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EDUCATIONAL COMMUNICATION USES OF SHORT MESSAGING SERVICES BY STUDENTS IN NIGERIAN UNIVERSITIES

Williams E. Nwagwu[1]
University of Ibadan, Nigeria

Abstract: A questionnaire was used to collect data from 1676 undergraduate and postgraduate students randomly selected from three major Nigerian universities to understand how media gratification and constraints motivated their use of text messaging to meet educational needs. Sixty-five (65%) and 63% of the respondents reported using the technology for contacting peers and lecturers for educational matters while less than 40% have used technology to contact lecturers and others respectively. Generally, closeness to mothers and education of parents influence use of the technology for educational contact. The instrumental gratifications of SMS capability to enable students escape face to face communication, convenience and low cost also explain use of SMS to make educational contact although this activity is constrained by the difficulty to decipher the intention of the messages and by the confusion that often arises due mainly to unclear acronyms.

Keywords: *short messaging services, SMS, Nigeria, mobile communication, texting*

INTRODUCTION

The mobile phone was invented in 1973, but its size efficiency, power economy and low-cost small packet exchange technology and others have made its penetration and diffusion the fastest, in comparison with other technologies (Leung, 2007). The Short Messaging Service (SMS) product of the technology was introduced in Europe in 1991, but it has developed into a major form of interpersonal mediated communication. SMS supports the sending and receiving of, not only texts, but also images, animation and sound originated or received by short messaging entities (SME) such as mobile phones, servers and personal computers (McAdams, 2006). SMS also supports e-mail addresses; messages can be sent and received instantly through a mobile phone, a fixed line phone, or over the Internet. In addition to messaging simple text strings, some mobile networks also enable multimedia messaging service (MMS), which include combinations of texts, voice, animated graphics, photos and video clips. SMS has many advantages over many other products of the technology and other forms of communication. It is devoid of weighty social structure and external surveillance and permits direct, non place-based, immediate and casual contact, enhancing communication in a manner that might not be feasible face to face or by telephone.

… mobile phones afford a fundamental

[1]Africa Regional Centre for Information Science, University of Ibadan, Nigeria,
Email: willieezi@yahoo.com

> liberation from place… Their use shifts community ties from linking people-in-places to linking people wherever they are. Because the connection is to the person and not to the place, it shifts the dynamics of connectivity from places – typically households or worksites – to individuals (Wellman, 2001).

In higher educational institutions, SMS has enhanced communication and information exchange in education by students, lecturers and authorities. It is being applied to conduct a feedback among students, lecturers and administration; news items and events, enrollment information, internship opportunities and grade results can be passed to students through SMS. SMS can also be used to alert students of events like job placements, contact specific students, send grades to students and notify students of results awaiting collection. Also, students may use the technology to seek advice from peers regarding lecture schedules and venues, as well as scheduling meetings, among others. Student unions and similar organisations in universities can use SMS to conduct voting, schedule meetings with students and send out promotional information. For those students who are far away from their parents or guardians, they may rely on SMS for communicating educational information with their family/relatives. Students also need to communicate educational issues with their lecturers; they may need to book meeting appointments, clarify issues and get information about educational issues.

In this study, the focus is on how media gratification and constraint variables motivate use of text messaging to meet educational needs by undergraduate and postgraduate students in Nigerian universities. In pursuing this objective, the following questions will be addressed: What are the educational purposes for which students in Nigerian universities use SMS? What are the major gratifications that motivate students use of SMS? What are the perceived constraints of SMS use? How do the demographic, gratification and constraint factors influence educational use of SMS among Nigerian students?

LITERATURE REVIEW

Theoretical perspectives

SMS as a medium of communication fits exactly the Uses and Gratification (U&G) perspective of Blumler and Katz (1974). The perspective is concerned with whether a technology use characteristics promote and foster individual and personal goal rather than merely enhancing exchange of messages. According to Palmgreen, Wenner, Rosengren (1985) a major issue in the use and gratification approach is that the audience participates actively in media selection and use, and that personal characteristics of the audience members and motivations shape choices and applications. Active audience has implications for utility – the uses people have for communication, intentionality or prior motivation that directs communication behavior, and, selectivity or prior interest and desires that affect communication choices and content. Put differently, audiences seek certain gratifications from communication media and the potential of a media to satisfy these gratifications motivate the use of any particular media. Satisfaction of certain psychological cognitive and emotional needs (Maslow, 1970), such as surveillance, information-seeking, entertainment, personal identity or companionship (Dimmick et al., 1994; Lin, 1998), will, for instance, influence choice of communication media. On the other hand, the technology might also not serve

its expected purposes if there are factors that inhibit its maximum use.

Several studies such as Peters, Johan, Buren, Snippers, Jacqueline (2003) and Harris et al., (2005) and Donna, Fraser and Reid (2007) have relied on uses and gratification theory to examine a wide range of SMS use motives. Using the perspective also, Leung (2007) summarised broad motivations of SMS use and they "included information exchange, conversation and socializing, information viewing, entertainment, information and education, escape and diversion, reassurance, fashion and status, and communication medium appeal.

There are other studies which used innovation adoption theory to examine ways in which everyday life activities influence mobile phone use and to a certain extent SMS usage. SMS is a robust, easy and cheap instant messaging technology, and it supports many different users from everywhere and provides access to the services from almost everywhere– while on transit, in group, alone, and other, without intrusion into anyone's conveniences. A major goal of this study is to explore a wide range of motivations and constraints that influence educational applications of SMS.

