IMPACT OF MOBILE DEVICES ON LEARNING IN AKURE

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ABSTRACT

A mobile device is an electronic device that are not restricted to a particular location but can be carried about to perform some kinds of computing. As long as there is a signal from the cellular network that is connected to, it can do nearly all the jobs the computer systems will do online. As mobility and found the clock cellular network signals availability had made it acceptable for people. In the light of this, this paper examines its impact on the learning among the students and educators. Literatures on the GSM technologies, mobile devices and related technologies were received. Questionnaires on the impact of mobile devices on learning were prepared and administered. Thereafter, the questionnaires were analyzed. The hypotheses were formulated and were tested using chi-square tool in Statistical Package for Social Sciences (SPSS). The results were interpreted and conclusion and recommendations were drawn.

Keywords: Mobile, Technology, Learning, Education, Location.

INTRODUCTION

The cellular network idea was first brainstormed in 1947. It was intended to be used for military purposes as a way of supplying troops with more advanced forms of communications. From 1947 till about 1979 several different forms of broadcasting technology emerged. The United States began to develop the AMPS (Advanced Mobile Phone Service) network, while European countries were developing their own forms of communication (Sanjay Et.al, 2008).

Europeans quickly realized the disadvantages of each European country operating on their mobile network. It prevents cell phone use from country to country within Europe. With the emerging European Union and high travel volume between countries in Europe this was seen as a problem. Rectifying the situation the Conference of European Posts and Telegraphs (CEPT) assemble a research group with intentions of researching the mobile phone system in Europe. This group was called Group Special Mobile (GSM) (www.LDPOST.COM, 04/05/2014).

In 1989 work done by the GSM group was transferred to the European Telecommunication Standards Institute (ETSI). The name GSM which was Group Special Mobile was transposed to name the type of service invented. Thus it name Global Systems for Mobile communications (www.LDPOST.COM, 04/05/2014).

The GSM revolution in Nigeria started in August 2001 when the licensed GSM operators namely, MTN, Econet and M-tel rolled out their services. This brought a great change in the face of Information and Communication Technology (ICT) in Nigeria. As at today, GSM has dominated the voice communication sector in Nigeria. As a result of the voice success story, Data communication has already gained good ground in GSM Network in Nigeria.

Today major GSM Network Operators in Nigeria namely MTN, GLO, Etisalat and Airtel are really into competition in rolling out the 3G and 3.5G Data services.

A Mobile Device

A mobile device, or handheld, is an electronic device that enables some kind of computing, and which is small enough to be easily carried around. The Motorola Corporation dominated the early decades of cell phone production in the United States and on 6 March 1983, Motorola unveiled the first commercially available mobile device, the analog DynaTAC 8000X. Its oversize profile stood 13 inches (or 33 cm) tall and 3.5 inches (or 88.9 mm) thick, weighing nearly 2 lbs. (or 0.9 kg). Over the years, there have been a lot of transformation has moved mobile device from that oversize to a small hand held device driving a fast sophisticated computing applications such as movie, games and so on. Commonly used mobile devices include cell phones, Personal Digital Assistant (PDAS) Smart phones and so on (www.wisegeek.org, 02/05/2014).

A Mobile Website

A mobile website is a hyperlink page on the Internet that has been adapted for use on mobile devices, such as smartphones. The increasing popularity of mobile devices has lead to the demand for mobile web development, in which typical computer activities, such as browsing websites, are accomplished on a device that fits within an individual's hand held devices. Many websites have redesigned their pages into a separate, mobile website to facilitate browsing on a smartphones. Opening a website on a mobile device may either prompt the mobile device user to select which layout option he or she prefers or may automatically redirect the user to the alternative site. One of the primary issues of computing on a mobile device is the significantly reduced screen size. A mobile website seeks to addresses this issue by reducing the amount of content that must be loaded (www.wisegeek.org, 02/05/2014).

Computers have been miniaturized into industrial and personal handhelds. They have small screens, and either basic keyboards or touch-sensitive screens for data input. Industrial handhelds are utilized for the scanning of bar codes and, sometimes, smart cards and RFID (radio frequency identification) tags. With personal handhelds, one can use popular applications for keeping notes, appointments, documents, and spreadsheets (www.wisegeek.org, 02/05/2014).

