Archives of Business Research – Vol. 11, No. 4
Publication Date: April 25, 2023
DOI:10.14738/abr.114.14391.
Wasiaya, O. C. (2023). Cognition as a Driving Factor for Mobile Phone Technology Use by Public University Students in Nairobi, Kenya. Archives of Business Research, 11(4). 76-86.

SERVICES FOR SCIENCE AND EDUCATION

Cognition as a Driving Factor for Mobile Phone Technology Use by Public University Students in Nairobi, Kenya

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ABSTRACT

This paper examined cognition as a driving factor for mobile phone technology use by public university undergraduate students in Nairobi, Kenya. The objective of the study was: to examine the drive of cognition on undergraduate university students' use of mobile phones. The research used the uses and gratifications theory and media technological determinism theory. The target population was 246,871 students in public universities in Nairobi, Kenya. The research design was quantitative. Findings indicated there was a correlation between extent of mobile phone technology use and cognition activities among undergraduate universities students. The research concluded that the more the need for cognition, the more the need for mobile phone technology use among university students. The research recommends to software developers that they could develop a specific mobile phone software for university students to use for cognition activities.

Keywords: Cognition, Mobile phone, Technology, Use

INTRODUCTION

Mobile phone as a communication medium has entrenched itself in the modern world as a tool that can be used for many functions besides communication. Its main strength is in the fact that it is portable and has multiple uses, especially the smart phones (Jiantti, 2015). Smart phones can be used to download and upload files such as songs, movies, sending e-mails, photographs, interactive games and searching for information from the Internet among other uses. According to Gardiner (2015), the need to use mobile phone is so strong that it is difficult to change adding that the mobile phone usage controls those students instead of them controlling it. In the United States of America, college students use mobile phones for privacy and also use them (mobile phones) to be in touch with their parents (Ishii, 2011). The writer, (Ishii, 2011) further states that the Scottish government has identified text bullying, filming violent incidents, downloading inappropriate materials, harassment, and data protection risks as some of the mobile phone abuses in their learning institutions, otherwise mobile phone should only help a student to make calls, text, e-mail, connect with the Internet, take pictures and make videos among other uses (Kolb, 2011). There is need to examine cognition as a factor that influence the use of the mobile phone technology among undergraduate university students in Kenya.

Background

In order to write a text or read one during class, it means the student's attention will be distracted and this will amount to misuse of the mobile phone. Ugur and Koc (2015), calls this habit – phubbing – which means phone snubbing, that is, attending to the mobile phone instead of the immediate surroundings. In the United Kingdom, lonely participants in a study preferred making voice calls and rated texting as a superior medium for expressive and intimate contact

(Reid & Reid, 2007). When this use persists, it may lead to addiction which then leads to the need to find out how cognition as a gratification factor drive such kind of mobile phone use. The mobile phone device has been found to be used by truant students to cheat in examinations which interfere with the measuring of learning outcomes, (Campbell, 2006). This is abuse of the device which should be used to enhance learning (cognition) by referring to educational resources from the Internet. In a study that examined parents', teachers' and students' perception of the effects of students' access to mobile phones on students' performance found that students with mobile phones perform poorly and misbehave more often than students without mobile phones while in Nigeria, looking into the usage and perceived effect implications Internet enabled phones have on the academic performance of the tertiary students found that Internet enabled usage does not affect the academic performance of the students, Ezemenaka (2013). Due to the diverse uses to which the mobile phone technology can be put to, it is most likely to be driven by various factors especially among university students. Undergraduate university students are not left behind in exploiting the advantages of the mobile phone technology which include calculator, clock, games, video function, calendar, FM radio, music player, picture identity, streaming multimedia, speaker phone, hard drive and camera among others. University undergraduate students being at that stage of life when they want to acquire as much learning as possible are likely to experiment as they seek what can satisfy their peculiar cognition needs. The mobile phone seems to be handy in fulfilling or gratifying these needs. In research titled "Mobile phone Usage at the Kenyan Base of Pyramid", the authors, Crandall, Otieno, Mutuku, Colaco, Grosskurth, and Otieno, (2012), found that of the mobile phone applications and services, 100 per cent of Kenyans use calling services, 85.3 per cent use SMS services, 84.4 per cent use M-Pesa services, 72.6 per cent use credit/airtime services, 12.1 per cent use mobile phones to track lost money while 18.9 per cent use it to monitor commodity prices. On the other hand, while striving to get maximum gratification from the mobile phone students invariably find themselves captivated by the many capabilities and the wide range of uses to choose from.

