional delivery, cost control, individual in learning, lack of professional technological training, tool inaccessibility, and technical issues. Additional challenges is linkaged to the instructrors' adaptability skills to customize lectures for online learning, learn to monitor students; synchronous or asynchronous collaboration, and design authentic online assesment tools that online learning need various necessitates skills.

Further, the impact of online learning is also included in this research. According to the survey the participants have choosen strongly agree that the impact of online learning is less. It is indicated that there are several factors that affect the result of online learning is not as expected. One of the possibilities obstacles is that students who utilize online learning platforms for learning are usually drawn into the subject matter at a deeper level due to the discussions they get involved.

The advantages of integrating online environments include developing autonomous learners on which they self explore and seek information, and asses, transform, and acclimate novel skills need for gen Z learners. So that, in this research survey tried to proven regarding the online learning whether it is fostering the educator to mastery in digital technology or just need basic skill. Regarding the last question in the survey most participants said strongly agree that during the pandemic COVID-19 the science teacher should have new skills such as mastering digital devices. Hence of every particular subject or propotion that neede to be delivered by online.

Discussion

School from home during the COVID-19 pandemic has significantly impacted all continent in the world including the devcloping countries such as Indonesia, Cambodia, Rwanda and Paraguay. The spread of the COVID-19 pandemic within a few months after began, almost all countries implemented online learning systems, both online (using online applications, TV, Radio, and internet) and offline (printed books, modules and news). Currently, the participating science teachers believed that instructional strategy needed to change and that all stakelholder, including goverments, schools, social organizations, school commite, parents must sit together to meet the demand and determines the online learning goals that are in line with a national curriculum based on humanism each countries.

Eventough the COVID-19 pandemic has pushed educator to prepare all teaching material unussualy they still have to keep motivated to reach the goal of learning. According to the research survey shown that in the condition of emergency the government was succesfully protect their society and could managing and controling to measure the proper solution. although some government institutions be hung up and there waas no readiness in facing the COVID-9 pandemic. As online educator, the science teachers have opportunity to create supportive environment for learners especially for science subject. This subject is not only teorital understanding but also the grounded concept by implementing practical activities.

Online learning and teaching have become a remarkable and famous way in teaching strategies during the COVID-19 pandemic. Teaching an online course require different path with traditional classroom. Moreover, it is greatly useful for science teachers to adapt and develpo their skills to teach online. There are many strategies to improve online science learning and teaching in the school environment. Cooper (2021) there are five strategies to improve online teaching such as:

1. Create a supportive learning environment.

   as online educator, there are several opportunity to encourgae learners environment. Strenghtening both science teacher and students engagement and their interaction is the prime way to achieve this. The step is begined from gettign ball rolling with a personal introduction post, during online meeting the teacher shoulpd be encourage the sutdents to contibute their own bio or intoduction to the group. Secondly, open forum and discuccion are created whereas students can share their opinion and assistance from each other, expanding peer-to-peer support. The next step is group learning by creating small groups, similar to traditional study group, for mentoring fellow learners. These strategies would encourage students to study together

2. Used a mix of learning tools for better engagement

   Blended learning is usefull in this context. Similarly used synchronous and asynchronous method to help students more experiencing in the learning procces and engaging and motivating them. By creating a blend of traditional learning styles with newer, more collaborative, and visual tools. Science teaching and learning using this method, a mix or blended learning activities, makes the subject content more interesting and exciting, improving student's engagement with bot teachers and othes students.

3. Provide ongoing feedback

   The feedback will help students to create learning more informative. So that why feedback is very important component of all effective science and teaching process. When teacher give feedback as soon as possible so that students can clearly identify hich behavior or skills need to be improved. According to the Hattie and Timperley (2007) feedback on class work has been consistently cited as one of the most powerful influences on students learning and achievement. Formatie feedback given throughout the semester, assist students judge how well they understand the subject concept and

recognize where they need improved effort or support to achieve the desired subject outcome. By giving formative feedback students could escape from unclear sense of where they have gaps in subject knowledge and what steps they need to take grow and meet the teachers' expectations before collecting their project or creating their final exam. Right ongoing feedback also contribute clarify excatly how their assigments will be graded, and on what grounds. Besides, providing spesific feedback to every students also helps them take control of and responsibility for their own learning, and builds trust and connection with instructor.

4. Make e-learning content mobile

    Mobile learning take hold of essential key advantages for students, allowing them to access up-to-date course materials and relevant content without place and time boundaries. Students can study through the science materials at their own space. It would help students more productive. With this way the teachers acan fell more confident about their online teaching skills and materials.

