

Towards Mobile Learning Support for the Transition from School to the Workplace

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Abstract: This paper analyses the requirements for supporting young people in placements, who are using a mobile widget framework. Placements are a way to smoothen the transition from an educational system into working life, that allow young people to connect the competences they have developed in formal education with professional practices. The wide adoption of mobile devices among young people suggests seeking for a mobile learning solution for supporting learning processes during placements. Widget based PLEs introduced attractive concepts that were adapted to work with mobile devices. This paper discusses three perspectives on aspects that influence the application of mobile technologies for workplace based learning. Each of these aspects adds a requirement for the development of a mobile learning solution. Given to the special nature of learning during placements, the paper identifies four challenges for future research.

Introduction

Young people argue (EC, 2001) that the transition from school to work should be easier. Increasing the employability of young people and supporting early career steps after leaving the formal educational system is high on the social and economic agenda throughout Europe. This requires effective and flexible ways of recognizing skills and competences acquired outside formal education and training systems. This includes formal recognition as well as the personal awareness of skills and competences (Chisholm, Hoskins, & Glahn, 2005). The proposed investigation contextualizing and exploring learning via mobile devices outside the school or college will identify ways to support learning in this transition.

Applications of technology-enhanced learning are mostly focused on the educational system or on learning in the professions. However, the transition from the educational system to working life is an educational challenge, which requires young people have to assess their own learning for the practical applications of their jobs and to develop a well founded understanding of the related professional practice.

Although this transition appears as a discontinuous process, many European educational systems smoothen this process through job placements as part of their formal education curricula. The role and the benefits of mobile technologies for supporting this special stage of developing professional and vocational skills have received little attention in the domain of technology-enhanced learning.

This position paper analyses the requirements for supporting mobile learners using a mobile widget framework. This analysis is grounded on the relation between the following three aspects of technology enhanced learning at the transition from formal education into self-directed learning in the working place.

- Mobile and contextualised learning
- Professionalization and workplace learning
- Learner support in self-directed learning

The analysis in this paper will lead to four research challenges that have to be tackled by future research in order to make effective use of technology-enhanced learning for bridging from formal education to working life.

Widgets for personalised technology-enhanced learning

Recent developments in web-based technologies on mobile devices allow the development of interoperable solutions beyond specific devices. Particularly, widget technologies (W3C, 2009) are appropriate to meet the needs of contextualised information access for learning (Specht, 2009). Widgets are lightweight applications that are based on core WWW technologies, namely, HTML, CSS, and JavaScript. Typically, widgets can run in native as well as web-environments. Therefore, widgets received some attention in developing platform independent applications. Work on widgets for learning support on desktop systems (Wilson et al., 2006; Griffiths et al., 2009) is currently being extended to mobile devices as part of the GRAPPLE (www.grapple-project.org) and the MOLECULE project (<http://celstec.org/-content/molecule>). The main scope of this work is to analyse factors for device specific personalisation and contextualisation for learner support.

Different aspects of widgets were discussed for the design of personal learning environments (PLEs) within the context of the ROLE project (www.role-project.eu). This work primarily focuses on organisational and technical factors for supporting partially self-controlled learning processes, as they can be found in higher education. The MATURE project (www.mature-ip.eu) focuses on widgets in PLEs for supporting informal learning in knowledge sharing communities. Besides addressing problems of service and user-interface orchestration in PLEs (Nelkner, 2009), there is a strong focus on just-in-time learning (Schmidt, 2007) and knowledge management as informal learning (Maier & Schmidt, 2007; Kunzmann et al. 2009).

Mobile widgets for contextualized learning support

Recent developments in the area of mobile phone systems made web-based technologies more accessible for developers and average users. This allows the

development of interoperable mobile applications. This significantly improved the access to information on the Internet. Besides improved information access on mobile devices, mobile web-applications have access to some device sensors, of which the geo-location sensor is the most prominent. These developments make it relatively easy to port existing widgets to mobile platforms. This enables complex applications for supporting learners by contextualizing information and services based on the context of the learner. Moreover, using widgets on mobile phone like devices, allows learning support in settings in which desktop style computing environments are not available or difficult to use.

