

THE GPII SHOPPING AID - USERS AND USE CASES

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INTRODUCTION

The purpose of the Global Public Inclusive Infrastructure (GPII) is to ensure that everyone who faces accessibility barriers due to **disability, literacy, digital literacy, or aging**, regardless of **economic resources**, can access and use the Internet and all its information, communities, and services for education, employment, daily living, civic participation, health, and safety (Raising the Floor 2011). The mechanism behind this effort is the creation of a system that allows the individual to define a set of access preferences which live in the cloud, then to call up those preferences from any assistive technology, and have the system automatically configure the device to match the individual's needs. When the individual is done using the device, it will automatically revert to its base state. This saves the individual from having to disclose their disability unless it is desired, and assures that the individual will have access to any information technology device that is connected to GPII, even if they have never encountered it before.

The genesis of the GPII Shopping Aid was the realization that, in the search for appropriate assistive technology, typical users do not need more information. In fact, in many cases, people searching for assistive technology are overwhelmed by the number and variety of choices that are available.

The process of using GPII involves two steps. First, the user creates a personal preferences file that is stored in the web. This preference file includes the types of accommodation that the user needs or wants (e.g. screen magnifier, on-screen keyboard, foreground and background colors), but the settings within those accommodations. Thus, the user's preference file may indicate that they need an on-screen keyboard, arranged in one-handed Dvorak pattern, and positioned in the upper right hand corner of the display, occupying 50% of the width and 25% of the height of the display. The preference file may also indicate that the user has licensed the WiViK keyboard, and prefers that on-screen keyboard when working in a Windows environment.

The second process of using GPII is for the user to identify their preference file to begin a session. This

can be done using passwords, QR Codes, or NFC markers. When the user indicates the preference file (which need not contain any personally identifying information) that is to be used, the system calls it down from the cloud. Based on the individual's preferences, the GPII system examines the machine to determine what resources are installed, and the licenses available for each. If, for example, the above user's file indicates the settings of WiViK that are preferred, and that WiViK is installed on the host computer, it is run and configured as the user prefers without any action of the user. If WiViK is not installed on computer the individual is attempting to use, it can be downloaded from the cloud, remain for the time the individual is using the computer, then be uninstalled at the end of the session.

The process of selecting the accommodations that will best meet the needs of an individual is a difficult one. With modern information sources and web searches, finding information about assistive technology is not difficult for the computer literate. Indeed, the larger problem is finding too much information, resulting in information overload (Bartlett and Green 1966, Malhotra 1982, Palme 1984, Wallace 2007). The challenge is to provide the user with **enough** information to make a good decision, but to filter the noise of products that do not meet the identified needs of the user.

In order to improve the selection process, we conceived the idea of a Shopping Aid that prefilters information based on the needs of the individual. By reducing the provided information to that which is relevant to the individual, the selection process becomes easier. However, the quantity and presentation of the information must be tailored to the individual user of the Shopping Aid. In order to do trim the information provided to fit the Shopping Aid, we must identify who is using the Shopping Aid, as each of our potential users will consume information in a different way.

Over the past two years, we have been developing more detailed approaches to the Shopping Aid, and how it can be navigated by users.

WHO WILL BE USING THE SHOPPING AID - USE CASES

We have defined five basic use-cases for the Shopping Aid that are guiding our development effort. While not complete, these probably cover the broad range of cases.

Expert Clinician Exploring Current State of the Art

Many clinicians who are experts in AT became experts because of a personal passion for assistive technology. They spend a great deal of time exploring options in assistive technology, not necessarily for any specific client, but to be prepared for the next client referred to them. Because of the constant “churn” of technology, such expertise requires regular updating. As Gregg Vanderheiden has observed, every five years, all that you know about technology is obsolete (Vanderheiden 2013).

The GPII Shopping Aid draws on the GPII Unified Listing, a comprehensive listing of available assistive technologies and the features provided by both assistive technology and main-stream products. Because this list will be federated from a number of international sources, including EASTIN (2015) and AbleData (AbleData 2015), it offers a likelihood of current information. This provides an avenue for the clinician to update their awareness of available technologies regularly.

When researching assistive technology in general, the expert is best served by having the information organized by product category. While there are many types of accommodation for individuals with low vision, a person seeking the latest information about screen readers is not helped by information about large print keyboards or enhanced reading lights. An AT expert likely knows the terminology that is used to describe technology, and will use that language both to search for information and to internalize the changes.

The End User with an Expert Clinician

When a person is having difficulty using information tech, and has access to an expert in assistive technology provision, they can work together to quickly identify the access barriers, and select optimum products to meet the needs of the end user. However, even an expert clinician risks falling into a habit of over-recommending a familiar, and sufficient solution, even when there are newer, unfamiliar solutions that may meet the individual’s needs better.

When a person with access difficulties can work with an expert clinician, and they can use the Shopping Aid, there is a high probability of finding a

good solution. The expert clinician can do a detailed needs-analysis to identify the current access barriers, then use the Shopping Aid to find current solutions that meet the individual’s needs. The end user can make selections among products that are all adequate, to find the one that best meets the user’s style of work. The expert clinician can set up the assistive technology to best meet the specific needs of the individual.

