

Picture Planner: A Cognitively Accessible Personal Activity Scheduling Application

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ABSTRACT

This paper describes design elements and field test results for an icon-driven, cognitively accessible personal activity scheduling application for use by individuals with disabilities and their assistants. Results showed that users with significant cognitive disabilities can learn to use and benefit from accessible computer-based self-management applications.

Categories and Subject Descriptors: H.5.2 [Information Interfaces and Presentation]: User Interfaces---graphical user interfaces, screen design

General Terms: Design, Human Factors.

Keywords: Accessibility, cognitive disabilities, activities of daily living, personal management, life skills software

1. INTRODUCTION

According to recent estimates the population of Americans with cognitive disabilities is over 20 million, with almost 4.5 million of those classified as having intellectual or developmental disabilities [1]. Incidence on an international level is harder to document, but will of course be far greater.. However, many individuals with significant cognitive disabilities remain excluded from the benefits of information technology in part because: (a) commercial software is not readily accessible due to its complexity and dependence on the user's reading ability, and (b) there is a lack of cognitively accessible software targeting specific user needs, such functional daily living skills [2,3].

Consider the many ways in which we all use information, increasingly technology-based, to prompt us through more competent performance of daily activities. Many of us would be lost without our paper-based or electronic personal organizers to help us keep track of our appointments. We rely on cookbook recipes and instructional manuals to perform household tasks, many of which are now or soon will be electronically presented. We navigate from one place to another using the information provided by traffic signals, dashboard displays, GPS readouts, or public transit signs and schedules.

Pieces of information from such sources serve as prompts that we either arrange for ourselves or that are presented by our external environment in order to guide our behavior toward completion of various goals. Because our world is designed for people of a certain cognitive ability, however, many of these prompts only come in text-based and complex formats that are inaccessible to individuals with cognitive disabilities. Transition-aged students have perhaps the greatest need for technology solutions in light of the challenges of postsecondary life [4]. Improved technology-based access to information could improve the lives of students with cognitive disabilities, providing accessible self-management applications for daily activities such as managing a class schedule, tracking homework and materials, personal activity planning, performing household management tasks, or using public transportation.

Eugene Research Institute has developed a cognitively accessible personal activity management application called Picture Planner™ [5,6]. The application uses an icon-driven software interface to provide users with cognitive disabilities with a means to construct and manage activity schedules. A screen shot of an icon-based view of an art class that has been scheduled using the application may be seen in Figure 1, below. A more detailed interactive tutorial and overview of Picture Planner□ may be found at the following web address: http://www.eugeneresearch.org/picture_planner.

Picture Planner is a versatile tool for engaging in the kind of daily and weekly self-scheduling activities outlined by Bambara & Koger [7] in their guide to facilitating daily choice making. A computer-based approach for this purpose also has the advantage of making it more practical to use personal images as prompts [8,9]. The application is in essence a tool for self-management and prompting. The user creates a schedule, prints out the results and can then refer either to the onscreen information or the printed schedule throughout the day or week as an aid in remembering all aspects of their activities.

2. DESIGN APPROACH

Picture Planner incorporates several key design goals and related features. The first is to enable maximally independent use by individuals who have limited reading ability, while at the same time facilitating assistance from caregivers. Toward that end, virtually every interface element is a tri-modal icon, consisting of an image, text label, and text-to-speech function that speaks the text label or describes the image contents when the icon is selected.

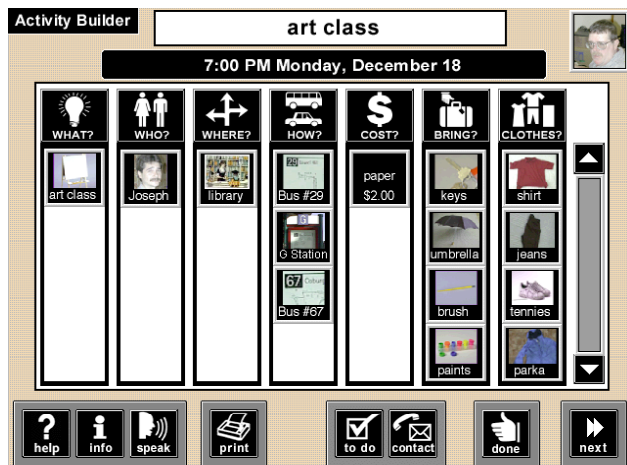


Figure 1. Activity Screen Detail from Picture Planner

The second goal is to enable use by those for whom typical software interfaces are too complex. Double-clicking is avoided throughout the program, in favor of single-click operation, which is less confusing and amenable to alternate access such as a touch screen. An effort has also been made to use uncluttered screen layouts and user action sequences that avoid having multiple screens open at the same time. This limits the extent to which the user can “tunnel down” and possibly get lost in layers of application windows.. A “Speak” button repeats the last text string that was spoken.

The third major design goal is a metacognitive approach to interface design that anticipates the information management challenges experienced by individuals with cognitive disabilities. A typical user of a paper or computer-based organizer might enter a word or two in a time slot, relying on that prompt to cue a metacognitive set of related implications that is retained in memory and retrieved as needed to accomplish an activity. Choosing and arranging the activities that constitute one’s daily, weekly, or monthly schedule involves many considerations that are more metacognitive in nature: knowing not just “what” activity is scheduled, but making explicit the many meta-elements of an activity that bear on its successful completion: What activities are available to choose from? How much money do I need? Who am I doing it with? When and where does it happen? How will I get there? What things should I remember to bring? What clothes are appropriate? Many individuals with significant cognitive disabilities need these metacognitive sets of information explicitly presented, with accessible ways to choose among options in each domain. In our application, upon selecting an activity or event to be scheduled, the user is systematically presented with and “stepped through” each of these considerations.

3. RESULTS AND CONCLUSIONS

We report here on a study conducted with a group of 5 students within the framework of naturally occurring school program activities for activity planning over a period of 8 weeks. The school program is a community living skills program that emphasizes vocational experience, household management and community access skills. Students ranged in age from 16-21, with IQ and adaptive behavior scores that would place them in the moderate to mildly disabled range.

Field test data indicate that after an average of one-half hour of weekly instruction over a period of 8 weeks, this cohort of five users with significant disabilities averaged 54% successful completion of the steps of an activity planning task, with either no assistance or with only nonspecific verbal prompts. Individual rates of step completion at that assistance level ranged from 29% completion to 82% completion.

These findings indicate that with minimal instruction, users with significant cognitive disabilities may be able to benefit from using computer applications for activity planning or other life management tasks *if they are designed with cognitively accessible interfaces*. It also suggests that over time they may require decreased staff assistance and only limited direct instruction. Our observations also suggest that software for personal management provides an important instructional framework for interactions between assistants and students in ways that affirm goals such as self-determination and independence, regardless of the level of expertise a student or assistant brings to the context. With regard to social validity assessment and consumer satisfaction, users expressed sustained interest in using the software, and program staff reported that students looked forward to the weekly instruction sessions. Users also reported improved self-esteem related to increased independence in computer use, and staff have made concurrent observations.

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