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Mobile Learning: Challenges for Teachers of Indian Open Universities

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Abstract: "Mobile Learning" (m-Learning) has emerged as a trend in the field of Open and Distance Learning (ODL). It is removing the time and geographical barriers for learning by placing learning opportunities at the fingertips of learners. ODL institutes in India are also adopting m-learning in different forms; however, it is not fully implemented due to various reasons. This paper aims to explore possible challenges faced by teachers of Open Universities of India in implementation of m-learning. In this context the teachers of Indian Open Universities were surveyed to identify and rate the intensity of various challenges in the successful implementation of m-learning in the ODL system. The findings from respondents (n = 72) revealed that out of thirteen (13) challenges presented to them, the three most important challenges were: (a) lack of support for instructional design for m-learning; (b) lack of institutional policy for m-learning and (c) lack of infrastructure/technological support. These barriers were extrinsic in nature as they were institution dependent. The least important challenges were found to be: (a) intrusion on personal time due to 24 x 7 access; (b) reluctance to adopt technology and (c) difficulty of use. These barriers were intrinsic in nature as they were person-driven. Challenges of m-learning were found to be the same irrespective of gender. Institutions need to provide adequate institutional support in terms of policy, infrastructure and instructional design for the successful implementation of m-learning.

Keywords: Open and Distance Learning (ODL), Mobile Learning, m-learning, Mobile Technology, Challenges.

Introduction

"Mobile Learning" has emerged as a trend in the field of Open and Distance Learning (ODL) and is being accepted by the teaching and learning community (Bozkurt *et al.*, 2015; Ally and Prieto-Blázquez, 2014). m-Learning refers to the activity of imparting knowledge to the learning community through hand-held devices connected via a wireless network, independent of place and time (Wang *et al.*, 2009; Peters, 2007; Bhat and Al Saleh, 2015). It provides unique educational environments, which include connectivity despite being mobile, and personalized learning along with peer-to-peer interaction (Peters, 2007). The ODL system is adopting mobile technology for providing quality educational opportunities to its learners in order to achieve its mission of equity, access and democratization of education more effectively. Many Open Universities in the world have introduced mobile applications (mobile apps) for their learners (Ally and Prieto-Blázquez, 2014). These apps are being used for disseminating university related information, confirmation of admission, announcements about important dates, results to the learners, etc. The more advanced usage of these apps include delivering course content, assignments, quizzes, providing support services, organizing events, delivering podcasts and video lectures, etc.

India is a geographically vast, culturally diverse and has a high percentage (69%) of rural population (Census, 2011). In such a scenario, an ODL system can play a vital role using mobile technology to reach those who are difficult to reach. India has 960 million mobile phone subscribers with a 77.5% rate of penetration (TRAI, 2015); out of which 200 million are smart phone users (MoEA, 2015). Therefore, m-learning is a more relevant and promising tool in the ODL system of India (Awadhiya *et al.,* 2014).

Currently there are fourteen (14) Open Universities in India that are single mode distance education universities. These were established with a view to cater to people who cannot be aligned with the conventional education system. These universities are funded either by central/state governments. During 2013-14 the total number of learners in these universities was around 2.1 million (Srivastava and Rao, 2015). These universities are applying mobile technology in their various activities in order to increase their reach to learners and provide them uninterrupted support at their own place. However, implementation of m-learning is still in progress and not fully materialized (Ally and Prieto-Blázquez, 2014; Sharples, 2013) due to various reasons and barriers faced by the organization, teachers and the learners.

Successful implementation of m-learning is possible through properly coordinated efforts of the institution, teachers and the learners. Through this paper our aim is to explore the possible challenges faced by teachers of Indian Open Universities. The study also seeks to explore if there is any significant difference in the opinion between males and females on the challenges of m-learning.

Review of Literature

Mobile technology has penetrated the education world more pervasively in the past two decades. Technological advancements have revolutionized the educational sector, especially ODL, where the learner and tutor are separated and the teaching-learning takes place through various types of information and communication tools. Today, the ODL system is embracing mobile technology (Fozdar and Kumar, 2007) which is a versatile tool to Connect, Communicate, Collaborate and Learn (C3L). Motiwalla (2007) and Wang *et al.* (2009), suggest that m-learning is an extension of e-learning and if implemented strategically, it may complement and add value to the existing e-learning models and theories.

