
Access, Skills and Constraints of Barangay Officials towards the Use of Information and Communications Technology (ICT)

Cereneo S, Santiago Jr.*; Ma, Leah P. Ulanday**, Zarah Jane R. Centeno***, Ma. Cristina D. Bayla****

ARTICLE INFO

Article history:

Received 17 September 2020

Revised 13 April 2021

Accepted 20 April 2021

Keywords:

Barangay Officials,
Local Government,
Office Productivity,
Community Empowerment,
ICT Competency

ABSTRACT

The study determined the access, skills and constraints towards the usage of ICT among barangay officials. A complete enumeration technique was used due to the small size of the population. A total of 121 barangay secretaries and barangay treasurers comprised the study respondents. The findings revealed that most of barangay officials have access to personal computer at home and in the office using their own mobile data and office internet connectivity. With the support from the Local Government Unit (LGU), it was found that most of the respondents are advance and proficient in computer usage. As constraints to ICT usage, the study respondents still experienced slow internet bandwidth that makes connection and communication weak along with the low income status. Consequently, it was found that there were no significant differences in terms of skills and constraints among barangay secretaries and barangay treasurers towards using ICT. It can be concluded that study respondents prefer to use office computer to access the information they need due to the convenience and availability of resources. The study respondents were competent enough to handle their job well but listed slow internet and low financial resources may hamper their ICT usage. Research implications were also offered.

1. Introduction

The use of Information and Communication Technology (ICT) has been recognized as the most powerful resource to an extensive and worldwide dissemination, sharing and transfer of information.

* Faculty, Department of Information Technology, Cavite State University (Silang Campus), Cavite Philippines (cssantiago@cvsu.edu.ph) (First Author) (Corresponding Author)

** Faculty, Teacher Education Department, Cavite State University (Silang Campus), Cavite Philippines (lpulanday@cvsu.edu.ph) (Co-Author)

*** Faculty, Department of Management, Cavite State University (Silang Campus), Cavite Philippines (zrcenteno@cvsu.edu.ph) (Co-Author)

**** Faculty, Department of Management, Cavite State University (Silang Campus), Cavite Philippines (mdbayla@cvsu.edu.ph) (Co-Author)

International Journal of Knowledge Content Development & Technology, 11(2): 37-54, 2021.
<http://dx.doi.org/10.5865/IJKCT.2021.11.2.037>

The usage and provision in both formal and non-formal ways mark its boom as the most integral and influential (Islam et al., 2017). The expanding sphere and influence of ICT in contemporary times cannot be simply undermined. Since the inception of internet technology in the 1960s, countless studies have been done to plot the development and the growing interface of ICT in our everyday lives. Computer technology has outgrown itself from the independent and stand-alone machines meant initially to compute and process data to repositories of electronic information that may be freely accessible to e-citizens anywhere in the world at any given time. A considerable number of studies have already been done to facilitate the connection between ICT and governance around the world. Most of these studies are firmly anchored on the belief that ICT is one of the most efficient, if not most effective, tools to good governance. ICT's role as a participative mechanism for development could not just be taken for granted. The assumptions bring one to a realization that ICT knits people closer together in the same way that it allows wider use of ICT for development. The Philippine ICT Development envisioned a society where citizen have access to technologies that will provide efficient government service, greater source of livelihood, and a better way of life through innovations. These calls the government leaders, and other government sectors particularly the information and communications technology (ICT) to came together to make solutions faced by the industry to cope with and succeed in the changing landscape of the digital economy (GISW, 2008). The convergence of media has been utilized to explore the economic, social, and political development. ICTs utilization can promote and bring an array of social and economic changes. This contributed toward the progress of humankind as a whole (Islam et al., 2017).

It is essential that communities are empowered with ICT skills that enable or strengthen the existing systems or knowledge. ICT skills that should be used to understand, interpret, and use the information to get the desired benefit. Barangay as the basic political unit in the Philippines is expected to perform efficiently including the utilization of ICT. The performance efficacy is measured in terms of quality and efficiency of submission of reports to higher authorities and in disseminating information to its locality. Two of the most relevant strategic vision towards ePhilippines is to provide government services to stakeholders online and develop an Information Technology (IT) enabled workforce. The same way is applied to elected officials in the government service. The skills acquired by barangay officials through attending seminars and trainings in ICT will give them the benefit in the application of ICT in everyday life. According to Martin, Cabo, and Nicolas (2009), the desire of the people to emerging technologies, to anything that is new and western as well as the flare to adopt and be adept at new technology, gave an edge in the use and mastery of ICT. Due to limited resources, the challenges in the Philippine ICT sector has been battled. There have been initiatives to support the government's digital transformation projects through a National Information and Communication Technology Summits. Lua (2018) mentioned that connectivity, ubiquity, trust, and interoperability are key to digital transformation and overcoming the bureaucratic and cultural barriers to change, digital transformation will be the best thing to happen in the country. Thus, the Department of Information and Communications Technology (DICT)'s National ICT Ecosystem Framework (NICTEF) launching in 2019 aims to address the absence of strategic roadmap for ICT formulation and direct responses to ICT challenges. The realization of NICTEF thrusts on participatory e-governance would manifest best practices through strengthening

and capacitating the ICT sector and applied all over the country. Despite huge government efforts on investment of infrastructure improvement, ICT challenges remains almost the same.

