

User Acceptance of the Microsoft Ribbon User Interface

MARTIN DOSTÁL

Palacký University of Olomouc
 Department of Computer Science
 Třída 17. Listopadu 12, 771 46 OLOMOUC
 CZECH REPUBLIC
 dostal@inf.upol.cz

Abstract: Modern graphical user interfaces are based on the WIMP (Window, Icon, Menu, Pointing device) paradigm which has been introduced around 1980 and used without any dramatic change until today. In 2007, Microsoft introduced the Ribbon: a radically redesigned user interface for the Office suite as a reaction to increasing complexity of the Office suite user interface with each new version release. We carried out a qualitative user study on the Microsoft Word 2007 in order to analyse how the Ribbon user interface is accepted by users.

Key-Words: User interfaces, WIMP paradigm, Ribbon user interface, user study, evaluation, qualitative approach.

1 Introduction

User interface principles of today graphics user interface (GUI) applications have quite a long history. The WIMP (Window, Icon, Menu, Pointing device) paradigm has been developed in Xerox PARC around 1980 (see [6, 14] for description of the famous GUI of the Xerox Star workstation) and popularised by Apple in 1984 when the Apple Macintosh computer has been introduced and successfully marketed. Afterwards, the WIMP paradigm has been adopted to most systems with GUI, including Microsoft Windows, Mac OS X and graphical desktop environments for Linux, such as GNOME or KDE. Actually, the present graphical desktops use similar design, provide similar user controls and offer basically the same interaction techniques: menus, toolbars, keystrokes, pop-up menus and forms or dialogs composed of user controls. Although the idea of WIMP has not been dramatically changed since early 80-ties, software applications did.

Software applications have dramatically increased offered functionality that resulted in increasing complexity of user interfaces. Each new version release provides additional features which increase the visual clutter of GUI interfaces (size of menus, toolbars and dialogs) and requires more user experience and more complete understanding of computers. This phenomenon has been termed *creeping featurism* [4, 10]. The causes of this phenomenon can be obviously identified in an explosion of the size and diversity of user population and a competitive struggle between software companies. It became known as *feature war*.

An illustrative example of increasing user inter-

face complexity can be provided with the Microsoft Word application. The rapid growth of toolbar and menu item count well demonstrates the increase of the user interface complexity over individual version releases, see Figure 1. However, McGrenere's study on Microsoft Word 97 [9] points out that most users use only a small subset of the provided functionality while many user commands remain never or rarely used. We also performed our own study on usage of word processing applications which is focused to utilisation of functionality and interaction styles among various word processing application. We briefly summarise our observations in Section 3.2. Our study also outlines that the used functionality differs largely from user to user, even on similar tasks.

2 Ribbon User Interface

The growing complexity of user interfaces has been addressed by research and to some extent also commercial, community using various approaches, such as *scaling* of software to variously featured versions [7, 8], *personalisation of user interfaces* [2, 3, 12] or proposing novel interaction techniques. The last mentioned approach has been utilised by Microsoft which introduced the so called Ribbon User Interface (RUI for short in the rest of the paper) in Microsoft Office 2007. It can be said that this is one of the most radical innovations of the WIMP paradigm since its introduction. However, originality of the RUI is quite questionable. The idea of tabbed toolbars had been used in several applications prior to introduction of the RUI, e.g., in Allaire HomeSite, Lotus eSuite or Borland Delphi.

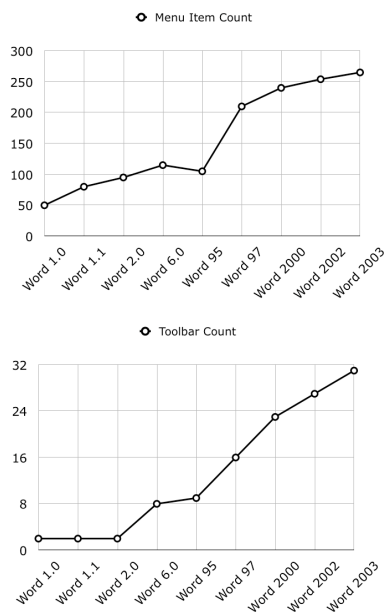


Figure 1: The growth of Microsoft Word user interface complexity

Basically, a ribbon is represented as a panel with tabbed toolbars which replaces original menus, toolbars and (to some extent) dialog panes in WIMP based applications. Each tab provides a set of commands and options represented using various interface controls. In comparison to menus, a ribbon is less hierarchical which presumably improves discoverability of the provided options and user commands. A ribbon provides a "one-click" availability of the most of user commands, in contrast to hierarchical menus. The availability of user commands is also supported by *Contextual tabs*; when a particular object type is selected, a tab with corresponding user commands is displayed. On the other side, a ribbon occupies quite a lot of a screen space and is visually complex. Additionally, some tabs use the so called *Rich User Commands* feature which enables various visual representations and various behaviour of a user command, however such a feature may be not always easy to understand for the user.