Research Problem

Studies have estimated that 100 percent of university students own and use mobile phones and that all of them bring these devices to class; (Ugur and Koc, 2015). Students employ mobile phones for discussion, photographs and video, podcasting, video recording, calculators, polling, research, calendars, taking notes and scavenger hunts (Kolb, 2011). This research seeks to examine how cognition as a gratifying factor is driving university students to use their mobile phones. In Tanzania, a study by Kihwele and Bali (2013), found that students with mobile phones perform poorly and misbehave more often than those without. With research capabilities, mobile phones can assist students to more quickly access information they need for the task they are working on which aids learning (cognition). In research carried out by Economides and Grousopolou, (2008), it was found that students typically used their phones more than 10 hours per week mainly for calling, which could be driven by factors such as the need for cognition. Educators can take advantage of the proliferation of the mobile phones and use it for instructional purposes (cognition), (Kolb, 2011). Texting can be very disruptive and distractive in many situations more so in a learning environment, (Kolb, 2011). It is common to observe students who are physically present, yet mentally preoccupied by non-course related material on their mobile phone devices. As mobile phone devices have deeply saturated the university student population, this problem pose a significant obstacle for faculty. The mobile

URL: http://dx.doi.org/10.14738/abr.114.14391.

phone device has been found to be used by truant students to cheat in examinations which interfere with the measuring of learning outcomes, (Campbell, 2006). This is abuse of the device which should be used to enhance learning (cognition) by referring to educational resources from the Internet.

RESEARCH OBJECTIVE

This research's objective was to examine the influence of cognition on undergraduate university students' use of mobile phones.

Research Question

The question of the research was: What is the influence of cognition on mobile phone use among undergraduate university students?

LITERATURE REVIEW

Theories

The research used the uses and gratifications theory and the media technological determinism theory as the main theories in trying to answer the question of the research. The uses and gratification theory, which was the main theoretical approach with which this research was done, states that people have needs and drives that are satisfied by using both media and non-media for communication. The theory was proposed by among others, Katz, Blumler and Gurevitch in 1974 when they postulated that people actively seek out specific media and specific content to generate specific gratifications (results), (West & Turner, 2000). Herta Herzog (1944) researched on women's preference for radio operas for emotional release, vicarious satisfaction and learning from the programs while Katz, Gurevitch, and Haas in 1973 found use of media as being for getting information, knowledge, pleasure, status, strengthening relationship and escape, (West & Turner, 2000). Perse (1995), states that people using computers for electronic communication satisfy the following needs: learning, entertainment, social interaction, escapism, passing the time and out of habit. Further, adding, use of computers hooked to networks or information services for reasons of passing time or out of habit suggests a routine use. It is said that this routine use of computers for connectivity might result in some users of computer networks or information services to misuse them (Severin & Tankard, 2001). Severin & Tankard, (2001), list information about things that might affect one or will help one do or accomplish something as a need for communication. The gratification factor influencing mobile phone use was singled out in this research as; cognition, that is, acquiring information, knowledge, and understanding, (Dominick, 2001). The other theory that was used in this research was the media technological determinism theory, that is, the relation between technology and society and is a term that was coined by Thorstein Veblen (1857-1929). In media technological determinism theory, technology is seen as the major mover in history where new technologies transform society at every level including institutions, social interactions and individuals, (Chandler, 1995). Proponents of the theory interpret technology in general and communications technology in particular as the basis of society in the past, present, and even in future. New technologies change society at all levels including institutions, social interactions and individuals, (Chandler, 1995). Pinch & Bjiker (1984) argued that technology design is an open process which can produce different results depending on the social circumstances of its development and is therefore subject to different interpretations. This research by looking at cognition as a driving factor influencing mobile phone technology