With the digitization of music, people can listen to a book rather than read it with audio players, present on mobile devices. Mobile devices are now having one capability to act as digital cameras to take pictures, view it and delete unwanted pictures immediately (stopwire.com, 05/07/2014).

The latest mobile phones combine calendars, games, personal navigation, media players, and cameras into one powerful system. The number of applications has exploded. E-mail from mobile devices is seamlessly synchronized with the email system accessed from desktops. The power of the internet is made available through web browsing. These devices are full-fledged multi-media players too. Mobile learning have now gained acceptance widely as a result of the outlined features of mobile devices and it acceptance among the users. Mobiles can support the great amount of learning that occurs during the many activities of everyday life, learning that occurs spontaneously in impromptu settings outside of the classroom and outside of the usual environment of home and office. They enable learning that occurs across

time and place as learners apply what they learn in one environment to developments in another (Bhan, 2011).

We have used computers for some time to do almost everything possible and came up with many innovative ways to use computers for teaching and learning in education. Mobile devices, once fully charged, can provide the same for 48 to 96 hours. Laptops and notebooks require connection to a network for Internet access, which is available at fixed locations in buildings or wireless access points, again at fixed and confined locations. Mobile devices have a network connection available all the time as long as the battery is charged. Mobile devices network availability and penetration is happening at a dramatic pace in developing countries. Already there is 68% penetration with an exponential growth of 10% per annum (ITU, 2010). Gaining the advantage of this penetration, learning and teaching should be able to take place anywhere whenever the student and the teacher are ready. The possibility of getting everyone educated once the constraints of attending classes at confined time slots and locations are removed is high with the advent of this mobile devices and communication technology. The objective of this work is to determine the impact of mobile devices on learning in Akure Ondo State.

LITERATURE REVIEW

A good number of studies have considered mobile devices as a resource for e- learning (Stone et. al, 2003, Whattananarong, 2005). All argue that the mobile's portability, simplicity, and affordability make it a natural fit for education initiatives in places where PCs and internet connectivity may be scarce. (Kumar et. al, 2009) argued that mobile devices are a perfect vehicle for making educational opportunities accessible to rural children than formal schooling. They conducted a 26-week study to investigate the extent to which rural children will voluntarily make use of mobile devices like cell phones to access educational content. Their results show a reasonable level of academic learning and motivation.

According to (Kamet. Al, 2008), Cell phones are increasingly gaining acceptance in the developing world and an increasing fraction of these phones feature multimedia capabilities for gaming and photos. These devices are a promising vehicle for personal learning to complement formal face to face learning.

Application for Mobile Technologies in Education

The National Educational Technology Plan of 2010 for the U.S. Department of Education in March 5, 2010 states put us a model that enables always on learning that will be available to students, educators and administrators regardless of their location of time of the day. A randomized evaluation of a mobile phone literacy and numeracy program in Niger (Akers et. al 2010), in which adult literacy students learned how to use mobile phones as part of a literacy and numeracy class. Students in ABC villages showed substantial gains in numeracy exam scores. As pointed out by (Ally, 2010), Rather than acquiring another technology to receive learning materials, people throughout the world will want to access learning materials on their existing mobile devices. As a result, educators and trainers must design learning materials for delivery on different types of mobile devices. A major benefit of using wireless mobile technology is to reach people who live in remote locations where there are no schools, teachers, or libraries. Additionally these remote locations have geographic terrains that are difficult for normal networking and cabling infrastructure. The (Gaskell and Mills, 2010) in a research paper titled Can we really learn from mobile handheld devices, concluded that there

is much evidence that mobile technologies are playing an increasing role in education (Warschauer, 2011), investigated the use of iPads in K-12 schools in the US, the research reveals that the students unanimously stated that they prefer using the iPads to the laptops due to the tablets light weight, mobility, touch screen, and apps.

METHODOLOGY

A survey approach was used in carrying out the research. The process involved in carrying out the research includes the following: A well structured questionnaire was designed to elicit responses from respondents; data was collected from the students of Secondary Schools, Undergraduate and Post Graduates School and relevant sources using questionnaires. Questionnaires were administered within the Akure metropolis in Ondo State Nigeria. The data and information obtained from the questionnaires were analyzed using chi-square analysis. After Interpretation of the results, then Conclusion and recommendation are drawn.

