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# A Theoretical Framework for Mobile Learning and E-Inclusion in Finland

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# A THEORETICAL FRAMEWORK FOR MOBILE LEARNING AND E-INCLUSION IN FINLAND

Un cadre théorique dédié à l'apprentissage mobile et à l'e-inclusion en Finlande

*Completed Research Paper*

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## Abstract

*Inclusion of people discontinuing their studies, so-called school drop-outs, represents a challenge in a modern information society, where numeracy, literacy and Information and Communication Technology (ICT) skills are needed in order to cope with everyday life. Several technology projects have been launched to explore the opportunities that mobile technologies bring about when tackling issues of social inclusion through mobile learning. Mobile devices are cheaper than for instance a Personal Computer (PC), and their affordance, usability and accessibility are such that they can potentially complement or even replace traditional computer technology. In this paper, a theoretical framework for mobile learning and e-inclusion is developed for people outside the conventional education system. The framework draws upon the fields of constructivist pedagogy, mobile learning objects and sociology. We also present data about the situation in Finland where we will use this theoretical framework to inform the design of mobile learning solutions for school drop-outs.*

**Keywords:** Mobile learning, e-inclusion, digital divide, constructivist pedagogy, forms of capital, school drop-outs

## Résumé

*Les personnes ayant quitté les études constituent un défi pour la société de l'information qui requiert des compétences d'usage liées aux TIC. Des projets ont été lancés pour explorer les opportunités apportés par les téléphones mobiles pour l'apprentissage de ce type de compétences. Le cadre d'analyse développé repose sur les champs de la pédagogie constructiviste, les objets d'apprentissage mobile et la sociologie.*

## Introduction

For nearly a decade, there have been several design and research projects all over the world applying mobile technology to support young disadvantaged adults who have dropped out, or are about to do so, of the traditional school system, and are thereby in danger of being marginalized in society. Mobile devices are cheaper and more usable for mobile users than for instance a Personal Computer (PC), which helps people to get access to the learning materials, the facilitators and the fellow learners (Fozdar and Kumar, 2007). This sort of easy access is a valuable means of retaining students and avoiding social exclusion. Mobile learning portals enable the presentation and use of learning materials that make it more adaptable to individual learning styles and even levels the way for tackling problems with numeracy and literacy (Attewell et al., 2003). As a rule, researchers have stressed the special significance of collaborative mobile solutions, that is, solutions enabling peer-to-peer support for mobile learning (Tétard and Patokorpi, 2005; Sharples, 2000; Dibella and Kelly, 2000). In brief, mobile solutions are valuable in easing up access (i.e. bridging the digital divide), retaining students, making learning more flexible and personalized, and providing collaborative (community) support for learning. Collaborative or community support can also function as a bridge from more formal and institutionalized forms of education to informal, work-related and life-long learning. There is no reason to stop here but one could develop digital technology further in order to find ways for all citizens, but especially for people in danger of being marginalized, to participate in the civic society and democratic decision making. Therefore, learning is in this paper seen as an active (though also contemplative), productive and collaborative form of engagement with the world.

The purpose of this paper is to lay out a theoretical framework for mLearning for people outside the conventional education system. Besides the practical experiences from a number of empirical mLearning and technology design projects, the conceptual framework presented here draws upon three theories in the fields of pedagogy (in general), mobile learning objects (in particular) and sociology. The general pedagogical theory is constructivist learning theory, originating from the seminal work of Piaget (1982; Piaget and Inhelder 1975) and Vygotsky (1969). The design guidelines for mobile learning objects and mobile learning in general are borrowed from Patokorpi et al. (2007), which by the way are in accord with the general constructivist learning theory. Thirdly, Pierre Bourdieu's (1985) theory of forms of capital is applied to the problems of social inclusion, as the mainstream of economically and technologically (e.g. technology driven design) oriented research and Research and Development (R&D) tend to turn a blind eye to various cultural and social factors related to social inclusion. The theoretical framework here presented informs our ongoing research project whose purpose is to design mobile learning solutions for young disadvantaged adults in Finland. A similar empirical project is commencing in Trento, Italy, and later on a twin project in China will hopefully follow.

The paper is structured as follows. Section 2 takes a critical look at previous definitions of mLearning and comes up with a definition that seems best to serve the purposes of democratic, informal and collaborative mobile learning. The third section examines the present state of mobile learning frameworks and application areas. Section four presents the pedagogical approach advocated in this paper. The fifth section discusses social inclusion and takes a brief look at previous research in the field of mLearning and social inclusion. This is followed by a section on a sociological theory – Bourdieu's three forms of capital – which will be applied to the study and design of mLearning for young disadvantaged adult learners in Finland. Section 7 sums up the approach by presenting the three theories and how they are related to one another. The eighth section presents different educational groups, and especially the groups of young people in Finland who fall, or are in danger of falling, outside the formal education system. Section 9 attempts to come to grips with the challenges as well as opportunities brought forward by education enhanced by mobile technologies. The concluding section sums up the most important points.