5. Engage with the students online

    Currently, many instructors are faced with navigating to a format in which tiny boxes showing a face, picture, or letter represent each students in the classroom. Moreover an additional consideration is engaging students with disabilities, which can provide an extra level of difficulty for effective instruction in online environment. Most importantly, an active approach to increase their motiation to learn and allowing them to connect and utilize higher-level thinking strategies. Furthermore, teachers should incorporate a variety of methods for students to interact with the materials being taught, including opportunities to participate individually, as well as within small and large groups. There are multiple technological component and websites thath can be added to daily instruction or could provided as supplemental learning activities. Below are five easy strategies for science teachers' that can utilize in an online format for engaging all students;

    a. Animated response

        Animated response will give students good understading and concept. By seeing animation, students have general picture regarding the mateial being taught.

    b. Cooperative learning

        There are several tools that can be used to ensure the work is collabprative which includes strategies such as share/pair, jigsaw, and flexible grouping. The platform that can supports these strategies includes Edublogs, Weebly for education, zoom breakout rooms, or a shared google document.

    c. Organizational outlets

        Grapic organizer assist students in conceptualizing the material being taught will help students maintaining a clear focus what needs to be dissected fom information. Freeology.com and canva.com provide acces to haundreds of free and printable grapic organizer templates. Besides, it will help students create visually attractive grapic organizer that can match any content.

    d. Movement

        Creative ways that teachers could complete the study in an online environment would be through the incorporation of a GoNoodle activity, or simply having the teacher walk students though movements together with their directive during a transition.

    e. Interactive lessons

        During online learning teacher can use some tools such as power point through the PearDeck add-on for Google Slides or Nearpod whereas students can interact with enjoy learning content by means questions, survey, or specific students responses.

One of the most significant challenges of science teaching and learning online is losing direct much face-to-face contact both students and teacher. A remote course does not have as many opportunities to interact with the students simply passing, and give them feedback on the fly. During the pandemic, the interaction between studenrs and teacher definetly decrease. Based on the online survey of this study, science teaching and learning using online learning less effective hence of not all of science teachers are welll internet educated and also the parents is not fully well understanding. This happens because in the developing countries have multicultural background of the family. Not all parents and students are coming from parental education attainment, well economic income, and adequate facilities in each schools.

The students that their family have internet illiterate must struggle to meet the demands because they have inadequate skills to accompany their children using new tools. Whereas the have not get when they was sitting in the schools. Some researcher have debated the correlation of parents's educational attainment nad students achievement. DeBaryshe, Patterson, and Capaldi (1993) argued that parental education is directly related to styles of parenting and not student's academic performance. In other hand, Smith (1989) said the difference among paternal and maternal influence on students' academic performance and educational goals, and conclude that early grade such as 6 grade and 10 grade students were greatly impacted by parental educational attainment.

Again, Raychaudhuri *et al* (2010) examined factors affecting students' academic performance: mother's education and presence of trained teacher in the school have a positive impact of students' academic performance. They also found that academic performance of students' depend on a number of socio-economic factors. They concluded that students' economic status affects their performance and the risk of becoming a dropout. Especially science subject, during conventional teaching and learning is neede to more practice in the laboratory rather than class meeting. It prove that science major need more financial support than others.

Interestingly, in developing countri during the COVID-19 pandemic the countries economic was greatly stuck. Many sector were close because of the government regulation to prevent the spread of virus. This matters is definetly affect parents economy. Nyakunga (2011) implied that students from low-income families were more likely to perform lower because of financial hardship and poor schools attandance.

It is obvious from the science teachers' statement and response that at times they had indeed lost some of their motivation to teach, frequently lacked energy, and were tired and bored, which is all understandable given the situation that they found themselves in. They were personally, socially, and environmentally driven. Sciences teachers' personally motivated to teach because they were challanged to achieve their personal goals, passion and eager to teach, determined and responsible to teach, satisfied and grateful to remain healthy and to have the opportunity to developt their skills, and commited to their faith and believed that learning is part of worship.

CONCLUSION

The high speed of COVID-19 pandemic has really been influence the education system in the across countries. Science online learning which uses internet access becomes familiar since it really support learning from home. The government has succeeded in protecting its population and has been able to properly regulate and control solution actions even though several government agencies have been delayed and there is no readiness to deal with COVID-19. During the pandemic, teacher-student interaction decreased greatly, science learning with e-learning was less effective because not all teachers and parents of students understood the internet. During the COVID-19 pandemic, teachers are highly required to develop e-learning science learning that can help achieve learning goals, so that e-learning

can satisfy all parties, and can reduce its negative impact. Science learning with e-learning can foster educators in mastering digital technology.

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