

# Mobile Technology in Facilitating Learning Goals

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## Abstract

Mobile and wireless computing technologies have influenced how people interact with each other. For the first time, mobile technology and student lifestyle choices are converging to allow mobile learning (m-learning) to be a viable choice for delivery and execution of coursework material. This study looks at the current research on how asynchronous technology, such as discussion boards, can be enhanced by enabling students to interact with a mobile device. A synthesis of the literature is presented, analysing the issues that may impact on the success of this project and any limitations that may impact on the value of this application. This paper then discusses the advantages of enabling a discussion board with particular focus on whether enabling students to interact with a mobile device will increase the participation and success of discussion boards.

## 1. Introduction

The world we live in is increasingly fast-paced and communication is ever-present. In this world, students require the ability to learn anywhere at anytime. Mobile learning (m-learning) delivers this requirement. M-learning is emerging as a pedagogical revolution which provides students with autonomy and the mobility to learn. The mobility of education is achieved with the use of mobile devices such as personal digital assistants (PDAs), smart phones and tablet PCs. The aim of this technology is to utilise the portability which mobile devices offer, combining it with a rich interaction enabling students to learn at a level previously unattainable.

Tools used in learning that offer collaboration between students are of great interest to educators, as their effectiveness tends to be interaction-dependent and thus sensitive to limits of face-to-face accessibility among educators and students. Discussion boards can be utilised as a tool for asynchronous group collaboration among geographically dispersed participants as they offer many benefits to users. The main benefit that discussion boards offer is that they facilitate the construction of low-level learning up to and including high-level evaluative skills (Weasenforth, Meloni, and Biesenbach-Lucas, 2000). Discussion boards, characterised by long response lags, allow students to develop more articulate and critical responses (Salmon 2000). Conversely, these long response lags may also adversely affect the level of interactivity of the participants. Long delays between messages limit creativity and motivation of students to continue interacting. The speed and level of interaction within a collaborative group are therefore associated and often reliant on the technology used to facilitate the collaboration (Hill, 2001).

Online threaded discussions seem particularly well suited to mobile enhancements given that their effectiveness depends heavily on active participation and timely posting/response cycles (Hill and Roldan, 2005). Mobile technology provides a vehicle for involving threaded discussions that better emulate face-to-face discussions by enabling interaction, in device-scaled form, between the participants in real time wherever they are (Hill and Roldan, 2005). Thus, discussions are not confined to the desktop, allowing dynamic and immediate communication that can take place anywhere, taking the paradigm from 'pull', beyond 'push', to a 'reach' orientation (Hill, 2003).

## **2. Collaboration and learning**

The asynchronous discussion mechanisms, such as discussion boards, draw on group interaction to encourage collaborative learning styles. Students learn through interacting with other students to help develop and confirm their understanding of the information. The role of the teacher is to help facilitate this interaction to help students build their own knowledge. Communication between students is more transitive in nature; communication is two-way, active and dynamic, therefore knowledge is conducted rather than just received from the teacher (Pea, 1994). This type of collaborative style can be helped through the use of a computer-mediated discussion board.

Studies in this area have shown that there are two main arguments supporting collaborative learning (Benbunan-Fich & Hiltz, 2003; Cross 1998; Webb, 1982). The first argument for the use of collaboration in learning is that students, who learn within groups, be it a small group or the whole class, have less anxiety and uncertainty. Students are able to verify and cement their learning through communication with other students. This, in turn, helps improve motivation and satisfaction of students and helps the general learning process (Benbunan-Fich & Hiltz, 2003).

In addition to the above argument, collaborative learning helps students develop an active learning environment over a more passive teacher driven environment (Cross, 1998). Communication and learning is created and developed by students who bring new views and opinions and students are able to develop their own understanding through this sharing of ideas. Learning is therefore an individual responsibility and students are accountable for their own learning (Johassen, 1994; Jones & Issroff, 2005).