use by undergraduate university students, hoped to examine how the mobile phone as a relatively new technology was transforming the use of communication technology by undergraduate university students while in a university learning environment. Karl Marx had stated that technological development decides the kind of society that will emerge while Marshall McLuhan who was another proponent of the media technological determinism said that technological inventions lead to development of the modern world, (Chandler, 1995). Media is said to be a metaphor - a symbolic form - in which information is encoded. Different media have different intellectual and emotional biases, because of the accessibility and speed of their information, different media have different political biases, because of their physical form, different media have different sensory biases, because of the conditions in which we attend to them, different media have different social biases and because of their technical and economic structure, different media have different content biases, (Postman, quoted in Chandler, 1995).Communication media technology is fundamental to society and that particular technology influences social change and communication revolutions result in social revolutions. Chandler, (1995), says that many social and cultural phenomena seem to be shaped by technology. The mobile phone technology has relative advantage over fixed land line telephony. The mobile phones are essentially mobile computers with most featuring texting, digital photography, video capabilities, research capabilities and calculators among other features. These advantages have made the mobile phone technology to be quickly accepted among university students as it is relatively advantageous, compatible, observable and easy for any new user but this research zeroed in on how cognition and this technology has influenced students in their gratification seeking affairs. The major advantageous feature of mobile phone technology to university students is the 4E feature, that is, it is everywhere, every time, for everything and everyone (Yan, Chen & Yu 2013), so does being everywhere include in class, and how does cognition influence its use. Rogers (1995), says that relative advantage indicates the benefits and the costs resulting from adoption of an innovation. The relative benefits include the degree of economic profitability, low initial cost, a decrease in discomfort, social prestige, savings in time and effort, and the immediacy of the reward. Because of this, mobile phone has become the most widely and quickly spread technology and the most common electronic device the world over. So, this research attempted to examine how cognition as a gratification factor influenced mobile phone technology use by undergraduate university students in Nairobi, Kenya.

Cognition Factors that Drive Mobile Phone Technology Use

The cognitive deals with the knowledge of things. Cognition means the act of coming to know something. When a person uses a medium to obtain information, then he or she is using the medium in a cognitive way (Dominick, 1993). Mobile phones have become some of the necessary medium of communication among the youths (Ishii, 2010). Most undergraduate university students fall under the youth age bracket. Mobile media enables students to communicate with others without feeling constrained in the presence of their family. This means the medium sets the students free, making them feel liberated from the constraining presence of their family, a situation that obtains when the wired or fixed phone is used. The fixed phone is usually located in premises where the family is likely to be present and its use is invariably monitored thus making it difficult for the students to feel free to express themselves fully. This is the relative advantage that the mobile phone has (Rogers, 1995). A study done in Greece among university students found that respondents typically used their phones more

URL: http://dx.doi.org/10.14738/abr.114.14391.

than 10 hours per week mainly for calling, (Auter 2007, cited in Economides, 2008). In the United States, college students use mobile phones to maintain or manage privacy, but they also use them to keep in touch with their parents (Aoki, 2003, cited in Ishii, 2010). The current study sought to find out whether cognition drives how Kenyan university students use their mobile phones. Jiantti (2015), in the study "The Usage of Social Media among Young Adults Living in Nairobi, Kenya" says that when asked about the reasons for the popularity of the mobile phone, most interviewees pointed out that they (mobile phones) are cheap, easy to use and portable. Dominick (2001) asserts that according to the uses and gratifications theory, a medium (in this case, a mobile phone) can be used for cognition just like other educational equipment. However, since the sophisticated models like the smartphone can be put to various uses by the user, there is need to find out how cognition as a gratification factor drives mobile phone use among the Kenyan undergraduate university students. Ordinarily, it would be expected that since the students are in the university where their core business is learning, the assumption would be that the factor driving students to use mobile phones would be cognitive more than others in the society. In the United States, sophisticated mobile phones are used by students to cheat in examinations (Katz, 2012). In such a case, even though the gadget was used in a cognitive way, it was negative since it violated examination regulations which prohibit reference to course material during examinations. The mobile phone in such a case has been used to perpetuate an examination offence and the use was likely a misuse of the phone by the concerned student. The right way of using the phone would be to use it to thoroughly prepare for the examination then abide by the examination regulations that prohibit its use in the examination hall. There was need to find out whether cognition influences how the Kenyan undergraduate university students used their mobile phones. Cognitive use of mobile phone technology has been found to be a problem though. It can be put to some use which has negative consequences on intellectual development. For instance, it has been found through research that examined both faculty and students' attitudes about the mobile phone, that the technology is a source of distraction during class, and that it is a potential resource for cheating in examinations leading to a policy being sought to ban the usage of the mobile phone technology in classrooms and school grounds (Campbell, 2012).

