

Information Communication Technology: Examining the Digital Divide in JRMSU System

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Abstract: *The digital divide is a core issue of the information society. It is a gap to describe between people who have the skills and ready access to information and communication technology (the 'haves') and with those who do not have the skills and access to use those same technologies within a geographic area, society or community (the 'have-nots'). With the flourishing availability of communication resources, it has also deepened the problem of digital divide in various countries and communities. The need to quantify the digital divide of an area, society or community is very vital since it is a common belief that Information Communication and Technology (ICT) uplifts standard of living: in terms of economic and human development particularly on education advancement. This study was conducted in the five (5) campuses of Jose Rizal Memorial State University using a questionnaire consisting items on the availability and use of ICT at home and in school and extent of skills in doing a task in a computer. To determine whether there is a digital divide or not, a probability index is established where 1 and more than 1 suggest an existing digital divide. It was found during the study that there is an existing digital divide in the JRMSU system in the availability, access and skills in using information and communication technology. It is not an assumption that even though majority of respondents were acquainted with computers they already had skills to do school-based tasks using the tool. The need for instructors to encourage students to build their ICT skills and integrate ICT in teaching, and maximizing the utilization of ICT tools inside the school were few of the recommendations in this study in bridging the digital divide.*

Keywords: ICT, digital divide, internet, JRMSU

1. Introduction

Information is power. Nowadays, it has become copacetic to say that we are living in an information society. The term "information society" has risen out of the accepted belief that information has become a core part of contemporary life, both work and play—so much so, that it has become a symbol of the very age we live in (Martin, 1988).

In 1998 Stichler and Hauptman asserted that the "information age has been widely acclaimed as a great benefit for humanity, but the massive global change it is producing brings new ethical dilemmas."

With the incessant flow of information through the access and use of Information and Communication Technology (ICT), it also has drastically affected every aspect of the human civilization.

Greater awareness of the importance of information has compelled nations across the world to commit themselves to the progressive development of ICT industries. However, ICT development has also deepened the problem of serious digital divide between developed and developing countries. (Dubey, Jyoti and Devanand, 2011).

The digital divide is a core issue of the information society. It refers to the division between those who have access to, or are comfortable using, information and communication technology (ICT) (the "haves") and those who do not have access to, or are not comfortable using ICT (the "have-nots") (Partridge, 2007).

In developing countries like the Philippines, 'digital divide' looms lagging development behind. According to the 2003

Functional Literacy, Education and Mass Media Survey (FLEMMS) by the National Statistics Office, personal computer ownership is non-existent for the poorest half of all households in the country, while 30 percent of the richest income are able to own computers. ICT ownership is highest for those household heads who are single and for those who are female. A positive relationship also exists between households with higher educational attainment and with higher ownership of ICTs; for example, among postgraduates, 90 percent own phones and 40 percent own computers while among without education, practically no household own computers while around 3 percent only own phones.

Data further revealed in the 2008 FLEMMS that forty-four percent of Filipinos have some exposure to the internet, meaning only one out of ten surfs internet everyday. It also revealed that functionally literacy rate is generally high among persons exposed to different forms of mass media; it ranges from 93.9% for those who watched television to 96.3% for those who surfed the internet.

Though most people in the rural areas have benefited so much to the flourishing access to communication, some people are left in the dark clueless and starved from the access of and skills in acquiring information. This gap can be simply described as variation between *information rich* and *information poor* individuals within a community.

The need to quantify the digital divide of an area, society or community is very vital since it is a common belief that ICT uplifts standard of living: in terms of economic and human development particularly on education advancement (Aguinaldo, 2013).

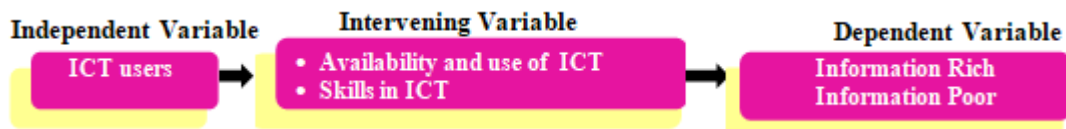
In this study, the digital divide in the JRMSU system has been quantified as to individuals' availability and accessibility of ICT, frequency of ICT usage and purpose of using ICT, and extent of doing tasks in a computer. The results of the study would give insights as to what interventions will be conducted to bridge this digital divide in the JRMSU system to help alleviate information poor students.