Research shows that m-learning helps to enhance learners' retention and assists them in completing their course, addressing individual learning needs with flexibility and reaching to unreached (Fozdar and Kumar, 2007; Hashemi *et al.,* 2011; Cobcroft *et al.,* 2006). Moreover, it can also be used to offer independent and collaborative learning experiences to learners and making learning informal (Gikas and Grant, 2013). In ODL, m-learning can be used to access course content, notes and assignments; perform various activities like quizzes; participate in discussions forums; communicate with learners and teachers, provide support services to learners, etc. (Hashemi *et al.,* 2011; Cheon *et al.,* 2012).

Mobile phones are one of the less expensive, most accessible and popular media among students of all ages (Fozdar and Kumar, 2007). Due to its affordability, m-learning may contribute to combat the 'Digital-Divide' (Hashemi *et al.,* 2011, Brown *et al.,* 2011). In India the cost of a laptop or a computer falls between twenty to fifty thousand rupees, whereas a smart

phone with the basic capabilities required for m-learning, costs less than eight thousand rupees. However, due to rapid advancements in technology, mobile phones become obsolete very quickly (Hashemi *et al.,* 2011).

Learners today are 'Digital Natives' who comprehend and analyze information fundamentally differently from 'Digital Immigrants'. They are socially more interactive and engaged in team-based activities. They prefer informal learning communications such as e-mail, text messages, instant messages, etc. (Looi *et al.,* 2010; Cobcroft *et al.,* 2006). m-Learning has the potential to address these learning needs of the new generation of learners. Despite the proven potential and readiness of the learners to adopt m-learning (Hussin *et al.,* 2012; Abas *et al.,* 2009), it is not yet exploited to its fullest due to various reasons. One of the most critical driving forces is teachers; who have the capability to effectively facilitate and promote learning through technology (Blackwell *et al.,* 2014; Wang *et al.,* 2009). Even though m-learning is learner driven, the role of the teacher is to facilitate the learner in their learning environment. In fact, teachers who were reluctant to integrate technology in their courses were termed as 'anti-technology instructors', and were found to be more frustrating and unresponsive to the learners' needs (Gikas and Grant, 2013). It is the need of the hour for the teachers to be trained so that m-learning can be implemented successfully (Ally and Tsinakos, 2014; Kukulska-Hulme et al., 2009). Unfortunately very few teachers are able to adopt m-learning for teaching learning purposes, indicating the presence of barriers for them (Blackwell *et al.,* 2014).

Therefore, it is of paramount importance to understand and evaluate the challenges faced by the teachers. Our review suggests that the challenges faced by the teachers to implement m-learning vary from personal to institutional, intrinsic to extrinsic and psychological to attitudinal (Panda and Mishra 2007; Blackwell *et al.,* 2014; Ertmer *et al.,* 2012; Ottenbreit-Leftwich *et al.,* 2010).

Although m-learning has many advantages and is being adopted by higher education institutes, it has its own set of challenges (Looi *et al.,* 2010; Gikas and Grant, 2013). One of the most important challenges which ODL institutions face is inadequate research prior to adoption of the mobile technologies (Fozdar and Kumar, 2007). However, not much literature is available on the barriers faced by the teachers using m-learning, especially in an Indian ODL context. Mitigating/ minimizing these barriers will unearth the huge potential of m-learning in developing countries, which needs to be further explored.

Method and Sample

This paper aims to explore possible challenges in the implementation of m-learning in Open Universities of India. In this context the teachers of Indian Open Universities were surveyed to identify and rate the intensity of various challenges in the successful implementation of m-learning in the ODL system. A survey method was adopted in order to collect the data required for the study. Based on the existing literature (Ally and Prieto-Blázquez, 2014; Sharples, 2013; Panda and Mishra 2007; Blackwell et al., 2014; Ertmer et al., 2012; Ottenbreit-Leftwich et al., 2010), and suggestions from the experts during development of the questionnaire, the possible challenges were identified. The questionnaire was then reviewed for content validity by experts in the field of education, distance education, e-learning, m-learning and psychology. It was further tested for its reliability through the test-retest method.

The final questionnaire consisted of twenty one (21) items to study the respondents' demographic profile, and to identify and rate the intensity of various challenges in the successful implementation of m-learning in the ODL system. A five-point Likert scale from 'Strongly Disagree' (1) to 'Strongly Agree' (5) was developed to measure challenges of m-learning.

