DIGITAL INEQUALITIES BETWEEN THE RURAL AND URBAN STUDENTS IN MALAYSIA

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Abstract

This article reports on a study carried out among the secondary school students in Malaysia. The main aim of this study was to determine the extent of digital inequalities, also known as digital divide between the rural and urban students in the country. This is because ICT is considered as an important tool for learning. Unfortunately, not all students have the opportunity to have access to ICT especially those in rural areas. In this study, the divide was assessed based on four types of digital inequalities namely, the divide in terms of having an access to the computer at home, the divide in terms of having a computer with an Internet access at home, the divide in ICT skills and the divide in the frequency of using the ICT. Eighty schools from all over the country were randomly identified and 1200 survey questionnaires were sent to the schools. The findings revealed that digital inequalities between the two geographical areas existed in all the four types of digital divide. It was discovered that the rural students were mostly left behind in having the opportunity to access and use the ICT. They were also less competent in using the ICT compared with the students in urban schools.

Introduction

Information and communication technology (ICT) has become a part in our daily lives that people have no other choice but to embrace it. People can live without using the ICT but it is difficult for them to survive. In education, ICT is considered as a tool to enhance students' learning in a very significant way. Trucano (2005) claimed that ICT could motivate students significantly and Huang and Russell (2006) found positive relationships between academic achievement and ICT use. This means that those who are not able to use the ICT have the risk of being left behind in their academic achievement. For instance, Eamon (2004) noted that there was a gap in academic performance among the poor and minority youth in the United States due to ICT factors. It is generally known that digital divide is about the access to the information and communication technology (ICT). The most widely discussed of the type of digital divide is the gap between those who have the access to the ICT and those who do not have the access. This is what others called as technology "haves" and "haves-not". The ICT technologies which are usually used to indicate the scenario of the divide are computers and the Internet. This can be found in U.S Department of Commerce (2000), Norris (2001), Pearson (2002), Huang and Russell (2006) and Hubregtse (2006).

However, digital divide is not only about the gap in technology availability particularly the computer and the Internet access. It should be looked beyond that as suggested by others. Salinas (2003) stated that digital divide should also concern about having the technological skills, getting the appropriate content and being regarded as information literate. According to Bertot (2003), inequalities in information access and information literacy ability were also parts of digital divide. Selhofer and Husing (2002) also suggested that knowledge divide or information divide as used by Bundy (2004) to be considered as a part of digital inequality. It can be understood that having the technology access alone is meaningless if it is not being fully utilized and the required skills to use it are not fully acquired.

In other words, indicators of digital divide should not only about having access to ICT; they should also include information access, information skills and ICT skills. For example, a student who has access to ICT at home can be considered as digitally divided if he or she is not competent in using the ICT or does not know how to look for information. Digital divide is a disparity that knows no boundary. It is a problem faced by both developed and developing nations. Digital divide exists among the people within the country that takes on many forms of digital inequalities between particular groups. These are all related with the three characteristics of digital divide categorized by Norris (2001) namely, global divide between poor and rich countries, social divide and democratic divide among the citizens. As for Bridges.org (2003), this digital divide was categorized as international divide and domestic divide. International divide concerned with the gap between countries while domestic divide concerned with the gap within the countries. In assessing the divide, most of the comparisons in terms of global perspectives were made between developed countries and developing countries as well as among the continents especially Europe, Asia and Africa. For example, Kvasny (2002) compared the internet subscribers in London alone has outnumbered those in the whole of African continent. OECD (2001) reported on the digital divide disparity by making comparisons between and among countries namely, Canada, Japan, the Netherlands and the United States.

