# Work-Based Mobile Learning

## Concepts and Cases

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# 1 Work-based mobile learning: an overview

The central question of this book is how mobile devices can be used to support learning and competence development in work contexts. With this volume, *Work-based mobile learning: concepts and cases*, we offer a multi-faceted collection of different concepts and cases of mobile learning in work environments from international contexts. The book is targeted at both practitioners – trainers or managers in charge of in company training – and researchers, who are interested in designing, implementing or evaluating work-based mobile learning. As the handbook is – to our knowledge – the first title that is explicitly dedicated to the new and emerging field of work-based mobile learning, the contributions represent a starting point to build on, and to further develop and refine the empirical, conceptual and theoretical repertoire for this field.

This chapter provides a brief introduction to work-based mobile learning as well as an overview of the various chapters of this book. Beyond the key messages of the individual contributions, we also briefly discuss themes that emerge across the different chapters on work-based mobile learning, issues according to which we have structured the book. The specially commissioned chapter on work-based learning (WBL) following this introductory chapter is intended as a starting point for the analysis and interpretation of subsequent chapters, which explicitly problematise mobile learning in work contexts. As mobile devices allow the generation of multimedia material, in the first section of the book we feature a number of cases involving the collection and sharing of, as well as the reflection on multimedia evidence of, situated learning experiences. The second section centres on scenarios in which mobile devices support learning 'on demand' directly in the processes of work, particularly in contexts of highly mobile

learners. Simulations and laboratories as alternative learning contexts for real-world situations which prepare learners for work are the topic of investigation of the third section. While the use of mobile technologies can be beneficial from an individual or organisational perspective, it also raises a number of ethical questions which need to be addressed; the fourth section deals with this topic. Finally, in consideration of the rapid technological and conceptual developments in this field, we take a look at the near future: in the section five, we present two studies exploring possible mobile learning scenarios in the near future.

## Importance and motivation

Mobile devices such as mobile phones boast a range of different functionalities from communication, multimedia capture to personal information management (Livingston, 2004). The cost of telecommunication has steadily decreased (compare e.g., Eurostat, 2008), making mobile technologies affordable to the vast majority of people in and beyond the Western world. No wonder, therefore, that mobile devices were identified in recent Horizon Reports (New Media Consortium, 2009, 2010) as the technologies with the highest likelihood of entry into the mainstream of learning-focused institutions within the coming years. The use of mobile devices is not limited to private spheres but takes an important role also in work contexts. Indeed, the penetration of mobile devices in the work environments of business professionals is reported to have been tremendous over the last decade (Dzartevska, 2009). In this context, mobile devices have the power to transform the way we work and learn: they arguably alter the nature of knowledge work as well as the balance between training and performance support (Traxler, 2007a). In this way, transformations brought about by mobile phones can result in greater efficiency and supervision but also in the weakening of home and work boundaries (Traxler, 2010).

Despite the increasing use of mobile devices in work contexts a lack of known concepts and practices of how mobile learning can be used for learning in and across work contexts exists at the time of writing this book: we are not aware of any guide or systematic approach to work-based mobile learning. Also, research in this field can be said to be at a very early stages (see e.g., Pimmer, Pachler and Attwell, 2010).

## Goals and scope

In order to address this shortcoming, we offer in this book a number of different concepts and cases of mobile learning in work environments. The central question across the different contributions is how mobile devices can be used to support learning in work contexts. The handbook is targeted at practitioners – trainers and managers in charge of in-company training – as well as researchers in this field, who are interested in practical and conceptual advice on designing, implementing and evaluating mobile learning in work environments. Accordingly, the contributions to this book are very much centred on conceptual and pedagogical issues.

