

A survey of blind users on the usability of email applications

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Abstract Blind users face many challenges and obstacles when using computers at home and in the workplace, including difficulties in accessing web sites and using corporate software. A detailed understanding of usability problems in common email applications can inform designs that will provide improved usability. To help understand the challenges faced, a web-based survey on email usage by blind screen reader users was conducted. This paper presents the results of the survey of 129 blind users, which reveal several important facets of email applications that can be improved for blind users. The paper also discusses the specific challenges that are faced by blind users when using desktop and web-based email software.

Keywords Email · Blind users · Screen reader · Unemployment · Usability

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1 Introduction

It is estimated that there are approximately 1.8 million individuals in the United States who are blind with no residual vision [29], 980,000 individuals in the United Kingdom with significant sight loss [23], 284 million individuals worldwide who are visually impaired, and 39 million worldwide who are fully blind. The World Health Organization identifies four levels of visual function: normal vision, moderate visual impairment, severe visual impairment, and blindness [36]. When one considers the unemployment statistics of between 70 and 75 % for working-age blind individuals in the United States [20] and 75 % for blind and visually impaired individuals in the United Kingdom [22], the usability of email becomes a major concern due to its intersection with many vocational responsibilities, such as collaboration with co-workers. Studies have shown that email frustrations waste the time of all users [35]. For blind users, the increased costs of frustration due to accessibility and usability problems may present a barrier to effective participation in workplace communication. In order to better understand the usability problems experienced by blind users, a web-based survey of blind users of screen readers was developed. This paper presents the results of 129 responses to the survey.

2 Related work

2.1 Usability issues for blind users

Assistive technology tools such as screen readers are necessary for blind individuals to use most software. A screen reader (such as JAWS, System Access, VoiceOver, or Window-Eyes) is software that audibly reads the visual

content that is being displayed on a computer screen to a blind user. HearSay, a non-visual web browser developed by Stony Brook University [4], and WebAnywhere, a portable screen reader developed by the University of Washington [3], are examples of alternative approaches to screen readers. Another method that blind people utilize to access software is Braille and Braille-supported devices. The challenge with Braille devices is that they are often cost-prohibitive, and the rate of Braille literacy among blind users is very low (an estimated 10–20 % in the United States) [21].

It is known that blind users are more likely to avoid content when they are aware in advance that it will cause them accessibility problems (such as those presented by dynamic web content) [2]. Blind users are also often forced to discover some sort of workaround to complete a particular task [25]. Computer frustrations that impact one's ability to complete a work task can affect the mood of blind users [17]. Examples of the challenges that are faced by blind users are well illustrated in the Lazar et al. study on the frustrations that screen reader users experience on the Web. The study identified poorly labeled links and forms, missing or confusing alternate text for graphics, and problems with PDF files as being some of the challenges commonly faced by blind users [15].

On the legal front, in the United States, Section 508 of the Rehabilitation Act has served as the guide for government web sites and technology, yet the laws that apply to private companies, such as the US Americans with Disabilities Act, do not provide specific technical guidelines. Section 508 is currently being revised [28], and the Justice Department in the United States is planning to expand the technical guidelines of the Americans with Disabilities Act to more specifically address web sites [18, 30]. In the United Kingdom, the Disability Discrimination Act specifies accessibility standards for web sites, but the focus for this has also been government web sites [6]. However, this was updated by the Equality Act in October 2010, which strengthens the impact of the Disability Discrimination Act, including restrictions on pre-employment, disability-related inquiries [11].

2.2 Potential email concerns for blind users

Accessibility refers to users with impairments being able to technically access technology, while usability is a broader topic, relating to true ease of use. This study is focused on usability, in order to fully understand how users who are blind use email applications and to identify which features or applications they are not able to fully use.

