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Teachers' implementation of reforms using ICT during the COVID-19 pandemic: Success factors and challenges

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Abstract

This study attempts to contribute to the search for approaches that ensure learning continuity during the COVID-19 pandemic. Specifically, this study examined how ICT was optimized for learning to continue in the geographically isolated areas in the Philippines that were devastated by Typhoon Haiyan in 2013. An exploratory sequential mixed methods design was used. Data were gathered through interviews with key research participants and ICT utilization and competencies questionnaires. Data were analyzed using descriptive statistics and qualitative analysis. From the analysis, perspectives that highlight ICT utilization and education in a difficult situation emerged. The results provided insights into how to address large-scale school disruptions through the lens of natural disasters and the COVID-19 pandemic. Success factors identified include the ICT capability of teachers, capability of local communities, contextualization of instruction, and teachers' resilience skills.

Keywords: COVID-19, resilience skills, teachers' ICT competence, local capability

Introduction

The present global health crisis has disrupted the normal course of life in all sectors of society. In addition, education is among the worst hit sectors. The pandemic caused massive school disruptions, affecting approximately 1.6 billion children and young people, accounting for 91% of students worldwide (Miks & Mcllwaidenine, 2020). To address this crisis, various approaches have been explored to promote learning continuity. Schools have implemented a variety of strategies that include the utilization of ICT to counter further grave consequences of this global health crisis to education systems. In the Philippines, Philippine President Rodrigo Duterte mandated in March 2020 that all schools stop face-to-face meetings days before classes for the 2020-2021 school year ended. Lockdowns were imposed in areas with the most COVID cases. Schools were closed. The Philippine Department of Education (DepEd) issued guidelines to safeguard the students. The computation of final grades based on their academic standing was applied. Schools not covered by class suspensions were mandated to allow students to take final examinations on a staggered basis while observing health protocols (DepEd Memo No. 042, s. 2020; Santos 2020). Remedial and enrichment classes were started on May 11, 2020, to provide the essential learning competencies that were not attained because of the sudden stoppage of classes (DepEd Memo. 051). In consultation with stakeholders, a DepEd released a Basic Education Learning Continuity Plan (BE-LCP) for the 2020-2021 school year was released on June 16, 2020, outlining the design of a learning delivery and operational direction that ensures the health, safety, and well-being of all learners, teachers, and department personnel. Blended learning was identified as the mode of instructional delivery, involving the use of modular and online learning. Teachers were also encouraged to attend professional development webinars to prepare them for teaching in an online setting. The Department's Educational Technology Unit (ETU) launched online seminars with topics ranging from emerging technologies, open educational resources (OERs), ICT skills development programs, and distance learning modalities through its Facebook page and YouTube live streaming platforms (OUA Memo 00-0520-0005, 04 May 2020). Regarding the implementation of the remote learning approach, a survey was conducted by DepEd to determine access to ICT resources by students throughout the country (DO 012, s. 2020). Santos (2020) mentioned that an ICT learning resource survey showed that approximately 2.8 million Filipino students have no access to the Internet, and 20% of the 6.5 million students who do have access to the Internet have to go to computer shops for their online classes and requirements. The study found that this situation is most prevalent in rural areas that, even before the pandemic, already experienced issues related to Internet access and speed.

As a result of this survey, modular learning was instituted for K-12 students when schools opened remotely on October 5, 2020. The self-learning modules were provided for alternative learning delivery modalities. These included modular-, television-, and radio-based instruction, as well as blended and online learning (DepEd, 2020). The modules

were printed and distributed to students in their respective homes. They were expected to study on their own and submit the provided learning activity sheet (LAS) for grading (Alipio, 2020; Manila Times, 2020; Santos, 2020). The LAS and other requirements for performance-based assessments are retrieved by the teachers at the end of every week, from either the students' houses or the designated barangay halls (village offices).

The initial implementation of this new approach encountered many challenges, particularly in geographically isolated areas, including poor Internet access, lack of technological devices, inadequate supply of instructional resources, low student readiness for online learning, and inadequate teachers' knowledge and skills in addressing issues related to remote teaching and learning (Alea, Fabrea, Roldan, and Farooqi, 2020; Alipio, 2020). These challenges were compounded by the intermittent supply of electricity in remote rural areas, the stress of community quarantines, and the unpreparedness of the parents or guardians of students who took on a greater role in the teaching-learning process in the new setup (Alea, Fabrea, Roldan, and Farooqi, 2020; Alipio, 2020; Santos, 2020). Additional challenges included an inadequate supply of materials, such as bond papers and printer ink for reproducing the printed modules. Teachers reportedly used their personal funds to print the modules that they downloaded from the DepEd website to ensure a 1:1 distribution, that is, one module per student (Manila Times, 2020; Santos, 2020). The average classroom in Philippine public schools has from 25 to 50 students. In remote rural areas, teachers are also challenged by difficult terrains and the remoteness of the villages that they have to visit to distribute and collect the modules (Santos, 2020).