## Work-based learning and mobile learning

The exploration of mobile devices for learning and competence development in work contexts must be seen as an emerging, and still rather immature area of professional development. For this book, we construct and conceptualise the notion of work-based mobile learning with reference to current approaches to work-based learning *and* mobile learning: for *work-based learning* we use a broad and inclusive definition drawing on Evans, Guile and Harris (2010). They understand work-based learning

as learning *at work, for work and through work*, an approach that bridges embedded workplace learning perspectives and those that frame WBL as (a series of) programmes. This breadth in scope we deem appropriate for the contributions featured in this book: it contains chapters in which mobile learning is embedded in placements as part of (higher) education programmes (*learning for/through work*), learning that is offered in the form of compliance training at the workplace (learning *at* work) and contributions which focus more on social, cultural and political dynamics of workplace learning (learning *through work*). Our understanding of *mobile learning* is based on the processes of coming to know, and of being able to operate successfully in, and across, new and ever changing contexts with and through the use of mobile devices. Therefore, instead of a technical orientation, our focus is on an educational perspective given the affordances that mobile devices provide for meaning-making (Pachler, 2009; Pachler, Bachmair and Cook, 2010).

We put forward a multi-faceted and rich collection of concepts and cases of mobile learning in work environments from an international perspective ranging, for example, from students in placement settings in the UK and service technicians in machine industries in Germany, to bakery apprentices in New Zealand and indigenous park rangers in Australia. Throughout the book, a mixture of mobile and blended learning scenarios are reported:

- with heterogeneous groups of learners (professional workers, employees, apprentices, students ...),
- in manifold industries and work contexts (machine building, health sector, craft, education, transport ...),
- based on different forms of learning and teaching (creating and consuming content, reflecting, solving problems, discussing, simulating, assessing ...),
- on diverse content/topics (health and safety, electrical engineering, biosecurity, dental hygiene, therapy, geomorphology ...),
- aimed at the development of multifaceted skills and competences (interpersonal, inter-professional, tacit ...).

The book demonstrates that mobile devices can be used in manifold ways in professional learning and development. Upon closer examination it is possible, however, to discern some patterns and issues emerging across individual chapters according to which we have structured the book:[1]

- Introduction
- Section 1: Assessment and identity formation: Collecting, sharing and reflecting
- Section 2: Learning and work processes: Providing information on demand
- Section 3: Mobile simulations and laboratories: Preparing learners for work
- Section 4: Ethical issues relevant for (researching) mobile learning
- Section 5: Near-future scenarios for work-based mobile learning

## Introduction

### *Chapter 2 Work-based learning: Setting the scene*

When implementing and researching mobile learning in work environments, practitioners and researchers can draw on a wide knowledge base in the academic discipline of work-based learning. The chapter 'Setting the scene' by Karen Evans, a leading figure in work-based learning, provides an introduction to the 'state of the art'. This is built on by the remainder of the book, which illustrates how the concepts outlined by Evans can be valuable for the analysis and interpretation of mobile learning in work contexts.

1 We are aware that the reported cases and concepts cannot be matched disjunctively, but we feel that the following categorisation reflects the main focus of the respective contributions.

Beyond exemplifying the broad notion of work-based learning discussed above, Evans characterises work-based learning as learning 'that expands human capacities through purposeful activities where the (following) purposes derive from the context of employment':

- enculturation;
- competence, license to practise;
- improving practice, innovation and renewal;
- wider capabilities;
- equity, ethics and social justice;
- vocational/professional identity development.

These purposes can be widely identified in and across various chapters: *enculturation* is, for example, evident in Ruth Wallace's contribution (Chapter 6), who reports on how mobile learning enables marginalised learners in presenting their work practices and showing 'how we do things here'. *Competence, license to practise* refers to learning that is necessary for performance to occupational standards. This, for example, is reflected in Geoff Stead and Martin Good's cases (Chapter 8) as well as in Claudia de Witt et al.'s project (Chapter 7). Both contributions refer, inter alia, to the use of compliance training in the transport sector. Improving practice, innovation and renewal is also a focus in some of the chapters: Lucy Stone (Chapter 4), for example, explains that teaching assistants have found 'innovative and creative ways of using the mobile devices'. The project by Ceridwen Coulby et al. (Chapter 3) was centred on the assessment of wider capabilities such as interpersonal and inter-professional skills that can enable learners to 'do the next job as well as the current one'. The importance of equity, ethics and social justice for mobile learning in work contexts is mentioned in several chapters and the topic is the focus of the fourth section of this book. In the analysis of work-based mobile learning vocational/professional identity is also taken into account: Selena Chan (Chapter 5), for example, discusses how mobile devices have enabled apprentice bakers to construct showcases of their vocational identity trajectory.

