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Immediate Usability: A Case Study of Public Access Design for a
Community Photo Library (2003)

by Bill Kules, Hyunmo Kang, Catherine Plaisant,
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Immediate Usability: A case study of public access design for a community photo library

Bill Kules[*+], **Hyunmo Kang**[*], **Catherine Plaisant**[*], **Anne Rose**[*], **Ben Shneiderman**[*]

{wmk, kang, plaisant, rose, ben}@cs.umd.edu

[*]Department of Computer Science, Human-Computer Interaction Laboratory, Institute for Advanced Computer Studies & Institute for Systems Research University of Maryland at College Park College Park, MD 20742

[+]Takoma Software, Inc. 7006 Carroll Avenue Takoma Park, MD 20912

ABSTRACT

This paper describes a novel instantiation of a digital photo library in a public access system. It demonstrates how designers can utilize characteristics of a target user community (social constraints, trust, and a lack of anonymity) to provide capabilities that would be impractical in other types of public access systems. It also presents a compact set of design principles and guidelines for ensuring the *immediate usability* of public access information systems. These principles and guidelines were derived from our experience developing PhotoFinder Kiosk, a community photo library. Attendees of a major HCI conference (CHI 2001 Conference on Human Factors in Computing Systems) successfully used the tool to browse and annotate collections of photographs spanning 20 years of HCI-related conferences, producing a richly annotated photo history of the field of human-computer interaction. Observations and log data were used to evaluate the tool and develop the guidelines. They provide specific guidance for practitioners, as well as a useful framework for additional research in public access interfaces.

Keywords

Photo collection, community photo library, group annotation, public access system, direct annotation, direct manipulation, drag-and-drop, immediate usability, zero-trial learning, walk-up-and-use, casual use

INTRODUCTION

Personal photo albums inspire hours of browsing, reminiscing and storytelling. They capture people, places and events of special significance to family members, who often inscribe short anecdotes and stories in the albums. These photo albums are passed from generation to generation, forming a treasured pictorial history of the family (Chalfen, 1987). The ritual signing of class yearbook pictures is a way that friends capture amusing anecdotes and special memories of shared experiences from their school community. This paper describes a novel application, a digital community photo album called PhotoFinder Kiosk, that enables members of a community of human-computer interaction (HCI) professionals to enjoy, share and contribute to similar experiences by browsing and annotating photos at an interactive public exhibit. Because PhotoFinder Kiosk is installed in a communal space, it encourages collaborative reflection, storytelling and interpretation of shared experiences.

PhotoFinder Kiosk was installed at CHI 2001, and attendees were invited to identify people in the pictures and add captions containing anecdotes or short stories. Attendees were also invited to contribute new pictures of the conference, either from their own digital cameras or by borrowing a camera from the exhibit. Over a three-day period, an estimated 800+ users eagerly browsed the library, adding more than 1700 labels and captions, and contributing over 1000 pictures.

Public access systems are pervasive in modern society, providing services, information and entertainment ranging from automated teller machines (ATMs) for banking to museums, government offices and unattended gas stations (Kearsley, 1994). Museum exhibits often include public access systems to provide information and educational content in a user-directed manner. Many public access systems are intended either for anonymous use, such as museums or retail displays, or for use by fully authenticated users, such

as ATMs. A community photo album, however, falls in between these two extremes, since it is designed for a specific community, in which members have common interests and established social bonds. Users in these communities are not necessarily anonymous, and may, in fact, be well known to each other. Applications for these domains can take advantage of the social constraints, trust, and a lack of anonymity within the community to provide capabilities that would otherwise require stronger authentication, such as a name/password or credit card/PIN.