DATA ANALYSIS

Methodology

This research used a quantitative design which included gathering assessable data while performing statistical techniques. So, the researcher gathered information from participants through sampling techniques while using questionnaires.

Population

The research targeted a population of 246, 871 undergraduates in six public universities with campuses within Nairobi City County (CUE, 2016). The research was restricted to six public universities within Nairobi City County as the focus of the research. Public universities are government sponsored so many parents and students would prefer them as their ultimate destination for higher education.

Table 1 Student Enrolment in Six Public Universities by Gender

Name of University	Number of Males	Number of Females	Total Population
University of Nairobi	49, 998	31, 591	**81, 589**
Moi University	23, 452	20, 856	**44, 308**
Kenyatta University	33, 755	25, 964	**59, 719**
Jomo Kenyatta University of Agriculture and Technology	15, 180	9, 979	**25, 159**
Egerton University	12,841	7,362	**20, 203**
Maseno University	9,646	6, 249	**15, 893**
Total	**144, 872**	**101, 999**	**246, 871**

Source: Commission for University Education: State of University Education in Kenya (2017)

Sample Frame

Six public universities with campuses in Nairobi City County were purposely picked to participate in this research. These included the University of Nairobi, Kenyatta University, Egerton University, Maseno University, Moi University and Jomo Kenyatta University of Agriculture and Technology. The student sample size was 573 respondents out of the 246, 871 students in the participating public universities.

Table 2 Population and Sample Size per University

University	Population	Sample Size
1. University of Nairobi	81,588	148
2. Moi University	44, 308	113
3. Kenyatta University	59, 719	184
4. Jomo Kenyatta University of Agriculture and Technology	25, 159	28
5. Egerton University	20, 203	76
6. Maseno University	15, 893	24
Total	**246, 871**	**573**

Sampling Technique

To arrive at the sample from the six public universities, the researcher purposefully sampled the faculties to take part in the research then used simple random sampling to pick the individual respondent. The respondents were stratified according to gender and year of study. The gender sampling was decided through proportionate sampling where the numbers in the groups selected reflected the relative numbers in the initial group from the population as a whole (Robson, 2002).

Data Collection Method

Quantitative data was used in the research and it involved the collection and analysis of numerical data gathered using the self-administered questionnaire.

Questionnaire

The questionnaire was issued to the respondents who were asked to fill and return to the researcher. The questionnaire had items which were aimed to capture validity and reliability of the outcome of the study.

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Data Collection

Data was collected using a self-administered questionnaire among the respondents. The questionnaire was given to respondents who had to fill and return. Closed questions were analyzed using the SPSS program as the main tool of analysis in this research. The same questionnaire with the same standard questions was administered to all student participants, the resultant data was expected to be reliable. The research targeted a sample of 573 undergraduate students. Data quality was maintained by checking on validity and reliability. All data was inspected for mistakes and corrected where necessary. The data was sorted and selected in accordance with outlaid standard of the research. The data that did not meet the standard were rejected. This research used internal consistency to test consistency of research instruments. This type of reliability estimates use of the coefficient of answers obtained from a single survey. This was based on the rating of research questions. The rating was categorized as positive or negative. If the rating of both questions were positive or negative among several respondents, the responses were said to be inconsistent and pattern less. When no pattern was found among responses, the questions were declared so difficult or easy and therefore there was random selection of answers and so unreliable and invalid. The data was cleaned, coded, and then entered. Entry was done repeated to minimize the incident of error. Factor analysis was used to analyze a factor that drive mobile phone technology use by public university students in Nairobi County, Kenya. The quantitative data in numeric form was reported as results (Creswell, 2011). Descriptive statistics of mean and standard deviation were used to answer the research question.

