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Onyango Christopher Wasiaya, Dr Sikolia Geoffrey Serede

and Prof. Mberia Hellen Kinoti

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DEMOGRAPHICS AND MOBILE PHONE TECHNOLOGY USE BY UNIVERSITY STUDENTS IN NAIROBI, KENYA

[1*]Onyango Christopher Wasiaya

Post-graduate, Department of media technology & applied communication

Jomo Kenyatta University of Agriculture and Technology

Corresponding Authors Email: cwasiaya@yahoo.com

[2] Dr Sikolia Geoffrey Serede

Lecturer, United States International University

Corresponding Authors Email: gserede@gmail.com

[3] Prof. Mberia Hellen Kinoti

Dean, school of communication & development studies

Jomo Kenyatta University of Agriculture and Technology

Corresponding Authors Email: hellenmberia@gmail.com

Abstract

Purpose: This research investigated the moderating effect of demographic factors on mobile phone technology use by undergraduate public university students in Nairobi, Kenya. The objective of the research was to establish the moderating effect of demographic characteristics on undergraduate university students' use levels of mobile phone technology.

Methodology: The research used the media technological determinism theory as a theoretical framework. The target population was 246,871 undergraduate university students in six public universities in Nairobi, Kenya. The research design used was quantitative. Self-administered questionnaires were used as data collection tools. This study utilized purposive sampling to arrive at a sample size of 573 undergraduate students. The data was analyzed using descriptive statistics and then processed using the Statistical Package for Social Sciences (SPSS) version 22.

Findings: Findings revealed that mobile phone technology use by undergraduate university students was not subject to demographic factors. The research concluded that there was no moderating effect of respondents' demography on the relationship between undergraduate public university students and mobile phone technology use levels.

Unique Contribution to Theory and Practice and Policy: Since this research focused on undergraduate university students in public universities in Nairobi, Kenya, the researcher recommends that another research could be carried among post graduate students and also among private universities to find out if demographic factors may be affecting mobile phone technology use.

Key Words: *mobile phone technology, public university students, media, technology*

Introduction

This research intended to establish the moderating effect of demographic characteristics on undergraduate university students' use levels of mobile phone technology. In a study of mobile phones usage among college students in the Philippines it was found that female students use mobile phones on socialization particularly on networking sites such as Facebook, twitter, and Instagram while male students had the tendency to use mobile phones on entertainment particularly listening to music and watching videos (Alson and Misagal, 2016). The present study sought to find out if gender had any effect on mobile phone use among undergraduate university students. Ogutu, Mariita, Nyakerario, Wanekeya and Akoth (2014), in their study: "Mobile Phone Usage Among University Students in Kenya: A Case Study of the University of Nairobi", found out that male students were more satisfied with their phones applications than their female counterparts and that female students rated higher in terms of mobile phone technology usage for academic purposes. Their research was a case study of the University of Nairobi only but the present study proposed to find out whether demography was a factor affecting mobile phone use among university students in the universities studied in Nairobi City County. In a base of the pyramid study of mobile phone usage in Kenya, Crandall, Otieno, Mutuku, Colaco, Grosskurth, and Otieno (2012), found that there was no difference in mobile phone activities between men and women other than mobile Internet usage which they said was dominated by educated male youth.

Theoretical Framework

The theory that was used in this research was the media technological determinism theory, that is, the relation between technology and society and was a term coined by Thorstein Veblen (1857-1929). In media technological determinism theory, technology is the prime mover in history where new technologies transform society at all levels including: institutions, social interactions and individuals, (Chandler, 1995). In this study, the institutions were the universities, the social interactions was the utilization of mobile phone technology in socialization among the students and the individuals were the undergraduate university students. Being university students, their age has an impact on their interactions, their year of study has an impact and their gender too has an impact their mobile phone technological use. Technological determinists take technology in general and communications technology in particular as the basis of society in the past, present, and even in future. Karl Marx had said that technological development determines the kind of society that will emerge while Marshall McLuhan who was another proponent of the media technology determinism opined that technological inventions lead to development of the modern world, (Chandler, 1995). The modern word among undergraduate university students is epitomized by the possession and use of mobile phone technology.

