

M-LEARNING – ON PATH TO INTEGRATION WITH ORGANISATION SYSTEMS

Shilpa Srivastava and Dr.Ved Prakash Gulati

Tata Consultancy Services Ltd.

1, Software Units Layout, Madhapur, Hyderabad, Andhra Pradesh -500034, India

ABSTRACT

Learning is essential in organizations for them to survive. However, given the changing environment owing to global inter-connectedness, mobile workforce, global unpredictability and complexities, the learning approach must also change. Today the Learning and Development unit must be able to facilitate collaborative work, develop learning practices in tune with the trends, and bring in appropriate tools and processes. Elearning systems may not suffice on their own owing to the need for infrastructure resources and the location dependency. Mobile Learning would help resolve several of these issues and can be used for various applications such as recorded information, audio files, reading, learning applications, scheduling, calendar features, assessments, collaboration, support and co-ordination activities, amongst other functions. However, for m-learning to be effective, the learning delivered must be recognized and credited, with learning being mapped to competencies database and roles assignment. Hence, the m-learning must be integrated through the LMS to competency management systems, internal knowledge management system and the collaboration network to benefit from peer learning. The case of an Academy in an IT major is described in this regard. The Academy, despite its success, is now piloting its mobile platform. For sustained usage of mlearning globally, there are challenges of device design, durability and network issues that need to be addressed.

KEYWORDS

Learning, mobile, elearning mlearning, integration, blended learning.

1. INTRODUCTION

Learning has been an important tool in devising business and competitive strategies. Intimate knowledge leads to innovation, which again leads to better products and services and happier customers. At all levels, learning is a critical enabling function for a competitive organization seeking to consolidate its growth. Today's environment is marked with global complexities, inter-connectedness and unpredictability and the changing nature of the work force. Work and learn constantly is the mantra, with both being continuous to keep pace with changes. In this new world order, learning systems must perform three core functions – i) Facilitating collaborative work; ii) Sensing trends and helping to develop learning practices; and iii) Working with management to bring in appropriate tools and processes. The existing learning systems focusing on traditional classroom training may not be able to offer these features. Learning departments in most organizations are aware of this shortfall and are implementing elearning platforms. In 2012 alone, corporate training was a \$200 billion industry. ELearning represented \$56 billion of that and is expected to double by 2015. The LMS (Learning Management Systems) market alone is likely to grow to nearly \$2 billion in 2013. E-learning on its own may not address the requirements of the globally mobile workforce, given the location specific constraint it poses. M-learning would be good option due to multiple factors such as its location independence, absence of need for heavy duty resources, and employee comfort factor. The paper lists several applications possible through m-learning. Also, the paper suggests that m-learning application be integrated with existing learning management system and through it also be integrated with key systems in the organization including the competency system, knowledge management system and the social collaboration network internal to the organization. Recognition and certification are also key to m-learning success. The paper also gives a case study of an Academy in an IT major that focuses on business domain learning through technology.

2. THE MOVEMENT TOWARDS M-LEARNING

Technologies today support the development of educational content that is more mobile and personalized, supporting the change of learning forms to elearning, mlearning and ulearning (ubiquitous learning). Mobile learning or m-learning as its called, is considered to be the most effective among flexible learning options, the reason is that it overcomes the limitation of a teaching location and location specific PCs. The additional benefit is that mobile learning utilizes the learner's spare time from any place any time. Studies show that about 88% of US workforce says they use tablet in transit! Further, in large organizations, its hard to direct learning to the thousands of employees even through elearning due to the following challenges:

- **Personalisation** – despite interactive features, elearning suffers from a lack of personal touch.
- **Resources** – elearning requires additional resources from the company such as a PC or laptop, internet connection, maintenance and helpdesk issues and manpower requirements
- **Others** – Bulky laptops for mobile workforce, late boot up issues, lack of comfort

The resources aspect becomes a major challenge, particularly in large IT companies that have to deal with "the bench". This means a big share of revolving pool of qualified graduates who fall into any one of the following categories: i)New joinees not tagged to any project and waiting for some allocation; ii)Professionals in between two projects and waiting to join soon; iii)Experienced professionals seeking completely new area and waiting for new projects. Most times, organizations are unable to provide them with computing resources due to non-availability of space, systems or simply due to security reasons.

