



# Innovation in Mobile Learning: A European Perspective

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## ABSTRACT

*In the evolving landscape of mobile learning, European researchers have conducted significant mobile learning projects, representing a distinct perspective on mobile learning research and development. Our article aims to explore how these projects have arisen, showing the driving forces of European innovation in mobile learning. We propose context as a central construct in mobile learning and examine theories of learning for the mobile world, based on physical, technological, conceptual, social and temporal mobility. We also examine the impacts of mobile learning research on educational practices and the implications for policy. Throughout, we identify lessons learnt from European experiences to date.*

**Keywords:** *Collaboration; Context; Europe; Innovation; Interaction Design; Learning Theory; Research Projects*

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## INTRODUCTION

The proliferation of mobile phones and other handheld devices has transformed mobile learning from a researcher-led, specialist endeavour, to an everyday activity where mobile devices are personal tools helping people learn wherever they go, through formal training or informal support and conversation (Kukulska-Hulme et al., 2007). Even so, the effective design and development of mobile learning applications and experiences, and their evaluation, are still core activities where specialist expertise, and

the initiatives and insights of teachers and learners, have important roles to play. From our perspective as researchers based in Europe, we consider it valuable to highlight and synthesize the innovative design, development and evaluation practices that have characterised European projects over the past several years. We see this as a step towards building up a more detailed picture of how the field of mobile learning is developing in various parts of the world, given that motivations and conditions are often very different (Rao & Mendoza, 2005).

Our expertise in mobile learning includes management of the European Mobile Learning Special Interest Group and leadership of projects including HandLeR (Sharples, 2000; Sharples, Corlett & Westmancott, 2002), MOBILearn (Lonsdale et al., 2004), Mobile Learning Organiser (Corlett et al., 2005), Caerus (Naismith, Sharples & Ting, 2005), Case Studies in Innovative e-Learning Practice (Kukulska-Hulme et al., 2005b), Mobile Learning Landscape Study (Kukulska-Hulme et al., 2005a), Myartspace (Sharples et al. 2007a; Vavoula et al. 2007), Personal Inquiry (Anastopoulou et al., 2008), MUSIS (Milrad & Jackson, 2008), the Treasure Hunt (Spikol & Milrad, 2008), AMULETS (Kurti et al., 2008), and The mobileDNA (Arnedillo-Sánchez, 2008; Byrne, Arnedillo-Sánchez, & Tangney, 2008).

As mobile learning continues to challenge the boundaries imposed by traditional classroom learning, it raises questions about its significance in relation to wider ambitions to improve education and exploit technology in furthering that aim. What shifts in pedagogical and theoretical perspectives have been observed? To what extent are e-learning policy and initiatives taking account of research project results and the potential of mobile learning? We examine the evidence, and highlight issues and barriers to more widespread uptake, such as provision of teacher training. Throughout the article, we identify more general lessons learnt from European mobile learning R&D to date. Although rooted in European research, the particular ways of thinking about technology, design or evaluation, may be transferable elsewhere—we leave it to other researchers and practitioners to make those judgments.

The article starts with a review of five projects that have shaped research and development of mobile learning in Europe: HandLeR, MOBILearn, M-Learning; and two projects funded under the Leonardo da Vinci Programme. These projects were not only influential in demonstrating the value of mobile technology for learning, they also provided an opportunity to devise and debate theoretical foundations for a new pedagogy and practice of mobile learning,

outlined in the next section. A change in emphasis, away from design of educational software for portable devices and towards socio-technical support for the mobility of learners, led to a more expansive framework for mobile learning and a set of innovative projects across a wide range of physical, institutional and social settings. The section entitled 'Recent Mobile Learning Projects' presents a representative selection of these projects, organised by the setting of the learning. Having indicated the scope of current European research into mobile learning, the Discussion section indicates findings from the projects in relation to designs for learning with personal technologies across contexts. Future success of mobile learning in school settings will depend on the preparedness of teachers to adopt mobile technologies in the classroom. In the section on 'Teacher Development' we discuss the relations between research, practice and policy, including the implications for teacher training and development. Taking a broader perspective, the impact of mobile learning in Europe has both shaped and been formed by national and European policy and this is discussed in a section on Education Policy for Mobile Learning. A concluding section suggests future challenges for researchers, developers and policy makers in shaping the future of mobile learning.

## Foundational European Mobile Learning Projects

Computer-supported mobile learning in Europe has a history that stretches back to the 1980s when early handheld devices were trialled in a few schools, such as the Microwriter (a handheld writing device with a unique chord keyboard comprising one button for each finger and two for the thumb that could be pressed in combinations to produce characters on a single line display) and the Psion handheld computer. Although later versions of the Psion computer were more widely adopted (Perry, 2003) they were mainly restricted to classroom use for the teaching of English (High & Fox, 1984). A broader perspective on mobile learning arose in

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