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USING MOBILE DEVICES FOR LEARNING IN INFORMAL SETTINGS: IS IT MOTIVATING?

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ABSTRACT

Informal evidence supports an argument that using mobile devices for informal learning can be motivating. This paper will consider evidence from the literature in one particular area of mobile learning – informal science learning and also present a brief study of how people use mobile devices in their informal learning. Finally it will briefly review the motivation literature to consider this issue further.

KEYWORDS

Informal science learning; motivation; mobile devices

1. INTRODUCTION

It is often suggested that learning activities involving mobile devices are motivating. For example Naismith et. al. (2005) describe examples of ‘participatory simulations’ with mobile devices, such Savannah (Facer et. al. 2004) as “compelling”. The results from the Savannah project provide more direct evidence of the children’s identification with the game scenario and their immersion in the game (Facer et al. op. cit.), although we should be cautious about such findings in this context where learners are engaged in relatively short term trials with novel uses of technology as some of the motivational benefits might not hold when there is more sustained use over time and the technology ceases to be novel. At the same time, in non-learning contexts, mobile devices have become almost ubiquitous and are particularly popular with young people: so learners are motivated to use mobile devices - in spite of usability issues. However, relatively few studies in the mobile learning literature specifically focus on motivation. In this paper we begin to explore the relationship between using mobile devices for learning and motivation. We focus on informal learning settings and mainly on science learning. The structure of the rest of the paper is as follows: in this we review the argument that using mobile devices for informal learning is likely to be motivating. Section 2 briefly reviews the literature, *with respect to motivation*, in one particular area – informal science learning and studies of mobile learning. Section 3 considers a case study of using mobile devices for informal learning and the final section reviews the motivation literature and discusses the implications for mobile learning.

Agreeing on what is meant by informal learning is not straightforward and remains the focus of much debate (see, e.g. Livingstone, 2001 and Vavoula, 2004). There is no straightforward distinction between informal and formal learning and many researchers propose either a continuum between the two, or matrices with a number of dimensions, although not surprisingly the particular features in the matrices differ. One important factor is whether the goals of the activity are under the learner’s control (see Vavoula, 2004) and some researchers emphasise this aspect and also use different terminology. Candy’s research in this area, for example, refers to ‘self-directed’ rather than informal learning and also focuses on the use of digital resources, particularly on-line learning in this context (Candy, 2004). In this paper, by *informal learning* we refer to learning that is outside institutional contexts. So what is the argument for why using mobile devices in such settings may be motivating?

Firstly, learners often find their informal learning activities more motivating than learning in formal settings such as schools where there is much less **freedom** to define tasks and relate activities to their own goals. There is evidence that people engage in a vast amount of informal learning (Vavoula 2004, Clough 2005) and by the very nature of informal learning, there is a strong relationship to learners' goals and interests which means that intrinsic motivation is likely to be high.

Secondly, mobile devices seem to give their users a very strong sense of control and **ownership** which has been highlighted in research on motivation as a key motivational factor. A recent study on the use of Tablet PCs in schools (Twining, 2005) suggested that ownership was also important in this more formal context.

Thirdly, mobile devices also allow **communication** between learners thus enabling collaborative activities. Again there is some evidence that working with other people, given the right conditions is in itself motivating (see, e.g. Crook, 2000).

Fourth, mobile devices are used by many people, especially young people, for entertainment, so the excitement engendered by this context may carry over to the device – mobiles become identified as “**fun**” devices.

Fifth, mobile devices enable learners to locate resources and information in the **context** where they are needed and used, including ‘in the field’ and to share this information with others. For example, the amateur birdwatcher can access websites from their mobile device, which provide identification guides (including audio and video) to support them in identifying birds at the point they need this information.

Last but not least, portability means that mobile devices can provide **continuity** between different settings so information or resources that have been captured in one context should be easily transported to another. Learners can therefore use these devices to plan their informal learning projects over time - suiting the episodic nature of much informal learning which is carried out in small, distributed chunks (Vavoula 2004). These features suggest that using mobiles in informal settings is potentially highly motivating. In the next section we consider the literature on learning science with mobile devices in informal settings with particular respect to motivation.

2. LITERATURE ON INFORMAL SCIENCE LEARNING AND MOBILE LEARNING

There is relatively little literature on the intersection of science, mobile and informal learning, although each area is itself well represented. In science learning in schools, there has been a shift of approach away from acquiring conceptual information and from learning science as an apprenticeship to becoming a scientist to focus on the scientific process and on science in everyday life and an emphasis on conducting science in relevant contexts – ranging from laboratories to studying wildlife in its natural environment (Scanlon, et. al., 2005).

There is therefore a reasonable literature on science field studies, and on science in settings less formal than schools – e.g. science museums. Both these settings are less formal than the classroom – but still at the formal end of informal learning. Scanlon and colleagues discuss how mobility and portability could change science education and allow educators to address two contemporary concerns in science education: (i) enhancing science communication and (ii) enabling collaboration in practical science activities/fieldwork. The first area includes communicating science to the public and there is work here on learning from museums and from science museums in particular e.g. the Exploratorium, (Fleck et. al., 2002) which show this potential. In the second area, an important issue is whether students are set authentic tasks that reflect the real work of scientists, and here particular possibilities are opened up by using mobile devices.

Collaborative working is a key part of science education and handhelds offer learners a natural mobile collaboration environment combined with face-to-face interactions (see, e.g. Staudt and Hsi, 1999). Whilst

learners in these studies often *appear* to find such uses motivating, there has been little investigation of affective factors including motivation so there is little firm evidence. In the next section we present a case study in order to illustrate the argument that mobile technologies may be motivating in this context further.

