



Adoption of Mobile Phones for Research as an Alternative to Desktop and Laptop Computers in Resource Constrained Countries: Case Study of Maasai Mara University

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ABSTRACT

Mobile phones, rather than personal computers, produced a rudimentary internet infrastructure in developing nations and due to limited land line availability, “the cell phones swiftly become the Africa’s computer of choice”. Technological innovation been adopted as quickly as the introduction of cell phones in developing nations. The study set out find out whether students have turned to mobile phones as research devices as an alternative to the desktop and laptop computers. The study was conducted using a questionnaire administered randomly to students at Maasai Mara University. From our study, we can conclude that mobile phones have become an alternative tool to desktop and laptop computers for research. With the advent of smart phones, mobile phones are even more popular for research because of high speeds and large storage capacities.

Keywords: *Mobile Phones, internet, desktop, laptop, research*

INTRODUCTION

During the heyday of the dotcom bubble, the notion arose of a digital divide, the disparity between the widespread internet accesses in industrialized nations vs. the limited connectivity in developing ones (Development, 2005) . As companies set up networks throughout developing nations, sales of inexpensive mobile phones (also known as cellular or cell phones) soared into the millions despite the low incomes of their people (Sullivan, 2007; Jing and Peng, 2010). The handsets offer effective communication in areas lacking extensive networks of land lines and do not need a continuous supply of electricity (“Mobile Telecoms in Africa,” 2011).

Mobile phones, rather than personal computers, produced a rudimentary internet infrastructure in these nations. Due to limited land line availability, “the cell phone is swiftly becoming Africa’s computer of choice” (“Mobile Telecoms in Africa,” 2011). Never before has a technological innovation been adopted as quickly as the introduction of cell phones in developing nations.

Most of the parents don’t have money to buy computers for their children but because a mobile phone is very basic especially for communication with their children while they are a way, for sending pocket money through M-pesa (mobile money) and the fact that mobile phones cost are low, many guardians buy for their children.

Most of the mobile phones nowadays have Wi-Fi capabilities and given the wireless internet is available in many public places including the university; it is possible for students to access the internet. Many times the students are given research assignments which they are supposed to go to the internet and do. Students always crowd in areas where hot spots signal is accessible on their mobile phones

.This prompted us to find out whether students have turned to mobile phones as research devices as an alternative to the expensive and heavy computers.

LITERATURE REVIEW

There have been many studies done on the positive impact of mobile phone adoption from as early as Hardy (1980) until recently where many children and youngsters own mobile devices, especially smart phones models with processors that rival even full sized desktop computers. They are a storage medium, media player, navigation system, encyclopedia, digital camera, game console, appointment book, news portal and a communication platform, as basic media equipment (JIM, et al., 2013). According to Barkham (2012) “it is not wise for institutions of learning that cannot afford modern ICT facilities to ignore powerful ICT gadgets in every student’s pocket” (Barkham 2012). Using mobile devices for educational purposes is becoming a common expectation of learners (Lan & Huang, 2012). “Smart phones are already used extensively in an informal learning context by enthusiasts” (Clough, et al., 2008).

Many students living and studying in developing countries, cell phones are the only computing technology they know and have access to. This makes mobile phones a potential alternative for computer supported learning. The cell phone has been argued to be an appropriate device for educational delivery in the so called developing world (Brown, 2013) Cell phones are considered capable of improving education for millions of underprivileged users; it is set to become a catalyst for narrowing the digital divide in developing countries. Despite this the Microsoft Chairman, Bill Gates, one of the world’s most generous philanthropists, has focused upon health, rather than technology, in developing nations (“Behind the



Digital Divide, 2005). The cell phone has the potential to provide an alternative access and participation mechanism for those who have previously been “digitally excluded” (Ford & Botha, 2009).

It is important to consider the use of mobile phones as potential learning tools because the devices do not permanently depend on electricity connection, are easy to maintain, easy to use audio and text interfaces, affordable and accessible (Valk, et al., 2010). The use of technology that did not exist ten years ago allows for a degree of freedom and autonomy.

METHODOLOGY

Selection of sample size

For us to determine the sample size we adopted Cochran method of sample size determination. For populations that are large Cochran, (1963) developed the method below to determine the size of the population.

$$n_0 = z^2pq/e^2$$

n_0 represents the sample size, z^2 is the abscissa of the normal curve that cuts off an area α at the tails ($1 - \alpha$ equals the desired confidence level, e.g., 95%) e is the desired level of precision, p is the estimated proportion of an attribute that is present in the population, and q is $1-p$. The value for Z is found in statistical tables which contain the area under the normal curve.

In our study we assumed 95% confidence, which is the popularly adopted level, desired precision of 7% because we felt that range is ok since the students have very contagious habits. Since we didn't know the degree of variability we assumed the maximum of 0.5

$$n_0 = (1.96)^2(0.5)(0.5)/(0.07)^2 = 160$$

We took a bigger sample to reduce errors and to take care of non-respondents. In our study we developed a questionnaire and produced 250 copies which were all given out. We gave the questionnaires to 20 interviewers who were chosen randomly. The interviewer administered the questionnaires randomly to students either from the hostels, lectures rooms or even just resting under trees. This was important because it reduced biasness.