This study attempts to contribute to the efforts of the Philippine education sector to address large-scale school disruptions through the lens of natural disasters and the COVID-19 pandemic. The hope is that the results contribute to the promotion of learning continuity during international and national crises, particularly in remote rural areas of the country. This research draws insights from the experiences of teachers in geographically isolated areas who were affected by Typhoon Yolanda (Haiyan) in 2013 and how these experiences contributed to the reforms they instituted using ICT to continue teaching and learning in a remote setting. Typhoon Yolanda was the strongest typhoon that visited the country and caused massive devastation to 44 provinces in the country, nearly 6,300 deaths, 4.1 million people displaced, and approximately 1,000 people missing. Infrastructures and homes destroyed were estimated at P71.2 billion or USD1.9 billion (Hallegatte, Bangalore, Bonzanigo, Fay, Kane, Narloch, Rozenberg, Treguer, & Vogt-Schilb, 2016)

Purpose of the Study

This study aims to examine the reforms instituted by teachers in geographically isolated areas to promote learning continuity during the COVID-19 pandemic.

Specifically, this study intends to:

1. Describe the reforms implemented by teachers in geographically isolated areas during the COVID-19 pandemic; and
2. Identify facilitating factors and challenges in the implementation of reforms during the COVID-19 pandemic in geographically isolated areas.

Methodology

This study applied a mixed methods case study design. It employed an exploratory sequential approach in which the researcher used both qualitative and quantitative data, with qualitative data being explored first and quantitative data second (Cresswell, 2014, p. 276). The case study design was utilized as a framework for mixed-method research (Yin, 2003). Two sets of data were used in the study. The first set included data collected before the COVID-19 pandemic to determine the capabilities of the teachers to institute reforms during school disruptions in times of natural disasters. To enhance the comprehensiveness and relevance of the research, the research expanded its scope and conducted additional data collection to include the reforms instituted by the teachers during the COVID-19 pandemic. Pre-pandemic qualitative data consisted of interview responses, open-ended questions, and document reviews. Quantitative data included the responses from the questionnaire. Additional data collection during November and December 2020 was performed through interviews with teachers. The study involved teachers at schools in geographically isolated and disadvantaged areas of the Visayan region in the Philippines.

This study examined the reforms instituted by three (3) teachers teaching in geographically isolated areas in the Philippines pre-pandemic and during the COVID-19 pandemic. Both qualitative and quantitative data were used to identify success factors and challenges in the implementation of reforms in these areas during the pandemic.

For the two data collection phases, the researcher obtained permission from school management to research in the schools identified for the study. After permission was granted, the researcher sent the schedule and program of research activities. Data collection was performed within the 2018-2019 school year (pre-pandemic) and the months of November and December 2020 (during the pandemic). Pre-pandemic data gathering activities included the administration of test instruments and interviews with teachers. Given the travel restrictions in place because of the pandemic, online interviews with teachers were conducted during the COVID-19 pandemic using various online media platforms.

This study used three key participants—junior high school teachers teaching in one of the provinces hardest hit by Typhoon Yolanda. The UNHCR reported that the typhoon caused school closures, with 183,976 school children affected nationwide and approximately 4.4 million were students from this part of the country. The three (3) teachers interviewed were coded for analysis as Teacher A, Teacher B, and Teacher C. Table 1 provides the profiles of the research participants.

Table 1. Participants' Profile

Participant	Subjects Taught	No. of Students	Age	No. of Years Teaching
Teacher A	English, Science, Technology, and Livelihood Education, Edukasyon sa Pagpapakatao (Values Education), Practical Research	221	25	7
Teacher B	Science	155	26	2
Teacher C	English, Science	129	36	8

Data collection activities for pre-COVID-19 included open-ended interviews with the teachers and administration of a questionnaire on ICT utilization and integration practices used in Bazzer (2016). Permissions were requested from and granted by the author of the instruments used. Follow-up interviews were also performed during the first phase (pre-COVID-19) through the Facebook Messenger app. Interviews during the second phase of the data collection were performed through Facebook Messenger rooms and Zoom video conferencing platforms. The documents reviewed included the school improvement plan before and during the COVID-19 pandemic.

Data were analyzed using descriptive statistics and qualitative analysis. The evaluation and scoring of the items followed the scale shown in Appendix A. The participants' responses to the open-ended questions in the questionnaire and the interview data were transcribed, and a code was assigned to each "case" teacher. As the analysis was ongoing, themes were identified and continuously reviewed for overlap and completeness. For data validity, triangulation of teachers' responses during interviews and online surveys on ICT utilization and competencies were performed. The results were used to justify the themes established during the analysis. Member checking was performed for a deeper understanding of the teachers' responses and validated the qualitative and quantitative findings.

RESULTS

The findings of the study were derived from the teachers' responses during the interviews and from the questionnaires, document reviews, and chat messages. The results informed the author of the reforms instituted by the teachers and the success factors in the implementation of these reforms with the use of ICT and the challenges that they encountered when implementing lessons during the pandemic.

Reforms implemented by teachers

Data from interviews, questionnaires, and documents reviewed emerged from the reforms instituted by the teachers: 1) modular learning; 2) optimized use of ICT for communication and materials development; and 3) utilization of available home and

community resources.

Modular learning

To implement remote learning during the pandemic, teachers used a modular teaching and learning approach. Teacher C shared that her school conducted a survey on access to technological resources and the capacity of learners for independent learning. She said that the results showed that the majority of the school's students do not have gadgets or Internet connections. Therefore, the school decided to implement modular learning and downloaded and printed the modules from the DepEd website and scheduled distribution to individual students and module retrieval. She added that they considered the availability of parents or guardians who could supervise the students when studying at home.

