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Technology Leadership: Assessing the Competency Level of High School Administrators and Teachers in the Use of ICTs

Mary Rose Gemma Rodriguez[1]

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ABSTRACT

Information and communication technologies (ICTs) have a significant role to play in schools and classrooms. The world is shifting towards a new digital era and school administrators and teachers must adapt to prepare their students for it. This study aimed to assess the ICT competency of high school administrators and teachers in Antique, Philippines in terms of cognitive ability, skills, and attitudes. The results showed that both school administrators and teachers rated themselves to have high proficiency in general computer uses and skills in using Microsoft Office and other productivity tools, use of the internet and data management. They were also rated to have high proficiency in applying ICTs in classrooms to create an ICT learning environment. However, the standard deviation shows that the ratings were varied, particularly for use of internet, data management, and application of ICTs in classrooms. There were no significant correlations between the proficiency of school administrator and teachers. However, sex, age, owned devices, internet speed, and hours using the internet per day were found to be significant factors.

Corresponding Author: marose_r@yahoo.com

INTRODUCTION

The coronavirus pandemic has altered the education system across the globe. Various governments have issued protocols for quarantine and social distancing which resulted in most educational institutions being temporarily shut down. Distance learning through accessible learning management systems (LMS) and social networking sites (e.g. Facebook, Viber) are being utilized by most schools, however, an initial survey in the Philippines showed that schools do not have the facilities and capacity to comply with requirements for distance learning (Magsambol, 2020). The Department of Education has been training teachers and parents for the distance learning approach, but this has yet to be completed (Magsambol, 2020). Many experts have warned that it would be disadvantageous for both the students and schools

if they are not prepared for distance learning (Hobbs and Hawkins, 2020, Marquez et al., 2020). Unreliable internet, technophobia, and lack of skills and methods to engage students in an online setting will hinder students from learning in class. Information and communications technologies (ICT) competency is a skill that professional educators should have and has become even more valuable as schools become more modern. These professional educators not only include teachers, but also the school principal/administrator. Effective technology integration in schools is strongly influenced by the school principal. The school principal's role has evolved from educational leader to also being a technology leader (Lennon, 2012). They must be flexible in adapting to new technology and methods, not only focusing on strictly adhering the school curriculum. The school leader's involvement greatly affects the learning environment for the students as well as the teachers' confidence in using technology (Webb, 2011). The year 2020 has been a turning point for schools all over the world to become online. As the world becomes digital, so too must education. There is a need for educators to proficiently use technology for administrative, instructional and learning functions. The pandemic is far from over, so schools may use this as an opportunity to reshape their education system, particularly how they have been integrating technology into their lessons and building capacity. Despite the increase of technology availability and the need for it, integration in schools has been poor. An assessment of the current capacity of administrators and teachers to proficiently use technology for distance learning is necessary to prepare for the next steps.

LITERATURE REVIEW

The youth of today are growing up in a world more comfortable with technological change and innovation. Teachers and administrators have the challenge of adapting and growing with them, as well as utilising the most effective techniques to teach and communicate with their students. It has become common for schools to acquire computers, internet access, digital visual presenters, etc., to implement ICT-supported education. When these tools are used properly, they empower both the teachers and students to perform at their best through enabling new ways of teaching and learning (Bonifacio, 2013). ICT-enhanced learning also promotes collaborative, integrative, evaluative, creative, and project-based learning which are lifelong skills and experiences that students will benefit from (Bonifacio, 2013). A study by Basri, Alandejani, and Almadani (2018) found that there is a relationship between university students' ICT adoption and academic performance in a conservative environment. More than 50% of the students use ICTs not only for academics (i.e., searching for information on the internet), but also for social connections which enables discussion and feedback with peers and teachers. Interactions like these help students develop research and communication skills. Modern technology has significantly altered people's daily lives and has been instrumental in connecting people during this COVID-19 pandemic. Distance learning, particularly online learning, became critical to accessing education for students. Ghavifekr and Rosdy (2015) found that ICT integration had great effectiveness for both teachers and students in public secondary schools in Malaysia. When ICT tools and equipment are properly used to create an interesting learning environment, students' quality learning increases. Their results indicated that a main factor in successful integration was the teachers' knowledge and skills in using ICT. The more knowledgeable and skilled they are, the better their teaching methods and approach will be. In the Philippines, a study by (Caluza et al., 2017, Taqi, M. et al., 2021, Adeem, M. A. et al., 2019 and Sibt-e-Ali, M.et al. 2018) on public school teachers found that most of the teachers have basic knowledge on ICT and needs improvement. Marcial, Fortich and Rendal (2014) assessed the ICT competency level of teachers' education professionals in Central Visayas, Philippines and their results indicated that while the teachers were proficient in using basic ICT tools, they did not have the skills to further innovate teaching and learning.