Evans introduces key theoretical and conceptual perspectives in a field that is much more mature than mobile learning. However, she identifies a

number of divergent, competing and even contradictory lines of inquiry. In identifying three significant theoretical domains of WBL (expertise and competence, power relations, practice and micro-interaction) she offers a framework suitable also for the exploration of mobilities of work-based learning. This book features a wide range of theoretical approaches that can be positioned within these categories (and their intersections) such as Schön's reflective practitioner, Kolb's learning cycle, communities of practice or concepts taken from the field of knowledge management. Particularly popular is Activity Theory and activity systems which are widely used as conceptual frameworks in work-based learning and mobile learning (see Pimmer, Pachler and Attwell, 2010).

With the concept of *recontextualisation* Evans offers a fresh approach to WBL: she considers the processes of knowledge recontextualisation – knowledge put to work in different environments – to be at the heart of WBL. This includes ways in which different forms of knowledge are recontextualised as people move between sites of learning and practice in and across universities, colleges and workplaces. This approach might be of interest to work-based mobile learning, as many of the chapters discuss how mobile phones bridge learning across different contexts. For example, Stone (Chapter 4) shows how mobile devices allow teaching assistants who learn in many different spaces to 'map their learning in one space onto their learning in the other spaces'.

Finally, Evans argues for a social ecological approach that provides a way into understanding the complexity of factors that impact on education and lifelong learning without losing sight of the whole. She posits that an ecology can be used to understand the motivations of adult learners in using technologies in work and in related learning. Notably, the metaphor of an ecology has also been used in recent theoretical work in the field of mobile learning (see Pachler, Bachmair and Cook, 2010).

Having shown examples of how WBL concepts discussed in the chapter by Evans can help to analyse the use of mobile devices for learning in work contexts, in the remainder of this introductory chapter we briefly summarise the other contributions to the book which introduce cases and concepts of work-based mobile learning. A key question we try to address in this context is *why* and *how* mobile devices have been used and how they

can enhance learning and competence development. Instead of considering mobile learning as an extension of e-learning on mobile devices, we attempt to identify in our overview its particular characteristics reported across the different chapters.

## Section 1 Assessment and identity formation: Collecting, sharing and reflecting

A key functionality of mobile devices such as mobile phones is that they allow users the generation of multimedia materials in the form of audio, images and even video. Although these functions have been supported by a number of other devices for a long time, it is the integration in one lightweight, ubiquitous device that provides new and simple opportunities for learning, a characteristic referred to as convergence in the literature (Pachler, Bachmair and Cook, 2010).

In all the cases reported in this section of the book, learners collected and reflected on situated learning experiences: for example, they recorded their thoughts for self-assessment purposes, they collected evidence of their experiences and achievements with the help of mobile devices and they reflected on their work practices. However, in all cases the generation of materials through mobile devices is only described as one step in an overall learning scenario. Mobile devices helped to trigger learning activities which can be considered from different, conceptual, technical and social perspectives. In all chapters, the collection phase was part of an integrated, blended learning *concept*. In these mobile-learning contexts 'blended' can imply the use of the materials generated with the mobile device online sessions or face-to-face classroom activities. In all the cases, examples are reported where learning in more informal contexts – such as learning in the workplace – is linked with learning in more formal contexts – such as learning in classroom settings or tutorial support. From a technical point of view the mobile devices are never used as stand-alone tools but they are

integrated with wider 'systems' such as e-portfolios, social networking sites or virtual institutional learning environments. Taking a social perspective into account, the collection phase mostly involved further actors in the learning process such as tutors and teachers who provided feedback or who recognised learners' achievements; this can be seen as a new opportunity for assessing and recognising competence development. In addition to educational professionals, learners shared their experiences with peers. In some cases also the wider social communities including workmates, employers, friends and even family are reported to have been involved.