The potential of ICT to make barangay officials more effective and efficient in the service is when they embrace all forms of media including voice information system, and the use of personal computers fitted with a modem or supply technologies that facilitate communication, processing and transmission of information (Omotesho, 2012). It is vital that barangay officials utilize technologies in sending and receiving information to make their duties more productive in improving the delivery of services. Through the recognition and development of ICT infrastructure of the local government, the economic and social status of its citizens can be lifted. ICTs can give a new impetus to the social and government organizations to productive activity, which could become a major factor in the transformation stages (Islam et al., 2017) of barangay officials. It is therefore, the objectives of the study is to determine the access, skills and constraints of barangay officials towards the use of ICT and compare the difference between skills and constraints in ICT usage among barangay secretaries and barangay treasurers.

2. Literature Review

Barangay is a native Filipino word for a village or district which is the smallest administrative division in the Philippines. Governance at barangay level plays a crucial role in supporting the country's LGUs. This is related to the responsibility, justice, and openness of the leader in carrying out his duties and responsibilities as a servant within his society. Collectively, the barangays are national government collaborators to respond to development issues due to their strategic position at the grassroots level in providing effective and efficient service to the community. The cohesion in service delivery through the barangays represents the city or municipality's state of governance. Moreover, barangay, as the basic political entity, acts as the primary planning and execution entity of government initiatives, public facilities, projects, and events, and as a forum where the collective opinions of the community's citizens can be crystallized and considered (Boysillo, 2017). The Philippine government acknowledges the importance of information and communication technologies (ICTs) in people's lives. In this era of 21st century, Philippines includes ICT integration, either in the national policies or in the laws pertaining to the LGU of the society. The DICT is the executive department of the Philippine government responsible for the planning, development and promotion of the country's ICT agenda in support to the national development. Thus, ICT is a combination of devices and technology resources that has been used in all sectors of economy. It is very useful for people to solve certain problems in data processing and distribution of communication in every community. According to Maria (2000) as cited by Prajanti (2013), ICT is a technology employed in the processing of data. The delivery of information is also beneficial. ICT is all manner of technology A tool to build, distribute, save, add value and manage the cycle of information. As cited by Omotesho, Ogunlade, & Muhammad (2012), it is fundamental to understand the usage and functionalities of computer and related equipment through education as it plays a significant role in creating awareness. Furthermore, Jarboe (2001); Czerniwick and Brown (2005), emphasize the economic importance of ICT by stating that access to IT is vital to governance and economic

development. Moreover, Prajanti (2013) claims through the use of ICT models where they could tend to solve information and communications problem such as communications barriers between stakeholders in the community. In addition, changes in ICT has remained constant to the way people do business and in their lives in general (Shaqiri, 2015). With ecommerce, eGovernment reflects a big wave of technical innovation and government reinvention. It is a huge opportunity to move forward in the 21st century with higher quality, cost effective government services and a closer partnership between people and government (Fang, 2002). To transform the local government sector into an information-driven, modern, and competitive sector, the role of ICT cannot be overruled. They need to provide faster and newer ways of delivering and accessing information. However, there are some barriers to the integration of ICT. According to Kinyanjui (2019), certain obstacles found to the incorporation of educational technology into higher education included weak technology infrastructure, lack of appropriate institutional policies on ICT usage and low technical skills, high costs of ICT usage, technology, and poor leadership decisions. In addition, Shahani (2015) stated that according to the latest "State of the Internet" survey from Akamai, a cloud data network specialized in real-time tracking of internet traffic, the Philippines has the third slowest average connection speed in the region—2.8 Megabits per second (Mbps) for the first quarter of 2015 - much slower than the global average connection speed of 5 Mbps. Furthermore, the Philippines came in fourth place for slowest peak connection capacity, with 20.3 megabits per second (Mbps), well below the global average of 29.1 megabits per second. Moreover, Despite the fact that access to ICTs has been slowly increasing - due in particular to low-cost smartphones - Internet speeds in the Philippines are among the lowest in the world, and rates for those services remain high.

ICT Access in ASEAN has lower expansion on fixed telephone lines relative to internet subscriptions. In the Philippines, mobile cellular phones are much more advanced than fixed telephones and the internet. In 2014, the subscriptions per 100 persons is 111.12 which is assumed that every Filipino owns more than one cellular phone as compared to the telephone line subscriptions of 3.09 per 100 persons and an internet user of 39.7 per 100 persons. In terms of broadband connection, services in the Philippines remained poor with an average download speed of 2.9 megabits per second (mbps) in 2015 noted being second slowest average download speed in Asia at 3.64 mbps (House of Representatives, 2016). Progressively, the Internet Report of Akamai State for the 2nd Quarter of 2016 for the Philippines is at 6th with an average mobile internet speed of 8.5 Mbps and a peak connection speed reached a high 105.1 Mbps. Bandalaria (2007) found that significant improvements must be made in the telephone infrastructure of the Philippines before those computers can be said to be 'connected'. Suggested further that the decline of telephone infrastructure could likely be attributed to the introduction of more affordable, accessible, practical cellular mobile telephones. Thus, there has been a marked increase in the number of registered Internet Service Providers (ISP) in the Philippines. In May 2019, in order to ensure greater access to cost-effective ICT infrastructure, DICT issued rules on the accelerated roll-out of common towers in the Philippines. These rules would pave the way for the construction or conversion of at least 2,500 specific towers in specified DICT owned property, as well as in other government agencies' property and hard-to-access areas found by Telcos. On the following year, to improve the services of internet service providers, DICT releases guidelines for the common tower policy on June 2020. Driven by the DICT, a

