

Alternative learning arenas – pedagogical challenges to mobile learning technology in education

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Abstract

ICT-implementation in education has mostly been aimed at enhancing learning in formal arenas – the classroom. However, accepting that learning does not only forego in the formal learning arenas, it is proposed that mobile technology can be used as a bridge between the formal and informal learning arenas. The question is whether the bridge between school and other arenas open or closed – is there a barrier? The paper asks what strategies/ changes/challenges have to be in place for the school to access and utilize learning arenas which are alternative to the formal learning arena?

1. Introduction

Koschmann [1] asks a question which he views as fundamental, namely:

“...if we had the power to change instructional practice through the introduction of new technologies, what sorts of changes would we really like to see?”

A retrospective look points towards a mobile development of technology: from desktop telephones to mobile telephones, from desktop computers to portable (“laptop”) to mobile units. During the last few years mobile technology has become integrated in day-to-day activities. Hand held computers appear to be part of a general movement towards mobile technology. Mobile telephony studies show that the personalised, mobile, accessible and social technology is widespread among children [2]. Figures for 1999, for example, show that 68% of fifteen-year olds owned a mobile telephone, while almost 40% of thirteen year olds and 82% of twenty-year olds possessed a mobile telephone in Norway [3]. In Norway one can say that mobile telephony is approaching near ubiquity.

Dillemans [4] points out that as new technologies become more and more embedded in our society, the

educational system also will be affected. The question is then what needs to be in place for the educational system to move away from the desktop arena and towards accessing, utilizing and tapping into mobile, alternative learning arenas. Soloway [5] points out that as long as computers are not ready-at-hand, they will not be used in a routine, day-in, day-out fashion and that there will be little or no impact on basic education. Personal experience as a schoolteacher has shown that mobile telephones have for example proved to be popular in what is often described as the *social* arena at school. However, the boundaries between the social arena and the formal learning arena [6], the classroom, diminish as students also take mobile telephones into use in classrooms. Drawing from personal experience, the classroom culture is bound to change, as there arises a conflict between the traditional classroom culture and the restraints it puts on social interaction and the technological ‘intruder’. Following this reasoning, the implementation of handheld technologies such as PDAs [7] presents challenges both to the school as an institution and to the classroom culture. PDAs in education appear to have a twofold use – that which pertains to the formal, classroom learning arena and the rest – the informal, alternative learning arena.

2. Schools and Education

It has often been argued that the fundamental task of the school is education and that education ideally provides perspectives and tools for participating in society, for understanding society and for shaping society and it should produce individuals who have a sound working knowledge base, who can use that knowledge when called upon to do so, and who are willing and able to continue the learning process after schooling [8].

Schools have often been criticised at having traditionally been slow to take on the technological

challenge while information and communications technology has infiltrated daily life, work, leisure and family [9]. It has been argued that schools are an isolated unit and that computer technology can provide students with a tool for applying concepts in a variety of contexts, thereby breaking the artificial isolation of school subject matter from real-world situations (Rochelle et al [10]). While this view has been viewed with some scepticism [11], despite the criticism of ICT in education it appears that ICT has pushed education to re-think its mission [12].

In a study of secondary schools and upper secondary in Norway, initiated after the 1994 and 1997 reforms, secondary school students' experience of what goes on within the classroom has been described as characterised by boredom, that it is often regarded as meaningless, not inspiring and that the students want to go "out of the classroom and into the world" [13]. Tyack and Cuban compare schooling to "grammar" which is has remained "remarkable stable over the decades" [14]. The example of the nineteenth century teacher who can still feel at home in the classrooms of the twenty-first century is often quoted as an example. However the counter argument is that this same teacher would be shocked by what is expected of today's students, not only in the amount of knowledge that they are expected to amass but in how it should be applied (Rochelle et al) [15]. Should then, as Gustafson [16] suggests, education be made available on an anything, anytime, anywhere basis.

3. Learning2go

One of the critiques towards ICT in education is that it has been segregated from aspects of children's lives, relegated to the "computer labs" or "computer rooms" making PCs (Personal Computers) anything but personal [17]. It has however been argued that flexible access to technology will provide tools to help children construct knowledge throughout their daily activities, making technology an integral part of daily learning [18]. Will the educational system also be moving away from the desktop arena and towards a mobile, and as such alternative learning arena – an anywhere, anytime education? The question is then: what role can mobile and personal media have in an anywhere, anytime education? Which begs the question as to whether there is place in the school for what the students learn in the alternative learning arenas.