There is also a need to increase ICT competency among the teacher educators, especially on ICT policy in the classroom and ICT in classroom organisation and management. Both of these studies recommended that there should be collaborative efforts between the government and academia towards efficient ICT integration in the teaching and learning process. Effective ICT training programs that increase educators' ICT competency were found to be a significant factor in improving students' quality of learning (Ghavifekr and Rosdy, 2015).

METHODOLOGY

Research Design

This is a quantitative study employing a survey technique to measure the ICT competencies of school administrators and teachers in high schools.

Participants

The participants of this study were senior high school administrators and teachers from the province of Antique. There are 53 public high schools and 20 private high schools. Purposive sampling was used to identify and contact schools for online participation until the minimum requirement of 62 school administrators and 232 teachers was met. This sample size was calculated with a 95% confidence level and 5% margin of error.

Research Instrument

A standardised questionnaire was used. The first part asked the demographic characteristics of the participants ie., gender, age, and educational level. The second part identified their ICT competencies, which are divided into cognitive ability, skills, and attitudes. For this study, cognitive ability was defined by the participant's knowledge and understanding of general computer uses. The skills being measured comprised Microsoft Office skills and internet and data management skills. Attitude was defined as their interest in ICT development for their schools and creating an ICT learning environment. A rating scale of 1-6 (lowest, very low, low, high, very high, highest) was used to assess these. The questionnaire was adapted from Akarawang, Kidrakran and Nuangchalerm's study on the ICT competency and training needs of teachers in Thailand (2015) and Caluza et al.'s ICT competency assessment survey (2017). Google form was used to create the survey.

Procedure

Operating high schools were contacted to request for the participation of their school administrators and teachers. Data collection was done through an online survey, sent to the participants' email address. Participants were given 10 days to respond to the survey. Survey responses will be kept confidential and consent was sought through Google Forms. Responses from the questionnaire were analysed using SPSS, using descriptive statistics such as frequency counts, percentages, and mean. T-test and ANOVA were used to analyse relationships between general characteristics (role, sex, age, etc.) and ICT proficiency. Spearman's correlation coefficient was used to determine the correlation of ICT proficiency variables.

RESULTS AND FINDINGS

There were 62 school administrators and 302 teachers that participated in the study. Table 2 shows the distribution of general and ICT-related characteristics of school administrators. A typical school administrator is female, has a Master's degree, and is 50+

years old. Most school administrators own a laptop and smartphone, have moderately fast internet, and use the internet for 5-6 hours per day. Whereas a typical teacher is female, has a Bachelor degree, and is 30-39 years old. Most school teachers own a laptop and smartphone, have moderately fast internet, and use the internet for more than 7 hours per day.

Table 1: *Characteristics of School Administrators and Teachers*

		School Administrators		Teachers	
Characteristic	*Categories*	*Number*	*Percentage*	*Number*	*Percentage*
Sex	Female	39	62.9	241	79.8
	Male	23	37.1	61	20.2
Education	Doctorate	8	12.9	0	0.0
	Masters	51	82.3	4	1.3
	Bachelor	3	4.8	298	98.7
Age	20-29 years old	5	8.1	72	23.8
	30-39 years old	18	29.0	110	36.4
	40-49 years old	15	24.2	75	24.8
	50+ years old	24	38.7	45	14.9
IT devices owned	Personal computer	14	22.6	34	11.3
	Laptop	55	88.7	246	81.5
	iPad/Tablet	8	12.9	35	11.6
	Smartphone	54	87.1	272	90.1
Internet speed	Slow	7	11.3	51	11.3
	Moderate	46	74.2	236	78.1
	Fast	9	12.9	13	4.3
	No Internet	0	0.0	2	0.7
Hours using the internet per day	1-2 hours	9	14.5	37	12.25
	3-4 hours	12	19.4	87	28.8
	5-6 hours	23	37.1	84	27.8
	More than 7 hours	18	29.0	92	30.5
	No Internet	0	0.0	2	0.7

School administrators and teachers were found to have moderate to very high proficiency in demonstrating their knowledge and skills in basic computer operations. However, the standard deviation reveals that in “Properly connect main components, configure

peripherals and install drivers when required" and "Understand the basic functions of the operating system" the teacher participants' answers are actually varied with a difference of two levels.

