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M-learning: Changing Roles of Instructors and Learners

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Abstract: Mobile learning or m-learning or wireless learning as the name implies means that learning takes place while in a mobile environment. Mobile in this paper is interpreted as an environment which allows the learner the luxury of mobility, and has several unique characteristics. However this new entry in learning concept certainly has some pedagogical issues. One of them would be the instructors' and the learners' role. M-learning envisions that learners have the freedom of getting educated whilst in a non-conventional classroom, and hence, the lessons are accessible anywhere at anytime. In a conventional classroom, the instructor and a group of learners would meet at a designated time and place to interact. All these have to change and a new set of expectations have to be considered. Obviously learners as well as instructors who are interested in m-learning may be unable to attend a traditional classroom and thus would be attracted to the characteristics of m-learning since the latter encompasses and integrates all the features as well as the limitations of eLearning; web-based learning as well as wireless learning or virtual learning. When mobile technologies are combined and armed with sound instructional design approaches, m-learning lessons have a huge advantage when compared to traditional classroom bounded lessons and instructions. This paper discusses the role of the instructors and learners in m-learning, as this type of learning has great potential to be the learning practices of the future

Keywords: Mobile E-Learning, M-learning, Mobile technologies, Mobile learner

Introduction

There is no need for a classroom; there is no need for students to be at one place at a given time. However, there is an instructor and there are learners and lessons with rich and thick sources of information. This is what mobile learning or m-learning envisions. Similar to e-learning, m-learning is capable of setting up 'classroom' anywhere at any time, but distinctly from e-learning, the 'classroom' setup of m-learning would be instantaneously and most importantly 'on the move'. However it is pertinent to be understood here that it is not the intention of the researchers to suggest m-learning as better mode of learning compared to other technology based learning. Each technology based approaches has its niche in the teaching and learning industry. For instance, e-learning refers to instructions and resources in digital format which provides access and promotes easy information sharing. Web-based learning relates to the format in which information is received and presented taking advantage on its multimedia and hyper linking capabilities. Meanwhile wireless or virtual learning refers to the transfer of source to the learner through wireless technology. This permits the learner to move freely although limited to either several metres (Bluetooth) or several hundred metres (for education application on WWW, see also, Andre, Rist & Muller, 1997; for 4G see Editorial, 2007; for WiFi see Cowley, 2003; Hanlin & Walke, 2008; for Bluetooth see Bluetooth, 2009; Smith & Collins, 2002). M-learning is an enhancement of the mentioned technologies as it integrates sound instructional design. In terms of users, e-learning caters for

the ‘wired society’ riding wired networks while m-learning would be more for the ‘mobile society’ which takes the advantage of radio networks. It is through the unique features that make m-learning more attractive to learners who are restricted to career commitments, time constraints and geographical limitations (Bartley & Golek, 2004). What makes m-learning even more appealing for learners on the move is the wealth of information and internet capabilities it integrates through the web and multimedia. M-learning has combined the elements of e-learning, web-based learning and wireless or virtual learning while improving their shortcomings to suit the needs of learners especially for those who could not afford the commitment of learning in fixed location and time.

However like any learning approaches, m-learning is not without pedagogical issues such as m-learning curriculum content, method of learning assessment, suitability of a course to the m-learning environment, skills needed for teachers and students in m-learning, roles of instructors and learners, and others. In this paper, the researchers chose to focus on the discussion of instructor’s and learner’s perspective in m-learning. The discussion will provide the evolutionary concepts of learning from traditional learning to m-learning in order to draw justification of its relevance for future learning; definition of m-learning; differences between conventional learning and m-learning; the roles expected to be taken by instructors and learners, and challenges faced with m-learning.

The evolution of learning

Learning is one of key human features, which enables development of human intellectual, spiritual, and physical powers for life enrichment. The core motivation of human learning can be rooted in original needs of humans as have been investigated and classified by Maslow’s (*Wikipedia*, 2009) hierarchy of needs. As exhibits briefly in Table 1, Maslow’s hierarchy of needs indicates that cognitive needs, beside other needs, play an important role in human needs for learning.