Based on the W3C widget specification we propose a widget framework that includes following additional features.

- Transparent connection state handling
- Client-side widget communication
- Scriptable context-sensitive widget setups

Transparent connection state handling allows offline usage of web-services. This allows data synchronization of a web-service and the mobile device under unreliable network conditions without affecting the interaction experience of the learner. Client side widget communication allows widgets to exchange information directly on the mobile device using a simple protocol. Scriptable Context-sensitive widget setups allow personalising the available widgets based on a learner's context. Through this feature it is possible to define rules for activating and deactivating different widgets depending on a learner's location, time, or previous activities. This allows defining simple instructional designs for mobile learning. This framework can be used for providing short assignments with different widget arrangement on the learners' mobile devices.

Mobile and contextualised learning

Constructivist notions of learning are helpful in attempting to theoreticise mobile learning where students have been observed to build their understanding through working with different forms of information collected in different locations (Wishart, 2007). Like earlier learner centred educational technologies (Jonassen, 1994) Internet enabled mobile devices can scaffold the all-important processes of articulation and reflection, which are the foundations of knowledge construction. Others (Sharples, 2003, O'Malley et al, 2005) have applied conversational learning theory to learning with mobile technologies. Sharples (2005) notes that the mobile device can assist both conversational learning by integrating context from different locations and constructivism through holding the results of learning actions for later retrieval and reflection. Specht (2009) argues that mobile devices serve as interfaces for connecting context dependent and context constructing information streams that can stimulate solitary and collaborative learning activities. It appears that we are coming close, whether considering mobile learning in college, at work, or at home or in transit, to matching Bruner's (1996) recognition of four ideas crucial to understanding teaching and learning: agency, reflection; collaboration, and culture.

Sharples (2007) identified a number of issues to consider when developing investigations into workplace based mobile learning. The first and most obvious is that the learners are mobile. Researchers will need to track learners across a range of locations: from home or recreation to work and including travelling between these and from real to virtual environments. Each location has an associated socio-cultural context that includes formal and informal, social and professional codes that govern the way learners use (and feel comfortable about using) mobile devices. Also workplace learning may involve a variety of personal and institutional technologies giving researchers opportunities to access to informal and personal learning activities as well as to formal, work-based tasks. Additionally, Burden et al. (2010) are pointing out that it is important to professional mobile learning for it brings authenticity to mobile learning episodes.

Professionalisation and workplace learning

Successful workplace based mobile learning development projects tend to fall into one of four forms: making distance learning activities available on mobile devices (Gregson, 2007, Ally & Stauffer, 2008) often with a focus on video (Savill-Smith & Douch, 2009), scaffolding placement based tasks (Treadwell, 2005), facilitating on the spot learning with contextualised bite-size learning objects (Wakelin & Stead, 2008) and using mobile devices to collate evidence of reflection and learning (Oliver, 2005) often with the support of social networking software (Chan, 2007). Other more exploratory projects include evaluation of a wider range of activities (Wishart, 2007) though using mobile devices with a focus on assessment is common; the ALPS project (Taylor et al, 2007) focuses on assessment of trainee nurses, physiotherapists and midwives in health care settings. The use of mobile devices to support reflection on practice by capturing images and sometimes video of work based competences and skills are central to many of these projects' outcomes. These cases benefit from students' acquired skills in mobile device use honed by their personal use e.g. for informal learning (Clough et al., 2008).

Informal and self-directed learning is of great relevance for the development of job related competences due to the lack of formal vocational education and training (Cheetham & Chivers, 2005). The lack of formally organized learning is partly compensated by "communities of practice" (Lave & Wenger, 1991). In these communities practitioners exchange their experiences and develop joint solutions for practical problems. Furthermore, communities of practice contextualize knowledge and learning experiences in social practice. Thus, learning can be considered as the socialization process into the social practice of a community (Lave & Wenger, 1991).