An online survey was conducted to collect necessary data. The survey link was sent to 350 teachers from Open Universities in India (Table 1) through e-mail. Out of 350 surveys administered, a total of 85 responses (response rate of 24%) were received, out of which 72 were used for analysis.

Table 1: List of the Indian Open Universities (in alphabetical order)

#	University	Web address
1.	Dr. B.R.Ambedkar Open University (BRAOU)	www.braou.ac.in/
2.	Dr. Babasaheb Ambedkar Open University (BAOU)	www.baou.edu.in/
3.	Indira Gandhi National Open University (IGNOU)	www.ignou.ac.in/
4.	Karnataka State Open University (KSOU)	http://karnatakastateopenuniversity.in
5.	Krishana Kanta Handiqui State Open University (KKHSOU)	www.kkhsou.in/
6.	M.P. Bhoj (Open) University (MPBOU)	www.bhojvirtualuniversity.com/
7.	Nalanda Open University (NOU)	www.nou.ac.in/
8.	Netaji Subhas Open University (NSOU)	www.wbnsou.ac.in/
9.	Pt. Sunderlal Sharma (Open) University (PSSOU)	http://pssou.ac.in/
10.	Tamil Nadu Open University (TNOU)	www.tnou.ac.in/
11.	U. P. Rajarshi Tandon Open University (UPRTOU)	www.uprtou.ac.in/
12.	Uttarakhand Open University (UOU)	www.uou.ac.in/
13.	Vardhman Mahaveer Open University (VMOU)	www.vmou.ac.in/
14.	Yashwantrao Chavan Maharashtra Open University (YCMOU)	www.ycmou.ac.in/

The data was analyzed based on the mean values of each barrier derived statistically. Z-test was applied in order to identify, if there was any significant difference in the mean values for males and females.

Results and Discussion

Demographic Profile of Respondents

Table 2 indicates the gender profile of the respondents. Out of 72 respondents, 47% were male, while 53% were female.

Table 2: Gender Profile

Gender	Number of Responses	Percentage
Male	34	47%
Female	38	53%
Total	**72**	**100%**

The age profile of the respondents is presented in Table 3. The greatest number of respondents (43%) was found in the age group 31-40 years. The smallest number of respondents (8%) was from the age group under 30 years, while no respondents belonged to the age group 61 years and above. The average age of the respondents was found to be 41 years.

Table 3. Age Profile

Age (in years)	Number of Responses	Percentage
< 30	6	8%
31 - 40	31	43%
41 - 50	22	31%
51 - 60	13	18%
61 & above	0	0%
Total	**72**	**100%**

Table 4 indicates the Subject domain of the respondents. Most of the respondents were in Science (22%), followed by Education (21%), Distance Education (19%), Social Sciences (18%) and Commerce and Management (10%). Few responses were received from respondents in Humanities (7%), Computers and Information Science (7%), Agriculture (6%), Health Science (6%), Engineering and Technology (4%) and Gender/ Interdisciplinary/ Trans-disciplinary Studies (3%).

Table 4. Subject Domain

Subject Domain	Number of Responses	Percentage*
Science	16	22%
Humanities	5	7%
Commerce and Management	7	10%
Social Sciences	13	18%
Education	15	21%
Distance Education	14	19%
Engineering & Technology	3	4%
Computers & Information science	5	7%
Health Science	4	6%
Agriculture	4	6%
Gender/ Interdisciplinary/ Trans-disciplinary Studies	2	3%
Any Other (Please specify)	10	14%

**People may select more than one option, so percentages may add up to more than 100%.*

Table 5 presents the professional experience of the respondents in years. The greatest number of respondents (29%) had 5-10 years of professional experience. The smallest number of respondents (3%) had professional experience of 30 years or more. The average experience of the respondents was found to be 15 years.

Table 5. Professional Experience

Experience (in years)	Number of Responses	Percentage
< 5	9	13%
5 - 10	21	29%
11 - 15	13	18%
16 - 20	11	15%
21 - 25	5	7%
26 - 30	11	15%
> 30	2	3%
Total	**72**	**100%**

Challenges of Mobile Learning

The challenges of m-learning as rated by the respondents are presented in Table 6. These challenges have been measured on five-point Likert scales, ranging from 'Strongly Disagree' to 'Strongly Agree'. Mean Scores (M) greater than three (M > 3) reflects agreement, a score of less than three (M < 3) represents disagreement, and a score equal to three (M = 3) represents a neutral opinion towards the corresponding challenge of m-learning. The findings from respondents (n = 72) revealed that the M score of all the challenges exceeded the agreement level greater than three, thus indicating the significance of all the listed challenges. Six out of thirteen challenges showed a mean score greater than four (M > 4). This indicates that these are the strongest challenges among teachers at Open Universities, which prevents them from adopting m-learning in their teaching and learning.