Details about methodology should be given in this section. Font Size 12, Times New Roman, single spaced.All the subheadings in this section should be in font size 12 Bold, Times New Roman, single spaced. The first letter of each word in subheading should be capital.

RESULTS
DATA COLLECTION AND ANALYSIS

The data used in this analysis was collected with the use of some well-structured questionnaires applied to different mobile device users in Akure metropolis using simple random sampling techniques. One hundred (100) questionnaires were sent out and 99 questionnaires were returned.

The data collected from the study were analyzed with the aid of Statistical Package for Social Sciences (SPSS) version 20. The statistical tools to be used include descriptive statistics, Chi square and Binary Logistic Regression. Results were also presented in form of frequency and percentage distribution and charts.

Theoretical Construct/Hypotheses

The following hypotheses relevant to our study were consequently formulated for tests thus:

H_1: Mobile Learning Software does not improve overall success performance.
H_2: Having Course Materials on Mobile devices does not improve Learning.
H_3: Receiving grades through Mobile devices does not make Learning completely comfortable.

Data Summary (Analysis of Responses)

Table 4.2.1 to 4.2.15 showed the summary of the survey data as provided by the respondents. 99 of the 100 questionnaires distributed across Akure metropolis of the Southern part of Nigeria were retrieved. In this section the analysis of the data collected is presented, and the results obtained from the analysis data are discussed.

Table 4.2.1: Respondent's gender

Gender	Frequency	Percentage	Cumulative percentage (%)
Male	36	34.4	34.4
Female	63	63.6	98.0
Total	99	100.0	-

Source: Primary data

Table 4.2.2: Age Bracket of Respondent

Age Declaration	Frequency	Percentage	Cumulative percentage (%)
15- 19 (years)	40	40.4	40.4
20 - 39 (years)	53	53.5	93.9
40 - 49 (years)	6	6.1	100.0
50 - 59 (years)	0	0.0	-
Over 60 years	0	0.0	-
Total	99	100.0	-

Source: Primary data

Table 4.2.1 and 4.2.2 represent the demographics of the respondent. The gender distribution is 64% for females and 34% are males. This indicates that mobile telecommunication subscribers have more females than males. Respondents between 15 and 19 years old have a 40%. We have 54% for those between 20 and 39 years old. Those between 40 - 49 years account for 6%. Those of 50 -59 years and above 60 years of age had no respondent, hence no percentage allocated. This indicates that most (54%) of the subscribers to mobile telecommunication services are between the ages of 20 and 39 years inclusive.

Table 4.2.3: Do you have a Mobile Phone?

Mobile Phone	Frequency	Percentage	Cumulative percentage (%)
Yes	97	98	98.0
No	2	2	100.0
Total	99	100	-

Source: Primary data

This analysis table on having a mobile phone by respondent shows that almost all the 99 respondents has a mobile phone which makes of 98% and a 2% of the 99 respondent not having a mobile phone.

Table 4.2.5: Occupation of the Respondent

Occupation	Frequency	Percentage	Cumulative percentage (%)
Student	89	89.9	89.9
Teacher	6	6.1	96.0
Lecturer	1	1.0	97.0
Civil Servant	3	3.0	100
Total	99	100.0	-

Source: Primary data

Table 4.2.4 and 4.2.5 represent the highest qualification of the respondent and the occupation they do. We can deduce that out of five categories displayed on highest qualification 13% have secondary education and 54% for tertiary education with 89% of student, little wonder it has higher respondent; 32% are post tertiary with no respondents on primary and with no

qualification indicating the norms that education is a necessary in Akure. Respondents for teacher shows a 6%; lecturer of 1% and civil servant have a 3% indicating a low respondents on the working class which is relevant to the concept of learning based to learning target.

Table 4.2.6: Where do you often use your mobile phone?