quicker installation of telecommunications towers is promising as LGUs express their interest in the permit standards and procedures for cell tower construction. According to recent news, telecommunications giant Philippine Long Distance Telephone (PLDT) company and its wireless unit Smart Communications are expected to initially deploy approximately 200 cell sites under its agreements with several independent tower companies, a step to support the Common Tower Initiative of the Duterte administration and its mission to boost connectivity in the country. In addition to enabling a large number of locations where telephone calls and internet connections are possible, DITO Tele community recently reported securing specific tower agreements with Independent Tower companies, and setting up 1,300 towers at various completion stages. The use of ICT to reorganize internal administration transactions, communications, inter-relationships and promote the flow and transfer of information provides a significant opportunity to improve government capability. Intranets allow various departments to share shared customer resources and pool the expertise and strengths of their employees to solve problems. These facilities, in turn, would allow easier flow and transfer of information, faster and cheaper delivery of goods and services, quicker and better decision-making processes, and unplugged paper bottlenecks. In Addition, developing basic infrastructure to reap the benefits of emerging technology and communications resources is key to implementation of e Government. However, ICT literacy are also important for citizens to be able to use eGovernment applications and to benefit from them. Education, freedom and the desire to have access to information are critical to the effectiveness of eGovernment. Moreover, the effectiveness of ICT initiatives depends to a large extent on human skills and capabilities. Accordingly, programs for education and training must be seen as priority actions. Training of staff is required to manage new procedures and activities, investment in human development is very important (Ndou, 2004).

3. Methodology

The study area was Silang, Cavite, Philippines. Complete enumeration technique was employed to the entire population of one hundred twenty-eight (128) barangay officials, comprising sixty-four barangay secretaries and sixty-four barangay treasurers. According to Crossman (2018), total enumeration was done when the target group is small and set apart by unusual and well-defined characteristics. Hence, all one hundred twenty eight (128) barangay secretaries and barangay treasurers constituted the study respondents. To gather the data, the researcher asked permission from the local Research Ethics Board of the University and the LGU. The questionnaire was distributed to 64 barangays for a period of one month. Data were collected, tabulated and employed the identified statistical tools. For data analysis and interpretation of results, simple descriptive statistics involving the use of frequencies and percentages were used to present the demographic profile and access to ICT of the study respondents. Weighted Mean was used to present the skills and constraints while z test was employed to examine the differences in skills and constraints between barangay secretaries and treasurers towards ICT usage.

The study questionnaire was adapted from the study of Omotesho, Ogunlade, and Muhammad

(2012). It underwent expert validation to suit the research questions with the research respondents and research locale. The specific parts of the questions adapted from the study were the access to ICT and constraints to ICT usage. The demographic and skills questions were made by the researchers. A four-point Likert type scale was used to evenly split the study respondents' answers into simple dichotomies. The goal was to report one number simply or directly without considering neutrality or middle responses. The following scale for the skills and constraints faced by the barangay secretaries and barangay treasurers were used: 3.51-4.00: Proficient; 2.51-3.50: Advance; 1.51-2.50: Intermediate; 1.0-1.50: Beginner, and 3.51-4.00: Strongly Agree; 2.51-3.50: Agree; 1.51-2.50: Disagree; 1.0-1.50: Strongly Disagree, respectively.

To calculate the reliability of the research tools, the researchers piloted the questionnaire to thirty (30) barangay officials who were not subjected to the final data gathering of the study. A reliability test was employed to determine the Cronbach alpha. The reliability factor of 0.76 was considered.

The study defined Barangay Officials as appointed Barangay Secretaries and Barangay Treasures in a particular barangay of Silang, Cavite, Philippines. The appointment of barangay officials took place on October 2018.

4. Results and Discussions

4.1 Demographic Profile of Barangay Officials

A total of one hundred twenty-eight were included in this study. Out of 128 study respondents, 121 questionnaires were retrieved. Among the 121 answered, 61 (50.4%) are barangay secretaries and 60 (49.6%) are barangay treasures. Gender distributed with 81 (67%) are female while 40 (33%) are male. For the male study respondents, 10% are (18-25 years old), 18% are (26-35 years old), 38% are (36-50 years old) and 35% are (50 years old and above). For the female study respondents, 3% are (18-25 years old), 13% are (26-35 years old), 43% are (36-50 years old) and 40% are (50 years old and above). Majority of the barangay officials were in service as follows: 45% males were appointed within the year; 55% of males were in service for over a year. 39% of females were appointed within the year; 61% of females were in service for over a year. Majority of the barangay officials are college graduate 43 (36%), while 78 (64%) are college undergraduate, high school graduate, vocational and high school undergraduates.