## Defining mobile learning

Definitions of m-learning abound. Popular business and technology literature defines m-learning as “*e-learning through mobile computational devices*” (Quinn, 2000; see also Trifonova and Ronchetti 2003), or as “*the point at which mobile computing and e-learning intersect to produce an anytime, anywhere learning experience*” (Harris, 2001). As argued by Pozzi (2007), the above definitions are highly technology oriented. These technology oriented definitions tend to oversimplify the concept of m-learning and its implications. First, m-learning is more than replacing the *e* of e-learning by an *m*, although it is true that m-learning borrows some features of e-learning so that m-learning enables education to be provided independently of time and place. Second, m-learning is not only about

providing location and context dependent knowledge. More learner-centred definitions of m-learning have been proposed: e.g. “*any sort of learning that happens when the learner is not at a fixed, predetermined location, or learning that happens when the learner takes advantage of the learning opportunities offered by mobile technologies*” (O’Malley et al, 2003, p. 6).

An alternative approach to defining m-learning is to start from two propositions. First, communication plays a major role in all human activity, including learning. Second, one cannot stop people from being mobile, and hence *all learning is mobile*. Technology allows us to interact socially, anytime and anywhere: communication has become strongly ubiquitous. This approach to m-learning is explicated in Nyíri (2002). Nyíri defines m-learning as learning taking place in the course of person-to-person ubiquitous or mobile communication. Tella (2003) also refers to m-learning as studying and communication in which different tools or mobile technologies are used. However, instead of seeing mobile technology and mobile learning as a means to learning irrespective of geographical location (Kopomaa, 2000; Dahlbom and Ljungberg, 1998), it should be seen as a means to situated learning; thus implying learning in a context in which the learning substance is to be put into use (Brown et al., 1989). Situated learning leads us to consider learning in real life contexts, outside the confines of a conventional classroom. Therefore mobile learning promises to put training and learning into a context of meaningful job activities in the real world.

As has been noted by several researchers (Pozzi, 2007; Brown-Martin, 2008), there is some kind of redundancy in the term mobile learning. Following from our propositions above, all learning is mobile in several respects. Knowledge is mobile in the sense that information can be transferred from one person to another and from one context to another. The learning materials are mobile in the sense that they can be transported from one device or platform to another. The learner is mobile in the sense that she can move from one place to another and from one point of time to another. Unlike most definitions of mLearning, we wish to take seriously the fact that mobile technologies enable the user to break away from conventional learning settings, embark on a quest for information, knowledge and experiences in the real world with the immediate communicational support from peers and digital materials on the web. Accordingly, we will follow Patokorpi et al. (2007) in defining mobile learning as “*situated, collaborative and guided teaching, studying and learning, supported by mobile devices that utilise symmetric mobile communications channels by which the learners and the facilitator may use and mould specially designed learning objects for work, hobby or citizenship -related purposes or as an aid to traditional education*” (p. 191).

## **Mobile learning – state-of-the-art, application areas and recent advances**

Application areas of m-learning technology can be many since the learning context can change depending on (1) place and time, (2) the learner (young/adult), (3) the subject matter to be learned, and (4) the skills that need to be applied in the particular context/task at hand. Depending on the factors above, the pedagogical approach to learning will be different, thus impacting how technology will be used to support learning. Naismith et al. (2004) identifies several (activity-based) approaches to learning that can be supported by mobile technologies:

- *Behaviorist approach* where learning means an observable change in the future course of actions (behavior) of the learner (see Roschelle, 2003 – for an account of benefits of this approach applied to mobile learning). An example is a system where a problem is presented to the learner, followed by the contribution of the learner (solution), which is then followed by feedback from the system with adequate corrective actions/response. Tenbergen et al. (2008) have developed a tablet PC-based tool that supports users to learn the UML syntax using this approach.
- *Constructivist approach* where learning is understood as a process where learners actively build new knowledge based on current and previous experiences and knowledge. An example is a system where the learner(s) is involved in a realistic situation, and uses support tools to deal with the situation at hand and communicates, interacts and shares his or her knowledge with other learners. Examples of the use of the constructivist approach in mobile learning can be found in Colella (2000), Facer et al. (2004), Klopfer et al. (2004) and Patokorpi et al. (2007).
- *Situated learning* where learning takes place in an authentic context and culture. An example is an electronic guide offering support (information resources, activities) to visitors of an exhibition or a place of interest. Chen et al. (2004), Proctor and Burton (2003), and Tétard and Patokorpi (2004) report cases of mobile systems developed in the context of situated learning. Fortier (2008) presents a system that student nurses use to collect data during a clinical experience, and plan and reflect over a course of nursing actions.

