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Mobile Device Intervention for Student Support Services in Distance Education Context – FRAME Model Perspective

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Abstract

This paper reports the findings of a study conducted to analyse the effect of mobile device intervention for student support services and to gauge its use for enhancing teaching – learning process as a future study in the context of offer of Distance Education programmes. The study was conducted with the learners of the coveted Post Graduate Diploma in Clinical Cardiology programme of Indira Gandhi National Open University. In order to illustrate the issues involved primarily in student support services and the mobile learning as a future course of action, it is proposed to apply the Koole's FRAME model. Questionnaire and interview methods are used to obtain a feedback. The findings are discussed and future direction of study is also indicated.

Keywords: Mobile phones, student support services, open distance learning, FRAME model, mobile learning

Introduction

The widening penetration of mobile services overtaking landline connections, increasing levels of band width, flooding of enriched handsets, decreasing user charges, and a growing tech-savvy learner population have a pushing effect on educational institutions to exploit the potential of the mobile technology for teaching-learning purposes besides being used as an effective communication means. Mobile based learning, also called m-learning, has been constantly evolving with added features, in spite of its shortcomings in terms of small screen size, short battery life and uneven network access. The cascading of traditional distance learning to e-learning and then to m-learning has a correspondence to the 'societal evolution' as suggested by Keegan (2002). Learning delivered or supported solely or mainly by handheld and mobile technologies such as personal digital assistants (PDAs) and smart phones (Traxler 2007, Okunbor and Guy, 2007) has been picking up very quickly due to the access at 'any time, any place'. M-learning uses a collection of tools – SMS (text messaging), learning from audio (iPods, MP3 player, Podcasting), Java-based quizzes, collection of pictures and video (using camera phone) – which could be used by the tutors and instructional designers.

The mobile technology has evolved as a boon for distance education institutions (DEI) with learners placed far off from the parent institutions struggling for and expecting every type of academic and administrative

support and guidance in other personal matters. Pre-admission and post-admission counselling, counsellor feedback and many other time-sensitive matters like, assignment submission, theory and laboratory counselling sessions, filling of exam form etc. are a few of the matters that pertain to the student support issues especially in open and distance learning situations (STRIDE Handbook, IGNOU). There have been reports indicating the use of mobile phones for tackling some of the administrative issues listed here (Dharankar 2008). However, use of mobile phones in education by developing countries is still a challenge for the obvious reasons of cost of the high end devices and access to internet services. An elaborate study of the projects from six developing countries of Asia including India on the use of mobile phones to improve educational outcomes substantiates a similar observation (Valk et al 2010). According to their review, the mobile phones bring in greater flexibility and help in reducing barrier to education but the attainment of educational outcomes is minimum. The reasons being different for different countries. Therefore, a mega University like IGNOU has also not ventured so far into the use of this technology in providing educational packages to its learners at mass scale. A humble beginning was made with the launch of SMS services in November 2008 (IGNOU website) to its students across the country as well as for the staff of the university. The device is being used for SMS alerts catering to various learner support activities like, registration, assignment submission, fee submission, examination dates, etc. Never the less the future planning is its integration towards on-line counselling, assignment upload, sending audio/video clippings and integration with the community radio.

This research paper is in the light of this background of the University. The findings indicate the success in providing a good support to the learners of the post graduation programme using mobile phones and the potential use of this device in enhancing the teaching –learning process in future.

Literature Review

It is a fact that the success of distance education depends largely on student support services provided to its learners who encounter feeling of isolation, lack of peer-peer interaction, lack of proper intimation from study centre, lack of proper academic support and hurdle of distance from the study centre to list a few (Fozdar, Kumar and Kannan 2006). The mobile devices are understood to be helpful in providing a good support to the learners to the extent of removing the feeling of isolation and lowering the rate of attrition (Simpson 2003). The text messaging (SMS) has been found to have particular and peculiar effects for counselling which has implications for the educators (Haxell 2008). Research from the OU, the University of Pretoria and the Leonardo project indicates some of the ways in which text messaging can best be used for student support in the context of Open and Distance Learning. In their research Gaskell and Mills (2004) indicate that telephones have a major role to play in student support and are indeed the best medium to choose for student contact on many occasions. The increasing ubiquity of the mobile phone begs for it to be used as a learning tool. Hendrikz (2006) has reported the use of mobile phones both for academic and administrative purposes. Some of the researchers from the third world countries consider mobile learning as the state of the art future educational solution for all despite a limitation of access to educational facilities and infrastructure (Abdullah and Siraj 2009).

