Gaziantep University Journal of Social Sciences (http://jss.gantep.edu.tr)
2013 12(2) Technology Special Issue:375-383 ISSN: 1303-0094

# Impacts of Mobile Learning in Motivation, Engagement and Achievement of Learners: Review of Literature

# Mobil Öğrenmenin Öğrencilerin Motivasyon, Başarı ve Derse Katılımına Olan Etkisi: Literatür Taraması

Selcan Kilis*
Middle East Technical University

**Abstract**

The integration of mobile technology into the education is widely proliferated in recent years due to portability, convenience, independence of time, location, flexibility, and so on. However, there are some conflicts among educators, teachers and students with regards to the implications of mobile technology in educational settings. Main challenges are related with hardware limitations such as small screen size, low resolution, etc. technical problems, motivation, engagement and achievement of students and so on. Literature was reviewed in this frame. This study is investigated to both profits and drawbacks of mobile technology and critical points in this consideration. Previous studies declared that there are some critical issues related with these factors and should be taken into consideration for intended integration of mobile technology successfully and effectively into educational settings.

**Keywords:** Mobile technology, motivation, achievement, mobile learning.

**Özet**

Mobil teknolojiler taşınabilirlik, elverişlilik, zaman ve mekândan bağımsızlık, esneklik, vs. gibi özelliklerinden dolayı son yıllarda eğitim alanında birçok alanda sıkça görülmektedir. Ancak; eğitimciler, öğretmenler ve öğrenciler eğitimde mobil teknolojilerin bazı dezavantajları olduğunu söylemekte ve bu kapsamda yapılan çalışmalara göre, mobil öğrenmenin eğitime yararları konusunda bazı çelişkiler olduğu görülmektedir. Temel sorunlar genel olarak donanımsal problemler (küçük ekran boyutu, düşük çözünürlük, vs.), teknik problemler, öğrencilerin motivasyonu, derse katılımı, başarısı, vs. ile ilgili çeşitli faktörler ile ilgilidir. Bu bağlamda, bu çalışma boyunca daha önce yapılan çalışmalar incelenmiştir. Daha önceki çalışmalar, mobil teknolojilerin bu kapsamda bazı dezavantajları olduğunu göstermekte ve mobil teknolojilerin eğitime başarılı ve etkin bir şekilde entegre edilebilmesi için öğrencilerin motivasyonu, başarısı ve derse etkin katılımı gibi faktörlerin iyi düşünülmesi gerektiğini göstermektedir.

Anahtar Kelimeler: Mobil teknoloji, motivasyon, etkin katılım, mobil öğrenme.

## Introduction

Mobile devices and technology are becoming widespread all over the world and used frequently by many people in these days (Gedik, Karademirci, Kursun, & Çağıltay, 2011). These electronic tools are portable, ubiquitous,

*e-mail: skilis@metu.edu.tr

comfortable, flexible, and easily accessible. According to Motivalla (2007), considering the popularity and support of wireless/handheld (W/H) devices with the student population, it would be foolish to ignore them in any learning environment. When it is the case, integrating mobile technology into the education is inevitable.

There are different approaches and definitions for mobile learning (m-learning). Early perspectives of m-learning focused on just technology. Another view is centered upon solely mobility. Mobile learning traces back to 1968, when Alan Kay conceptualized the "Dynabook", which was intended to be a "personal computer for children of all ages" and it was based on the idea of a dynamic book, which added an element of mobility to the learning through computing systems (Sampangi, Viswanath, & Ray, n.d.). We can call the m-learning like Mockus et al (2011) defined as "knowledge on the move". That is, m-learning is the decentralizing of information handling since it provides working in anywhere at any time. However, new mobile learning perspectives acknowledge it as a new paradigm and put emphasis on learner-centeredness and individualism. Another study by Suki & Suki (2011) defines mobile learning as the intersection of mobile computing and electronic learning (e-learning): accessible resources whenever you are, strong search capabilities, rich interaction, powerful support for effective learning, and performance-based assessment. The other and more detailed definition described by Keskin and Metcalf is that m-learning is any activity allowing individuals to be more productive when consuming, interacting with, or creating information, mediating through a compact digital portable device that the individual carries on a regular basis, has reliable connectivity, and fits in a pocket or purse.