Public access systems must be immediately attractive, engaging and usable to be successful. Potential users typically have no training on or prior experience with the interface. There are often competing demands for their attention, such as other exhibits or small children. And users have little incentive to invest any time learning how to use an interface, even when the content has compelling interest, because there is little expectation of future use. Designers use advanced graphical users interfaces (GUIs), touchscreens and alternative modes of input such as proximity sensors and machine vision to provide attractive and engaging applications. Some applications are well designed and widely used. Automated teller machines are a success story because of extensive usability testing and a concrete motivation (e.g. getting money) for users. But high profile failures such as the U.S. Postal Service's Postal Buddy still occur (Engström and Escalante, 1996). Our premise is that many public access systems sit unused and idle because designers did not design for *immediate usability,* and the systems fail to initially attract users or are simply too difficult for casual use.

This paper describes the design and evaluation of the PhotoFinder Kiosk community photo library, and a set of Immediate Usability principles and guidelines formulated as a result of extensive informal evaluations and observations. Designers can use the guidelines to develop and evaluate user interfaces for public access systems. Practitioners can incorporate these guidelines into development processes and researchers can use them to identify appropriate applications of new technologies.

The remainder of this paper is organized as follows: First, we present the project background and related work. This is followed by a description of the design and development process. We then describe our observations and evaluation of the tool, which leads to four principles and associated guidelines. We conclude by briefly describing current and future work and summarizing the contribution.

BACKGROUND
These guidelines were the result of a need to transform a personal photo library tool into a public access system as part of a project to create a photographic history of conferences and events in the field of human-computer interaction (Shneiderman et al., 2002). One of the authors (Shneiderman) has an extensive personal library of photos spanning 20 years of HCI-related events. The library includes pictures from landmark events such as the 1982 Gaithersburg conference that lead to the founding of the Association for Computing Machinery (ACM) Special Interest Group in Computer Human Interaction (SIGCHI) and shows many of the leading contributors to the field at early stages of their careers. These pictures have been digitized and annotated with basic metadata such as event name, date and location using PhotoFinder, a personal photo library tool (see http://www.cs.umd.edu/photolib) (Shneiderman and Kang, 2000). A challenge of the photo history project was to identify the people in these photos, most of which were not annotated. Due to the large number of photos (3300 were eventually selected from more than 7000), it was not practical to individually label each picture. Even if it were, many of the people in the pictures were unknown, even to the original photographer.

Since this was to be a history of an HCI community, we decided to bring the collection to a large HCI conference, CHI 2001 in Seattle, Washington USA, and ask the attendees to contribute their knowledge by adding names and captions to the photos. PhotoFinder Kiosk was thus developed to enable members of this community to enjoy browsing the photos and reminiscing with friends and colleagues at the same time that they contribute their annotations.

PhotoFinder Kiosk was developed from PhotoFinder, a research tool for managing personal photo libraries. PhotoFinder is a single-user program that provides collection management and annotation, with an emphasis on easily annotating and searching for people using drag-and-drop techniques. It uses a

conceptual model of a library having a set of collections, with each collection having a set of photos. Users can annotate photos by dragging names from a list and dropping them onto the photo. The location of the annotation on the photo is preserved. It is a powerful tool, providing a rich set of features and it requires a small, but non-trivial, investment of time to learn the annotation and searching techniques, thus it is not an effective tool for a public access system.

PhotoFinder Kiosk, although not a true kiosk as implemented, is designed to support casual use, such as would be found in a kiosk at a conference, wedding or other event that brings together a community of people with a common interests and social bonds. It allows users (typically members of a common organization or community) to browse, search and annotate photographs with captions and name labels. Users can add captions and labels to any picture, with the system maintaining the annotator's name. It encourages individual and side-by-side exploration of photo libraries, with users sharing a common PC or using a network of co-located PCs. It also allows members of the community to contribute their own pictures to the library and e-mail their favorite pictures to themselves and their friends.

RELATED WORK

Many personal photo management tools are available, both commercial and experimental, including FotoFile (Kuchinsky et al., 1999), Shoebox (Mills et al., 2000), PhotoMesa (Bederson, 2001), ACDSee, PhotoSuite, and ThumbsPlus. These tools (including PhotoFinder) are primarily intended for individual users to annotate their own collections of pictures. Some online services provide group-oriented features. Services such as Kodak's PhotoNet and AOL's You've Got Pictures enable registered users to share pictures and stories. Kodak's PhotoQuilt web site encourages anyone to contribute a photo and story, without any registration requirements. PhotoNet and PhotoQuilt allow multiple people to contribute photographs to a library, but only the contributor of the photo may annotate it.