## **3. Traditional Discussion Board**

Computers enable easier collaboration between students, enabling them to interact without constraints of time or place. This is especially important for students who are physically distributed (Benbunan-Fich & Hiltz, 2003; Harasim, Hiltz, Teles, & Turoff, 1998).

Asynchronous online interaction such as discussion boards leads to new paradigms for learning. Students are allowed to collaborate and communicate with each other more easily than would be possible in an offline environment (Harasim, Hiltz, Teles, & Turoff, 1995). Studies have shown that students may achieve a higher level of understanding compared to more traditional methods, such as in-class discussions (Benbunan-Fich & Hiltz, 2003; Hoyt, 2000; Sheard, 2004). This may be due to the fact that students do not need to respond immediately to messages, which they would have to in a synchronous environment either online or offline. Students are able to think about the queries and even utilise the wider resources that are available online to respond with answers that are better thought out and add more value to the discussion than they would be able to if the replies were needed to be given straight away (Mason & Kaye, 1990).

Asynchronous communication also allows for an equal foundation for all students no matter if they are physically handicapped, are less dominant and tend to be introverted, or have low language ability, which may affect face-to-face or synchronous communication (Benbunan-Fich & Hiltz, 2003). Students may feel more comfortable presenting information than they would in a face-to-face situation (Swift, 2002).

Tools such as discussion boards enable additional feedback for teachers and allow them to monitor and track student's discussions (Swift, 2002). Discussions are therefore more robust and thoughtful, as students know that the discussion is recorded and teachers have a better idea of student's understanding of concepts (Swift, 2002).

One of the major issues with the use of discussion boards in learning is that often participation among the students is low. Even though access to the discussion board is available to students all the time, it is often not utilised or the quality of participation is minimal (Hoyt, 2000).

## **3. Where Mobile technology aims to fill in the gap**

The main idea behind collaboration is that it is based on interaction that is dynamic and of a high quality. Students are busy and usually have a high workload and many other commitments. For students to use a discussion board they first need to see it as a beneficial tool for the completion of their studies and it should be easy to use and not take a large amount of student's valuable time. Enabling students to interact with a mobile device allows them to communicate anytime and anywhere no matter their schedule and where they happen to be located; students are no longer tied to the desktop computer but are able to get valuable, timely information when and where they need it.

Enabling students to interact with mobile devices allows them to access messages as they are posted; the messages do not get old and students are able to keep up-to-date with the current discussion. This, therefore, helps in maintaining momentum in the discussion (Hill & Roldan, 2005). Facilitating students with the ability to check messages easily and more frequently, a mobile device eliminates the accumulation of unread messages. Students no longer need to wade through large volumes of unread messages that are not valuable because they are not relevant any more.

Giving students the facility, which enables them to interact more conveniently, should increase participation. Increased participation should then directly influence the level of learning on the discussion board (Benbunan-Fich & Hiltz, 2003; Hoyt, 2000; Sheard, 2004). Since students will be able to access posts as they are posted, this should in turn decrease the time that they take to respond and increase interaction. Having said this, the discussion board will not lose the advantage that students still have a chance to take time preparing a well thought out response that traditional discussion boards offer (Hill & Roldan, 2005).

Interaction between students can be instantaneous. Students can choose to interact immediately if they are available and willing to engage. If the timing is right a critical mass can develop sparking a lively synchronous debate (Hill, 2003). Therefore mobile devices offer the advantages of allowing communication that can be both asynchronous and synchronous.

According to Chen, Ko, Kinshuk & Lin (2005), enabling the discussion to have the flexibility to

take place synchronously in addition to asynchronously offers the following additional benefits for students: immediate feedback and increased motivation. Immediate feedback allows students to strengthen their learning by being able to immediately correct wrong or ill thought out assumptions, which are needed in group decision-making, brainstorming, and analysis. In addition, synchronous discussion motivates students to participate as there is a compulsion to be present and participate which in turn would increase students involvement in learning activities, hence resulting in better learning experiences.

