

The Pedagogical Perspectives of Mobile Learning

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Abstract

Distance learning has existed in some form for centuries, but modern technologies have allowed students and teachers to connect directly, no matter what their location, using the internet and mobile devices.

Mobile Pedagogy and Perspectives on Teaching and Learning explores the tools and techniques that enable educators to influence wireless applications and social networks to improve learning outcomes and provide creative ways to increase access to educational resources. This publication is designed to help educators and students at every level optimize the use of mobile learning resources to enhance educational experience and improve the effectiveness of the learning process regardless of physical location.

Introduction

Most theories of pedagogy fail to capture the distinctiveness of mobile learning. This is because they are theories of teaching, predicated on the assumption that learning occurs in a classroom environment, mediated by a trained teacher.

Any theory of mobile learning must embrace the considerable learning that occurs outside the classroom and is personally initiated and structured. It must also account for the dynamics of learning. A relevant theory of learning must embrace contemporary accounts of the practices and ontology of learning. Learning is a constructive process, involving the active construction of knowledge.

Thus, theories of learning must be tested against the following criteria:

- Do they account for both formal and informal learning?
- Do they analyse the dynamic context of learning?
- Do they theorise learning as a constructive and social activity?

1 The Pedagogical Perspectives of Mobile Learning

1.1 Behaviourist Learning

Within behaviourist learning paradigm, learning is thought to be best facilitated through the reinforcement of an association between a particular stimulus and a response (drill and feedback).

Mobile devices in particular can enhance the behaviourist learning process. The use of mobile devices to present teaching materials/content specific questions (stimulus), obtain responses from learners (response), and provide appropriate feedback (reinforcement) – provide ‘drill and feedback’ activities, fits within the behaviourist learning paradigm.

Case Studies

- Mobile phones for language learning
 - Students were sent frequent vocabulary messages and revision material via mobile phones using SMS text messages.
 - Mobile phones with online services allow students to access multiple choice questions and answers, and practical exercises¹.
 - Mobile devices allow students to review, listen and practice speaking, and provide services such as phrase translation, quizzes and live coaching (Stanford Learning Lab)².
- “Drill and feedback”: use mobile devices to present content specific questions, gather student responses rapidly and anonymously, and assemble a public, aggregate display, to show variation in the group’s ideas.

1.2 Constructivist learning

Constructivist learning is an active process in which learners construct new ideas or concepts based on their current and past knowledge. Within a constructivist learning framework, instructors should encourage students to discover principles for themselves. In order to transform learners from passive recipients of information to active constructors of

¹ Furuya, C., Kimura, M. & Ohta, T. (2004). *Mobile Language Learning – A Pilot Project on Language Style and Customization*. Proceedings of ELEARN 2004, pp.1876-1880.

² Yuen, S.C.Y., & Wang, S.Y. (2004). *M-learning: Mobility in Learning*. Proceedings of ELEARN 2004, pp. 2248-2252.

knowledge instructors must give learners an environment in which to participate in the learning process, and the appropriate tools to work with that knowledge.

Mobile devices provide a unique opportunity to have learners embedded in a realistic context at the same time as having access to supporting tools. Each learner carries a networked device which allows them to become part of the dynamic system they are learning about.

Case Studies

- Games (PDA): participatory simulations where learners play an active role in the simulation of a dynamic system or process.
- Handheld games (Pocket PC): where context-sensitive data (raw data) and social interactions (interviews with ‘virtual’ experts) are used to supplement real world interactions.

1.3 Situated Learning

The situated learning paradigm holds that learning is not merely the acquisition of knowledge by individuals, but instead a process of social participation. It also emphasises the idea of cognitive apprenticeship where teachers (the experts) work alongside students (the apprentices) to create situations where the students can begin to work on problems even before they fully understand them.

Situated learning requires knowledge to be presented in authentic contexts (settings and applications that would normally involve that knowledge) and learners to participate within a community of practice.

Case Studies

- Mobile devices for natural science learning: use PDA to support field studies, e.g. taking observational notes, taking photo, querying networked database and comparing data, etc

- Mobile devices for Geography: use iPods to support field-based activities, e.g. listen to pre-loaded instructions, taking photos and observational notes, record students own reflections, etc. (University of Gloucestershire & Kingston University³)
- Multimedia museum⁴: use Pocket PC to provide an interactive audio-visual tour, allowing visitors to view video and still images, listen to expert commentary and reflect on their experience by answering questions or mixing a collection of sound clips to create their own soundtrack for an artwork.

1.3.1 Problem-based Learning

Problem-based learning (PBL) aims to develop students' critical thinking skills by giving them an ill-defined problem that is reflective of what they would encounter as a practicing professional.