RESULTS AND ANALYSIS

The percentages of the different variables of study were as distributed in the frequency tables 1 below

Table 1: Level of Course

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Degree	196	92.0	92.9	92.9
	Diploma	11	5.2	5.2	98.1
	Certificate	4	1.9	1.9	100.0
	Total	211	99.1	100.0	
Missing	System	2	.9		
Total		213	100.0		

The level of course was represented as shown above with 92 % taking degree courses, 5.2 % were taking diploma courses, and 1.9 % was taking certificate courses. This is a general representation of the university's student distributed. Most students take degree courses followed by diplomas and then certificates. There are very few post-graduate students and most of them are rarely on campus.

Table 2: Year of Study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	6	2.8	2.9	2.9
	2	80	37.6	38.8	41.7
	3	67	31.5	32.5	74.3
	4	53	24.9	25.7	100.0
	Total	206	96.7	100.0	
Missing	System	7	3.3		
Total		213	100.0		

The number of students in each year is almost the same as seen in table 2. The results show most of respondents are in 2nd,3rd and 4th year. This is because in most of the first years are not on session. The first years on session are the self-sponsored (not Kenya government sponsored students) a very small proportion of the student's population.

Table 3: Access to Computer

		Frequency	Percent	Valid Percent	Cumulative Percent
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Valid	Yes	170	79.8	80.2	80.2
	No	42	19.7	19.8	100.0
	Total	212	99.5	100.0	
Missing	System	1	.5		
Total		213	100.0		

Table 4: Own Computer

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	108	50.7	50.7	50.7
	No	105	49.3	49.3	100.0
	Total	213	100.0	100.0	

80.2 % of the respondents replied yes to having access to computers as seen in table 3 whereas 50.7 % of the respondents confirmed to own computers as seen in table 4. 19.8 % and 49.3 % denied having access to computers and owning a computer respectively. The students could be accessing the computers from their friends or from the computer laboratories.

Table 5: Type of Computer

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Laptop	88	41.3	79.3	79.3
	Desktop	12	5.6	10.8	90.1
	Tablet	11	5.2	9.9	100.0
	Total	111	52.1	100.0	
Missing	System	102	47.9		
Total		213	100.0		

Amongst the students who own computers majority own laptops as seen in table 5. This could be because of the portability ease of use, and performance. Tablets have small screens and lower specifications e.g. random access memory, hard disk size and processor speeds, therefore not convenient for students. Their prices are not very different from the ones of laptops which are more superior.

Table 6: Internet Access in Campus

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	193	90.6	91.5	91.5
	No	18	8.5	8.5	100.0
	Total	211	99.1	100.0	
Missing	System	2	.9		
Total		213	100.0		

Table 7: How often do you use computer for browsing?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Often	55	25.8	26.2	26.2
	Often	92	43.2	43.8	70.0
	Rarely	63	29.6	30.0	100.0
	Total	210	98.6	100.0	
Missing	System	3	1.4		
Total		213	100.0		

Table 6 shows that a large percentage acknowledged to having access to campus internet the percentage standing at 91.5 % with, 8.5 % denying access to campus internet. This is because the university has fast WI-FI. 26.2 % of the respondents went on to further confirm that they browsed the web very often using computers with 43.8 % and 30.0 % browsing the internet often and rarely as seen in table 7.

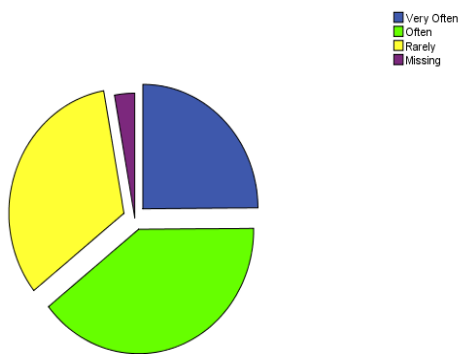
Table 8: How often do you use computer for research?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Often	53	24.9	25.6	25.6
	Often	84	39.4	40.6	66.2
	Rarely	70	32.9	33.8	100.0
	Total	207	97.2	100.0	
Missing	System	6	2.8		



		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Often	53	24.9	25.6	25.6
	Often				
	Often	84	39.4	40.6	66.2
	Rarely	70	32.9	33.8	100.0
	Total	207	97.2	100.0	
Missing	System	6	2.8		
Total		213	100.0		

How often do you use computer for research?



Out of the respondents questioned 25.6 % admitted to carrying out research very often using computers and 40.6 % did their research often with the rest rarely doing research using computers as shown in table 8. Also a large percentage accepted to using computers for entertainment apart from using the computers for research with research, games, and social being the least with 0.5 %.

Table 9: Phone Access

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	209	98.1	100.0	100.0
Missing	System	4	1.9		
Total		213	100.0		

The results show that majority of the students interviewed had phones as seen in table9 and 99.5% actually owned the phones as seen in table 10.