This research focused on the demographic factors affecting the uses of the mobile phone technology as an interpersonal communication media among public university students in Nairobi, Kenya. According to Mc Quail (2000), communication media technology is fundamental to society and that particular technology influences social change and communication revolutions lead to

social revolutions. Chandler, (1995), argues that a wide range of social and cultural phenomena are seen as 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 easily embraced by university students as it is relatively advantageous, compatible, observable and easy for any new user but this research focused on the demographic factors that could be affecting mobile phone technology use. 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). Rogers (1995), points out that relative advantage are the benefits and the costs resulting from adoption of an innovation. Due to this, mobile phone has become currently the most widely spread technology and the most common electronic device in the world.

Methodology

Research Design

This research employed a quantitative research approach. This research design was preferred because the researcher had to use quantitative data in a single study.
Therefore, this design was to capture demographic factors affecting mobile phone technology use by undergraduate public university students in Nairobi, Kenya.

Sampling Frame

The sampling for the universities to be included in this research was purposively done from six public universities with campuses in Nairobi City County. These include the University of Nairobi, Kenyatta University, Egerton University, Maseno University, Moi University and Jomo Kenyatta University of Agriculture and Technology. The sample size was 573 respondents out of the 246, 871 students in the six public universities using the following formula (Bartlett et al, 2001):

$$\underline{n= z^2pq}$$
$$e^2$$

Where n = sample size
Z = Standard normal value (1.96 for 95% C.I)
P = Proportion of the population having desired characteristics (default = 0.5)
e = Margin of error (default 0.05)

Given a population of **246, 871** students, a confidence level of 95%, confidence interval of 5, the sample size would be 384 respondents. Using the Seitel (1987) method, 384 undergraduate students were drawn from the six public universities in Nairobi City County. However, because of the need to cushion against failure to participate, an additional student number was added as "over sample" (Bartlett et al, 2001). This study adopted the Bartlett et al (2001) formula for oversampling as follows:

$$n2= \underline{\text{Minimum Sample Size}}$$
$$\text{Anticipated Return Rate}$$

Where n2 = sample size adjusted for response rate

Minimum sample size = 384

Anticipated Return Rate = 67% (Bartlett et al, 2001)

Therefore, n2 = 384/.67 = 573

This therefore brings the sample to participate in the study to 573 students. (Bartlett et al, 2001)

Instrument

The self-administered questionnaires were given to the respondents who were asked to fill and return to the researcher. This research had the objective which was addressed in the main body of the questionnaire, that is, to establish the moderating effect of demographic characteristics of undergraduate university students' use levels of mobile phone technology.

Data Collection Methods

The research used quantitative data. Quantitative data involved the collection and analysis of numerical data gathered using the self-administered questionnaire. A self-administered questionnaire was used as the main method of data collection from the sampled students.

Moderating Model

Moderation suggests an interaction effect, where upon introduction of a moderating variable leads to changes in the direction of the relationship between the predictor and the response. A moderation effect could lead to one of the three things, that is, enhance, buffer or antagonistic relationship. This means that when a moderator is introduced it leads to an increase in the strength and significance of the predictor variable on the dependent variable. Buffering, this, means that when a moderator is introduced it leads to a decrease in the strength and significance of the predictor variable on the dependent variable. Lastly, antagonistic, where an introduction or an increase in moderation reverses the effect of the independent variable on the response variable.