2. Conceptual/Theoretical Framework

This study is anchored on the theory of reasoned action by Martin *Fishbein* and *Icek Ajzen* (1975 & 1980) on individual's effective reaction or attitude toward using an innovation. It will also use **Technology Acceptance Model (TAM)**, which is an information systems theory that models how users come to accept and use a technology. The model suggests that when users are presented with a new technology, a number of factors influence their decision about how and when they will use it, notably: **Perceived**

usefulness (PU) - This was defined by Fred Davis as "the degree to which a person believes that using a particular system would enhance his or her job performance" and **Perceived ease-of-use (PEOU)** - Davis defined this as "the degree to which a person believes that using a particular system would be free from effort" (Davis 1989).

The preceding diagram illustrated the conceptual framework of the study which consisted of the independent variable, which is the ICT users and is linked to the intervening variable which consists of the availability and use of ICT and the skills in using the technology. This means that the intervening variable will directly affect the dependent variable which is the information rich and information poor students. The intervening variable will surmise whether the ICT users belong to the group of information rich students who have ready access and skills in using ICT or to the information poor group who do not have access and lacks skills.



Research Design and Method

The study utilized the descriptive method of research through the use of a questionnaire checklist. The questionnaire consisted items on the availability and use of ICT at home and in school and extent of skills in doing a task in a computer. The questionnaire consisted of 6 questions all of which respondents were requested to select the response that best indicated their answer on each statement. Using the Sloven's formula, a total of 384 student respondents were

picked randomly in the study who were all from the 5 campuses of the JRMSU System namely: Dapitan (135), Dipolog (79), Katipunan (65), Tampilisan (74) and Siocon (31).

3. Results and Discussion

ICT access at home

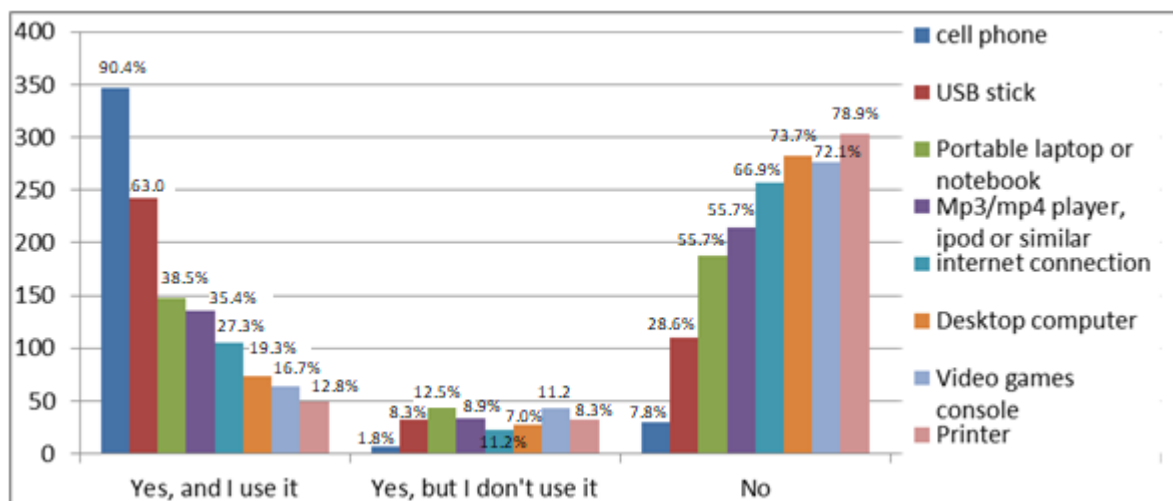


Figure 1: Availability and usage of ICT at home

Part of the digital divide is the access and usage of ICTs. Among the ICTs, cellular phones were found to be the most common tool used for information and communication acquisition with 90.4% of the respondents using it at home. Cellular phones had proven to be the most convenient and affordable ICT gadget specifically among students followed by the USB stick where they could store important school files. The results support the Technology Acceptance

Model of Davis (1989) of perceived usefulness (PU) and perceived ease of use (PEOU) of a technology. Meanwhile, majority of these gadgets had a huge percentage of unavailability in most homes specifically for desktop computer and printer with 78.9% and 73.7%, respectively. It is an indicator of a grappling huge digital divide when it comes to availability and usage of these ICTs at home, with a probability index of 1.4483.