To further compound these issues, the work force today is mobile, constantly on the move. Traditional effective though, would be irrelevant. E-learning through traditional devices such may not always be ideal. Hence, organizations are coming up with the concept called "Bring Your Own Device (BYOD)", wherein employees can get their mobile devices to offices, after clearing security protocols. Employees then would be able to download official applications on these devices to conduct official activity. This highlights the fact that mobile devices are already gaining acceptance in organizations, especially in the IT sector. For example, an IT major has downloadable mobile applications in certain specific areas such as performance management, project attendance, leave management etc. Hence, there can be a case of extensive deployment of m-learning in organizations as they already are working with these devices. But mobile learning is gaining traction. There are several statistics that speak volumes in this respect.

- According to American Ambient Insight Report 2011, 39% of organizations were using mlearning.
- Mobile Learning Market to reach \$9.1 billion by 2015 as opposed to the worldwide market for Mobile Learning products and services of \$3.2 Billion in 2010. (Ambient Insight Mobile Learning Market Forecast 2009-2014)"
- According to IDC, about 75% of the US workforce is already mobile, with the numbers growing to 1.3 billion in 2015 or a massive 37.2% of global workforce."

3. THE KEY ATTRIBUTES OF MOBILE LEARNING

The learning community and researchers have always opined that learning must be ubiquitous. There are certain attributes of m-learning as identified by researchers that support their use in corporate training field:

- Ability to function in formal and informal learning settings
- Communication intense medium enabling greater peer to peer as well as trainer-learner interaction
- Focuses on individual learning while promoting collaborative learning
- Learners using mlearning can use and also develop information individually as well as collectively

In a team environment, the collective learning feature of mlearning has the potential to bring down learning barriers and encourage development of solutions pertinent to the teams. Several research and piloting initiatives have revealed that ownership of mobile devices promoted involved learning.

The key features afforded by mobile learning are summarized the pyramid structure given below in Figure 1:

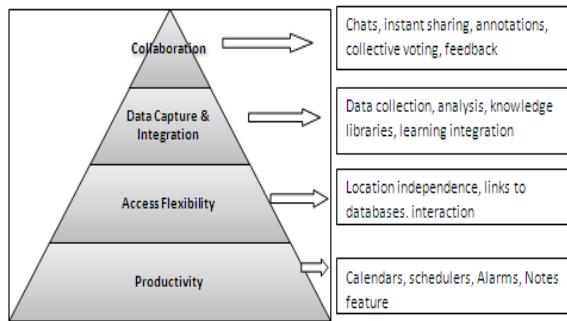


Figure 1. Features Afforded by Mobile Learning

Each level of this pyramid has application for mlearning in a corporate environment, as shown in the figure. The applications range from productivity, which aims to improve the learning attendance and absorption through several features to collaboration, which is highly reliant on communication. Thanks to these features, several benefits accrue to learning with mobile devices:

- “Individual” Learning – Learning driven by learner requirements in a suitable format
- “Timely” Learning – Flexible, convenient, fast track and completely relevant learning when needed
- “Adequate” learning - Highly applied, easily digestible learning for increasingly busy executives

4. TYPES OF MOBILE LEARNINGS THAT CAN BE FACILITATED

Mobile learning is not an ideal option for stand-alone learning vehicle, despite all the benefits given above. The major limitation is the absence of a validated, accepted industry framework for instructional design and delivery on the mobile device. Another major hurdle is the “noise” involved in mobile learning. Hence, in combination with other learning systems, m-learning can happen in following ways:

- Mobile learning in conjunction with elearning
- Connected classroom training
- Informal mobile learning in a social setting
- Mobile performance/training support

For all of these learning options, m-learning can facilitate different types of learning:

- **Recorded information/sessions** – Learners can input information through multiple ways and also record their observations, examples and thoughts in notes. These can be used to assist them in future for comprehension or assessments
- **Assessment** – Multiple types of assessments can be done. Trainers can do a small pre-assessment test so learners understand their progress. Final assessments can also happen on mobile devices.
- **Images** – Sometimes images speak louder than words. M-learning can include illustrations, photos, videos or even animations to explain concepts.
- **Collaboration via SMS, chat, networking, discussion forums and email** – Learners can communicate and share knowledge with co-learners and also the trainers/faculty.
- **Games/simulations** – There can be learning oriented games, simulations or other interactive features.
- **Compressed reading material – learning capsules** – Learning can be delivered as small reading files or anecdotes or examples for reading.
- **Audio files** – Learners can listen to audio including short lectures, podcasts, research discussions and interviews, among others.
- **Polling/surveys** – This can be used for evaluations (such as asking learners to respond to questions). There are several other ways polling can be used. Learners can access the polling site from their mobiles to create surveys.

- **Search facility** – The internet on mobiles can be used to search for relevant information when needed.
- **Scheduling** – Calendar and scheduling features allow learners to organize their learning schedules, while also facilitating reminders, deadline tracking. It allows trainers to keep tab of attendance, performance and progress of learners.
- **Support and co-ordination** - Learners can store relevant messages and information and co-ordinate with trainers about course timetables, and content. They can engage in course reviews with their co-learnings and facilitate discussions.
- **Apps** – Smartphones today carry hundreds of applications that can help drive learning such as dictionaries, glossaries, calculators and several more.

5. THE MOBILE LEARNING ECO-SPHERE

The existing learning systems must be leveraged to employ mobile learning so learners can choose from a range of platforms. We propose a blended learning approach for integrating mobile learning with the organizational learning management system. According to one recent study, nearly 70% of the respondents cited mobile learning as an essential component for their learning management system (as per Parry, Carl. “eLearning Trends: How Hot Is Mobile Learning In 2012?”). Hence, most existing LMS platforms already have the required plug ins to support m-learning.

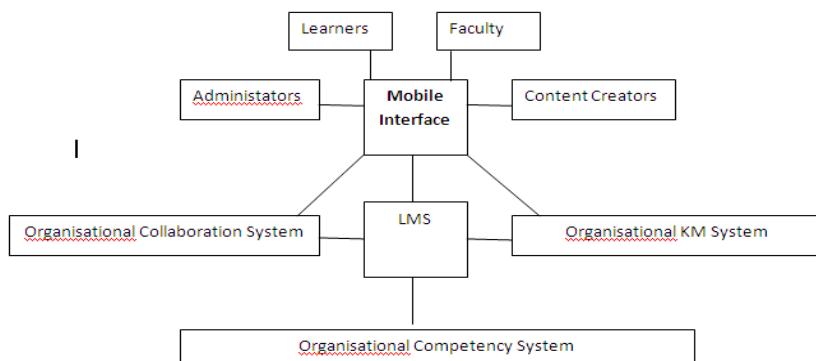


Figure 2. M-Learning Integration

M-learning is integrated with the internal learning management system. We suggested that all learning that happens is also integrated with the following systems – i) internal competency management system ii)the organizational knowledge management system iii) organizational social collaboration network

5.1 Integration with Competency Management System

In the corporate environment, learning is driven with one main intent, though there are several more intrinsic motivations – to gain the skill or competency required to perform and progress in the company. The organization also encourages this kind of learning to gain a pool of experts who can contribute to organizational growth. As such, as learning activities and recorded and mapped to a particular skill level. This motivates learners. For example, in one IT major, all learning is recorded by learning officers and then recorded in an integrated competency management system – manually if its classroom sessions or automatic in case of web based learning. By doing this, the company can check and see which employees have the competencies required for a particular project and call upon their services. Hence, it is good learning sense to integrate m-learning with the company’s competency management system, which is again linked with the company’s performance management system.