Table 1: Classification of the Original Needs of Humans

Items	Original needs of humans
Biological and Physiological needs	air, food, drink, shelter, warmth, sex, sleep etc.
Safety needs	protection from elements, security, order, law, limits, stability etc.
Belongingness and Love needs	group work, family, affection, relationships etc.
Esteem needs	self-esteem, achievement, mastery, independence, status, dominance, prestige, managerial responsibility etc.
Cognitive needs	knowledge, meaning etc.
Aesthetic needs	appreciation and search for beauty, balance, form etc.
Self-Actualization needs	realizing personal potential, self-fulfillment, seeking personal growth and peak experiences
Transcendence needs	helping others to achieve self-actualization.

Source. Adapted from *Wikipedia* (2009), Maslow’s hierarchy of needs.

In ancient Greece, the educative culture used role-modelling extensively, assembled strong mentoring network which nurtured the young and contesting and questioning becomes advocated. Cities were built; scholars and theoreticians were hired all in the name of education. Since infrastructure, teachers and students are at the disposal for learning and education; this model could be considered as the first total model for learning and education. It is this model where learning institutions are being based on until this day. The only variance would be the content, tools and technology. The learning and teaching approach throughout history remained unchanged until the end of the 19th century. Labs and experiments in the 19th and early 20th centuries increased human knowledge and learning abilities as Einstein (born 1879) used to say that: "We live in a world of problems which can no longer be solved by the level of thinking that created them" (in Karaliotas, 1999). This saying indicates that human creativity and imaginative powers evolve faster than our learning process to find solution for problems, that is, we need to know more, since our generation power is faster than our knowledge generating and learning abilities. In the last 50 years, technologies, research and experimental labs have managed to generate massive information and knowledge to the extent that Eliot's (born 1888) *Choruses from the Rock* stated that: "Where is the wisdom lost in knowledge? Where is the knowledge lost in information?"(in Karaliotas, 1999). This sentence suggests that if we do not provide ways to learn and organize the order of the existing massive knowledge and information, not only will we be lost in the available knowledge and information, we would also be polluted by the knowledge and information and lose our wisdom!

It seems the days of traditional and literal *chalk-and-talk* in the classroom have been superseded by overhead projectors, readily available handouts and worksheets produced by duplicators and then by photocopiers, and by routine provision of video facilities. Each innovation provides little-discussions but nevertheless potentially profound implications for the conduct of the teaching-learning situation. Related to introduction of such adjuncts to conventional teaching, student expectations are changing as well while the core learning systems have not been changed dramatically.