Table 2: *Cognitive Ability of School Administrators and Teachers*

	School Administrators			Teachers		
	Mean	*Qualitative description*	*Standard deviation*	*Mean*	*Qualitative description*	*Standard deviation*
Identify and define functions of the main components (ie., monitor, CPU, mouse, keyboard) of a computer.	5.11	Very high proficiency	0.85	5.01	Very High proficiency	0.99
Identify and define the functions of the computer peripherals (i.e. printer, scanner, modem, digital camera, speaker, etc.)	4.85	High proficiency	0.92	4.76	High proficiency	1.00
Properly connect main components, configure peripherals and install drivers when required	3.98	Moderate proficiency	1.25	4.06	High proficiency	1.14
Configure computer settings of various software and hardware	3.74	Moderate proficiency	1.17	3.76	Moderate proficiency	1.17
Understand the basic functions of the operating system	4.26	High proficiency	1.19	4.07	High proficiency	1.11
Organize and manage computer files, folders, and directories	4.68	High proficiency	1.10	4.54	High proficiency	1.09
Use storage devices (i.e. hard disk, diskette, CD, flash memory, etc.) for storing and sharing computer files. Create back-ups for important files	4.68	High proficiency	1.11	4.57	High proficiency	1.19
Protect the computer from virus, spyware, adware, malware, hackers, etc.	3.76	Moderate proficiency	1.02	3.79	Moderate proficiency	1.16
Use online and offline help facilities for troubleshooting, maintenance and update of applications	3.68	Moderate proficiency	1.16	3.66	Moderate proficiency	1.22

School administrators and teachers have high proficiency in using Microsoft Office and other appropriate productivity tools. However, the standard deviation reveals that in "Make computation, use formula and create graphs using MS Office Excel/Google Sheets" the teacher participants' answers are actually varied with a difference of two levels.

Table 3: *Skills in using Productivity Tools of School Administrators and Teachers*

	School Administrators			Teachers		
	Mean	*Qualitative description*	*Standard deviation*	*Mean*	*Qualitative description*	*Standard deviation*
Use MS Office Word/Google Docs to enter and edit text and images	4.76	High proficiency	1.14	4.65	High proficiency	1.14
Format text, control margins, layout, and tables	4.94	High proficiency	1.10	4.74	High proficiency	1.14
Print, store and retrieve text documents from MS Office Word/Google Docs	4.81	High proficiency	1.17	4.63	High proficiency	1.15
Use a calculation spreadsheet to enter data, sort data and format cells into Tables	4.53	High proficiency	1.17	4.31	High proficiency	1.24
Make computation, use formula and create graphs using MS Office Excel/Google Sheets	4.37	High proficiency	1.10	4.08	High proficiency	1.23
Print and store data tables using MS Office Excel/Google Sheets	4.60	High proficiency	1.11	4.28	High proficiency	1.25
Use a presentation package to add text and sequence a presentation	4.56	High proficiency	1.08	4.27	High proficiency	1.26
Enhance slide presentations by adding sound, customising animation and inserting images	4.55	High proficiency	1.12	4.32	High proficiency	1.29
Print presentation handouts and store slide presentations	4.66	High proficiency	1.12	4.55	High proficiency	1.24

School administrators have high proficiency in using the internet and skills in data management, except for “Download and install relevant applications including freeware, shareware, updates, patches, viewers, and support applications” in which they have moderate proficiency. Standard deviation shows that there is a 2-level variation of answers for “Crop, scale, colour, correct and enhance digital images”, “Attach and configure scanners, cameras, cell phones to acquire digital images”, “Configure and use Web browsers and Help applications”, “Search and collect textual and non-textual information from online and offline sources”, and “Efficiently store and organise collected information using directories, drives or databases”. Teachers have moderate to high proficiency, however, the standard deviation reveals that in “Crop, scale, colour, correct and enhance digital images”, “Play various media files using appropriate media players”, “Attach and configure scanners, cameras, cell phones to acquire digital images”, “Send and receive emails with attachments, manage emails and use LAN and Web-based mail servers”, “Effectively use synchronous and asynchronous web-based communication tools like Zoom, Google Meet, Messenger, etc.”, “Properly acknowledge information sources – online and offline” the teacher participants’ answers are actually varied with a difference of two levels.

