

Investigating the Digital Divide in a Rural Community in the Philippines

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ABSTRACT

Digital divide is a global social issue that deals with the inequality of availability, access, and utilization of Information and Communications Technology (ICT). This study investigated the incidence of the digital divide and its factors among the residents in a rural community in the Philippines. A survey based on the concepts of measurement of Digital Divide on a micro level was conducted to identify factors based on ICT Development Index (IDI), Digital Access Index (DAI), and Digital Opportunity Index (DOI). It was found that majority of the respondents were “non-users” of ICT due to lack of knowledge, access, and comfort in doing so. Therefore, a digital divide exists and the factors that cause the gap are age, employment status, educational attainment, and household income.

Keywords: *digital divide, internet access, rural area, information and communications technology*

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INTRODUCTION

Information and Communications Technology (ICT) is a means of extending the access to a wide variety of opportunities for community development (Kaino, 2013). However, digital divide, as defined by the uneven distribution, access, and utilization of ICT, has significant implications for developing countries, like in the Philippines, and it can cause segments or groups who have no or limited accessibility to these technologies to be denied of educational and socioeconomic opportunities (Gatautis, 2015). Long-term economic growth has often been associated with technological progress. Previous studies confirmed the positive relationship between ICT and economic growth (Jung et al., 2013; Sassi & Goaided, 2013; Vu, 2013). It has also been shown that ICTs play a central role in driving productivity (Cardona et al., 2013). This means that ICTs have the potential of alleviating poverty in developing countries. Research evidence indicates that the availability of ICTs has a contribution to education, governance, and transparency, income, and employment, institutional capability, health, culture as well as gender empowerment (Wastiau et al., 2013; Misuraca et al., 2012; Mahmud et al., 2013; Ogato, 2013). Kolko et al. (2014) also showed the value of ICT access and training as an instrument towards livelihood improvement through technology-based community training.

However, there is a limited amount of published research that strongly demonstrates the impact of ICTs on rural community livelihoods (Duncombe, 2016). Similarly, most development agencies have failed to mainstream strategies to harness the potential of ICTs effectively. Thus the real role of ICTs in livelihood development need be investigated. Conducting digital divide surveys can be helpful in a country's economic development by looking at technological means of a person regarding access to technology, utilization and ease or comfort in doing such (Telecommunications Authority of Trinidad and Tobago, 2013).

The community of Dologon was chosen as a purposive sample. Central Mindanao University is located in Dologon and the university's ICT extension activities are focused mainly in the area. The results of this study could be input to ICT extension projects to be conducted in rural areas and help implementers in designing interventions that would help resolve adverse impacts of ICT. The output of this study could also be utilized to improve the delivery of the technology to uplift the lives of the people, and some initiatives could be undertaken to bridge the gap that causes the digital divide. Consequently, it would greatly help the local government officials in planning and designing appropriate programs to target specific factors. The results would help set priorities for the LGU's digital inclusion

initiatives and help them engage in businesses, neighborhood and community groups, public sector partners, and the academe to more effectively address community technology and economic development needs through various ICT projects.

This study investigated the incidence of the digital divide in the local community of Dologon, Maramag, Bukidnon. It aimed to describe the profile of Barangay residents in terms of gender, age, housing characteristics, income, educational background, ethnic background, and religion; determine the available ICT resources present in the community of Dologon; describe residents' use of ICT in relation to gender and age; and determine the factors that affect the residents' use of ICT.

METHODOLOGY

A survey was conducted in Brgy. Dologon, Maramag Bukidnon. The number of samples was determined using Slovin's Formula. Out of 2, 538 total number of households, the sample size computed was 346 (with 0.05 margin of error). The sample was divided into the 21 zones using proportional allocation based on the number of households per zone. The households where the survey was conducted were chosen using a simple random technique. Five random households were also chosen from each zone for contingency in case some households cannot be located or unavailable.