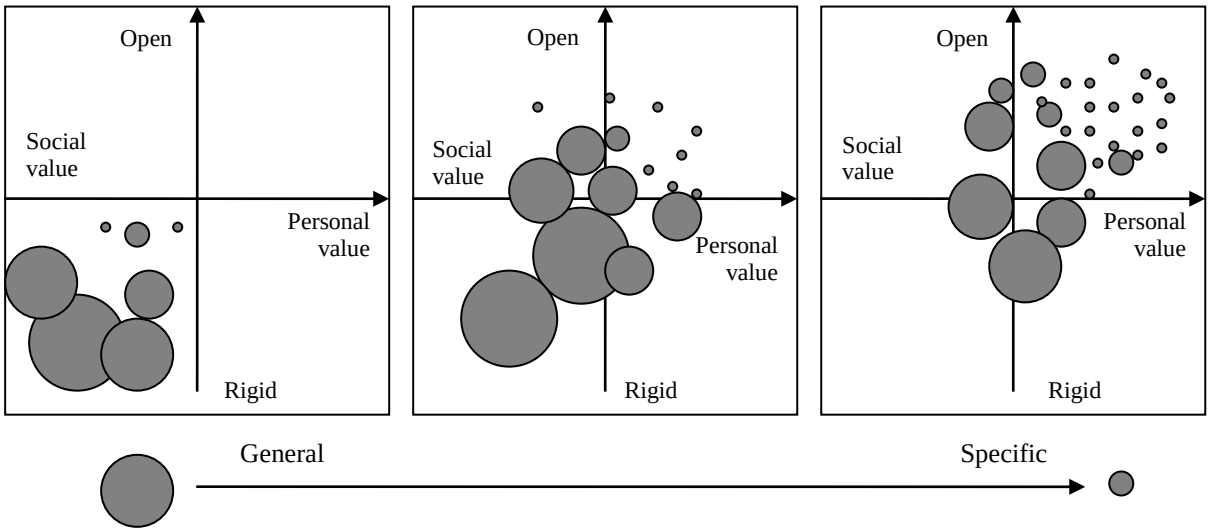

Figure 1: Atomization and personalization in an open infrastructure and management system (Lytras and Naeve, 2007)

The 21st century witnesses the progression of learning from rigid, in chunks yet socialized to one that is opened, atomic yet personalized as shown in Figure 1. This is made possible as ubiquitous technology allows the use of the satellite, internet, universities and virtual learning centres to transform learning to one that is global and open while the invention of the mobile phones, laptops, PDA and other related high technological equipment allows learning to be personalized.

Toffler, cited in Goodreads (2009) envisioned the illiterate of the 21st century will not be referring to those who cannot read or write, but those who cannot "learn, unlearn and relearn." This implies that there is an imperative need to determine the learning systems of tomorrow or devising a method of *how to learn* with the infinite resources or content that is available to be learnt. As learning inevitably moves from the rigid, chunk and socialized to one that is opened, atomic and personalized, a new learning system should be redefined and redesigned to fulfill the needs of future learning.

The environment and the *atomic contents* should be designed and produced by professional teachers in a proper presentation form to provide an active environment for learners. The learning speed should be increased, enabling learners to cope with the rapid changes in the future information society. Eventually, as a result of such learning system the cultural evolution process would speed up in different societies whereby the eWorld dreams can come true. In next part a brief explanation is presented to highlight some major issues in the future learning system and its features.

A Cognitive Model on Learning in Information Age (IA)

There are two major points of view in the study of learning system: internal view (students, teachers, managers, and environment); and external view (performance, speed, cost, maintenance). The history of learning contains variety of learning system such as teacher-centred, student-centred, content-centred, or open learning, flexible learning, individualized learning, computer aided learning, and project-based learning which are developed to improve learning performance with respect to the demands in time and space. Meanwhile, the learning concept itself is still a major issue to be clarified. This part features an advanced learning system discussed from different angles or point of views in order to draw a clear vision of an ideal learning system in Information Age. The learning concept will be discussed based on a cognitive model that facilitates learning.

Ideal requirements of learning concept in IA

As discussed earlier, learning plays a crucial role in the transition period (currently, IA) and during IA itself. At this level, the direction of learning should lead to one that caters to lifelong learning, continuous, boundless, quick, high performance, public and private, by request, multiplicity, uncomplicated, interconnected, adaptable, dynamic, and affordable. This translates the liberty of IA learners to learn whatever suits to personal request and level about any subject anywhere and anytime with minimal cost while at the same time contents are dynamically interrelated and adaptable to the needs and talents of each individual learner and actively requests the learner to learn in accordance with the existing situation! Comparing this idealistic general concept with present understanding of learning concept indicates a vast gap and shortage that needs to be filled. These ideal features of learning should be elaborated to

the extent that the current researchers can develop corresponding theories, techniques, technologies and style management as well as dynamic environment and system of architecture, for realizing the ideal learning in IA.

Learning how to learn

As mentioned earlier, devising a concept of how to learn will be the objective of future learning and it is strongly based upon the cognitive model of the human brain. Refer to Figure 2. Concepts, knowledge or information are depicted by blocks. A single block represents a simple concept while a network of blocks represents a complex concept.