Throughout the process of exploring a problem, students are encouraged to identify the areas of knowledge they will require to understand the problem. The group then collects these learning issues, along with data, hypotheses and plans for future inquiry in a structured manner, which can be facilitated by shared information resources (e.g. physical or electronic whiteboard), and uses the collected information to develop a plan for the next iteration of problem formulation, solution, reflection and abstraction.

Case Studies

- Medial education
- Business administration
- Nursing

1.3.2 Context Awareness Learning

Context awareness means gathering information from the environment to provide a measure of what is currently going on around the user and the device. Activities and content that are particularly relevant to that environment can then be made available.

³ Applications to be implemented by IMPALA partners – information achieved by visits

⁴ Scanlon, E., Jones, A. & Waycott, J. (2005). *Mobile technologies: prospects for their use in learning in informal science settings*. <http://jime.open.ac.uk/2005/25/scanlon-2005-25-paper.html>

Mobile devices are especially well suited to context-aware applications simply because they are available in different context, and so can draw on those contexts to enhance the learning activity. Context-aware mobile devices can support learners by allowing a learner to maintain their attention on the world and by offering appropriate assistance when required.

Context awareness is being explored not just as a way to deliver appropriate content but to enable appropriate actions and activities, including interactions with other learners in the same or similar contexts.

Case Studies

- Multimedia museum and gallery: provide additional information about exhibits and displays based on the visitor's location within them.
- Pre-class podcasts: Contain news/issues related to the subject, books/journals/films reviews, explanation of key concepts/terminologies, background information about the subject, links to make wider connections, questions students should be thinking about before the class, etc. (University of Leicester⁵, University of Gloucestershire & Kinston University⁶, Duke University⁷, University of Mary Washington⁸, Charles Sturt University⁹)

1.4 Socio-cultural Theory of Learning

The socio-cultural theory of learning views that learning takes place in a social context, and the forming and re-forming of concepts need not necessarily take place only at the level of the individual, but that collaborative group work and sharing with peers (and others) can be a powerful way of confronting one's own conceptions (pre-conceptions), contributing to the need to restructure one's cognitive schemas. So learning is perceived as being as much about communication as it is about content. Of course, communication is not confined to

⁵ Edirisingha, P., Salmon, G., & Fothergill, J. (2006). *Profcasting: a pilot study and a model for integrating podcasts into online learning*. A paper proposal for the EDEN 2006 research conference in Barcelona

⁶ Applications to be implemented by IMPALA partners – information achieved by visits

⁷ http://cit.duke.edu/about/ipod_faculty_projects_fall05.do#downstream

⁸ Campbell, G. (2005). *There's Something in the Air: Podcasting in Education*. EDUCAUSE Review 40 (6), 32-47. <http://www.educause.edu/apps/er/erm05/erm0561.asp>

⁹ Chan, A. & Lee, M.J.W. (2005) *An MP3 a day keeps the worries away: Exploring the use of podcasting to address preconceptions and alleviate pre-class anxiety amongst undergraduate information technology students*. In D.H.R. Spennemann & L.Burr (eds.) *Good Practice in Practice: Proceedings of the Student Experience Conference* (pp. 58-70). Wagga, NSW, September 5-7.

peer-to-peer. It can involve teachers, experts, experienced colleagues, workmates, friends and family.

The mobile environment can make a significant contribution to this process. By facilitating the rapid access to other users any time/any place, sharing content, knowledge, experience and gossip, learners can develop ‘communities of practice’ as well as informal discussion groups, as and when needed to optimise their learning processes.

1.4.1 Collaborative Learning

There is a specific focus on the use of mobile technologies to promote, facilitate and enhance interactions and collaborations between students.

Both the capabilities of mobile devices and their wide context of use contribute to their propensity to foster collaboration. Mobile devices can easily communicate with other devices of the same or similar type, enabling learners to share data, files and messages. They can also be connected to a shared data network, further enhancing possibilities for communication. These devices are also typically used in a group setting, and so interactions and collaboration will tend to take place not just through the devices but also at and around them as well.

1.4.2 Conversational Learning

Conversation theory describes learning in terms of conversations between different systems of knowledge. Learning is a continual conversation with the external world and its artefacts, with oneself, and also with other learners and teachers. The most successful learning comes when the learner is in control of the activity, able to test ideas by performing experiments, ask questions, collaborate with other people, seek out new knowledge, and plan new actions.

The most compelling examples of conversational learning occur when mobile technology is used to provide a shared conversation space. Effective learning occurs when people can converse with each other, by interrogating and sharing their descriptions of the world.

A mobile learning device can assist conversational learning by integrating learning descriptions across different locations, for example by making connections between exhibits in a museum, and by holding the results of learning actions for later retrieval and reflection. It can also provide tools to support learning in context, such as electronic measuring instruments, maps, and reference guides.

