

# Mobile Research Supervision Initiative (MRSI) at Makerere University: Lessons to Learn

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The rapid technological development in mobile phones coupled with their rapid diffusion into all walks of life has instigated various sectors to exploit them for various purposes aimed at enhancing organizational efficiency and flexibility. The communication, business, financial, banking and education sectors have developed and continue to develop applications for mobile phones. Our research sought to evaluate an initiative introduced at Makerere University's Department of Distance Education (Mobile Research Supervision Initiative – MRSI), for guiding (using mobile phones) distance learners who were completing their final year field research projects. The study adopted a mixed methods research approach, employing a self administered semi-structured questionnaire/survey, in-depth interviews and document review methods for data collection. Results from the evaluation have indicated that the mobile research supervision: i) created a virtual community of practice amongst research students and their supervisors, ii) motivated lonely distance learners in the field, iii) created a customer care feeling amongst students, and iv) bred intimacy amongst the alumni and their institution. The results of this study could be used to inform the development of mobile learning policy and pedagogy for developing countries.

**Keywords:** Distance learning, m-learning, e-learning, mobile research supervision

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## 1. INTRODUCTION

Mobile phones' diffusion, capability and portability are making them the number one companion for the human race. Other than their orthodox purpose of communication, mobile phones are also being used in the entertainment, business and education sectors. The education sector is using them to extend learning support to students in what is now called mobile learning (m-learning). Many institutions are implementing various educational applications for mobile phones. At the Department of Distance

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Education, Makerere University, mobile phones are being used to extend support (academic and administrative) to the distance learners. In particular, the Department of Distance Education introduced the Mobile Research Supervision Initiative (MRSI) on 1<sup>st</sup> August 2005, to support its students completing their final year field research project. Most of the support is embedded in SMS messages. SMS messages are sent out to research students to guide them in various aspects of research including: field data collection, making face to face meeting appointments with supervisors, providing pointers to useful literature sources, motivating the 'lonely' student in the field, pacing the students, encouraging students to collaborate amongst themselves, informing students of deadlines and providing a two way collaboration mechanism between the students and their supervisors. The mobile phone therefore has made the supervisor available to the research students at anytime in any place. This study sought to evaluate the extent to which the Department of Distance Education and the students are benefiting from the MRSI and draw lessons for improvement.

The Department of Distance Education was established at Makerere University in 1991. Its programmes cater for students who study through the distance education mode. The Department's programmes are run on a collaborative venture with other academic faculties in the University which run conventional/internal programmes [Aguti and Fraser 2006]. Hence Makerere University is a dual mode University. The Department of Distance Education carries out student support activities to students scattered in many parts of Uganda mainly via the radio [Kajumbula 2006]. As a mass media, the radio cannot provide synchronous or asynchronous one to one customized communication. Hence the Department introduced mobile learning to ensure one to one student to staff, staff to student, student to student and staff to staff support. The MRSI aims at enhancing collaboration among research students and their supervisors. Mobile research supervision involves the supervisor guiding the research student (using a mobile phone) as he/she carries out his/her final year field research project. It ensures that guidance is provided to the student at anytime in any place in the field.

## 2. GENESIS OF THE MOBILE RESEARCH SUPERVISION INITIATIVE (MRSI)

As a partial fulfilment for the requirements for the award of a bachelors degree from Makerere University, undergraduate students in their final year of study are required to undertake an independent field study in an area contributing to knowledge in any of the Department's specified research themes. As is the practice everywhere, each research student is allocated a supervisor, who is supposed to collaborate (through face to face or otherwise) with the research student on a regular basis. However, the face-to-face collaboration between the supervisor and the student was found to be inadequate. Often, research students were frustrated by the 'non-availability' of their supervisors when they came to meet them at the main campus, meaning that the students' face to face interactions with their supervisors were only limited to a few occasions. In some instances, the research paper unnecessarily prolonged the students' stay at the University beyond their programme's stipulated minimum duration\*. In other instances, the research paper proved to be too 'difficult' for some students to comprehend hence leading to failure in completing their programmes. These and other factors have been argued as the reason for poor throughput (60%) of distance learners at Makerere University [Otto and Wrightson 2005]. According to a number of research students, the perceived 'difficulty' in the research course was attributed to lack of adequate research supervision.