In the context of medical education and health services, the requirement for mobile devices to deal with medical information overload and knowledge navigation has been stressed by Ducut and Fontelo (2008). According to them, the particular requirement has arisen due to recent developments of elucidating the pathophysiology of diseases down to the molecular levels; earlier most diseases were treated on the basis of symptoms and empirical data. Based on literature study Kho et al (2006) reported that around 60% to 70% of the medical students and residents use mobile devices (PDAs) for educational purposes and patient care. Rege and Keane (2009) have provided details as to how leading US medical schools have adopted mobile technology as an educational tool for enhancing the education of students. According to them, mobile devices support existing learning tools besides enhancing course management, could influence accreditation (by providing well- rounded learning experiences) and is a cost-effective solution for medical schools. Kenny et al (2009) have provided details regarding the increasing use of PDAs in the domain of Nursing Education.

In the Indian context, it is significant to mention the recent developments in mobile percolation. The growth of mobile phones in India has been phenomenal. Indian Telecom market is one of the fastest growing markets in the world. With its 562.21 million telephone connections as on December 31, 2009, it is the second largest network in the world after China and also the second largest wireless network in the world. About 15 million connections are being added every month (Annual Report 2009-2010). Research studies in India have shown that learners in various programmes have benefited by various forms of student support services. Fraunholz and Unnithan (2006) have carried out a preliminary research to assess the potential of m-learning in India. Significant collection of details on mobile technology use for health care has been provided by Singh et al (2010), who have indicated a list of key applications of mobile devices. However, Literature survey did not indicate any research work in the use of mobile devices for student support services in a medical program run under distance mode.

With the literature reports confirming increasing use of mobile devices in the field of education, it is necessary to look for factors favourable for effective mobile education. Specifically facets of mobile devices, desirable characteristics for a learner and facilitating features of a learning environment need to be gauged for optimum mobile based learning. In this context, the **F**ramework for the **R**ational **A**nalysis of **M**obile **E**ducation (FRAME) model is worth examining.

FRAME Model

Koole (2009) formulated the FRAME model stating that mobile learning is the consequence of convergence of three aspects – technical characteristics of the mobile device ('device aspect'), personal characteristics of the learner ('learner aspect') and the social environment in which the learning takes place ('social aspect').

i. **Device aspect** refers to features of the mobile device – its physical characteristics, input and output capabilities, storage capacity, processor speed and error rates.
ii. **Learner aspect** signifies the distinct features of an individual learner – his/her cognitive abilities, memory, learning preferences, willingness to learn, motivation level.
iii. **Social aspect** points to the features required for conversation, cooperation and social interaction – it means sharing/respecting socio-cultural aspects paving way for congenial interaction.

Koole's model builds on these three aspects in two ways:

1. Three possible **intersections** that describe the relationship between any two of the aspects.
    i. **Device usability intersection** relates the features of the mobile device to the learner characteristics; it helps in gauging the capability of the learner or his/her comfort level in using the features of the device. Possession of a mobile device with rich features could give rise to effective mobile learning, only if the learner has the necessary capability to exploit the potential.
    ii. **Social technology intersection** indicates how a mobile device could facilitate communication and collaboration with many individuals and systems – the options available for social interaction using the technical capabilities of the mobile device to send SMS, call a friend, access the internet, etc. It refers to networking capacity, connectivity and collaboration tools. High data transmission speed and network quality to support multiple features can facilitate mobile learning. Broadband access (high speed internet services for instance) and 3G service (that provides high speed access to voice and data; capable of multimedia applications like video and broadband services) are social technology features well known for their interaction capability.
    iii. **Interaction learning intersection** represents different types of interactions facilitated between the learner and other components of the social environment – with other learners, teachers/mentors/counsellors, other functionaries, learning materials, etc. This interaction points to the philosophy of social constructivism and of the zone of proximal development (Vygotsky 1978).
2. **Mobile learning process** is the primary intersection wherein all the three aspects overlap. It signifies the requirement of a mobile device with optimum features being made available to a learner, who has desirable cognitive abilities and amidst a facilitating social environment so that maximum learning could accrue out of mobile usage. Effective mobile learning process facilitates information access, selection and navigation, so that appropriate information is accessed and applied as per contextual relevance.