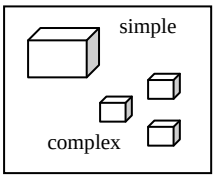

Figure 2: Concepts, knowledge or information at any level of complexity (Lytras & Naeve, 2007)

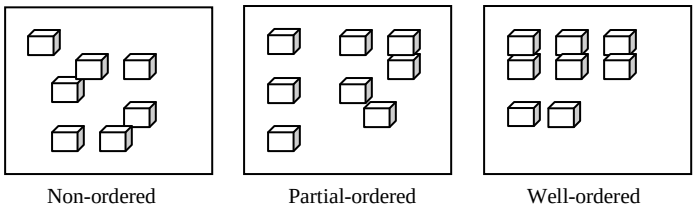

Figure 3: Blocks of network model (Lytras & Naeve, 2007)

The relationships which occur between the blocks define a certain order between them and each individual configuration of each block in the network represents a higher level concept. Thus by changing the relationship between these blocks the meaning of a complex concept is changed. Based upon this model, if blocks of the network are well-ordered then the perceptions concept can be properly retrieved in the same order as it has been learnt. Refer to Figure 3

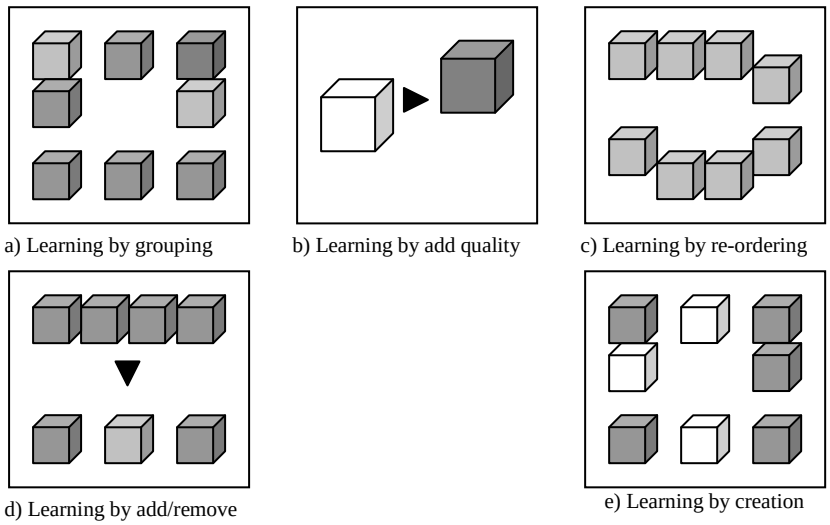

Figure 4: Learning process (Lytras & Naeve, 2007)

First, learning occurs when a well-ordered network is formed or learning by grouping. Refer to Figure 4a. Second, the quality of one or blocks are improved or learning by adding quality. Refer to Figure 4b. Third, reordering occurs between certain groups of blocks or learning by

re-ordering. Refer to Figure 4c. Fourth, blocks are either added or removed or learning by adding or removing. Refer to Figure 4d. Fifth, gaps are reduced and new concepts are created or learning by creation. Refer to Figure 4e. This concept suggests that a learner try to learn any of the above approach depending on one's existing knowledge but the learner also tries to fit the learning materials into one's existing knowledge. Thus, the learning quality depends on two powers, the teacher power for preparing a concept for teaching in a proper order, and the learner power to get and make his out of his mind. Therefore, the cognitive model for learning is needed to facilitate m-learning.

What is M-Learning?