- *Collaborative learning* where learning is promoted through interaction. An example is a system where learners interact remotely in groups and have to answer questions (Zurita and Nussbaum, 2004). Ng'ambi and Knaggs (2008) demonstrate a system through which students can prepare their exams with SMS technology. The mobile Digital Narrative Tool enables students to collaboratively engage in the creation of a collective digital narrative (Arnedillo-Sánchez, 2008).
- *Informal learning* where learning takes place outside a designed and dedicated learning environment. Informal learning takes into account the fact that learning takes place all the time (and that there is actually more learning taking place outside the classroom than inside!) and that one should try to make use of all learning opportunities. An example is a system that enables learners to digitally save/record bits of information and interactions, and to (re)use these bits at a later point of time (when writing an essay, for example). Examples can be found in Attewell and Smith (2003) and Wood et al. (2003). Wyeth et al. (2008) make an account of how children use mobile technologies in a non-school context (treasure-hunting) to learn about science.

Naismith also adds a category of services and applications that support the learners in their tasks: *learning support services* can be used to remind the learner when and where the next lecture will take place, or manage a list of borrowed textbooks from the library, for example.

In an extensive literature review of more than 400 publications, Cobcroft (2006) emphasizes several important changes which have taken place in recent years in the field:

- First of all, *learners have changed*. Exposure to a number of digital technologies has led to the emergence of a new breed of students whose key traits are digital literacy, permanent (persistent?) online presence, mobility, and community-orientation. These learners, also referred to as the Generation C (Trendwatching.com, 2005), are focused on creating connections and social interactions, and prefer group-based activities. Being versed in the use of technologies and multi-tasking, these learners interact with each other using a variety of forms of communication (SMS, online chats, e-mails and voice communications to a lesser degree) and use/consume a variety of media content (music, television, online content, games...). They are also more involved in content creation in all forms (blogs, video-blogs, avatars...).
- *Technological advances* have made their way in the field of mobile learning. Broadband access to the Internet has become a commodity. At the same time, the world wide web has gone through fundamental changes with the web 2.0 revolution (blogs, wikis, mashups, podcasts, videocasts, social networks), which has led to the emergence of websites offering (user-generated) content accompanied by interaction features. On the mobile side, technological advances are such that they enable learners to stay permanently connected with their peers, and access rich multimedia content.
- *Organizational issues*: adoption of mobile learning by an educational institution needs to be considered, planned and implemented very carefully. There are several risk factors that can hinder an educational institution to reap the benefits of mobile learning, starting from the concerns of the teachers, and of the learners to a lesser degree. Educational institutions invest a lot of resources in the development of learning management systems, and it is of course important, when planning adoption of mobile learning, to consider how this will be integrated into the existing LMS and the staff's work practices, and also whether it makes economic sense (see for example Bates and Poole, 2003, for a model for determining technology choices in higher education; Barker et al., 2005, for a model for m-learning adoption; and Traxler, 2005, for a report on the strategic issues related to mobile technology adoption in educational institutions). Institutions need also to pay attention to issues related to evaluation of m-learning implementations, and development of content creators', and teaching and administrative staff's skills.
- *Organizational policy development*: when engaging in m-learning, educational institutions must address several questions: implications for the learning experience, implications for teaching practices, implications for technology planning, and implications for university sustainability (Cobcroft et al., 2006).
- *Pedagogical development*: recent developments in the field of pedagogy and instructional design have led to a better understanding of how mobile technologies can be applied in various learning contexts. In particular, (social) constructivism lends itself very well as a pedagogical approach to the use of mobile technologies in learning. As a result, mobile learning will be an important cornerstone in the development of critical, creative, collaborative and communicative skills of the learners. According to Cobcroft et al. (2006), there is a wide diversity in how mobile technologies have been used to support the development of the above-mentioned skills.