A hierarchical multiple regression is used to examine the moderation effect while examining the relationship between independent and dependent variable. In simple words, testing moderation means assessing the interaction effect between a predictor and moderating variable and whether or not that effect is significant in predicting the response variable. The study had cognition, diversion and social utility as areas where university students could use their mobile phones technology. This study wanted to find out if age, gender, year of study, and area of study had any impact on these areas while a student is using mobile phone technology in a university learning situation. Like in the technological determinism theory, technological determinists take technology in general and communications technology in particular as the basis of society in the past, present, and even in future. Karl Marx had said that technological development determines the kind of society that will emerge while Marshall McLuhan who was another proponent of the media technology determinism opined that technological inventions lead to development of the modern world, (Chandler, 1995).

This research used the hierarchical multiple linear regression to examine the moderation effect of demographic characteristics on the relationship on the undergraduate university students' use levels of mobile phone technology. The demographic characteristics were gender of the respondents, their age, year of study and their area of study. Each has been examined separately.

Findings

Correlation Analysis of Gender and Mobile Phone Technology Use

A Pearson's correlation analysis was performed using mobile phone technology use levels by undergraduate public university students and the gender variable. The results were in Table 1.

Table1: Correlation Analysis of Gender and Mobile Phone Technology Use

		MOBILE USE INDEX	Gender
MOBILE USE INDEX	Pearson Correlation	1	-.112*
	Sig. (2-tailed)		.025
	N	405	400
Gender	Pearson Correlation	-.112*	1
	Sig. (2-tailed)	.025	
	N	400	411

*. Correlation is significant at the 0.05 level (2-tailed).

From the results, it was observed that there was a negative and statistically significant linear relationship between gender and mobile phone technology use levels by undergraduate public university students, r = -0.112, p = 0.025. This was indicated by significant probability values found to be less than 0.05 at 95% confidence level. This implied that gender was significantly related to mobile phone technology use levels by undergraduate public university students. This is in tandem with what Ogutu, Mariita, Nyakerario, Wanekeya and Akoth (2014), in their study: "Mobile Phone Usage Among University Students in Kenya: A Case Study of the University of Nairobi", found out that male students were more satisfied with their phones applications than their female counterparts and that female students rated higher in terms of mobile phone technology usage for academic purposes.

ANOVA for the Gender Moderated Regression Model

Analysis of variance (ANOVA) was used to test whether the gender moderated regression model was significant in predicting the undergraduate university students' use levels of mobile phone technology. The results in Table 2 proved that there was sufficient proof or evidence to reject the null hypothesis concluding that the gender moderated regression model was significant in predicting the undergraduate university students' use levels of mobile phone technology, (F = 8.978, p = <0.001).

Table 2: Hierarchical Linear Regression Analyses Results for Testing Moderation Effect of Gender

Model Variables	Model 1		Model 2	
	$\hat{\beta}$ (SE)	t (p-value)	$\hat{\beta}$ (SE)	t (p-value)
(Constant)	1.359 (0.304)	4.471(<0.001)	1.339 (0.305)	4.395(<0.001)
COGNITION	-.024 (0.074)	-0.322 (0.748)	0.020 (0.099)	.206 (0.837)
DIVERSION	.427 (0.076)	5.627(<0.001)	.353 (0.109)	3.255 (0.001)
SOCIAL UTILITY	.098 (0.065)	4.471 (0.132)	.172 (0.096)	1.785 (0.075)
Cognition_X_Gender			-.064 (0.135)	-.470 (0.639)
Diversion_X_Gender			.113 (0.133)	.848 (0.397)
S.Utility_X_Gender			-.114 (0.127)	-.900 (0.369)
R^2	0.108		0.121	
F	15.899*	<0.001	8.978*	<0.001
ΔR^2			0.013	0.122

* Significant at 5% level of significant

Correlation Analysis of Age and Mobile Phone Technology Use

A Pearson's correlation analysis was performed using mobile phone technology use levels by public university students and age as the independent variable. The results were presented in Table 3.