Research on the effects of mobile computers on teaching and learning, however, is still relatively scarce (Swan, van't Hooft, and Kratcoski, n.d.). The factors affecting efficiency of m-learning should be determined to enhance the efficiency of m-learning and to have better learning outcomes. This paper reviews the literature in regard to the effects of m-learning in motivation, engagement and achievement scores of learners. In literature review, recent studies nearly seventy papers were collected and examined from different countries and different databases including mainly EBSCOHOST, ERIC and ScienceDirect. In the third part of the study, the results of articles that are examined are discussed and then finalized.

## Literature Review

As in the study by Traxler in 2010, mobile learning in general terms enhances and enriches the concept and activity of learning with learning experiences which are more personalized, authentic, situated and context-aware than ever before. Although m-learning provides many benefits, it has some drawbacks at the same time. In some aspects, its impacts are not clear yet. So, throughout this study, recent studies about the effects of m-learning in motivation, engagement and learning outcomes of learners are examined deeply. From three databases named as EBSCOHOST, ERIC and ScienceDirect, about seventy articles and proceedings were examined in the scope of this

study. The studies from nearly eight years, starting from today to the past were included. The keywords for searching in these two databases were mobile learning, motivation and achievement, m-learning, and mobile technology.

**Mobile Learning**

Mobile technology is developing rapidly and the number of mobile device users has gradually been proliferating (Georgiev, Georgieva, and Smrikarov, 2004). This is evident from a report by the Telecom Regulatory Authority of India (TRAI). In its annual report for 2008-09, TRAI (2009) has indicated a consistent overall growth of approximately 100 million subscribers per year, and with a growth of approximately 50 million subscribers in rural India alone (Sampangi, Viswanath, & Ray, n.d.). As for Turkey, in the year of 2004-2013 by Turkish Statistical Institute (TUIK), the number of mobile device users is in the figure below.

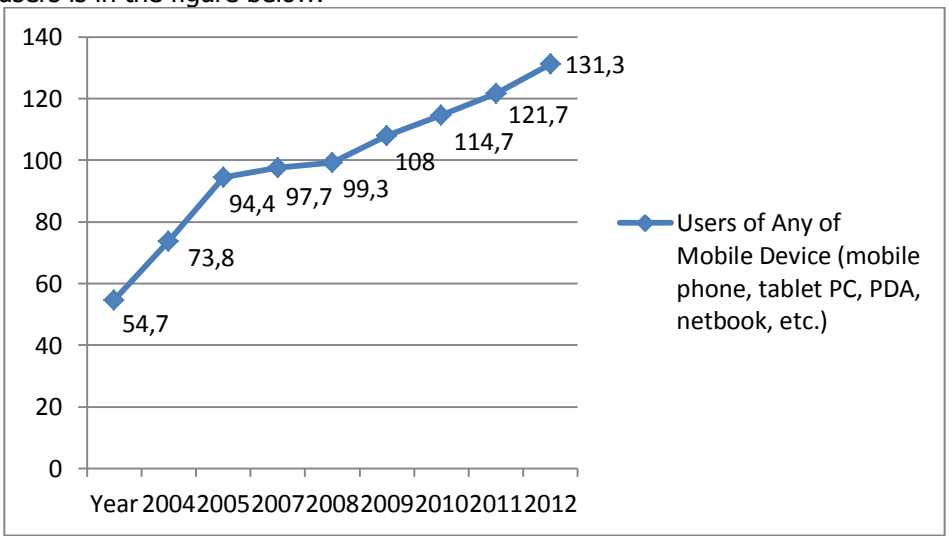


Figure 1: Availability of any of mobile devices in households between 2008 and 20013 in Turkey by TUIK

As seen from the Figure 1 above, mobile devices have becoming widespread with each passing day and there is an explicit growth in the number of users of mobile devices. Another institutional survey report named Informing Innovation (Booth, 2009) at Ohio University and University of Minnesota's Twin Cities' 21st Century Students: Technology Survey (Walker and Jorn, 2009) found that large majorities of students have now their own handheld or portable devices such as laptops, cell phones, and iPods (Barnhart and Pierce; 2011). As a summary, number of mobile device users has been increasing by the time.

Advances in mobile phone technology and applications have led to the development of mobile commerce and involve location-based m-commerce. It is important for business managers to create opportunities for building a new marketplace. This progress, as Jin and Villegas (2008) detected, could also become a major issue in the academic field, and since how and why consumers use certain communications media remains an important field of study. However, there are, of course some problems with mobile devices; for instance,

one of them lies in the usability of mobile devices. Keegan stated most wireless devices had small screens, low resolutions, slow processing and limited storage capabilities. After all, most of these limitations are fading as a result of evolving new technologies (Boyinbode, Bagula, and Ngambi, 2011). For example, mobile devices today have bigger screen size, higher resolution, higher processing power, and so on.