Demonstrating personal capabilities and sharing situated learning experience with a (wider) social community results in the construction and transformation of the learners' vocational identity; this is an aspect highlighted in two of the chapters in this section. Across the contributions the affinity of the learners to and their ownership of mobile devices are also underlined as crucial elements: it is deemed useful to deploy technology which is readily available to the learners and to draw on existing competences in the handling of familiar devices.

### *Chapter 3 Mobile technology and assessment: A case study from the ALPS programme*

In their contribution, Ceridwen Coulby, Nancy Davies, Julie Laxton and Stuart Boomer explore how Dental Hygiene and Therapy students can use mobile devices to assess interpersonal and inter-professional competences such as team work, communication and ethical practice within work-based placements. In addition to having to deal with a poor IT infrastructure, students on placements can feel unprepared, experience a lack of feedback on their performance and receive limited support when reflecting on their work. These issues are addressed by way of a blended learning concept: after carrying out a particular task, students answer a set of questions designed to help them reflect on and learn from their experiences. Mobile devices also provided students with the opportunity to audio-record their thoughts aloud. The learners found the assessments helpful for their reflective practice. Students requested peer feedback before developing an action plan

to improve their future performance. The assessments were collected in e-portfolios which allowed students and tutors to engage in discussions about the assessment and wider placement issues. The e-portfolio was appreciated by the learners for their reflection on action and enabled dialogues between students and tutors which increased the level of remote support for students.

*Chapter 4* *The WoLF Project: Work-based Learners in Further Education*

Lucy Stone describes very similar learning activities in the context of teacher education in busy, early years settings including kindergarten, primary school classrooms and special educational needs settings. While usually working environments of teaching assistants provide little support for the recording and subsequent reflection of learning experiences, the Teaching Assistants (TA) in this project were enabled to collect evidence of their placement work with mobile devices (PDAs). In addition to conducting self-assessments of their study skills, they also used the PDAs to capture spontaneous moments or examples of theory they were putting into practice with still images, video files and voice recordings. The devices opened up new opportunities for TAs to develop their portfolios and, thereby, promoted reflection in practice. While the learners used the mobile devices to capture moments to reflect on them at a later stage, the biggest impact appears to have been the sharing and discussing of the TAs' experiences with their peers and tutors in face-to-face classes or through online activities through the learning platform.

*Chapter 5* *Becoming a baker: Using mobile phones to compile e-portfolios*

Selena Chan shows how learners used mobile phones to collect situated learning experiences in the workplace and how they shared their experiences with teachers and with their wider social community. Chan explores the learning activities of apprentice bakers with a particular focus on the

learners' conceptualisation of their vocational identity as a process of belonging to a workplace, becoming and then being a baker. Apprentices documented authentic multimedia evidence of their situated learning experiences as their skill acquisition developed. They shared this evidence on social networking sites not only with other apprentices and teachers but also with friends, workmates, employers and family. Apprentices were able to develop narratives to showcase their occupational identity trajectory from novice to recognised, competent trades practitioner. Mobile phones are considered key in the project as they provide opportunities to document relevant aspects of apprentices' skill development. Chan also notes that the opportunity to share concrete evidence of skill acquisition, which in the past could not be easily disseminated, has enhanced apprentices' initial self-recognition and eventual self-acceptance of occupational/vocational identity transformation.

*Chapter 6 The affordances of mobile learning that can engage disenfranchised learner identities in formal education*

Ruth Wallace also centres her chapter on learner identities, although in a completely different context: she explores the affordances of mobile technologies in recognising and engaging disenfranchised adult learners in indigenous workplace learning. In this example, indigenous rangers use mobile devices to document work practices and to share the materials generated with colleagues. More precisely, they produced multilingual digital stories of regular tasks such as mixing chemicals or explaining financial management. They also recorded formal training lessons and stored them in their office. These materials were then reused in further sessions before undertaking specific tasks, to induct new staff or to refresh learning outcomes from previous training. The deployment of mobile devices is reported as crucial because the learners are already experts in using the technology. Mobile devices supported indigenous rangers' learning and the demonstration of their strengths in their own context, language and time. In this way, mobile learning led to an active construction of knowledge and learner identities. Mobiles enabled indigenous rangers to manage the knowledge in

ways that are described as empowering rather than embarrassing to senior cultural leaders, people with low-level English skills or learners who prefer to review material often. The technology allowed them to demonstrate their competence and value as workers in their community.