> … ang ginawa na lang namin since nag modular yun nga nag print kami ng mga downloaded na modules galing DepEd. Tapos nag set din kami ng schedules, kung kailan yung distribution, kailan yung retrieval ng module para hindi rin naman magkaroon ng conflict… And then para rin sa mga parents … para hindi naman sila mahirapan kasi yung iba may pumupunta sa farm, nagtrabaho so inano namin yung mga reasons. Then the good schedule was every Friday. Nag schedule po kami every Friday pag distribute and retrieving of modules. (What we did was [since the approach is] modular, we printed the modules we downloaded from DepEd [website]. Then, we set schedules of distribution and retrieval of modules to avoid conflict. We also considered the parents' availability because some of them work in the farm, they have work. So we found Friday as the good schedule to distribute and retrieve the modules)

Teacher B mentioned that she also utilized the modular approach because her students had no gadgets and no access to the Internet. She clarified that she was not tasked with bringing the modules to the students' houses or barangay halls because a committee was assigned to do so. She is responsible for the disinfection of retrieved modules and the distribution of these modules to concerned teachers.

The teachers designed their lessons based on the modules prepared by the DepEd's central office. Teacher A said that to help students understand the lessons in the modules, he prepared activities and examples to which the students could easily relate. He said that their school also implemented academic ease to provide relief to students from the stress of remote learning.

> Yung implementation namin ng academic ease, ma'am, we still use the module and the LAS or the learning activity sheets. Pero, may instruction kami about sa module. Sasabihin namin don na answer Activity 1 only. Nililimit namin yung

> activity sa module tapos yung ibang time sa activity sheets na. Tapos inuulit namin yung concept from the module to the answer sheet na prerequisite sa activity na yan. (To implement academic ease, we still use the module and the LAS or the learning activity sheets. However, we have instructions about the module. We told [the students] to answer Activity 1 only. We limit the activity stipulated in the module, and more time is given to the activity sheets. Then, we recall the prerequisite concepts from the module)

Optimized use of ICT for communication and materials production

The remoteness of the areas in which students live and the poor Internet connections limit the use of technology. Nevertheless, the teachers ensured that ICT use was optimized. They used ICT to communicate with students, translate modules and learning activity sheets into the local language to ensure concept understanding, produce modules for each student, and converted documents into more accessible formats. Teacher C cited that among the activities she used ICT for was converting files into a more accessible format, such as converting PDF files into Word documents to enable students to access the uploaded lesson and reference materials.

The teachers also found the Facebook Messenger app to be a useful platform for communication. Teacher B said that video calls using Facebook Messenger are very difficult because of poor Internet connections. Therefore, she used chat messaging to maintain connections with her students. Teacher C also shared the experience, who recognized the app as an effective tool to communicate with parents and her students.

> … yung pag send namin ng communication sa mga estudyante, tsaka parents ng mga estudyante namin is through messenger. Nagcreate po kami ng group chat per year level para po mag communicate yung mga estudyante namin. (We send communication to the students and parents through a [FB] messenger. We created a group chat per year level to communicate with them).

In contrast, Teacher A used social media. He was privileged to have a strong and convenient Internet connection because his house is near a telecommunications tower. He used this opportunity to create Facebook pages for his science and research projects that his students could access 24/7.

> … yung pangalan ng program is Daily Dose of Research for Grade 12. Facebook Live. Minsan may 3 viewers or apat. I don't mind it. I just continue with the Daily Dose. May napansin ako, nagvu-view sila madaling araw… Most na number na nakuha ko sa viewers ay hanggang 16 lang. 16 yung live talaga. Pero yung past views, halos lahat. Ewan ko kung naview nila ang buo, o nag attempt lang silang mag open (The name of the program is Daily Dose of Research for Grade

> 12 [students]. It's a Facebook live. Sometimes I can see there are 3 or 4 viewers [during the livestreaming]. I don't mind it. I just continue with the Daily Dose [program]. I noticed that they also view at dawn. The most number of viewers [during livestreaming] I had were 16. However, for past views, almost all [of my students] viewed it. I am not sure though if they viewed it in its entirety or they just attempted to open it)

Teacher A added that he launched a private group for his science classes. "I call it Science Distansensya for Grade 10," and it was used to broadcast the summary and waray-waray (local language) translation [of the lesson].

Use of available home and community resources

The teachers mentioned that geographical isolation added to the challenges that they encounter when implementing remote learning. To address this issue, the teachers prepared lessons in more understandable and engaging formats. They also ensured that the class activities did not incur additional expenses on the students' families. Teacher C shared that 89% of the students in their school belong to families who are recipients of the Pantawid Pamilyang Pilipino Program (4Ps), a social development program that provides conditional cash grants to Filipino families in the lowest economic bracket (Philippine Official Gazette, n.d.). She mentioned that the teachers in their school changed their mobile phone subscription to that one their students use. The readiness survey conducted before school started showed that most students use a prepaid plan of a certain telecommunication provider, which offers a strong signal in the students' communities. This provider also offers unlimited call and text messaging for two days, with a prepaid load of P15 (USD0.31), allowing students to send messages if they have concerns about their modules and other requirements.