Table 4: *Skills in using the Internet and Data Management of School Administrators and Teachers*

	School Administrators			Teachers		
	Mean	*Qualitative description*	*Standard deviation*	*Mean*	*Qualitative description*	*Standard deviation*
Acquire digital images and other media from websites, CD, flash drives, etc.	4.53	High proficiency	1.16	4.36	High proficiency	1.29
Crop, scale, color, correct and enhance digital images	4.24	High proficiency	1.28	4.11	High proficiency	1.30
Play various media files using appropriate media players	4.32	High proficiency	1.10	4.10	High proficiency	1.28
Attach and configure scanners, cameras, cell phones to acquire digital images	4.21	High proficiency	1.22	4.19	High proficiency	1.27
Configure and use Web browsers and Help applications	4.00	High proficiency	1.02	3.94	Moderate proficiency	1.26
Send and receive emails with attachments, manage emails and use LAN and Web-based mail servers	4.26	High proficiency	1.16	4.12	High proficiency	1.30
Effectively use synchronous and asynchronous web-based communication tools like Zoom, Google Meet, Messenger, etc.	4.50	High proficiency	1.04	4.24	High proficiency	1.25
Effectively use search engines, web directories, and bookmarks	4.14	High proficiency	1.11	3.98	Moderate proficiency	1.30
Download and install relevant applications including freeware, shareware, updates, patches, viewers, and support applications	3.85	Moderate proficiency	1.24	3.76	Moderate proficiency	1.25
Search and collect textual and non-textual information from online and offline sources	4.07	High proficiency	1.21	3.67	Moderate proficiency	0.58
Efficiently store and organize collected information using directories, drives or databases	4.02	High proficiency	1.21	3.85	Moderate proficiency	1.26
Properly acknowledge information sources – online and offline	4.32	High proficiency	1.16	4.04	High proficiency	1.29

School administrators have high proficiency in applying technology in developing students' skills and in creating an ICT learning environment. Standard deviation shows that there is a 2-level variation of answers for "Analyse assessment data using spreadsheets and statistical applications" and "Set up online databases or repositories of student works". Teachers range from moderate to high proficiency. However, the standard deviation reveals

that in "Encourage students to do data analysis, problem solving, decision making and exchange of ideas", "Use various synchronous and asynchronous communication tools (emails, chat, forums, blogs)", "Use electronic means of administering quizzes and examinations", and "Use emails, group sites, blogs, etc. for disseminating information directly to students, colleagues and parents" the teacher participants' answers are actually varied with a difference of two levels.

Table 5: *Attitudes towards ICTs of School Administrators and Teachers*

	School Administrators			Teachers		
	Mean	Qualitative description	Standard deviation	Mean	Qualitative description	Standard deviation
Make students use databases, spreadsheets, concept mapping tools and communication tools, etc.	4.15	High proficiency	1.14	3.83	Moderate proficiency	1.26
Encourage students to do data analysis, problem solving, decision making and exchange of ideas	4.16	High proficiency	1.16	4.06	High proficiency	1.26
Use appropriately slide presentations, videos, audio and other media in the classroom	4.60	High proficiency	1.08	4.46	High proficiency	1.17
Teach students to use various multimedia materials for the reports and class presentations	4.34	High proficiency	1.14	4.25	High proficiency	1.20
Use various synchronous and asynchronous communication tools (emails, chat, forums, blogs)	4.37	High proficiency	1.27	4.13	High proficiency	1.23
Facilitate cooperative learning and exchange of ideas and information	4.47	High proficiency	1.07	4.29	High proficiency	1.23
Design rubrics for assessing student performance in the use of various technologies	4.42	High proficiency	1.12	4.22	High proficiency	1.09
Use electronic means of administering quizzes and examinations	4.32	High proficiency	1.20	4.03	High proficiency	1.27
Analyze assessment data using spreadsheets and statistical applications	4.06	High proficiency	1.14	3.88	Moderate proficiency	1.25
Use emails, group sites, blogs, etc. for disseminating information directly to students, colleagues and parents	4.35	High proficiency	1.03	4.21	High proficiency	1.26
Explore the use of electronic assessment tools like online testing, submission of projects via email or online facilities	4.21	High proficiency	1.06	3.97	Moderate proficiency	1.28

Set up online databases or repositories of student works	4.02	High proficiency	1.23	3.75	Moderate proficiency	1.26

Both school administrators and teachers are highly competent, having mostly high proficiency ratings in cognitive ability, skills, and attitudes towards ICTs. However, a closer look into the standard deviation and percentages shows that the data is more varied than what can be seen in the mean. In all the variables there is at least a one- and even two-level differences in proficiency rating. For example, the mean shows that teachers have a moderate proficiency in "Properly connect main components, configure peripherals and install drivers when required", but the standard deviation shows that there are a number teachers who have rated themselves as having low proficiency or not proficient. Looking at this matters when developing workshops to know what areas to focus on for improvement. Skills in using the internet, skills in data management and attitude in creating an ICT learning environment and ability to develop students' skills using ICT had the most variations.