Often Use	Frequency	Percentage	Cumulative percentage (%)
Home	30	30.3	30.3
School	55	55.6	85.9
At work	12	12.1	98.0
Other	2	2.0	100.0
Total	99	100.0	-

Source: Primary data

The present of usage of mobile phone by respondents shows that at school which is 55.6%, 30.3% of the respondents uses their at home, 12.1% of the respondents uses theirs at work and 2.0% at others places. Indicating a higher percentage on school environment which is a good notation that the impact of mobile devices has it firm ground in the education sector in Akure.

Table 4.1.9: Do you have Internet access connection on your phone?

Internet access	Frequency	Percentage	Cumulative percentage (%)
Yes	80	80.8	80.8
No	17	17.2	98.0
Maybe	2	2.0	100
Total	99	100.0	-

Source: Primary data

The analysis above shows that 80.8% of the respondents have internet connection on their phone, which is a clear indication of the effort of NCC and telecommunication providers in Akure, 17.2% of the respondents thus do not have and 2.0% of the respondents are not sure.

Table 4.1.11: Would you be comfortable allowing your lecturers or teachers to contact you through your phone?

Receiving grade	Frequency	Percentage	Cumulative percentage (%)
Uncomfortable	93	93.9	93.9
Not sure	5	5.1	99.0
Comfortable	1	1.0	100.0
Total	99	100.0	-

Source: Primary data

From the analysis table above 93.9% of the respondent opined that they are completely comfortable allowing their teachers and lecturers to contact them on phone, 5.1% of the respondents are not sure and 1.0% is completely uncomfortable.

Table 4.1.12: Benefit of having course materials on phone

Benefit	Frequency	Percentage	Cumulative percentage (%)
Disagree	6	6.1	6.1
Not sure	8	8.1	14.2
Agree	85	85.8	100.0
Total	99	100.0	-

Source: Primary data

From the above analysis table 6.1% of the respondents completely disagree with the benefit of having course materials on phone, 8.1% of the respondent are not sure of it, 85.9% of the respondents completely agree that having course materials on phone is benefit.

Table 4.2.14: Relationship between Mobile Phone and Internet access
Do you have a mobile phone? *
Do you have internet access connection on your phone?

		Do you have internet access connection on your phone?			Total
		Yes	No	May be	
Do you have a mobile phone?	Yes	78	17	2	97
	No	2	0	0	2
Total		80	17	2	99

Source: Primary data

Table 4.2.14 reveals that 78% of the people having mobile phone has internet access connection whereas 17% of the mobile phone users does not have internet access on their phone in Akure.

Table 4.2.15: Test of Relationship between Mobile Phone and Internet access

		Value	Asymp. Std. Error[a]
Interval by	Pearson's R	-.067	.025
Interval Ordinal by	Spearman	-.070	.026
Ordinal	Correlation		
N of Valid Cases		99	

Source: Primary data

As indicated table 4.2.15, shows a negative relationship between internet and mobile phone with value r = (-0.67) and the negative correlation was significant with value (0.025). This implies that not all mobile phone devices are having Internet connection installed on it and vice versa.

Analysis and Test of Hypotheses

The three hypotheses were respectively tested, using Chi-square, Correlation and spearman's Rank Correlation thus:

H_1: Mobile Learning Software does not improve overall success performance.
H_2: Having Course Materials on Mobile devices does not improve Learning.
H_3: Receiving grades through Mobile devices does not make Learning completely comfortable.

How to Calculate the Mobile Device to Learning Using Chi-Square TEST for Mlearning in Akure, Ondo State, Nigeria

The chi-square (I) test is used to determine whether there is a significant difference between the expected frequencies and the observed frequencies in one or more categories. Do the numbers of respondents/individuals or objects that fall in each category differ significantly from the number you would expect? Is this difference between the expected and observed due to sampling error, or is it a real difference?

RECALL:

The null hypothesis states that there is no significant difference between the expected and observed frequencies. The alternative hypothesis states they are different. The level of significance (the point at which you can say with 95% confidence that the difference is NOT due to chance alone) is set at .05 (the standard for most science experiments.) The chi-square formula used on these data is (DiMaria, 2013):

$$X^2 = \frac{(O - E)^2}{E}$$

where *O* is the Observed Frequency in each category
E is the Expected Frequency in the corresponding category
is sum of
df is the "degree of freedom" (n-1)
X^2 is Chi Square

Procedures on Chi-Square Goodness-Of-Fit Tests

The steps in using the chi-square test may be summarized as follows:
1. Write the observed frequencies in column *O*
2. Figure the expected frequencies and write them in column *E*.
3. Use the formula to find the chi-square value:
4. Find the *df*. (*N*-1)
5. Find the table value (consult the Chi Square Table.)
6. If your chi-square value is equal to or greater than the table value, reject the null Hypothesis.