The teachers in separate chat messages shared that they encouraged their students to use indigenous or available resources in their homes and communities. Teacher A said that he asked his students to prepare models of plate boundaries using "cover of notebooks, tie wire and glue." In contrast, Teacher B mentioned that she required her students to make a model of different types of faults that utilized "cardboards, medicine boxes o kahit ano na pwede nilang gmitin na available sa bahay" (or anything that is available in their houses). Teacher C explored the use of household chores or activities to study the concepts of power and energy by asking students to go to their kitchen carrying a pail of water and to go up and down their stairs using their watch timer.

Success factors and challenges when implementing reforms

Factors that facilitated the implementation of reforms at the time of COVID-19 were likewise reflected in the responses from the questionnaire, interviews, follow-

up interviews through chat messaging, and document reviews. These factors include 1) ICT capability of teachers; 2) capability of local communities; 3) contextualization of instruction; and 4) teachers' resilience skills. The same set of data showed the following challenges in the implementation of reforms: 1) perceived digital isolation; and 2) inadequate technological resources.

Success Factors

ICT capability of teachers

Teachers' capabilities for using ICT despite its limited use at the time of COVID were demonstrated by Teacher A. Teacher A recognizes the wide reach of Facebook and its ease of use and initiated Facebook live for two of his subjects: Research and Science. In fact, he said, his competence in using ICT tools even went to a higher level during the pandemic.

> In regard to demonstration of competence, it is still the same. Actually, mas tumaas sya, yung compounding variable, yung reach, mas lumawak. (In regard to demonstration of competence, it is still the same. Actually [the competence] increased. The compounding variable is the reach, which has become wider.)

Teachers B and C said that before COVID-19, they had been fully integrating ICT into their lessons.

> Teacher B: … mas okay talaga nung una, ma'am, sa face-to-face kasi napepresent mo yung ano… yung topics mo, may videos pa, minsan nagge-games pa, maraming activities. (It's much better before, ma'am, when there was face-to-face interaction. I could present my topics using videos, sometimes I use games, lots of ICT-based activities)

> Teacher C: … hindi naman gayun nga gaya ng dati na gumagamit kami ng powerpoint just to impart our knowledge, the lesson to our students. (It's not like before that we can use powerpoint [presentation] to impart our knowledge, the lesson to our students).

Before the pandemic, the teachers completed a questionnaire that determined their ICT utilization and competence in using technological tools. Table 2 shows that all three teachers rated their utilization as "Always," highlighting teachers' positive attitude toward the potential of ICT in enhancing teaching and learning.

Table 2. ICT Utilization

ICT Utilization	$\bar{X}$	QE	$\bar{X}$	QE	$\bar{X}$	QE
	Teacher A		Teacher B		Teacher C	
Mean	5.00	Always	5.00	Always	5.00	Always

$\bar{X}$ = mean; QE = qualitative equivalent

Teachers' capability to use ICT in teaching their lessons is shown in Table 3 and has a general mean of 3.88, which indicates that they have "high" competence in using ICT. Teacher A has the highest mean, 4.67, or a "Very High" rating. Teacher C has an "Average" mean rating of 3.17. It can be deduced that the extent of ICT utilization and high competence in using ICT enabled them to optimize the use of ICT despite the challenges of the COVID-19 pandemic. The teachers recognize the potential of ICT in addressing educational issues, particularly in times of crisis.

Table 3. Competencies in Using ICT Tools

ICT Competencies	$\bar{X}$	QE	$\bar{X}$	QE	$\bar{X}$	QE
	Teacher A		Teacher B		Teacher C	
Computer operations	5.00	Very High	3.50	Ave	3.00	Ave
Productivity tools	5.00	Very High	4.00	High	3.83	High
Internet and network applications	5.00	Very High	3.57	High	3.00	Ave
Legal aspects of technology use	4.33	Very High	3.67	High	3.00	Ave
Ethical use of technology	4.00	High	4.00	High	3.00	Ave
Mean	4.67	Very High	3.75	High	3.17	Ave
General mean	3.88	High				

$\bar{X}$ = mean; QE = qualitative equivalent

Capability of local communities

One of the factors that facilitated the implementation of remote learning is the support of local communities. They extended assistance to the schools when delivering updates to students in geographically isolated areas and protected both teachers and students.

Teacher C mentioned that barangay (village) officials helped them relay information to students. They set up trumpa (loud speakers) on streets to disseminate important information for parents and students.

… Minsan naman yung ibang communication namin through the barangay …

> may trumpa kasi sila… Nagpapa announce kami... in our dialect yung bandilyo ba yan sa barangay... Malaking trumpa yan, sa lahat ng mga kalye, by zone meron yang sila. Tapos pag inaannounce, naririnig na ng mga residente ng barangay. Mga information na kailangang ma disseminate don sa mga estudyante, sa mga parents ng estudyante. (Sometimes our communication is done through the barangays [villages]. They have a loud speaker. We request them to announce [updates]... We call it, in our language, bandilyo [public announcement sent through a loud speaker]. That's a big speaker, set up on road posts, by zone they have it. When they announce, the village residents will hear the information that the students and parents of our students need to be informed about)

Teacher B narrated that the barangays provided them with protection when visiting students who needed mentoring in their homes. A travel order was issued to them every time they visited their students to ensure that they followed health protocols and to ensure their safety.