In terms of domestic digital divide, comparisons were particularly made regarding geographical locations, age, gender and social status. A digital divide between urban and rural areas was reported by OECD (2001), Bridges.org (2003), Looker and Thiessen (2003), Nikam, Ganesh and Tamizhchelvan (2004), Hubregtse (2005), Ma (2005) and Cooper (2006). In Malaysia, Ramasamy (2004) reported that 93% of the Internet subscribers in Malaysia were from urban areas. Digital inequalities between urban and rural areas were also reported in Alhabshi (2004), Zaitun & Crump (2005), Kementerian Pelajaran Malaysia (2007) and Suruhanjaya Komunikasi dan Multimedia [SKMM] (2008). Based on all the literature sources, it has been acknowledged that the rural areas were mainly digitally divided in most of the related aspects especially regarding the access to the computer and the Internet. This could be one of the reasons why urban students outperformed rural students in most academic subjects in the national level examinations. For example, in the Sijil Pelajaran Malaysia examination in 2005, rural students were outperformed by the urban students in English Language, Mathematics, Physics, Chemistry and Biology (Wahid, 2007).

In Malaysia, efforts have been made to bridge the digital gaps between rural and urban areas. These involve the federal government through its ministries, state governments and private organizations. For examples, the e-Melaka project by the Melaka state government, e-Bario project by the Sarawak state government, Jejak-IT and Mobile Internet Unit initiatives by the Selangor state government (Zaitun & Crump, 2005). Most of these projects also involved the private or non-profit organizations. Most importantly, the Ministry of Education has implemented its own initiatives to close the digital divide between the two areas through its Education Development Master Plan 2006-2010 (Kementerian Pelajaran Malaysia, 2007). Some of the major initiatives were to build computer laboratories in schools nationwide, provide Internet access and implement smart school projects. It is actually not an easy task to bridge the digital divide. The Ministry of Education in Malaysia acknowledged that the main challenge was to deal with the lack of the basic infrastructure availability in rural areas especially in remote places in Sarawak and Sabah (Kementerian Pelajaran Malaysia, 2007). Most of the schools in these areas had old buildings as well as did not have electricity and water supply. The schools also did not have proper teaching and learning facilities. It was reported by Kementerian Pelajaran Malaysia that 42.9% of the secondary schools were more than 30 years old that needed high maintenance. Most of these schools were in rural areas.

The Study

The main purpose of the study was to find evidence of the existence of digital inequalities between the students in urban areas and the students in rural areas. There were four main aspects of digital inequalities being assessed in this study. These were the gaps in (a) access to the computer at home, (b) access to the Internet at home, (c) ICT-related skills and, (d) the frequency of using the ICT. The study is based on a survey conducted among the students. It was carried out between January 2008 and March 2008. Forty urban secondary schools and forty rural secondary schools from all over the states in Malaysia were randomly selected. The schools were selected from the list of all national secondary schools in the country available at the Ministry of Education's website. Also, the rural and urban type of schools was based on the Ministry's categorization. These schools were government-owned which most of them were fully funded and some of them were partly funded.

Fifteen sets of questionnaire were then mailed to each of the selected schools to be answered by the students and administered by their teacher librarians. The total number of questionnaires sent to all the 80 schools was 1200. The respondents were identified and selected by their teacher librarians based on their form (grade) classes. The questionnaires were then mailed back to the researchers using the provided envelopes. The questionnaire was designed to find out students' experience in using the ICT, home computer access, home Internet access, ICT skills and ICT use. Statistical techniques were employed to analyze the data descriptively and inferentially. In order to prove the existence of the digital divide aspects, four null hypotheses were formulated and tested to find their significance levels. The significance tests used in the analyses were chi-square and independent samples T-test. The formulated null hypotheses were:

a) There is no significant difference in terms of having an access to computer at home between the secondary school students in rural areas and the secondary school students in urban areas.
b) There is no significant difference in terms of having an internet access at home between the secondary school students in rural areas and the secondary school students in urban areas.
c) There is no significant difference in terms of ICT skills between the secondary school students in rural areas and the secondary school students in urban areas.
d) There is no significant difference in terms of frequency of using the ICT between the secondary school students in rural areas and the secondary school students in urban areas.