The survey questionnaire used in this study was based on the concepts of measurement of Digital Divide on a micro (community) level which are the ICT Development Index (IDI), Digital Access Index (DAI) and Digital Opportunity Index (DOI) to identify underserved communities (Telecommunications Authority of Trinidad and Tobago, 2013). The construction of each question was also based on the Community Technology Survey (The City of Minneapolis IT Department, 2012) which has proven to show the current state of the divide by its results and to help bring people together to review existing resources and identify opportunities to work more efficiently to close the gaps.

The questionnaires were brought to each randomly chosen household. The respondent was the household member aged 18 years old or above who had the latest birthday at the time of the survey. If the person was present during the enumerator's visit, the survey was conducted in the form of an interview based on the questionnaire; otherwise, the enumerator left the questionnaire and provided a thorough explanation as to how the survey must be answered to ensure accuracy. A total of 346 survey questionnaires were returned from the 346 target households

having an overall response rate of 100%.

Frequency counts, percentages, and correlation coefficient were the bases for data analyses. Questions were categorized based on the concept of measurement indices mentioned in the previous section. IDI includes answers about access, skills, and usage; DAI includes knowledge, infrastructure, and affordability; and DIO is about opportunity and utilization. These indices are interrelated predictors since each category impacts one another. The results for each category of questions were then correlated with the possible factors for each index. Based on the profile questions, IDI factors include age, literacy skills, and gender; DAI factors are educational attainment and income; and employment status for DOI. A 95% confidence interval was used for all correlations.

RESULTS AND DISCUSSION

Barangay Dologon Residents' Profile

A total of 71% of the respondents are considered to belong to the young population (18-44 years old). Out of the 346 who answered the survey, 55% are female, and 45% male; 33% are employed, 16% are students, 32% are the homemaker and 19% unemployed. The highest educational attainment for 21% is elementary, 34% high school, 27% associate degree and some units in college, while 18% have bachelor's degree. The top three highest educational attainments are comparable to the latest report of Philippine Statistics Authority (PSA, from 2010 census) where elementary undergraduate and below is 27.5% followed by high school graduate (19.1%).

Seventy-seven (77%) of the respondents have a total (combined) annual household income of less than PHP 100,000.00. This is lower than the average family income of 206,000 for national, and 165,000 for Northern Mindanao region as reported by PSA (based on 2011 figures). This is evidence that Dologon belongs to the low-income communities in the country.

In terms of ICT user-level, there was a high percentage (74%) of "non-users" of ICT in Barangay Dologon. It was found that only 7% of the respondents are considered as "high-level users" and 19% are "mid-level users" based on the responses. Factors that may contribute to this are further discussed in the subsequent sections.

Dologon Local Government Unit Initiatives

A total of 68% gave favorable ratings ("excellent" and "good") to "Opportunities to participate in community matters," 72% to "Access to Technology in the

Community," and 73% to the "Community's Use of Technology." This means that majority of the community are satisfied on how the local administration handles ICT issues in the area.

The survey also included a brief description of Dologon LGU's ICT program by providing a computer center with Internet access, located at the Barangay Hall. The survey asked the resident's familiarity with this computer center. Almost half of the total respondents (43%) said that they are "Not Familiar at All" with this service. On the other hand, more than half (54%) answered "Familiar" and "Somewhat Familiar." Ratings varied by zone. The majority of the respondents from the nine specific zones (1, 2, 4, 5, 6, 7, 10, 15, and 21) have shown familiarity with the said ICT program of the Barangay possibly due to their location which is closer to the Barangay Hall. The assumption of geographic location as a factor is because residents from other zones cannot frequently go to the Barangay Hall because there are no regular means of transportation from those far-flung zones going to the Barangay.

Frequency and comfort of Internet Activities

"Daily access of social media" has the highest rating of 22% followed by the "use of email, chat, text, or video to communicate" with 20%. Twelve percent (12%) of the respondents "seek entertainment" using the Internet and 5.49% "get the news or weather report." The rest of the Internet activities listed got 0% to less than 4% in terms of daily access. It can be noted that a huge percentage of the respondents answered "not at all/not applicable" to 12 out of the 15 Internet activities listed in the survey. This is not surprising because as previously presented, a high percentage (74%) of the respondents were classified as non-users of ICT.