Table 1. Demographic Profile of Barangay Officials

Total Respondents	Bgy. Secretaries	Bgy. Treasures
N=121	61(50.4%)	60(49.6%)
Sex	Male 81(67%)	Female 40(33%)
Age	18-25 years old	26-35 years old

	10%	18%
	36-50 years old	50 and above
	43%	40%
Appointment	Within the Year	Within the Year
	45%(male)	39%(female)
	Over a year	Over a year
	55%(male)	61%(female)
Education	College Graduate	High School-College Undergraduate
	43(36%)	78%(64%)

4.2 Access to Information and Communications Technology of Barangay Officials

Most of the barangay officials access their official PC with internet connection to do their tasks. It is notable however, that most of the offices have no internet connection. The findings suggest that apart from their access to the official PC, a few have access over their personal computer at home. This can be attributed to the fact that government hardly acquires ICT resources especially for the barangay level. It is also apparent that most barangay officials have access using their own broadband or Wi-Fi at home, along with mobile data and pocket Wi-Fi. It can be noted further that most barangay offices have no internet subscription. It could be evident that internet represents a technological innovation, whose effects range from communication to interaction (Shaqiri, 2015) where most of the barangay officials are able to do so. In addition, the barangay officials have high range of literacy in using and accessing the official PC and being skilled of using it especially with their respective tasks. It seems that the LGU of Silang supports the ICT program as response to the call of the Philippine ICT Development Plan by DCIT aiming to equip barangay officials with the necessary skills needed in their service. This can be in a form of capability training provided by the LGU, Universities in the area and other GA and NGO. For this reason, the barangay officials are able to submit their report to the higher authorities of the LGU. Through the call further, the LGU of Silang is taking their responsibility in supporting most barangays to have their officials PC connected to the internet to access and share and or submit files between and among the barangay officials. Santos (2016), claimed that internet access is considered as value-added service (VAS) in the country. This could somehow resulted to a collective effort of the different organizations in promoting and helping the LGU's to make initiatives in order to achieve the streamlining plan of ICT locally. ITU (2016) found that access to the internet is not enough, it suggest that policy makers must address broader socio-economic inequalities and help people acquire the skills to take full advantage of it. Further, this will support to the 2030 Agenda for Sustainable Development highlighting the development challenges. The provision of internet service is anchored on the telecommunications networks owned and controlled by private telecom operators. The R.A. 10929 known as the free internet access in public places act. Its program covers public places such as national and local government offices, public basic education institutions, State Universities and Colleges

and Technical Education and Skills Development Authority (TESDA) technology institutions; public hospitals, health centers, and rural health units; public parks, plazas, libraries, and barangay reading centers; public airports, and seaports; and public transport terminals. The DICT’s implementation of R.A. 10929 in greater areas will give full realization of the Philippines vision in streamlining government services and transactions.

Table 2. Access to ICT of Barangay Officials

		Bgy. Secretaries		Bgy. Treasures	
		Frequency	Percent	Frequency	Percent
Access to Personal Computer at Home	Barangay officials with access to personal computer at home	14	23%	18	30%
	Barangay officials without access to personal computer at home	47	77%	42	70%
Access to Personal Computer in the Office	Barangay officials with access to personal computer at home	52	85%	48	80%
	Barangay officials without access to personal computer at home	9	15%	12	20%
Internet Connectivity of Offices’ Personal Computer	Barangay officials with internet connectivity in the office	28	46%	39	65%
	Barangay officials without internet connectivity in the office	33	54%	21	35%
Mode of internet Access	Mobile Data	15	25%	12	20%
	Pocket WIFI	13	21%	15	25%
	Broadband WIFI at Home	17	28%	18	30%
	Wired Internet Connectivity	12	20%	12	20%
	Public WIFI	4	6%	3	5%

*N=121, P=F/N*100

4.3 Skills of Barangay Officials towards Information and Communication Technology (ICT) Usage

As gleaned in **Table 3**, the barangay secretaries and barangay treasurer’s skills towards ICT obtained a composite mean score of 3.66 (barangay secretaries) and 3.74 (barangay treasures) with an overall mean score of 3.70 to denote proficient, respectively. For barangay secretaries in particular, the highest value of mean score is evident by a skill that is turning on and turning off computers

with a mean score of 3.96 to denote proficient. For barangay treasurers in particular, the highest value of mean score were evident by a skill that is identifying and using basic functions with a mean score of 3.95 to denote proficient. The combined highest mean score obtained is a skill that is to identify and navigate to the environments of computer and use of computer functions needed in the performance of tasks with a mean score of 3.89 to denote proficient, respectively. This implied that barangay officials particularly secretaries and treasures were able to apply the skills learned in the context of basic computer training, hence, will promote a concrete economic well-being and quality of life. Garrido, Sullivan, and Gordon (2010) mentioned that the role of ICT skills delivers in improving employment for low-income groups. The significant investment to human capital will be an asset and a commitment to lifelong learning (NICTEF 2019), so to address the programs and projects of the government for the benefit of economic and social systems of the country. Further, ITU (2016) found that there was a strong association between economic and ICT development. Access to computers with internet connection coupled with the skills required in the performance of duties changed the way ICT facilities and deliver results to individuals, government, organizations and other sector.