The responsiveness of participants in the discussion will impact on the overall success of the discussion board. Low response will lead to a decline in use as users develop a "responsive image" (Tyler & Tang, 2003). This means that students develop an impression of the overall responsiveness of the discussion and mirror the level. A minimal level of activity eventually leads to minimal levels of postings. Students who post regularly maybe discouraged by the slow rate of participation and may be less inclined to check posts regularly; if a reply is posted quickly it may not be checked till later further impacting the level of interaction. Interaction on mobile devices should eliminate this as students will be notified of new posts to questions and they will be able to access new posts immediately with the option of also replying immediately (Hill & Rolan, 2005).

The use of mobile technology can also be used to help generate critical thinking. Intelligent agents can be used to prompt users to stimulate and enhance the discussion (Hill & Rolan, 2005). The higher activity of students along with wider participation, and decreased time between posts should better allow for a more enhanced learning experience.

#### **4. Issues with using mobile technology**

Though mobile devices offer a better learning environment, a number of limitations do affect the success of this technology. The following discusses some key limitations that relate to trying to enable asynchronous discussions to take place on a mobile device.

### **Small screen size**

One of the major advantages of mobile technology is the size of the device. To be fully portable, mobile devices have shrunk and have become ubiquitous. This advantage can often cause a problem when trying to use mobile devices in the learning context. Mobile devices are not typically designed to enable learning, bigger devices, such as PDAs are aimed at the business-orientated market and are not totally suited to supporting learning (Savill-Smiths Kant, 2003). The small screen size limits the amount of text that can be seen easily and long posts may require a high amount of scrolling. In addition, it is hard to show how messages are connected if there are a large amount of messages linked to one discussion. (Cheng & Gruen, 2003). Typically on a PDA a 95mm, 240-by-320 pixel screen is approximately one-sixth the size and one-fourth the resolution of a 380mm, 640-by-480 standard desktop monitor (Comerford, 2000). Most Web pages are designed to be displayed using desktop computers with large screens and are of a higher resolution.

Fortunately, the future looks a little brighter with the advent of mobile television. Mobile devices are being introduced with increasing functionality and bigger screens, making screen size an issue that may be resolved partly if not fully in the near future.

### **Difficult input mechanisms**

Inputting text is often slow and difficult on a mobile device, so long messages maybe discouraged (Viehland & Marshall, 2005). This may impact on the quality of discussion. Therefore, to counteract this, mobile interaction should be looked as more to enhance interaction and not to replace traditional discussion boards accessible from desktop computers.

### **Decreased storage capacity and bandwidth**

Large content can often cause problems when sending it between mobile devices (Lee, Yamada, Shimizu, Shinohara, Hada, 2005, Stone, 2004). Mobile devices often have a slower download speed, hence the discussion board will need to be designed to enable fast uploads and downloads.

### **Cost of interaction**

To view and interact with the discussion, participants will need to connect to the Internet or send text messages. It is often difficult and

expensive to access ordinary web pages. Most websites are distorted on a mobile device and multimedia is often lost. The discussion board will need to be designed with the aim that it will also be viewed using a mobile device. This maybe difficult when working with a dynamic website such as a discussion board (Shudong & Higgins, 2005). Therefore the design of a discussion board must be taken into account with an understanding that the discussion must be accessible from both a traditional desktop computer and a mobile device without limiting or impacting interaction on either device.

### **Language versions**

Currently very few mobile devices can support a wide range of languages, often limited to English and the user's mother language (Shudong & Higgins, 2005). This issue should not be critical at the moment as often discussion boards are only available and interacted in one language but if the discussion board is used in a language course this may become an issue.

### **Standardisation and compatibility**

To be truly effective, a discussion board should be able to be accessed from a wide variety of mobile devices (Lee et al, 2005).

## **Future research and conclusion**

The use of mobile devices as a means of interaction on a discussion boards offers many key advantages, but for this to be feasible the issues mentioned above need to be overcome or limited. A mobile device can offer students a rich form of interaction and not limit the students from interacting only when they are in front of a desktop computer. Students can access information and develop a social connection when they want to and how they want. Mobile devices can enhance students learning by offering them a more effective, useful learning environment.

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