Schön (1983, pp. 141-156) notes that reflection is part of a self-directed learning process, in which move-testing inquiry guides the practice of professionals. Through this kind of exploratory on-the-spot research practitioners analyse complex situations and validate practical hypotheses based on the information they gather throughout the process. This kind of practice-driven "research" relies on a person's ability to reflect on his or her actions. This ability is a factor for competence development (Schön, 1983, 1987). Schön (1983) distinguishes two variations of reflection that are relevant

to learning: reflection on action and reflection in action. In both cases the learner creates a relation between past experiences and a situation. The main difference of the two kinds of reflections is the time when the reflection takes place in relation to the actual action. The quality of reflective activities depends on the repertoire of unique problems and solutions to which reference when analysing new problems (Schön, 1983, p. 138).

The ability for reflection on professional practice is partially the result of an unstructured learning process, which is often related to the socialization into a community of practice. Given to the relevance of reflection for the professional practice, Schön (1987) suggests that more structured approaches for educating the practitioners' ability to reflect in and on their practice.

Learner support in self-directed learning

Formal education can be characterised by clear role distinction and a predefined curriculum that is provided for the learners, whereas self-directed learning is learner centred that often lacks of predefined roles and relies on a limited or even no form of a curriculum (Livingstone, 2001). To the extreme this may lead to situations in which reflection and exploratory experiments are no longer recognized as parts of learning processes (Bjørnåvold, 2000). The consequences for self-directed learning are twofold. On one hand the learners gain more freedom, while on the other hand the implicit responsiveness of formal learning environments is missing in these settings. This includes reduced or sometimes even the absence of "institutionalised" feedback and support provided by teachers and trainers.

Two goals for supporting self-directed learners were previously identified (Glahn, 2009). Firstly, it is important to stimulate the learners' engagement and reflection about their learning processes and retain the self-directed nature of their learning course. Secondly, support for self-directed learning requires solutions that are independent from a specific knowledge domain and from the personal learning goals of the learners. Taking both goals together learner support in self-directed learning has to deal with some uncertainty regarding the learning goals, the learning content, and the learning process.

Verpoorten, Westera, & Specht (2010) propose a classification framework for supporting reflection for self-regulated learning. This framework relates interaction types to the scope of the reflective process. The authors differentiate three interaction types: receiving information, providing information, and verbalising information. These interaction types can be related to a range of targets of the reflection: the content of learning, a learning task, the learning process, the whole learning experience. The framework is a tool for analysing design decisions on supporting meta-cognitive processes in learning.

Conclusions and further research

This paper proposes the application of a mobile widget framework for supporting learning processes of young people in placements. Placements are a way to smoothen the transition from an educational system into working life, that allow young people to connect the competences they have developed in formal education with professional practices. The wide adoption of mobile devices among young people suggests seeking for a mobile learning solution for supporting learning processes during placements. Widget based PLEs introduced attractive concepts that were adapted to work with mobile devices. However, supporting learning processes in placements is not a technological problem. This paper discussed three perspectives on aspects that influence the application of mobile technologies for workplace based learning. Each of these aspects adds a requirement for the development of a mobile learning solution. With regard to mobile and contextualized learning, the requirement is that a solution needs to be aware of the learners' contexts, the transition between contexts, and also relations between contexts. Furthermore, research on professionalization suggests more structured approaches for educating the practitioners' ability to reflect in and on their practice. Finally, learner support in self-directed learning has to be tolerant regarding the uncertainty of learning goals, learning content, and learning process.

Besides these generic requirements for supporting workplace learning using mobile devices, a placement is framed by formal educational activities. This implies that the informal support of a community of practice has to be partially compensated by a teacher or trainer, who is responsible to encourage learners to analyse their experiences and to identify their learning episodes. Similar to fieldtrips, this can be achieved by defining assignments that focus the learners' attention to potential learning episodes.

The special setting of placements leads to four challenges for future research.

1. The role of context for performing mobile learning assignments
2. Teaching practice for supporting learning in placements
3. Defining flexible mobile learning assignments for supporting reflection in and on working practice
4. Arranging assignments for structuring the competence development of young people in placements

The first challenge focuses on contextual factors that influence the learning process in and across contexts. The second challenge analyses the existing practice for supporting students in placements with regard to encouraging reflection on workplace related aspects. The third challenge addresses activity patterns for stimulating reflections in different settings. The fourth challenge targets the instructional design aspects for supporting self-directed learning.