In a bid to make the research process a rewarding and exciting experience for the students and increase the supervisors' availability (physical and virtual) to their research students, the Department of Distance Education encouraged supervisors to integrate readily accessible ICTs into the research supervision process. The mobile phone has been highlighted in particular; because an earlier study [Kajumbula 2006] had revealed that 97% of distance learners at Makerere University had access to it. The initiative was named the Mobile Research Supervision Initiative (MRSI).

It was hoped that the additional voice and text collaboration on the mobile phone would help minimise the perceived negative impact of lack of face-to-face interaction and encourage the development of 'a personal touch' between the research students and their supervisors. This initiative, which falls in the wider context of m-learning, began in the 2005/06 academic year. Since then, the Department had not taken stock of its effectiveness and had not established the students' perception to it. We evaluated the

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\* Makerere University distance education programmes are not yet open. They have a minimum and maximum completion duration

initiative to establish its outcomes to the Department of Distance Education and students. An evaluation is “the systematic investigation of the worth or merit of some object” [Commonwealth of Learning 2007, p.37]. Evaluations are carried out to improve evidence-based decision making. This evaluation project was aimed at producing evidence to guide open, distance and e-learning (ODEL) practitioners and policy makers in deciding whether or not to continue investing in mobile research supervision and other mobile learning initiatives. It answered the general question – ‘Is it worthwhile to continue with mobile research supervision and should we invest more resources and effort into it or not?’ Specifically, the study has answered the following questions:

- i. What research supervision aspects were most adequately handled through mobile research supervision?
- ii. What influence did mobile research supervision have on students’ throughput?
- iii. What were the constraints faced by the research students during mobile research supervision?
- iv. What were the cost implications of mobile research supervision to the student, supervisor and Department?
- v. What other academic and administrative components could be delivered via mobile phones to distance learners at Makerere University?

### 3. EVALUATION FRAMEWORK

The evaluation study was underpinned by two major theories of learning, namely: the social constructivist learning theory [Brown and Campione 1996] and the conversational theory [Pask 1975]. The social constructivist learning theory required the research students to act and reflect within their social environment. The messages sent and calls made to the research students required them to act by solving a given research problem and reflect on the derived solution(s) with the aim of enriching their experiential knowledge. The conversation theory suggests that successful learning requires continuous two-way conversations and interactions between the teacher and learner and amongst the learners themselves [Pask 1975]. The MRSI embraced these two theories because text and voice messages sent to a supervisee’s mobile phone could be saved for future action and reflection, while the learners could use their mobile phones to converse/collaborate with fellow research students or with their supervisors. The MRSI is an abstraction from m-learning which in turn is a subset of e-learning.

M-learning is attracting considerable research among the academia and industry. While evaluating the effectiveness of SMS communication to distance learners at Makerere University, Kajumbula [2006, p.6] concluded thus, “... students' access to mobile phone technology is very high and therefore the mobile phone presents a very attractive option to easing communication between the students and the Department”. This conclusion implied the need to explore the mobile phone as an ICT for delivering a multitude of student support services. Fagerberg and Rekkedal [2004] see the mobile phone as a tool which increases flexibility in distance learning. With its collaborative features and portability, the mobile phone is capable of delivering learning at any time in any place.

However, simply jumping onto the bandwagon of technological innovations is not a panacea to improving student support. Different features of the technology must be understood by all the stakeholders before deploying the technology for learning or student support [Keegan 2005]. Pedagogical issues must be born in mind [Muyinda 2007]. Costs of the technological innovation have to be evaluated vis-à-vis the anticipated benefits [Graham, 2004]. The limitations of the technology must also be known in advance and mitigated. For instance, while considering delivering content on mobile phones with small screens and low memory, Zhang [2003] proposed to use Wireless Access Protocol (WAP) gateways, agent profilers and caching proxies to deliver content to users of the mobile phone in a combination of push and pull mechanisms. Some researchers [Sharples *et al.* 2005] are actually wondering whether the use of mobile phones in mobile learning is any different from the conventional e-learning. In other words, they see no difference between mobile learning and e-learning. To them, what is important is the careful integration of a new learning technology and not its hypnotization. Based on their view, one would be given a license to simply integrate mobile phones into the research supervision process without any due consideration. This would be unacceptable to Muyinda [2007] and Graham [2004] who prefer a careful and considered integration of new technology into the learning process.