## **Focusing on the learners: Towards a pedagogy of m-learning**

Although technology driven educational projects sometimes seem to reduce questions of learning into questions of technology adoption, technology alone does not bring about learning. The fact that students/users do not sometimes use the devices or applications provided for them is not an issue concerning only either the learning content, pedagogical methods or the technological tools. It is an issue of all of them functioning in happy harmony. About the given pedagogical approach one could say that being explicit about the (explicitly or implicitly) chosen pedagogical approach is especially important as one's views on learning and learning outcomes are dependent on it. We need to be in the clear what we mean by learning and what are the desired learning outcomes in the first place in order to be able to construct an effective and desirable learning environment in any systematic fashion. Consequently, in this paper we openly adhere to a constructivist pedagogy, which helps us stating with reasonable clarity what learning is and what are sought-after learning outcomes. Advocates of other learning theories will see these matters differently, but even they will probably find it easier to assess the role and value of mobile technologies and learning content when they have been applied in accordance with a well-defined pedagogical approach. Accordingly, we shall follow Patokorpi et al. (2007) in their application of constructivist learning theory to mobile learning and design of mobile learning content (i.e. mobile learning objects).

Constructivist pedagogical theory is not a completely unified theoretical framework but there is a considerable agreement on the key features. Tétard and Patokorpi (2005) list the constructivist learning principles as follows:

- *a larger goal* that organizes smaller tasks into a sensible whole
- *ownership of the problem* so that the learner will be motivated to try to solve it
- the problem is close to a real world problem
- many possible solutions to a problem
- the learner has the main responsibility for gathering knowledge
- the learning environment should be similar to a real-world environment
- building on the learner's prior knowledge and experience
- room for alternative individual learning strategies
- opportunities for social interaction and cooperation
- communication with peers and outsiders encouraged
- iterative learning process
- guidance should be provided (p. 168).

Mobile learning should not be seen as an isolated activity or phenomenon but something that works best as part of other forms of education. However, Abbott (2007) points out that we can fully exploit mLearning after having found ways of enabling learning with the help of mobile technology – ways which would not be possible with other technical or pedagogical means. Abbott sees the potential of mLearning especially in supporting and enabling social inclusion. It is in connection with social inclusion that the key characteristics of mLearning are "leading to a second wave of e-inclusion which is collaborative rather than individually supportive, holistic rather than skills-based and inclusive rather than separatist" (2007, p. 3). The task is to identify learning situations and deliver the potential of mobile technologies in these situations.

## **Digital divide and e-inclusion of young adults**

### ***Definitions and terminology***

By Digital Divide is meant an unequal access to computing and digital resources due to certain differences, for example in income, leading to larger inequalities in the distribution of income and wealth within and across societies. Non-access or limited access to ICT leads to limited access to information, materializing in few

opportunities for learning/training, and consequently resulting in fewer job opportunities, fewer possibilities for advancement, lower income, and eventually leading to social exclusion.

Learning difficulty has also been advocated to be one of the reasons leading to social exclusion. Learning difficulty has been historically seen as a (medical) defect internal to the learner; on that basis, educational systems have been designed to school learners according to their needs (i.e. moderate learning difficulty – severe learning difficulty...). Recently, understanding of learning difficulty has changed from a “medical” model of learning (i.e. *this child has learning difficulties*) to a “social” model of learning (i.e. *the social environment - classroom, family ... - does not enable this child to learn*), i.e. learning is not dependent on the “physical and cognitive abilities” of the learner alone, but also on the social conditions prevailing in the learners’ environment (Abbott, 2007; see also Pierrakeas et al. 2004).

### ***Previous research on disadvantaged young adults, social inclusion, and student retention***

M-learning has been seen as one solution to problems related to digital inclusion. In the following, we will present several cases where m-learning methods and technologies have been used to deal with inclusion issues.

*m-Learning - supporting young disadvantaged young adults* was an EU-funded project running 2001-2004. Taking as a starting point what young adults have in common (the mobile phone), m-learning aims at helping young people aged 16 to 24, who are considered most at risk of being socially marginalized, because they have dropped out of formal education (Mitchell and Doherty, 2003). These young people are usually employed in low-skilled jobs or unemployed, with few opportunities for advancement in their career. Most do not have necessarily access to a computer (with an Internet connection), but most have a mobile phone (80% according to the Foyer federation, cited in Mitchell and Doherty, 2003). Disadvantaged young adults lack basic skills (poor literacy/numeracy): for example according to the Moser report: 20% of UK adults lack even the most basic of literacy and numeracy skills (Moser, 1999). According to Mitchell and Doherty (2003), causes for dropping out of the educational system are that young disadvantaged adults are disillusioned with or just not interested in taking part in traditional education and training, they are also not always granted access to education facilities. Consequences are social exclusion and even homelessness (Moser, 1999). Exclusion has an impact on life chances in respect with personal income, social benefits, family life, health, housing, crime and community (Mitchell and Doherty, 2003)

The project addresses the basic numeracy and literacy skills needed by young adults. From a pedagogical point of view, the m-learning project sees learning as a collaborative activity, where learners contribute and share knowledge, not only information. This in turn implies that the technological artifacts must be designed in order to support the pedagogical objectives: in practice, this means identifying and developing technology solutions that support interactivity, networking and collaboration. In the project, a microportal (mPortal) was developed, consisting of web pages giving access to the following materials, activities and functionality: learning materials, page building tools (pages including text, audio, pictures, movies...), collaborative activities tool, peer to peer communication tools, a learning management system, help guides, web links (Attewell, 2005a, Colley and Stead, 2003).