A school plan provided by Teacher A revealed the strong partnership between the school and the local government unit. One of the schools partnered with the LGU to allow the continuation of education for the municipality's high school students and to simultaneously reduce the transmission of the disease among students, teachers, and the community. Specifically, the local government and the schools in the province adopted a home-based learning approach that ensures the provision of a learning area per household, assistance to students in undertaking their school activities and requirements, home visits for each student once a week to monitor their progress, and the implementation of learning modalities based on students' ability and capability.

Contextualized delivery of instruction

The teachers mentioned that they had to translate the modules downloaded from the DepEd website into their local language to help students understand the concepts. Likewise, they integrated the culture and practices of their community into the learning activity sheets.

Teacher A launched a Facebook live in Waray (the local language) and gave a summary of Module 1. When live streaming the lessons, he also included community scenarios that students are familiar with. However, he added that "contextualization creates a big difference in the utilization of print materials in distance learning," especially with no physical teacher-student interaction.

Teacher B noted that when she provided her students with activities that use their local language, they could easily relate and were more engaged. Teacher C said that she always contextualized her learning activity sheets to enable students to better understand the concepts found in their modules.

> Nakakatulong talaga sa mga bata ang pag translated into a local dialect. Lalo na po sa mga mahina ang comprehension and slow learners kasi mas lalo nila itong naiintindihan (Translating the [module and the learning activity sheets] is truly helpful to the students. Especially for students who have low comprehension and slow learners, they will learn more the [lessons])

The pre-COVID-19 data show that teachers have a strong capability to design lessons that address learner diversity. In Table 4, Teachers A and B have "Very High" ($\bar{X}$=5.0) to "High" ($\bar{X}$= 4.0) competence, respectively, regarding designing lessons that address learning, social, and cultural diversity. Teacher A rated himself "Very High" in almost all competencies relating to addressing learner diversity. Teacher C has a general mean of "High," highlighting her competence in utilizing flexible learning options and promoting a sound learning environment. Teacher B, who started teaching in 2019, has an "Average" rating. She confided that this COVID-19 crisis made her reflect more on her teaching practice.

Table 4. Competencies in Addressing Learner Diversity

ICT Competencies	$\bar{X}$	QE	$\bar{X}$	QE	$\bar{X}$	QE
	Teacher A		Teacher B		Teacher C	
Utilization of flexible learning options	5.00	Very High	3.00	Ave	4.00	High
Promotion of sound learning environment	5.00	Very High	3.00	Ave	4.00	High
Addressing diversity of learners	3.00	Ave	3.50	High	4.00	High
Learning, social, and cultural diversity	5.00	Very High	4.00	High	3.00	Ave
Design of learning activities (assessment)	4.67	Very High	3.00	Ave	3.00	Ave
Mean	4.91	Very High	3.25	Ave	3.60	High
General mean	3.86	High				

$\bar{X}$ = mean; QE = qualitative equivalent

Resilience of teachers amid disasters

Teachers' resilience skills helped facilitate remote learning in geographically isolated areas. All of the teachers interviewed experienced the devastation caused by Typhoon Yolanda. They said that the experience instilled a sense of courage and hope that they could draw from at this time of the pandemic.

Teacher B was still a student at the time of the typhoon. She mentioned that life then was more difficult for students because there was no transportation to bring them to school. Her Typhoon Yolanda experience and the present pandemic helped her cope with the challenges of remote learning. She expressed a sense of optimism for student learning amid the pandemic.

> Sa Yolanda kasi sobrang iba ng situation, Like hirap kami papunta sa school. Walang mga sasakyan. I guess the situation is mas better pa rin sa pandemic. Kasi ang mga bata, hindi kailangan pumunta sa school. So kami talaga ang nag eeffort na madalhan sila ng mga modules… Sa Yolanda, walang online learning, walang modular learning. Sobrang hirap kung wala ka talagang pamasahe. Ngayon kahit wala kang pera, walang pamasahe makakapag aral ka. Kailangan mo lang maging responsable sa paghawak ng time. (The situation during [typhoon] Yolanda is very different. Like it was very difficult to go to school. No means of transportation. I guess the situation is much better during this pandemic. Students need not go to school. It is us teachers who took the effort to bring the modules to them. During Yolanda, there was no online learning and no modular learning. It was so difficult. Now, even if you do not have money, you can still learn. You just need to be responsible in budgeting your time as student)

Teacher A's school developed digital modules after Typhoon Yolanda. Using a learning management system, the school developed online modules to lessen the impact of school disruptions "even during unexpected inclement weather and other interruptions on the regular conduct of classes." The teachers were trained to use the digital classroom that Teacher B utilizes up to this time of the pandemic.