#### 4. EVALUATION METHODOLOGY

A mixed methods approach employing quantitative and qualitative paradigms was employed. Distance learners who had completed their research project (herein referred to as research students), research project supervisors (herein referred to as supervisors) and administrators in the Department of Distance Education at Makerere University (hereafter referred to as administrators) formed the target population of the evaluation study. Using simple random sampling, 100 research students were selected from the Research Report Submission Register found in the Research Office at the Department of Distance Education. Phone calls were made to the respondents to recruit the research students for their voluntarily participation in the study. The phone calls to respondents also helped us to determine the most convenient mode of delivering the research instrument. Of the 100 research students selected, 86 agreed to participate in the research and provided postal mail addresses or physical locations. However 71 responses were returned representing a response rate of 84%. A semi-structured self-administered questionnaire was mailed or delivered physically to the research students. The questionnaire asked standard sets of questions including mobile phone ownership, mobile phone connectivity issues and use of mobile phone in research supervision. Such questions provided answers to questions from the measurement and understanding perspectives. Learners were given freedom, in the instrument, to express their opinions and views about the conduct and experience of mobile research supervision. Seventy-one responses were returned.

In order to obtain views, opinions, experiences and understanding about the MRSI, in-depth interviews were conducted with 5 supervisors and 2 administrators. These were purposively chosen as key informants. Since the in-depth interviews were semi-structured, we were able to obtain detailed answers to non-standard questions that were posed.

The data gathered was analyzed using descriptive statistics, and are presented in tables and text forms in the following section.

#### 5. RESULTS

##### 5.1. Mobility Characteristics of Research Students

##### 5.1.1. Employment Status of Research Students

One of the objectives of introducing the distance education learning mode at Makerere University was to extend university education to adults who found it difficult to leave their jobs or families to attend fulltime university education. We sought to establish the employment status of the research students and their distribution by region. The regional distribution variable was necessary for establishing the proximity of the research students to Makerere University's main campus. Employment status would provide a lead into the ability of the research students to pay for their own mobile communications costs. Results are presented in Table 1.

Table 1. Research students' region of aboard and employment status

Region	Education Sector (Freq)	Business/Financial Sector (Freq)	Self Employed (Freq)	Unemployed (Freq)	Total (Freq)
Western	1	2	1	2	6
Central	13	8	3	20	44
Eastern	3	3	0	5	11
Northern	2	0	0	8	10
Total	19	13	4	35	71

Source: Primary data

From Table 1, it is evident that 35 of the 71 (or 50%) of the research students were unemployed. Sixty seven percent (or 24 out 36) of those that were employed were working in the central part of Uganda with

the northern part of the country contributing only 2 out of 36 working research student. The majority (44 out of 71 or 62%) of the research students were from the central region of Uganda. This region is in close proximity to Makerere University's main campus; therefore, the research students could easily travel to the main campus to physically meet their supervisors. Of those who were employed, 53% (19 out of 36) were employed in the education sector, 36% (13 out of 36) in the business/financial sector, and 11% (4 out of 36) were self employed. It is not surprising that the education and financial sectors featured most because respondents were drawn from the Department of Distance Education which offers the Bachelor of Education (external) and Bachelor of Commerce (external) degree programmes.

An assumption is made that the 50% unemployed research students, may not be able to afford mobile phones and their associated costs. This assumption was thwarted by the pervasiveness of the mobile phones among research students as presented in Section 5.1.2 below.

### 5.1.2. Mobile Phone Pervasiveness

Here, we present findings related to mobile phone ownership, research collaboration and connectivity issues. These findings are important for bringing out the plausibility of mobile research supervision among distance learners in Uganda.

#### *Mobile Phone Ownership*

Respondents were asked to indicate whether they had a personal mobile phone or not in order to determine the proliferation of this device among research students. The results are indicated in Table 2 below and in the text that follow.

Table 2. Mobile phone ownership

<b>Mobile Phone Ownership</b>	<b>Frequency</b>	<b>Percent</b>
Owned a Mobile Phone	68	96
Did Not own Mobile Phone	3	4
Total	71	100

Source: Field data

The data presented in Table 2 contradicts the assumption made previously in regard to unemployed research students not being able to own and maintain a mobile phone, as 96% of the research students, regardless of employment status, owned mobile phones. Also all supervisors and administrators interviewed owned a mobile phone. This indicates a high penetration of the mobile phone among the students, supervisors and administrators.