Koole also has specified checklists in terms of above six features for planning and analyzing mobile learning environments which will be applied when we discuss the present study.

Present Study

In order to illustrate the issues involved in the study of effectiveness of mobile device intervention in the distance education programmes, the Post Graduate Diploma in Clinical cardiology (**PGDCC**) programme has been chosen. As an initial step towards the use of mobile technology, the mobile phones were used exhaustively by the coordinators in providing support to all the learners right from the time they face an interview to get admission till they have got the final grade cards. As mentioned earlier the exploitation of the potential of mobile phones towards learning is planned as a future experiment. It is worthwhile to know about the programme, its learners and specificities involved

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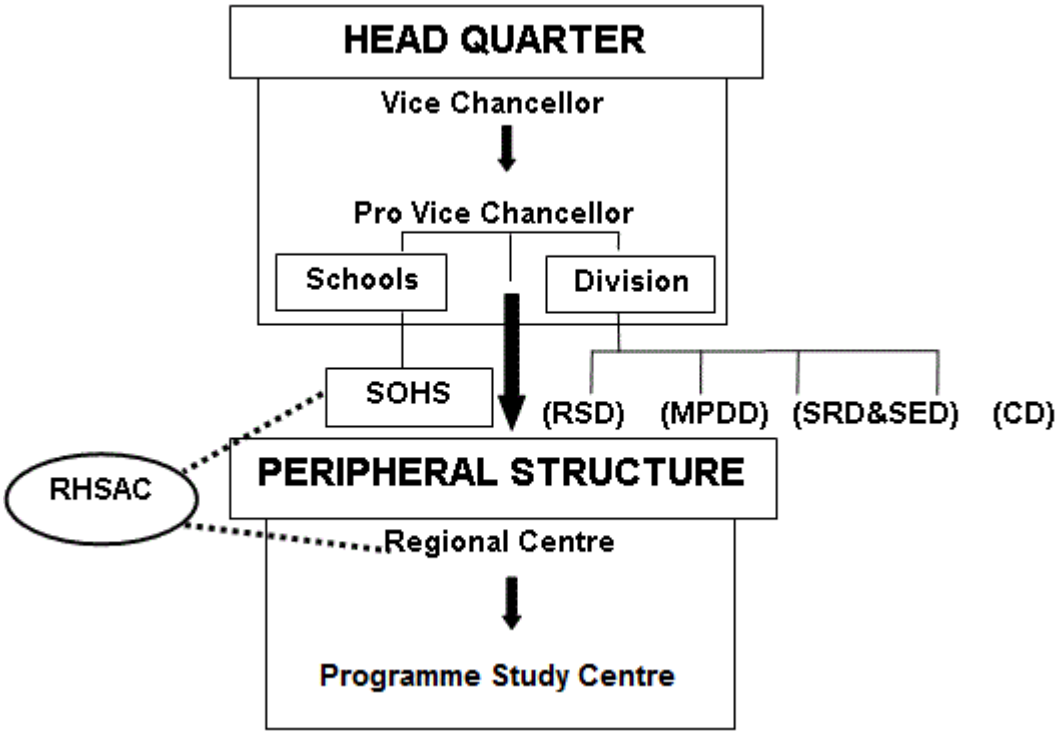
The PGDCC Programme

The programme is offered by Indira Gandhi National Open University (**IGNOU**) through its School of Health Sciences (**SOHS**). The programme has been launched to enhance human resource in the critical health care area; there is a dire need for this programme, as rural poor could not afford high tech hospitals situated in urban areas, where cardiologists are available. IGNOU has launched this programme with the main objective of developing non-intervention cardiologists.