Unsolicited email (spam) is a particular concern for blind users. While sighted users can visually scan and skip over offensive or non-relevant email in their inbox, blind

users must listen to the email in their inbox one email at a time. Spam can also present a security threat since it is one of the most common carriers of electronic viruses and worms [26]. The obvious primary solution to managing spam is through aggressive spam filtering software. The major tradeoff with a spam filter is that by its very nature (filtering email) the likelihood of false positive and negative identification of spam email is always possible [5]. It is perceived that blind users tend to use high levels of spam filtering, which may filter out legitimate incoming emails that are sent using the BCC feature (blind carbon copy) [14].

Studies have shown that an email inbox full of messages is something that most users struggle with [8]. Some of the most common methods for managing email revolve around archiving and storing messages in folders, as well as the common practice of “inbox message visibility,” which involves visually scanning the inbox for messages [34]. It is important to determine how blind users handle email organization as well as other extended features, such as calendars and contacts, in order to develop suggestions for improvement in design.

A focus group held in May 2008 at the National Federation of the Blind in Baltimore, Maryland, USA, identified some possible usage barriers of email that may impact blind users [31]:

- Spam, which was described as both frustrating and at times embarrassing, due to the potentially objectionable content of some spam messages
- Methods of searching and organizing email
- Cluttered and hard-to-navigate web-based email interfaces
- The use of extended features (such as contacts and calendaring)
- Visual CAPTCHAs (distorted text used to verify that a user is human and not an automated security threat).

The results of this focus group prompted the creation of an adaptive, web-based survey to further explore email usability for blind users.

3 Research methodology

Initially, a web-based survey tool called SurveyMonkey [27] was used to develop the survey due to its advertisement as a Section 508-compliant survey tool. After testing the web-based survey with the JAWS screen reader software, it was determined that SurveyMonkey was not, in fact, entirely accessible. At this time, a different tool, SurveyGizmo, was used to develop the web-based survey, and it was successfully evaluated for accessibility. The detailed content of the survey can be found in the [Appendix](#).

The web-based survey was advertised through emails to the state chapters of the National Federation of the Blind. Since the population of interest is blind users, and there is no central directory of all blind individuals, a true random sampling would be technically impossible, so self-selected sampling was used. The goal of this survey was to identify problems and concerns, rather than to rank or prioritize them in a statistically robust manner.

4 Results

4.1 Demographics

Data were gathered from January 21, 2009, through April 30, 2009, and 129 valid responses were received from the survey. Two additional responses to the survey were not included in the analysis because they contained no demographic data and few answers to any survey questions. The survey respondents were asked to be at least 18 years of age, self-labeled as blind with no residual vision, and screen reader users not able to use screen magnification. As respondents were not required to answer every question, percentages in the following discussion will be limited to those respondents who actually answered each question. The overall employment rate of 49 % of respondents was higher than the national employment average of blind individuals in the United States [20] and that of blind and partially sighted individuals in the United Kingdom [22]. Less than 20 % (21/128; 16 %) reported being currently enrolled in academic classes at a college or university. Only five students were also currently employed.

Out of 123 respondents who reported gender, 64 (52 %) were female, indicating an almost balanced response from both genders. Out of 126 respondents who answered the question on approximate age, the largest numbers of respondents were from 22 to 64 years of age (Table 1).

Most respondents (112/125; 90 %) reported that they had been using email for more than 5 years. Respondents made frequent use of email with most (84/124; 67 %) checking their email more than three times per day.

Most email use occurs at home, with 61 % (76/124) indicating that the home was their primary email use location, and another 31 % (38/124) indicating that they used email as much at work as they did at home (Table 2).

4.2 Email software usage

Respondents made extensive use of both stand-alone desktop email clients and web-based email. Desktop email client use was reported by 78 % (100/129) of respondents, with 59 % (76/129) indicating use of web-based email. One-third (42/129) of the respondents indicated that they use desktop email exclusively, and 17 out of 129 respondents (13 %) indicated that they use web-based email exclusively. Respondents varied in their use of desktop email clients, but Microsoft applications were the most popular. Respondents were restricted to selecting only one choice of email software. Some examples of the email software in the “other” category included Mozilla Thunderbird, Eudora, and Windows Mail (Table 3).