> Yung training namin at yung accumulated experience namin, although naka help sya when it comes sa mindset ng teacher, pero yung skill na accumulate namin before is contributory sya pero hindi namin masyado magamit because we are... traversing a road not taken. Parang di namin alam what lies ahead, what will happen next, we are blind sa future. Pero with the experience na meron kami, sige lang meron, kahit maliliit na increments lang, basta meron. (The training we had and out accumulated experience were able to help in terms of mindset as a teacher, but the skill that we accumulated before, it is contributory but we could not fully utilize it because we are traversing a road not taken. We do not know what lies ahead, what will happen next, we are blind for the future. However, with the experience that we have, go on, even we do it in small increments, go on what is important is we have something to draw from)

A teacher's mindset was also shown by Teacher C, who said that her experience during Typhoon Yolanda was far different from the COVID-19 crisis. Two months after the typhoon, schools resumed in makeshift classrooms. Teachers had face-to-face interactions with students, and they could easily reach out to them whenever they needed support. Teacher C said that the situation could be different this time. She could not see them physically, but at least she could connect with them through social media and mobile phone messaging. She said that the hope that she had when they were recovering from the devastation of Typhoon Yolanda is still the hope that she has for this crisis.

> Kahit anong pandemya po ang dumating (in every pandemic), we have to be strong. We are teachers. Education must go on. We have to continue education. We have to embrace the new normal. We have to be positive. Katulad ng sa [typhoon] Yolanda, kailangang bumangon kahit ano pa man ang dumarating na pagsubok sa edukasyon. We have to be strong, and we hope na ipagpatuloy pa rin kahit ano pa ang hirap na darating pa. Kailangan isipin natin ang future ng ating mga estudyante (Like what we did during Typhoon Yolanda, we need to rise up above all the challenges in education. We have to be strong, and we hope that we could still continue amid the difficulties that will still come. We need to think about the future of our students).

Challenges

Inadequate or no technological resources

All of the teachers mentioned that the present setup limited their use of ICT to communication and materials production. All schools were encouraged to implement classes remotely using both synchronous and asynchronous approaches. Schools in cities were able to implement remote online learning, but most schools in geographically isolated areas were faced with the challenges of poor Internet connectivity and inadequate technological resources for student use.

Teacher B mentioned that she has problems with Internet connections when working from home. Her residence is in an area with a poor Internet signal, and she had access only when asked to physically report to school.

> … yung connection kasi unstable. Tapos minsan work from home man, so sa bahay walang Internet. Pag may nagtatanong na bata sa messenger okay lang… … Ako pag pumupunta lang dito sa school medyo nakakasagap ng signal, pero dito sa bahay, wala. Messenger, gumagana. (The [Internet] connection is unstable. Then, if sometimes work from home, I have no access. If a student wants to ask me [about the lesson], they can message me through [FB] messenger … When I go to school I can get [Internet] signal. Here in the house, I can't. However, I can access messenger)

Teacher B also mentioned that she cannot perform the online delivery of her lessons. Aside from the poor Internet connection in her home, not all of her students have gadgets to use to access online sessions. This difficulty was affirmed by Teacher C, who said all of the teachers in their school have to make the most out of modular learning because this is the most appropriate mode of instructional delivery given the situation.

> Gustong gusto naman naming gawin yong online class. Hindi naman magawa po kasi… yung mga gadgets ng mga estudyante namin, yung connection and load also.

> Kaya yun na yung pinaka best strategy namin yung modular learning. (We wanted to implement online class. However, we cannot do it… our students do not have gadgets, no Internet connection and [money] to buy [prepaid] load for their mobile phones).

Teacher A described this difficulty as teaching behind a wall. He explained that the present situation challenged them to find the best ways to help students learn through the modules provided to them.

> Maghahanap ka ng paraan na tumagos yung module sa kabilang wall, di mo sya nakikita, di mo sya naririnig, di mo alam kung ano ang ginagawa nya, wala kang nakikita about sa bata, pero you have to teach. (You have to look for ways to make the module get through the other side of the wall. You cannot see [the students]. You cannot hear them. You do not know what they are doing. You do not know anything about them, but you have to teach).

The teachers also mentioned that they were encouraged to utilize video resources aired over government television channels. However, they said that doing so posed a greater challenge because a subscription to the cable channels that airs the television programs is needed. They added that using television-based instruction is definitely not an option, given that most of their students are from poor families and do not own a television set.

Perceived digital isolation

Geographical isolation is not the only challenge that teachers are faced with—the pandemic also brought digital isolation to education. The interviews indicate that this digital isolation refers to the absence of physical teacher-student interactions in this new learning environment.

Teacher A reflected that not all of his students actively participated in all class activities. He said that students do not have the drive despite the availability of technology or gadgets for them. He volunteered that the readiness survey showed that up to 80% of the students have gadgets and access to the Internet. Nevertheless, students were not participating. He mentioned that out of the 100 students that he has, only 15 students dare to "follow the instructions for online, those who would like to meet you even virtually." Their interest in learning is declining. He presupposed that students could be missing the formal school structure and the physical presence of teachers in the teaching-learning process.

> Tinatanong ko ang mga bata ano yung gusto nila. Gusto kong makita saan kami papasok as teacher. Tapos nakikita ko yung reasons nila gusto talaga nila ng formal,

> parang it's either face-to-face or wala (I asked the students what they wanted, because I wanted to determine how could we come in [in the process] as teachers. Then, I could see that their reasons are they want formal [schooling]. Like it's either face-to-face or none at all)

For Teacher C, isolation has taken on a different level. She always has her students in mind, thinking about the difficulty that they might be experiencing.