## Section 2 Learning and work processes: Providing information on demand

Providing ad-hoc access to information, collaborative knowledge building and context-aware information management are central issues of the chapters that are included under the heading 'learning and work processes'. Referring to field studies, the authors critically evaluate and discuss specific needs of workers and learners in situations that are typical for their professional fields. Their need to react in complex situations that are often constituted in situ is not only a demanding day-to-day routine for workers and learners but also challenging for those providing mobile learning environments and technologies. In addition to the provision of contextualised content, mobile devices can allow learners to document problems in specific situations in order to better illustrate and discuss their uncertainties with others. Multimedia materials generated in this way can then be used for further learning and training purposes. A concept similar to this is currently also being developed in the clinical context (see Pimmer, Pachler, Gröhbiel and Genewein, 2009; Pimmer, 2009). This section of the book is based on three contributions by authors from Germany and the United Kingdom who give insights into the professional areas of truck drivers, apprentice electronics engineers, workers in the passenger transport and logistics (PTL) industries, service technicians and machine building and plant construction companies and are providing solutions for work-based mobile learning in complex and fast evolving professional fields.

*Chapter 7 Mobile learning in the process of work: Participation, knowledge and experience for professional development*

The provision of learning content, the compilation of glossaries and assessments in the form of tests is the focus of Claudia de Witt, Sonja Ganguin, Maciej Kuszpa and Sandro Mengel's chapter. Looking at the learning needs and habits of two professional groups – electronics engineers and truck drivers – the authors describe the assessment of the framework in which learning takes place within these two groups. Their specific needs, which are based on the structure of their professions, are evaluated as well as their use of ICT and mobile devices for information retrieval and knowledge production. Learning is covered under the structural framework of participation and information retrieval which are both strongly connected to interpersonal interaction and activity. The target group analysis allows first insights into the role of mobile devices within specific work processes and situations and considers them as the basis for future didactic/teaching and learning concepts in order to support individualised learning as well as collaborative knowledge building using mobile devices.

*Chapter 8 Mobile learning in vocational settings: Lessons from the E-Ten BLOOM project*

Geoff Stead and Martin Good describe an EU-supported project that was realised in Austria, Germany and the UK and which focuses on the passenger transport and logistics industries. Besides the infrastructural importance of the use of mobile devices within an industrial sector that is inherently mobile, the use of mobile devices to support basic skills such as driving regulations, customer service, literacy, numeracy, IT skills and health and safety, etc., is highlighted. The study refers to a broad basis of qualitative and quantitative methods such as background contextual research, workplace questionnaires, focus groups and real workplace trials. The study evaluates the status quo of the use of mobile devices, ICT and face-to-face teaching and chooses an approach of content provision for learning that considers different factors resulting in the following key needs for providing mobile learning contexts: easy and context-related customisation of the devices

and contents, the supportive and changing status of mobile learning in relation to other forms of knowledge building, as well as personalisation, flexibility and ease of access.

*Chapter 9* *From know-how to knowledge: Exploring Web 2.0 concepts for sharing hands-on service expertise*

With a shift from production to service, companies rely more and more on highly qualified technicians who are confronted with installations and repair tasks at the customers' sites, as Liza Wohlfart, Simone Martinetz and Alexander Schletz describe in their chapter. A central aspect in the day-to-day routine of technicians is changing contexts to which they have to respond in adequate ways. A number of factors – such as time pressure, informal communication or high mobility within and across different physical sites – frames and constrains the work and learning processes of these technicians. Against this background, the authors describe a concept that is aimed at providing fast, on-demand support during practical work processes and at enabling some sort of pre-qualification in potential problems. In this context, mobile learning can support technicians' problem-solving processes. Mobile phones can, for example, enable technicians to document and discuss current problems. Within such communicative and collaborative interactions with colleagues by using mobile devices, tacit knowledge of products and processes is collected, distributed and shared. This leads to a shift from tacit to explicit knowledge which can be harnessed for the task of situative problem solving.