Table 3. Skills of Barangay Officials toward Information and Communications Technology (ICT)

Indicators	Bgy. Secretaries		Bgy. Treasures		Combined	
	Mean	Description	Mean	Description	Mean	Description
Able to turn on and turn off computers	3.96	Proficient	3.88	Proficient	3.88	Proficient
Able to identify and navigate to the environments of computer	3.87	Proficient	3.92	Proficient	3.89	Proficient
Able to use identify and use basic functions	3.68	Proficient	3.95	Proficient	3.81	Proficient
Able to identify and use computer functions needed in the performance of tasks	3.88	Proficient	3.90	Proficient	3.89	Proficient
Able to demonstrate the functions to colleagues	3.77	Proficient	3.76	Proficient	3.76	Proficient
Able to access the internet using available resources	3.86	Proficient	3.88	Proficient	3.87	Proficient
Able to access, compose and submit email communications	3.80	Proficient	3.82	Proficient	3.81	Proficient
Able to present output using computer when needed	3.77	Proficient	3.89	Proficient	3.83	Proficient

Able to identify computer errors or issues that hinders the performance of tasks	3.17	Advance	3.26	Advance	3.21	Advance
Able to fix from simple to complex computer issues	3.14	Advance	3.12	Advance	3.13	Advance
Composite Mean	3.66	Proficient	3.74	Proficient	3.70	Proficient

3.51-4.00: Proficient; 2.51-3.50: Advance; 1.51-2.50: Intermediate; 1.0-1.50: Beginner

4.4 Constraints of Barangay Officials towards Information and Communication Technology (ICT) Usage

As seen in **Table 4**, the barangay secretaries and barangay treasurer’s constraints towards information and communications technology obtained a composite mean score of 2.27 (barangay secretaries) and 2.21 (barangay treasures) with an overall mean score of 2.24 to denote disagree, respectively. In particular, the highest value of mean score is a constraint that is low economic status with a mean score of 2.87 (barangay secretaries), 3.16 (barangay treasurers) with a combined mean score of 3.01 denote agree, respectively. It means that providing ICT is costly to in procurement of equipment and installation of connectivity of internet provider. Stam et al. (2012), claim that economic constraints affect ICT activities and practices to obtain good performances by the barangay officials. As mentioned by N. Roztock, Soja, and Weistroffer (2019) productive activities will improve the economic position of a region hence, providing the fundamental facilities and equipment of barangay secretaries and treasurers will build positive effects to economic status. The improvement of internet bandwidth makes the communications among barangay officials effective and translate their outputs to positive outcome in the community. Seki (2008) mentioned that ICT sector’s importance is vital, it is the fastest way of using and communicating knowledge where ICT productivity could be transformed into economic competitiveness. The increasing contribution of ICT to economic productivity is a key factor in the economic and social developments due to its positive effects on economic growth, productivity, and employment (Toader et al., 2018). Awhareno and Nnadi (2017) mentioned that constraints are more serious especially in in rural areas just like the place of the study. The internet connection is weak that hinders a good communication among barangay officials. The economic status, poor technical capability and the fear in using ICT facility are realized also as constraints.

Table 4. Constraints of Barangay Officials towards Information and Communications Technology Usage

Indicators	Bgy. Secretaries		Bgy. Treasures		Combined	
	Mean	Description	Mean	Description	Mean	Description
The cost of ICT is high	2.16	Disagree	2.38	Disagree	2.38	Disagree

There is no enough supply of electricity	1.49	Strongly Disagree	1.47	Strongly Disagree	1.48	Strongly Disagree
The internet bandwidth is low that makes connection and communications weak	2.80	Agree	2.95	Agree	2.87	Agree
The computer shops and ICT facility are too far from the residence	1.57	Disagree	1.76	Disagree	1.66	Disagree
The economic status is low to afford ICT	2.87	Agree	3.16	Agree	3.01	Agree
The educational level is low to use ICT	2.36	Disagree	2.27	Disagree	2.31	Disagree
The technical capability in using ICT is poor	2.77	Agree	2.22	Disagree	2.49	Disagree
The capability trainings on ICT is poor	1.49	Strongly Disagree	1.29	Strongly Disagree	1.39	Disagree
Accessing the internet is costly	2.47	Disagree	2.37	Disagree	2.42	Disagree
There is fear in using ICT facility	2.64	Agree	2.24	Disagree	2.44	Disagree
Composite Mean	2.27	Disagree	2.21	Disagree	2.24	Disagree

3.51-4.00: Strongly Agree; 2.51-3.50: Agree; 1.51-2.50: Disagree; 1.0-1.50: Strongly Disagree

4.5 Difference in terms of Skills between Barangay Secretaries and Barangay Treasurers towards Information and Communication Technology (ICT) Usage

Table 5 showed the differences between the skills of barangay secretaries and barangay treasurers. The skills z was -1.61, the df was 61, the p-value was 0.10 and the decision was failed to reject the null hypothesis. It was mentioned that the barangay officials in Silang have high range of literacy in using and accessing the official PC and being skilled of using it especially with their respective tasks. Moreover the skills acquired by barangay officials through attending seminars and trainings in ICT have given them an advantage in the usage of ICT in everyday life. It implies that barangay secretaries and barangay treasurers possessed the same level of skills. Both groups are capacitated with the ICT competencies in performing basic computer operation in their tasks. Their skill set could be a product of capability trainings and that their combined knowledge and abilities are also developed throughout the years. These in turn contributes to the development of the communities they serve. This could be in a form of socio-economic changes brought by

the officials' empowerment in ICT usage. The effective delivery of service to the community like engaging on the on-line communication, producing on-line content and institutional access of the citizens to participate in political information and decision process.