StoryTrack is a prototype portable device that supports local sharing of a photo library and the creation of stories with audio annotation (Balabanovic, Chu and Wolff, 2000). The Personal Digital Historian is a tabletop interface used by small groups to explore photos, audio and video (Shen, Lesh and Vernier, 2003). Both of these devices support face-to-face exploration and storytelling. Collections, a research project at MIT, enables the owner of a collection of pictures to share them with multiple communities of people according to the intended audiences (Viégas, 2000). Different intended audiences will see different photos, and even the same photo may have different captions for different audiences.

The CHI '89 InfoBooth was a public access system that allowed conference attendees to create digitized photos of themselves and enter personal information, which could then be browsed by other conference attendees (Salomon, 1990). The Blacksburg Electronic Village's Blacksburg Nostalgia project (Carroll et al. 1999), which encourages unrestricted annotations of (mostly textual) stories, is a notable example of a community history archive.

DESIGN PROCESS

The objective in developing PhotoFinder Kiosk was to transform PhotoFinder (see figure 1) into a community access system that supported casual use by multiple users, with a lightweight mechanism for tracking contributions. The design team formed a cross-section of the HCI community, with long-term members and newcomers to the field, and we used our interests as well as previous work on a user/task analysis for personal photo libraries to guide the initial design. The project was initiated by considering the community members to identify typical user profiles, tasks and anticipated usage characteristics. Much of the early design discussion focused on the core set of functions to retain from PhotoFinder. Initial designs used sketches and storyboards. They were then implemented in Visual Basic and evaluated and refined with informal user testing.

The prototype system was installed on three workstations at the Computer-Supported Collaborative Work conference, CSCW 2000, where over 50 conference attendees used it. It was then substantially refined and re-tested based on observations and user feedback prior to the field test at CHI 2001. We observed users

extensively during the conference. In addition, the software was instrumented to collect usage statistics, and booth visitors at CHI 2001 were asked to complete a short questionnaire.

User Profiles and Content Interests

When developing user profiles, we carefully considered what content would be attractive to each type of user. As noted in (Maguire, 1999) and (Heller and McKeeby, 1993), having compelling content is critical. We were confident that long-time CHI attendees would be attracted to the exhibit and would enjoy browsing the photos because of the pleasant memories associated with them. The challenge with these users was to encourage them to add annotations, to help more completely identify the people and activities in the pictures. To do this, we decided to add a caption capability and tried several sizes and locations during development to make it highly visible on the screen.

For more recent attendees, though, most of the pictures are not relevant. Several techniques were chosen to attract these users. First, a small subset of pictures was selected to create a collection of highlights – pictures that showed significant people and events in the CHI community. A second set of humorous pictures (labeled "Outrageous") showed people in amusing poses. Allowing users to contribute pictures was expected to enhance users' interest, so we decided to lend digital cameras to attendees, which they could use to take pictures anywhere in and around the conference. Pictures would be imported from several digital formats so users could contribute pictures from their own digital cameras, too. This would provide a growing set of pictures from the current conference, encouraging users to add timely commentary about events they had attended.

Figure 1. The interface for the original tool, PhotoFinder, showing the Library Viewer (left), Collection Viewer (top right) and Photo Viewer (bottom right).

Figure 2. The final interface for PhotoFinder Kiosk.

The photos were organized into three libraries: Historical HCI photos, other related HCI photos, and photos taken at the current CHI 2001 conference (this was initially empty). Tabs for each library were provided at the top of the Library Viewer (see figure 2).

After establishing the user profiles, we reviewed all PhotoFinder functions to determine which would be used in a community photo library and which could be removed. A small number of new features to be added were also identified, such as annotator identification and support for multiple libraries.