Attewell et al. (2003) surveyed 746 young adults (16 to 24 years old) about their views on the use of phones to improve their numeracy and literacy skills. 49% of the respondents would use phone-based games to improve their reading skills, and 44% for mathematics. Within the m-learning project, m-portal was found to be a “liberating structure that can promote attitudinal change and qualities such as: adaptability, self-confidence, curiosity, creativity” (Barlex, 2003 in Mitchell and Doherty, 2003).

Student retention is an issue that needs to be discussed in the context of social inclusion. Some studies show that retention in distance learning is low compared to traditional education (Pierrakeas et al., 2004). Factors such as lack of time/time management issues, poor guidance/feedback, course load and high expectations are often the cause for students to withdraw from their courses. Fozdar and Kumar (2007; Fozdar et al., 2006) conducted a survey (n=67) in order to study students’ perceptions of the effectiveness of mobile learning in relation to retention at the Indira Gandhi National Open University in India. Their results indicate that mobile learning can be an effective method of learning as it can (i) provide immediate support, (ii) bring new opportunities of learning, (iii) provide learning anytime, anywhere, (iv) improve communication between teacher and student, and (v) provide quicker feedback. Their study also indicates that mobile learning can be effective for providing short information (feedback on assignment, important dates, grades and results). The same study indicates that SMS is the favoured mode of

communication, rather than mobile Web-browsing. Finally, the authors concluded that mobile learning could help overcome some of the issues in student retention (e.g. absence of interaction with fellow students).

Mobile learning is an opportunity to overcome some of the obstacles and problems related to information delivery, and therefore to include learners belonging to such groups as “mature-aged, gifted, international and remote learners, as well as those with cognitive, behavioral, or social problems, or with physical or mental difficulties” (Cobcroft et al, 2006, cited in Pozzi, 2007). According to Attewell (2005b), mobile learning addresses some of the issues relevant to inclusion and student retention, i.e. mitigate resistance using IT, engage reluctant learners, enable learners to remain more focused for longer periods and promote self-esteem and self-confidence.

## **Forms of capital and e-inclusion**

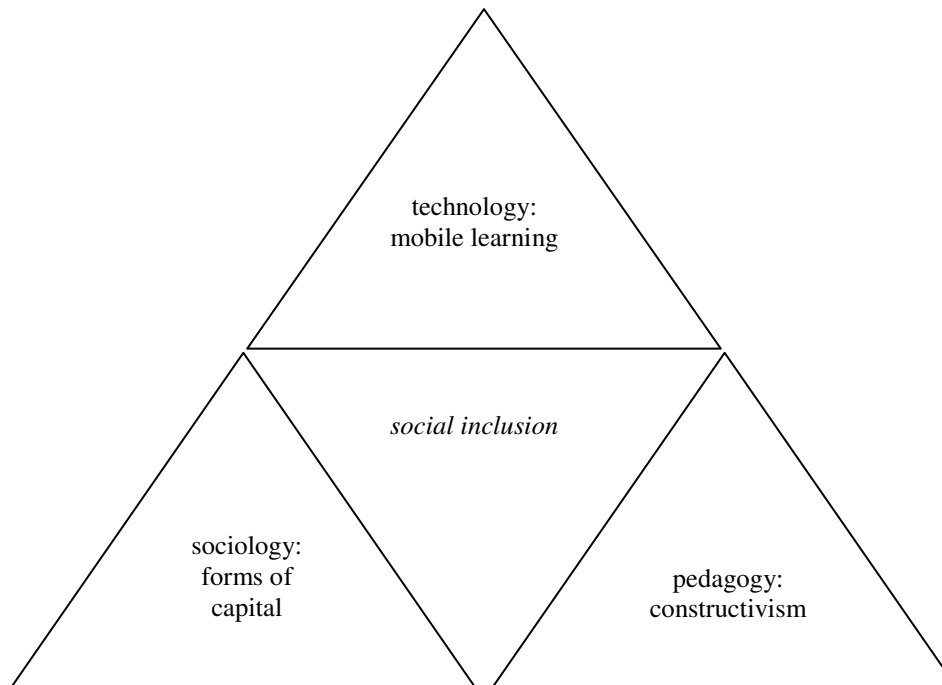
The statistics gives one side of the story but an in-depth empirical study based on observations, questionnaires and interviews will be needed to get a more detailed picture of the matter. Pierre Bourdieu’s empirical and theoretical work on the sociology of education will form the basis for further research on e-inclusion in Finland. Bourdieu’s “The Forms of Capital” (1985) seems promising in particular. According to Bourdieu, economists systematically ignore the unequal and disguised accumulation of (human) capital in modern society. If the sphere of economic exchange alone is – as it is by mainstream economists – seen as the playing field of egotistic interest and profit maximization, the spheres of social and cultural life are seen as pure from the calculation of interests and profits. It would seem to follow that all people will get an equal chance to “make it” in society if only the playing field of economic exchange – for instance by giving money or access to technology – would be leveled. However, what many people do not have enough is something that Bourdieu calls social and cultural capital. By social and cultural capital Bourdieu means the accumulated knowledge, skills, experience, practices, (social) connections, and so forth that an individual has acquired or inherited and whose nature as a form of capital is covered from sight. The challenge for our R&D project is to be able to level the playing field also in terms of social and cultural capital, and in order even to begin to do so we have to be able to recognize these disguised forms of capital. Bourdieu’s numerous empirical studies give an insight into how the three forms of capital could be applied to the problems of e-inclusion in Finland.