5.2 Integration with Knowledge Management System

An organisation's knowledge management system is a repertoire of all knowledge centric initiatives and activities. Learning with mobile devices form an important constituent of knowledge base. All m-learning initiatives have to be integrated with the KM system, as it is an important repository and available across the organization. It also helps linkages with project information repositories.

5.3 Integration with Organisational Social Network

The Gen Y employees are the most comfortable with social networking. Social learning does not simply imply learning via Facebook or Twitter (though these can be effective informal learning mechanisms), it includes a horde of other options such as blogs, wikis, discussion groups and search mechanisms for specific information. These can be part of the organizational learning platform and also integrated with mlearning. Social collaboration through m-learning is ideal in situations where learning on the job is required or where situational learning is needed. For example, an IT task which is not familiar to the employee or a client query for which the employee has no ready information. In such instances, the employee may refer the social platform for advice. According to the GlobalWebIndex Study 2013, usage of global social platforms is growing worldwide with mobile being the key driver. Other statistics point towards the growing influence of social media. Facebook has more than 1 billion users, of which 200 million are purely mobile based, which means a fifth of these users do not use PCs. Between 2010 and 2011, there was a 200% growth in mobile users accessing Facebook via their mobile devices. The number of Facebook users is nearly three times the population of the United States. This shows the extent of globalization that has occurred in the internet age. The learning departments can utilize this reach of social media and link m-learning with this media to enable more collaborative learning.

Once the m-learning platform integration is in place, there is a need for standardization across the organization to give greater leverage to m-learning system. The learning gained through mobile device needs to be recognized and awarded, which is what every learner seeks. The recognition thus obtained would gain organisation wide credence due to the integration as proposed in this paper.

6. LINK WITH CERTIFICATION STRATEGY

To ensure broadbased acceptance and implementation of m-learning, its content, formats and assessments should all converge towards a solid structure – certification and competency. Every role in any IT major requires certain competencies and these are mapped to the learning programs. M-learning supports these programs. To ensure that these competencies are recognized and follow a structure, how to evaluate these competencies? That's where certifications at various levels make sense. A certification carries some weight and can be related to a competency. This is easier than combining multiple sessions and trainings and assigning some competency.

With certification, the process is easy. The employee simply needs to complete the program, get a certificate and get mapped to a competency and then a role. So, the m-learning content and delivery needs to be linked to a certification strategy. Learning should be captured in the LMS that m-learning is integrated with.

7. CASE OF ACADEMY IN AN IT MAJOR

The training needs of a large multi-national IT organizational are highly complex. Apart from the obvious technology skills, employees need training in client vertical – both are highly dynamic sectors with rapid changes. Large companies know that learning is an asset and a continuous, life-long process. This is being driven by “client orientation” and the race to deliver more than expected to the clients to retain their competitive edge and maintain client relationships for continuous business. To add to the training complexity, large IT multinationals are active in several business streams such as software development,

maintenance, services, product, BPO/KPO, and consulting. Accordingly, there can be several content areas that associates are trained on apart from technology, including Product, Management & Leadership, Process (quality, risk, security, compliance, HSE, etc), Functions (Marketing, sales, HR, finance, etc), Business domain, Softskills (Etiquette, Culture, Communication etc), Language and culture initiatives.

In this case of a Business Domain Academy in a large IT major, a study revealed that clients' satisfaction was low in terms business knowledge of people assigned to work with them. IT employees need intimate client vertical knowledge, processes and interactions, if they need to function effectively in any IT project including software development, a new solution, updation of an existing solution and even maintenance. Hence clients increasingly seek proof of business domain/vertical knowledge being imparted to IT employees and this has become a criteria for awarding projects. On the other hand, IT companies also seek this knowledge to gain a pool of subject matter experts who can help impress clients and bring out innovative solutions.

In the past, the IT major concentrated primarily on technology training, and with changing environment realized the need for focused, standard business domain training. Hence, there were initiatives at each industry vertical level– but suffered from duplication and a lack of structure and recognition. With this background, the IT major realized that traditional learning would not suffice and set up the Business Domain Academy as an online platform focusing on client vertical knowledge delivery. Apart from the global reach, the e-learning Academy was envisaged for several other benefits including – ability to scale up capacity, replicable standards, certification strategy, modular method for adding programs, report generation capabilities, operational efficiency, access control, easy database creation and maintenance, feedback mechanisms and discussion capabilities.