Only "Search and collect textual and non-textual information from online and offline sources" had a significant difference in ICT competency based on role, in which school administrators scored better than teachers.

Table 6: *Comparing ICT Proficiency by Role*

	Sig.
Search and collect textual and non-textual information from online and offline sources	0.019

This may be because the technological environment for them is similar; both owned laptops and smartphones and had moderately fast internet. Only time spent on the internet per day was found to be different. Multiple significant correlations were found when comparing general characteristics and ICT competency. Sex, age, education level, devices owned, internet speed, and hours spent using the internet per day were found to be significant factors to ICT proficiency scores. There were significant differences between females and males in almost all variables under cognitive ability, skill in using Microsoft Office and other productivity tools, use of internet and data management, and attitudes towards ICTs. Male administrators and teachers were rated to have higher proficiency in cognitive ability, skills and attitudes towards ICTs than their female counterparts. Most studies that assess teacher ICT competency, including this study, are based on self-reported data. Past studies found that males would have higher confidence in using technology, higher perceived proficiency, and higher self-efficacy. Kaarakainen et al., (2018) did a performance-based, ICT skills test among Finnish teachers and found that male teachers outperformed female teachers. Outperformance also occurred by education level.

Sex, number of years in teaching, and education level were found to be significant factors in an assessment of teachers' computer literacy in Turkey (Konan, 2010 Taqi, M. et al. 2021,Shah, S. Z. A. 2021, Sibt-e-Ali, M. et al 2021 and e Ali, M. S. et al. 2021). Manyilizu and Gilbert, Ismail and Manyilizu (2015) had a case study that assessed the use of ICT between male and female teachers in Tanzania. They found that a large number of male teachers used ICT tools and attended ICT courses more than females. In an analysis of teacher data from Norway, Scherer and Siddiq (2015) found that male teachers have higher self-efficacy in regards to basic and advanced operational skills, but there was no significant difference in using ICTs for instructional purposes. In contrast, Basargekar and Singhavi (2017) found that female

teachers in India had higher perceived proficiency in using ICT than male teachers. Recent studies show that this gap is becoming smaller. A literature review by Qazi et al. (2021) exposes that most of the research on ICT skills are gender-based and that their meta-analysis shows there is no significant gender difference in ICT use and skills and support. A study on higher education teachers by Guillén-Gámez et al., (2021) also found that overall there was no significant difference in the level of digital competence of higher education teaching staff in Spain. Age, technological environment, and accessibility to digital content were identified as important variables to be looked into.

Only "Search and collect textual and non-textual information from online and offline sources" had a significant difference in ICT competency based on education, in which those with a Masters degree scored better than those with a Doctorate and Bachelors only. The skill to search and collect textual and non-textual information is interesting because the proficiency to this skill was found to have a significant relationship to role and positively correlated higher education attainment, but had no relationship to other factors. This could be because this skill requires both high proficiency in internet use and data management. There are only a few studies that compare highest educational attainment and ICT competency, Konan (2012) shows that there is a significant difference in computer literacy between teachers with high education level and low educational level.

There is a significant difference among age groups in ICT competency for all the variables ($p=0.000$) except "Search and collect textual and non-textual information from online and offline sources" which did not have a significant difference. Those within 20-29 years old and 30-39 years old scored better than 40-49 years old and 50+ years old. This study finds that age is a significant factor in ICT competency. This is verified by multiple studies (Guillén-Gámez et al., 2021; Qazi et al., 2021; Basargekar and Singhavi, 2017). This gap could be because of difference in age at first computer use and perceived ICT competence and autonomy (Juhaňák et al., 2019), varying levels of acceptance and usage of ICT applications (Qazi et al., 2021, e Ali, M. S. et al. 2021,Khan, U. et al. 2021, Sibt-e-Ali, M. et al 2021), self-efficacy and confidence (Basargekar and Singhavi, 2017; (Albion, Jamieson-Proctor and Finger, 2011), among other factors. The BSLF for Sustainable Working Life (BSLF-SWL) (2020) assessed the ICT proficiency of older workers aged 55+ in countries in the Baltic Sea Region. There was a wide digital divide found that was linked to educational attainment, employment, and accessibility to technology. They also linked that ICT proficiency is linked to numeracy and literacy skills. Ageism related to technology was found to be a concern, which could be addressed by non-formal and informal learning options.