4.3 Web-based email usage

When 75 respondents responded to a question about the importance of web-based email to them, on a scale of one to five, 43 out of 75 (57 %) reported that web-based email was moderately to highly important. The most popular specified type of web-based email was Gmail, which was used by 22 out of 74 respondents (30 %). Respondents were restricted to selecting only one type (their primary choice). For data on the types of web-based email used, consult Table 4.

Respondents who used web-based email applications were then asked an open-ended question regarding any problems that they encountered when using that application. Problems that users experienced with web-based email included poorly composed HTML tags for headings, difficult navigation because of the excessive number of links, cluttered interfaces that can make it difficult to access email messages, and the use of visual CAPTCHAs.

Table 1 Approximate age of respondents

Age range	Number of responses with percentage
65 and over	7 (6 %)
55–64	41 (33 %)
45–54	25 (20 %)
35–44	20 (16 %)
22–34	28 (22 %)
18–21	5 (4 %)

Table 2 Primary email use location

Location	Number of responses	Percentage
Home	76	61
Work	9	7
Home/work the same	38	31
School	1	1

Table 3 Types of desktop email software used

Email software	Number of responses with percentage
Lotus Notes 8	1 (1 %)
Outlook Express	43 (43 %)
Outlook 2002	4 (4 %)
Outlook 2003	28 (28 %)
Outlook 2007	7 (7 %)
Novell GroupWise 6	1 (1 %)
Novell GroupWise 7	1 (1 %)
Other (not listed)	15 (15 %)

Table 4 Types of web-based email used

Web-based email used	Number of responses with percentage
AOL	2 (3 %)
Gmail	22 (30 %)
GroupWise Webmail	1 (1 %)
Hotmail	11 (15 %)
Outlook Web Access 2003	2 (2 %)
SquirrelMail	2 (3 %)
Yahoo Mail	9 (12 %)
Other (not listed)	25 (34 %)

4.4 Handling spam and phishing emails

Survey respondents were asked to select the statement that best describes their experience with spam emails. A majority (66 out of 119; 55 %) of respondents noted that spam is somewhat of an annoyance to them, and 12 % indicated that spam is very frustrating and embarrassing. For data on the experiences with spam email, refer to Table 5.

Respondents were next asked whether they were using a spam filter, and 82 out of 127 (65 %) of users reported using a spam filter. Only 3 % were not certain whether or not they were using a spam filter. The next question asked how often the spam filter mistakenly filters out legitimate emails. Of the 82 respondents, 48 % reported rarely

Table 5 Experience with spam email

Reaction	Number of responses with percentage
Spam is not a problem at all to me	37 (31 %)
Spam is somewhat of an annoyance to me	66 (55 %)
Spam is very frustrating and embarrassing at times	14 (12 %)
So frustrating that it almost causes me to not use email	2 (2 %)

experiencing this problem, and 15 % never experienced this problem. However, 21 % reported this problem occurring on a weekly basis, 11 % on a daily basis, and 6 % reported this happening several times per day.

Phishing emails represent another security threat that may cause similar frustrations. When asked a question as to whether they experience a problem with phishing, 50 % (out of 127) of the respondents indicated that they experience a problem with phishing emails. The respondents who indicated that they had a problem with phishing emails were then asked to rank the level of difficulty in determining whether or not an email is a phishing or legitimate email, but most people did not identify phishing email as a difficult problem.

4.5 Extended email features

4.5.1 Address book/contacts

Most respondents (110/127; 87 %) reported using an email address book. When asked about the level of difficulty that is experienced when using the email address book, 80 % of 109 respondents reported little to no difficulty. Table 6 shows how respondents rated the level of difficulty in using their address book.

The next question was whether there would be a benefit from an email function that would allow a user to automatically add a contact to their address book by checking a box when replying to an email. Out of 118 respondents, 85 (72 %) indicated that this would indeed be a useful feature. While some email programs do provide this feature, many do not, including Gmail and Yahoo Mail Classic.

