Communication Software using Pictures for use with Pocket PCs

Gondy Leroy\textsuperscript{a}, Ph.D, John Huang\textsuperscript{a}, Serena Chuang\textsuperscript{a}, Marjorie H. Charlop-Christy\textsuperscript{b}, Ph.D.

\textsuperscript{a}School of Information Science, Claremont Graduate University, Claremont, CA
\textsuperscript{b}Department of Psychology, Claremont McKenna College, Claremont, CA

Abstract
Autism spectrum disorder has become one of the most prevalent developmental disorders. A difficulty with communication is one of the main impairments. We are developing a digital library of images that will be used to help children with autism communicate without the need for reading or writing skills. Images will be displayed on Pocket PCs to convey messages. We are currently developing and evaluating the first prototype.

1. Introduction
Autism spectrum disorder (ASD) has become one of the most prevalent mental disorders over the last few years. The disorder is characterized by a wide variety of possible symptoms such as developmental disabilities, extreme withdrawal, lack of social behavior, severe language and attention deficits, and repetitive behaviors. Research that leverages information technology (IT) is still in its infancy in this area. Moore, McGrath, and Thorpe present a framework to guide such research and development for computer-aided learning tools for people with autism\textsuperscript{1}. They suggest that computer-aided learning software focus on three main impairments: social and interpersonal skills, communication difficulties, and rigidity of thinking.

2. Communicating with Images
We are developing a tool that fits in Moore’s second category and addresses communication difficulties. Autistic children are often taught to communicate with pictures when they have difficulties communicating verbally. They can use the Picture Exchange Communication System (PECS) and combine images that form a message. For example, they learn to combine the image for “I want” with one for “book” to indicate they want a book.

We are developing a software tool that provides similar communication options while providing parents and therapists with usage data. Three components comprise this system. An overview is shown in Figure 1. The centralized database contains all images and personal settings of people using the image library. An Internet access portal lets users (parents, therapists, children) upload, delete, or change images and settings. Later, we will add the capability to view the actual usage of the images (frequency, time, date). This portal provides control over the communicative images on the Pocket PC.

\begin{figure}[h]
  \centering
  \includegraphics[width=\textwidth]{system_overview.png}
  \caption{System Overview}
\end{figure}

The communication component is a personalized digital library of images on a Pocket PC. The images are organized in folders and can be selected to form a message. This message is shown to other, non-autistic people to communicate. The autistic users can select the image based on how it looks. The images themselves contain a descriptive word on the bottom. By reading the combined words, non-autistic people can easily understand the message. For this component, we adhere to two general guidelines\textsuperscript{2}, which we believe to be especially important for our user group: streamlining, i.e., focus on essential information only, and automating, i.e., the need to remove reliance on text for commands. The Pocket PC users touch the images on the touch screen to select them. Once images are selected, they are combined on a communication strip. After selection of all images that form the message a button click centralizes and enlarges the images, making them easy to view for other people. We are developing this system using evolutionary prototyping. Early user testing is part of the development cycle and helps develop a user-friendly tool.

3. References