In a set of scenarios by Soloway et al [19] the starting point is the child learning something at school, and something outside makes the child link the two together and 'inquire' further into the subject. The scenarios look at possible uses of mobile, handheld computers in different learning contexts, from a child who decides that she wants to measure the relationship between the amount of noise her school bus makes and acceleration, to a couple of friends wanting to find out what the optimal conditions for growing flowers in their garden are. These scenarios point in the direction that

learning arena need not necessarily be enclosed within the school premises.

The OECD report "Learning to Change: ICT in Schools" [20] illustrates that ICT has established a new complementarity between formal learning in school and informal learning outside. Mifsud [21] suggests that one of the roles of mobile and personal media could be as "bridges" between the various arenas. This can be related to the challenges that school as an institution and the culture of the classroom face. While a "bridge" may allow a flow of information, communication and access, if there is a barrier at the one end of the bridge, the access information and communication flows stops. This is a challenge which the school has to take up. Drawing on own experiences in school to exemplify, I would say that the introduction of handheld technologies presents a challenge to the traditional classroom culture. For example, teacher-student interaction is often punctuated by a raised hand and one can say that the teacher has a monopoly on social interaction. Student-student interaction is often expected to be limited to schoolwork. As such it appears that for example mobile telephones challenge this power that the teacher has over communication – easily seen in the students' sending of messages to each other, across the physical boundaries of the classroom, and without the "permission" of the teacher. The mobile technology thus assumes the role of "intruder" - the 'grammar' of school is challenged. Mobile telephones are in many Norwegian schools forbidden in the classroom. Personal field observations in a classroom where all the students (and teachers) were equipped with a laptop show that the monopoly over communication and knowledge is challenged by technology. Students interacted freely through chat rooms, instant messaging and had the opportunity to access knowledge from other sources than the ones stipulated by the teacher. One can also look at the worries that some teachers have expressed at PDA implementation in their classrooms: PDAs might be used for things other than school related work, such as playing games, pranks, emailing friends in and out of school or cheating on tests [22]. One can relate these worries to the challenges that schools face when implementing PDAs – challenges to timetable, curriculum, assessment, testing... the backbone of the structure, and "grammar", of school. Consequently, one can argue whether the existing structure changes and in which way – and whether alternative learning arenas, and "learning2go", have a place in the existing structure, and which strategies have to be in place in order for changes to be effected.

The arguments for handhelds in education are many. While the size of mobile computers or PDAs can be seen as its strength, it also appears to be its weakness. At the moment PDAs, have relatively limited computational power and the screens small. However, PDAs have the advantage of being handy size-wise, relatively cheap, mobile and the latest wireless technologies point to a totally wireless enable

environment and accessible technology. With a “HotSync” plug in (connecting the handheld device to a computer for synchronising purposes), students can upload data files. Attach a probe and the possibilities in science subjects appear to be many. Imagiprobe [23] has developed sensors which can be attached to the handheld device and which can for example, measure the PH value of water, where the values are directly entered into the PDA. Students can then beam (exchange of information via an infrared port) the values over to each other. PDAs can be taken outside, to playgrounds, walks, malls... wherever the “students” want to be.

Inkpen [24] points out that handheld computer technology for children is not a new idea – referring to the entertainment industry and hi-tech toys such as Sega Gameboy™, Nintendo™, Tamagotchi™. She further points out that one of the main advantages of these handheld electronic devices is their ease of integration into a child’s world and that the products themselves become a part of the children’s culture (Inkpen *ibid*). They are personal, they are accessible and flexible and allow for *collaborative* solutions. Collaborative learning has been described as a creative process where one exchanges ideas, expands on them, changes, modifies or discards them together with peers [25]. In collaborative learning the emphasis is on working in ‘collegial’ roles. It has been argued that participants in a collaborative learning environment can learn from each other in as much as from the instructor or course material, and learning is not a static subject matter, but the process of participating itself [26]. A quick look at many of the programs being developed for PDAs appear to build on the principles of collaboration. The Center for Highly Interactive Computing in Education at the University of Michigan, HiCE (<http://www.hice.org>) can be used as an example. Hi-CE has developed, and is researching, a collection of applications for the classroom - “the Cool Dozen” - based on Palm OS, along with instructions for each. One of the programs that Hi-CE is working on is for example PiCoMap, a concept-mapping programme. Students working on a topic can first work on their own, making out their own concept map. The concept map can then be beamed (exchange of information through an infrared port). The programmes also include an offline browser (Fling-It) [27], a scrapbook maker (Go ‘n tell) that can be used together with a camera to create a story illustrated with pictures among other programmes. Imagiprobe also appears to build on the lines of collaborative learning. However, as Resnick [28] points out, the dominant form of learning, performance and judging in school is individual – success or failure at tasks are independent of what other students do, despite group activities. Wenger [29] also points out that schools/classrooms are (institutions) based on the assumption that learning is an *individual* process and that it has a beginning and an end, that it is best separated from the rest of our activities and is the result of teaching. Yet the programs mentioned above

appear to build on collaboration-principles, which begs the question – what changes have to be in place?