Out of thirteen challenges presented to them, the three most important challenges were (a) lack of support for instructional design for m-learning (M = 4.38); (b) lack of institutional policy for m-learning (M = 4.30) and (c) lack of infrastructure/ technological support (M = 4.23). On further examination, it was found that the top three challenges were extrinsic in nature as they were institution dependentdepend, whereas, the three least important challenges were found to be (a) intrusion on personal time due to 24 x 7 access (M = 3.83); (b) reluctance to adopt technology (M = 3.73) and (c) difficulty in using technology (M = 3.51). These barriers were intrinsic in nature as they were person driven. This shows that it is more difficult for teachers to get institutional support than to adopt m-learning and devote time to it.

Our findings were consistent with previous studies (Ertmer *et al.*, 2012; Ottenbreit-Leftwich *et al.*, 2010; Blackwell *et al.*, 2014), which have reported that inadequate training, knowledge and skills; a time, inflexible attitude, and reluctance to use technology are the common challenges among teachers in influencing their use of technology.

Panda and Mishra, (2007) also reported the lack of instructional design, institutional policy and infrastructure for e-learning as important challenges for teachers at an Open University. This shows that the Indian ODL system is still lagging behind in streamlining its institutional efforts in technological intervention (be it e-learning or m-learning) in its pedagogy. Cobcraft *et al.*, (2006) and Tossell *et al.*, (2014) also emphasized that there is a need to develop an explicit policy framework and guidelines on m-learning for its successful implementation.

The literature suggests that previously the predominant barriers for the teachers, such as attitude, reluctance to use technology, unavailability of time and workload, were intrinsic in nature. However, over time, there has been paradigm shift in the attitude and perception indicating that teachers are ready to adopt the technology in their teaching and learning if provided with adequate support from the institution.

Table 6. Challenges of Mobile Learning

S. No.	Statements	SD	D	N	A	SA	M
1.	Lack of support for instructional design for mobile learning	0	0	4	38	30	4.38
2.	Lack of institutional policy for mobile learning	0	2	8	30	32	4.30
3.	Lack of infrastructure/ technological support	1	3	4	36	28	4.23
4.	Concerns about effectiveness of course delivery	0	2	8	37	25	4.18
5.	Cost of internet usages through mobile	1	8	4	25	34	4.15
6.	Lack of awareness about mobile learning	0	3	10	34	25	4.13
7.	Affordability of mobile phones to the learners	3	9	5	28	27	3.93
8.	Concern about faculty workload	1	9	12	25	25	3.91
9.	Lack of required training	1	7	7	40	17	3.90
10.	Lack of incentives to use mobile learning	2	5	14	30	21	3.88
11.	Intrusion on personal time due to 24/7 access	2	9	12	26	23	3.83
12.	Reluctance to adopt technology	2	11	9	33	17	3.73
13.	Difficult to use technology	0	13	20	28	11	3.51
14.	Other challenges	0	1	2	4	5	4.08