7.1 Expansion of the Academy

The Academy piloted its elearning system with banking and financial services (BFS) vertical and was widely accepted by employees and clients. The Academy soon followed up with non-BFS programs across other verticals such as insurance, healthcare, lifesciences, telecom, travel, hospitality, retail management, manufacturing, Media, Government, etc. The advantage was that the programs were free, and company copyrighted and filled a huge gap in learning function. Today, this Academy is central to all business domain activities in the company and are even contributing in sales and customer activities. The Academy initiatives can be clubbed in the main categories of: Online Certification Programs; Customized Training Programs; Train the Trainer Programs; Portal Management and Innovation; Research Activities, Pre-Sales Activities, Consulting and Content Development. Today the Academy has close to 140 certification programs across the verticals, more than 120,000 registered users, more than 27,000 certified in 2012-13, with 20% annual growth.

7.2 Technology and Standards

In terms of technology, the Academy adopted the Modular Object-Oriented Dynamic Learning Environment (MOODLE) as the core Learning Management System (LMS) with customizations such as registration page with CAPTCHA, negative marking for incorrect responses to quizzes, sequential order of learning, mandated feedback survey, automatic certificate generation (linked to fulfillment of survey), 90 days enrolment period. To facilitate easy upgradation and replication of courseware, the Academy has established standards for how the course is created, displayed and how learners are assessed, graded and certified. Course content is in the form of extensive word document and a presentation. Each program is grouped into modules (with 3-4 chapters in each module), with module wise quizzes and a final quiz. Quizzes carry randomly generated questions and negative marking for wrongly marked questions. Pass percentage is set at 60%. These standards ensure that the Academy is taken seriously and the effort put in by employees is recognized through internal recognition points as well as in terms of better projects and career path prospects. The Academy has over 120,000 employees registered with it!

7.3 Integration with Organisational Systems

The Academy is integrated with other key systems in the company - the competency and proficiency mapping tool, and the knowledge management system. All the three systems are integrated, so that the IT major can have a ready pool of skilled employees, who can be easily tracked, monitored and put into suitable roles. The Academy builds the base level business skills and knowledge through various tools such as e-learning, and integrated learning using the web-audio-video systems in sync. These skills get reflected in the competency system, which gives the learning roadmap, while creating a database of skillsets in the company. Often, material from the competency management system is linked to specific project repository on the KM system, so that projects can directly access the information required by them. The KM system directly links to the Academy portal, so that employees can look up and enroll into certifications of their domain. Also, whenever an associate completes a program in Academy portal, it gets updated in the competency management system. Thus, employees are able to get the best from all the systems and gain the maximum information and knowledge.

7.4 On Path to mLearning

Academy wants to reach out to greater Gen Y crowd through m-learning. The basis of this decision were a series of internal surveys among employees globally, conducted to understand behavior of employees with respect to mobile devices. Questions raised were i)the kind of device they use ii) applications they access over the device iii) Frequency of usage of device for such applications iv)Interest for learning over devices. Results showed that 48.7% had android phones, and 22% or over 61,000 employees lean towards mlearning. Another 21% or about 60,000 find laptop convenient and can be a future base. The organization also went social with the idea of mobile learning to monitor acceptance. Academy found that reaching out to this crowd enhance learning participation, as Gen Y comprises 73% of total workforce.