Considered more than just a temporary fascination with technology, m-learning is a valuable means of technological movement which is evident and inevitable in the advocacy of learning and teaching (Wagner, 2005 as cited in Cobcraft, Towers, Smith, & Bruns, 2009). M-learning is either regarded as a subset or an extension of e-learning which refers to learning using mobile-devices such as mobile phones and PDA. The main difference is e-learning originally referred to learning via wired network access before the widespread availability of radio networks, while m-learning came along to focus on phone networks and devices which were first used and handheld with small screens. In the beginning of the new millennium, m-learning in curriculum studies was defined as new teaching and "learning approach through mobile computational devices" (Quinn, 2000) network-based learning content (Malinen, Kari, & Tiusanen, 2003), wireless network-learning (Boerner, 2003) or technology-based curriculum (Wierzbicki, 2002). However, these definitions have evolved to be more dynamic and comprehensive due to the fact that m-learning covers not only learning via mobile devices, network and wireless, but it has expanded covering any service or facility that provides a learner with general electronic information and educational content that assists in knowledge acquisition anywhere and anytime (Lehner, Nosekable, & Lehmann, 2003).

Differences between conventional and m-learning environment

The differences between conventional or traditional learning environment and m-learning can be displayed in this manner:

Table 2: The differences between the Conventional School Environment and m-learning Environment

	Conventional School Environment	m-learning Environment
Location	Learning normally occurs at fixed classroom at specific time slots.	Learning environment is no longer fixed but can occur almost anywhere.
Time	Interaction between teacher and students is face-to-face limited to specific time.	Interaction is no longer confined to a stipulated time but is accessible at various times both synchronous and asynchronous.
Resources	Resources depend on readily printed forms like books, worksheets and etc. where knowledge is mainly based on the resources.	Resources are no longer limited to just printed forms but digital as well, thus creating an inexhaustible pool of knowledge.

Roles	Teachers are mainly referred as ‘knowledge giver’ or ‘knowledge guardian’ where students assume the receiver of the knowledge. Classroom discussion will be confined to knowledge given where teacher validates.	Teachers now mainly assume the role of facilitators or group-guiders of a classroom while learners are considered as collaborators who need to work together to achieve the learning experience. Students will take charge of their own learning experience as active learners (construct knowledge).
Evaluation	Examination and assignment to gauge students’ progress and achievement based on set knowledge are mainly conducted at on-going process or periodically and collectively in a group at specific time and location.	Evaluation of students could be conducted individually or as a whole according to the instructor or on mutual basis as the students and the instructor are no longer confined to time and space boundaries. Evaluation is not confined to application of readily tailored knowledge but may open to construction of new knowledge.
Medium of instruction	The medium for instruction is very much dependent on the advances in technology as well as what is feasible for a normal educator with limited resources.	
Planning	Careful planning is required to ensure the changes in location, time and roles are fully utilized to achieve this new medium of instruction.	
Instructional Design	Instructions now have to be strategized to include the potential of the medium for instruction as well as meeting the course goals and objectives. Learners who have special needs, working adults with varied work locations and schedules as well as curious learners have their own needs, expectations as well as limitations. They have to employ various learning strategies to realize the full potential for undertaking a course through m-learning. It is then the responsibility of the instructor to help facilitate and design the information to ensure these learners would achieve the goals set for the course as well as meeting their individual goals.	

Comparison between non-electric, e-learning and m-learning

The difference between e and m-learning can be explained in the context of time and space where fixed and flexible space are at the ends of a continuum while fixed and flexible time on another.

According to Lytras and Naeve (2007) learners are required to be physically in a class; they have to be there at a specific time and place. Through synchronous learning, learners are not required to be at a certain place thus giving them the spatial flexibility. Nonetheless, non-mobile technology requires network connectivity, electrical energy and the need to carry along hardware. This makes synchronous e-learning not as flexible as synchronous m-learning. Different with mobile technology, time and space flexibility are available since mobile devices can be carried around and accessed readily.

Instructor's Perspective

From the instructor's point of view, teaching would take place in a teaching and learning environment however, formal assessment and examinations could indicate that learning has in fact taken place.