> Nag iisip na lang kami kung ano kaya ang ginagawa ng estudyante ngayon. Ano kaya ang naiisip ng mga estudyante natin ngayon. Nahihirapan ba sa silang sumagot sa module? Kasi hindi naman lahat ng mga estudyante nakakapag communicate through messenger. Hindi nila naitatanong lahat ng pwede nila itanong… Namimiss namin yung mga estudyante… Yung interaction between you and students in the discussion of topics...Tumaas pa po ang isolation. Literal na talaga isolated. Kung sa isolated, parang kami na lang dito sa school. Wala yung mga bata. Magkahiwalay kami." (We can only think of the students now. What are they thinking now? Do they find it hard to answer the module? [We think like this]. because not all students can communicate through the [FB] messenger. They cannot ask [us] any [questions] that they would like to ask. We miss the students. The interaction between you and students in the discussion of topics[is lacking]. Isolation has gone higher. We are literally isolated. If you have to define being isolated, it means only us [teachers] are in school. No children to teach]

Teacher B noted that students are in difficult situations when in remote learning. She volunteered that students must develop independent learning to cope with the challenges of remote education.

> Mahirap sitwasyon para sa mga bata. Kasi nga yung mga bata, they are used na yung teacher is andyan to guide them, para magdiscuss. They need to be independent learners, na kailangan talaga nilang magbasa, unawain lahat ng andyan sa module. Pero kailangan pa rin talaga ng mag eexplain sa kanila. Nakikita sa mga posts, na nahihirapan na sila sa module. (The situation is difficult for the students. They are used to have the teachers' presence to guide them, to discuss [the lesson]. They need to be independent learners, they need to read, to understand what is in the module. However, they need somebody to explain to them. I could see in their [chat group] posts that they are finding it hard to understand the module)

Discussion

The COVID-19 pandemic highlighted the many challenges that most schools in geographically isolated areas were already confronting. To prevent the spread of the

disease, schools were closed and tasked to ensure that learning continued. The lack of technological resources, poor Internet connections, and inadequate technological and pedagogical knowledge on the design and implementation of technology-enabled instruction (Que, 2020) were further compounded by the remote learning approach that the Philippine government imposed for compliance by all educational institutions throughout the country.

Modular learning was used as an approach to promote learning continuity. Students were provided with self-learning modules at home that they could study individually, and teachers supervised them remotely. This new approach was found to be difficult for both teachers and students who were used to having learning facilitated in a physical classroom. The absence of student-teacher interactions contributed to students' decreased motivation to learn. The virtual presence of teachers is not enough to stimulate them to study the modules. Teachers' physical presence provides emotional support and facilitates students' active participation in the teaching and learning process. Students' feeling that they are heard, understood, and appreciated increases their motivation to study and participate in classroom activities (Che, Ainoor & Lee, 2017; Pöysä, Vasalampi, Muotka, Lerkkanen, Poikkeus & Nurmi, 2019).

The results show that teachers' mindset matters in the pursuit of learning during the pandemic. Mindset refers to teachers' way of thinking about work and relationships (Dweck, 2008). The teachers optimized the use of ICT in communicating and producing materials. One of the teachers defined the mindset as "how teachers look at the pandemic situation, where teachers need to create more and give more to reach the students," which was affirmed by the response of another teacher who said "nag adjust po kami and nag adapt sa mga pagbabago" (we adjusted and adapted with the changes). This mindset was evident in their responses that indicated that they maintained their connection with the students, making their presence felt on different platforms, and assuring them that they are there not to pressure them on their requirements but to help them get through the difficulties of learning in the new setup. One teacher said that whenever he sees any of his students online at nine o'clock in the evening, he reminds them to take a break from doing the module and take care of themselves. He made sure that his messages were "seen" so he could just imagine that he had been "heard." Another teacher changed her mobile phone card to the one being that her students used because it is much cheaper. In this way, the students—most of whom belong to poor communities—could reach her for consultation. She volunteered that despite the pandemic, "we have to continue with courage and commitment," especially now that many of the teachers in their town were tested for COVID-19, and "kahit anu pa man ang pinagdadaanan ngayon we truly have to continue education" (whatever we are experiencing right now, we have to continue education).

During this health crisis, the teachers demonstrated resilience. The grit and tenacity that they developed during the devastating typhoon Yolanda were demonstrated amid the present health crisis. Students are not prepared to do all the learning by themselves. In this

situation, the teachers who are as unprepared as the students have been doing their best to help the students acquire the competencies needed. All of the teachers interviewed cited that they were drawing from their typhoon Yolanda experience to cope with the current pandemic—notwithstanding the local government's capability to complement the schools' efforts in sustaining quality education during the present crisis. Local communities' support systems helped schools in geographically isolated areas overcome the challenges associated with the remoteness of the location of their schools (Que, 2020).

Conclusion

ICT use, local capabilities, and resilient spirit made it possible for teachers in geographically isolated and disadvantaged areas to cope with the present health crisis. ICT was not used fully in the new setup given the poor Internet connection and lack of technological devices for students to use. However, the teachers optimized their use when communicating to and producing instructional materials that would assist students in acquiring the required competencies. The local communities' efforts to assist the schools in implementing remote learning and simultaneously protect both teachers and students from the disease are also important factors in dealing with this pandemic. Most importantly, teachers' resilience skills applied to even the most difficult situations demonstrated that school disruptions brought about by natural disasters, COVID-19, and other international and national crises could be overcome. However, instituting reforms to make education viable even during crises is imperative. Such reforms include curricular changes in the teacher education program, more emphasis on the provision of technological infrastructure, and the empowerment of schools at the grassroots level in geographically isolated and disadvantaged areas.