Respondents using Microsoft desktop email software were asked whether they used the auto-complete feature (automatically remembering and suggesting an email recipient when composing an email), and 46 (56 %) reported that they use that feature. Of those 46 respondents, 80 % reported being moderately to greatly satisfied with the feature. It should be noted, however, regarding the automatic contact function discussed above, that some blind users would prefer more than simply the auto-complete functionality, because user comments in the initial

Table 6 Level of difficulty using address book

Level of difficulty	Number of responses with percentage
1	58 (53 %)
2	29 (27 %)
3	17 (16 %)
4	4 (4 %)
5	1

focus group noted problems with auto-complete suggestion lists [31], and 42 % out of 46 respondents to this survey were moderately to extremely dissatisfied with the auto-complete functionality in Microsoft Outlook. Also, auto-complete is reliant on a cache, previous emails, and/or contacts already in an address book. Additionally, in a corporate environment, there is often a need to look up the contact information for someone in a shared or global address list.

4.5.2 Calendar

While not every email client supports calendar integration, desktop email software, such as Microsoft Outlook, and web-based email, such as Gmail and Yahoo, are examples of common products that do support email and calendar integration. A relatively small percentage of respondents (25/128; 20 %) reported using an email calendar. When asked about the level of difficulty experienced when using the email calendar, most (20/23; 87 %) rated the difficulty as a three or less on a five-point scale (five being the most difficult). 18 respondents described the difficulties that they experienced with their email calendar. Navigation and labeling were among the problems that users noted.

4.5.3 Reminders

An email reminder is a method of flagging an email for follow-up at a later time when the user selects a format and timeframe to be reminded. The reminder itself is typically a pop-up at the predetermined time, and there is often also an audio cue. Email reminders were not widely used, with 73 % (93/128) indicating that they did not use email reminders. Of those who did, 53 % (18) reported low levels of difficulty. One of the few problems with email reminders involved changes in screen focus, as popup windows cause screen readers to change their focus, potentially disorienting users.

4.5.4 Storage and organization

Sorting and searching for email was noted to be problematic for some users, with 40 out of 123 respondents (32 %) indicating a moderate to difficult time sorting email. Also, 49 out of 127 respondents (39 %) indicated a moderate to difficult time searching for email (selecting 3–5 on a scale of 1–5). When asked about the amount of email stored in their inbox on a regular basis, 43 % (55/127) reported storing 50 or more messages in their email inbox. This is in line with research that shows that all users experience difficulty with having an email inbox full of messages [8]. Only 20 % of the survey respondents noted that they kept only a few messages in their inbox (Table 7).

Table 7 Amount of email in inbox

Amount of email	Number of responses with percentage
Only a few email messages	26 (20 %)
10 or more email messages	35 (28 %)
50 or more email messages	19 (15 %)
100 or more email messages	36 (28 %)
All of my email messages are in my inbox	11 (9 %)

The most commonly selected method of organizing email was responding to or deleting a message immediately, with 101 out of 127 respondents (80 %) utilizing this method as one of their methods of email organization. Storing a message in a folder was almost as common, with 92 respondents (72 %) utilizing this method. A majority of respondents (67) also noted that they often wait until an email is no longer needed and then delete it. Only two respondents reported using a third-party product to manage their email organization. Respondents were permitted to select more than one utilized method of organizing email.

Respondents using desktop email software were asked whether they change email folder settings to make them easier to use with their screen reader software. Out of 84 responses to that question, 48 respondents (57 %) indicated that they did not. Additional details concerning which settings users changed were included in the survey. The two most reported changes reported were changing the sorting order of messages and disabling the preview pane.

4.6 Important improvements

Survey respondents were asked an open-ended question regarding what they felt would be the most important changes for blind users that could be made to email software. 100 of the survey's respondents responded with a variety of suggestions. A summary of the most common responses includes:

- Improved search usability within desktop and web-based email applications
- Easier to use contacts/address books
- Easier to use email calendars
- Improved notification when there is an email attachment and easier methods of reading attachments
- A unique sound to indicate a message of high importance
- Better alternatives to visual CAPTCHAs
- A concrete solution to spam email.