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References

- Ally, M. & Stauffer, K. (2008). Mobile Learning to Bridge the Distance for Adult Learners. Paper presented at MLearn 2008, Telford, UK.
- Attwell, J. (2009). Mobile Learning: transforming teaching and learning in colleges, schools & workplaces. Paper presented at Learning and Technology World Forum 2009, London, UK.
- Attwell, J., Savill-Smith, C. & Douch, R. (2009). *The Impact of Mobile Learning: Examining what it means for teaching and learning*. London: LSN
- Chan, S. (2007). m-learning for work based apprentices:- A report on trials undertaken to establish learning portfolios. Paper presented at MLearn 2007, Melbourne, Australia.
- Chisholm, L.A., Hoskins, B., & Glahn, C. (eds.) (2005). *Trading-Up – Potential and Performance in Non-Formal Education*. Strasbourg, Council of Europe.
- Clough, G., Jones, A.C., McAndrew, P. & E. Scanlon (2008). Informal Learning with PDAs and SmartPhones. *Journal of Computer Assisted Learning* 24(5) 359-371.
- Commission of the European Communities (2001). *European Commission White Paper: A New Impetus for European Youth*. Brussels: EC. Available from http://ec.europa.eu/youth/archive/whitepaper/download/whitepaper_en.pdf [accessed 23.3.10]
- Gregson, J. (2007). M-Learning: The First Piece in the Distance Learning Jigsaw? Paper presented at MLearn 2007, Melbourne, Australia.
- Griffiths, D., Hernández-Leo, D., Perez, M., Santos, P., Llobet, L., Melero, J., et al. (2009). D6.3 - Learning activities and Units of Learning. Compilation of internal deliverable outcomes ID6.6 - 6.12. Research report. TENCompetence. <http://hdl.handle.net/1820/2293> [accessed 6.4.10]
- Herrington, J., Herrington, A., Mantei, J., Olney, I. & Ferry, B. (2009) (Eds.). *New Technologies, New Pedagogies: Mobile Learning in Higher Education*. Wollongong: Faculty of Education, University of Wollongong.
- Jonassen, D. (1994) *Technology as Cognitive Tools: Learners as Designers*. IT FORUM Paper 1. Retrieved April 3, 2010 from <http://itech1.coe.uga.edu/itforum/paper1/paper1.html>
- Johnson, L.F., Levine, A., Smith, R., & Stone, S. (2010) *2010 Horizon Report*. Austin, TX: The New Media Consortium. Retrieved, April 6, 2010 from <http://www.nmc.org/pdf/2010-Horizon-Report.pdf>
- Kunzmann, C., Schmidt, A., Braun, V., Czech, D., Fletschinger, B., et al. (2009). Integrating Motivational Aspects into the Design of Informal Learning Support in Organizations. Proceedings of the 9th International Conference on Knowledge Management and Knowledge Technologies, September 2-4, 2009, Graz, Austria.
- Livingstone, D.W. (2001). Adults' informal learning: definitions, findings, gaps and future research (WALL Working paper, No. 21). Centre for the Study of Education and Work, Ontario Institute for Studies in Education of the University of Toronto, Canada.
- Maier, R., & Schmidt, A. (2007). Characterizing Knowledge Maturing: A Conceptual Process Model for Integrating E-Learning and Knowledge Management. In N. Gronau (ed.): 4th Conference Professional Knowledge Management - Experiences and Visions (WM '07), Potsdam, GITO, 2007, pp. 325-334.
- Nelkner, T. (2009). An Infrastructure for Intercommunication Between Widgets in Personal Learning Environments. In: M.D. Lytras et al. (eds.): 2nd World Summit on the Knowledge Society (WSKS 2009), Crete, Greece, Communications in Computer and Information Science vol. 49, Springer, pp. 41-48