3. CASE STUDY: INFORMAL MOBILE LEARNING AND BIRD WATCHING USING TABLET PCS

One rough indicator of motivation is the extent to which learners make use of mobile devices in support of their own learning - i.e. in contexts where there is not external pressure (such as course completion or assessment). Clough (2005) surveyed experienced mobile device users about their use of mobile devices to support their own informal learning. Participants in internet forums about learning with and using mobile devices took part in a web-based survey, and from 204 responses, 108 respondents gave details of how they used PDAs and Smartphones for informal learning. The level of use does indeed suggest that learners are motivated to use their mobile devices for informal learning and the descriptions provided demonstrated an enthusiasm for integrating mobile devices into the learning process with some participants going to considerable lengths to adapt the functions provided to suit their learning needs. Given the freedom to determine their own goals and tasks, they explored the range of mobile resources available to them for diverse activities:

I have a copy of the Havamal (Viking poem, beliefs), which I read occasionally. ... I use it to download papers that I may be interested in from specialist apps ...and from RSS feeds. This is automated every morning and I check it all on the train to work.

One participant devised an ingenious way to combine the notes application and the voice-recording in order to support his language learning.

I make flashcards using the notes application. I first write out the question or "front side of the flashcard" on the note. Then I make a recording of the "back side of the flashcard" and put a link to the recording right next to the first part. Then, you look at the first part, say your answer, then check it with the voice recorded correct answer.

A follow up small scale study investigated the use of wireless enabled Tablet PCs for taking part in a UK national survey – BirdWatch. Participants used Tablet PCs to participate in an hour long observation of garden birds and reported back on their experience. There is a tension between the desire to investigate informal learning and the aim that as far as possible, that investigation should not interfere with the activity. The very act of studying this activity by its nature makes it less informal and therefore many studies are less towards the informal end of an informal-formal spectrum than we might wish. In this case, the national BirdWatch activity is not entirely informal, as it is an activity organized by a bird protection charity aimed at both increasing interest in birdwatching and contributing to a national survey. In addition, some of the participants took part because they wished to participate in this study, whilst others had already planned to participate in the national activity which takes place annually.

Interviews with participants included a particular focus on motivation. It was not possible in this initial study to focus on **all** the motivational features identified in section 1. Nevertheless, the results provided some insights into how some of these features mapped onto learners' practice. The first feature, freedom. Most participants found the experience enjoyable and motivating. Interestingly the technology itself was a motivating feature for some participants who thought "it made it a lot more fun" and also acquiring identification skills in an appropriate context. Additionally, the technology allowed participants to switch between applications and thus provided not only continuity but also multi-tasking which was important for maintaining motivation when there were not many birds to be seen! Participants were not asked to collaborate, but those who did so reported high motivation..

4. MOTIVATION AND MOBILE LEARNING

There has been a long standing concern with understanding student motivation in the context of learning technologies yet still relatively little work in this area. Researchers and practitioners have also looked for relevant theories and models of motivation that can help us to understand what is motivating and one model that is widely referred to in this context is Keller's ARCS (Attention, Relevance, Confidence, and Satisfaction) model (1987), which synthesized existing psychological research on motivation. Issroff and del Soldato (1996)'s review of the literature on motivation and learning also includes control as one of the four motivational factors identified: the others are curiosity, challenge and confidence and control.

The idea of control has often been discussed in the context of learning technologies and was once very hotly debated. Keller argues that ideally learners should perceive themselves as being in control of their learning process.

Eales, Hall and Bannon (2002) distinguish between *authentic* motivation – related to a focus on the development of robust, long-term knowledge – and *inauthentic* motivation – focused on assessment and the tactics of schooling. They also note the importance of the ownership of learning and for motivation and view computer supported collaborative learning as a way of virtually 'deschooling' education by bridging educational and outside worlds. It would seem that mobile technologies could have a strong role to play in linking these different worlds.

In reviewing the motivation literature more generally, we need to consider how motivation is currently viewed. In the 60's and 70's motivation was contrasted with cognitive processes and generally studied in laboratories and it is only during the last 30 years that attention has focused on the relationship between motivation and learning. However, since the 80's research on motivation has increasingly been carried out in real contexts, signifying the recognition that learning is a situated activity. As Jarvala (2001, p4) points out:

“Through the influence of sociocultural and situated cognition theories, it has been recognized that motivation of individual learners is also influenced by social value and by the context in which the learning takes place. Motivation is no longer a separate variable or a distinct factor, which can be applied in explanations of an individual's readiness to act or learn – but it is reflective of the social and cultural environment.”

This has led to an emphasis on the situated nature of learning, which is consistent with the uses of mobile learning that we have considered here. As we noted briefly earlier, and as with informal learning *per. se.*, there is an argument for collaboration itself being motivating. Crook (2000) argues that collaboration and motivation are strongly related: collaboration is a *motivated* activity because it has a distinct, important emotional dimension - collaborative settings evoke affective responses. What is so motivating in collaboration, according to Crook is 'shared meaning': both the sense of shared histories which learners build up in collaborative activities and also that the shared history is unique to this particular group.

5. CONCLUSION

Motivation has been assumed but under researched as a factor in mobile learning. Considering the characteristics of mobile devices we have identified six factors why mobile devices may be motivating, namely: freedom, ownership, communication, fun, context, and continuity. In our research we have found that experienced users look for new ways to appropriate the devices they own for informal learning with high-level of motivation for seeking solutions to extend device capabilities with motivation from ownership, fun, context and continuity. A follow up study focusing on using tablet PCs for bird observation demonstrated that mobile devices can motivate informal learning through freedom to alter the task to include additional resources, context and fun. In addition the novelty of the technology was seen as motivating in

itself. The design of both studies showed limited use of communication, however we hope to address this through further location based experiments where sharing of data is encouraged.

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