The applications of mobile learning, according to Park (2011), range widely from K-12 to higher education and corporate learning settings, from formal to informal learning to classroom learning, distance learning and field study. M-learning open up new opportunities for independent investigations, practical fieldwork, professional updating and on-the-spot access to knowledge and offers many prohibits for the users (Hulme and Traxler, 2005). One of the most important advantages is the portability of mobile technology means that m-learning is not bound by fixed class times; m-learning enables learning at all times and in all places, during breaks, before or after shifts, at home, or on the go (Valk, Rashid, and Elder, 2010). Via mobile technology, like Valk and et al (2010) reported, learners engage in conversation across whereby they resolve differences, understand the experiences of others, create common interpretations and shared understanding of the world. The other benefit is related with the immediate feedback. Wireless devices provide immediate feedback by allowing students to interact with instructors and classmates and to access course materials from any location (Uzunoglu, Cavus, and Ercag, 2009).

Based on the characteristics of m-learning, four types of learning approaches, namely, individualized, situated, collaborative and informal learning respectively, can be supported by mobile technology (Cheon, Lee, Crooks, and Song, 2012). Mobile learning allows students to pace learning at their own pace, this means it supports individualized learning. People can easily interact and communicate with others via mobile devices and this means it supports collaborative learning. Moreover, students can learn out of class at their own convenience, such as at home, on the go, etc. and this is called informal learning. And finally, students use mobiles to learn within a real context and this refers to the situated learning. Despite many benefits, there are some drawbacks of course. Firstly, mobile device hold some technical limitations such as small screen size, low resolution, limited processing power, reduced input capabilities etc. as stated in the study of Rosman in 2008. However, with the advancing in mobile technology in recent times, this problem has being solved gradually and smart phones, tablet Pcs and PDAs have bigger screen, more processing power, and much resolution in today. Technological advances with the last 5 years have been able to address the limiting issue of screen size and resolution (Crescente and Lee, 2010). On the other side, for some students who are learning to write, small screens are better to prevent confuse at elementary level students especially (Swan et al 2005). Since new handheld devices and smart phones feature a handheld-specific operating system. The other is that mobile learning environments, according to Lee (2001), should include greater access to necessary content and information timely, reduced cognitive load during learning tasks and increased interaction with users and other systems. In

addition, technical support is an ongoing challenge for m-learning adoption (Crescente & Lee, 2010). Devices can fail, access can be lost, firewalls can be breached, security can be compromised, and the information technology (IT) staff may not be equipped to handle serious problems, in which case, access to a vendor's help desk may be essential. Furthermore, there are many frequent changes in mobile devices and in functionality and different types of devices are found in the word of Singh (2010). This is also challenge for both users and instructional designers.

**Impacts of Mobile Learning in Motivation, Engagement and Achievement Scores of Learners**

Motivation just refers to a mental process and hence cannot be directly observed from outside; can be inferred from its products such as behaviors including choice of task, effort, desire, persistence, engagement, initiating and sustaining of activities, etc. (Sha et al 2011). Motivation and engagement of learners change based on their learning style. Here, we can define learning style basically, as a concept that all students learn best through different types of interactions with the information or skill to be learned. There are three main types of learning styles, namely, visual including seeing and reading, auditory including listening and speaking and lastly kinesthetic incorporating some aspects of doing in the teaching and learning process (Mockus et al 2011). M-learning that is designed to incorporate optional activities for the students to choose depending on their learning style adds to student motivation, engagement and learning success beside flexibility and convenience. Since providing students' motivation even in traditional classroom settings may be difficult at sometimes. Students can easily be distractible and may not pay attention into the course. In this case, they are not engaged with the lesson and their success rate decreases. That being the case, if an instructional designer plan to make the course compatible with mobile learning environment, he/she should pay more attention to how to provide and sustain motivation and engagement of learners. Moreover, via m-learning, learners can access the resources from the home, on the move, etc. and they can learn with respect to their learning pace and speed. Whenever and wherever they want, they can work and for this reason, they feel relax, free, more comfortable and flexible. Therefore, flexibility and individualized settings offered by m-learning encourage motivation and engagement of learners (Kerawalla et al 2007; Livingstone, 2007). On the contrary, students sometimes use mobile devices for different purposes that are not related to course, such as surfing on web, playing game, chat, etc. and so, their attention for the topic lost and they are distracted. As Fisher and Baird declared, to overcome this problem, in order to create a better learning environment for the digital learning styles …, there is a need to use strategies and methods that support authentic uses of technology to support and foster motivation, collaboration, and interaction (2007). If an instructional designer increase collaboration and add interactivity to the applications, this would be better for encouraging motivation, engagement and achievement of learners. For example, visuals such as video, sound, animation, flashcard, etc. make a great contribution to supply and maintain motivation and engagement of