Mobile Communication and texting in Nigeria

Nigeria adopted the mobile communication technology in 1999, but has presently become a major telecommunication hub in Africa. International Telecommunications Union (ITU) revealed that between 2000 and 2006, the number of mobile subscriptions in Africa increased more than 12 times, from 15.6 million to 189.4 million, representing approximately 62 percent of total mobile and fixed line telephone subscriptions. Nigeria made a major contribution in this figure. According to Information Economic Report (2007-2008) of United Nations Conference on Trade and Development (UNCTAD), Nigeria has Africa's fastest growing mobile markets with a 125 percent average annual growth rate in the number of subscribers for mobile and fixed lines. Nigeria's telephone subscription figures rose to about 45.7 million in the first quarter of 2008 to become Africa's largest market, overtaking South Africa, and rising 10 per cent compared to seven per cent for Africa as a whole. According to Nigerian Telecommunications Report (2008), Nigeria's mobile market gained more than 11.3 million new customers in the first half of 2008, expanding by 28 percent to reach 51.73 million users. By the end of June 2008, mobile penetration in Nigeria had exceeded 33 percent. In its five-year mobile growth forecast for Nigeria (2008-2012) the report envisages a growth rate of 56 percent in 2008, and predicts that the number of customers will rise to over 63 million by the end of the year. Also, by the end of the forecast period in 2012, the report predicts a total market of 163 million customers, which is equivalent to nearly 94 percent penetration.

Linking up with people for social reasons is important for everybody, but most particularly to students, some of who live outside their homes and are disconnected from parents, siblings and some of their peers, and SMS meets this need. In the United States and Hong Kong, the use of the handset for this purpose has reached over 100% (OFTA, 2005). In Nigeria, many businesses are using SMS to ink their customers. For instance, courier companies use SMS to track information about postal packages, while travel agencies use it to provide flight-status updates. The banks have also found ways of benefiting from SMS technology.

All banks in Nigeria offer customers regular updates on their account balances, some send stock quotes to their clients, while others send messages to their customers when any unusual activity is detected on their accounts. According to Global Messaging 2008 conference, held in Cannes, France, African companies are leading the way in developing innovative uses of SMS messaging. "Delegates at the conference were surprised by the number of innovative ways that SMS messaging is already being used in Africa, especially for banking services, person-to-person messaging and local economic development," (Streicher, 2008). While these observations indicate heavy deployment of SMS in African countries, SMS statistics appear to be only maintained by individual telecommunication service providers, and not by any national agency. This is not the situation in Hong Kong (Leung, 2007) and the United States (http://www.statsmine.com) where SMS traffic is monitored and the statistics made available to the necessary public.

Age, Gender and Socioeconomic issues in SMS use

Much of the research on digital divide has found a relationship between use of modern technologies and demographic and social and economic status of individuals. Also, adoption of a given new technology and the embedded facilities they have is influenced by the constraints and opportunities that these new technologies bring. Those, combined with the final user needs, will always lead to dissimilar appropriation processes by prospective users in different communities. There is strong evidence that user groups of different age, sex, locality, culture, and socio-economic capital have shown different media usages (Bae, 2001; Kim, 2004; Na, 2001).

Leung et al (2007) used discriminant analysis method to show that student SMS users in Hong Kong were more likely to be male than female. In a different study, Muhammed (nd) showed that there is a significant difference between males' and females' lexical and morpho-syntactical choices in cell phone messaging and there is also no significant difference between their perceptions about influence of SMS on language of commercials. In their own study, Peters et al. (2003) showed that male and female users do not differ with respect to the number of messages sent, but that female users are apparently more enthusiastic about using SMS as a means of communication than male users. Peters et al also study assessed whether SMS motives are related to age, gender, current education, mobile phone experience, SMS experience and SMS use and located four types of motives for using SMS: entertainment, social interaction, immediate access, and efficiency. They discovered that immediate access and social interaction were most salient and more often endorsed by young people than entertainment and efficiency and that the mean for SMS experience for male users suggests a more extensive SMS experience than female users.

SMS is cheap but requires some physical and mental abilities and some free time for one to become an efficient user. Access to some expendable income is also a very important variable. Students who have higher allowances from their parents and guardians or from other sources are most likely to text more than their counterparts who do not have the same privileges. In view of the finding that educational status positively predicts income (Okuwa, 2007), it is expected that wards of highly educated persons might have access to higher maintenance allowance, which might also reflect on their SMS spending. As elsewhere, youth in Nige-

ria are more adept at experimenting with new technologies than their older counterparts (Nwagwu, 2007). Generally, youth have substantial spending power combined with having a lower depth of interaction than older people (Sutherland and Thompson, 2001). They also have more free time, and can live on a looser budget than their older counterparts. In contrast, a voice call can be easily done and might not require much of special skills. Young adults may therefore be more likely to develop SMS texting skills than older persons. Older people may focus their relationships around family and close friends and have smaller social networks, while the youth usually have a wide network.

Nwagwu (2008) showed in a study of students at the University of Ibadan in Nigeria that Internet skill is significantly associated with level of study. Inability to use the Internet decreases with increasing educational levels, although ability to use the same does not increase with increasing levels of education. To the extent that younger adults and adolescents are more adept at using technologies (Tapscott, 1998); use of SMS may decrease with increasing level of education. Many studies show that young adults use SMS for flirting and romantic purposes (Leung, 2007); young adults who are living with their parents might likely use less of SMS than those living on their own in the hostels or elsewhere, just as the married might also have less time and convenience to use SMS for this purpose. Lack of statistics of SMS in Nigeria and in other developing countries (Livingstone, 2004) might account for lack of data regarding the interaction between demographic factors and mobile phone technology adoption and use. Mobile phone has become a youth culture, and the characteristics of youth facilitate mobile diffusion among them, an observation that should make the subject of educational uses of the technology an interesting one.

What are the constraining factors in using SMS?

Like all other innovations, SMS is also fraught with its own difficulties. One of the major problems is that standard language is not used, a feature arising because the technology is suited for short messages only. Texters device their own ways of communicating information with their peers and this includes use of shortened forms of words and symbols based mainly on sounds and symbols. Shortening of words and use of symbols often have implication that the intended meaning of texts may not be understood by recipients of texts. Although Muhammed (nd) has studied differentials in males' and females' lexical and morpho-syntactical choices in cell phone messaging, another study will be required to establish the effect of this development on language skill development of young people, who are the most inclined to using the technology.

