

Mobile Collaboration for Young Children

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As the American flag waves above Fort McHenry (a 19th century battleground and birthplace of the U.S. National Anthem), children explore the fort carrying personal digital assistants (PDAs) collecting, creating, collaborating and learning about the structure, events and people associated with this historic site. These children are creating a shared story describing their collective experience as they visit the fort. One child reads out loud, recording on his mobile device a placard describing the magazine. Another child adds to the narrative by writing “this is a historic place” as he walks around the inner fort. Another begins to write out the national anthem as he adds a picture of a flag to an instrumental arrangement of the national anthem as he stands by a cannon overlooking the bay with the flag waving behind him. Children come together sharing and discussing what they have added, even though all can see the additions and changes each other has made.

This describes some of the interactions during an initial investigation of the use of mobile devices as collaborative tools for children to construct narratives in context. This research will leverage the lessons learned from these active, playful learning experiences to develop and evaluate new mobile technologies for children, ages 6-10. Specifically, software architectures will be developed and physical interactions will be evaluated to better understand collaboration between children using mobile devices. True mobility not only increases access to the available information, but can allow content creation when and where a user is inspired. Mobile devices empower children to create content or digital artifacts *in situ*, while they are in the context of the object or situation for which they are creating a representation [6, 8]. Creative, constructive, and generative activities in context are educational as they help the learner synthesize the information as well as provoke further investigation [10].

In the last two decades, mobile devices (e.g. cell phones, PDAs, etc.) have become more and more popular and ubiquitous [4]. In fact, it is anticipated that within the next three years, more than 2.6 billion mobile devices will be in use throughout the world [16]. In several places, mobile phones instead of landline phones have become the norm [3]. In developing countries, even those with struggling



Figure 1 – Co-present collaboration on a shared story at Fort McHenry National Park in Baltimore, Maryland.

economies, cell phones have empowered users enabling opportunities not previously attainable [1]. Indeed, mobile technologies are emerging as the computing platform of the 21st century [5].

Collaboration is of particular importance as it is vital to the social and cognitive development of young children [14]. To bring education into the 21st century, a change in tactics is necessary to promote deeper, collaborative learning [15]; collaborative and cooperative approaches are one of best educational uses of computers [9]. Other learning theory suggests moving beyond consumption enabling interactive learning, allowing creation of artifacts, thus enabling constructionistic learning [11]. Generative processes go beyond recall and recognition learning and suggest a deeper understanding [12]. This adheres to Papert’s learning theory of *constructionism* which is based on manipulating objects and building a public artifact — it is in the construction of the artifact that children learn [11].

In the past, mobile devices have been geared towards consumption, collection and controlling, this research represents a shift to enable creative, constructive and collaborative use of mobile devices. Although generating content has been allowed on mobile devices (e.g. text and audio notes), there are interactive limitations to these relatively small devices [13]. This research looks at ways

to overcome these limitations via co-present collaboration. Co-present collaboration occurs when people meet at the same time and place to “work together, especially in a joint intellectual effort” [2]. This research proposes not only bringing people together in the same place but specifically investigating how bringing mobile devices together can afford different collaborative advantages for young children.

There are different ways co-present mobile collaboration can be approached. The simplest is space-sharing – when devices are brought together their screens join and content is spread across displays. Another approach is to split the content across devices as illustrated in Figure 2. Further still, collaboration can incorporate shared interactions including focus/navigation, editing, and copying/trading.

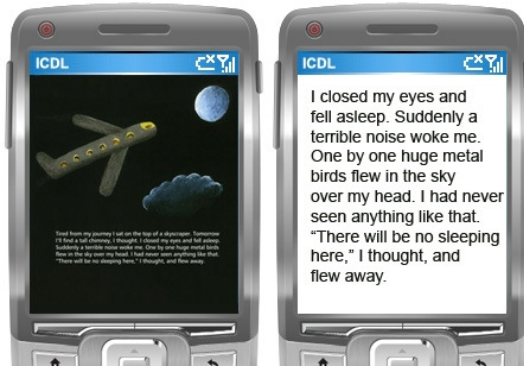


Figure 2 – Mobile collaboration mockups using Ciconia Ciconia (White Stork; 2003) by Andrea Petrik, Kašmir Promet – Croatia, Available in the International Children’s Digital Library (ICDL)

FORMATIVE RESEARCH

Initial investigations included a comparison between desktop and physical interactive environments [7] providing direction towards mobile computing environments that can bridge the virtual-physical gap. Preliminary design sessions on collections were performed with children from which observations were made leading the direction from direct support for collections (collecting, organizing, sharing), to a narrative approach which inherently supports these activities. These sessions along with work on Tangible Flags [6] helped form the direction for this research.

An initial prototype for Mobile Stories was built and tested with children in Kidsteam and at Fort McHenry National Park. The prototype supported the addition and editing of multimedia to scenes in a shared narrative. The supported multimedia included sound, pictures, and words. Observations from this initial study have formed the ideas for this proposed work, illustrating the importance of mobile collaboration.

TAKE HOME MESSAGE

There are many ways to collaborate and interfaces must support, at least some, of if not many of them. New

interfaces and interactions for mobile devices must be developed to better support collaboration. Such developments not only have the potential to impact educational technologies for young children, but go beyond to influence the way mobile devices – in general – are used today.

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