#### *Mobile Phone Research Collaboration*

A follow up question asked research students who had a personal mobile phone to indicate whether they had used it to collaborate with their supervisors and amongst themselves during the research process. The data collected indicates that the mobile phone enabled 93% (n=63) of the research students to collaborate with their colleagues and supervisors on various aspect of research using their mobile phones while 7% (n=5) did not use their mobile phones for research collaboration.

#### *Mobile Phone Connectivity Issues*

We wanted to establish whether a research student could send/receive a text message or make/receive a call wherever he/she was, at anytime and whether he/she could afford the cost of mobile communication. Sixty nine percent (69%) of the research students never had any disruptions in network connectivity, 30% sometimes had disruptions while only 1% always had mobile network connectivity problems. The less disruption in mobile network connectivity could be attributed to the fact that the majority of respondents (67%) were located in the central region which has a high concentration of mobile telecommunication companies.

There were a significant number of research students (71%) who got disruptions in communication due to lack or insufficient airtime credit on their phones. Twenty nine percent (29%) never

ran short of airtime credit. This implies that universities wishing to embrace m-learning for student support services will have to provide a budget for phone airtime credit or work out a mechanism for toll free communication.

Other phone connectivity issues considered related to phone battery life. Research students reported having no disruptions to communication arising from phone battery power. Phone batteries were charged using multiple sources of energy, including: the national power grid (UMEME - 97% - n = 67), generators (7% - n = 5), solar power (3% - n = 2) and cars (3% - n = 2). The batteries were charged either at home (82% - n = 60), place of work (18% n = 13), commercial charging vendor (4% - n = 3), by a neighbor/friend (6% n = 4), or a combination of power sources (18% - 13). This indicates that the mobile phone could be used in rural (with no grid power) and urban (with grid power) areas.

## 5.2. Mobile Phones and Research Supervision: Research Aspects that Were Effectively Handled Through the MRSI

We sought to establish, the aspect of research supervision that were adequately handled through mobile phones. We began by establishing whether, on being assigned to a particular supervisor, a researcher sought that supervisor's mobile phone contact, the reason for seeking or not seeking the phone contact and mechanism of collaboration during the research process.

Ninety seven percent (97% - n = 69) of the research students sought to get their supervisors' phone contacts in order to: i) fix appointments for face to face discussions (96% - n = 68), seek guidance in the field and report progress (90% - n = 64) and iii) communicate with supervisors to create intimacy that could breed better academic working relationship (56% n = 40). By enabling the fixing of face to face meetings appointments with supervisors, the MRSI improved efficiency of arranging these meetings hence saving research student's time and money that could be spent in failed meetings.

By communicating with their supervisors, research students broke the phobia that usually affects them in student-teacher relationships. This enabled them to freely express problems and challenges encountered in the field. The mobile phone also reduced the 'loneliness' that is usually associated with distance learning.

Three percent (3%) of the research students did not seek phone contacts of their supervisors because they could physically get access to them at any time they wished. The small percentage of research students being physically able to meet their supervisors at any time is an indication of limited physical access to the supervisors. It confirms the students' outcry of limited face to face supervision. This calls for technologies that could increase supervisors' 'availability' to the research student. This evaluation research has revealed that the mobile phone is one of such technologies. After all, 90% (n = 64) of the research students were at liberty to call their supervisors, who in turn received their calls positively (87% - n = 62). In some instances, research students (7% - n = 5) reported that their supervisors had discouraged calls from them. When asked why they did not encourage calls from research students, one supervisor said, "... sometimes students call at awkward hours of the day. Besides, it is costly to the student". Supervisors felt it right and fitting for them to use University resources to reach out to the research students in the field. Fifty two percent (52% - n = 37) of the research students benefited from this generosity.

When asked to tick off only one option which was closest to the feeling experienced as soon as they received a call or text message from their supervisors or administrators in the Department, research students generally felt that they were cared for. Table 4 provides the different feelings.