Those who had personal computers, laptops, iPad/tablets, and smartphones scored better than those who did not own those ICT devices. Past studies have already proven that early exposure to technology and time spent using ICTs and softwares are all positively correlated to ICT competency (Basargekar and Singhavi, 2017; Hatlevik and Hatlevik, 2018). There is a significant difference among internet speed in ICT competency for all the variables ($p=0.000$) including "Search and collect textual and non-textual information from online and offline sources" ($p=0.040$). Those with quick internet speed scored better than those with slow, moderate, and had no internet. There is a significant difference among hours spent using the internet per day in ICT competency for all the variables ($p=0.000$) except "Search and collect textual and non-textual information from online and offline sources" which did not have a significant difference. Participants that spent more than 7 hours and 5-6 hours on the internet per day had scored better than those that spent 3-4 hours, 1-2 hours, and had no internet. Mota and Cilento (2020) found however, that it is internet knowledge and internet attitudes that

predicted internet use. Their findings also indicate that content-related internet skills, internet knowledge, and internet attitudes are less device dependent. This is supported by this study as both those who had multiple devices and those who only had one device scored high proficiency in internet-related skills.

All variables under cognitive ability, skills and attitudes had a significant difference ($p=0.000$) and strong, positive correlation among each other when Spearman's correlation coefficient was used to analyse their relationship. This is true for all variables except "Search and collect textual and non-textual information from online and offline sources" which was shown to not have a significant difference. This shows that ICT learning is holistic; improving one area will help acquire knowledge and skills in the other areas. This holistic connection is also evident in the UNESCO ICT Competency Framework for Teachers (ICT CFT). Basargekar and Singhavi (2017) shows that teachers' training programs are important in building up teachers' capabilities and attitudes. These factors and areas of improvement must be taken into consideration when creating ICT training programs for school administrators and teachers in Antique.

CONCLUSIONS

In this new digital era, it is important to assess the ICT competency of school administrators and teachers to identify areas of improvement and to prepare schools to adapt to students' needs. This study found that both school administrators and teachers are competent in the use of ICTs. They were rated to have high proficiency in general computer knowledge and skills in using productivity tools, internet use, and data management. They also have high proficiency in applying technology in their schools and creating an ICT learning environment. However, the standard deviation shows that in some areas, the data is actually varied and are 2-level gaps in skill. These teachers who rated themselves as low/not proficient must not be overlooked despite the mean. This was evident in proficiency in using the internet and data management and ICT attitude.

There were no significant correlations between the proficiency of school administrators and teachers. This could be because they have similar technological environments. Instead, the factors found to have significant differences were: sex, age, owned devices, internet speed, and hours using the internet per day. All proficiency knowledge and skills were found to have strong, positive correlations with each other except for one. This means that training for ICT development is more holistic; strengthening one area will help develop the rest.

The recommendations of the study are the following:

- The ICT competency of participants should be assessed before training to identify problem areas and to adjust the curriculum to be more relevant. It is also recommended that the trainings be separated by age groups to avoid ageism, which could be a barrier to digital and ICT learning.
- Based on UNESCO's ICT Competency Framework and the findings of this study, training for Antique's school administrators and teachers should be geared towards improving skills in using productivity tools such as Microsoft Office, how to navigate through the internet and how to acquire and use information/tools they need, how to use web-based communication tools for long distance learning (e.g., Zoom, Google Meet, etc.), and how to apply ICT in the classroom. The latter includes how to set-up databases to record and analyse students' works/grades more efficiently, how to administer online quizzes and examinations, and how to use ICTs to communicate with students and parents. Developing school administrators' and

teachers' competency will lead to a more effective integration of ICT in schools and classrooms, which will empower students as well.

- Governments and schools must invest in creating a technological environment for teachers and students. Exposure to digital tools and frequent use of the internet for meaningful purposes helps increase ICT knowledge, confidence, and competency. There could be allotted times scheduled and ICT units reserved for teachers to ensure that they can freely and comfortably learn and work.

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