The Results

There were 63 schools from both urban and rural areas managed to return the mailed questionnaires. After carrying out the screening process, 410 questionnaires from urban schools and 510 questionnaires from rural schools were used for this study. The total number of respondents for this study was 920 with the response rate of 76.6%. The number of samples enabled to make generalizations about all the students in the government national secondary schools in Malaysia. The respondents consisted of 401 (44%) boys and 519 (56%) girls. The distribution of respondents among all the form classes was not much difference among them with the Form Five students was the highest and the Form Four students was the lowest in number. There were 194 (21.1%) Form Five students and 178 (19.4%) Form Four students. This was because the respondents were selected according to their form classes (three representatives for each form class). The analysis also found that there were 548 (57%) lower secondary students comprised Form One, Form Two and Form Three classes. The number of upper secondary students which comprised Form Four and Form Five classes was 372 (43%).

The respondents were also asked to reveal their ICT experience concerning the use of computer. It was discovered that almost all of them (97.2%) had an experience using the computer. Only 2.8% among them admitted that they have never used the computer before. Further investigations found that 22.8% have started using the computer for less than a year, 26% between one and three years and 17% between three and five years. The highest percentage among these groups was those who have used it for more than five years (28.2%). The demographic data of the respondents and their ICT experiences are shown in the following table.

Table 1: Demographic Data of the Respondents and ICT experience

Demographic variable	Categories	Frequency	Percentage
School Location	Rural students	510	55.0
	Urban students	410	45.0
Gender	Boys	401	44.0
	Girls	519	56.0
Forms	One	185	20.1
	Two	183	19.9
	Three	180	19.6
	Four	178	19.4
	Five	194	21.1
Form Levels	Lower Secondary	548	57.0
	Upper Secondary	372	43.0
Experience to use computer	Yes	894	97.2
	No	26	2.8
Length of Experience in using the computer	Less than a year	210	22.8
	Between one and three years	239	26.0
	Between three and five years	156	17.0
	More than five years	259	28.2
	Never	26	2.8

The following discussions are focusing on the four aspects of digital divide between the students in urban areas and the students in rural areas. Hypothesis testing was made to each of the aspects to determine how significant the differences were.

Firstly, a comparison was made regarding the availability of computer access at home. It was found that 63% of all the 920 students had an access to the computer at home. For the urban students, 72.2% and for the rural students, 55.7% had the home computer access. A chi-square analysis was carried out to know whether the difference was significant. The results proved that the difference was statistically significant(χ^2 = 26.59, df = 1, N = 920, p < .001) and therefore, it was concluded that a digital divide existed between the students in urban areas and the students in rural areas in terms of having an access to home computer. It was evident that the rural students were left behind in having the computer access at home compared to the urban students. The Table below shows the results of the analysis.

Table 2: Chi-square Analysis of Computer Availability At Home between Urban and Rural Students

		Computer access at home			
Variable	n	No	Yes	χ^2	*p*
School location					
Urban	410	114	296	26.587	.000*
Rural	510	226	284		
Totals	920	340	580		

* Significant at the 5% significance level

Secondly, a difference regarding the availability of home computer with the Internet access between the urban students and the rural students was analysed. Among the secondary school students who had an access to the computer at home, it was found that 57% of the urban students and 43% of the rural students had the Internet access. Based on the results of a chi-square analysis shown in Table 3, the difference was found to be statistically significant (χ^2 =27.259, df = 1, p < .001). It can be said that there was also inequality in having the Internet access between the students in urban areas and the students in rural areas. In this aspect, there were more urban students who had the home Internet access than the rural students.