Although SMS is cheap relative to phone calls, those who are addicted to SMS may be spending so much sending texts as well as wasting of precious time. There also exist environmental specific challenges such as low service quality which often accounts for delayed delivery of messages, detracting from the instant messaging expectation of the technology. This is very common in Nigeria where there is evidence that text messages sometimes take a long time before being delivered. A factor that could discourage some people, particularly the older ones, from using SMS is the smallness of screens and keypads of handsets (Johansen and Hansen, 2003). Apart from straining the eyes, writing or reading the small size characters are complicated by the new text

language encyclopedia which will require some new literacy for older people to comprehend and use SMS efficiently.

Educational uses of SMS

Evidences abound that SMS is already being deployed to meet educational needs in Nigeria and elsewhere. In The Philippines, SMS is students' favourite means of communication with faculty and other students (Pabico, 2003; Mariano & De La Rosa, 2004). A study by Nonyongo, Mabusela and Monene (2005) in the University of South Africa established the critical role of SMS by students in South Africa. Many universities design SMS information systems to enhance communication between students and staff, and to meet other communication needs too. For instance, the Makerere University in Uganda acquired a software called Broadcast System (Kajumbulla, 2007), similar to the Chikka Network in the Philippines (Mariano & De LaRosa, 2004), which administers SMS instant messaging to the mobile phones or email addresses of students. In Nigeria SMS is also fast becoming an educational communication tool. GSM numbers constitute part of the data students supply while processing admission or registration in the three universities in this study. At the University of Ibadan, postgraduate applicants are notified of the success of their applications through bulk SMS, but SMS appears to be working better in the Universities in scheduling of meetings, distribution of reminders about meetings and related activities.

METHODS

Study Area

The study focuses on undergraduate and postgraduate students in the universities in Nigeria. According to the National Universities Commission of Nigeria, there were 94 private, mission and public universities in the country 2008 ending, spread around the 36 states of the federation. Although there are indications of differences in the socio-demographic characteristics of these universities and their students, the older universities are the largest; they are the most prestigious and the most equipped in terms of human and physical infrastructure, and requirements for securing admission into them are also more stringent than the newer ones. The new universities are mainly cosmopolitan in nature and their prohibitive costs are often met by students of affluent backgrounds, but they are known to be academically poorly staffed, and deliver lower quality of education than the older ones (Erinoso, 2007). The pattern of choice of institutions of learning among prospective students in the country seems to follow the path that students first attempt gaining admission into older universities first before they opt for the new universities. By implication therefore, older universities are constituted of students whose social status cut across all strata of the Nigerian society, and would suffice in the study.

Sample and sampling procedure

Three large, geographically central and oldest universities were purposively selected: Ahmadu Bello tertiary, Zaria in the arid, Islamic and mainly Hausa speaking North; tertiary of Nigeria, Nsukka in the Igbo speaking and Christian dominated East, and tertiary of Ibadan, Nigeria's first and largest tertiary located in the Yoruba speaking West, consisting of a mixture of Christians and Moslems. Nigeria's educational and cultural diversity is sufficiently demonstrated by the location of these universities in the major tribes that account for the largest population of the country, and which also reflect major

differentiating characteristics of people living in the various regions. Furthermore, the size and high reputation of the selected universities in comparison with the more recent ones, and their central locations make them major choices for higher education among youths across socioeconomic status. Considering a strategy to facilitate easy access to the respondents as well as ensure the inclusion of students from different academic departments and levels of study led the researchers to choose main and off campus hostels. At least 10% of the total number of students in each tertiary was targeted. At the end of the exercise, 1676 students were successfully recruited from the tertiary of Ibadan, 576 from Ahmadu Bello and 478 from tertiary of Nigeria Nsukka.

Data collection

Data was collected from the students using a questionnaire during the last weeks of February 2009. For face validity, the questionnaire was circulated to lecturers at the Africa Regional Centre for Information Science of the University of Ibadan for their comment and observations. The observations were mainly regarding the large number of questions in the form, and they were reduced according to their suggestions.

Measures

SMS Gratifications

Based on Leung's (2007) study, we listed 26 possible gratifications. To establish which of these gratifications as well as educational uses of SMS and constraints of the technology fit into our study environment, two focus groups consisting of 60 of students of the Africa Regional Centre for Information Science and Faculty of Education both of the University of Ibadan were constituted in two different sessions, and each session lasted for about two hours. The participants did not know about the research questions and did not also participate in the survey. After the sessions, the following categories of gratifications were arrived at: affection, escape, convenience, entertainment and coordination, and components constituting each of these groups were identified and cast in 20 statements. A 5-point Likert scale, from 1=strongly disagree to 5=strongly agree, to rate each of the reasons.

Educational use

The FGD also yielded four major categories of educational uses of SMS by students to exchange educational information with peers, contact family/relatives about educational needs, communicate educational issues with lecturers and seek advice on educational issues from any other sources. A dichotomous scale guided data collection.

Constraints of SMS

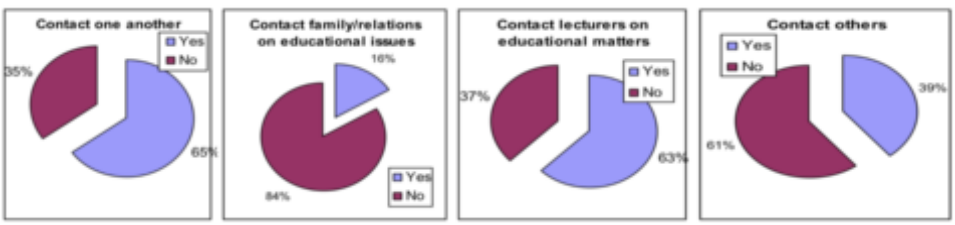
To assess the perception of the respondents on the limitations of SMS, participants in the FGD were asked to identify constraints they perceive in the use of SMS. Four groups of constraints namely: confusing acronyms, intention difficult to understand, timing and ergonomics were agreed upon. A total of eleven statements were finally constructed from the four groups, and the opinions of the respondents were collected using a 5-point Likert scale, with 1 = strongly disagree and 5 = strongly agree.