The contribution of the RUI is a somewhat controversial topic since there are many proponents and opponents. Although the RUI has been broadly and lively discussed in the popular press, discussion forums or reviews, there are, as far as we know, no research studies on user acceptance of the RUI available. According to "The Story of the Ribbon" keynote presented at MIX 08 conference, Microsoft performed some studies on the RUI. However the results are not publicly available. This paper introduces such a study

on acceptance of the RUI of the Word 2007 by users. The study is based on qualitative measures surveyed using a questionnaire. The subjective users' measures are important for exploring user experience besides quantitative measures (such as task speed, error rates, etc.), because not always the both approaches provide corresponding results.

3 Study Design

We surveyed users' opinions on the RUI of Word 2007 within the scope of a more extensive survey focused on the usage habits in word processing applications. The survey covers various aspects related to word processing, i.e., users' knowledge and experience with computers, intensity of usage of particular types of applications, utilisation of individual word processing applications, utilisation of functionality and interaction styles in word processing, users' opinions on hypothetical intelligent features in word processing applications and opinions on the RUI. The section of questionnaire related to the RUI consisted of eight questions (see Section 4) which investigate users' opinions on the RUI in comparison to common WIMP user interfaces of word processing applications, such as Microsoft Word 95-2003, OpenOffice.org Writer, WordPad or Pages (a word processor for the Mac OS X).

Responses to individual questions (in this paper we utilise only a fraction of a complete survey) are either ratio (e.g., age or years of word processing applications usage) or ordinal variables (e.g., "State, how frequently you use Word 2003" on 1-5 scale, 1=not using at all, 5=using frequently). Subjective responses (e.g., "Ribbon user interface is annoying") are measured on 5-Point Likert scale (strongly disagree = 1, disagree = 2, neutral = 3, agree = 4, strongly agree = 5) if not stated other.

The questionnaire has been prepared and carried out using the LimeSurvey — an open source online survey application (www.limesurvey.org). The data was analysed statistically using the "R" [11] (www.r-project.org). Statistical results are reported according to the APA style [1].

3.1 Sample

One-hundred and seventeen users participated in our survey on word processing. However only 68 of them had an experience with the RUI in Word 2007 and responded to corresponding questions. Participants (23 females and 45 males) were aged from 16 to 45 (M=22.57 years). The sample was not representative in terms of age and education. Participants have quite

high overall computing experience ($M=3.88$, on the 5-point scale, $Max=5$, $SD=.90$) and a long-term experience with word processing ($M=9.54$ years, $SD=3.20$).

Participants also reported a frequency of usage of particular types of applications on the five-point scale (1=not use at all, 5=use frequently); word processing applications ($Mdn=4$, $Mode=5$), e-mail clients ($Mdn=4$, $Mode=5$), spreadsheet applications ($Mdn=3$, $Mode=2$), web browsers ($Mdn=5$, $Mode=4$) and presentation applications ($Mdn=3$, $Mode=2$).

In the case of word processing applications we surveyed also the usage of individual word processing applications. A participant could state utilisation of arbitrary number of word processing applications. There were 49 participants using Word 2003 (that is, participants who selected value two or higher on the five-point scale), 14 participants using Word 2000, 33 participants using WordPad, 30 participants using OpenOffice.org 3.x and 9 participants using OpenOffice.org 2.x. Other word processing applications were used by less than four users and we do not report them here.