Access of ICT at school

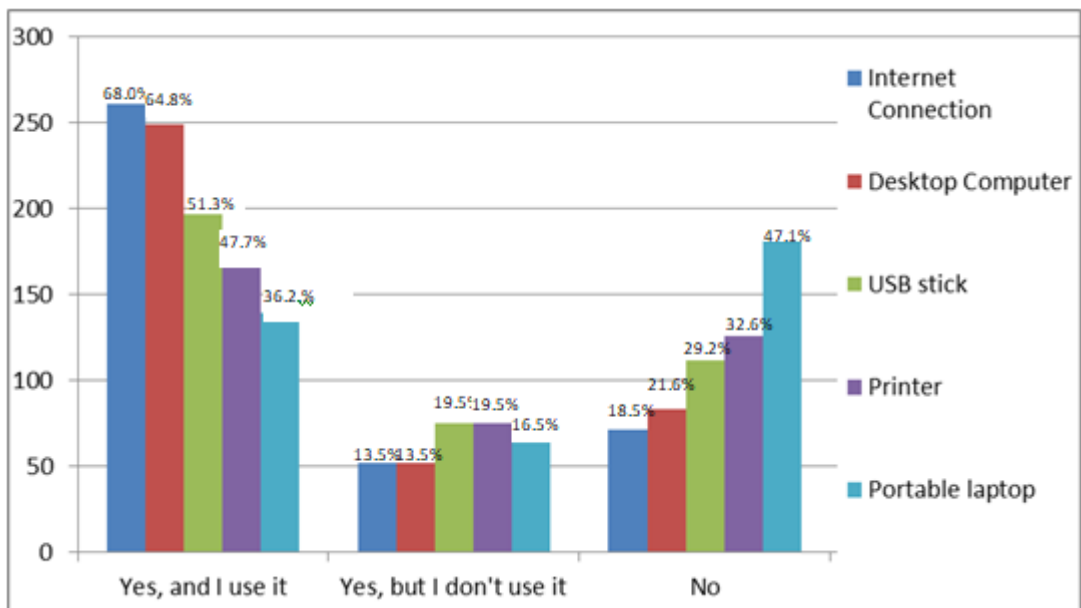


Figure 2: Availability and usage of ICT at school

Results revealed that internet connection is highly available in the respective campuses and is being used by the respondents with 68% mark, followed closely by availability of desktop computers with 64.8%. It has a probability index of 0.5559. It is an indicator that most of the JRMSU campuses, computers were connected to the internet or free wi-fi internet access are readily available. It should also be given weight the data on limited or unavailability of desktop computers and internet connection in some campuses since unavailability and lack of access of these at schools can possibly hinder students to exploit enormous information possibilities for schooling purposes.

Ayub (2014) noted that “Internet is widely used by students in institutions of higher education to seek relevant information and materials to complete their assignments or project.”

Computer use

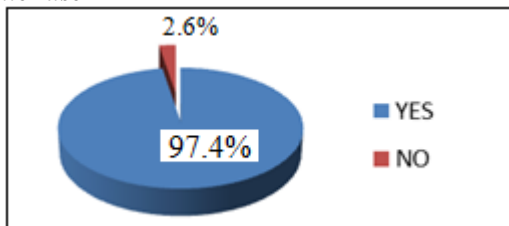


Figure 3: Computer Use

As computers have been one of the preferred ICTs ,majority of the respondents were able to use it with different purposes and extent of use. Though 73.7% of them do not have computers at home, it never hinders the chance to use it, as it is significantly compensated and available for use in school.