## Section 3 Mobile simulations and laboratories: Preparing learners for work

Simulations and laboratories as alternative learning contexts for real-world situations are the topic of investigation of authors from the United Kingdom, Austria and Mexico whose chapters are covered in this section.

The use of text messages by undergraduates studying Applied Geomorphology and in the context of a Teaching Qualification in Adult Literacies (TQAL) as well as an example of the use of online laboratories of electrical engineering students offer insights into the simulation of situations by using mobile devices and the construction of an online learning environment to provide remote or mobile work-based experimental practice. By using mobile-learning concepts such as mobile simulation and laboratory-situated learning, contexts can be augmented. Also, learners are able to engage in activities that are considered basic in terms of their professional skills and knowledge, but that are – for different reasons – not available for learners in their real-world environments.

*Chapter 10 Online laboratories in interactive mobile learning environments*

Michael E. Auer, Arthur Edwards and Danilo Garbi Zutin frame their chapter with an approach based on e-learning with a particular focus on technology. They highlight the shift from training partners providing information for learning to self-initiated information retrieval by learners in order to train themselves. This shift originates from the flexibility gained through the features of mobile devices and wireless networks and includes the result that the traditional place for work-based learning, i.e. on-the-job learning, is replaced by site unspecific locations and times. Learners can engage in knowledge building also in places other than the workplace and mobile systems can replace the training partner. This is the central starting point for the authors to discuss the implementation of mobile learning in work-based learning contexts.

With their chapter, the authors cover an area of work-based mobile learning that tends to move away from on-site experiences and the learners' professional and private everyday life – one of the central reference points of many of the other authors contributing to this book. Whilst other authors try to adopt learner agency and cultural practices that originate in the everyday use of mobile and web-based technologies, Auer et al. argue for 'personnel who can function optimally in the workplace' and, at the same time, for the creation of circumstances where learners are able to refer

to their previous experiences and to learn in continuous, stimulating and enjoyable environments. Thus, the optimisation of the work-based learning process includes not only the minimisation of such factors applying to appropriation of knowledge-building, but also the acceptance of learners' perceived interests, preferences and goals.

After giving an example of learning with online laboratories, the authors conclude their chapter with the description of technical details of an online learning environment that they developed to provide remote or mobile work-based experimental practice in the area of engineering.

### *Chapter 11 Work-based simulations: Using text messaging and the role of the virtual context*

Mobile learning in the form of simulations using SMS text messages is the topic of investigation in the project described by Sarah Cornelius and Phil Marston. Undergraduate students of Applied Geomorphology receive text messages referring to flood disaster scenarios in order to get involved in work-related tasks and real-world experiences and to foster their decision-making abilities. The use of theoretical knowledge to real situations was one of the aims of this project. The authors refer to an activity theory approach to evaluate learners' experiences with text message simulations and a text message-based mentoring scheme that is developed for work-based adult literacies practitioners. Real-time learning in varying and real-life contexts by using mobile devices is seen as an alternative to prepare learners and workers for situations where real-world experiences would be too costly, sensitive, dangerous or logistically impossible. In such a framework, different aspects have to be considered, such as a complex set of issues associated with the virtual context of the simulation scenario and the work context of the learners themselves.

## Section 4 Ethical issues relevant for (researching) mobile learning

For a long time ethics has been one of the dominant public issues in relation to the everyday use of mobile devices: the infringement of personal rights, the responsibility of companies in selling ring tone subscriptions to minors or 'happy slapping' and bullying are some of the most prominent issues that have impacted on the attitudes of schools towards the use of mobile devices for teaching and learning. The issue of ethics is, of course, also highly relevant in relation to workplace mobile learning and research. By referring to teaching and nursing professions, authors from the United Kingdom and Australia investigate responsibilities that workers and researchers have with regard to the physical and mental integrity of others. On the basis of a literature review and field studies, categories are elaborated that can be used as guidelines for the responsible use of mobile technologies in work and learning contexts and to ensure accountability towards others in their learning process and work routines.