3.2 Findings on functionality and interaction styles

Now we briefly introduce our findings on utilisation of functionality (what users use) and interaction styles (how users use the offered functionality). Users stated information about the frequency of usage of the 179 selected user commands (25 of them were the Microsoft Word specific commands and other 39 were specific to the OpenOffice.org Writer) which covers most of the user commands represented as menu items, toolbar items and pop-up menu commands available in the OpenOffice.org Writer. Users stated the frequency of usage on the following 6-point scale: *I do not use and do not know such command*, *I do not use, but know such command*, *I use the command rarely*, *I use the command routinely*, *I use the command regularly* and *I use the command frequently*. In the case of commands used *at least routinely* (routinely or regularly or frequently) a user stated which interaction styles he/she uses to perform individual user commands. Possible options were: menu, toolbar, keystroke and pop-up menu.

The RUI users use on average 79.6 commands at least routinely ($SD=26.5$), 46.5 commands at least regularly ($SD=28.3$) and 26.3 commands frequently ($SD=21.2$). Quite surprising is data about functionality shared among users; only eight user commands are used frequently by more than 50 % of participants (Paste, Save, Copy, Undo, Cut, Close, New and Open). If we turn our focus from *frequently*

used commands to the *at least regularly* used commands, we will see that only 16 commands are used by more than 75 % of users. The data suggest that the differences in used functionality between users are considerable. In addition, while a user uses on average 79.6 commands at least routinely, the average difference between users on at least routinely used functionality is 61.2 functions ($Min=19$, $1Q=50$, $Mdn=59$, $3Q=70$, $Max=140$). The overall percentage of utilisation of individual interaction styles is following: menu ($M=58$, $SD=22.7$), toolbar ($M=31.3$, $SD=17.5$), keystrokes ($M=15$, $SD=9.5$) and pop-up menu ($M=12.1$, $SD=11.1$).

4 Results on User Experience

In this section we analyse responses to questions related to the RUI. Since the most of the statistical variables in the survey are ordinal and the data has other than normal distribution, we use non-parametric method of statistical inference, namely Spearman's correlation and Kruskal-Wallis test [13].

4.1 Questions

A part of questionnaire related to the RUI has been composed of eight questions. Questions A–D, F and G are formulated as a comparison between the Word 2007 RUI and a classical WIMP user interface of word processing applications.

- A Ribbon user interface has better arrangement than classical WIMP interfaces.
- B Using the Ribbon user interface it is easier to find a particular user command.
- C Ribbon user interface is easier to use.
- D Ribbon user interface is more efficient.
- E Ribbon user interface is annoying.
- F A switch-over to the Ribbon user interface has not been too difficult for me.
- G A classic WIMP user interface was better.
- H Estimate a number of days required to get accustomed to the Ribbon user interface.

A first look at the overall responses is somewhat surprising. Responses to questions A–G are well-balanced on the 5-point Likert's scale, see Figure 2. In Table 1 we report the descriptive statistics of the

| | A | B | C | D | E | F | G |
|--------|-----|-----|-----|-----|-----|-----|-----|
| mode | 2 | 2 | 4 | 3 | 2 | 4 | 3 |
| median | 3.0 | 2.5 | 3.0 | 3.0 | 2.5 | 4.0 | 3.0 |

Table 1: Median and mode of responses to individual questions

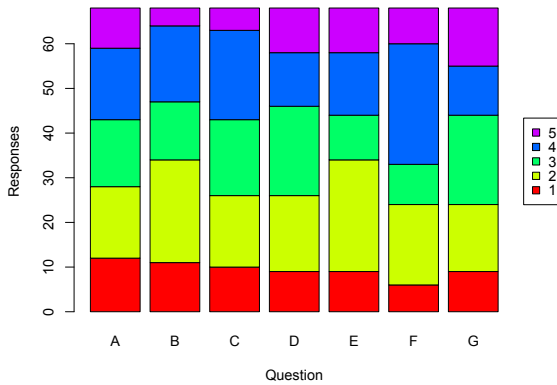


Figure 2: Barplot of responses to the Ribbon user interface related questions

surveyed questions¹. The overall response to individual questions is quite neutral, except the question "F": participants consider a switch-over from the classic interface to the RUI as fairly easy.