Similarly, the Chi-Square goodness-of-fit tests can be calculated using the steps above.

Test of Hypothesis (H1) Results and Interpretation

H_1: Mobile Learning Software does not improve overall success performance in Akure, Ondo State. This was tested with six tables listed as table 4.3.6, 4.2.8, 4.2.9, 4.2.11, 4.2.12 and 4.2.13 respectively. By following the aforementioned section 4.3.2.3 we have as follows:
Step 1: Write the observed frequencies in column *O*
Table 4.4.1: Observed frequencies in column *O* in H_1

Often use		Variables	Contact	Benefit	Improve success	Internet access	Self-conscious	Overall total
Home	30	Comfortable	93	6	95	80	90	394
School	55	Not sure	5	8	-	2	5	75
At work	12	Uncomfortable	1	85	4	17	4	123
Other	2	-	-	-	-	-	-	2
Total	99	Total	99	99	99	99	99	594

Step 2: Figure the expected frequencies and write them in column *E*
Table 4.4.2: Expected frequencies in column *E* in H_1

Often use		Variables	Contact	Benefit	Improve success	Internet access	Self-conscious	Overall total
Home	65.7	Comfortable	65.7	65.7	65.7	65.7	65.7	394
School	12.5	Not sure	12.5	12.5	-	12.5	12.5	75
At work	20.5	Uncomfortable	20.5	20.5	20.5	20.5	20.5	123
Other	0.33		-	-	-	-	-	2
Total	99	Total	99	99	99	99	99	594

To find the expected frequencies, we assume independent of the rows and columns. To get the expected frequency corresponding to the 30 at top left, we look at row total (394) and column total (99), multiply them, and then divide by the overall total (594). So the expected frequency is: 394 X 99 / 594 = 65.66; hence to get the entire table expectation entry we calculate (row total multiply column total) divide overall total.

Table 4.4.3: The computed chi-square table in H_1

O	E	(O - E)	(O - E) ^2	|O – E|^2/E
30	65.7	-35.67	1272.3489	19.3748881
93	65.7	27.33	746.9289	11.3739744
6	65.7	-59.67	3560.5089	54.2181955
95	65.7	29.33	860.2489	13.0995721
80	65.7	14.33	205.3489	3.12698188
90	65.7	24.33	591.9489	9.01399269
55	12.5	42.50	1806.2500	144.500000
5	12.5	-7.50	56.2500	4.50000000
8	12.5	-4.50	20.2500	1.62000000
2	12.5	-10.50	110.2500	8.82000000
5	12.5	-7.50	56.2500	4.50000000
12	20.5	-8.50	72.2500	3.52439024
1	20.5	-19.50	380.2500	18.5487805
85	20.5	64.50	4160.2500	202.939024
4	20.5	-16.50	272.2500	13.2804878
17	20.5	-3.50	12.2500	0.59756098
4	20.5	-16.50	272.2500	13.2804878
2	0.33	1.67	2.7889	8.45121212
			TOTAL	
			534.769549	

Step 4: Find the *df*. (*N*-1)

The number of degree of freedom is calculated from an m-by-n table as (m * n – 1); so in this case we have (6 * 4 – 1) = 24 – 1 = 23; hence the degree of freedom as 23 which is 35.172.

Step 5: Find the table value (consult the Chi Square Table)
Hence the tabular 95% value of X^2 (degree of freedom = 23) is 35.172; the calculated chi-square value for the set of data we analyzed (534.7695) is significant at 5% level and greater than the table critical value (35.172) - reject the null hypothesis, and accept the alternate (there is a significant difference). In this situation, the rejection of the null hypothesis means

that the differences between the expected frequencies and the observed frequencies are not due to chance. That is, they are not due to chance variation in the sample survey; there is a real difference between them. Therefore, in deciding Mobile Learning software does improve overall success performance in Akure, Ondo State. So we conclude that our survey sample supports the hypothesis of a difference, since the significant probability is lesser than α level i.e there is statistical reason to reject H_1 and conclude that Mobile learning software improves overall success performance.