Location for the class

Once, a learning environment without a location is unheard of but with m-learning, a predetermined locale is not a requirement. Learning can take place anywhere as long as there is internet connection. Another requirement is a password for the course registered. Application for m-learning in education in the USA involves the provision of mobile computer apparatus and wireless connection.

Schedule (A set time)

Since learners and instructors are no longer required to meet at a particular time and place, detailed planning is necessary to ascertain that communication between the two are maintained. A way would be to set a specific time for learners to *talk* to instructors. This could be via emails, forum, bulletin board and etc. Then, instructors would need to reply within a stipulated period. As an example, all questions posted by 12 noon during weekdays will be responded on the same by 5pm. Queries or questions posted later than 12 noon will only be answered the following day. It is the duty of instructors to ensure that the queries are answered within a stipulated time and also provide alternative directions and guidance to useful sources of information if they are somehow unable to answer.

Face to face interaction

Face to face interaction is almost nil as interaction between learners and instructors, and learner and learner normally occur online. Although the identities of the learners are known, those who are shy to participate in class could actually contribute or participate actively in discussions since they would be in a less *threatening* environment (Ramsden, 1992; Prosser & Trigwell, 1999 as cited in Litchfield, Dyson, Lawrence, & Zmijewska, 2007).

Resources

Since the internet is the basis of mobile learning, resources become unlimited. This means that materials, activities or exercises such as discussions, presentations are left to the creativity and resourcefulness of the instructor. The internet would be able to provide a vast range of resources and it is up to the instructors to decide on the applicability and relevance of web portals and websites to the course they are teaching and how well it meets the course objectives.

The role of the instructor

Instructors now play the role of facilitators and are no longer the centre of information. They direct the learners to where to obtain information and how to obtain them. As mentioned earlier in the section on face to face, since interaction occurs online, instructors would need to ensure that activities are designed to fulfill the needs of the learners. Not only is interaction between learners and instructors changed, accepted and implemented but the important element of learner and learner interaction must be maintained to gain optimal benefit from the course. Instructors have a pertinent role to encourage learner's self-discovery through various

means such as having discourse. Similar to a conventional class, instructors need to encourage all learners to participate. They would need to understand and utilize the web, digital video, sound, animation and interactivity to achieve the best possible environment for m-learning.

Evaluations

Other than the conventional essays, reports, quiz, test and exam, additional assessment can be designed with the help of networked evaluation. Online assessments are available to measure cognitive abilities. Among the advantages of online testing is its ability to conduct formative, summative, practice, surveys and performance testing. Instructors or facilitators could monitor each learner closely through online portfolio or e-portfolio.

Instructional strategies

Instructors need to design and prepare digital media such as CD-ROMs appropriate for the nature of the course. The use of CD-ROMs creates a Computer-aided Instruction or Computer-based Learning (CAI / CBI) or as reference material. The Web-based Instruction (WBI) format which information are presented allows embedded Hypermedia links on the CD itself or through the internet. Here, Instructional Design Principles can be applied too. Bluetooth (2009), Cowley (2003), Editorial (2007), Hanlin & Walke (2008), and Smith & Collins (2002) mentioned that Bluetooth, 4G and WiFi are emerging wireless access that we can expect to play a big role in instructional designing. Although the three technologies have mobility access capabilities, they are restricted to certain bandwidth and distance. The amount and quality of the materials selected will be subjective to the chosen instructional medium.

Planning

The planning of course needs to be rerouted. Bearing in mind that the physical presence of the instructor is not required, all activities pertaining to meet the course objectives need the continual involvement of the learners. Instructors need to somehow encourage them extrinsically while the intrinsic motivation would need to come from within the learners. As mentioned earlier, activities or exercises would be in the form of discussion groups and assignments. These will all be in digital format. Learners would then develop the ability to interact online with ease i.e. *online-mentality*. Here experiential learning (Leigh & Kinder, 2001; Leigh & Spindler, 2004 as cited in Litchfield, Dyson, Lawrence and Zmijewska, 2007) may be adapted in the design of m-learning activities along with self and peer evaluation, feedback, review and assessment strategies (Raban & Litchfield, 2007 as cited in Litchfield, Dyson, Lawrence and Zmijewska, 2007).