Case Studies

- Mobile computer supported collaborative learning (MCSCCL) system: teacher's handheld device (Pocket PC) is used to distribute activities to a mobile network, students work in collaborative groups (students have to come to agreement before the answer can be submitted), teacher collects students works through Pocket PC.

1.4.3 Activity Theory

Activity theory builds on the work of and is a way of considering learning using three features – involving a subject (the learner), an object (the task or activity) and tool or mediating artefacts. Its central tenet is that human behaviour is situated within a social context that influences their actions. The meanings of actions are mediated by the rules of their community and the division of labour within the community influences the ways in which we behave.

The emphasis that Activity Theory places on tools, including computer based tools in the way activities are mediated is very helpful. This shifts our attention away from simply the interaction between computer and to the activity as a whole. Activity Theory is a productive way to evaluate learning environments that are rich in technology.

Case Studies

- Museum Art Gallery exhibit¹⁰: the PDA contained background information in a variety of media about works on display, in addition to games, opinion polls and the possibility of communication with other visitors via standard text messages.

¹⁰ Scanlon, E., Jones, A. & Waycott, J. (2005). *Mobile technologies: prospects for their use in learning in informal science settings*. <http://jime.open.ac.uk/2005/25/scanlon-2005-25-paper.html>

The PDA introduced many possibilities to the activity of learning in the museum. The main possibility – the use of multimedia content appeared to enhance the activity, expanding the type of information available to visitors Informal and lifelong learning

Learning happens all the time and is influenced both by our environment and the particular situations we are faced with. Informal learning may be intentional, for example through intensive, significant and deliberate learning ‘projects, or may be accidental by acquiring information through conversations, TV and newspapers, observing the world, or even by experiencing an accident or embarrassing situation. Indeed, studies of informal learning show that most of adults’ learning happens outside formal education. While informal learning is a reality in people’s lives, they may not recognise it as learning.

Thus, people learn in order to be able to perform a new task, or even to be able to carry out a routine task in a better, more efficient or elegant way. Technology that is used to support learning should be blended with everyday life in the same way that learning is blended with everyday life: seamlessly and unobtrusively.

Mobile technologies, with their reduced size and ease of use, provide the potential to support such activities. With regard to accidental learning, learning episodes are impossible to predict. The personal and portable nature of mobile technologies makes them very strong candidates for recording, reflecting on and sharing this type of informal learning.

Lifelong learning is a means of providing people with the knowledge and skills they need to succeed in a rapidly changing world. The basic premise of lifelong learning is that it is not feasible to equip learners at school, college or university with all the knowledge and skills they need to prosper throughout their lifetimes. Therefore, people will need continually to enhance their knowledge and skills, in order to address immediate problems and to participate in a process of continuing vocational and professional development. The new educational imperative is to empower people to manage their own learning in a variety of contexts throughout their lifetime.

The convergence of lifelong learning and personal technology:

Lifelong Learning	New Technology
Individualised	Personal
Learner centred	User centred
Situated	Mobile
Collaborative	Networked
Ubiquitous	Ubiquitous
Lifelong	Durable

Case Studies

- Mobile devices for breast cancer patients: delivery of text, images, and audio-visual material to the patients' PDAs via the internet and the hospital's intranet, the user can query specific subject knowledge bases through a content specialist, patient communication is enabled via SMS, allowing a patient community to share valuable insights and experiences.
- Mobile devices allow students to record their own reflections on activities or events, and share with other students via podcasting (University of Gloucestershire¹¹, Charles Sturt University¹², Duke University¹³, GCSU¹⁴)

Conclusion

It could easily be said that Mobile Pedagogy is more effective as it satisfies all the perspectives of learning discussed in this paper. It is an advanced form of teaching and learning which could be implemented for all subjects. Mobile Pedagogy is an unusual term since it is more common to talk about mobile learning. The use of mobile devices, which is often accompanied by learner mobility across diverse contexts and settings, puts a spotlight on learners and their experiences, but it may obscure the role of teachers, which is an issue of great research. The learner as well as the facilitator has to be well informed about mobile technology.

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¹¹ Applications to be implemented by IMPALA partners – information achieved by visits

¹² Chan, A. & Lee, M.J.W. (2005) *An MP3 a day keeps the worries away: Exploring the use of podcasting to address preconceptions and alleviate pre-class anxiety amongst undergraduate information technology students*. In D.H.R. Spennemann & L.Burr (eds.) *Good Practice in Practice: Proceedings of the Student Experience Conference* (pp. 58-70). Wagga, NSW, September 5-7.

¹³ http://cit.duke.edu/about/ipod_faculty_projects_fall05.do#downstream

¹⁴ <http://ipod.gcsu.edu/>



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