Initial User Interface Changes

No changes were made to the fundamental metaphor of PhotoFinder. PhotoFinder provides a rich set of visual cues and experience indicated that users quickly understand it (Cho, Holman and Phelps, 2000; Goto et al., 2000, Jung, 2000). The Full Screen and Slide Show modes from PhotoFinder were retained and made more visible by enlarging the icons and buttons. A new feature was added to allow users to email pictures, and a button was placed at the bottom of the screen for this function.

The original software provided no access controls, as is typical with software for personal use. Because this is a public access system, some level of control or at least logging is desirable, but any controls must require minimal administrative support. For this reason, a login box was added, which prompted to enter their names and email addresses before browsing or annotating photos.

Since many contributors will provide annotations, it will often be of interest to know who placed a particular name label. This information is shown as pop-up text (e.g. a "tool tip") when the pointer pauses over a label. PhotoFinder did not originally support captions, so a caption box was added below the picture. Multiple

captions are allowed for each photo. Each caption is displayed prefixed with the annotator's name. The current annotator's name is displayed at the bottom of the screen, labeled as Author.

Eliminating scrolling in the Library Viewer by limiting the number of collections in a library to 40 also simplified the interface. Individual collections, however, contain as many as 100 photos, so the scrollbar was retained when displaying large collections on the Collection Viewer. It is, however, hidden when not needed. Several non-visible features from the original program were retained, based on the reasoning that certain types of interactions would be familiar to the target users. For example, the target users are generally well versed in computer use and aware of the interaction techniques such as double-clicking and drag-and-drop. In all cases, however, redundant visible affordances were retained.

Most delete features were removed or restricted. Only the administrator can delete a picture. Only the original annotator (or administrator) can move or remove the name labels they placed on pictures. Captions cannot be changed after they are entered. Users can send email to the administrator by clicking on the Contact Us button at the bottom of the screen.

Several unneeded management functions were removed and the remaining functions were carefully placed to be clearly visible in the interface. The standard MS-Windows menu was removed from the top of the screen and the toolbar icons for the Library, Collection and Photo Viewers seen in figure 1 (a total of 28 icons) were replaced with just seven icons in a single toolbar at the bottom of the screen. Although PhotoFinder requires users to explicitly save changes, this would clearly be problematic for the casual user, and it was changed to automatically save all annotations and captions as they are entered.

Prototype Evaluation and Subsequent Changes

During the prototype evaluation most users needed some introduction to begin using the system. This was often accomplished by watching another user for 15-60 seconds. When that introduction was unavailable, some users would have difficulty getting started. As observed in (Shneiderman et al., 1989), the lack of an introduction "transform[ed] an easy to use system into a frustrating mystery game for some… untutored users."

Figure 3. Detail of overlay help showing the task-oriented selection bar (top center) and sticky notes for several steps of the Annotate Photo task.

To overcome this challenge, we created an overlay help system that provides task-specific help for users (see figure 3) (Plaisant, Kang and Shneiderman, 2003). It consists of one small window at the top of the screen with a drop-down list of tasks, and several "sticky note" style windows that vary depending on the task. The help windows are set off from the underlying display through the consistent use of a bright yellow background, large fonts and thick borders. A shadow effect would have reinforced the perception that they float over the main window. Each sticky note window is numbered, and describes one step of the task in a few words or a sentence. Sticky note windows may be individually closed, or all may be closed at once. The sticky note windows are placed to avoid obscuring critical parts of the main window, so users can keep them visible until comfortable with the task. When the system detects 60 seconds of inactivity, the help window is automatically displayed.

A slide-out search pane with advanced Boolean capabilities was difficult for users to find and caused numerous problems during the prototype evaluation, so it was replaced with a single text box prominently located at the lower left corner. This required slightly more space on the display but ensured that the search function was fully visible, and both the text box and its label serve as targets for drag-and-drop name searches.

Several interactions were redesigned to eliminate dialog boxes. A few functions still require a dialog box for form fill-in, such as emailing pictures (recipient email address, subject line, etc.), but they form a natural part of the interaction and do not interrupt the user.