Extent of use of ICT at home

Table 1: Extent of use ICT at home

Particulars	never or hardly ever	once or twice a week	everyday
play one – player games	201(52.3%)	150(39.1%)	33(8.6%)
Play collaborative online games	234(60.9%)	111(28.9%)	39(10.2%)
Doing homework on the computer	143(37.2%)	184(47.9%)	57(14.8%)
Browse the internet for school work	124(32.3%)	187(48.7%)	73(19.0%)
Read news online	133(34.6%)	196(51.0%)	55(14.3%)
Use e-mail	149(38.8%)	176(45.8%)	59(15.4%)
Chat Online	125(32.6%)	185(48.2%)	74(19.3%)
Browse the internet for fun	122(31.8%)	187(48.7%)	75(19.5%)
Download music, films, games, or software from the internet	143(37.2%)	189(49.2%)	52(13.5%)
Publish and maintain a personal website, weblog, or blog	236(61.5%)	104(27.1%)	44(11.5%)
Participate online forums, , virtual communities of spaces	163(42.4%)	150(39.1%)	71(18.5%)
Use e-mail for communication with other students about school work	164(42.7%)	176(45.8%)	44(11.5%)
Use e-mail for communication with teachers and submission of homework or other schoolwork	218(56.8%)	132(34.4%)	34(8.9%)
Download, upload or browse material from your school’s website	193(50.3%)	153(39.8%)	38(9.9%)
Check the school’s website for announcements	223(58.1%)	129(33.6%)	32(8.3%)

Various drives influenced the usage of ICT at home, the most common activity of respondents at home is browsing the internet for fun with 19.5% of respondents doing it every day, while reading news online marked the most common activity conducted once or twice a week with 51.0%. This is indicating that internet connection at home, gives leisure to its users as well as inputs updates on current events and issues worldwide. However, 61.5% of respondents never or hardly ever ‘publish and maintain a personal website, weblog, or blog.’ This is an indication that respondents

either lack openness in expressing one’s thoughts on certain things; not exposed to weblogs or they are not too confident to write blogs online as it is for everybody to read. Another important thing to note is that a huge number of respondents do not even check the school’s website for announcements, it also indicates that either the school website is not updated or the school has not cultivated online engagement between the school and its students.

Extent of use of ICT at school

Table 2: Extent of use ICT at school

Particulars	never or hardly ever	once or twice a week	everyday
Play one – player games	250(65.1%)	117(30.5%)	17(4.4%)
Play collaborative online games	267(69.5%)	92(24.0%)	25(6.5%)
Doing homework on the computer	88(22.9%)	246(64.1%)	50(13.0%)
Browse the internet for school work	75(19.5%)	252(65.6%)	57(14.8%)
Read news online	138(35.9%)	206(53.6%)	40(10.4%)
Use e-mail	130(33.9%)	208(54.2%)	46(12.0%)
Chat Online	114(29.7%)	211(54.9%)	59(15.4%)
Browse the internet for fun	121(31.5%)	213(55.5%)	50(13.0%)
Download music, films, games, or software from the internet	157(40.9%)	198(51.6%)	29(7.6%)
Publish and maintain a personal website, weblog, or blog	228(59.4%)	132(34.4%)	24(6.3%)
Participate online forums, , virtual communities of spaces	170(44.3%)	165(43.0%)	49(12.8%)
Use e-mail for communication with other students about school work	103(26.8%)	234(60.9%)	47(12.2%)
Use e-mail for communication with teachers and submission of homework or other schoolwork	147(38.3%)	197(51.3%)	40(10.4%)
Download, upload or browse material from your school’s website	207(53.9%)	153(39.8%)	24(6.3%)
Check the school’s website for announcements	184(47.9%)	168(43.8%)	32(8.3%)

The importance ICT in schools in recent years had been immensely highlighted in various settings. Results revealed that even though chatting online is the most common activity conducted every day in school using ICTs with 15.4% of respondents boosting socialization, 65.6% of respondents browse the internet for school work once or twice a week. This is indicating that aside from socialization, ICTs played an essential role in fostering educational advancement. Meanwhile, 69.5% of

respondents, never or hardly ever play collaborative online games. This indicates that online games are not their top priority when using school computers as either playing online games may have been disabled by computer administrators in school or students’ computer activities are closely monitored.