A total of 91% of the respondents answered "not at all/not applicable" on online banking which shows that it is not a common Internet activity for them wherein 77% of the total number of respondents answered to have an annual income of "less than PhP 100,000.00."

In terms of attending an online class or training, 96% of the respondents answered: "not at all/not applicable." Fifty-five percent (55%) of the respondents answered "elementary" and "high school" as their highest formal education completed but they are not able to utilize the Internet for online class or training which can help them acquire additional knowledge and skills while they won't have to go to school physically considering that there are a number of free online classes available where they can enroll. Moreover, 51.16% of the respondents are "unemployed" and "homemaker" who may take advantage of the employment or "work from home" opportunities using the Internet but 90% answered "not at

all/not applicable" when it comes to working from home using the Internet. Also, 82% of the respondents answered "not at all/not applicable" in terms of using the Internet to apply or look for jobs online. This could be attributed to the fact that more than half or 61% of the respondents do not have an internet connection at home. Townsend et al. (2013) mentioned that rural areas are among the most excluded from fast broadband developments. Among those who have, the Cellular type of connection is the most common (28%) followed by DSL with 5%. Another 5% of the respondents said they have Internet access, but they don't know the type of connection.

Forty-two percent (42%) of the respondents answered "Very Comfortable" in "using smartphone or tablet." Other activities which respondents find "very comfortable" are "Using social network sites" with 30%, this can be attributed to the popularity and affordability of mobile phones which is considered as hope to bridge the digital gap (Bornman, 2012). Additionally, "Using a computer laptop/desktop" got 27%, "Accessing the Internet" with 26%, "Using email" 23%, and "Creating documents or spreadsheet" with 19%, this small percentage is due to the strong correlation between employment status and educational attainment with digital divide as discussed further in the subsequent sections.

Digital Divide in terms of Gender and Age

There is no significant correlation between the gender of the respondents and their responses in terms of the importance of a computer system and the Internet in the household, the frequency of use of the Internet, and their comfort in doing so.

On the other hand, there is a strong correlation ($p < 0.05$) between the age group of the respondents and their responses in terms of the importance of computer and the Internet in the household ($r = 0.72$), the frequency of using social media ($r = 0.74$), frequency in using email, chat, text, or video to communicate ($r = 0.78$), frequency in seeking entertainment (games, videos, music) ($r = 0.78$), the familiarity with the ICT program of Dologon LGU ($r = 0.80$), and comfort in using a computer or laptop ($r = 0.88$), comfort in using the Internet ($r = 0.88$) among other variables involving the frequency of utilizing the Internet ($r = 0.72$) and the comfort in doing so ($r = 0.88$).

Digital Divide in terms of Household Income, Employment Status, and Educational Attainment

There is a strong correlation ($p < 0.05$) between the combined household annual income and owning a computer system ($r = 0.77$), the frequency of using

social media, email, chat, or video ($r=0.69$). But there is only a moderate correlation when it comes to the comfort in doing so ($r=0.57$). A moderate correlation was also observed in terms of the employment status as it affects the household income ($r=0.58$) since, in rural areas, employment is not the only source of income but also farms. Household income is also an apparent factor why only 14% has an Internet-connected computer (mostly from zones 18 and 20), 5% has a tablet with Internet access, 21% reported having a cell phone with Internet access, but no one has a gaming console in their household. Although a cell phone is the most common device that the households have, still 9% of the total respondents, don't have cell phones at home and most of them are in zones 7 and 15, areas which are far from the center of the community.

Employment status of the respondents and their responses in terms of their educational attainment has a strong correlation ($r=1.00$), owning a computer system ($r=0.75$), and their perception of the importance of computer and the Internet ($r=0.86$). Moreover, a very strong link was found between the respondents' employment status and the frequency of using the social media, email, chat, or video over the Internet ($r=0.96$) and the comfort in doing so ($r=0.96$).