Table 4. Single most feeling when a student received a call or text message from the supervisor/Department

Feeling	Frequency	Percent
Felt good and gratified	10	28
Felt sense of care by supervisor	6	18
Was encouraged/motivated to accomplish my research	6	18
Felt sense of responsibility by the department	6	18
Was excited and surprised	3	9
I was tensed up	3	9
Total	34	100

Source: Primary Data

Table 4 gives an indication that mobile research supervision, created a customer care feeling among the research students. Research students who were called or sent a text message expressed gratitude to the responsible and motivating supervisor/department action. Others were simply surprised because they never expected such a thing to happen. Consequently, the call/text message tensed up some students, who felt they were so insignificant to receive such a ‘first class’ treatment from their university or supervisor. Being excited, surprised and tensed up by the call/text message received from their supervisors is an indication of lack of prior knowledge about the MRSI on the part of the research students. The administrators in an interview confirmed that research students were not briefed about this mode of supervision.

When asked to write down some of the SMS messages received on their mobile phones, research students gave a number of messages some of which are reproduced below. It should be noted that the 150 character limitations of text messages dictated the use of abbreviations and symbols in some messages.

*... come with Chapter one we shall meet at CCE Common Room at 2:00pm. Come for feedback from your work. We are meeting the supervisor at the Institute. The supervisor is not around. Please find out if supervisor is in office. How far have you reached? Can we meet at campus? We are meeting at the Institute at 10am – supervisor. Please come 4 feedback on sat 23 June 2007 at 9:00am. Deadline 4 handing in research reports is July 15 2007. Come for supervision meeting from 9-5pm. Have you typed the questionnaire, lets discuss them 2moro. Will not be available, meet 2gther next week same time. Come for your research questionnaire. Research supervision meeting is on sat 17th feb 2007 starting at 9:00am-prepare to travel. Kindly confirm whether you have completed your research or not, I am updating my workload. Please hurry the supervisor is about to leave. .SoP is that problem whose answer calls for research....*

Source: Message sent on research students’ mobile phones

An analysis of the messages sent to research students reveals that they sought to: i) fix face to face research supervision meeting appointments, ii) motivate the ‘lonely’ research student in the field, iii) pace and motivate the research student, iv) provide a two way communication mechanism, v) establish and monitor research students’ progress, vi) inform research students about deadlines and important dates, and vii) provide research students with some useful research tips.

In an asynchronous way, research students responded to the SMS messages or calls sent or made to them by their supervisors and fellow research students. Again we reproduce some of the messages in their raw form in order to emphasise the need to learn a new form of vocabulary for SMS messaging in m-learning.

*.... I will be waiting 4 the instructions as u promised. I was ur rsch student and I am requestg u 2 B my referee. Am sorry am late, but about to arrive. I am unable to meet u now, I have to get a loan 4 S/fees from the association & the meeting is at 3:00. By GODS name, do me favour again to RSCH thru somebody my body stil betrays me.or give alternative. I will not manage to see u have tests the whole day please give another day. Ok i will pass de message 2 her 2day evening. Thank you 4 accepting 2 be my supervisor and offering all your time 2 ensure that I complete my research be4 the deadline. God bles u. Gd evening sir! was calling you abt my research report. you told me lst wk dat you would meet me this week. the deadline for submitting is friday. thanks. My report is at your desk for signing. May I come over sir? Ur rsch student is on bed rest 4 two months due backache can’t travel a long distance. My marks 4 research are out bt my name is not on d list, I need ur help sir. Am very sorry 2 sms u sir, bt I called, u’ve left d fon at home. My supervisor help me 2 b put on graduatn list, i checkt but my research marks r not out. I would like to know ua schedule of duties so that I come to meet u for de research report i have submitted. Am sorry I dnt inform u bt due 2 my fixed schedule i had 2 change supervisor. Very sorry 4 not informing u.. THAXS FR DE MSG AM SORRY I HV BN AWAY I’M CONFIRMING THAT I WILL HAND IN MY DRAFT REPORT AT DE END OF FEB 2007 YR STUDENT. Mai RESEARCH was gven 2 da RECEPTIONIST. Sir, sorry 4 not responding in time, I’m upcountry & I do request u kindly 2 allow me bring my work mid-next month. I will be so grateful upon ur consideration. Nice time sir. I am about to complete my RSCH, I had some problems. Thank u. Thanks 4 ur service. Thanks 4 the message. I finished & graduated in oct. 2006. I’m finalizing with the last bit of the research a hope to travel any time this week to present it. Am realy very sorry sir! I got an accident dt almost put me 2 death but now i’ve just dropped mi report in ur*

office, kindly act as a parent & tel me wn 2 mt. I still have adv.a/c to retake next sem.my resch work will be handed over to yu soon for oct gradtn. Thks so much....