Table 3: Chi-square Analysis of Having an Internet Access At Home between Urban and Rural Students

		Internet access at home			
Variable	n	No	Yes	χ^2	*p*
School location					
Urban	410	249	161	27.259	.000*
Rural	510	391	119		
Totals	920	640	280		

*Significant at the 5% significance level

Thirdly, another aspect of digital inequality assessed in this study was the frequency of using the ICT. This was relevant to determine because of two reasons. The first reason was that having the home computer and Internet access did not necessarily mean that students used the ICT frequently. The second reason was that without having the ICT access at home, did not necessarily mean that students were not able to use it frequently because there were other places they could access it especially at schools. In accessing the frequency of use, the respondents were given twelve ICT-related activities for them to indicate how frequent they carried out each of the activities using five types of frequency scale namely, *'never', 'less than once a month', 'between once a week and once a month', 'a few times a week'* and *'almost everyday'*. The ICT-related activities pre-determined in the questionnaire were:

i. Using the computer for internet surfing
ii. Using word processing such as Microsoft Word

iii. Using the computer for assisting you to understand learning materials
iv. Using the computer for playing games
v. Using the computer to use graphics programming for drawing and painting
vi. Using DVD or CD-ROMs
vii. Using the computer for electronic communication such as e-mailing and chatting
viii. Using spreadsheets such as Microsoft Excel
ix. Using the Internet for downloading songs
x. Using the Internet for downloading software (including gaming software)
xi. Using the computer for programming
xii. Using the Internet for communicating and discussing with friends

The means frequency of using the ICT was used to compare the differences between the two geographical areas. In this respect, the mean frequency for the urban students was M=2.20, SD=.64 and for the rural students was M=1.97, SD=.78. An independent samples *t* test was then employed to find out how significant the difference was with an alpha level .05. The results indicated that the difference was statistically significant, $t(905) = -4.94$, $p < .001$. This means that the students in urban areas used the ICT more frequently than the students in rural areas. It was concluded that a digital inequality also existed between the two geographical areas in terms of the frequency of using the ICT.

Table 4: The Independent Samples *t*-test Analysis of the Frequency of Using the ICT between Urban and Rural Students

	School Location	N	Mean	*t*-statistic	*p*-value
ICT Skills	Rural	501	1.9716	-4.943	.000*
	Urban	406	2.2044		

* Significant at the 5% significance level

Lastly, a digital divide between the students in the two geographical areas in terms of skills in using the ICT was assessed in this study. The ICT skills were determined based on their abilities in performing the seven ICT-related activities listed in the questionnaire. The activities were:

i. Using Microsoft Word
ii. Surfing the Internet
iii. Using search engines like Google and Yahoo
iv. Using Microsoft PowerPoint
v. Using Microsoft Excel
vi. Writing and sending e-mails
vii. Copying or downloading files from the Internet

The respondents were required to self-assess their skills in carrying out all the activities based on four types of ability that they had to choose. These were:

i. I don't know what this means
ii. I know what this means but I cannot do it
iii. I can do this with help from someone
iv. I can do this very well by myself

Based on the results of the ICT skills perceived by the students, the difference between the urban students' ICT skills and the rural students' ICT skills was determined to find out if it was statistically significant. An independent samples *t* test was used to compare the mean ICT skills for the urban students (M = 3.09, SD = 0.64) and the mean ICT skills for the rural students (M = 2.84, SD = 0.90) with the alpha level .05. It was found that the results were statistically significant, $t(897) = -4.88$, $p < .001$. It was evident that the urban students had higher ICT skills than the rural students. Thus, there was also a digital inequality in the ability of using the ICT between the urban and rural areas. The table below shows the results.

Table 5: The Independent Samples *t*-test Analysis of Perceived ICT Skills between the Urban and Rural Students

	School Location	N	Mean	*t*-statistic	*p*-value
ICT Skills	Urban	407	1.8888	-4.504	.000*
	Rural	505	2.1007		

* Significant at the 5% significance level

Discussion

First of all, it is encouraging to find that almost all students in the country had the experience using the computer. This finding was actually expected because ICT is at present considered as an important agenda by the Ministry of Education. Most schools from all over the country are now equipped with the ICT facilities (Kementerian Pelajaran Malaysia, 2007). As a result, students have more opportunity to use the computer. Involvements from other government agencies especially the Ministry of Energy, Water and Communications have also given the students more and better opportunity to use the ICT. For example, Village Internet Centres are increasingly being set up in the country in their efforts to narrow the digital gaps between rural and urban areas (SKMM, 2008). It is hoped that from all these efforts, all students will have the opportunity to at least use the computer.