5 Discussion

The data from this survey revealed several important facets of email that could be improved for blind users. It should be noted that since the survey was of a self-selected sample, the respondents may have been more likely to be employed and experienced with email. Also, with 90 % (113/125) reporting having used email for more than 5 years, it is possible that there would have been even more problems if the majority of the respondents had been users with less email experience. It was also clear from the comments of the 59 % (76/129) of respondents who reported using web-based email that a focus on creating more usable web-based email would be important to blind users. There were many positive comments about the usability of many of the current web-based email products, but reducing cluttered interfaces and simplifying navigation was repeatedly noted as a needed improvement. The need for simplification and better navigation of email in general was emphasized by comments from the respondents in the discussion of needed improvements to email.

The need for improved search capabilities is related to the problem of email organization and overload, since search can be one way to manage a large amount of email. Clearly, all users struggle with email organization [1], and a user's strategy to approaching that problem is often one of individual personality [19]. Organizing emails by traditional folders is only a short-term solution, as users prefer shallower folder hierarchies and would like immediate access to their information [7]. Studies of broad versus deep menu structures also support this conclusion, with even a study of blind users confirming the preference toward shallow hierarchies [13]. New email interfaces, such as Gmail, have moved away from the traditional "folder" concept for email organization and instead implemented the idea of "labels" being associated with related information. Google also recently released a new feature called a "priority" inbox as another attempt to simplify the process of locating important email [10]. The question regarding such changes is whether concepts such as "labels" may not solve email organization and search problems for blind users, but instead confuse the user if they are expecting to use traditional email folders. An evaluation of new approaches such as the Gmail "priority" inbox approach should be conducted with screen reader users who are blind.

The email calendar functionality is a vital part of enabling an individual to fully collaborate in the workplace, as exemplified by the use of the calendar to schedule meetings and manage one's schedule. Calendar usability and navigation for blind users must be examined in more detail. Contacts could also become more usable, with 85

out of 118 (72 %) of respondents reporting that a feature to more easily automatically add contacts to the address book would be a benefit to them (not simply an auto-complete cache of email addresses). It may be that users prefer to know that contact information is more permanently stored in their address book rather than contact information merely being cached data, and the previous discussion of auto-complete lists noted the difficulty that users experience with that feature.

The problem of recognizing and reading email attachments is more complicated than many of the other issues, primarily because attachments are often from various sources and in many different file formats. Gmail has addressed this problem by providing the option to view file attachments as HTML, but this has been problematic with some file sizes, content, and formats [9]. A reliable solution similar to this for all email clients would go a long way in improving the accessibility of third-party attachments for blind users.

The user comments regarding unique sounds for messages of importance could be investigated further as a possibility for data sonification studies. Beyond merely a notification for a new email message or the wish for a unique notification for messages of high importance, perhaps other activities in email applications (such as notification of email attachments and calendaring) could also be enhanced by the use of data sonification. Research by Zhao et al. [37] explored the possibilities of data sonification for blind users accessing georeferenced data, and this may serve as a foundation for future research on email sonification.

Visual CAPTCHAs have caused accessibility barriers and frustrations for blind users when registering for or using web-based email applications. Traditional CAPTCHAs have slowly been augmented by optional audio CAPTCHAs; however, research by Lazar et al. [16] has demonstrated that even the new radio clip audio CAPTCHAs do not provide sufficient usability. Alternative CAPTCHAs which use recognizable sounds to augment visual CAPTCHAs (such as HIPUU) have been developed to address this challenge [24], and their successful implementation may begin to correct this serious problem.

Spam still represents a great concern to both blind and sighted users, and there is also still a need for precise spam filtering that avoids false positives and negatives. Recent research by Zheleva et al. [38] has proposed augmenting current spam filters with reporter-based software, in which trusted users contribute to a common repository of reported spam sources. While this does not solve the problem of false positives and negatives, this and similar solutions may help to find creative ways to address the problem of spam.