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References

Alea, L.A., Fabrea, M.F., Roldan, R. D.A., and Farooqi A.Z. (June 2020). Teachers' Covid-19 Awareness, Distance Learning Education Experiences and Perceptions towards Institutional Readiness and Challenges. *International Journal of Learning, Teaching and Educational Research*, 19, 6, pp. 127-144. https://doi.org/10.26803/ijlter.19.6.8

Alipio, Mark (2020). Education during COVID-19 era: Are learners in a less-economically developed country ready for e-learning?, ZBW – Leibniz Information Centre for Economics,

Kiel, Hamburg http://hdl.handle.net/10419/216098

Asian Development Bank (2013). Supplementary document 6:Typhoon Yolanda-affected areas and areas covered by the Kalahi–CIDSS National Community-driven Development Project https://www.adb.org/sites/default/files/linked-documents/46420-002-sd-06.pdf

Che Ahmad CN, Ainoor Shaharim S, Lee Abdullah MFN. Teacher-Student Interactions Learning Commitment, Learning Environment and Their Relationship with Student Learning Comfort. *Journal of Turkish Science Education (TUSED)*. 2017;14(1):57-72. doi:10.12973/tused.10190a

Department of Education (March 15, 2020). DM No. 042, s. 2020. Guidelines for the Remainder of School Year 2019-2020 in light of COVID-19 Measures https://www.deped.gov.ph/wp-content/uploads/2020/11/20201117_Summary-of-DepEd-COVID-19-Memoranda_v18.pdf

Department of Education. (OUA Memo 00-0520-0005, 04 May 2020). Guidelines on webinar sessions.

Department of Education (6 May 2020). Clarifications on the use of the Most Essential Learning Competencies (MELCs) and other related issues. http://depedcapiz.ph/issuances/Advisories/2020/SDA112s2020.pdf

Department of Education (May 7, 2020). DM 051, s. 2020 Guidelines on the Conduct of Remedial, Advancement, and Enrichment Classes during Summer https://www.deped.gov.ph/wp-content/uploads/2020/11/20201117_Summary-of-DepEd-COVID-19-Memoranda_v18.pdf

Department of Education (01 July 2020). DepEd prepares Self-Learning Modules for education's new normal https://www.deped.gov.ph/2020/07/02/deped-prepares-self-learning-modules-for-educations-new-normal/

Dweck, C. (2008). Mindset: The new psychology of success. New York: Penguin Random House LLC

Hallegatte, S., Bangalore, M., Bonzanigo, L., Fay, M., Kane, T., Narloch, U., Rozenberg, J., Treguer, D., and Vogt-Schilb, A. (2016). Shock waves: Managing the impacts of climate change on poverty: Climate change and development series. Washington, DC: World Bank. doi:10.1596/978-1-4648-0673-5. License: Creative Commons Attribution CC BY 3.0 IGO

Humanitarian Country Team (November 2013). Philippines: Typhoon Haiyan Action Plan. United Nations High Commission for Refugees https://www.unhcr.org/528228cf9.pdf

Joaquin, J.J. B., Biana, H.T. and Dacela, M.A. (22 October 2020). The Philippine higher education sector in the time of COVID-19. *Front. Educ*. https://doi.org/10.3389/feduc.2020.576371

Manila Times (October 21, 2020) EDITORIAL: Problems with distance learning system must be thoroughly investigated https://www.manilatimes.net/2020/10/21/opinion/editorial/problems-with-distance-learning-system-must-be-thoroughly-investigated/783310/

Miks, J. and Mcllwaine, J. (April 20,2020) . Keeping the world's children learning through COVID-19. UNICEF.
https://www.unicef.org/coronavirus/keeping-worlds-children-learning-through-covid-19

Philippine Official Gazette (n.d.) Retrieved from
https://www.officialgazette.gov.ph/programs/conditional-cash-transfer/

Pöysä S, Vasalampi K, Muotka J, Lerkkanen M, Poikkeus A, Nurmi J. Teacher–student interaction and lower secondary school students' situational engagement. *British Journal of Educational Psychology*. 2019;89(2):374-392. doi:10.1111/bjep.12244

Que, E. N. (September 2021). Sustaining successful ICT integration practices in remote, rural schools. Pertanika Journal of Social Science and Humanities (Scopus-indexed), 29(3)
https://doi.org/10.47836/

Santos, A. P. (6 October 2020). In the Philippines, distance learning reveals the digital divide (Feature article). Heinrich-Böll-Stiftung.
https://eu.boell.org/en/2020/10/06/philippines-distance-learning-reveals-digital-divide

Appendices

Appendix A. Evaluation and Scoring Scale

Unit Weight	Mean interval	Verbal Interpretation	
		ICT Utilization	ICT Competencies
5	4.21 - 5.00	Always	Very High
4	3.41 - 4.20	Often	High
3	2.61 - 3.40	Sometimes	Average
2	1.81 - 2.60	Rarely	Low
1	1.00 - 1.80	Never	Very Low

Note: Adapted from the author's article entitled "Sustaining successful ICT integration practices in Philippine remote, rural school," accepted for publication on July 10, 2020.