Question "H" surveyed a number of days required to get accustomed to the RUI. It was responded by 63 of 68 participants. We report the descriptive statistic: Min=0, 1st Qu.=2.00, Median=7.00, M=11.66, 3rd Qu.=18.75, Max = 60.00. Surprisingly, no significant differences were found for the age of respondents.

| | A | B | C | D | E | F |
|---|-------|-------|-------|-------|-------|-------|
| B | 0.82 | | | | | |
| C | 0.74 | 0.79 | | | | |
| D | 0.72 | 0.74 | 0.79 | | | |
| E | -0.64 | -0.60 | -0.70 | -0.70 | | |
| F | 0.47 | 0.50 | 0.39 | 0.49 | -0.50 | |
| G | -0.74 | -0.67 | -0.69 | -0.73 | 0.73 | -0.52 |

Table 2: Spearman's correlation ranks between responses to individual questions related the Ribbon user interface

¹We don't report arithmetic mean because it is for ordinal data inappropriate.

| | (16,23.2] | (23.2,30.5] | (30.5,37.8] | (37.8,45] |
|--------|-----------|-------------|-------------|-----------|
| mode | 3 | 4 | 1 | 1 |
| median | 3 | 3 | 2 | 1 |

Table 3: Mode and median values for question "A"

We found that responses to RUI related questions were strongly correlated. Spearman's $\rho(68)$, $p < .001$ of individual comparisons is depicted on Table 2. The lowest correlation rank was found between question "C" (Ribbon is easier to use) and "F" (A switch-over to the Ribbon user interface has not been too difficult for me).

4.2 Hypotheses

Our hypotheses were as follows:

- H1** Ribbon user interface is received better by younger people.
- H2** Less experienced users consider a switch-over to the Ribbon user interface as more difficult.
- H3** More experienced users are less satisfied with the Ribbon user interface in comparison to less experienced ones.
- H4** Intensive users of Word 2003, OpenOffice.org or another Word 2007 predecessor are less satisfied with the Ribbon user interface.

4.3 Results

4.3.1 Ribbon user interface acceptance by users across age

We ran a Kruskal-Wallis [13] test and used Wilcoxon signed ranks with a Bonferroni adjustment for pairwise comparisons. The only significant difference was found for question "A", $\chi^2_{(4,N=68)} = 10.36, p = .034$. No pairwise comparisons were significant. Respondents over 30.5 years strongly disagree that the RUI has a better arrangement than classic user interface, see Table 3 for mode of question "A" by age split into the four intervals.

Hypothesis supported: Partially.

4.3.2 Impact of user experience on a switch-over to the Ribbon user interface

The survey observed various aspects of user experience such as years of a computer experience (M=11.43, Mdn=10, SD=3.81), hours spent daily at a computer (M=6.48, Mdn=6, SD=3.45), hours spent

weekly with word processing applications ($M=6.32$, $Mdn=4$, $SD=5.83$), years of word processing experience ($M=9.54$, $Mdn=10$, $SD=3.20$) and an overall computing experience ($1=Min, 5=Max$, $Mdn=4$, $Mode=3$). We ran Kruskal-Wallis tests between variables expressing computer experience and responses to question "F", with exception of the overall computing experience variable, where we ran a Spearman's correlation test [13]. However, no significant differences were found.

Hypothesis supported: No.

4.3.3 More experienced users are less satisfied with the Ribbon user interface

To test this hypothesis we use the same variables as in the test described in the previous section.

For question "A" we found a significant difference $\chi^2_{(4,N=68)} = 9.34, p = .05$ on years of a word processing experience. Users with longer word processing experience do not consider the RUI as well organised ($Mode=2$).

For question "B" we found a significant difference $\chi^2_{(4,N=68)} = 10.17, p = .037$ on years of a computer experience. Users with longer computer experience do not agree with the claim stated in question "B". In more detail, the mode of years of computer experience (2.99,6.49]: $Mode=4$, (6.49,10]: $Mode=2$, (10,13.5]: $Mode=1$, (13.5,17]: $Mode=2$.

For question "C" we found a significant difference $\chi^2_{(4,N=68)} = 11.14, p = .024$ on years of a word processing experience and $\chi^2_{(4,N=68)} = 12.63, p = .013$ on hours spend weekly on word processing. Users with stronger word processing experience, less agree that the RUI is easier to use. In more detail, the mode of hours spent weekly with word processing: (0.926,19.5]: $Mode=4$, (19.5,38]: $Mode=3$, (38,56.5]: $Mode=2$, (56.5,75.1]: $Mode=2$.

For question "D" we found a significant difference $\chi^2_{(4,N=68)} = 9.58, p = .04$ on years of a word processing experience.

For questions "E" and "G" no significant differences were found.

Hypothesis supported: Yes.