Statistical analysis

Principal component analysis was used to build a structure for the variables in each of the five groups of the gratification variables as well as the four groups of the constraint variables, adopting varimax rotation approach to account for expected correlations

among potential factors. The educational use variables were then examined. For each of the educational use variables, discriminant analysis was used to establish the predictor variables that successfully discriminated those who use SMS for educational purposes from those who do not. A regression analysis was finally carried out to examine how gratification variables, constraints and demographic variables predicted each of the education uses.

A cross correlation was used to diagnose the suitability of the demographic variables in the process, and it was found that there exist relatively high correlations (r>0.5) between highest educational level of father and highest educational level of mother, and between age and level of study. But review of literature in this study showed that SMS use has been found in several studies to be highly correlated with age (Leung, 2007) a reason for which the variable is considered very crucial in this study. Furthermore, given the importance of social status and its possible effect on expendable income among students (Okuwa, 2007), highest educational level of mother and highest educational level of father are aggregated to constitute parental education and parental occupation.



1a 1b 1c 1d

RESULTS

Educational uses of SMS

Figures 1a-1d show the frequencies of use of the various educational activities by the students. Using SMS to contact parents/guardians on educational matters is the least reason for which the students use SMS (16%). On the other hand, contacting peers for educational matters is the reason why 65% of the students use SMS, 63% of the students use the technology to contact lecturers while 39% for other contacts.

Gratifications of students use of SMS?

Principal component factor analysis was used to assess the underlying structure for the 20 gratification items as shown in Table 1. Altogether, the 20 factors explained 78.24% of the total variance. The Kaiser Mayer Olkin and Bartlett's test of sphericity is significant (p<0.05) for all the factors, indicating that the correlation matrices are significantly different from an identity matrix, and the correlations between variables are therefore not all zero, justifying the extraction. The factor loadings resulting from orthogonal rotation are the correlation coefficients of each item with the factor. These loadings are high in this analysis (being higher than 0.3), and show that all the factors have strong loadings, and this provides some support for these factors being conceptualized as pertaining to the same construct.

Using SMS to show affection, consisting of rebuke or express satisfaction with a per-

son, thanking people or showing appreciation, encouraging people or comforting people, sending goodwill messages, and sending romantic messages, was the first factor, and its components also have the highest mean scores compared to the components of other gratifications. The factor also explained the highest proportion of variance in the observation (31.16%) and had a high reliability Cronbach alpha coefficient (0.72). Within this component, sending goodwill messages to loved ones has the highest mean score but has the third highest factor loading. This is followed by thanking people, which has the highest factor loading, and then encouraging and comforting people which has the second highest factor loading. Romantic message was the fourth ranked component in terms of mean score but has the second lowest factor loading, while rebuking and expressing satisfaction/dissatisfaction which has the least factor loading also had the least mean score.

Escape was the second factor, which explained 19.17% of the total variance contributed by the five factors. It has a reliability Cronbach alpha value of 0.86 and Eigenvalue of 2.86. The factor consisted of engaging oneself with SMS in order to defer something one should be doing, playing tricks on acquaintances and evading face to face conversation. The factor loadings were highest for using SMS to distract oneself from what one should being doing currently, followed by playing tricks on people and finally avoiding confronting people face to face to discuss matters. The third factor was entertainment, which explained 13.34% of the variance and also has a reliable scale given the Cronbach alpha coefficient of 0.70, and an Eigenvalue of 2.52. Using SMS to get sports news is the first component in this factor and it has the highest factor loading, but the second highest mean score. Getting general news follows, but with the highest mean score while taking part in TV/radio talkshows and radio/TV lotteries and promotions, follow in this order of magnitude of factor loadings.

The fourth is convenience, which explained 8.90% of the variance, and has an Eigenvalue of 2.24. The scale of the factor is also reliable because it has a Cronbach alpha of 0.75. Ease of use component of the factor has the highest factor loading as well as the highest mean score while SMS' quick and immediate feature follows, but with the third highest mean score. Cheapness of SMS is followed by non-intrusiveness of SMS in terms of factor loadings, but they have the second and fourth mean scores respectively. Coordination is the last factor, explaining 5.6% of the variance but has a good scale given the Cronbach alpha coefficient of 0.85. The first component in this category is that SMS serves the students the purpose of agreeing and clarifying how and when to meet with acquaintances. The next component is to arrange time to phone each other and then to clarify information about an event. Clarifying information about an event has the highest mean score followed by arranging when and how to meet and arranging time to meet to talk.

Factors constraining SMS use

Principal component factor analysis was also used to examine the structure of the eleven identified constraints (see Table 2). Altogether these factors accounted for 78.78% of the variation in the factors that constrain the use of SMS. With $p=0.000$, the Kaisser Mayer Olkin and Bartlett test of sphericity is significant at $p<0.05$.