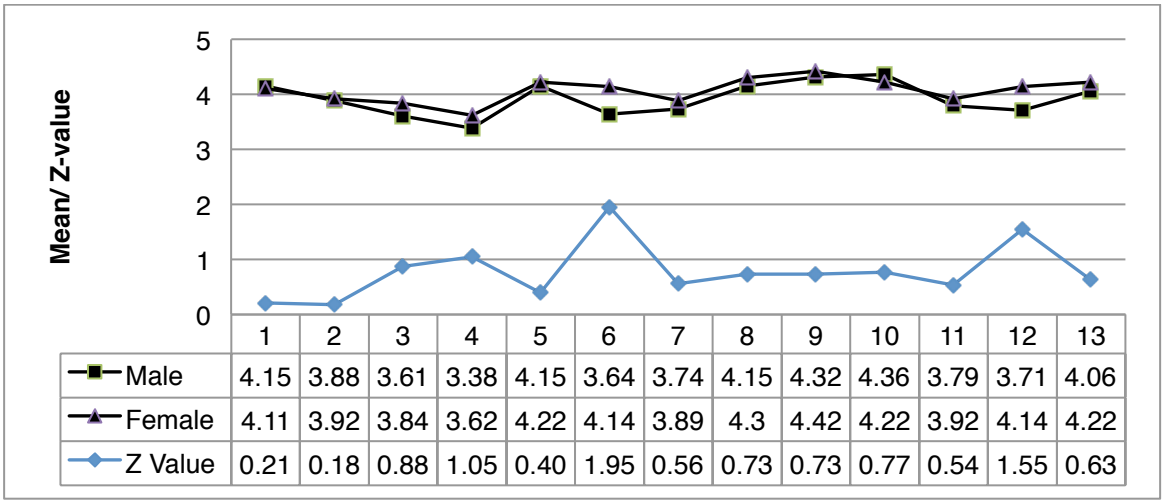
SD: Strongly Disagree; D: Disagree; N: neutral; A: Agree; SA: Strongly Agree

Besides the challenges presented above, respondents also identified additional barriers to m-learning. These challenges were found to be (a) the small screen size of the mobile device, (b) the concern about the operating system and language compatibility of mobile devices (c) concern about safety and misuse and (d) the sustainability of the mobile technology.

Gender Differences

The mean values of male and female respondents for each challenge were analyzed to identify if there was any significant difference in their perception for that challenge. Figure 1 shows the mean values

of male and female respondents and their respective Z scores. The values of all the Z scores indicate that there is no significant difference in the mean score of the two groups at a 0.05 level of significance. Therefore, we may conclude that the challenges of m-learning are the same, irrespective of the gender they belong to.



	1	2	3	4	5	6	7	8	9	10	11	12	13
Male	4.15	3.88	3.61	3.38	4.15	3.64	3.74	4.15	4.32	4.36	3.79	3.71	4.06
Female	4.11	3.92	3.84	3.62	4.22	4.14	3.89	4.3	4.42	4.22	3.92	4.14	4.22
Z Value	0.21	0.18	0.88	1.05	0.40	1.95	0.56	0.73	0.73	0.77	0.54	1.55	0.63

Figure 1: Z-test analysis of Mean Values of Challenges on the basis of Gender

However, there is little difference (also statistically insignificant) in the opinions about faculty workload between males and females. Female respondents were found to be more concerned (M = 4.14) about the faculty workload as compared to their male counterparts (M = 3.64).

Conclusion

Open Universities of India need to effectively implement m-learning in their teaching-learning process to sustain themselves in the globally competitive community and to retain their learners. Mobile learning will become pedagogically more structured and ubiquitous in the future (Ally and Prieto-Blázquez, 2014). However, the ODL system in India is still in the early stages of m-learning and still has a long way to go. This study identifies the institutional driven (extrinsic) and personally-driven (intrinsic) challenges for the teachers to adopt m-learning and reveals that these challenges are gender independent. As per the findings the most important challenges were institutionally driven, also supported by Sharples, 2013. Therefore, the impetus to implement m-learning should come from the institution, followed by the teachers.

It is critical that institutions identify, analyze and respond to the challenges of m-learning faced by teachers. Institutions need to provide adequate institutional support in terms of policy, infrastructure and instructional design for m-learning.

Ally and Tsinakos (2014) have indicated that "it is important that standards for mobile learning be set, so that high-quality mobile learning materials are developed and learning materials can be shared among educational organisations".

The institutional policy has to encourage the adoption of m-learning by creating a supportive environment for all. The policy should provide the framework for instructional design and the development of pedagogically appropriate content for m-learning and its delivery. An effective

policy on m-learning will not only help to mitigate the extrinsic barriers but may also prove beneficial to address intrinsic challenges.

Institutions also need to address other challenges identified in this study, such as inadequate infrastructure/technological support, the need for training and the lack of incentives to use m-learning.

Future research should endeavour to identify the ways to remove/ mitigate these challenges. E-learning is already implemented by the institutions with well-established policies. Since m-learning is an offshoot of e-learning (Motiwalla, 2007 and Wang *et al.,* 2009), there is a need to research if the existing e-learning policies can be adopted as such or if they need to be looked at again as per the requirement of m-learning. Also, due to rapid change in the technology, new challenges will appear which need to be tracked and dealt with.

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