4.3.4 Intensive users of Word 2003, OpenOffice.org or another Word 2007 predecessor are less satisfied with the Ribbon user interface

Since responses to questions A-G and responses to questions on intensity of individual word processing applications usage are ordinal, we ran Spearman's correlation rank tests in order to test the hypothesis.

For question "A", we found a significant correlation on the Word 2007 usage, $\rho(68) = .30, p = .01$ and found a significant negative correlation on Word 2003 usage, $\rho(68) = -.31, p = .007$.

For question "B", we found a significant correlation on the Word 2007 usage, $\rho(68) = .31, p = .009$. Although there was no significant correlation found for the Word 2003 usage, we found a significant correlation on usage of word processing applications as such $\rho(68) = -.29, p = .01$, web browsers $\rho(68) = -.26, p = .02$ and spreadsheets $\rho(68) = -.29, p = .01$.

For question "C", we found a significant correlation on the Word 2007 usage, $\rho(68) = .42, p < .001$ and found a significant negative correlation on the Word 2003 usage, $\rho(68) = -.29, p = .01$ and a significant correlation on the WordPad usage, $\rho(68) = .24, p = .04$. An interesting point there is a positive correlation between question "C" and the WordPad usage in contrast to a negative correlation between question "C" and the Word 2003 usage.

For question "D", we found a significant correlation on the Word 2007 usage, $\rho(68) = .48, p < .001$. No other significant correlations were found, even for the Word 2003 usage. This suggests that the Word 2007 users consider the RUI as more efficient than a classic WIMP interface of word processing applications.

For question "E", we found a significant negative correlation on the Word 2007 usage, $\rho(68) = -.43, p < .001$ and found a significant correlation on the Word 2003 usage, $\rho(68) = .32, p = .006$.

For question "F", we found a significant correlation on the Word 2007 usage, $\rho(68) = .29, p = .01$, found a significant negative correlation on the Word 2003 usage, $\rho(68) = -.27, p = .02$. We also found a significant correlation on the OpenOffice.org Writer 3.x usage, $\rho(68) = -.28, p = .01$.

For question "G", we found a significant negative correlation on the Word 2007 usage, $\rho(68) = -.38, p = .01$, found a significant correlation on the Word 2003 usage, $\rho(68) = .39, p < .001$ and found a significant correlation on the OpenOffice.org Writer 3.x usage, $\rho(68) = .27, p = .02$.

To summarise, there is a strong evidence that users who intensively use or used word processing applications with a classical WIMP interface are quite critical of the RUI in various aspects. However, the Word 2007 users report fair satisfaction with its user interface.

Hypothesis supported: Yes.

4.4 Impact of interaction styles on Ribbon user interface acceptance

We ran series of 28 (seven questions by four interaction styles) Kruskal-Wallis tests to investigate an impact of interaction styles on the RUI opinions. Afterwards we used Wilcoxon signed ranks with a Bonferroni adjustment for pairwise comparisons.

We found a slight preference of the RUI by users who use toolbars more intensively than others. A significant difference was found for question "A", $\chi^2_{(4,N=68)} = 12.09, p = .01$, and question "C", $\chi^2_{(4,N=68)} = 11.31, p = .02$. However, no pairwise comparisons were significant.

5 Word Assessments

The participants could state a comment on pros and cons of the RUI. Twenty-six of 68 participants left such a comment. Unexpectedly, the most frequent comment was not about a functional or behavioural issue; seven participants commented out that they like a visual appearance of the RUI. One participant criticised the visual clutter and he put the following comment: *I don't like it at all. From a modern civilisation back to pictograms and hieroglyphs.*

Three participants highlighted the LivePreview feature, which displays what the results would like whenever a user hovers a command with LivePreview support. One participant positively commented out the contextuality of the RUI tabs.

It is a quite surprising finding that participants were not critical about the visual and behavioural complexity of the RUI in comparison to a classical WIMP interface. The visual appearance and design of the RUI is obviously more complex than classic WIMP interfaces and the behaviour of the RUI is more complex since it supports various advanced features, such as LivePreview, Contextual tabs, Galleries or Advanced tooltips. Although we cannot support that claim in our survey, we assume that the power and efficiency of the RUI lies mainly in an improved accessibility of user commands (many commands are available through one or two clicks since the RUI is much less hierarchical than a WIMP interface) and better layout rather than visual clarity of the Ribbon user interface.