Yet another challenge is knowledge of how to *utilise* mobile technologies in education. PDAs have begun to make their appearance in Norwegian schools. The programs appear to, so far, have been limited to the administrative side of teaching, with a program, Classe [30], that enables teachers to take attendance, grades etc on a pocket PC [31]. In a preliminary evaluation of the program Classe as an administrative aid for teachers in upper secondary schools [32], there appeared to be indications that the teachers, while seeing the potential in the PDA, were not sure of how to actually use it in a learning situation.

3.1 Mobile technology in education

Several research centres in the United States and Canada (for example Stanford Research Institute (SRI) and Simon Fraser University among others) are now focusing on handheld devices in education, and also trying to learn from the past mistakes of ICT implementation into schools. Critiques have for example been based on the grounds that the rush for software comes after the buying of the hardware [33]. SRI, together with the Center for Technology Learning and Palm inc awarded a \$2.3 million grant to schools and research hubs in order to increase activity on the PDA front and have also established an idea bank for innovative use of PDAs in education, the aim of which is to research and evaluate innovative uses of handheld computers in education. The Center for Highly Interactive Computing in Education at the University of Michigan is currently working with the Detroit Public Schools and the Union City Schools in Michigan to integrate Palm handheld computers in the classrooms. In this project they are investigating two models of student use of Palm handhelds: the “personal computer” model, where each student is assigned a Palm computer to take home; and the “class set” model, where teachers have a class set of Palms that teachers use for specific curricular activities.

An example of PDA integration is the Consolidated High School District 230 [34], in the Chicago area (US), has implemented handhelds in three of their schools. Their web-page, while giving an overview to whoever has an interest in knowing what the school is doing (by which I would usually understand prospective students, students or either’s parents/caretakers), also points out that their PDA project can be termed as a success (they do not define what success is) depending on the teacher – if the teacher is keen on the project, then the project is successful.

4. Closing reflections

Building further on Koschmann’s question quoted at the beginning of this paper - what kind of changes in education would we like to see, if we had the power to make these changes? Mobile computers offer new

possibilities, possibilities of tapping into alternative learning arenas, but whether these are realised as an enhancement of that which is already there, such as administrative roll taking programs, or to the exclusion of other routines is still a question. Mobile learning technologies present a challenge to the school – a challenge to *access* and *utilise* alternative learning arenas.

Studies into PDAs might eventually show results similar to those in mobile telephony, and applied to education. Can mobile computers have a role in bridging different learning arenas together? Or will the intruder role dominate? Can the “outside” be taken in and the “inside” taken out? There also appears to be the need for studies into strategies needed in order to see these changes through, and how the institutions approach the changes, whether, for example, these changes are realised through the already existing structure. Strategies for implementation – that teachers need to be familiar with the technology itself, and to be able to experiment with it before using it in a learning situation. Research in mobility needs to focus on these questions How can anytime, anywhere learning be achieved? Is there room for an “anytime, anywhere learning” in the educational structure? There is the need for more research into the contribution of different learning arenas to the school and classroom arena and vice versa.

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[5]Soloway, E et al (April 2001) *Learning in the Palm of your Hand*
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[6] For the purpose of this paper, I define *arena* as a sphere of activity and *environment* as surroundings in which a person

operates, and as such I take as my starting point an environment as that which can stimulate an arena (Oxford Concise English Dictionary 1999 edition). The informal learning arena is defined as an alternative to the formal learning arena, which refers to the classroom. However, as I argue later in this paper, the classroom arena is only one of several learning arenas, and the social arena is thus also defined as a learning arena.

[7] Mobile computers are one of mobile digital media. They are often referred to as handhelds, Personal Digital Assistants (PDAs) or Pocket PCs (PPCs). For the purpose of this paper I will not differentiate between these three or the terms mobile computer or mobile digital media.

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