This study has also provided empirical evidences that digital inequalities still exist between the rural and urban areas in Malaysia despite all the efforts made to narrow the gaps. It was discovered that the students in rural areas were left behind in all the four aspects of digital divide. These aspects were home computer access, home Internet access, ICT skills and ICT frequency of use. The urban students had more opportunity to access the computer and the Internet at home compared to the rural students. The ICT skills and frequency of using the ICT among the urban students were also found to be higher than the rural students.

It is also important to highlight that home computer availability for the students in the country is not really encouraging despite the fact that 63% of them had the access. Although a majority of them had the computer at home, the percentage was considered low compared to students in more developed countries. For example, Livingstone, Bober and Helsper (2005) reported that 87% of the students in the United Kingdom aged 9 to 19 years old had the computer access at home. This was then supported by Underwood, Dillon and Twining (2007) who found that 90% of the UK students had the home access. Data provided by OECD (2007) can also be used for comparison purposes. Based on the OECD data, households that had the ICT access in Denmark, Iceland, Sweden, Japan and the Netherlands were above 80%. The discouraging scenario of the students' lack of access to the ICT at home was due to the finding that only 55.7% of the rural students had the home computer access compared to the encouraging percentage of 72.2% of the students in urban areas. This also means that the government needs to put on more efforts in bridging the gap between the two geographical areas as well as increasing the number of home computer access in the country at large.

The results that indicated the urban students' ICT skills were higher than the rural students might suggest that there was a positive relationship between having an ICT access at home and ability in using the ICT. This is based on the findings of the study that the ICT was mostly accessed by the students at their homes and that urban students had a much higher percentage of having the home access. It also implied that the students who did not have the ICT access at home were less likely to use the ICT although there were opportunities for them to use it especially at school where most of the government schools at present including in the rural areas are equipped with ICTs due to the Ministry of Education's strong commitment in bridging the digital divide (Kementerian Pelajaran Malaysia, 2007). In other words, it can be said that having an access to the ICT at home provides a good opportunity for students to use it more frequently and develop their ICT skills. This is also supported by Trucano (2005) who concluded that students who frequently used the computer at home would most likely use the computer frequently at school also.

The findings also confirmed that Malaysia is still facing the challenge in the efforts to narrow the digital gap between the rural and urban areas just like most of the countries in the world. The divide between the two geographical areas is still a global issue as reported in Norris (2001), Kvasny (2002), Looker & Thiessen (2003), Ma (2005), Hubregtse (2005) and Huang and Russell (2006). The findings also supported the claims that digital inequalities between the rural and urban areas existed in Malaysia as mentioned by Alhabshi (2004), Zaitun & Crump (2005), Kementerian Pelajaran Malaysia (2007) and Suruhanjaya Komunikasi dan Multimedia (2008).

Conclusion

The overall findings of the study indicated that digital inequalities still existed between rural and urban areas in Malaysia. This occurred despite all the efforts made by the government especially through the Ministry of Education to bridge the digital divide between the two geographical areas. The students in rural areas were still left behind by the students in urban areas in most digital-related opportunities. These were inequalities in having the computer and the Internet access at home, the opportunity to access the ICT and the skills in using the ICT.

It is not to say that the government and other concerned parties have failed in bridging the digital inequalities but it is hoped that more efforts could be implemented to ensure that students in the rural areas are provided with more opportunities to get access to the ICT especially at home. It is mainly because students tend to use the ICT frequently if they have the home access although there are other places that they can use it. Efforts should also be done to ensure how students could make full use of the ICTs provided at their schools. This is especially to the students who do not have the ICT access at home. Similar efforts should also be considered on how to develop the skills in using the ICT besides ensuring them to have the access and use it frequently. Developing the skills requires beyond the access factor such as conducting formal training in using the ICT that includes both theories and practices.

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