Source: Messages sent on supervisors' phones

The SMS messages above indicate that there was a two way asynchronous collaboration between research students and their supervisors and amongst students themselves. The two way collaboration created intimacy between research students and their supervisors and amongst research students themselves. Research students upheld the relationships created even after the supervision. Messages seeking for help from supervisors even after a student had graduated are evident. "I was ur rsch student and I am requestg u 2 B my referee", read one of the messages. The collaboration also paced research students and helped supervisors to monitor their progress. "THAXS FR DE MSG AM SORRY I HV BN AWAY. I'M CONFIRMING THAT I WILL HAND IN MY DRAFT REPORT AT DE END OF FEB 2007 YR STUDENT", read another message. The prompting messages also brought hope to those who had almost given up with research due to one reason or another. "Am realy very sorry sir! I got an accident dt almost put me 2 death but now i've just dropped mi report in ur off, kindly act as a parent & tel me wn 2 mt". Here, the research student was responding to a call made to him by his supervisor trying to find out his ware about, as the student had taken over 12 months in the field without the supervisor hearing from him. The collaboration text messages and calls kept the supervisor in the know about what was happening to his/her research students out there in the field. However, space limitations of the supervisors' mobile phones only allowed a given number of messages to come through. Also, supervisors reported a cognitive overload especially when many messages required instant response. This called for the need to ration messages.

### 5.3. Influence of Mobile Research Supervision on Students' Throughput

A research project paper is a partial fulfilment for the award of a bachelor's degree at Makerere University. This implies that the longer one takes to accomplish the research paper the longer he/she stays on any given programme or even not finish the programme.

We used the mean comparison test to cross tabulate the ownership of a mobile phone versus the duration (in months) it took a student to accomplish his/her research. The mean comparison test results are presented in Tables 5. We established, as is indicated in Table 5, that those who owned a mobile phone and used it for research collaboration on average used the same time (about 5 months) to complete their research paper as those who owned a mobile phone but did not use it for research collaboration. However those who did not own a mobile phone and never collaborated with their supervisors and colleagues using a mobile phone were likely to spend 2 more months doing their research paper (used 7 months) than those who owned mobile phones and used them for research collaboration. These results indicate that mobile research supervision contributed less to student throughput. We conclude from these findings that there are other intervening variables that determine students' throughput.

Table 5. Mobile phone research collaboration and research project completion duration

Used Mobile Phone for Research Collaboration	Completion Duration		
	Mean (Months)	N	Std. Deviation (Months)
Owned a mobile phone and used it for research collaboration	4.556	63	3.686
Owned a mobile phone but did not use it for research collaboration	4.800	5	4.087
Did not own a mobile phone and did not have research any research collaboration on any mobile phone	7.333	3	5.774
Total	4.690	71	3.776

Source: Primary Data

### 5.4. Constraints Faced by Research Students and Supervisors during Mobile Research Supervision

In an open ended question, research students were asked to list the challenges faced during the mobile research supervision process. Table 6 provides a tally of the challenges mentioned. The challenges are ranked using frequency counts from the most frequent (ranked as number 1) through to the least frequent (ranked as number 11).

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In Table 6, the most important challenge reported was the rigor of the research process. As a way of maintaining quality, supervisors were strict on many issues including: the research methodology and writing style. “I do not entertain mediocrity”, said one of the supervisors during an interview with him. Evidence of the reported rigor is attested to in the responses the research students gave to the question – What major research supervision challenges did you encounter during your research?