It became abundantly clear during observations that the initial strategy for identifying annotators (a login box) was problematic. It obscured the most interesting parts of the tool, the pictures, which are crucial to attract users. In addition, users were clearly reluctant to provide personal information before using the tool. The login box proved to be such a problem during the observation that we simply left a guest user logged in, effectively bypassing the login process. Subsequently, the identification process was redesigned to ask users for their names only when they add a label or caption (see figure 4) and to retain names for

subsequent annotations. This avoids interrupting users when they first start exploring, allowing them to browse or search.
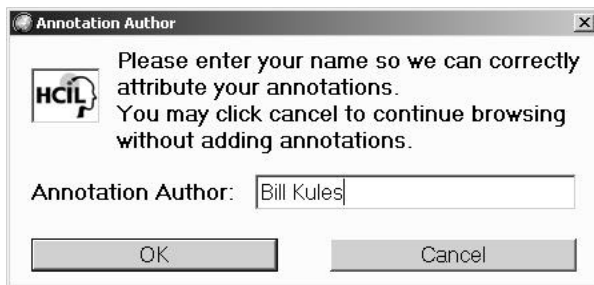
Figure 4. Dialog box used to identify annotation authors.

A simple mechanism was used to detect user departure and end a session. A session was ended when the user clicked on the Sign Off button or when the system detected 60 seconds of inactivity.

During the prototype evaluation, several users suggested that a Back button, modeled on the web browser Back buttons, would allow them to return to previously viewed collections or search results. Based on this feedback, we implemented a Back button, but during additional user testing the semantics of the function were not immediately understood by users, and it was removed from the final version to minimize the complexity of the interface.

Conference Installation

Prior to the conference, the data management component was changed from a single-user MS Access database to a client/server model using a server process to manage updates to a central SQL Server database. This was done to support the multiple clients, ensure data integrity on updates, and to enable immediate propagation of changes to clients via a callback mechanism. This allowed users to see others' changes as they happened and enhanced the interactivity of the exhibit. For the conference installation seven computers were configured in an "L" shape as shown in figure 5. One computer ran the SQL Server database, one was used to import and manage photos and five were used for end-users.

To attract the attention of visitors, an oversize monitor was used for one of the five stations in the exhibit. When not being used by a visitor, this station displayed a sequence of photos from the current conference. We reasoned that these photos would be interesting to most of the attendees because of the novelty of seeing pictures of the same conference they were attending. We considered the interests of several types of potential users, ultimately concluding that photos of the current conference would be of interest to most people because the images would be relevant and novel. Posters and signs were also used to direct users to the exhibit.

Figure 5. Photograph of the PhotoFinder Kiosk installation. Note the oversized monitor in the background.

EVALUATION AND GENERAL OBSERVATIONS

Trace logs, a survey and informal observations of users where employed to evaluate the use of the system. Due to the limitations in detecting session endings described below, it was not possible to record the exact number of users. Also, the trace log, which recorded 259 sessions, does not include users who browsed but made no annotations. Thus the total number of visitors cannot be precisely determined. We estimate there were a total of 800-1000 users.

User Profiles and Usage

Sixty-one visitors completed surveys. Over half of the respondents had attended at least 5 CHI conferences and these people were more likely to contribute annotations (table 1). Of course, heavy users were also more likely to answer the survey.

Conferences Attended	Number of Respondents	Annotated Pictures?	
		Yes	No
1 (first time)	9 (15%)	3 (33%)	6 (67%)
2-4	16 (26%)	8 (50%)	8 (50%)
5 or more	36 (59%)	27 (75%)	9 (25%)
Totals	61	38 (62%)	23 (38%)

Table 1: Annotation activity by the number of conferences attended.

Visitors added 1335 name annotations plus 399 captions, and attendees contributed 1180 new photos to the current conference library. Of the 1335 annotations added, 677 were for the newly contributed pictures and 658 were for older photos. Of the 399 captions, 268 were for older photos and 131 were for the new photos. A single user contributed 163 of the captions, all of which were for older photos. Thus the annotation activity of users was evenly divided between old and new collections, even though most of the users were long-time attendees.