learners. These objects can easily call attention of students. If small applications similar to game elements are included in learning context, then motivation of the learners would be positively affected (Sandberg, Maris, and Geus, 2011). This also influences positively achievement of the students. In addition, podcast and opencast can be a better solution. Increasing use of podcast in education has the ability to positively influence and enhance the teaching and learning experiences of students (Boyinbode, Bagula, & Ngambi, 2011). Another important point is about especially post-graduate students that work in a job full-time or part-time and some people who cannot attend into the class due to being physically handicapped, family life and having child, etc. Since they have not enough time to attend the class, they prefer and like e-learning and m-learning and for this reason, they are already motivated and engaged in learning. People having learning disabilities as Espejo (2009) stated can benefit from mainstream and specialized hardware and software to operate a computer and further their academic and career goals.

**Summary**

Mobile technology has advancing rapidly in recent times and expanding both in daily life and also in the field of education due to benefits (Macdonald & Chiu, 2011). So, there are many researches in this area. Some studies focus on the development, some focus on advantages and disadvantages, etc. One of the issues in the literature is about technical problems such as small screen size, low resolution and so on. However, with the evolving capabilities of mobile devices, this has remaining in the background since many deficiencies with these devices such as low resolution, limited storage capability, etc. have already being solved. The other important issue is related with purchasing power. Previous studies focus on this issue, but technology is becoming cheaper and purchasing power is now bigger in today. Moreover, one of the important points concentrates in motivation, engagement and achievement of the learners in m-learning. Some authors claim that mobile devices cause students to lose concentrations and being distracted since they engage in different and irrelevant activities such as chat, surfing on web, playing games, etc. and passing paper and textbook from mobiles from time to time and vice versa. However, opponents assert that with including educational games, small animations and flashcards, etc. in learning context and instruction, mobile technology supports to enhance motivation, engagement of learners and so better learning outcomes. In addition, m-learning provides people learning at any time in any place, so people having no enough time due to family, illness, job, etc. like and take advantage of m-learning. Thus, their motivation and engagement are already maintained and sustained. One important point is that at the beginning, there are some studies using the same applications and tools both for desktop computers and mobile devices and according to results, tried to examine efficiency of m-learning. Subsequent researches declared that earlier instructional designers and educators were not aware of the requirement of developing special applications appropriate for mobile devices. After that, many instructional designers, educators and researchers have already aware of the need for developing and using specialist applications, interface and tools for m-learning. To have better

learning outcomes, maintain motivation and engagement of learners, authors have over reached a consensus for requirement of designing applications special for mobile learning environment.

## References

Barnhart, F.D., & Pierce, J.E. (2011). Becoming Mobile: Reference in the Ubiquitous Library. Retrieved from *Taylor & Francis Group.*

Boyinbode, O., Bagula, A., & Ngambi, D. (2011). An Opencast Mobile Learning Framework for Enhancing Learning in Higher Education. *International Journal of u- and e- Service, Science and Technology*, 4(*3*), 11-18.

Cheon, J., Lee, S., Crooks, S. M., & Song, J. (2012). An Investigation of Mobile Learning Readiness in Higher Education Based on the Theory of Planned Behavior. *Computers & Education*, *59*, 1054-1064.

Crescente, M.L., & Lee, D. (2010). Critical Issues of m-Learning: Design Models, Adoption Processes and Future Trends. *Journal of Chinese Institute of Industrial Engineers,* 28(*2*), 111-123.

Espejo, R., (2009). Has Technology Increased Learning? *Greenhaven Press*.

Fisher, M., & Baird D.E. (2007). Making m-Learning Work: Utilizing Mobile Technology for Active Exploration, Collaboration, Assessment, and Reflection in Higher Education. *Journal of Educational Technology System*, 35(*1*), 3-30.