PGDCC is offered to MBBS (Bachelor of Medicine and Bachelor of Surgery) graduates and it is a two year programme. Two faculty members of SOHS are identified as the Programme Coordinators (**PC**). They have the responsibility to manage all the academic activities of the programme, starting from program design, material preparation and assessment taking adequate support as necessary. Keeping in view the sensitivity associated with the offer of an academic program in health related area, that too in the field of cardiology, following additional steps (which are not generally observed for many academic programmes of IGNOU) have been taken in programme delivery:

- The Programme Study Centres (PSCs) have been identified among 35 leading Cardiac Hospitals/Medical Colleges across the country. Each PSC could admit a maximum of 10 students.
- The activities in each PSC are coordinated by a Programme –in Charge (**PIC**), who is appointed from among the faculty of the host institution. PIC has to ensure smooth functioning of the programme and he acts as the bridge between the students and the Programme Coordinators situated in SOHS. The PIC is supported by academic counsellors who are specialists in the field. PICs also facilitate creation of an atmosphere of socialization among students.
- The students are provided with print materials and audio-video materials. Teleconferencing sessions and interactive Radio Counselling are offered directly by SOHS faculty.
- The theory counselling and skill training are carried through the PSCs. The programme has around 55% practical component.
- To monitor the quality of the program, Regional Health Sciences Advisory Committee (**RHSAC**) is constituted with members of SOHS, Health officials of the State Government and PICs within the state.

The administrative set up for PGDCC programme is given in Figure 1.



RHSAC	Regional Health Sciences Advisory Committee
CD	Computer Division

MPDD	Material Production and Distribution Division
RSD	Regional Services Division
SRD&SED	Student Registration Division and Student Evaluation Division
SOHS	School of Health Sciences

Figure 1. *Administrative set up for PGDCC Programme*

Issues Regarding Student Support Services of the Programme

Variety of measures have been taken to provide information to the students – through the website, Programme in-charge at the Programme Study Centres, Programme Coordinators at SOHS, Regional Centres (at each state) and from the concerned Divisions at the Headquarters, apart from the options of teleconferencing, interactive radio counselling sessions and email facilities. The students also have been advised to form groups among themselves for information dissemination.

Still, learners have expressed concerns regarding untimely dispatch of print materials, late assignment evaluation, non-declaration of results, and lack of information regarding counselling schedules. Keeping this in mind, a facilitating step has been taken by the Program Coordinator of PGDCC to encourage the use of mobile phones 'as and when required'. It is amply clear that student support services are the channels in the delivery of a distance education programme. In this context, it was felt necessary to check the effect of mobile device intervention on the program delivery in the context of PGDCC programme.

Methodology

Participants

The participants included two categories. The first category involved all the learners registered for the PGDCC programme in the year 2008 (233 in number) which happens to be the third batch since the launch of this programme in 2006. The second category includes all the Programme-in-Charges (PICs) of this programme (35 in number).

Research Setting

Although the main focus of our study has been on the student support aspect yet keeping in mind the future plan of mobile usage for teaching-learning process, it was felt apt to analyse both the aspects in FRAME model perspective.

We examine the implications of the two aspects using the checklist given in Appendix A of Koole's model (*loc cit)*; the details are given in Table 1 below:

Table 1. Implications for two types of study in the light of Koole's model

Device/Intersection/Primary intersection	Requirements for a comprehensive study (i)	Requirements for study of student support services part only (ii)
Device aspect	Should be capable of receiving voice, data and multimedia application	Should be capable of receiving voice and data
Learner aspect	Learning activities planned as per instructional design	Content inclusion not considered
Social aspect	Not an issue within a culturally homogeneous group with 'shared signs and symbols'– all students have similar entry level requirements; the hierarchy of relationship between teacher and student defined by the University Rules	
Devise usability intersection	Information exchange	Information exchange
Social Technology Intersection	Needs 3G network/wiFi – capability for internet access, authoring tools and project management tools, etc.	Needs Wide area network – 2G is enough
Interaction learning	All types of interaction possible – learner-learner, learner-instructor and learner-content, should facilitate higher cognitive tasks	Only learner-learner and learner-instructor interactions possible

Mobile Learning	Capability for mediation and knowledge navigation	Not Applicable

As is evident we are prepared only for (**ii**) mentioned in Table 1, as all conditions for (**i**) cannot be satisfied at present. Hence, we planned to study the effect of mobile device intervention for student support services as made available for PGDCC Programme.

