GNOME Usability Study Report

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Executive Summary

GNOME is a great example of distributed development by the open source community. One of its strengths lies in the community's ability to critique itself. Sun's Human Computer Interaction staff bring a new perspective to this project. It's our expressed goal of joining fully in the development activities, with the idea that a non-programmer user is our target customer.

Sun's GNOME usability staff in Menlo Park, California, conducted a baseline usability study of the GNOME desktop during the week of March 13-16, 2001. We recruited a dozen adult participants, each with several years of experience using computers in their work - but specifically not with backgrounds in computer science, software development or programming - to use GNOME 1.2.2 on Linux with Nautilus installed.

Our goals were to capture initial reactions to GNOME, a new desktop environment, from the expected user population of business, creative and scientific professionals.

- Business Professionals - e.g. Financial Analyst, Director of Marketing, Business Analyst
- Scientific Professionals - e.g. Mechanical Engineer, Analytic Chemist, Director of Diagnostics

- Creative Professionals - e.g. Videographer, Graphic Designer, Web Content Manager

For a more detailed breakdown of the participant mix see [Appendix 1. Participant Mix](#).

The participants were asked to log in to the system, comment on the look of the desktop and then each participant in turn used GNOME for common file management and desktop customization tasks, with which they were presumably familiar from their previous computer experience. The participants were given a [Participant Script](#) to follow.

The report that follows gives detailed findings of the study and makes 32 design recommendations. For each finding relevant usability principles are invoked. Where possible, these principles are expanded upon in [Appendix 4: Usability Principles](#). The study findings are organized by the tasks undertaken, and are summarized again in [Appendix 3: Summary of Design Recommendations](#).

Improving GNOME's usability means a user will better be able to predict what's going to happen, and to understand what's just happened as the user interacts with the system. The desktop environment may be different from those the user has previously experienced. Incorporation of these principles will promote learning of a new environment, as well as graceful recovery from errors. The most successful environment will allow the user to accomplish the intended tasks without constantly being aware of the interface as a collection of objects and behaviors.

Note to readers: Throughout this report comments are attributed to participants by the participant number. For example, Participant 4 (P4) made the following comment:

> *"I felt that [GNOME] was really fun to discover."* (P4)

GNOME Usability Study Report :: Architectural Issues

July 2001

Architectural Issues

Throughout the study, we saw large-scale issues that impacted the user experience. These issues are pervasive throughout the desktop and are not constrained to any specific component. They surfaced throughout the study as users completed different tasks. These issues have resulted from architectural choices made throughout the GNOME development cycle. GNOME's dispersed development process should be transparent at the user level but it currently shows through. This results in confusion for the user who is confronted with inconsistent terminology and user interfaces, multiple ways to accomplish tasks, and information that is not organized intuitively, requiring the user to manipulate similar information in separate locations. The user is also presented with overwhelming amounts of detail and complexity, all displayed at the same level.

One example of where the underlying system architecture is exposed and confusing users occurs in the poor organization of menus. Users made the following comments about the menu organization throughout GNOME, which they did not find intuitive:

> *"'Settings' should be in the control panel...'Settings' is not a program!"* (P7)
> *"I wouldn't expect 'Settings' or 'System' to be under 'Program'."* (P9)
> *"'Foot > Panel > Global Preferences...', I wouldn't think those would have to do with the panel."* (P6)
> *"There are lots of options. Do they consider 'Programs' to be the same as 'Applications'? I'm not sure of the overlap between the menu items."* (P3)

an one user, after right clicking on panel, commented:

> *"It's giving me the same choices as up here!"* (P2)

As they spent more time completing the study tasks, users were exposed to the terminology throughout GNOME. Their feedback included:

> *"For people not as versed in UNIX and UNIX terminology, it might be confusing."* (P11)
> *"I was surprised at the humor and jargon. I wouldn't expect that in a finished product."* (P6)
> *"Some of the terminology I have no awareness of."* (P4)
> *"It took me a while to look for words I'm used to that would guide me to areas to do work."* (P8)

Users also commented on the GNOME's complexity, in both the number of options and the amount of information on the screen:

> *"Someone might be overwhelmed by the amount of options."* (P7)
> *"There are too many features and icons for somebody new."* (P7)
> *"I wouldn't have as many games for work."* (P10)
> *"It seems like there's more than normal, that it's giving me a whole bunch of choices."* (P1)

"There are a lot of options and menus. All the choices could be tough, it's a lot of information to go through." (P3)
"Some things were accessible that an entry-level user would not want or need, but other things were buried deep." (P11)

and, of the Control Center specifically, they commented:

"There's too much stuff on the [Control Center] screen!" (P5)
"I was surprised by how many things were listed in the Control Center." (P7)
"It's not stuff you know, I don't think it should be here. It should be condensed down to one advanced area." (P10)
"It's a lot to digest, it could be intimidating." (Pilot)

Summarizing their experience and their overall impression of how easy GNOME was to use, users said:

"GNOME was slightly more difficult [than the system I use now]. I was not satisfied with the ease of tasks." (P9)
"If someone showed me it would be okay, but if I was a new employee without help, I wouldn't get it." (P6)
"I felt a little frustrated, I needed help. It's not quite as easy as it could be." (P2)
"You can better it [GNOME] and make it much easier." (P1)

Design Recommendation: These architectural issues, which are pervasive throughout GNOME, would best be addressed in a User Interface Style Guide for GNOME. To solve these issues, which have a large impact on the user experience, will require the coordination and cooperation of the community; to develop user interface guidelines, to implement the necessary changes, and to adhere to the guidelines.

Send feedback to Sun-GNOME-HCI@sun.com

GNOME Usability Study Report :: Logging In

Logging In

Participants' first interaction was with the GNOME login dialog. They were told that a new computer was installed on their desk at work and they were asked to log in to the new system. They were told that their username was Pat and they were given the password.

Login Dialog.

Participants' comments centered around lack of feedback as well as unfamiliar dialog layout and terminology. Comments revealed that the users' mental model was based on experience with stand-alone systems, versus networked environments.

Login Dialog Field Labels:

- **Relevant Usability Principle:** [Match between system and the real world](#).

- When discussing the login dialog, users repeatedly used the word "username" instead of "login". We heard the following comment,

    "When I see 'login' I think "password"." (P8)

- **Design Recommendation:** The term 'login' is unclear, as it is both a noun and a verb. We recommend that the field labeled 'Login' be relabeled 'Username' as depicted in the following illustration.

Login dialog with 'Username'.

We recommend following the [GNOME Documentation Style Guide](#). We also recommend developers to involve a technical writer in the review of any terminology, error messages, or other on-screen text delivered into GNOME. Developers are encouraged to ask terminology questions on the gnome-doc-list@gnome.org mailing list or the #docs channel on IRC.

Login Dialog Focus:

- **Relevant Usability Principle:** [Feedback](#).

- Several users tried to enter the username "Pat" but their entry was not accepted because their cursor was not over the login dialog. The default requires users' cursors to be inside the dialog for it to be active. We heard several comments along the following line:

    "It's not responding when I type in the field." (Participants 8 and 9)

  One user entered her username while window was not active and thought her entry was accepted and but not shown in the text field for security reasons. This user sat there waiting, thinking the system was working, while nothing was actually happening. (P9)

  The only action a user can take at this point is to log in, so it should be as easy as possible for them to accomplish this task. There should minimal opportunity for a user to make an error here.

- **Design Recommendation:** We recommend that the login dialog be made active by default. No matter where the cursor is, the user's entry should go into the text field. The text field should also be in focus by default. It should not be possible for the dialog to become inactive or the text field to lose focus. If it simply is not possible to implement this solution, then feedback, both audio and visual, must be provided if the user tries to type while the cursor is outside the dialog.

Error Feedback:

- **Relevant Usability Principle:** [Feedback](#).

- We saw more than one user experience confusion over the lack of feedback when incorrect login information was entered. If they made error while typing in the login information (either the username or password) the system did not provide feedback that the

user had made an error. Instead, it simply returned to the beginning of the cycle and displayed the username field again.