6 Summary and Conclusion

In Section 4.1 we stated that the acceptance of the RUI is from an overall view rather inconclusive. However, further analysis showed that the RUI is received quite well by users, except experienced and frequent

users of word processing applications with a classical WIMP interface. Such a user group is less convincing about the RUI in terms of efficiency and organisation. We conclude that the biggest issue with the RUI is to get accustomed to a redesigned user interface.

Nevertheless, in context of the switch-over related issues, there is another point that should be taken into account. According to the Windows Vista Human Interface Guidelines [5], the RUI is not thought as a replacement for a WIMP interface. It is considered rather an alternative to WIMP. Human user interface guidelines recommends the RUI for mid-sized applications for a document creation, authoring, or a document-based viewers of browsers. However for advanced applications (such as development environments) or simple applications (such as utilities, games or configuration panels) another type (including classical WIMP interfaces) of user interface presentation is recommended. Our findings suggests that the simultaneous utilisation of WIMP and Ribbon interface in one GUI environment could be inefficient and unnatural for the user. We assume that the corresponding design concepts and guidelines of the Microsoft Windows user interface could be reconsidered in future in order to take the full advantages of the Ribbon user interface.

In our study we analysed the Ribbon user interface using qualitative research methods. However, both qualitative and quantitative research is necessary to gain understanding of the Ribbon user interface properties. In example, an evaluation of task times, user command selection speeds and error rates represent important directions for further research.

7 Acknowledgement

I would like to thank the Faculty of Informatics and Management of University of Hradec Králové for supporting this research.

References:

- [1] American Psychological Association. American psychological association publication manual, fourth edition., 2009.
- [2] Leah Findlater and Joanna McGrenere. A comparison of static, adaptive, and adaptable menus. In *CHI '04: Proceedings of the SIGCHI conference on Human factors in computing systems*, pages 89–96, New York, NY, USA, 2004. ACM.
- [3] Krzysztof Z. Gajos, Mary Czerwinski, Desney S. Tan, and Daniel S. Weld. Ex-

- ploring the design space for adaptive graphical user interfaces. In *AVI '06: Proceedings of the working conference on Advanced visual interfaces*, pages 201–208, New York, NY, USA, 2006. ACM.
- [4] Idris His and Colin Potts. Studying the evolution and enhancement of software features. In *ICSM '00: Proceedings of the International Conference on Software Maintenance (ICSM'00)*, page 143, Washington, DC, USA, 2000. IEEE Computer Society.
- [5] Microsoft inc. *Windows Vista User Experience Guidelines*. Microsoft, 2007.
- [6] Jeff Johnson, Teresa L. Roberts, William Verplank, David C. Smith, Charles H. Irby, Marian Beard, and Kevin Mackey. The xerox star: A retrospective. *Computer*, 22(9):11–26, 28–29, 1989.
- [7] Joanna McGrenere, Ronald M. Baecker, and Kellogg S. Booth. An evaluation of a multiple interface design solution for bloated software. In *CHI '02: Proceedings of the SIGCHI conference on Human factors in computing systems*, pages 164–170, New York, NY, USA, 2002. ACM.
- [8] Joanna McGrenere, Ronald M. Baecker, and Kellogg S. Booth. A field evaluation of an adaptable two-interface design for feature-rich software. *ACM Trans. Comput.-Hum. Interact.*, 14(1):3, 2007.
- [9] Joanna McGrenere and Gale Moore. Are we all in the same "bloat"? In Sidney Fels and Pierre Poulin, editors, *Graphics Interface*, pages 187–196. Canadian Human-Computer Communications Society, 2000.
- [10] Donald A. Norman. *The invisible computer*. MIT Press, Cambridge, MA, USA, 1998.
- [11] R Development Core Team. *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing, Vienna, Austria, 2009. ISBN 3-900051-07-0.
- [12] Andrew Sears and Ben Shneiderman. Split menus: effectively using selection frequency to organize menus. *ACM Trans. Comput.-Hum. Interact.*, 1(1):27–51, 1994.
- [13] Sidney Siegel and N. John Castellan. *Nonparametric Statistics for the Behavioral Sciences*. McGraw-Hill, New York, second edition, 1988.
- [14] David Canfield Smith, Charles Irby, Ralph Kimball, and Eric Harslem. The star user interface: an overview. In *AFIPS '82: Proceedings of the June 7-10, 1982, national computer conference*, pages 515–528, New York, NY, USA, 1982. ACM.