Users made 151 requests for a total of 2591 photos (excluding one user who requested an extremely large number – 399 photos), and 38 miscellaneous messages. These messages were often used to notify us of spelling and other minor errors, and a few people requested that several photos they had contributed be removed because of poor technical quality.

Analysis of trace logs showed that the two CHI libraries were each selected more often than the related HCI conferences library, showing a stronger interest in the more directly relevant material (table 2). Long-time conference attendees spent more time on the historical photos, while newcomers appeared to divide their time more evenly between the libraries.

Library	Number of Times Selected
Current conference (CHI 2001)	242 (39%)
Previous conferences (Historical SIGCHI)	221 (35%)
Other HCI-related conferences and events	161 (26%)
Total viewings	**624**

Table 2: The number of times each library was selected.

Attracting and Engaging Visitors

Users arrived with various expectations and motivations. As expected, many long-time attendees wanted to see pictures of themselves or their colleagues earlier in their careers. They found great satisfaction in adding a new name or contributing a caption, and were pleased that they could send pictures to themselves or to friends who could not attend the conference. Smiles of amusement and appreciation accompanied finding youthful pictures of friends. Some were disappointed when they didn't find any pictures of themselves. One user commented, "Apparently Ben and I do not frequent the same locations. 10 conferences, not one photo." Newer attendees would often view the current conference photos initially, and then look at the highlight collections. Visitors often exchanged perspectives on specific events and laughed about unusual personalities encountered while adding captions. Many users were enthusiastic, with comments such as "Great! Thanks for the memories," "This is addictive," and "The PhotoFinder rocks!" Still others volunteered to contribute pictures from their personal collections, and many offered useful suggestions for improvements and keen critiques of usability problems.

The social aspects of the photos were very apparent, particularly for the long-time community members. Individual users would often return with friends and colleagues to show a favorite picture. Two or three visitors would often cluster around a display, laughing and sharing reminiscences. Users of separate stations would often exchange comments and point out pictures to each other. We conjecture that the availability of 5 stations contributed to user interest. Seeing several people actively engaged is a more compelling attraction than just seeing one person at a PC. The experience of exploring pictures with others (even at separate stations) is qualitatively different than solitary exploration.

Several users came because their pictures had been taken at an evening event, and they wanted to make sure they were "good" pictures or else have them removed – a form of attract sequence that was not anticipated, but which is consistent with the tactic of creating anxiety to raise interest, described in (Berlyne, 1960). After finding the pictures, they chuckled and continued browsing. Several attendees remembered the CHI '89 InfoBooth, which allowed conference attendees to create digitized photos of themselves, and thought that they could have their picture taken for an attendee yearbook.

When visitors wished to use the large-screen station, they would press the Escape key or click a button on the mouse to interrupt the display sequence, however, there was no specific instruction on the screen for this. Users had to guess or be told. This deficiency caused some users initial difficulty.

Learnability of the Interface

Users easily understood the fundamental metaphors of PhotoFinder. Most of the changes made to the interface were to streamline it and remove unnecessary interruptions such as dialog boxes. The prototype asked users to identify themselves prior to browsing, which was a strong disincentive to use. This was removed in the final version, where users were only asked for identification if and when they added an annotation.

Several non-visible features from the original program were familiar to users. They often experimented with double-clicking, finding the search capability this way. The drag-and-drop feature was not obvious to users, however, most people were immediately comfortable using it to search and annotate after observing other users or reading the online help. Of 1266 searches recorded in the trace log, 692 (55%) were initiated with a double-click, 280 (22%) were initiated with drag-and-drop, and 294 (23%) were initiated by typing into the Search box. Users also appeared comfortable using the Escape key or clicking the mouse to end the slide show. Similarly, the Delete key was far more popular than the Delete button for removing annotations, being used in 82 of 88 instances (93%).