Gedik, N., Karademirci, A.H., Kursun, E., & Çağıltay, K. (2011). Key Instructional Design Issues in a Cellular Phone-based Mobile Learning Project. *Computers & Education*, 1149-1159.

Georgiev, T., Georgieva, E., & Smrikarov, A. (2004). M-learning - a New Stage of e-Learning. Proceedings of the 5th International Conference on Computer Systems and Technologies, Rousse Bulgaria, *17,* 1–5.

Hulme, A.K., & Traxler, J. (2005). Mobile Learning: A Handbook for Educators and Trainers, USA & Canada: *Taylor & Fransic.*

Jin, C.H., & Villegas, J., (2008). Mobile Phone Users' Behaviors: The Motivation Factors of the Mobile Phone Users. *International Journal of Mobile Marketing*, 3(*2*), 4-14.

Kerawalla, L., O'Connor, J., Underwood, J., duBoulay, B., & Holmberg, J et al. (2007). Exploring the Potential of the Homework System and Tablet PCs to Support Continuity of Numeracy Practices Between Home and Primary School. *Educational Media International,* 44(*4*), 289–303.

Lee, K.B. (2011). Developing Mobile Collaborative Learning Applications for Mobile Users. *International Journal of Interactive Mobile Technologies*, 5(*4*).

Livingstone, S. (2007). Strategies of Parental Regulation in the Media-rich Home. *Computers in Human Behavior,* 23(*2*), 920–941.

Macdonald, I., & Chiu, J. (2011). Evaluating the Viability of Mobile Learning to Enhance Management Training. *Canadian Journal of Learning and Technology,* 37(*1*).

Mockus, L., Dawson, H., Malizia, S.E., Shaffer, D., An, J.S., & Swaggerty, A. (2011). The Impact of Mobile Access on Motivation: Distance Education Student Perspectives. Retrieved from http://learningdesign.psu.edu/research/MLRTWhitePaper.pdf

Motivalla, L.F. (2007). Mobile Learning: A Framework and Evaluation. *Computers & Education, 49,* 581-596.

Park, Y. (2011). A Pedagogical Framework for Mobile Learning: Categorizing Educational Applications of Mobile Technologies into Four Types. *International Review of Research in Open and Distance Learning*, 12(*2*).

Rosman, P. (2008), M-learning As a Paradigm of New Forms in Education. *Economie & Management, 1*, 119-125.

Sampangi, R., Viswanath, V., & Ray, A. (n.d). Reaching the Unreached: A Study on Mobile Learning in India. *International Conference on e-Learning,* 350-357.

Sandberg, J., Maris, M., & Geus, K. (2011). Mobile English Learning: An Evidence-based Study with Fifth Graders. *Computers & Education*, *57*, 1334-1347.

Sha, L., Looi, C.K., Chen, W., Seow, P., & Wong, L.H. (2011). Recognizing and Measuring Self-regulated Learning in a Mobile Learning Environment. *Computers in Human Behavior*, *28*, 718-728.

Singh, M. (2010). M-learning: A New Approach to Learn Better. *International Journal of Education and Allied Sciences*, 2(*2*), 65-72.

Suki, N.M, & Suki, N.M. (2011). Using Mobile Device for Learning: From Students' Perspective. *US-China Education Review A 1*, 44-53.

Swan, K., van't Hooft, M., & Kratcoski, A. (n.d.). Teaching and Learning with Mobile Computing Devices: Closing the Gap. Retrieved from http://www.mlearn.org.za/CD/papers/Swan.pdf

Swan, K., van't Hooft, M., Kratcoski, A., & Under, D. (2005). Uses and Effects of Mobile Computing in K-8 Classrooms. International Society for Technology in Education, 38(*1*).

Traxler, J. (2010). Distance Education and Mobile Learning: Catching Up, Taking Stock. *Distance Education*. 31(*2*), 129–138.

TUIK, (2013). Retrieved from http://www.tuik.gov.tr/PreTablo.do?alt_id=1028

Uzunoglu, H., Cavus, N., & Ercag, E. (2009). Using Mobile Learning to Increase Environmental Awareness. *Computers & Education*, *52*, 381-389.

Valk, J.H, Rashid, A.T, & Elder,L. (2010). Using Mobile Phones to Improve Educational Outcomes: An Analysis of Evidence from Asia. *International Review of Research in Open and Distance Learning*, 11(*1*).