> *"I expected a dialog saying 'Wrong Username or Password'."* (P3)

With no feedback from the system, users were confused about why they were unsuccessful at logging in or where they made a mistake. Users also had trouble discerning what to do next and some did not recognize that they were brought back to the username field.

- **Design Recommendation:** Provide brief yet clear feedback to the user that communicates what went wrong, why, and what the user can do about it. We recommend providing error feedback within the login dialog itself. For example, the following text string could appear in the login dialog when users enter incorrect login information: "The username or password you entered in incorrect. Letters must be typed in the correct case. Be sure the caps lock key is not selected." This error message would appear above the username field to communicate that the user should try logging in again. The is illustrated below:

Login dialog with 'Username' and error feedback.

We also recommend following the [GNOME Documentation Style Guide](). We also recommend developers to involve a technical writer in the review of any terminology, error messages, or other on-screen text delivered into GNOME. Developers are encouraged to ask terminology questions on the gnome-doc-list@gnome.org mailing list or the #docs channel on IRC.

Input Field Layout:

- **Relevant Usability Principle:** [Consistency and standards]().

- We heard comments from four participants (Pilot, P4, P8, P10) that they were accustomed to and would prefer the username and password fields to appear on the same dialog. This, however, did not prevent the users from successfully logging in.

- **Design Recommendation:** If there are no technical reasons to the contrary, then consider putting the username and password fields together in the same dialog.

Command Buttons:

- **Relevant Usability Principles:** [Feedback. Direct manipulation]().

- Currently there are no command buttons on the login dialog and users must hit enter to send their input to the system. One user, confused after typing in her login information, commented:

  > *"There was no indication of what else to do. I am used to a 'continue' button".* (P9)

  It is standard to include a button to apply users' commands. Users should not have to guess what to do next. Just as it is recommended that that everything one can do with a mouse should be accessible through the keyboard, everything accessible through the keyboard should be supported for the mouse.

- **Design Recommendation:** We recommend supporting users who are more mouse-oriented as well as those comfortable navigating with the keyboard. To support mouse-oriented users, we recommend adding an 'OK' button on both the username and password screens.

Login dialog with 'Username' and 'OK' button.

This button should be the active default. We also recommend consulting the proposed guidelines for accessible keyboard navigation.

Dialog Help:

- **Relevant Usability Principle:** Match between system and the real world.

- When asked, users (P1, P8) did not know what "marge-hci" was in the login dialog. Because there was no label, such as "hostname", "machine name" or "computer name", users did not recognize that they were logging into a machine named "marge-hci". Many future GNOME users will transition from a world of stand-alone machines. They will not come equipped with a mental model of a networked environment or the concept of logging in to different machines from a single machine; the basis of UNIX. We saw this confusion again at the end of the study when we asked users to log out. See Logging Out.

- **Design Recommendation:** Not knowing what "marge-hci" was did not hinder users from successfully completing the task. However, novice GNOME users' confusion did highlight an opportunity for us to provide more assistance. To support new GNOME users we suggest including a Help button or menu in the login dialog. Selecting this button or menu should invoke Help with information about the elements and terminology found in the dialog. Again, we recommend following the GNOME Documentation Style Guide. We encourage developers to involve a technical writer in the review of any terminology, error

messages, or other on-screen text delivered into GNOME. Developers are encouraged to ask terminology questions on the gnome-doc-list@gnome.org mailing list or the #docs channel on IRC.

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GNOME Usability Study Report :: Exploring the GNOME Desktop

July 2001

Exploring the GNOME Desktop

After logging in to the new system, participants were asked to describe what they saw on the desktop. They were asked not to move the mouse, so tooltips would not provide clues about the icons and objects on the desktop. After about 5 minutes, they were told they could move the mouse to see the tooltips and explore.

We heard general comments about icons and tooltips that included the following:

> *"The icons are not immediately obvious"* (P2)
> *"Some of the icons could be more helpful. Icons that work well are really simple."* (P4)
> *"The icons are not clear."* (P6)
> *"The tooltips make no sense."* (P7)

Participants misinterpreted many of the same icons, found others indecipherable, and consistently pointed out the same tooltips as "confusing" and "not helpful".