Test of Hypothesis (H2) Results and Interpretation

H_2: Having Course Materials on Mobile devices does not improve Learning. This was tested with on eight tables listed as table 4.2.3, 4.2.6, 4.2.7, 4.2.9, 4.2.10, 4.2.11, 4.2.12 and 4.2.13 respectively. By following the aforementioned section 4.4.2.3 we have as follows:

Step 1: Write the observed frequencies in column *O*
Table 4.5.1: Observed frequencies in column *O* in H_2

Variable	Internet access	Having mobile	Purchasing new mobile	Variable		Variable	Comfortable receiving	Contact	Benefit	Self-conscious	Overall total
Yes	80	97	98	Home	30	Uncomfortable	9	93	6	4	417
No	17	2	-	School	55	Not sure	15	5	8	5	107
Maybe	2	-	1	At work	12	Comfortable	75	1	85	90	266
-	-	-	-	Others	2	-	-	-	-	-	2
Total	99	99	99	Total	99	Total	99	99	99	99	792

Step 2: Figure the expected frequencies and write them in column *E*
Table 4.5.2: Expected frequencies in column *E* in H_2

Variable	Internet access	Having mobile	Purchasing new mobile	Variable		Variable	Comfortable receiving	Contact	Benefit	Self-conscious	Overall
Yes	52.125	52.125	52.125	Home	52.125	Uncomfortable	52.125	52.125	52.125	52.125	417
No	13.38	13.38	-	School	13.38	Not sure	13.38	13.38	13.38	13.38	107
May be	33.25	-	33.25	At work	33.25	Comfortable	33.25	33.25	33.25	33.25	266
-	-	-	-	Others	0.25	-	-	-	-	-	2
Total	99	99	99	Total	99	Total	99	99	99	99	792

To find the expected frequencies, we assume independent of the rows and columns. To get the expected frequency corresponding to the 80 at top left, we look at row total (417) and column total (99), multiply them, and then divide by the overall total (792). So the expected

frequency is: 417 X 99 / 792 = 52.125; hence to get the entire table expectation entry we calculate (row total multiply column total) divide overall total.

Table 4.5.3: The computed chi-square table in H_2

O	E	(O - E)	(O - E) ^2	|O – E|^2/E
80	52.125	27.875	777.015625	14.9067746
97	52.125	44.875	2013.76562	38.6333932
98	52.125	45.875	2104.51562	40.3744004
30	52.125	-22.125	489.515625	9.39118705
9	52.125	-43.125	1859.76562	35.6789567
93	52.125	40.875	1670.76562	32.0530575
6	52.125	-46.125	2127.51562	40.8156474
4	52.125	-48.125	2316.01562	44.4319543
17	13.380	3.620	13.1044	0.97940209
2	13.380	-11.380	129.5044	9.67895366
55	13.380	41.620	1732.2244	129.463707
15	13.380	1.620	2.6244	0.1961435
5	13.380	-8.380	70.2244	5.24846039
8	13.380	-5.380	28.9444	2.16325859
5	13.380	-8.380	70.2244	5.24846039
2	33.250	-31.250	976.5625	29.3703008
1	33.250	-32.250	1040.0625	31.2800752
12	33.250	-21.250	451.5625	13.5808271
75	33.250	41.750	1743.0625	52.4229323
1	33.250	-32.250	1040.0625	31.2800752
85	33.250	51.750	2678.0625	80.5432331
90	33.250	56.750	3220.5625	96.8590226
2	0.2500	1.750	3.0625	12.2500000
			TOTAL	
			756.850223	

Step 4: Find the *df*. (*N*-1)

The number of degree of freedom is calculated from an m-by-n table as (m * n – 1); so in this case we have (8 * 4 – 1) = 32 - 1 = 31; hence showing a degree of freedom as 31.