- Oliver, C. (2005). The Road to Mobile Learning, Fine Print - Victorian Adult Literacy and Basic Education Council Journal, 28(3), pp. 10-14.
- O'Malley et al (2005). Pedagogical methodologies and paradigms: Guidelines for learning/teaching/ tutoring in a mobile environment. MOBIlearn Report UoN,UoB,OU/WP4/1.2. Retrieved from http://www.mobilearn.org/download/results/public_deliverables/MOBIlearn_D4.1_Final.pdf [5/4/10]
- Palmér, M., Sire, St., Bogdanov, E., Gillet, D. and Wild, F. (2009): Mapping Web Personal Learning Environments. In: Proceedings of the Second International Workshop on Mashup Personal Learning Environments (MUPPLE09), Nice, pp. 80-88.
- Savill-Smith, C. & Douch, R. (2009). The use of mobile learning to break down barriers between education and Further Education. Paper presented at the 3rd WLE Mobile Learning Symposium: mobile learning across cultures, education, work and leisure, London, UK.
- Schmidt, A. (2007). Microlearning and the Knowledge Maturing Process: Towards Conceptual Foundations for Work-Integrated Microlearning Support. In M. Lindner and P. A. Bruck (eds.): Micromedia and Corporate Learning. Proceedings of the 3rd International Microlearning 2007, Innsbruck, Austria, June 2007, Innsbruck University Press, pp. 99-105
- Sharples, M. (2003). Disruptive devices: mobile technology for conversational learning. International Journal of Continuing Engineering Education and Life Long Learning, 12(5/6), 504-520. Retrieved from <http://www.nottingham.ac.uk/lsri/msh/Papers/ijceell.pdf> [Accessed 5/4/10]
- Sharples, M. (2005). Learning As Conversation: Transforming Education in the Mobile Age. In Proceedings of Conference on Seeing, Understanding, Learning in the Mobile Age, pp. 147-152. Budapest, Hungary.
- Specht, M. (2009). Learning in a technology enhanced world. Heerlen: Open University of the Netherlands.
- Stellar (2009). Orchestrating Learning. Retrieved from http://www.stellarnet.eu/d/1/1/-Orchestrating_learning [accessed 24.3.10]
- Tashakkori, A. & Teddlie, C. (2003). (Eds) Handbook of Mixed Methods in Social and Behavioural Research. California: Sage Publications Inc.
- Taylor, J., Coates, C., Eastburn, S. & Ellis, I. (2007). Interactive learning using mobile devices to enhance Healthcare practice education. Paper presented at EFODL International Conference: Demonstrating Transformation: Practice, Process and Product Belfast, Northern Ireland, May 2007.
- Treadwell, I., (2005, October). Using Portable Technology for Assessment of Practical Performance. Paper presented at MLearn'05, Cape Town, South Africa. Retrieved from <http://www.mlearn.org.za/CD/papers/Treadwell%20removed.pdf>. [5/4/10]
- Verpoorten, D., Westera, W., & Specht, M. (2010). Reflection amplifiers in online courses: a classification framework. Journal of Interactive Learning Research, 21(4).
- Wakelin, J. and Stead, G. (2008). BLOOM (Bite-sized Learning Opportunities on Mobile Devices) Paper presented at MLearn 2008, Telford, UK.
- Wang, F. & Hannafin, M. (2005). Design-based research and technology-enhanced learning environments. Educational Technology Research and Development, 53(4), 5-23.
- Wilson, S., Liber, O., Johnson, M., Beauvoir, P., Sharples, P., & Milligan, C. (2006). Personal Learning Environments: Challenging the Dominant Design of Educational Systems. In E. Tomadaki & P. Scott (Eds.) Innovative Approaches for Learning and Knowledge Sharing at the EC-TEL 2006 Workshop, Proceedings (pp. 173-182).
- Wishart, J. (2007) The Seven Cs – No Eight, Nine Cs of M-Learning. Paper presented at Kaleidoscope Alpine Rendez-Vous, Villars, Switzerland. January 2007
- Wishart, J., Ramsden, A. & McFarlane, A. (2007). PDAs and Handhelds: ICT at your side and not in your face. Technology, Pedagogy and Education, 16(1), pp. 95-110.