Table 6. Challenges faced during mobile research supervision

Challenge	Research Students faced with the Challenge (Percent)	Ranking as per most frequent
Rigor of the research process	45 (n=32)	1
Busy schedule of the research students	42 (n=30)	2
Non-availability of the supervisor at certain times	40 (n=28)	3
Costly research process	33 (n=23)	4
Limited time allocated to the research project paper	32 (n=22)	5
Limited guidance	20 (n=14)	6
Long distance traveled to come and meet the supervisor	18 (n=13)	7
Need for word processed manuscripts	17 (n=12)	8
Non response/respondents being suspicious	11 (n=8)	9
Using e-mail and Internet to communicate	9 (n=6)	10
Electricity load shedding	2 (n=1)	11

Source: Primary Data

... I disliked a lot of criticism to my work. I was unable to put up a clear research problem for five consecutive times. The supervisor made me rewrite the report several times due to mistakes I had made. My supervisor wanted me to be as knowledgeable as him in research method, something I was not able to cope up with in the little time given. Not knowing exactly what the supervisor wanted me to do in certain instances. Crossing my work all together ...

Source: Primary Data

The responses above point to the fact that the supervisors placed strict emphasis on quality of the research project report. Therefore the MRSI did not compromise research quality standards.

Supervisors reported supervising, in some instances up to 30 students. Towards the closing in of the deadline for research report submission, supervisors reported having an information overload on their mobile phones as students simultaneously sent SMS messages to their mobile phones. This created a problem of increased cognitive load to the supervisor especially when multitasking.

Electricity load shedding caused the least challenge (2%) due to there being a number of alternative power sources which could be used to charge mobile phones (see Section 5.1.2) and power secretarial bureau computers that research students used for processing their work. Other important challenges included: busy schedule of the research students (n=30), non-availability of the supervisor at certain times ((n=28), costly research process (n=23) and limited time allocated to the research project paper (n=22).

The above challenges point to the need to have a robust mechanism to aid research students and their supervisors keep in constant touch. This could motivate research students to carry on with their research, an exercise some students have tagged to be ‘difficult’.

Research students were asked in an open ended question to give ICT based solutions for solving the challenges mentioned in Section 5.4 above. Table 7 summarises the responses given and uses frequency counts to rank them from most important (as number 1) to the least important (as number 8).

Table 7. ICT based suggestion for improving research supervision process at Makerere University

ICT based Suggestion	Number students making the suggestion (Percent)	Ranking as per most frequent
Encourage use of Internet/e-mails in research supervision	92 (n=65)	1
Improve on the mobile/internet communications infrastructure	87 (n=62)	2
Train research students in use of ICTs	81 (n=58)	3
Entrench mobile phones in student support services	81 (n=58)	3
Use mobile phones to give guidelines to research students	79 (n=56)	4
Send regular SMS reminders to research students	71 (n=50)	5
Establish subsidized call centers at regional offices	52 (n=37)	6
Partner with phone dealers so as to provide low cost phones to students	50 (n=36)	7
Messages, calls and e-mails should be sent/made to research students in good time	50 (n=36)	7
Distance education should forge a partnership with secondary schools for sharing ISP fees	40 (n=28)	8

Source: Primary Data

The students of today, even in developing countries such as Uganda, are quickly embracing the digital age requirements. Many of the research students (65 out of 71) wished to have online supervision through Internet discussion fora and e-mails. Generally speaking, Table 7 brings out a high enthusiasm for mobile and online supervision. However, there is recognition that the infrastructure and capacity to enable this preferred mode of supervision is not yet mature and needs to be developed.

Asked why those with access to Internet services did not utilise it during the research supervision, 75% of the research students said that their supervisors did not encourage them to use Internet and e-mail. This implies that uptake of mobile and online supervision can be deeply entrenched if the University encouraged staff to adopt its use through provision of the necessary facilities.

##### 5.5. Cost Implication of Mobile Research Supervision

Our research did not go into the detail of determining the cost/benefit ratio of mobile research supervision. However, views were collected from research students, supervisors and administrators regarding their mobile research supervision cost experiences. Supervisors and administrators singled out airtime credit as the major cost of maintaining a mobile phone. This was confirmed by the responses generated from the question which required research students to state whether they had received any disruption in collaboration due to lack of or insufficient airtime credit. Lack or insufficient supply of airtime credit sometimes disrupted communication of 62% of the research students, 8% were always constrained while 30% communicated without limitation of phone airtime credit. For the supervisors, they only communicated (using their mobile) to research students on goodwill since the Department did not provide them with any airtime credit for supervision purposes. Some supervisors used the Department's landline phone to communicate to research students. This, according to supervisors and administrators interviewed, was neither sustainable nor convenient. The supervisors proposed that a proposal be developed and presented to mobile telecommunications service providers for them to consider giving a concession in communications charges to distance learners as one of their social responsibility package.

