

Chapter 8.22

A Proposed Tool for Mobile Collaborative Reading

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ABSTRACT

This chapter presents a tool for collaborative e-learning using handheld devices that incorporates pair communication via text and speech input. It discusses the current state of e-learning for mobiles and illustrates the lack of such tools in reading comprehension domains. It then describes the tool development as a model for interface design, communication strategies, and data manipulation across mobile platforms. It is argued that such a tool can enhance e-learning among children, due to freedom of movement and variety of input (text and speech). The design is centered on a proven paper-based collaborative learning methodology which should strengthen its effectiveness. A paper prototype test that assisted in determining optimum interface layout and confirming that speech input was preferred among children is described. The system was developed and designed using creative

strategies for interface layout and data manipulation. Lessons learned and plans for additional research are discussed.

INTRODUCTION

Collaboration is an important aspect of today's educational learning environment, and the infusion of technology has given rise to various studies in the area of computer-supported collaborative learning (CSCL), computer-supported collaborative work (CSCW), and computer-supported intentional learning environments (CSILE) (Jones, Dircknick-Holmfield, & Lindstrom, 2005; Scardamalia & Bereiter, 1996). The systems developed through these studies have been effectively implemented to produce major gains in comprehension of material in the math and science curriculum, but have yet to explore these benefits when applied

to domains which are not math and science. The investigation of how to efficiently apply emerging technology in such environments is resulting in innovations in a wide range of systems and platforms, including handheld computers and other mobile devices.

One of the disciplines that could benefit significantly from such advancements is reading comprehension. At the present, it is apparent that reading comprehension has emerged as a major problem area in American society (Vaughn, Klingner, & Bryant, 2001). It is important to note that there are several reading comprehension tools available for the desktop platform, but the problem becomes enormous when attempting to transfer such applications to the handheld platform. There are many obstacles that must be overcome, such as limited screen real estate, smaller memory capacity, smaller processing power, and limited and often more difficult input mechanisms (such as stylus and virtual keyboard). These obstacles have led developers to steer away from this handheld platform and instead focus on the more common personal computer environment. Yet, research is indicating that the handheld computer is becoming a more viable and attractive platform due to the smaller cost, portability, durability, and increasing advancements in wireless technology (Soloway & Norris, 1999). Additionally, many scientists are investigating more innovative ways to utilize this technology and make it much more readily available to children from diverse backgrounds (MIT Media Lab, 2006).

Question-answer relationships (QAR) is a very successful learning methodology for developing reading comprehension skills (Royer & Richards, 2005; Outz, 1998; Raphael, 1986). QAR has been beneficial to educational research in that QAR not only has demonstrated the ability to improve comprehension skills of student participants, but has also shown effective implementation of peer-assisted learning strategies. There has not been a

significant effort to place QAR in a computerized reading environment, and it is worth investigating whether applying QAR to a handheld learning environment would produce a more efficient reading comprehension software platform.

Thus, this chapter makes the case for collaborative reading comprehension on a mobile platform by illustrating the absence of current research in this area, describes a paper-prototype study for an interface model for collaborative reading comprehension, and then presents a handheld tool supporting collaborative reading using text and speech communication. The tool is designed using QAR as a foundation, and presents a model for development of such systems on mobile platforms. An emphasis is placed on speech input, which can further increase the robustness of user input and collaboration as a result, particularly when implemented for children.

RELATED WORK

Mobile Collaboration in Learning Environments

The explosion of mobile learning (m-learning) in educational environments is largely due to the massive influx of these portable devices in society, and more directly, in the classroom. Mobile learning takes place when users communicate wirelessly via handheld devices (phones, Personal Digital Assistants (PDAs), tablets, etc.) in the process of learning—in other words, learning that takes place with the aid of handhelds (Attewell, 2005). And, since collaboration is a natural and significant extension of a robust learning environment, it is natural to consider ways to facilitate mobile cooperation in learning activities. The mobile environment is rich with a plethora of communication tools (chat, instant messaging, shared workspaces, e-mail, and voice input/out-

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