Users expressed satisfaction with the overlay help system design, and it helped some users to more rapidly understand the interface.

Visitor Departure

The mechanism to detect departure was too simplistic and limited the ability to properly credit authors for their annotations. As noted above, annotator names were saved for the duration of a session to avoid making users re-enter their names for each annotation. Unfortunately, when users were lined up waiting to browse photos, and one user departed, the next person's annotations were frequently incorrectly attributed to the previous annotator. There was simply no way to create a short enough timeout to detect a departure without also affecting users who were simply pausing to view a photo or carry on a conversation. Confirming identity after each annotation with a dialog box (e.g. "Thanks, John Smith") might have helped, although it would have interrupted the users and required an additional mouse click to dismiss the dialog. A better solution would have used a sensor to detect departures and immediately reset the system for the next visitor.

Privacy Concerns

Legal and social constraints set limits on the use of photos, particularly of private citizens (Chalfen, 1987), but privacy issues were rarely a concern for visitors. It is likely that the non-profit nature of the exhibit, sponsorship of SIGCHI, the context of the exhibit (within the physical conference site), and the general context of the CHI community contributed to a level of trust in which attendees were comfortable having their pictures in the exhibit. In other communities and environments, privacy and related issues could be more problematic.

PRINCIPLES AND GUIDELINES

Many texts provide guidelines for developing public access systems, including (Heller and McKeeby, 1993; Maguire, 1999; Kearsley, 1996; Blank, 1992; Felix, Graf and Krueger,1991). Kearsley describes a four-stage model of user interaction with a public access system: attraction, learning, engagement, and disengagement. In the attraction stage, potential users are alerted to the system and encouraged to use it. This can be done with pamphlets or signs, in addition to displays on the system itself. The first few moments of use constitute the learning stage, and ease of initial use is of paramount importance at that time. During the engagement phase, users explore the content of the system. Disengagement occurs when users decide to leave the system. This framework is used to organize a simple but elegant set of four principles and guidelines for Immediate Usability. These are based on our experience on PhotoFinder Kiosk and other projects such as the Library of Congress (LOC) National Digital Library Program (Marchionini, Plaisant and Komlodi, 1998; Plaisant et al., 1996), the LOC Online Public Access Catalog (Marchionini, Ashley and Korzendorfer, 1993), and the Smithsonian's Guide to Opportunities in Volunteer Archeology (Plaisant, 1990).

Immediate Attraction
Principle: Use the most attractive content ("treasures") to demonstrate the system and invite use.

Guidelines: Organize content to highlight treasures for the general community and for sub-communities with special interests; implement an attract sequence tailored for the audience; clearly indicate how to end the attract sequence and begin using the system; avoid introductory ("splash") screens.

The attract sequence must clearly communicate the nature of the system, while competing with other environmental distractions. It should invite passers by to approach, displaying content that is interesting and relevant to a wide variety of potential users, balancing familiarity and novelty (Berlyne, 1960; Eysenck 1982). It should clearly indicate how the visitor could start using the system (e.g. "Touch screen to begin"). It may run continuously, or be triggered by proximity sensors, infrared, sonar, pressure-sensitive mats or even machine vision (Christian and Avery 2000).

Our installation started with an initial attract sequence consisting of the selected highlight photos. As photos from the conference were added to the collection, they were included in the attract sequence. By the end of the conference, the sequence included approximately 1100 pictures that would be displayed over a period of about 30 minutes.

Immediate Learning
Principle: Support zero-trial learning. Users should be able to use the interface after observing others or using it themselves for a brief period of time (15-60 seconds).

Guidelines: Use the simplest practical interface; take careful advantage of common knowledge in the community (e.g. computer familiarity); use an immediately understandable metaphor; make visible affordances for all operations and ensure that all results are immediately apparent; avoid menu bars and other elements that hide functionality; avoid UI navigation such as scrolling and jumping. If online help is needed, it should be extremely condensed and displayed in the context of the primary interface without obscuring it.