Portes (1998) points out the importance of paying heed to negative externalisations of social capital. Social capital enables not only positive consequences but enables also barring outsiders from the social network, restricting individuals’ freedoms, burdening group members with excessive demands and hindering social mobility. These potential negative consequences, too, have to be taken into account.

## **Summing up the theoretical framework**

Our project will be informed by three theoretical approaches drawn from three different scientific disciplines: pedagogy, technology and sociology. This triad is meant to guarantee that the research will satisfactorily cover the most important aspects of the phenomenon under study and the technological tools and systems under development. Mobile learning as a means of supporting social inclusion requires outspoken guidelines on what is learning and what counts as good learning outcomes. This is where constructivist educational theory comes in. Secondly, the technological requirements have to be built upon an educated and tested understanding of the special conditions of technological support for mobile learners using mobile devices. Here we rely on Patokorpi et al.’s (2007) conceptual scheme of mobile learning and mobile learning objects, which in terms of pedagogy is appropriately based on constructivism. Bourdieu’s writings on social and cultural capital contain perhaps the most sophisticated analysis of the use of social relationships as a way of appropriating various (also economic) resources. The concepts of social and cultural capital help us focus on the informal aspects of learning, collaboration and technology use that traditional studies on learning and technology usually miss. The figure 1 below depicts how the three conceptual elements are combined to form a coherent method.





**Figure 1. A Framework for Mobile Learning and E-inclusion**

## **Dropping out of the Finnish education system**

Figure 2 depicts the Finnish education system. In Finland the general attitude of Finnish students is to want to continue studying after comprehensive school; only 2.8% of 15-year olds do not want to pursue further studies (OECD preliminary statistics 2007, in Ministry of Education, 2007). According to the Finnish Ministry of Education report (2007, p. 2), in 2005, 63 417 students obtained the comprehensive school leaving certificate, whereas only 0.56% failed to complete the comprehensive school. Approximately 3000 young people per year are left outside of the public education system in Finland. These young people will start working or attend folk high school or have a sabbatical, etc. Students continuing their studies in the upper secondary school have a high likelihood of finishing their studies; approximately 90% of all upper secondary school students are likely to graduate. The situation in vocational education is somewhat worse; approximately 70% of all vocational education students are likely to receive their qualifications. In other words, more than every fourth vocational education student will discontinue their studies (Ministry of Education, 2007).

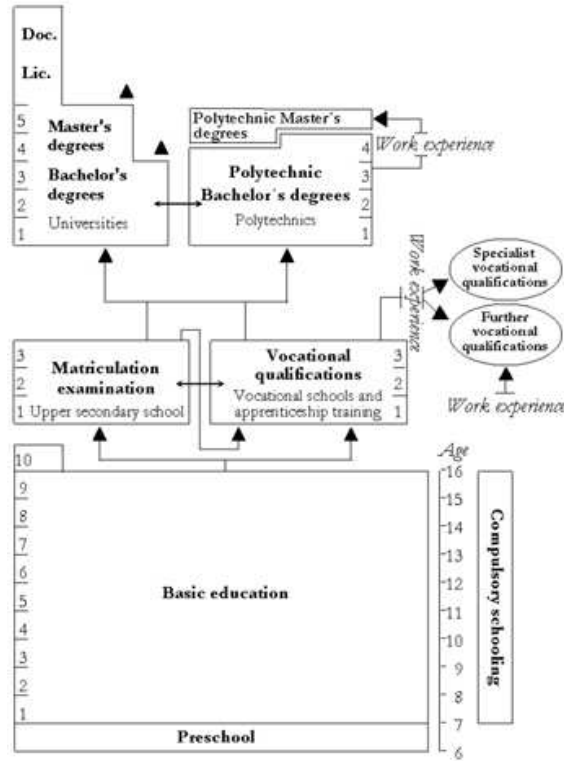


Figure 2. The Finnish education system (source: <http://www.edu.fi/english/SubPage.asp?path=500,4699>)