Research Questions

Accordingly, the research questions were formulated as follows:

1. What is the experience of learners towards the use of mobile devices for learner support services?
2. What is the opinion of learners regarding the use of mobile devices in enhancing learning?
3. What is the experience and perception of PICs regarding the use of mobile phones for learner support activities and in the enhancement of learning respectively?

Method: Questionnaire and Interviews

The feedback study was done by mailing a pre-tested questionnaire to the PICs who downloaded it and passed on to the learners. The questionnaires included items categorised into three main types. The first was related to the general information on the type of mobile phone they possess, the frequency of the use of computers and mobile phones. The second type sought their opinions and experiences about the use of mobile phones for various student support activities and the third type sought their opinion regarding the use of mobile phones for enhancing the teaching-learning process. The last category of items forms the basis of the future study envisaged to be taken up in the next phase of research.

The interviews with the PICs were held telephonically. These were structured and sought a qualitative picture of the issues raised under aims of the study. It was an opportunity to capture details of the actual usage of mobile phones and to go beyond-seeking the future prospects. The questions asked were very precise as to what is their feedback on the use of mobile phones by the learners? Do they think that mobile phones could be used effectively for learner support? How are they using mobile phones for giving support to the learners? What is the future use of this device?

Analysis and Discussion

Learners' Responses

The students are graduates in medicine with the mean age of 38.25 for males and 30.00 for females. The total response rate was 35.6% out of which 21.4% are females 78.6% males. The results indicate that all the learners who have responded possess mobile phones. The access to the highest mobile or computers is not an issue since the University does not offer learning management system as part of curriculum. In other words, mobile is being used for learner-learner and learner- instructor interaction. There is a low percentage of clientele using computer for word processing or e-mailing. All of them use mobile phones for receiving or giving messages, 70% are using for communicating with fellow learners everyday. However, the percentage for web browsing and receiving picture message by mobile phones is quite small; 12.5% and 19% respectively (Table 2). A good number of respondents have the phone numbers of their PICs (92.9%) and the programme coordinator (92.1%) while a few have mobile number of RDs (only 47.2%). This is probably one of the reasons of an effective use of the mobile phones for getting support from the persons directly involved with the programme i.e. the PICs and the PCs.

Table 2. Learners' usage of ICT

Usage of Computers		**Usage of mobile phones**	
Activity	**Response (%)**	**Activity**	**Response (%)**
Word processing	33.3	Receiving/sending text messages	100 (70% daily)
emailing	30.8	Receiving/sending picture messages	19
Learning	**50**	Web browsing	**12.5**

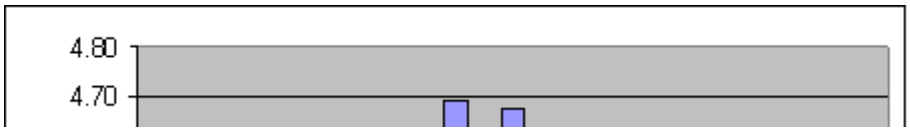
The major number of items pertained to the experience of learners in using mobile phones for various learner support activities which was the main aim of this study. The feedback was obtained on a five point Like rt type scale varying from 'strongly agree' to 'strongly disagree' responses. Most of them either agreed or strongly agreed on the use of mobile phones for a number of learner support/co-curricular activities. It is reflected in the mean scores being more than 4. The percentages and the mean scores of the response for different activities are given in Table 3.