Kozma & Vota (2014) states that many countries in developing world are making significant investments in educational ICT. The Philippine Development Plan 2017-2022 reiterates that it will continue to enhance and sustain government performance in the delivery of quality services by upgrading its management system to be more citizens oriented. Medina, Separa, Generales, and Delos Reyes (2017) asserts that based in Republic Act No. 7160, majority of the duties and responsibilities of barangay secretaries and treasurers in the Philippines requires the usage of different computer applications.

Table 5. Differences between the Skills of Barangay Secretaries and the Skills of Barangay Treasurers

Indicators	Z	DF	p-value	Decision
Skills	-1.61	61	0.10	Accept Ho.

4.6 Difference in terms of Constraints between Bgy Secretaries and Treasurers towards Information and Communication Technology (ICT) Usage

Table 6 showed the differences between the skills of barangay secretaries and barangay treasurers. The skills z was 1.45, the df was 61, the p-value was 0.14 and the decision was failed to reject the null hypothesis. It is highlighted that most offices have no internet connection. This results to use their own data in the office or at home. Constraints experienced by barangay secretaries and treasures such as inadequacy of ICT resources, limitations on bandwidth connectivity, internet cost and other technical capabilities may be apparent however this does not become an obstacle to performing the job efficiently. These problems are a broad and long standing issue for the government that requires immediate resolution by those concerned. Addressing the problems will unlock the immense potential to improve the quality of life and position individuals to a better and life long careers. The social connectivity through internet enhanced communications, interactions and information access with people who share similar interest.

The Philippine Digital (2015) claims the government has still some deficiency in terms of an integrated ICT infrastructure that will permit an optimal inter-agency cooperation, support for all civil servants direct to reinforce social practices and efficient public service delivery. In addition, the government's agenda of increasing transparency and trust also embolden more provision of government data, specifically on procurement, budget allocation and disbursements. The Office of the Ombudsman (2013) contends that many government agencies and LGUs maintain a website. However, generation gap and issue of access to computer due to poor bandwidth are considered as limiting factors in ICT.

Table 6. Differences between the Constraints of Bgy Secretaries and the Skills of Bgy. Treasurers

Indicators	Z	DF	p-value	Decision
Constraints	1.45	61	0.14	Accept Ho.

6. Conclusion

Barangay officials access computers at home and in the office using their personal internet connection, office internet connectivity and uses different mode of internet access. The basic skills of barangay officials are remarkable due to the collective effort of the community and the LGU in capacitating local officials with the skills towards ICT. Through this, the barangay officials are able to demonstrate ICT skills needed in their functions like composing emails, submitting reports and presenting outputs to the higher office. Further, their competence towards using ICT abled them to perform their job regardless of unstable internet connectivity that is available. The slow network performance affects the barangay officials' usage in ICT. The individual's economic standing and the fear in ICT usage for barangay secretaries was recorded as constraints. While, there were no significant differences on the skills and constraints of the study respondents. The results revealed the same for both group of study respondents.

In order to maintain the interests of barangay officials in ICT usage, the LGU may create a program that could improve further the skills and cope with the demands in ICT usage. These could be attained through collaboration with SUCs and other NGO, or GAs. Likewise, the LGU should make adequate provisions in improving ICT facilities, such as internet connectivity and ICT resources that could be readily available for the barangay officials. Furthermore, the price affordability of availing internet connections should be considered for economic competitiveness.

The telecommunication landscape of the Philippines has few major players catering to the increasing demand of different customers like government agencies. Hence, few competitions would mean consumers have very limited options for the services that they want. The issue of access to computer due to poor bandwidth, and economic status were considered as limiting factor and major constraints to afford ICT between barangay treasurers and secretaries. They are the underserved markets who have unmet needs. The roles and responsibilities they hold are essential to community.

The national government as part of its 10- point agenda has opened the said market in order to promote competition and improve service quality. The Philippine Competition Act, RA10667 is a policy of the Philippines that promote and protect competitive market. The market attractiveness of Telco industry is high. However, strict guidelines and strengthening of existing laws must be imposed in order to set stipulations that will cater to the needs of underserved market or the clientele who needed them the most. This can be a ground breaking opportunity to help improve the quality of life and offer affordable services.

In doing future research, a study may focus on the respondent's soft skills and professionalism for since they are at the forefront of the local service. Other attributes like social responsibility

and good governance, integrity and honor may be explored. Likewise, an impact assessment on ICT usage capturing the economic and social outcomes brought about by the nature of their jobs.

Acknowledgement

The researchers are indebted to the study respondents and students of CvSU-SC for the help in the distribution and collection of questionnaires in 64 barangays and to all the barangay officials who participated in the study.