6 Conclusion

The data obtained through this extensive survey should highlight the challenges and opportunities for further investigation and interface improvements. It is heartening to see renewed political interest and new legislation being proposed to expand the reach of policies which attempt to promote electronic equality, such as the Equality Act in the UK [11], the US Section 508 refresh [28], and the Twenty-First Century Communications and Video Accessibility Act, in the US, which attempts to ensure access to Internet communication devices and video for people with disabilities [12]. The following agenda reflects both the priority items emerging from this survey (based on the number of problems reported), as well as other ideas for future research relating to this topic:

- Continue research into methods for better search and organization of email (for both blind and sighted users)
- Examine in depth the issues related to email calendaring and contacts that are experienced by blind users
- Develop creative concepts for reading third-party email attachments so that they can be easily recognized and accessed by blind users
- Conduct research exploring the sonification of email features and the possible benefits it could have for blind users
- Evaluate the impact of spam email on individuals with impairments and disabilities
- Evaluate the usability of email interfaces on mobile devices for blind users.

Research inspired by this study further investigated the usability of both desktop and web-based email interfaces [32]. In addition, a new web-based email calendar prototype was developed and evaluated [33]. Email is an essential tool for collaboration in the modern workplace. The opportunity for all individuals to be able to use it equally should not be ignored. The universal usability of all interfaces should continually be evaluated, and more research that focuses on these challenges is a clear necessity.

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Appendix: Survey structure

The following is a text description of the survey structure and included questions. Questions that triggered additional questions about a topic are preceded by an asterisk.

Since it was an adaptive survey, some questions were only asked if the answer to a previous question triggered their display.

Demographics

1. What is your gender?
2. What is your approximate age?
3. Are you currently employed?
4. If employed, what is your current occupation?
5. Approximately how many years have you been using email?
6. How many times per day do you check your email?
7. Where do you primarily use email?
8. How many hours do you typically spend per day using email?
9. Are you currently enrolled in any academic classes at a college or university?

Spam and phishing

10. Please select the statement that best describes your experience with spam emails:
 - a. Spam is not a problem to me
 - b. Spam is somewhat of an annoyance to me
 - c. Spam is very frustrating and embarrassing at times
 - d. Spam is so frustrating it almost causes me to not use email
11. *Are you using a spam filter?
12. How often does your spam filter mistakenly filter out legitimate email?
 - a. Never
 - b. Very rarely
 - c. Once or twice a week
 - d. Several times a week
 - e. Almost every day
13. Other than a spam filter, what other things do you do if any to handle spam emails?
14. Phishing refers to an email that tries to make you think that it is from a legitimate web site like your bank or credit card company when it is really an attempt to obtain your personal information for unauthorized or illegal purposes.
15. Have you experienced a problem with phishing emails?
16. How difficult is it for you to determine whether an email is a phishing email or legitimate email? Please rate the level of difficulty on a scale of 1–5 with 5 being the most difficult.

Email address book

17. *Do you use an email address book?
18. What is the level of difficulty that you experience when you add contacts to your email address book? Please rate the level of difficulty on a scale of 1–5 with 5 being the most difficult.
19. Would you benefit from an email function that would allow you to automatically add contacts to your address book by checking a box when replying to an email?

Email calendar

20. *Do you use an email calendar?
21. What is the level of difficulty that you experience when using the email calendar? Please rate the level of difficulty on a scale of 1–5 with 5 being the most difficult.
22. Please describe the problems that you have with your email calendar.

Email reminders

23. *Do you use email reminders?
24. What is the level of difficulty that you experience when you create or view your email reminders? Please rate the level of difficulty on a scale of 1–5 with 5 being the most difficult.
25. Please describe the problems that you experience with your email reminders.