##### 5.6. Other Academic and Administrative Services that can be Delivered via Mobile Phones to Distance Learners at Makerere University

Other than the text and verbal collaboration, supervisors and administrators indicated the need to use mobile phones for delivery of content to learners and providing links to useful study materials. The distance education administrators felt that the mobile phone could be used to remind students about registration, examination and face to face dates, in addition to giving them motivational messages.

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## 6. DISCUSSION

This evaluation study was aimed at answering the question, “is it worthwhile to continue with mobile research supervision and should we invest more resources and effort into it or not?” Our specific intentions were geared at establishing; i) the supervision aspects that could be adequately handled through mobile research supervision, ii) determine the influence of mobile research supervision on students throughput, iii) establish the constraints faced by research students, iv) find the cost implication of mobile research supervision and v) find other academic and administrative components that could be supported via the mobile phone. The answers would be useful to educators and policy makers wishing to create an m-learning pedagogy and formulate m-learning policies.

The results indicate that over 96% (n=68) of the research students who participated in the study, owned mobile phones and were using them for research collaboration (93%). This pervasiveness has made the mobile phone a handy and cost effective collaboration device. The phones owned by students and the general public in Uganda are of various generations (1G, 1.5G, 2G, 2.5G, 3G, etc.) and capabilities. However, the cross cutting advantage of these varied phones is their ability to broker voice and at least 150 character text messages. With continuous improvements in mobile technology and decline in prices of mobile devices, current low end mobile phone holders will soon be able to acquire high end mobile phones capable of accessing the World Wide Web and send and receive e-mails. With more learners preferring online and mobile supervision (92%), a new breed of learners has emerged. Such breed of learners consider their mobile phone as the number one source of information. Learning, just like their mobile devices, is becoming personalized and a new form of pedagogy referred to by Fisher and Baird [2006-2007] as the ‘mobile digital pedagogy’ has to be put in place, together with personalized technologies to support the student to collaborate with fellow research students and his/her supervisor.

The study has also revealed that mobile research supervision is capable of removing the loneliness associated with distance learning and increase flexibility in distance learning. This is consistent with Fagerberg and Rekkedal [2004] who see m-learning as having come to re-introduce the flexibility that had been phased out by online learning. “The introduction of the desktop computer (and other learning technologies), which required the student to study at a certain place, often also at a certain time, reduced flexibility of distance learning”, [Fagerberg and Rekkedal 2004, p.3]. With the mobile phone, it was possible at anytime in any place, for the research students to schedule face-to-face meeting appointments with their supervisors, seek guidance from their supervisors, communicate progress to their supervisors and create intimate working relationships. These aspects of supervision amplified Fisher and Baird’s [2006-2007] need to personalize learning.

Because mobile research supervision personalised learning, the study has revealed that the additional voice and text collaboration on the mobile phone helped to minimise the perceived negative impact of lack of face-to-face interaction and encouraged the development of ‘a personal touch’ between the research students and their supervisors. This increased students’ throughput. On average, research students who owned a mobile phone and used it for collaboration completed their research project paper in the statutory time frame (5 months) while those who did not collaborate using their mobile phones took longer (7 months and above) to complete. This confirms Otto and Wrightson’s [2005] exposition that effective student support increases students’ throughput in distance learning.

## 7. CONCLUSION AND FUTURE WORK

The evaluation study has showed that the mobile phone is a very handy device for facilitating collaborative/cooperative learning. It is therefore worthwhile to invest more time and resources in developing m-learning solutions geared towards personalising learning and providing learning support to learners at anytime in any place. Research needs to be carried out to determine the actual unit cost of implementing m-learning and how this cost could be shared between the learner and the institution. It has been espoused that the research paper did not significantly contribute to the high attrition rate of distance learners. Hence there is need to undertake a study to determine the causes of high attrition rates at Makerere University. Also, m-learning policies and pedagogy for learners in developing countries need to be developed. The research has also pointed to the need to extend the use of the mobile phone beyond SMS communication to learning content access, delivery and use on mobile phones.

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