Table 3. Learners' experiences* of using mobile phones for learner support

S. N.	Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Mean scores
	Mobile phones can be effectively used in getting:						
1.	Feedback of internal evaluation	24(29.3)	48 (58.5)	6(7.3)	2(2.4)	2(2.4)	4.20
2.	Information regarding important dates						
	a) Result of interview	36(43.9)	40 (48.8)	2(2.4)	2(2.4)	2(2.4)	4.40
	b) Joining in the programme	48(61.5)	24 (30.8)	6(7.7)			4.54
	c) Teleconference schedule	52(66.7)	22 (28.2)	4(5.1)			4.62
	d) Last date of filling up exam form	52(65.0)	24 (30.0)	4(5.0)			4.60
	e) Date of term end exam (theory)	56(71.8)	20 (25.6)	2(2.6)			4.69
	f) Date of practical exam	54(73.0)	16 (21.6)	4(5.4)			4.68
3.	Information regarding other issues						
	a) Non receipt of study material	48(64.9)	8(10.8)	6(8.1)	4(5.4)	8(10.8)	4.64
	b) Change of exam centre	50(71.4)	6(8.6)	8(11.4)	6(8.6)	-	4.43
	c) Leave during the programme	34(48.6)	28 (40.0)	2(2.9)	4(5.7)	2(2.9)	4.38
	d) Non receipt of hall ticket	52(74.3)	10 (14.3)	4(5.7)	4(5.7)	-	4.57
	e) Pattern of question paper	36(50.0)	18 (25.0)	10(13.9)	6(8.3)	2(2.8)	4.23
	f) Grade card and result related	32(50.0)	26 (25.0)	6(13.9)	6(8.3)	2(2.8)	4.23

* The figures in brackets indicate the respective percentages

As is clear from the data given in Table 3, a good number agree on using the mobile phones for getting a feedback of internal evaluation (58.5%) while some of them strongly agree for the same (29.3%). On an average more than 60% strongly agree on getting information on important dates like, the date of teleconferencing, dates of filling of examination form and dates of examination etc. and 50% of them strongly agree on the effectiveness of mobile phones for getting information for leave, date for grade card and result of examination and pattern of question paper. More than 70% again strongly agree on using this device for enquiries on change of exam centre and non receipt of the hall ticket. The graphical representation showing the mean scores of the responses is given in Figure 2.



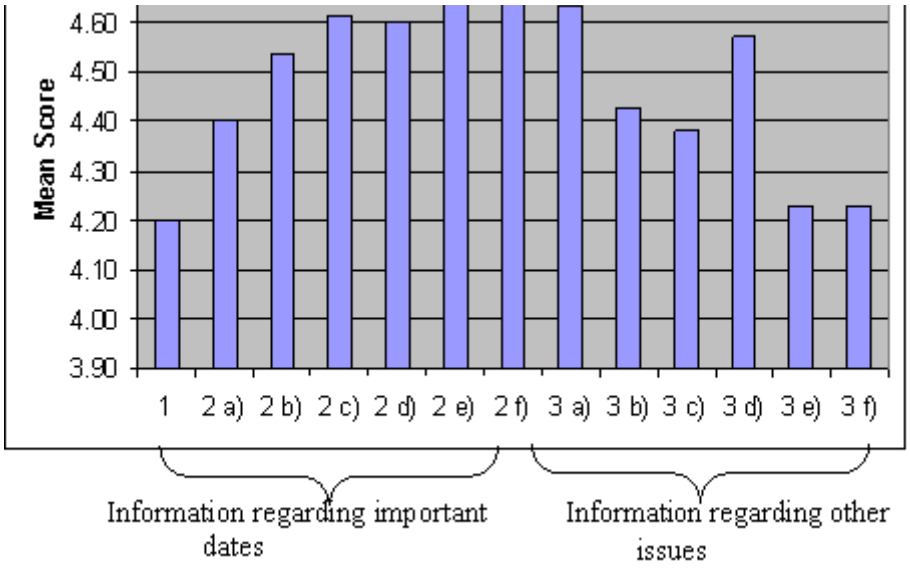


Figure 2. *Learners' experiences of using mobile phones for learner support*

In order to gauge the possibilities of using the mobile phones for enhancing teaching-learning process by the potential users, a number of items in the questionnaire sought opinion on whether mobile phones can bring in opportunities of learning or improving communication between student and teacher or be a quicker method of getting feedback in learning. The response rate for these is 64.3%, 52.4% and 51.2% respectively. For the question asking whether IGNOU should adopt learning using mobile phones, 50% of them agreed. For the question related to the usage of mobile phones at IGNOU for various student support related activities more than 50% strongly agreed.