Table 3: Correlation Analysis of Age and Mobile Phone Technology Use

		MOBILE USE INDEX	Age
MOBILE USE INDEX	Pearson Correlation	1	-.066
	Sig. (2-tailed)		.198
	N	405	377
Age	Pearson Correlation	-.066	1
	Sig. (2-tailed)	.198	
	N	377	388

*. Correlation is significant at the 0.05 level (2-tailed).

From the results, it was observed that there was a statistically insignificant linear relationship between age and mobile phone technology use levels by undergraduate public university students, r = -0.066, p = 0.198. This was indicated by insignificant probability values found to be greater than 0.05 at 95% confidence level. This implied that age was not significantly related to mobile phone technology use levels by public university students.

ANOVA for the Age Moderated Regression Model

Analysis of variance (ANOVA) was used to test whether the age moderated regression model and was significant in predicting the undergraduate university students' use levels of mobile phones.

The results in Table 4 proved that there was sufficient proof or evidence to reject the null hypothesis concluding that the age moderated regression model was significant in predicting the undergraduate public university students' use levels of mobile phone technology.

Table 4: Hierarchical Linear Regression Analyses Results for Testing Moderation Effect of Age of the Students

Model Variables	Model 1		Model 2	
	$\hat{\beta}$ (SE)	t (p-value)	$\hat{\beta}$ (SE)	t (p-value)
(Constant)	1.334 (0.316)	4.227 (<0.001)	1.286 (0.316)	4.075 (<0.001)
COGNITION	-.034 (0.075)	-.448 (0.655)	-.421 (0.197)	-2.135 (0.033)
DIVERSION	.440 (0.077)	5.694 (<0.001)	.497 (0.193)	2.577 (0.01)
SOCIAL UTILITY	.095 (0.068)	1.407 (0.160)	.549 (0.214)	2.565 (0.011)
Cognition_X_Age			.153 (0.071)	2.164 (0.031)
Diversion_X_Age			-.034 (0.064)	-.528 (0.598)
S.Utility_X_Age			-.158 (0.070)	-2.267 (0.024)
R^2	0.113		0.139	
F	15.731*	<0.001	9.895*	<0.001
ΔR^2			0.026	0.012

* Significant at 5% level of significant

Correlation Analysis of Year of Study and Mobile Phone Technology Use

A Pearson's correlation analysis was performed using mobile phone technology use levels by undergraduate public university students and year of study. The results were presented in Table 5.

Table 5: Correlation Analysis of the Year of Study and Mobile Phone Technology Use

		MOBILE USE INDEX	Year of Study
MOBILE USE INDEX	Pearson Correlation	1	.022
	Sig. (2-tailed)		.710
	N	405	297
Year of study	Pearson Correlation	.022	1
	Sig. (2-tailed)	.710	
	N	297	305

*. Correlation is significant at the 0.05 level (2-tailed).

From the results, it was observed that there was a statistically insignificant linear relationship between the year of study and mobile phone technology use levels by public university students, $r = 0.022$, $p = 0.710$. This implied that the year of study was insignificantly related to mobile phone technology use levels by public university students.

ANOVA for the Respondent's Year of Study Moderated Regression Model

Analysis of variance (ANOVA) was used to test whether the year of study's moderated regression model was significant in predicting the undergraduate university students' use levels of mobile phone technology. The results in Table 6 proved that there was sufficient proof or evidence to reject the null hypothesis concluding that the year of study's moderated regression model was significant in predicting the undergraduate university students' use levels of mobile phone technology, (F = 8.172, p = <0.001).