Step 5: Find the table value (consult the Chi Square Table)
Hence the tabular 95% value of X^2 (degree of freedom = 31) is 44.985; the calculated chi-square value for the set of data we analyzed (756.8502) is significant at 5% level and greater than the table critical value (44.985) - reject the null hypothesis. In this situation, the rejection of the null hypothesis means that the differences between the expected frequencies and the observed frequencies are not due to chance. Therefore, having course materials on mobile device does improve learning. As such there is statistical reason to reject H_2 and conclude that having course materials such as lecture note, practice quizzes on mobile device improves learning.

Test of Hypothesis (H3) Results and Interpretation

H_3: Receiving grades through Mobile devices does not make Learning completely comfortable.

This was tested on four tables listed with table 4.2.3, 4.2.8, 4.2.9 and 4.2.10 respectively. By following the section 4.4.2.3:

Step 1: Write the observed frequencies in column *O*
Table 4.6.1: Observed frequencies in column *O* in H_3

Variables	Having a mobile phone	Internet access	Comfortable receiving grade	Improve success	Overall total
Yes	97	80	75	95	347
No	2	17	9	4	32
Maybe	-	2	15	-	17
Total	99	99	99	99	396

Step 2: Figure the expected frequencies and write them in column *E*
Table 4.6.2: Expected frequencies in column *E* in H_3

Variables	Having a mobile phone	Internet access	Comfortable receiving grade	Improve success	Overall total
Yes	86.75	86.75	86.75	86.75	347
No	8.00	8.00	8.00	8.00	32
Maybe	-	4.25	4.25	-	17
Total	99	99	99	99	396

To find the expected frequencies, we assume independent of the rows and columns. To get the expected frequency corresponding to the 97 at top left, we look at row total (347) and column total (99), multiply them, and then divide by the overall total (396). So the expected frequency is: 347 X 99 /396 = 86.75; hence to get the entire table expectation entry we calculate (row total multiply column total) divide overall total.

Table 4.6.3: The computed chi-square table in H_3

O	E	(O - E)	(O - E) ^2	|O – E|^2/E
97	86.75	10.25	105.0625	1.2110951
80	86.75	-6.75	45.5625	0.52521614
75	86.75	-11.75	138.0625	1.59149856
95	86.75	8.25	68.0625	0.78458213
2	8.00	-6.00	36.0000	4.50000000
17	8.00	9.00	81.0000	10.1250000
9	8.00	1.00	1.0000	0.12500000
4	8.00	-4.00	16.0000	2.00000000
2	4.25	-2.25	5.0625	1.19117647
15	4.25	10.75	115.5625	27.1911765
			TOTAL	18.7373919

Step 4: Find the *df*. (*N*-1)

The number of degree of freedom is calculated from an m-by-n table as (m * n – 1); so in this case we have (4 * 3 – 1) = 12 – 1 = 11; hence showing a degree of freedom as 11.

Step 5: Find the table value (consult the Chi Square Table)
Hence the tabular 95% value of X^2 (degree of freedom = 11) is 19.675; the calculated chi-square value for the set of data we analyzed (18.7374) is significant at 5% level and greater than the table critical value (19.675) – accept the null hypothesis (there is no difference). In this situation, the acceptance of the null hypothesis means that the no differences between the expected frequencies and the observed frequencies are due to chance. That is, they are due to chance variation in the sample survey. Consequently, there is statistical reason to accept H_3 and conclude that receiving grades through mobile device does not make learning completely comfortable.

SUMMARY OF FINDINGS

Based on the analysis on this project work and various statistical tests carried out, the following findings were made in the course of this research work:

i. There is a negative relationship between having a mobile device and having Internet access, which indicates that not all mobile phone devices are having internet connection installed on it and vice versa.
ii. Mobile learning software improves overall academic success performance.
iii. Having course materials on Mobile devices improves learning and enhances good academic performance.
iv. Mobile devices make learning completely comfortable.

CONCLUSIONS

From the project research and analysis been carried out, it was discovered that mobile devices have good impact on learning. Mobile devices technologies are playing an increasing role in education and the use of mobile technologies is increasing role in developed world.

RECOMMENDATION

In as much as Learners can be able to access the learning materials conveniently at anytime, anywhere from the mobile (handheld devices) and the research has shown that from the research that Mobile devices enhance learning, thereby, it is recommended that schools, individuals and governments should step-up to adoption of mobile devices learning.

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