One in five learners only feels categorically that the non-availability of mobile phone is a hindrance in adopting it for mobile learning. One in three learners see the cost or network problem as inhibiting factor in adopting mobile learning, Table 4.

Table 4. Learners' opinion on usage of mobiles in teaching-learning and on hindrances in adoption of m-learning

Usage of mobiles in teaching-learning process		**Hindrances in adoption of m-learning**			
Query	**Agreement (in %)**	**Reason**	**Strongly disagree (%)**	**Disagree (%)**	**Undecided (%)**
Provide opportunities in learning	64.3	Unavailability of mobile phones	19.5	26.8	34.1
Improve communication	52.4	Cost and network problems	19.5	19.5	26.8
Provide quicker feedback	51.2	-	-	-	-

It quite relevant to mention that an earlier survey carried out by Fozdar and Kumar (2007) in a different context revealed that the mobile technology could be an effective tool to improve the learner support activities and learning and be instrumental in lowering the attrition rate by removing the sense of isolation amongst learners. The survey results in the present case substantiate the feedback result of the preliminary study done to only gauge the perceptions of the learners of programme offered by the School of Sciences of the Indira Gandhi National Open University.

Responses from the Programme in Charges

The interview results have given a qualitative picture of the scenario of the mobile phone use by learners and by the PICs themselves. A total of twenty five interviews out of thirty five tried could be carried out successfully. All of them said they were in direct communication with the Programme Coordinator for finding out the schedules especially for teleconferencing. respondents *vis a vis* the learners' mobile usebut out of the twenty five interviews done only fifteen said that they were making a good use of mobile phones

out of the twenty five interviews done only fifteen said that they were making a good use of mobile phones for communicating to the learners about the information regarding the lecture and teleconferencing schedules by means of SMS. Consequent to the frequent visits of learners to the PSCs, the requirement was not very much felt for contacting them through mobile. The PICs are not very sure about the possible contact amongst the learners. When briefed about IGNOU's initiation into SMS alerting facility for the learners, all of them took it as an important endeavour and a good service to the distance learners.

Findings

The feedback study has been quite motivating for the authors and the programme coordinators in particular as far as the research questions are concerned. The results can be expressed precisely as follows.

1. The learners have expressed high level of satisfaction in relation to the use of mobile devices for learner support services through information exchange (device aspect and device usability intersection)
2. Majority of learners expressed confidence in welcoming any possible move in IGNOU for content delivery through mobile device.
   In terms of Koole's model both the statements bring out the effectiveness of the intervention in terms of the device aspect, device usability intersection and interaction learning.
3. As far as the responses from the PICs are concerned, 60% of them have been utilizing the mobile phones for interaction with the learners while the rest did not feel the need in the light of frequent counselling sessions.

Direction for the Future

The university is committed to making use of bulk SMSs (text messages) to communicate important administrative issues to students as well as to use mobile technology for academic purposes. Recently, IGNOU has signed a Memorandum of Understanding with Ericsson for providing 3G services to the students at a nominal fee. With 3G, the students will be facilitated to access part of the web pages, download files, submit assignments and download a few video files. It is the responsibility of the academics to come out with mobile compatible content. By facilitating 3G service provider, IGNOU has strengthened the social technology intersection as per Koole's terminology for network capability. By keeping a nominal fee, IGNOU has also facilitated the learner aspect in the sense of bringing the 3G accessibility within their affordability.

It is proposed to conduct a comprehensive study (on mobile learning) as per (i) of Table 1, once social technology intersection and mobile learning requirements are fulfilled.

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