Email search and organization

26. Please describe how you know if there are important or flagged messages in your email inbox.
27. What is the level of difficulty that you experience when you attempt to sort your email messages? Please rate the level of difficulty on a scale of 1–5 with 5 being the most difficult.
28. What is the level of difficulty that you experience when you attempt to search for email messages? Please rate the level of difficulty on a scale of 1–5 with 5 being the most difficult.
29. What amount of email do you estimate is stored in your email inbox on a regular basis?
30. Please select any other method that you use, if any, to organize your email messages:
 - a. Responding to or deleting the message immediately

- b. Waiting until the email is no longer needed and it can be deleted
- c. Storing the message in a folder
- d. Using a third-party search product like Google desktop

Open-ended email improvement question

31. If you could name the most important improvements that could be made to email software to make it more accessible and usable to you, what would they be?

Desktop email

The following question relates to desktop email software such as Microsoft Office Outlook or Lotus Notes.

32. *Do you use any desktop email software—not web-based email?
33. *Please select the type of email software that you primarily use:
 - a. Microsoft Outlook Express
 - b. Windows Mail
 - c. Microsoft Outlook 2000
 - d. Microsoft Outlook 2002
 - e. Microsoft Outlook 2003
 - f. Microsoft Outlook 2007
 - g. Lotus Notes 6
 - h. Lotus Notes 7
 - i. Lotus Notes 8
 - j. Novell GroupWise 5
 - k. Novell GroupWise 6
 - l. Novell GroupWise 7
 - m. Other, not listed

Microsoft outlook

34. *Do you use the auto-complete feature in Microsoft Office Outlook?
35. How satisfied are you with the auto-complete feature? Please select your level of satisfaction on a scale of 1–5, with 5 being the most satisfied.
36. *Do you use Microsoft Outlook Rules to organize messages?
37. How difficult is it to set up the Rules? Please rate the level of difficulty on a scale of 1–5 with 5 being the most difficult.
38. *Do you change the settings on your email folders to make them easier to use with your screen reader?
39. Please explain which settings you typically change.

Web-based email

40. *Do you use web-based email?
41. Please rate the level of importance of web-based email to you on a scale of 1–5 with 5 being the most important.
42. *Please select the type of web-based email that you primarily use:
 - a. Gmail
 - b. Yahoo Mail
 - c. Hotmail
 - d. AOL
 - e. SquirrelMail
 - f. Outlook Web Access 2003
 - g. Outlook Web Access 2007
 - h. Lotus Notes Webmail
 - i. GroupWise Webmail
 - j. Other, not listed

Outlook web access

43. Please describe what problems if any you experience with Outlook Web Access 2003.
44. Please describe what problems if any you experience with Outlook Web Access 2007.
45. Have you ever used Outlook Web Access 2007 Light?
46. How well does Outlook Web Access 2007 Light work to correct the accessibility problems of Outlook Web Access?
 - a. No noticeable improvement
 - b. Some improvement
 - c. Major improvement
47. Please describe the problems if any that you experience with Outlook Web Access 2007 Light.

Yahoo mail

48. Please describe the features if any that you like about Yahoo Mail.
49. Please describe the problems if any that you experience when using Yahoo Mail.

Gmail

50. Please describe the features if any that you like about Gmail.
51. Please describe the problems if any that you experience when using Gmail.

Hotmail

52. Please describe the features if any that you like about Hotmail.
53. Please describe the problems if any that you experience when using Hotmail.

SquirrelMail

54. Please describe the features if any that you like about SquirrelMail.
55. Please describe the problems if any that you experience when using SquirrelMail.

Social networking

56. *Have you ever used an online social networking web site such as Facebook or MySpace?
57. Please describe the difficulties if any that you experience with the email features of the online social networking service such as Facebook or MySpace.

BrailleNote

58. *Do you use BrailleNote for email access?
59. How satisfied are you with the ability of BrailleNote to provide accessible email? Please rate your level of satisfaction on a scale of 1–5 with 5 being the most satisfied.
60. Please describe any limitations or problems that you experience when using BrailleNote.

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