The first component in this regard are the confusions of SMS which include the

Table 1: Gratifications of SMS use by students

Gratifications of SMS	Mean	Std. Dev	Factors				
			1	2	3	4	5
Affection							
Rebuke, express dissatisfaction	2.93	1.371	0.423				
To thank people, show appreciation	4.32	0.982	0.842				
To encourage, comfort people	4.29	0.969	**0.863**				
To send goodwill messages to loved ones	4.46	0.928	0.831				
To send romantic messages to lovers	3.83	1.306	0.539				
Escape							
To put off something I should be doing	2.49	1.181		0.837			
To get away from what I am doing	2.46	1.165		**0.87**			
Helps me play tricks on other people	2.39	1.316		0.866			
To say what I cannot say face to face	3.18	1.462		0.811			
Entertainment							
Get general news	3.14	1.285			0.793		
Get sports news	2.98	1.316			**0.843**		
Take part in radio,TV talk shows	2.96	1.351			0.728		
Participate in radio,TV lotteries	2.86	1.386			0.536		
Convenience and low cost, SMS is:							
Quick and immediate	3.99	1.16				0.803	
Easy to use	4.09	1.082				**0.851**	
Cheap	4.07	1.127				0.777	
Not intrusive, free from interruption	3.58	1.278				0.589	
Coordination							
Arrange a time to phone, talk	3.7	1.117					0.873
Agree and clarify how and when to meet	3.968	1.037					0.906
Clarify information about an event	4.02	1.029					0.858
Eigenvalues			2.614	2.866	2.518	2.243	2.23
Percent of variance explained			31.16	19.17	13.34	8.901	5.67
Cronbach alpha			0.72	0.866	0.7	0.75	0.848
KMO and Bartlett's test (sig level)			0	0	0	0	0

difficulty that arises when different acronyms cannot be understood by the receiver, the annoyance that attend this confusion, the difficulty of understanding shortened phrases and difficulty of deciphering what the sender has in mind. This component has the highest proportion of variance in the observation (38.89%) and also has a high Cronbach alpha coefficient of 0.78 and an Eigenvalue of 3.72. Within this component, the annoyance that follows inability to understand a message has the highest mean score as well as the highest factor loading. This is followed by the

Table 2: Constraints of SMS use

Constraints of SMS	Mean	Std Dev	Factors			
			1	2	3	4
Confusion						
Different acronyms for the same word difficult to understand	2.97	1.255	0.981			
Annoying when you don't know what the acronyms stand for	3.26	1.242	0.992			
Non-obvious long phrases when shortened are confusing	3.24	1.205	0.955			
Acronyms in SMS have meanings that might cause confusion	3.18	1.242	0.927			
Intention						
Difficult to determine the intent from the SMS message	2.68	1.212		0.854		
Hard to figure out whether SMS message is a joke or serious	2.73	1.256		0.884		
Timing						
SMS come when it is inconvenient to read the messages	2.89	1.327			0.93	
Sometimes delayed delivery	4.04	1.112			0.618	
Ergonomic issues						
Some literacy required	3.68	1.234				0.669
Keypad is small	2.75	1.257				0.761
Limited in Volume of information carried	3.57	1.249				0.807
Eigenvalues			3.717	3.30	1.997	2.614
Percent of variance explained			38.89	22.872	20.57	17.67
Cronbach alpha			0.785	0.676	0.441	0.604
KMO and Bartlett's test (sig level)			0.001	0.001	0.001	0.001

struggle to understand difficult acronyms which has the next highest factor loading and the difficulty of understanding shortened phrases and then distinguishing and understanding acronym when they could also be used in other contexts.

The next factor is the difficulty of understanding the intention of the sender. It explains 22.87% of the variation although the Cronbach alpha coefficient of 0.67 is relatively low. Within this component, differentiating between a joke and a serious message has both the highest mean score and the highest factor loading. The next factor is that sometimes, the receiver often has a problem of struggling to infer the intention of the sender. The third component is the issue of time, which explained 20.57% of the variation, and has a low Cronbach alpha coeffi-

cient of 0.441. Delayed delivery is the first component in this factor, and it has a higher mean score but a lower factor loading than the next namely: SMS sometimes comes when it is inconvenient to read messages. Finally, ergonomic issues constitute the next component which has an Eigenvalue of 2.614 and a Cronbach alpha of 60%. Within this component, the problem of limited volume of information which SMS can convey at any time has the highest factor loading. The smallness of the size of keypad of handsets is the next factor, having a 0.761. Finally, the requirement of some literacy for using SMS has a factor loading of 0.669.

Discriminant analysis of educational use of SMS with demographics, constraints and gratifications

In this section, discriminant analysis was conducted to assess whether the various groups of predictors: demographics, constraints and gratifications could distinguish those students who used SMS to contact peers, contact family/guardians, contact lecturers and contact others for educational purposes respectively from those who did not. Table 3 presents the standardized function coefficients and correlations for the use of SMS to contact peers, family, lecturers and others.

(i). Contact Peers

The classification result indicates that the analytical model correctly predicted 60.9% of those who reported using SMS to contact their peers for educational information and 56.5% of those who did not. Table 3 shows that generally, only 59.6% of the cases were correctly classified.

Table 3 further suggests that the gratification variables of ease of use of SMS, getting sports news, and agreeing and clarifying how and when to meet successfully distinguished those who contacted their peers for educational information with SMS from those who did not. The correlations between the discriminant function and each of the predictor variables show that to agree and clarify when to meet have the highest correlation. On its own part, none of the constraint variables successfully classified the use of SMS.

For the demographic variables, Table 3 shows that younger and single female students who are sponsored by their parents, and whose parents have tertiary educational status and work in the public sector successfully discriminated the respondents who contacted their peers from those who did not. All the demographic variables that successfully classified the grouping variables have moderate correlations between 0.3 and 0.5. The rest of demographic variables did not significantly distinguish users accordingly.