According to the statistics, presenting the main activities of 15-24-year olds (Statistics Finland, 2007a), about 20 000 people (3.11%) were not registered as student, employed, unemployed, pensioner or at home. 14 301 (2.18%) of these young people did not take a post-comprehensive examination. A relatively large part of these young people (15%) appeared to have a foreign ethnic background. According to Statistics Finland (2007b), 93% of completers of 9th grade of comprehensive school and 42% of passers of matriculation examination in 2006 continued their studies in the same year. Vocational education has grown more popular in recent years while upper secondary general school education has lost some of its popularity. 6.8% of the completers of comprehensive school did not continue studying. The proportion of those who remained outside further studies grew by two percentage points from the year before. At the same time, it can be observed that discontinuation of studies has increased in polytechnic and university education in the last few years, whereas it has constantly decreased in vocational education and remained somewhat the same in upper secondary general education (Statistics Finland, 2008). It also appears that a large part of students, who discontinued their studies (20%), did not quite completely quit the formal education system, but actually changed to another sector of education.

In Finland, the phenomenon of study discontinuation is less important compared to the average international level. Statistically, Finland is below major EU countries (France and Germany). In Italy, the number of drop-outs reaches up to three times the respective figures for Finland (Ministry of Education, 2007).

Reasons for dropping out range from psychological or health problems, motivational problems, poor grades, problems in studies and study techniques, starting to work, wrong preconceptions and choice of the subject of study, poor guidance, personal problems in the sphere of one's private life, and so forth. Since the phenomenon is complex, and its causes often intertwined, available statistics do not give a detailed picture of the reasons for dropping out. Tolonen (2001) has charted some key risk factors for students discontinuing their studies:

- Relationship with teacher(s) somewhat negative
- Problems at home, background factors
- Risk behaviour, alienation from school

- Social relationships do not support studying
- Poor success, doesn't believe in oneself to succeed
- Lack of motivation, uncomfortable at school

In a report for the Finnish National Board of Education, Päiväsalo (2003) emphasizes that the risk factors and problems that 15-17 year-old drop-outs face in their lives can vary greatly; and therefore the solutions to these problems should be developed and customized accordingly, by taking into account the situation of the learner. The drop-outs' needs can be divided into three categories:

- temporary need for support: including help in joining back school or vocational training with support from the schools and/or unemployment office.
- interim need for support: including help in making choices regarding future career/training options with support from the schools, unemployment office and/or other competent authorities.
- continuous need for support: including help in life management, solving social and/or health problems, making choices regarding one's own future with support of social authorities, families, schools, unemployment office, etc.

The Ministry of Education (2007) has outlined a set of actions to reduce the number of drop-outs in Finland. We present below a few of these actions: these can be supported by mobile technologies.

- One of the reasons for dropping out is a potential mismatch between the offer (education programmes proposed) and the demand (the education that people actually want). As a result, people start their studies in an education programme which does not match their needs and expectations. These people are at risk of discontinuing their studies as they lack motivation to complete their studies. The education system should react in such a way that it accommodates the needs of learners with the actual offering.
- It happens that students apply to and join an education programme without getting a prior understanding of its content and demands. As reality sets in after a few months, students may realize that they do not fit in or are not interested in the subject of study. Information services to inform about the content of given education programmes should be developed, especially with a focus on completeness, accessibility, and freshness of information given to students.
- During the course of their studies, students may run into unforeseeable problems. In order to overcome these problems, and still make continuation of studies possible, student services and counselling activities should be developed. Special attention should be given to international students who may not be as easily reachable through well-known channels and are at risk of being more easily marginalized.
- Students have bonds to the world outside the formal education system (family, friends, work): when something happens in these spheres (for example, a cut in study allowance leading to the student taking a part-time job), flexibility of the educational organisation and in study arrangements is needed, so that students can complete their studies despite changes in the study environment.
- Many students work in parallel as a means to finance their studies. Others get full-time employment even before finishing their studies. Flexibility in order to support students who work at the same time as they study is needed. This can be accomplished by introducing new forms of distance education and multiple forms of teaching and studying.
- Students may lack interest in finishing their studies if they do not experience direct relevance of teaching content with their own reality. This happens often to students who have been on the work market for a longer time. In order to counter discontinuation of studies, education programmes should anchor studies in real life (in particular work life) through various forms of projects, internships, and so forth.