Results and Discussion

This part presents the response rate, the demographic data, findings and a discussion of research to achieve the specific objective. The first part of the questionnaire was about the respondent's bio-data. Here there were six items including: gender, year of study, age, area of study, access to a smart phone and the frequency of using a smart phone. Reliability is the level at which an assessment tool gives consistent results. This research used Cronbach's Alpha test for the reliability of the various constructs. Cronbach's Alpha coefficient is used to determine reliability of constructs extracted from both dichotomous and Likert formatted questionnaire or scale. The alpha coefficients range from 0 to 1 (Santos, 1999). The higher the score, the reliable the generated scale is. Nunnaly (1978) indicated that a coefficient of 0.7 and above is an acceptable reliability coefficient but lower thresholds are sometimes used in the literature. The results indicated that cognition had a reliability coefficient of 0. 823. According to Mugenda and Mugenda (2003), a coefficient of 0.70 and above implies high degree of reliability of the data. The construct of cognition, was found to be reliable. In this part descriptive and inferential statistics were used to present and analyze quantitative data collected with the purpose of interpretation of study results and findings.

Descriptive Analysis for Cognition

This part looks at the cognition variable which addressed the objective of the study which was to examine the influence of cognition on undergraduate university students' use levels of mobile phone technology. There were eight items in this section on cognition that used a 5-point Likert scale to measure the respondents' response to the areas being examined. The results are presented in Table 3.

Table 3 Descriptive Analysis for Cognition

	Strongly disagree %	Disagree %	Neutral %	Agree %	Strongly agree %	Mean	SD
I coordinate class meetings/activities	6.1	10.2	22.7	33.2	27.8	3.66	1.163
I sometimes refer/check hard concepts when not prepared for examination	21.0	12.2	18.1	27.6	21.0	3.15	1.436
I regularly search for educational information on the web	1.2	3.4	12.7	34.9	47.8	4.25	.890
I frequently share in-class media	3.9	13.0	22.7	33.5	26.9	3.67	1.121
I sometimes get distracted in class	11.8	14.0	27.5	29.2	17.6	3.27	1.241
I frequently get distant privileges of libraries	13.3	15.6	24.9	28.9	17.3	3.21	1.276
I frequently carry out in-class surveys	12.0	18.4	26.0	27.8	15.7	3.17	1.244
I frequently transfer files/photos/other data	5.6	3.9	13.9	35.0	41.6	4.03	1.104

The first item asked respondents whether they use mobile phones to coordinate class meetings/activities. The response was high at a mean of 3.66 with a standard deviation of 1.163 meaning the respondents agreed. Many of the students, 33. 2%, agreed that they used mobile phones to coordinate class meetings and activities while 27.8% of them strongly agreed. This implies that many respondents use the mobile phone for coordination of class activities. It was again found that majority of the students, 27.6% agreed and 21% strongly agreed that they sometimes use mobile phones to refer or check hard concepts when not prepared for exams. A good number of them, 21% strongly disagreed and 12.2% disagreed on using mobile phones to check hard concepts. Therefore, the students were indifferent on average as they neither agreed nor disagreed as indicated by a mean value of 3.15 and a standard deviation of 1.436. In the United States, sophisticated mobile phones are used by students to cheat in examinations (Katz, 2012). In this study, the students were noncommittal on whether they use the phones to engage in examination irregularity or not. However, their ambivalence can be understood when it is considered that examination cheating is an offence which students strive to conceal whenever it occurs. What is significant here is that the students use their phones to support their learning (cognition) activities. About searching for educational information on the web, a high number of respondents were found to use their mobile phones to do the searches at a mean of 4.25 with a standard deviation of 0. 890. Nearly half of the students, 47.8%, strongly agreed to use mobile phones to regularly search for educational information on the web while 34.9% agreed. The study found that a good number of the students, 33.5% who agreed and 26.9% who strongly agreed, frequently share in-class media. It was confirmed that students on average frequently shared in-class media as indicated by a mean of 3.67 and a standard deviation of 1.121.The respondents were neutral on getting distracted while in class by the mobile phone use at a mean of 3.27 and a standard deviation of 1.241.However it was found through a study in the United States that examined both faculty and students' attitudes about the mobile phone, that the technology is a source of distraction during class, and that it is a potential resource for cheating in examinations leading to a policy being sought to ban the usage of the mobile phone technology in classrooms and school grounds (Campbell, 2012). The sampled students seemed