References

- Awhareno, U. S., & Nnadi, F. N. (2017). Constraints to Information and Communication Technology Utilization by Village Extension Agents in South-South Nigeria. *Nigerian Journal of Rural Sociology*, 17(1), 14-18. DOI: 10.22004/ag.econ.285286
- Bandalaria, M. (2007). Impact of ICTs on Open and Distance Learning in a Developing Country Setting: The Philippine experience. *International Review of Research in Open and Distance Learning*, 8(1). <https://doi.org/10.19173/irrodl.v8i1.334>.
- Boysillo, S. L. (2017). Governance of the Barangay Chairpersons in the Municipality of Ubay Bohol. *International Journal of Business and Management Studies*, 9(1), 1309-8047. <https://dergipark.org.tr/tr/download/article-file/440187>
- Congressional Policy and Budget Research Department, House of Representatives (2016), *Facts and Figures*. (11). https://cpbrd.congress.gov.ph/images/PDF%20Attachments/Facts%20in%20Figures/FF2016-11_ICT.pdf
- Crossman, A. (2018). *Understanding purposive Sampling*. <https://www.thoughtco.com/purposive-sampling-3026727>
- Czerniewicz, L., & Brown, C. (2005). Access to ICT for Teaching and Learning: From single Artefact to interrelated Resources. *International Journal of Education and Development using Information and Communication Technology (IJEDICT)*, 1(2), 42-56. <https://files.eric.ed.gov/fulltext/EJ1057837.pdf>
- Department of Information and Communications Technology (DICT). (2017). *State of the Internet Report*. <https://dict.gov.ph/ictstatistics/state-of-the-internet-repor/#:~:text=17%20October%202017%20%E2%80%94%20The%20Akamai,105.1%20Mbps%20for%20the%20Philippines>.
- Department of Information and Communications Technology. (2019). *DICT Issues Rules on Common Tower Sharing*. <https://dict.gov.ph/dict-issues-rules-on-common-tower-sharing-2019/>
- Department of Information and Communications Technology. (2020). *DICT Releases Guidelines for the Common Tower Policy*. <https://dict.gov.ph/dict-releases-guidelines-for-the-common-tower-policy/>
- Fang, Z. (2002). E-Government in Digital Era : Concept, Practice, and Development. *International Journal of the Computer*, 10(2), 1-22. http://www.ijcim.th.org/past_editions/2002V10N2/article1.pdf
- Garrido, M., Sullivan, J., & Gordon, A. (2010). Understanding the Links Between ICT Skills Training and Employability: An Analytical Framework. *ACM International Conference Proceeding Series*, DOI : 10.1145/2369220.2369234
- Global Information Society Watch (2008). https://www.apc.org/sites/default/files/GISW2008_EN.pdf
- Gregorio, J. (2015, February 18). Digital Marketing in the Philippines - 2015 Edition. <https://www.linkedin.com/pulse/digital-marketing-philippines-2015-edition-jomer-gregorio/?fbclid=IwAR0JWOY32eKgpqI2ou43rPpEu2jgRXcIHqkRLTjEihh-krzAXkVE4MgCAI>
-

- International Telecommunication Union. (2016). *Measuring the Information Society Report*.
<https://www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2016/MISR2016-w4.pdf>
- Jarboe, K. (2001). Inclusion in the Information Age: Reframing the Debate. Athena Alliance.
<http://www.athenaalliance.org/apapers/inclusion.html>.
- Islam, M. S., Haque, M. E., Afrad, M. S. I., Abdullah, H. M., & Hoque, M. Z. (2017). Utilization of ICTs in Agricultural Extension Services of Bangladesh. *Asian Journal of Agricultural Extension, Economics & Sociology*, 16(1), 1-11. DOI:10.9734/AJAEES/2017/31207
- Kinyanjui, D. N. (2019). Assessing the Need for and Constraints to Information and Communication Technology (ICT) Integration in the Teaching and Learning of Tourism at Higher Education Institutions in Kenya. *Journal of Education, Society and Behavioural Science*, 31(2), 1-11.
<https://doi.org/10.9734/jesbs/2019/v31i230143>
- Kozma, R. & Vota, W.S. (2014). ICT in Developing Countries: Policies, Implementation, and Impact. *United Nations Educational, Scientific and Cultural Organization (UNESCO)*.
DOI:10.1007/978-1-4614-3185-5_72
- Lua, K. C. (2018, June 26). Digital Transformation for Filipinos: Thinking Beyond Politics. *Business World*. <https://www.bworldonline.com/digital-transformation-for-filipinos/>
- Martin, E., Cabo, W., & Nicolas, J. (2009). Electronic Connection to Access and Network Information and Knowledge for Governance Effectiveness and Sustainability. *UNDP Philippines*.
<https://www.ombudsman.gov.ph/UNDP4/report-on-the-rapid-assessment-of-ict-utilization-for-participation-in-the-philippines/index.html>
- Medina, R., Separa L., Generales L., & Delos Reyes, S. (2017). Moving Towards Technology-Based LGUs: A Review of Computer Literacy of Mariveles Barangays. *International Journal of Sciences: Basic and Applied Research*, 33(1), 218-226.
<https://gssrr.org/index.php/JournalOfBasicAndApplied/article/view/5760>
- National ICT Ecosystem Framework. (2019).
<https://dict.gov.ph/national-ict-ecosystem-framework-to-streamline-dict-agenda-serve-as-strategic-compass/>
- Ndou, V. (2004). E – Government for Developing Countries: Opportunities and Challenges. *The Electronic Journal on Information Systems in Developing Countries*, 18(1), 1-24.
<https://onlinelibrary.wiley.com/doi/pdf/10.1002/j.1681-4835.2004.tb00117.x>
- Omotesho, K. F., Ogunlade, I. O., & Muhammad, L. (2012). Assessment of Access to Information and Communication Technology among Agricultural Extension Officers in Kwara State, Nigeria, *Asian Journal Agriculture and Rural Development*, 2(2), 220-225.
<https://ageconsearch.umn.edu/record/197963?ln=en>
- Prajanti, S. D. W., Djuniadi., & Soesilowati, E. (2013). Evaluation on Benefits and Development of Information and Communication Technology (ICT) to Improve the Performance of Agricultural Extension in Central Java. *The International Journal of Organizational Innovation*, 6(2), 243-253.
https://search.proquest.com/openview/5678ea61d98075d00167a553e1fb7983/1.pdf?pq-origsite=scholar&cbl=55118&fbclid=IwAR0t03av4WU1zTjimHO4AybWOkYZV6gzv9JH_E4e70BRO6zuqT3IAjn-Hdw
-