The respondents' educational attainment was found to have a strong correlation ($p<0.05$) with their employment status ($r=0.72$), their perception of the importance of computer and the Internet ($r=0.74$). Moreover, it has a moderate correlation with frequency of using social media and comfort in using the computer or laptop and accessing the Internet, owning a cellular phone and frequency of using email, chat, or video to communicate over the Internet.

The correlation results of the factors mentioned affecting Digital Divide are summarized in Table 1.

Table 1.

Correlation of the Digital Divide Factors with Digital Divide Indicators

Factors	Owning a Computer System	Frequency of Using ICT	Comfort in Using ICT	Perception on the importance of ICT
Household annual income	0.77	0.69	0.57	0.51
Employment status	0.75	0.96	0.96	0.86
Age	0.72	0.77	0.88	0.72
Educational Attainment	0.29	0.58	0.69	0.74

Note: *n=346

*p<0.05

The relationships between these factors can be mapped to the three indices of concepts of measurement for Digital Divide. The indicators of digital divide which are the level of computer skills (IDI), owning a computer (DAI), comfort and frequency in performing computer related tasks (DOI) versus the factors educational attainment and household income (DAI), age (IDI), and employment status (DOI). The significant correlations between these indicators and factors are evidence of the existence of Digital Divide.

Age as a factor validates previous studies about the challenges in integrating internet technologies with the older population due to the need to learn and acquire computer skills (Friemel, 2016; Niehaves & Plattfaut, 2014; Olphert & Damoradan, 2013). Household income shows a negative correlation because the lack of financial resources can hinder obtaining computers and technology (Choi & DiNitto, 2013). This is not surprising because as mentioned, the annual household income of the majority of the respondents was lower than the average for both national and regional household incomes reported by the PSA. Moreover, since results showed that educational attainment and employment status were strongly correlated, their role in the digital divide can be attributed to the fact that in the 21st century, ICT has been widely integrated into education (Sarkar, 2012) and in various industries (Sassi & Goaid, 2013).

On the other hand, no evidence was found that gender is a factor in the digital gap in Brgy. Dologon which is in contrast to results of previous studies (Antonio & Tuffley, 2014; Haight et al., 2014; Ritzhaupt et al., 2013) where gender

was found to be a factor in the digital gap. This may be due to the modern culture of our society, but further investigation may be conducted.

CONCLUSION

Based on the findings, the respondents' profiles do not have significant variations when it comes to their residency status, combined annual household income, the use of a cellular phone as the primary device for communication, their ethnic background, religion, and dialect spoken at home. The similarity of the responses may be attributed to the fact that 86% of the respondents have lived in Dologon for more than 10 years.

In terms of available ICT resources, Dologon LGU has a Computer Center for public use but almost half of the respondents, mostly from areas far from the Barangay Hall where it is located, are not aware of it. The LGU may improve their information dissemination about it or may plan other ICT programs targeting those areas.

Digital Divide in terms of the level of computer skills (IDI), owning a computer (DAI), comfort and frequency in performing computer related tasks (DOI), educational attainment and household income (DAI), age (IDI), and employment status (DOI) are evident. However, there was no evidence that gender is a factor in the digital gap in Brgy. Dologon.

Finally, the digital divide exists in the community of Dologon based on the concept of measurement indices on ICT Development, Digital Access, and Digital Opportunity. The significant factors that contribute to it are educational attainment, employment status, household income, and age.

RECOMMENDATION

The researchers recommend the planning and implementation of appropriate programs that would target the factors identified in this study. Some suggestions include ICT training for out-of-school and unemployed individuals, establishing a public ICT library, and improving information dissemination about the LGU's ICT projects in the community. Another study may also be conducted to validate equality of men and women outside the context of ICT and the digital divide. Lastly, it would also help if a model could be developed in detecting the existence of digital divide in a community so it would be easier to identify interventions to bridge the gap.

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