### *Chapter 12 Ethical professional mobile learning for teaching and nursing workplaces*

The complexities and confusion faced by teachers and nurses in their use of work-based mobile learning is the starting point for Kevin Burden, Sandy Schuck and Peter Aubusson in discussing ethical issues that arise in contexts of mobile learning. Data collection by means of picture taking, data exchange and distribution are not just central functions of mobile devices and mobile learning, but they are also issues that have to be considered from the perspective of vulnerability of the people depicted and/or recorded.

With reference to basic ethical principles, rules, norms and values of professionals engaged in mobile learning as well as to power, accountability and vulnerability that are established in and through social interaction, the authors provide guidelines for ethically responsible use of mobile

devices in professional contexts that can be generalised and used in contexts of teaching and nursing and beyond: trust and confidentiality, genuine collaboration, transparency, the analysis of consequences and risks and accountability of activities.

### *Chapter 13 Ethical concerns relevant to researching work-based mobile learning*

Starting with a short history of ethics in different professional fields and in research with a focus on privacy, ownership and copyright, Jocelyn Wishart critically discusses the notion of ethics with a view to the needs and rights of vulnerable people such as patients in hospital and young children.

Informed consent, personal information and images, ownership, data protection and user-generated content are considered to be key issues of ethics in mobile learning and research. They are viewed as a contemporary addendum to already established ethical principles and can be used as a scheme that can be discussed with professionals before they start using mobile devices in the field. One of the central issues of considering ethics in mobile learning is the awareness of personal needs and the needs and rights of others as well as a process in which values, norms and rules are negotiated in advance in order to respects the rights of those involved in mobile-learning processes.

## Section 5 Near-future scenarios for work-based mobile learning

This section of the book features two studies focusing on future aspects of mobile learning. Both chapters discuss learning that is 'just in time' and 'when necessary'. While an initial approach to the use of mobile devices for learning in work contexts might be in the provision of learning modules,

the supportive function of mobiles in immediate work contexts appears to be a more promising but also challenging aspect in the near future. This is a finding that was already reflected in other studies: a multinational IT company, for example, shifted its focus for mobile learning from the delivery of formal learning modules to just-in-time performance support systems (Ahmad & Orion, 2010). Other commonalities across the two chapters include approaches that are more collaborative than didactic, focusing on social interactions between learners and experts or between peers facilitated by mobile devices. A particular potential for the near future appears to exist in the field of life sciences and health care, where both chapters report and analyse a number of different scenarios. Unsurprisingly, some of the issues raised in this section have already been mentioned in other contributions to the book: examples include the use of mobiles for the compilation of e-portfolios or their use to record learning experiences. Some possible scenarios, however, have not been covered in other book chapters: these include the use of a 'handheld projection device' for tutorial support. However, new developments in the field of Tablet PCs such as the iPad may enable this kind of learning scenario in the foreseeable future. Despite great advances in the field of mobile technologies, some issues such as interoperability, connectivity or power remain to be resolved. Across the two contributions in this section it is also interesting to note how the methods applied – the *Futures Technology* Workshop, the *Cognitive Forseight* toolkit, the *Building Visions for Learning Spaces* cards and the scenario-based Delphi approach – framed the scenarios in terms of richness and creativity.

### *Chapter 14 Mobile learning in corporate settings: Results from an expert survey*

The question of whether and how mobile devices can be used to support employees' learning processes in the near future is also addressed in a study conducted by Christoph Pimmer and Urs Gröhbiel. A group of international experts, researchers and practitioners was asked to evaluate four scenarios: sales representatives learning with personalised learning objects;

engineers accessing learning materials on display goggles; nurses documenting the handling of work tasks and apprentices who answer daily questions from their classroom teacher to reflect on their learning progress at work. Experts were also invited to describe additional scenarios they expect to come on stream in the near future. These scenarios were classified according to their immediacy and relevance to the work process (just-in-time and just-in-case) and whether learning involves social interaction or solely human-computer interactivity. Participants in the study anticipated mobile learning in companies in the near future mostly in the form of learning 'just-in-case', based on human-computer interactivity, as the implementation of this kind of scenario seems to be relatively easy. Other findings of the survey show that social interaction in learning processes received the most positive evaluation, as did content-based scenarios with examples focusing on contextualised learning. The integration of learning at work was described as the most important area of inherent tension to be addressed: challenging but very promising at the same time. While reflection that occurs in scenarios based on the production and sharing of learning material was positively highlighted, experts expressed reservations in terms of the mastery of technical and didactic skills in order to produce learning materials of sufficiently high quality.