Visitors typically spend limited time using a public access system and are often unwilling or unable to invest even 60 seconds to decipher a cluttered interface or discover a hidden feature. Features that are easy to learn from the privacy one one's home or office can be unlearnable in the public access environment with its many distractions and where any mistakes are visible to others. During early evaluations it was clear that even scanning through menus on a menu bar, which can be an effective strategy for exploring the functionality of a desktop interface, is unworkable for typical public access systems. The use of the Delete key and the double-clicking interaction by many visitors would appear to contradict this guideline, but really only reflect the shared experiences of many community members, who are familiar with windowing user interfaces and have a predilection to explore them.

Immediate Engagement
Principle: Encourage users to immediately interact with content; provide immediate reward; avoid interrupting users.

Guidelines: Defer login or user identification as long as possible; avoid any interactions that interrupt the user or display dialog boxes.

Once users have started using the system, the user interface should be transparent, so users can focus on the content. If it will be necessary to identify users (as is done in PhotoFinder Kiosk when users annotate a photo), that should be deferred as long as possible to allow users to engage as fully as possible. Any interactions that involve alert boxes, dialog boxes, or fill-in forms should be avoided because they interrupt the user. Any operation that can generate error or warning messages should be similarly avoided, although all operations should provide immediate feedback.

Immediate Disengagement
Principle: When a user departs, immediately reset the system and prepare for the next visitor.

Guidelines: Use proximity sensors, infrared, sonar pressure-sensitive mats or machine vision when it is important to reset the system between users; otherwise, provide a reset button and implement an idle-timeout.

Detecting the departure of a user is difficult to do within software alone. For most applications it will suffice to provide a clearly marked reset button and implement a timeout. This will often fail, however, when a user departs and another immediately arrives. When it is important or desirable to differentiate between users, such as the PhotoFinder Kiosk application, additional sensors are necessary. In some applications, it may be desirable to provide a farewell to the user or otherwise confirm their departure. The lack of such a mechanism in PhotoFinder Kiosk caused difficulties in attributing comments and annotations.

CURRENT WORK

We have recently developed PhotoFinder Web, a web-based version of PhotoFinder, to complete the HCI photo history project (available at http://www.acm.org/sigchi/photohistory) (Shneiderman et al., 2002). It uses the same fundamental metaphors that were successful for PhotoFinder and PhotoFinder Kiosk to support browsing and searching. The design accommodates slower network connections, smaller screens, and limitations of HTML as an interaction medium (e.g. no drag-and-drop).

To take advantage of labels and captions in the personal version of PhotoFinder, a new feature, StoryStarter, has been developed. StoryStarter allows users to take a collection of photos that have already been annotated and publish a static set of web pages using any of the information stored in PhotoFinder. The web pages are meant to be a starting point for sharing stories with family and friends using digital pictures. The HTML pages generated by StoryStarter are easy to edit with any HTML editor and can be uploaded to any web directory.

CONCLUSION

PhotoFinder Kiosk is a novel combination of a digital photo library in a public access system. It demonstrates how designers can utilize characteristics of a target user community (social constraints, trust, and a lack of anonymity) to provide capabilities that otherwise would be impractical. This project was focused on a particular community – members of ACM SIGCHI – with a specific interest in the content of PhotoFinder Kiosk. Users were often known to each other and had common interests and backgrounds. These social bonds, combined with the physical layout of the system, allowed us to build a lightweight user identification mechanism. This strategy can be applied to other domains where users share common interests and have established social bonds.

As a direct result of contributions from members of the HCI community, 71% of the 3300 pictures in the SIGCHI photo history are now annotated with names, and many include amusing and informative captions. The photo history has been incorporated into SIGCHI's web site and will be a resource for professional members of the community as well as students, journalists and historians.

Public access systems are widely used, but they often suffer from poor usability for casual users. Designers need better guidelines on how to build public access interfaces. The principles and guidelines in this paper provide specific advice and concrete examples that practitioners can use to help ensure the immediate usability of public access systems. They also provide a framework for researchers to use when creating and evaluating new technologies for public interfaces.

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