

## Chapter 107

# Visualizing the Evolution of Mobile Learning Research

Hüseyin Özçınar  
Pamukkale University, Turkey

### ABSTRACT

*The aim of this research is to investigate the scope and change of mlearning literature taking stand from the author co-citation patterns revealed in the publications between the years 2002 and 2015 in mlearning field. This study uses the author co-citation analysis, a kind of bibliometrics, and PFNET analysis to obtain the intellectual structure of mlearning field. In this study, it was found that the mlearning research focus on design and effectiveness of mlearning environments, developing a pedagogic framework for mlearning, adoption and proliferation of mlearning assisted language learning, collaborative mlearning and augmented reality. Assessing the results of factor analysis together with the PFNET graphics, it can be said that these subfields are the fundamental orientations of the field and the main themes of the field will be these subjects in following periods as well.*

### INTRODUCTION

Rapid developments in information and communication technologies (ICT) have an impact on education and learning just as in other areas of life. Today mobile technologies are widely used in education and transforming education and learning. In a similar vein, conducting research on mobile technologies is one of the main research trends in educational technology journals. Considering there were a few researches conducted on mlearning (or mobile learning) ten years ago (Hung & Zhang, 2011), one can clearly understand the rapid change in this research area. As Sharples, Taylor, and Vavoula (2005) stated, there is a co-evolution of learning and technology.

There were previous studies that reviewed mobile learning research area. For example, Hung and Zhang (2011) studied the research trends in mlearning research area using text mining technique. Data for this study consisted of 119 articles and conference proceedings that were published between the years 2003 and 2008 and indexed by SCI/SSCI database. Hung and Zhang (2011) investigated the publication date, publication journal, country and institution of origin and research themes. A rapid increase in

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mlearning publications found Taiwan and the USA are the most prolific countries. Main mobile learning research themes are effectiveness, evaluation, and personalized systems.

To analyze mlearning literature, Wu et al. (2012) conducted a meta-analysis study on 164 articles which had been published between the years 2003 and 2010. Research results showed that mobile phones and Personnel Digital Assistants (PDAs) are the most widely used devices for mlearning, and effectiveness and system design are the most prolific research themes. These studies shed light on the structure of the field between the years 2003 and 2010.

In a more recent study, Hwang and Wu (2014) determined 214 publications published between 2008 and 2012 on mlearning in 7 journals publishing research on technology-enhanced learning and indexed by 7 journals. They investigated these publications in terms of learning domain, context of mobile learning, and the type of mobile devices adopted. At the end of the research, it has been reported that mlearning has a lot of promise for the future in terms of increasing academic success and raising interest and motivation towards learning on condition that satisfactory support is granted for the learners and suitable strategies are used during the learning process. Other findings obtained in the research reveal that smartphones and tablet PCs are the most commonly used tools in the recent period and mlearning is used both in formal and informal education. It has also been revealed that many studies using the mlearning method mostly in language learning fields do not focus on a certain subject.

Ever-changing environment of mlearning research makes it important to map the structure of the research field and trends. Providing an up-to-date and in-depth map of the field could be very informative for policy makers in educational regulations, funding agencies and researchers in the field. In the literature review, studies conducted on mlearning especially before the year 2010 were analyzed. This period is named “*embryonic stage*” of mlearning field (Motivalla, 2007, p.582). After the mlearning keywords were searched in the web of science database, it was found that nearly 60 percent of mobile learning research published after 2010. Besides, mobile device usage is also increasing day by day and research on mlearning go through changes with technological developments (Motivalla, 2007). This case indicates that the literature may have substantially evolved after 2010. Therefore, it is believed that a research embracing this period will be useful in terms of depicting the development and current picture of the literature. One of the common characteristics of the studies on mlearning research is the focus on method, mobile device and learning domain rather than the formation of sub-fields of the main field in these studies. This study, unlike similar studies, tries to determine sub-fields and orientations of the field through bibliometric method. The aims of this study are:

1. To determine the subfields and reference disciplines of the mlearning field,
2. To determine the change in intellectual structure of the mlearning field, and
3. To determine the emerging research themes.

## **METHOD**

### **Bibliometrics**

This study uses the author co-citation analysis being a kind of bibliometrics. Bibliometrics is the application of statistics to the publications and written professional communications (Diodato, 1994). The main assumption behind bibliometrics is that “bibliographic citations are an acceptable surrogate for

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