## **Implications for research and practice**

### ***Research implications – a research agenda for mobile learning and e-inclusion***

As mentioned in the introduction, the development of the theoretical framework in this paper is the basis for an R&D project aiming to help school drop-outs and young disadvantaged adults. The project is currently conducted in Finland and the Trento region in Italy. In this section, we present the research agenda for mobile learning and e-inclusion, as we have outlined it in our research project. The objective of the empirical part is to study the perceptions of several focus groups on the use of mobile technologies and the application of mobile learning. Application of mobile learning has been poised in the project to be part of the solution to social exclusion.

The main goal of the study is to understand the use of mobile technologies in groups of young disadvantaged adults. Such a study has the potential to provide relevant information about the kinds of services that can be developed in order to improve social inclusion. It will also provide information about possible barriers to mobile technology adoption within informal learning. A list of themes has been identified:

- Ownership and access to a mobile
- Expertise or lack thereof in the use of mobile phones
- Mobile phone usage
- Reasons for using or not using a mobile
- Ideas about services or functions required
- Experiences of and attitudes towards government and eGovernment services
- Experiences of and attitudes towards potential mGovernment services and content
- Attitudes towards content and services via a mobile
- Experiences of and attitudes towards technology enhanced collaboration and education
- Experiences of and attitudes towards formal and informal education

The empirical part starts with a questionnaire. Personal interviews informed by the questionnaire will follow. The results will be analysed through a qualitative analysis in accordance with the conceptual framework presented in this paper. A comparative analysis between the focus groups and the countries involved will be conducted. On the basis of the analysis, we will presumably be able to identify the social, economical, educational and technological factors that may hinder or favor e-inclusion for our focus groups. Understanding these factors will help us design working solutions for e-inclusion, including not only the development of technological artifacts – mobile technologies – but also a sound pedagogical approach, supported by the utilization of different forms of capital.

### ***Implications for practice***

A word about the potential, wider social implications of this research project. The Finnish education system is still very much driven by an egalitarian ethos. Instead of having schools for exceptionally talented pupils the system is focused on supporting poorly performing pupils. Nobody is supposed to be left behind. Another focus group coming down the pipeline of our research project is immigrants. For instance, language skills can be seen as cultural capital. This capital might be turned into economic as well as social capital, connections, that may benefit not only the individuals themselves but the whole society.

## **Conclusion**

Modern day society sets many demands on its citizens in terms of numeracy, literacy, and ICT-related skills. As society moves further towards a knowledge-based society, citizens are required to master the above-mentioned skills in order to cope with everyday life, and be able to participate in the civic society and democratic decision-making. Disadvantaged young adults, or “dropouts”, are not necessarily versed with necessary skills, have no access (or refuse access) to the education resources (guidance and support, materials, and ICT resources), often lack peer support, and reject the formal education system. For these reasons, they represent a group of citizens who are at risk of being marginalized: finding functioning and cost-effective ways to reach, support and include these people is an important issue.

Mobile technologies have become commonplace during the past few years. The large penetration rate of mobile technologies across different customer segments indicates that a large part of the population has access to one digital device (the same statement is not necessarily true for desktop and laptop computers). The term “Mobile learning” has been coined to define some form of learning through mobile devices: sometimes defined as an “extension to e-learning”, sometimes as “learning through mobile devices” or “learning in a specific context with mobile technology support”, mobile learning can be found in many forms. We define mLearning as “*situated, collaborative and guided teaching, studying and learning, supported by mobile devices that utilise symmetric mobile communications channels by which the learners and the facilitator may use and mould specially designed learning objects for work, hobby or citizenship -related purposes or as an aid to traditional education,*” thereby emphasizing the importance of authenticity of learning situations, communication, and peer support in the course of learner’s everyday life.

Mobile learning is one solution to the problems of social inclusion. Potentially any citizen has access to a mobile phone. Citizens also know, to an extent, how to use their mobile phones; therefore the barriers to technology-mediated education of some kind are much lower than for example with computers. We are not politicians, and hence not in power to equalize the hereditary starting-points of individual human capital. However, there is something researchers, teachers and designers can do to level the playing field for all citizens. Better (perhaps user-centered) design, more and better opportunities for informal (outside the conventional education system) learning, enabling peer-to-peer communication and collaboration, improved learning content, favoring open source software, enabling end-user (re)programming, and providing easier access to both technology and content. This is, we think, in line with Bourdieu’s views of lowering the threshold of appropriating cultural and social capital (power) by individuals who are being marginalized through the logic of economic power and its (dis)guises.

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