Logout Icon:

- **Relevant Usability Principle:** Match between system and the real world.

- 11 out of 12 people misunderstood the logout icon.

Logout icon

Users' guesses included:

> *"I would click this to set a screensaver."* (P2, P4, P6, P9, P10)
> *"...power saving."* (P5, P8)
> *"I would click this to use less energy."* (P1, P8)
> *"I would click this to put the monitor to sleep."* (P7, P11)
> *"...monitor settings."* (P3)

One user commented:

> *"I expected a screen saver; [for logout] I'd expect something that communicates "finish"...night time did not connect [with me]."* (P4)

- **Design Recommendation:** This icon relies heavily on elements commonly associated with sleep, a moon and stars, to convey its meaning. A moon and stars can convey night time, but users did not associate night time with the end of the day and logging out. This icon also uses the same computer as the terminal icon, making it difficult to distinguish between the two. We suggest redesigning the icon and removing the moon and stars as well as the computer imagery. Alternate design elements that might communicate "logging out", "leaving", or "exiting" more successfully include arrows and/or doors. We recommend trying to illustrate the physical aspect of "leaving" rather than relying on "sleep" or "nighttime" imagery to imply "the end of a work day or work session". We recommend testing new designs with a wide range of users to ensure that they interpret it correctly.

Terminal Icon and Tooltip:

- **Relevant Usability Principle:** [Match between system and the real world](#).

- None of the 12 participants knew what the terminal icon meant. They referred to it as "a footprint on a monitor" (P2, P5, P11), or a "pathway to the system" (P4) and one (P10) said "it looks like someone has kicked the computer".

  10 out of 12 participants commented that the tooltip for the terminal icon, "Terminal emulation program" was confusing.
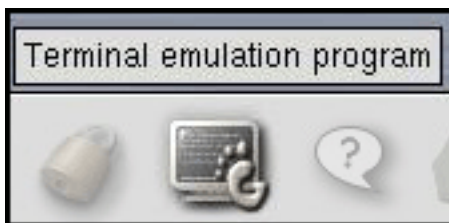
Terminal icon and tooltip

> *"Tooltips for terminal icon were unclear, even with the icon."* (Pilot)
> *"'Terminal emulation program', that doesn't tell me anything."* (P4, P9)
> *"Don't know, no idea, not sure what that means."* (P2, P3, P4, P8)
> *"What's emulation?"* (P10)

  They remarked that it was "unclear", "doesn't mean anything", and "doesn't tell me a lot". Even participants with more extensive UNIX experience were not satisfied with this tooltip, commenting:

> *"That seems weird, you're actually using a terminal with a UI emulator on the terminal."* (P11)
> *"'Terminal emulation program', that doesn't tell me a lot, I'm more comfortable with 'console' or 'shell'.* (P5)

  Some participants still did not know what the icon or tooltip meant after clicking and opening a terminal window. When they clicked the icon and invoked a terminal, we heard comments like:

"Oh, is this DOS?" (P3)
*"Is this for programming?"* (P8)
"[this is] a scary window with a black background, I'd have to type in some kind of code." (P9)

- **Design Recommendation:** This icon might be more clear if the logout icon is redesigned to not use the same computer imagery (see the logout icon design recommendation). However, we recommend testing a version of the terminal icon that does not have the small GNOME footprint overlaid on the computer. The footprint seemed to confuse users the most. The icon might also be improved by thickening or brightening the color of the small light gray lines on the monitor so there is greater contrast between the lines and the black screen. We recommend testing new designs with a wide range of users to ensure that they interpret it correctly.

  We also recommend rewriting the tooltip for this icon. Suggestions to test with users, as alternatives to "Terminal Emulation Program", might include "Command Prompt" or "GNOME Terminal Window". We also recommend following the GNOME Documentation Style Guide and involving a technical writer in the review of any terminology, error messages, or other on-screen text delivered into GNOME. Developers are encouraged to ask terminology questions on the gnome-doc-list@gnome.org mailing list or the #docs channel on IRC.

Browser Icon:

- **Relevant Usability Principle:** Match between system and the real world.