(ii) Contact family

For contacting family, Table 3 shows that the model correctly classified 61.10% of the whole respondents. The classification result was also able to adequately classify 54.0% of those who contacted family using SMS and 67% of those who did not. The standardized function coefficients suggest that the gratifications of encouraging and comforting people, ease of use of SMS and getting sports news discriminated the students into users and non users of SMS for this purpose. On the constraints, unclear acronyms and limited volume of text accommodated by SMS messages contributes in enabling us understand whether a student will contact family or otherwise. For demographic factors, younger single female students of either Islamic, Pentecostal or Catholic extraction, who live off without

Table 3: Discriminant analysis of use of SMS to contact peers, family, lecturers and others for educational purposes with demographics, constraints and gratifications

	Contact peers		Contact family		Contact lecturers		Contact others	
	Function	**Correl.**	**Function**	**Correl.**	**Function**	**Correl.**	**Function**	**Correl.**
Gratifications								
To encourage, comfort people	-0.231	0.177	0.289**	0.398	0.071	0.226	-0.398	-0.19
To get away from what I am doing	0.15	0.161	0.064	0.023	-0.207	-0.171	-0.018	0.04
SMS is easy to use	0.335*	0.479	0.192**	0.321	0.228**	0.315	0.066	0.052
Get sports news	0.202**	0.332	-0.497**	-0.343	0.355	0.386	0.698**	0.591
To agree and clarify how and when to meet	0.514**	0.61	0.210**	0.336	0.162**	0.27	0.145	0.113
Constraints								
Unclear acronyms	-0.061	0.136	-0.011*	-0.026	0.086**	-0.071	-0.162	-0.159
Hard to figure out SMS message	0.116	0.196	-0.196	-0.107	-0.398**	-0.191	-0.077	-0.079
Limited volume of information carried	-0.061	0.003	0.131*	0.171	-0.040**	0.012	-0.037	-0.102
Demographics								
Age	-0.417**	-0.464	-0.03	-0.183	0.350*	0.023	0.138	0
Gender (Ref cat=Males)								
Females	0.456**	0.481	0.105**	0.282	0.378	0.387	0.604**	0.433
Parents closest to (Ref cat=none)								
Father	0.087	0.043	-0.09	0.032	0.01	0.071	-0.061	-0.095
Mother	-0.107	-0.005	-0.174*	-0.103	0.385	0.333	0.053	0.012
Education of parents (Ref cat=None)								
Primary	0.21	0.401	0.085	0.245	0.492	0.499	0.087	0.123
Secondary	-0.173	0.048	0.329**	0.378	-0.144	0.115	-0.194	-0.086
tertiary	0.144*	0.098	0.072	-0.074	0.253	0.133	0.198**	0.231
Occupation of parents (Ref cat=None)								
Self employed	0.058	0.083	0.307	0.316	0.07	0.09	-0.071	-0.123
Private sector	0.148	-0.027	-0.141	-0.253	-0.276	-0.275	-0.036	-0.009
Public sector	0.214*	-0.264	-0.130*	0.153	0.781	0.119	-0.911	-0.091
Religion (Ref cat=Others)								
Islam	0.15	0.282	0.115	-0.203	0.133	0.089	0.131	0.01
Pentecostal	0.228	0.104	-0.009	0.212	0.478**	-0.289	0.504**	0.231
Catholic	0.211*	-0.105	-0.317*	0.512	0.111	0.123	-0.101	-0.105
Protestant	0.11	0.117	0.215	0.176	0.135**	0.318	0.703	0.09
Living type (Ref cat= hostel)								
Off hostel (with parents)	0.828	0.421	0.312	0.281	0.499	0.101	-0.047	0.091
Off hostel (not with parents)	0.010*	0.146	0.440**	0.102	-0.314*	0.133	0.031	-0.106
Marital status (Ref cat=Divorced)								

Married	0.511	0.227	0.107	-0.11	-0.106**	0.519	-0.142	0.221
Single	0.320*	0.199	0.312**	0.14	0.142	0.311	-0.836**	-0.118
Sponsorship type (Ref cat=others)								
Parents	0.128*	0.023	-0.34	0.138	-0.444	0.105	0.119**	-0.19
Self	0.115	-0.121	-0.004	0.519	-0.209	0.033	-0.017	-0.1
Scholarship	0.128	-0.323	0.241*	-0.104	0.252*	0.1	-0.106	-0.203
Eigenvalue	0.044		0.026		0.108		0.101	
Canonical correlation	0.204		0.159		0.313		0.303	
Group centroids								
Yes	0.154		0.209		0.254		0.396	
No	-0.284		-0.178		-0.426		-0.256	
Cases correctly classified	59.60%		61.10%		64.40%		62.20%	

Notes: SMS users were coded as 1, and 0 otherwise; Figures are standardised coefficients, = p≤0.05

their parents but sponsored by their parents, and are close to their mothers as well as those whose parents have tertiary education and work either in the public sector or in the private sector successfully discriminated students into users and non users, with Pentecostal type of religious affiliation havuing the highest correlation (r=0.512).

(iii) Contact lecturers

On the use of SMS to contact lectures, the model correctly predicted 61.19% of those who contacted their lecturers using SMS and 51.89% of those who did. Table 3 shows that the model correctly classified 63.4% of the cases. In distinguishing those who contacted their lecturers from those who did not, ease of use of the technology and clarifying and fixing appointments are significant discriminating gratifications. But all the constraints of SMS: unclearness of the acronyms, difficulty of figuring out what the message is as well as limited volume of allowable text discriminate the respondents into those would contact their lecturers using SMS and those who would not. Older married and sponsored pentecostal or catholic students, who are not living with their parents are the demographic variables that discriminated respondents into those who would use or not use SMS to contact their lecturers.