*Chapter 15 Future scenarios for workplace-based mobile learning*

Jocelyn Wishart and David Green explore future scenarios for mobile learning developed by a number of experts in a series of workshops in Great Britain. Out of twelve scenarios, six are centred on workplace mobile learning – a fact that underlines the growing importance of this field. The scenarios include college and tourism students on placements communicating with peers and tutors or creating e-portfolios; trainees using a futuristic handheld projection device that enables multimedia communication with tutors; student doctors accessing external services and expertise at the point of care; a holistic portfolio containing life and work experiences to encourage life-long learning across different contexts; and inter-professional networks where mobile phones bridge local and remote expertise. Across the

scenarios developed and analysed Wishart and Green note an increasing use of just-in-time and 'when necessary' training, an increasing amount of peer-to-peer networking and collaboration and an approach to teaching and learning that is more collaborative than didactic. Mobile learning is reported as being particularly useful in specific subjects, especially those where both theory and practice are studied or those which involve field-work and data collection such as in the sciences, geography and vocational subjects. Other emerging issues for workplace mobile learning include both ethical and practical implications such as cultural barriers, resistance to change as well as ethical and privacy concerns.

## Conclusion and outlook

Considering the 'enormous amount of interest and momentum and investment going into mobile technologies' (Traxler, 2007b) we focus in the book on how learners and organisations in work contexts can make use of this development in order to enhance or enable learning. While mobile devices have not primarily been developed for learning and education, the chapters provide a number of examples of how learners and organisations use and harness the pervasive technology for learning purposes in work contexts. We contend, however, that the deployment of technology for (mobile) learning is neither apolitical nor beneficial per se for the people and parties involved. A number of ethical and political issues have to be considered when using work-based mobile learning.

Whilst we have tried to provide a first appraisal of the field of work-based mobile learning, we are fully aware that this volume can represent all but a starting point in the exploration of the complex issues in hand. However, we very much hope, and believe, the book offers a rich collection for both practitioners and researchers to build on and to develop and refine the knowledge base for this field. Practitioners can, for example, apply and evaluate the concepts presented in further professional environments.

Researchers are invited to contribute with further empirical findings to a better understanding of critical factors and causalities in this emerging field. There is also a need to consolidate the still very fragmented theoretical base which is currently being used. Mirroring Sawchuck (2010), who notes that no single theory or area of research can 'lay claim to any sort of definitive account of the multi-dimensional phenomena of workplace learning research as a whole' we believe that this is also true for the exploration of mobile learning in work contexts. While we fully acknowledge the value of the applied theoretical concepts, we also encourage fertilisation across different lines of research in order to more holistically explore the complexities of mobile learning in work contexts.

Given the wide range of different concepts and cases presented in this book, we do not see the use of mobile devices as a one-size-fits-all approach to learning in and across work contexts; instead, we consider them as tools that are suited for learning in particular settings; some of which are presented in this book. We also hope the cases show that mobile learning goes far beyond the delivery of e-learning modules on small devices. In this sense, we believe that mobile learning has some unique characteristics and transformative potentials impacting on work environments and beyond.

Obviously, we have not been able to offer an exhaustive perspective on such a wide-ranging topic in this book. We have, for example, not provided cases of how mobile devices and augmented reality can be combined to enhance human visual perception and, possibly, contribute to learning. While some chapters have shown that the use of mobile devices can impact on learners' identities, we only marginally discuss how new practices triggered by mobile devices are transforming society as a whole, for example, in shifting our work-life balance. These are all aspects that might well be discussed in a future edition.

## References

Ahmad, N., & Orion, P. (2010) *Smartphones make IBM smarter, but not as expected.* Available online at <http://www.allbusiness.com/media-telecommunications/telecommunications/13738659–1.html> (accessed 01/05/10)