Table 10: Own Phone

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	212	99.5	99.5	99.5
	No	1	.5	.5	100.0
	Total	213	100.0	100.0	

Table 11: Access internet using phone on campus?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	181	85.0	85.4	85.4
	No	31	14.6	14.6	100.0
	Total	212	99.5	100.0	
Missing	System	1	.5		
Total		213	100.0		

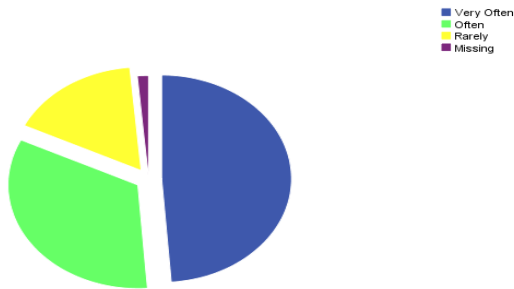
Table 12: How often do you use phone to do research?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Often	104	48.8	49.5	49.5
	Often	71	33.3	33.8	83.3
	Rarely	35	16.4	16.7	100.0
	Total	210	98.6	100.0	
Missing	System	3	1.4		
Total		213	100.0		

The study found out that 85% of the students use their phones to access internet on campus as seen in table 11 while majority use their phones for research as seen in table 11.



How often do you use phone to do research?



Hypothesis testing

The following hypotheses were tested and conclusions drawn as implied below

H₀: Students have adopted the use of phones for research more compared to use of computers

H_a: Students have not adopted the use of phones for research more than computers

The above hypothesis was tested at 95% confidence level using the chi-square non parametric test obtaining the following results.

Table 13: How often do you use computer for research?

	Observed N	Expected N	Residual
Very Often	53	69.0	-16.0
Often	84	69.0	15.0
Rarely	70	69.0	1.0
Total	207		

Table 14: How often do you use phone to do research

	Observed N	Expected N	Residual
Very Often	104	70.0	34.0
Often	71	70.0	1.0
Rarely	35	70.0	-35.0
Total	210		

Table 15: Test Statistics

	How often do you use computer for research?	How often do you use phone to do research?
Chi-Square	6.986 ^a	34.029 ^b
Df	2	2
Asymp. Sig.	.030	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 69.0.

b. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 70.0.

From the chi-square test it was evident that more students were using their phones to carry out research as opposed to the ones using their computers. Hence we accept the null hypothesis and we are 95% confident that there is more use of phones for research work compared to computer use amongst students in Maasai Mara University.

There was also a correlation between the numbers of students who had access to a computer to the number of students who used their computers for research work.

Table 16: Access to Computer * How often do you use computer for research? Cross tabulation

		How often do you use computer for research?			Total
		Very Often	Often	Rarely	
Access to Computer	Yes	52	74	38	164
	No	1	10	31	42
Total		53	84	69	206

Table 17: Symmetric Measures

	Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.



Interval by Interval	Pearson's R	.421	.052	6.625	.000 ^c
Ordinal by Ordinal	Spearman Correlation	.425	.053	6.714	.000 ^c
N of Valid Cases		206			

- a. Not assuming the null hypothesis.
- b. Using the asymptotic standard error assuming the null hypothesis.
- c. Based on normal approximation.

However the correlation between access to a phone and use for research could not be computed since the variable phone access was a constant statistic recording 210 responses out of 213, With 3 missing.

Table 18: Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Own Phone * How often do you use phone to do research?	210	98.6%	3	1.4%	213	100.0%

DISCUSSION

98.1 % and 99.5% agreed to owning and having access to phones respectively, compared to 80.2 % and 50.7% of the respondents who have access and own computers respectively. Out of the percentage that agreed to have access to phones 79.7 % had smart phones whereas 20.3 % did not have smart phones.

85.4 % could access the campus internet using their mobile phones compared to 91.5% who could access using their computers. This is because some students may not have mobile phones that are WI-FI enabled but they can access internet from the computer laboratories.

49.5 % out of the population that could access a phone confirmed to doing their research very often using their phones compared to 25.6 % who used a computer. 33.8 % of those who had access to mobile phones confirmed using it to do research compared 40.6% who used computers.16.7 % of those who had access to mobile

phones confirmed rarely using them for research as compared to 33.8% who had computers.

CONCLUSION

From our study, we can conclude that mobile phones have become an alternative tool to computers for research by students in Maasai Mara University. Mobile phones are much cheaper and more portable compared to computers. They can be used with memory cards for saving data. With the advent of smart phones, mobile phones are even more popular for research because of high speeds achievable using them and bigger storage space.

Maasai Mara University is one of 24 public universities in Kenya and we can conclude that mobile phones have become an alternative tool of research to computer amongst university students in public universities in Kenya because the sample selected can truly represent the student population in public Universities in Kenya and resource constraint countries.

There are many countries in the world at the same level of development as Kenya especially in Africa and Asia. The countries face the same challenge as Kenya and students face the same challenges. Since students face the same challenge, it is possible to generalize that mobile phones have become an alternative tool of research to computers in resource constrained countries.

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