(iv). Contact others

For using SMS to contact others, the classification results showed that the model correctly predicts 64.2% of those who reported contacting others for educational information and 61.6% of those who did not. Generally, Table 3 shows that 62.6% of the cases were correctly classified. The standard coefficients show that getting away from what one is doing, sports news and agreeing and clarifying when to meet are the gratification variables that distinguish the respondents according to whether or not they would use SMS to contact others. The ease of use of SMS and the use of SMS in encouraging and comforting people are not significant. In fulfilling these needs, unclearness of the acronyms is the only constraint variable that distinguishes the respondents into those who use and those who do not use. With respect to demographics, females who are

Table 4: Regression analysis of educational uses of SMS with demographics, gratifications and SMS Constraints

	Educational contact	***Contact peers***	***Contact family***	***Contact lecturers***	***Contact others***
	ßeta	*ßeta*	*ßeta*	*ßeta*	*ßeta*
Gratifications					
Affection	0.150*	0.101 *	0.043**		0.050*
Escape		0.332 *	0.102*	0.531*	-0.022*
Entertainment		0.122**	0.030*		-0.030**
Convenience and low cost	0.138**	0.031**	-0.311**		-0.010*
Constraints					
Confusion	0.111*		0.011 *	0.141**	0.110 *
Unclear intention	-0.210**		0.341 **	0.110**	
Timing	-0.327 **			0.101**	0.401 *
Ergonomic issues	0.311 **		0.022**	0.180 **	0.101 *
Demographics					
Gender (ref =Males)					
Female		-0.079*	0.039**		0.126**
Occupation of parents (ref=unemployed)					
Self employed	0.504*				
Private sector	-0.112**	0.344*	0.026*		
Public sector	0.780**		0.030**		
Closest parents (ref =none)					
Father					
Mother	0.022**	0.044*	0.070**	-0.072*	
Religion (ref= none)		-0.033	0.110*	0.173**	
Islam					-0.057**
Pentecostal					
Catholic	0.330**	-0.079*	0.223*		0.059*
Protestant	0.212**				-0.021*
Marital status (ref=divorced)					
Married		0.344*	0.039**	0.070**	0.310*
Single	0.415**				0.150*
Sponsorship type (ref=others)					
Parents					
Self	0.404*	0.044*		-0.170*	

Scholarship	-0.012**		0.131**	0.371**	
Age	0.541**	0.190*		0.366**	0.240*
Education of parents (ref=none)					
Primary					0.150*
Secondary					
Tertiary		0.221*			
Living type (ref=off campus)	0.473**		0.203*	0.422**	0.201*
Living in hostel					
With with parents	0.392*			0.321*	

Notes: (i). SMS users were coded as 1, and 0 otherwise;** = p≤0.05, (ii) values in the table are standardised coefficients

close to their fathers, pentecostal, not living with parents but sponsored by parents are mostly likely to correctly classified users or non users of SMS to contact others.

Predicting educational usage pattern of SMS

Table 4 is a regression analysis result showing the pattern of relationship between the various educational uses of SMS and the predictor variables. For gratification, affection has a significant relationship with educational contact (Beta=0.150, p<0.05), but convenience/low cost has a greater significance (Beta =0.138, p<0.01). All the gratification variables: affection (r=0.101, p<0.05), escape (0.321, p=<0.05), entertainment (r=0.122, p<0.01), and convenience/low cost (r=0.031, p<0.01) significantly relate to use of SMS to contact peers, although the later two were more significant than the the former two. This result also applies to contacting family, except that the significance of the relationship is higher for affection (r=0.043, p<0.01) and convenience/low cost (r=-0.311, p=0.01). For contacting lecturers, only escape (r=0.531, p<0.05) relates significantly with using SMS, and the magnitude of the relationship is relatively high.

SMS constraints of confusion in understanding SMS phrases used (r=0.111, p<0.05) and ergonomic issues (r=0.311, p<0.01) have positive significant relationship with the use of SMS for educational contact, while the relationship is negative for unclear intention (r=-0.210, p<0.05) and timing (r=-327, p<0.01). None of the constraint variables relates significantly with educational contact with peers. But unclear intention (r=0.341, p<0.01) and ergonomic issues (r=0.022), p<0.01) have significant relationship with educational of SMS to contact family, but relationship between use of SMS to contact others and confusion of SMS texts is less significant (r=0.011, p<0.05). Furthermore, all the constraint variables, except unclear intention, significantly relate with educational use of SMS to contact lecturers (p<0.01).

Age has a relatively high and significant relationship with using SMS for general educational contact (r=0.541, p<0.01), and also has a positive and significant relationship with making contact with lecturers (r=366, p<0.01) and contacting others (r=0.240, p<0.05). Being single is significantly related to general educational contact using SMS (r=0.415, p<0.01) as well as

contacting others (r=0.150, p<0.05). But being married relates significantly with contacting peers (r=0.344, p<0.05), contacting family (r=0.039, p<0.01), contacting lecturers (r=0.070, p<0.01) and contacting others (r=0.310, p<0.05). On its own part, gender relates significantly but negatively with contacting peers (r=-0.079, p<0.05), positively with contacting family (r=0.039, p<0.01) and contacting others (r=0.126, p<0.01). The three levels of occupation of parents namely self (r=0.504, p<0.05), private (r=-.0112, p<0.01) and public (0.780, p<0.01) relate significantly with use of SMS for educational contact, but only private sector employment type relates significantly to contact of peers (r=0.344, p<0.05). Using SMS to contact family is related to private sector (r=0.026, p<0.05) and public sector employment (r=0.030, p<0.01). Closeness to father relates to generally using SMS for educational contact (r=0.022, p<0.01) as well as contacting peers (r=0.044, p<0.05), contacting family (r=0.070, p<0.01) and negatively with contacting lecturers (r=-0.072, p<0.05) but not with contacting others. Closeness to mother relates significantly and negatively to contacting peers (r=-0.033, p<0.05) and contacting family (r=0.110, p<0.01), contacting lectures (r=0.173, p<0.01), but not with contacting others. Catholic and Protestant types of religious affiliation relate to using SMS to make educational contact generally (r=0.330, p<0.01) and (r=0.212, p<0.01) also to contact others (r=0.059, p<0.05) and (r=-0.021, p<0.05), but Catholics are less likely to contact their peers (r=-0.079, p<0.05) than they likely are to contact family (r=0.223, p<0.05).