For this purpose, the Academy is integrating with the Moodle Mobile application for Moodle. This involved customization of the Academy page, and using the presentation for content rather than the word document, course history and status updates information,. In addition, the Academy would be part of the BYOD initiatives, with downloadable applications with regard to content and certificates. The pilot effort is on and the learnings from it would help further fine tune the effort. The current architecture of the Academy is given in the picture below with the mobile interface:

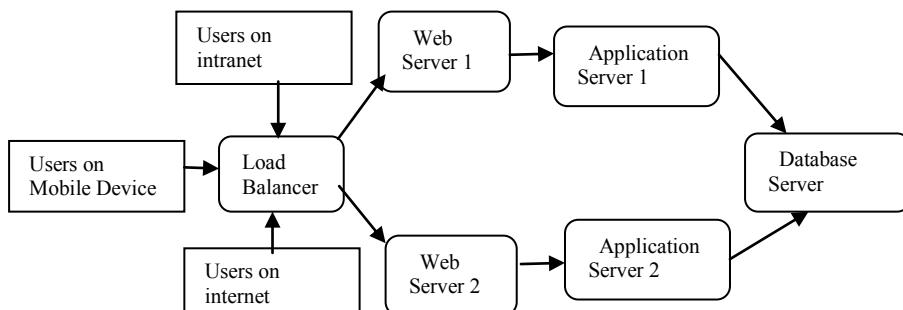


Figure 3. Academy Architecture

8. CONCLUSION

There are several merits to mlearning, but there are certain challenges too. If these are addressed, then the effectiveness of mlearning will grow multifold. The challenges are summarized below:

- The physical features of mobile devices may make learning deployment a challenge. The mobile device suffers from issues of small screen size, restricted memory and battery life constraints.
- There could be challenges with deployment and employment of learning applications on the mobile. The user while comfortable with communication and collaboration applications, may not be open to using the device for learning due to content issues, difficulty in adding the applications and lack of interest altogether.
- The obvious network speed and reliability concerns
- Physical environment related concerns such as outdoor visibility of the device screen, screen resolution, device radiations concerns, inability to use in case of rains

These challenges need to be considered when selecting mobile devices and developing learning platforms and content. For challenges relating to screen size, the content must be delivered as learning capsules, so that it overcomes the issue of extensive reading material in small screens. Given the lack of standard formats in terms of m-learning content and delivery, there is need for further work and collaboration among researchers and users to develop the same. Network operators are already coming up with high speed internet access, but there is need for widespread spread of such access and reliability options. In terms of the device sturdiness, there are weather proof devices coming up, but they are very expensive and there is scope for research in developing such devices.

While the paper suggests integration of m-learning with organization wide systems, there would be need for analysis and surveys internally in terms of acceptance of this change. Issues such as access control to such systems and the level of integration, plus modifying existing legacy applications to link them to m-learning and LMS need to be addressed. In terms of the kind of applications that can be put for m-learning, internal feasibility and acceptability again needs to be studied. This may vary from organization to organization.

REFERENCES

- Vukmirović, V., et al, 2009. A Model for Integration of m-Learning into Learning Management System. *Internet Journals*,
- Wood, F. H. & McQuarrie, F. 1999, On-the-job learning. *Journal of Staff Development*, 20
- Pasanen, J. 2003. Corporate Mobile Learning. In Kynaslahti, H. & Seppala, P. (Eds.) Professional Mobile Learning. Helsinki, IT Press.
- Keegan, D., 2005. The incorporation of mobile learning into mainstream education and training., *Proceedings of mLearn 2005: 4th World conference on mLearning*. Banff, Alberta, Canada.
- Sharples, M., Taylor, J. & Vavoula, 2005. Towards a Theory of Mobile Learning. *Proceedings of mLearn 2005: 4th World conference on mLearning*. Banff, Alberta, Canada.
- Christoph Pimmer and Urs Grobliel..2008, *Proceedings of mLearn08*
- Beck, K. and Ralph, J., 1994. Patterns Generates Architectures. *Proceedings of European Conference of Object-Oriented Programming*. Bologna, Italy, pp. 139-149.
- Schofield, c et al, 2011. How mobile technologies are changing the executive learning landscape. *Research for UNICON Produced by Ashridge, November 2011*
- Kok A, 2013. Factors of Acceptance for Mobile Learning in Corporate Settings: An Empirical Investigation in Banking Industry. *Intelligent Information Management*, Vol 5, 141-149