- Roztock, N., Soja, P., & Weistroffer, H. R. (2019). The Role of Information and Communication Technologies in socioeconomic Development : towards a Multi-dimensional Framework. *Information Technology for Development*, 25(2), 171-183.
DOI:10.1080/02681102.2019.1596654
- Report on the Rapid Assessment of ICT Utilization for Participation in the Philippines. (n.d).
<http://www.ombudsman.gov.ph/UNDP4/wp-content/uploads/2013/02/ICT-Utilization-Study.pdf>
- Republic Act No. 10929. (2017).
<https://www.officialgazette.gov.ph/2017/08/02/republic-act-no-10929/>
- Santos, M. G. M. (2016). Philippine Broadband: *A Policy Brief*.
<http://www.investphilippines.info/arangkada/wp-content/uploads/2016/02/ONLINE-BROAD-BAND-POLICY-BRIEF1.pdf>
- Shahani, L. R. (2015, August 23). Why is our Internet so slow? *The Philippine Star*.
<https://www.philstar.com/opinion/2015/08/23/1491398/why-our-internet-so-slow?fbclid=IwAR2OV15DZK0e7Cw88mKGYVvOZB1FAwapx3-cK9zApCABeMqeC19Ifk2Kxb4>
- Shaqiri, A. B. (2015). Impact of Information Technology and Internet in Businesses. *Academic Administration, Law and Social Sciences*. 1(1), 73-79.
https://www.researchgate.net/publication/287205733_Impact_of_Information_Technology_and_Internet_in_Businesses
- Seki, Y. (2008). The Importance of ICT for the Knowledge Economy: A Total Factor Productivity Analysis for Selected OECD Countries, Papers of the Annual IUE-SUNY Cortland Conference in Economics, in: Oguz Esen & Ayla Ogus (Ed.), *Proceedings of the Conference on Emerging Economic Issues in a Globalizing World*, (pp. 72-90), Izmir University of Economics.
<https://ideas.repec.org/h/izm/prcdng/200804.html>
- The University of Maryland. (2014). *Digital Inclusion Survey Report*.
<http://digitalinclusion.umd.edu/content/2014-survey-results-and-reports>
- Toader, E., Firtescu, B. N., Roman, A., & Anton, S. G. (2018). Impact of Information and Communication Technology Infrastructure on Economic Growth: An Empirical Assessment for the EU Countries. *Sustainability*, 10(10), 3750. <https://doi.org/10.3390/su10103750>
- Van Stam, G., Johnson, D. L., Pejovic, V., Mudenda, C., Sinzala, A., & Van Greunen, D. (2012). Constraints for Information and Communications Technologies Implementation in rural Zambia. In: Jonas, K., Rai, I. A., Tehuente, M. (eds.) *Fourth International IEEE EAI Conference on eInfrastructure and eServices for Developing Countries (Africomm 2012)*, Yaounde, Cameroon. Springer. DOI: 10.1145/2369220.2369234
-

[About the authors]

Cereño Sailog Santiago Jr finished his college degree of Bachelor of Science in Computer Science. He took his Teacher's Certificate Program in 2013 and Masters in Education in 2018. He is currently taking a Masters degree in Information Technology. His research works include, Android-Based Technologies, Computing, Technology in Education, Statistics and Analytics, Data Mining, and Learning Management System. He is currently a faculty member of Cavite State University – Silang, Campus, Cavite Philippines.

Ma. Leah Pacleb Ulanday finished her college degree in Nursing and took Teacher's Certificate Program and Master's degree in Education. Her research work include developmental research in Education, Gender- Based, Social science and/or Humanities Research. A faculty member of Cavite State University, Coordinator of National Service Training Program and one of the Gender and Development Focal Person of the University. A co- author of an extension program implemented by CvSuSilang Campus, a proud member of Philippine Society of NSTP Educators and Implementers, INC., Faculty researcher and extensionist, GAD Advocate, a graduate nurse and a licensed professional teacher.

Zarah Jane Rabina Centeno is a an instructor of Cavite State University - Silang Campus at the Department of Management. She received her Masters in Business Administration at De La Salle University, Dasmarias City, Cavite. Her research interests include Entrepreneurship, Human Resource Management, Risk Management, Operations Management, Marketing and Financial Management.

Ma. Cristina D. Bayla is an instructor and a research coordinator in the Department of Management at Cavite State University Silang Campus. She received her degree of Master of Management in Business Management in University of the Philippines-Los Banos. Her research interests include Product and Service Development, New Product Proliferation, Consumer Behavior, Entrepreneurship Social Marketing, and Agripreneurship. At present, she is working on a research project with her colleagues. Her long term goal is to make an innovative product that would be accessible to the underserved markets so as to attain inclusive growth.