Table 6: Hierarchical Linear Regression Analyses Results for Testing Moderation Effect of Year of Study

Model Variables	Model 1		Model 2	
	$\hat{\beta}$	t (p-value)	$\hat{\beta}$	t (p-value)
(Constant)	.986	2.700 (0.007)	1.000	2.696 (0.007)
COGNITION	-.014	-.167 (0.867)	.076	.405 (0.686)
DIVERSION	.516	5.641(<0.001)	.436	2.209 (0.028)
SOCIAL UTILITY	.097	1.180 (0.239)	.082	.427 (0.670)
Cognition_X_ Year of study			-.034	-.549 (0.583)
Diversion_X_ Year of study			.029	.446 (0.656)
S.Utility_X_ Year of study			.005	.074 (0.941)
R^2	0.144		0.145	
F	16.381*	<0.001	8.172*	<0.001
ΔR^2			0.001	0.952

* Significant at 5% level of significant

Correlation Analysis of Area of Study and Mobile Phone Technology Use

A Pearson's correlation analysis was performed using mobile phone technology use levels by public university students and the area of study as the independent variable. The results were presented in Table 7.

Table 7: Correlation Analysis of the Area of Study and Mobile Phone Technology Use

		MOBILE USE INDEX	Area of study
MOBILE USE INDEX	Pearson Correlation	1	.018
	Sig. (2-tailed)		.771
	N	405	271
Area of study	Pearson Correlation	.018	1
	Sig. (2-tailed)	.771	
	N	271	277

*. Correlation is significant at the 0.05 level (2-tailed).

From the results, it was observed that there was a statistically insignificant linear relationship between the area of study and mobile phone technology use levels by public university students, r = 0.018, p = 0.771. This implied that the area of study was insignificantly related to mobile technology use levels by public university students.

ANOVA for the Area of Study's Moderated Regression Model

Analysis of variance (ANOVA) was used to test whether the area of study's moderated regression model was significant in predicting the undergraduate university students' use levels of mobile phone technology. The results in Table 8 proved that there was sufficient proof or evidence to reject the null hypothesis concluding that the area of study's moderated regression model was significant in predicting the undergraduate university students' use levels of mobile phone technology, (F = 9.196, p = <0.001).

Table 8: Hierarchical Linear Regression Analyses Results for Testing Moderation Effect of Area of Study

Model Variables	Model 1		Model 2	
	$\hat{\beta}$	t (p-value)	$\hat{\beta}$	t (p-value)
(Constant)	1.115	3.202 (0.001)	1.151	3.298 (0.001)
COGNITION	-.031	-.376 (0.707)	-.255	-1.112 (0.267)
DIVERSION	.499	5.892 (<0.001)	.644	2.865 (0.004)
SOCIAL UTILITY	.100	1.296 (0.196)	.244	1.085 (0.279)
Cognition_X_ Area of study			.168	1.060 (0.290)
Diversion_X_ Area of study			-.116	-.765 (0.445)
S.Utility_X_ Area of study			-.108	-.697 (0.486)
R^2	0.131		0.145	
F	16.421*	<0.001	9.196*	<0.001
ΔR^2			0.015	0.139

* Significant at 5% level of significant

Summary

Arising from the analyses done, it could be seen that gender was significantly related to mobile phone technology use by public university students. Age was found to moderate the relationship between mobile phone technology use levels and public undergraduate university students while year of study was insignificantly related to mobile phone technology use levels by public university students.

Conclusion

From the study done, it can be said that gender, area of study were affecting mobile phone technology use levels by undergraduate university students. It could also be said that year of study and age do not affect mobile phone technology use levels by undergraduate university students. In other words, the mobile phone technology users at the university level do not depend on age, year of study or gender very much such that these as factors do not moderate mobile phone technology use.

Recommendations

The policy makers who target the youth in this age group who are in learning institutions could design policies to regulate mobile phone technology use by the youth in learning institutions. The policy could help in the recognition of mobile phone technology as legitimate learning/teaching aid tool that should be freely used by students in learning institutions. Behavior change advocates could latch on to this technology to provide and / or avail platforms and messages directed at university students using this kind of technology. The advocates would be sure that their messages would be well received as their targets are only too eager to use mobile phone technology whether for cognition, diversion or social utility and in the process consume the advocator's message.

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