Extent of skills in doing a task using computer

Table 3: Extent of skills in doing a task using a computer

Tasks	I can do this very well by myself	I can do this with help from someone	I know what this means but I cannot do it	I don’t know what this means
Edit digital photographs or other graphic images	137(35.7%)	171(44.5%)	54(14.1%)	22(5.7%)
Create a database (using Microsoft Access)	103(26.8%)	175(45.6%)	65(16.9%)	41(10.7%)
Create presentation (using Microsoft power point)	250(65.1%)	104(27.1%)	21(5.5%)	9(2.3%)
Use spreadsheet to plot a graph	115(29.9%)	166(43.2%)	58(15.1%)	45(11.7%)
Create multi-media presentation	145(37.8%)	168(43.8%)	48(12.5%)	23(6.0%)
Download music and videos online	209(54.4%)	121(31.5%)	30(7.8%)	24(6.3%)
Use search operators when using search engines	123(32.0%)	149(38.8%)	59(15.4%)	53(13.8%)

Another aspect of the digital divide refers to the extent of skills a user has in using ICT tools. Six tasks had been coined that fits their level of need as students. Out of six tasks that have been presented to respondents, there are only two tasks that respondents are highly skilled to and can do it very well by themselves, these are creating presentation with 65.1% and downloading music and videos online with 54.5%. It is clear that respondents are taking initiatives in presenting reports in class using Microsoft power point thereby making them skilled in the said task.

how respondents perceived their skill using a particular application. Simply put, the more someone uses software, the better they perceive they are at using it.”

However, results revealed that the rest of the tasks respondents are not skilled to include editing digital photographs or other graphic images, creating a database using Microsoft access, using spreadsheet to plot a graph, creating multi-media presentation and using search operators when using search engines. Most of the respondents claimed that they cannot do it without the help of someone, while others simply do not know what the tasks means. This

It validates further the study of Gibbs (2008), that there is “a strong relationship existed between frequency of use and

indicates that there is an existence of digital divide when it comes to the skills the respondents has in using an ICT tool.

Relationship between the availability and computer use at home and the skills of ICT users

Table 3: Relationship between the availability and computer use at home and the skills of ICT users

Skills		Available and usage of Computer		X ² - value	X ² -Critical Value (X ² _{0.05} df=1)	Decision
		Yes	No			
Edit digital photographs or other graphic images	Skillful	36	101	6.721	3.84	Reject Ho
	Not Skillful	38	209			
Create a Database (e.g. using Microsoft access)	Skillful	23	80	0.847	3.84	Accept Ho
	Not Skillful	51	230			
Create Presentation (e.g. using Microsoft Power Point)	Skillful	51	199	0.587	3.84	Accept Ho
	Not Skillful	23	111			
Use Spreadsheet to plot a graph	Skillful	29	86	3.731	3.84	Accept Ho
	Not Skillful	45	224			
Create multi-media presentation(with sound, pictures, video)	Skillful	41	104	12.143	3.84	Reject Ho
	Not Skillful	33	206			
Download music and videos online	Skillful	52	157	9.276	3.84	Reject Ho
	Not Skillful	22	153			
Use search operators when using search engines	Skillful	29	94	2.157	3.84	Accept Ho
	Not Skillful	45	216			

The importance of home-based ICT use has been noted from different research perspectives. Table 3 revealed that there is a significant relationship between the availability and usage of computer at home to the skills of ICT users specifically in editing digital photographs or other graphic images, creating multi-media presentation(with sound, pictures and videos) and downloading music and videos online. Aside from considering it also as home-based ICT activities, these tasks do not only require certain software to use but also need frequent usage for the user to be skilled.

This validates that “the role of home computers can be crucial in enhancing adolescent’s digital skills and self-efficacy regardless of country-basis high or low ICT penetration rates. A possible explanation for the latter may be that home-based activities such as computer game

playing, downloading, and emailing might be more closely related to digital skills enhancement than school-based activities (Zhong, 2011).

However, there is no significant relationship between the availability and usage of computer to the skills of ICT users at home in creating a database using Microsoft access, creating presentation using Microsoft power point , using spreadsheet to plot a graph and using search operators when using search engines. This indicates that either respondents already had prior knowledge and skills about the tasks or they are skilled in doing it using other ICT tools.