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to have been shy and avoided to admit to anything that could jeopardize their continued freedom to use their mobile phones on campus otherwise a ringing or buzzing mobile phone is distracting to anyone anywhere. It was surprising, however, that a purely academic activity like getting distance privileges of using library services could receive ambivalent response from respondents just like carrying out in-class surveys. The students were neutral on these two items as indicated by mean values of 3.21 and 3.17 respectively and standard deviations of 1.244 and 1.104 respectively. Transferring files, photos and other data received high endorsement at a mean of 4.03 and a standard deviation of 1.104. Majority of the respondents were found to strongly agree and agree, at 41.6% and 35.0% of the respondents respectively. The researcher went ahead and asked the students to indicate uses of mobile phones for academic work and their responses were recorded in Table 4.

Table 4 Uses of Mobile Phones for Academic Work

	Responses		Percent of Cases
	N	Percent	
Research	3	18.8%	21.4%
Photos	3	18.8%	21.4%
Transfer data	1	6.3%	7.1%
Coming up with new programs and applications	1	6.3%	7.1%
Listening to music	1	6.3%	7.1%
Games	2	12.5%	14.3%
Social media	1	6.3%	7.1%
Online courses	1	6.3%	7.1%
Hard work and committed	1	6.3%	7.1%
I frequently share class assignments	1	6.3%	7.1%
I frequently download movies	1	6.3%	7.1%
Total	16	100.0%	114.3%

Summary of the Findings

This part summarizes the research's findings.

Demographics of the Sample Students

Out of the sampled participants, just more than half were male while the rest were female. This was taken as a favorable comparison between the genders. Many were in the fourth year of study, next were those in their first year of study, followed by second years, then by third years and finally the least were in their fifth year of study. In terms of age, many of the participants were aged 23-25 years, next were those who were aged 20-22 years then followed by those who were aged 17-19 years. Those aged 29 years and above followed and finally, those who were the least were aged 26-28 years.

The Drive of Cognition on University Students' Use Levels of the Technology

The objective of this research was to examine the drive of cognition on undergraduate university students' use of mobile phone technology. The research found that there existed a correlation between extent of mobile phone technology use and cognition activities. Cognition as a gratification factor was driving mobile phone technology use. Mobile phone technology use

has become important in the cognition needs among undergraduate university students in Nairobi, Kenya.

CONCLUSIONS

This research examined cognition as a gratification factor driving mobile phone technology use among public university undergraduate students. It is worth concluding that cognition is an important gratification factor in mobile phone technology use among undergraduate university students in public universities in Nairobi, Kenya. From the foregoing, it can be concluded that the more the need for cognition, the more the need for mobile phone technology use. This could be taken to mean that cognition as a gratification factor drive mobile phone technology use among public university undergraduate students in Nairobi, Kenya.

Recommendations

This research has established that undergraduate university students in public universities do use mobile phone technology to gratify their need for cognition. Behavior change advocators could rely on this technology to provide and / or avail platforms and information aimed at university students using this technology. The advocates would be confident that their information would be well received as those intended recipients are willing to use mobile phone technology for cognition and while at it get the advocator's information. The research dealt with undergraduate university students who were in the age group of between ages 17 and 29 years. The policy makers with information aimed at the youth in this age group who are in learning institutions could design their policies to regulate mobile phone technology use by the youth in learning institutions. The policy could assist in the recognition of mobile phone technology as a legitimate learning/teaching aid or tool that should be freely used by students in learning institutions. This research found that university students use mobile phone technology for cognition. In light of this, software developers could develop some software that is targeted at university students for their use for cognition (learning). This research targeted undergraduate university students in public universities in Nairobi, Kenya. Another research could be done among undergraduate university students in private universities in the same location to see if things were different. Similarly, another research could be done among post-graduate university students to find out if cognition as a gratification factor drive their use of mobile phone technology differently.

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