The End User with a Clinician Who Is Not an AT Expert

A much more common occurrence is that where the clinician, while experienced and knowledgeable about human function and dysfunction, is neither knowledgeable nor current in assistive technology solutions. This situation is not a reflection on the clinician, as most training programs do not emphasize assistive technology, and most clinicians do not have the passion or the time to remain current in assistive technology.

In this case, the Shopping Aid can be particularly useful, but must present information in a different way than to an AT expert. In this use case, we can assume that the clinician understands the language of functional limitations, and can, through evaluation, identify the barriers that the client is experiencing. These may stem from “inability to see color differences” (color blindness), to “able to use only a single digit to type with the left hand.”

The Shopping Aid, when requesting information from, or providing information to a clinician will use clinically relevant language and request information in terms of functional limitations and user skills. Once the clinician has provided the information on client needs, the Shopping Aid will match those needs to products that address those needs, and produce a list of solutions to match the needs of the user.

The End User without Professional Assistance

Although in an ideal situation, people with disabilities will generally find better solutions with professional assistance, we must recognize that, Dr. Pangloss to the contrary, we do not live in the best of all possible worlds. In many cases, individuals who would benefit from assistive technology do not have access to professional assistance. For example, adults who are experiencing the normal changes in hearing, seeing, and dexterity that accompany aging may not seek or desire referral to a medical clinician, as they do not have medical issues (Forrester Research 2003). In many places in the world, medical services and rehabilitation are basic at best, and clinical assistance may not be available.

One of the particular challenges for a person with a functional limitation, especially one that is age related or congenital, is that the individual may not have the vocabulary to describe what it is that is causing problems. At best, they can describe the things that cause problems. To meet the needs of this group of Shopping Aid users, information must be requested based on the activities, and we must, as much as possible, provide support to the individual.

The End User with Family Assistance

A common occurrence, even among those who have access to clinician services, is for a family member to describe a product that has been featured in a news or social report, and to suggest that this may be of interest to the person with a disability.

In this case, there are two levels of communication difficulty. First, the family member (or reporter) may not have fully understood the functions and limitations of the product being described. Second, the family member may not fully understand the nature of the limitations the end user is experiencing. In order to meet the needs of this family, the Shopping Aid must allow the family member to describe the product that is being sought, then attempt to match that to the needs of the client. For example, an elder who has age-related vision loss may have a young family member who hears about text-to-speech as part of a product for reading electronic books. The Shopping Aid must first determine that the interaction is about text-to-speech, then determine if this is a desirable solution. The user might benefit from text-to-speech, but might benefit more from screen enlargement, or even increased contrast on the screen.

The End User Alone

Perhaps the most challenging case that the Shopping Aid must deal with is the person with functional limitations who does not have assistance of either clinicians or family members, but is seeking accommodation. This is particularly challenging as the first step is to identify an initial method of interaction that will even allow the individual to use the Shopping Aid. Once a method of interaction has been determined, the Shopping Aid must attempt to identify the needs of the individual, without relying on excessive technical language. Here, the focus must be on identifying specific tasks that the user has difficulty with, and exploring ways to make that task easier.

One other group of people with disabilities

may seek assistance without clinical assistance are current users of assistive technology who may be seeking better solutions or to gain the benefits of GP11 with their current solutions. If the person is happy with their current accommodations, we need only discover what those accommodations are, and create a needs-and-preferences file from that. One way that this can be done is using a match-making tool that is part of the customization side of GP11. When a person activates their personal preferences file on a new computer, this component of GP11 examines the assistive technology and settings that are resident on the device, so that the existing technology can, to the extent possible, be configured to meet the individual's needs. However, this same technology can be used for initial needs identification for GP11. The person who is an AT user, but new to GP11, can install the GP11 software on the computer that they currently use, with accommodations. The Match Maker component can then examine the system, identifying the installed accommodations and the settings that are current, and use this to create a preferences file for the individual.

Unsearch

A second segment of this group consists of users of assistive technology who may be seeking better products to meet their needs. This person may know that their computer has a product like Read and Write Gold. Read&Write Gold is what may be termed an omnibus product, combining a wide range of accommodations in a single product. It includes text-to-speech, a dictionary, a pronunciation tutor, a spell checker, word prediction, and even speech input. The user may rely on some of these features but not be aware of what the other features of the product.

Where convention search functions take the user from the general (I want something that does this...), to a specific product, the Shopping Aid "unsearch" feature will allow the user to go from the specific to the general. When the user indicates that they use Read&Write Gold, but are looking for something "better," Unsearch will show a list of the features that the product has, and ask the user which of these are being used. It might be that the sole function of this complex product in use is the text-to-speech capability. Unsearch can then provide a list of text-to-speed products for the individual to evaluate.

CONCLUSION

In the first year of development of the Shopping Aid, significant work has been completed on identifying the potential use cases of the tool. Identifying the users, from AT experts to individuals with disabilities working alone, has allowed us to begin designing the process of interaction that the Shopping Aid must support. Each potential group of users has unique needs, and unique communication styles. To meet these needs, the interaction with the Shopping Aid must be flexible to support all identified users.

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