Relationship between the availability and usage computer at school and the skills of ICT users

Table 4: Relationship between the availability and usage of computer at school and the skills of ICT users

Skills		Available and usage of Computer		X ² - value	X ² -Critical Value (X ² _{0.05} df=1)	Decision
		Yes	No			
Edit digital photographs or other graphic images	Skillful	95	42	1.891	3.84	Accept Ho
	Not Skillful	154	93			
Create a Database (e.g. using Microsoft access)	Skillful	68	35	0.085	3.84	Accept Ho
	Not Skillful	181	100			
Create Presentation (e.g. using Microsoft Power Point)	Skillful	183	67	21.944	3.84	Reject Ho
	Not Skillful	66	68			
Use Spreadsheet to plot a graph	Skillful	83	32	3.869	3.84	Reject Ho
	Not Skillful	166	103			
Create multi-media presentation(with sound, pictures, video)	Skillful	106	39	6.972	3.84	Reject Ho
	Not Skillful	143	96			
Download music and videos online	Skillful	144	65	3.309	3.84	Accept Ho
	Not Skillful	105	70			
Use search operators when using search engines	Skillful	85	38	1.442	3.84	Accept Ho
	Not Skillful	164	97			

Table 4 revealed that there is a significant relationship between the availability and usage of computer at school and skills of ICT users specifically in creating presentation using Microsoft power point, using spreadsheet to plot a graph and creating multi-media presentation (with sounds, pictures, videos). This suggests that instructors’could givea greater share in developing and fostering ICT skills of students

specifically if they require students to present reports in class using multi-media presentation and the like as it would improve and hone the skills of students in doing these tasks. These findings also imply that teachers should also encourage students to build their ICT skills in school-based activities with the use of available computers in school and likewise build on out-of-school learning with ICT.The

results validate that “availability and usage of ICT is very essential to improve the educational efficiency of students” (Nisar, et al, 2011).

On the other hand, there is no significant relationship between the availability and usage of computer in school and ICT skills of user in editing digital photographs, creating data base using Microsoft access, downloading music and videos online and using search operators when using search engines. This indicates that either respondents already had prior knowledge and skills about the tasks or they are skilled in doing it using other ICT tools.

4. Findings of the study

Findings of the study revealed that majority of the respondents (90.4%) used mobile phones at home as the most common tool used for information and communication acquisition. There is a huge percentage (73.7%) of respondents who do not have desktop computers and internet connection at home and other ICT tools. Though internet connection is sufficiently available in various campuses, there is still a significant percentage (47.1%) of unavailability and lack of access in some areas. ICT and internet connection in schools foster positive outcomes to respondents, with 65.6% browsing the internet for schoolwork once or twice a week. Majority of the respondents (97.4%) are acquainted with computers. ICT and internet connection at home are mainly used for leisure activities like browsing the internet for fun and avenue for acquiring information on current events like reading news online, once or twice a week. Computer availability and usage at home have direct relationship to the skills of ICT users specifically with these tasks: Edit digital photographs or other graphic images; create multi-media presentation using Microsoft power point and download music and videos online. Majority of respondents never publish or maintain blogs. Respondents are skilled to only two (2) out of six (6) tasks present that fit their needs as students using a computer, these are: creating power point presentation and downloading music videos online, claiming that they can do the tasks very well by themselves. Likewise, computer availability and usage at school have significant relationship to the skills of ICT users specially with these tasks: create presentation using Microsoft power point, use of spreadsheet to plot a graph, create multi-media presentation with sound, pictures and videos.

5. Conclusion

The following conclusions are drawn from the findings of the study. There is an existing digital divide among respondents' access and skills in using information and communication technology. Skills are significantly related to availability and usage of ICT tools. It is not an assumption that even though majority of respondents were acquainted with computers they already had skills to do school-based tasks using the tool. The availability of internet connection at home and in school has paved way to acquisition of current events updates and school-work related researches among the respondents. Since there is an existing digital divide in the availability and access of ICT tools at home, the availability of it specifically computers in school

compensated that void as respondents can freely use them. But it should not be taken lightly the result that some campuses do not have computers and unavailability of internet connection that respondents were not able to use them.

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