Teaching

If the objective is to introduce new information, the central narrative should not be linear; rather, it should allow opportunities for learners to explore other related websites although it would be wise to arrange the links onto a separate page. Installing a printing facility is recommended to enable learners to make hard copies of information necessary. This allows learners the freedom to read them elsewhere at another occasion if they do not have the time to read during one sitting. This printing facility is able to merge several pages into a long page.

References
Learners should be able to access references through relevant websites conveniently from the main programme. Here, the printing facility is also required or alternatively, learners could download the references onto removable media. Since such information is governed by copyright laws, learners need to be reminded and explained of the rights and the consequences of copyright law violation. Links to popular search engines such as Google, Google Scholar and Yahoo or an *in-house* search engine would provide an excellent source of references. Subscriptions to academic journals could form the bulk of relevant references. Examples of academic journals are questia.com and Springerlink. It is advisable to limit the learner's contact time for referencing or limiting the number of websites visited as information provided, although very relevant, could lead to distraction and straying from the main course.

Learner's perspective

Much of the learner's expectation, belief and accountability would shape their role in m-learning. It could be assumed that the average mobile learner would have heuristic skills and is very self-directed because of the nature of the m-learning environment which requires the learner to be intrinsically motivated. On this note, it is not advisable to create restrictive or linear design strategies. It could also be assumed that m-learners are non cyberphobics but are highly competent in technology and net applications. Therefore, the instructional design models should be non-linear, flexible and interactive.
Information design and text
Fast access and connection to vast links of relevant topics are a necessity. To create excitement and stimulation, skilfully designed graphics and illustrations should be employed to list the links as opposed to mundane table of contents and indexes. Here, printing application would be useful.

Learning discipline
Discipline and commitment is demanded from the learner. The learner would need to adhere to modular time for learning as arranged by the instructors. The knowledge offered by the abundance of available resources would only be put to good use if the learners are able to explore the links provided or obtain specially prepared CD-ROMs. Learners would also need to be actively involved in discussions and bulletin boards to exchange ideas and voice concerns. Since the method of instruction differs, the same applies to the method of evaluation.

Conclusion

The objective of this paper is to focus on the roles, responsibilities and the expectations of two groups involved in m-learning i.e. instructors and learners. Career commitments, time constraints and geographical limitations are some of the main reasons learners opt for m-learning.

Careful planning needs to be made to take full advantage of the online medium and the hypermedia capabilities of web technology for a particular course. Instructions on main servers should be accessible at any time or place. Some limitations on conventional or traditional learning environment such as location, time and resources are no longer applicable

to m-learning. However, there are several challenges which not only instructors have to overcome but learners as well. Among these challenges are the medium of instruction, mode of interaction, evaluation and keeping focus.

The characteristics of m-learners pose a challenge to instructors. Since interaction between learner and instructor are via online, instructors have to design their course to ensure learners are not deprived of receiving information as opposed to face to face interaction – instructors need to be creative and empower the benefits of technology. Instructors now play the role of facilitators to guide and direct learners and not looked upon as the source of information.

Resources are now in abundance as links are being provided together with the main information. The advantage of this is that learners will be able to explore in depth the web of knowledge available on the topic being discussed. However, there is always the threat of resources being abused through unwarranted browsing and this may cause digression which in turns defeats the purpose of m-learning.

Keeping focus is featured as an important role for learner and instructors. Learners have to be intrinsically motivated to learn and are required to be focused while instructors have to design instruction to keep learners in focus. Thus it is pertinent that both learner and instructor are fully aware of their roles to ensure that both parties benefit from m-learning. It is hoped that this paper will serve as an impetus for further collaboration to gather response and reaction from mobile learners and instructors. If this is possible then, information could be shared to provide a thick and rich learning experience on m-learning.

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