Being sponsored by self (r=-0.012, p<0.05) or by scholarship (r=0.541, p<0.01) significantly relates to using SMS for making general educational contact; self sponsorship (r=0.044, p<0.05) and scholarship type of sponsorship (r=0.190, p<0.01) also relate to using SMS to contact peers and to contact family (r=0.131, p<0.01) respectively. Self sponsorship and scholarship sponsorship types also significantly and positively relate to contact of lecturers (r=0.3781, p<0.01) and (r=0.366, p<0.01); but those who have scholarship type of sponsorship are more likely to contact others (r=0.240, p<0.05) more those with other type of sponsorship. Tertiary status of parental education relates significantly with general educational contact using SMS (r=0.473, p<0.01), contacting peers (r=0.221, p<0.05), contacting family (r=0.203, p<0.05), lectures (r=0.422, p<0.05) and others (r=201, p<0.05). Living in hostel relates significantly with educational contact (r=0.392, p<0.05), contacting family (r=0.341, p<0.01) and lecturers (r=0.321, p<0.05).

DISCUSSION

SMS is no doubt an emerging communication choice among youth and is being deployed to facilitate educational information exchange in the universities in Nigeria. In varying degrees, the students actually reported using SMS to make educational contact; and they link one another most, parents next, followed by teachers and others the least. This result underpins the enormous interpersonal educational communication that goes on among students in the process of learning. The relative hugh proportion of students who reported contacting one anther for educational reasons suggests that students probably prefer receiving educational information from their peers before they could attempt other sources. Given the possibility of differentiation in the information students might required according to their sources, this result suggests further students expect that much of the information

they need could be obtained from their peers. More exciting than this result is the large number of students who reported using the technology to make contact with their lecturers. An interview would be required to establish exactly what types of information students communicate with their lectures using SMS. It is also important to understand the direction of this communication. Do lecturers also use SMS to communicate information back to the students or is it just the students that send texts to their lecturers? This understanding is important to know the extent to which lecturers are willing to absorb the cost of the technology to achieve delivery of educational information to their students.

Affectionate needs to encourage and comfort, and, share goodwill messages are the major gratifications of SMS use while avoidance needs of deliberate distraction from current engagement further explains SMS use. Youth also get instrumental, and this leads to the need for entertainment and convenience to also command the use of SMS, while self management task of coordinating one's schedules is also very important. The frustration that accompany the confusions in the shortening of words necessitated by the compulsion to say so much within the limited space constitute the major constraint reported by SMS users. Also, the difficulty to figure out what an SMS is all about, the possibility of arrival of texts at very unusual times, as well as late delivery of text messages and limited volume of texts constitute obstacles to the use of SMS.

The gratification variables of ease of use, getting sports news, and agreeing and clarifying how and when to meet successfully contributed to distinguishing those who used SMS to contact their peers from those who did not. But the constraints to SMS use did not appear to be an issue in contacting peers as they failed to classify respondents into users and non users. The demographic characteristics of highest educational level of parents and age-level were significant in classifying SMS users for the purpose of contacting peers for educational information. For contacting family, the gratifications of encouraging and comforting people, ease of use of SMS, getting sports news discriminate the students into users and non users. Also, gender, occupation of mother, religion, marital status are major demographic factors determining whether a student will or will not use SMS to contact family members. On the other hand, ease of use of the technology and capability in clarifying and fixing appointments are significant gratifications when contacting lecturers. Also, the unclearness of acronyms common with SMS users and the limited volume of information the technology permits for a single communication also classify those who use the resource for seeking advice from their lecturers from those who do not. Demographically, gender, closeness to parents, educational status of parents, marital status and sponsorship type influence some to use the technology to reach their lecturers and at the same time discourage others to do the same.

A regression analysis shows that for general educational purposes, closeness to mothers and education of parents foster use of the technology for educational contact, just as those who have sponsorship from their parents are most likely to making educational contact using SMS. Age plus level of study of the respondents negatively predicted educational use of SMS. The gratifications around the capability of SMS to enable students escape face to face communication, with SMS' instrumental convenience and low cost of SMS, also explain SMS use educational use.

This deployment of SMS for educational contact is, however, constrained by the difficulty to decipher the intention of the messages, and more by the confusion that often arises due to unclear acronyms.

For specific educational contact, there are variations on how the independent variables predict the use of SMS. Males appear to be more in touch with parents for educational information than their female counterpart just as Pentecostals make educational connection to their families more than respondents with other categories of religious affiliations. Younger students and those in lower classes and children of parents with tertiary education stay in contact with their parents more than the others. Furthermore, affection and entertainment are the major serious gratification explanations for contacting family for educational purposes, although the constraints of confusion of language and timing somewhat inhibit this opportunity.

Seeking advice from lecturers presented a different picture altogether because sponsorship type, education of parents and more significantly, age plus level of study of the student explained the practice. The major gratification explanation is the low cost and convenience of the technology. But it appears that lecturers might not appreciate struggling to decode and understand SMS texts when they come from their students, and this may be why the ergonomic constraints such as limitation in volume of SMS texts and timing and confusion of language are problematic in this regard. Demographic characteristics of marital status and living type and gender negatively predict interaction with lecturers using SMS.

For further studies, it may be necessary to examine exactly the detail of the information communicated by students with their parents, lecturers, peers and others. For instance, what specifically does a student discuss with his or her lecturer using SMS. This information is necessary for facilitating SMS information systems which have become necessary to reduce information communication gap that exists between parents and their wards when their wards are in institutions far away from home, and between lecturers and students and other peers.

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BIOGRAPHY

Williams Nwagwu holds a PhD in Information Science obtained from the Africa Regional Centre for Information Science of the University of Ibadan. He teaches science communication and quantitative aspects of the field.

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