- At least 4 participants were confused by the browser icon.
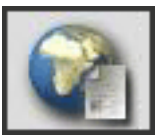
Browser icon

 There were a couple of incorrect guesses that clicking this icon would invoke email. Other guesses included, "global browsing", "translation", and "language or keyboard language". One user who was unsure of what the icon was before seeing the tooltip remarked,

>   *"This is not the standard Netscape icon, this is not helpful."* (P2)

Once users saw the tooltip they understood this icon would launch a browser. This icon confused users but did not keep them from successfully completing tasks related to surfing the web.

- **Design Recommendation:** Consider using the existing application icon for the default browser in the default configuration of the panel. If Mozilla is the default browser, use the application icon for Mozilla in the panel. Likewise, if Netscape is the default browser, use the Netscape application icon in the panel.

GNOME Main Menu (Foot Icon):

- **Relevant Usability Principle:** Match between system and the real world.

- Because they had never seen GNOME before and were unfamiliar with the GNOME logo, several participants did not know what the foot icon was.

Gnome Main Menu (foot icon)

Guesses included:

> *"The footprint of the computer?...for traveling or search and replace? Its local, not global. I don't know why its there."* (P4)
> *"Where I've been before? A history?"* (P2)
> *"A "footprint" of where I've been or a list of tasks I've performed most recently."* (P8) *"I don't know. I have no idea what the foot means."* (P6, P9, P10)

With a hint that the foot was the GNOME logo, participants guessed that it was,

> *"Where everything is; like a start menu like in Windows."* (P5, P9)
> *"...to go to programs."* (P3)
> *"...a 'Go' button."* (P11)
> *"From my previous experience, I'd click there for a list of programs."* (P2)

After moving his mouse and clicking on on the GNOME foot, one user with a strong Windows background was surprised and said he "expected 'About [Box]' type information" while another Windows user clicked on it and said, "Exactly, that's exactly what I expected."

Two participants missed the ability to click on the GNOME foot icon, one because "there was no tooltip" when he moused over it and another because he missed the small arrow indicating the foot was a menu.

Most participants did not understand what the foot icon represented when they first encountered it, but after clicking on it, most recognized that it was something similar to the Microsoft Start menu. Not knowing that the foot was the GNOME logo did not keep them from successfully completing tasks. However, some people did not realize on the first pass that clicking the foot icon would invoke a menu.

- **Design Recommendation:** We recommend redesigning the GNOME Main Menu foot icon so that it is more obvious that clicking it will display a menu. The small arrow above the foot, that indicates a menu is invokable, needs to be made more noticeable. Possible redesigns could include enlarging the arrow or changing the color of the arrow when the user mouses over the foot icon.

Help Icon and Tooltip:

- **Relevant Usability Principle:** [Match between system and the real world](#).

- Most people interpreted the icon correctly, although one person did ask if clicking it "turned on balloon help?" (P8).

11 out of 12 participants were confused by the Help icon tooltip, "Integrated help system (info, man, HTML)".
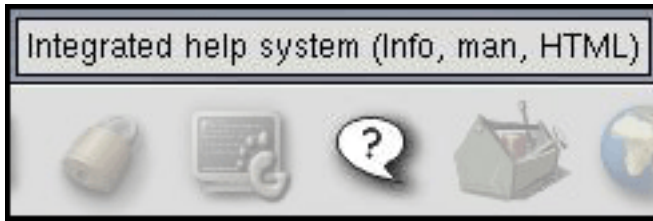
Help icon and tooltip

Only one participant out of 12, Participant 5 (P5), understood what 'man' meant. He was one of only three participants with Solaris and CDE experience. When we asked users to rate their expertise on a scale where 0 = novice and 5 = expert, P5 rated himself 3 for Solaris expertise and 2 for CDE expertise.

Two participants (P6, P10) thought 'HTML' meant "help with writing HTML [code]". Others thought this meant "help using a browser" or that there would only be help "if an item is related to the web". One person commented that the tooltip was "not intuitive" and asked "what format would I get these types of Help in?".

- **Design Recommendation:** Most future GNOME users coming from Macintosh or Windows will have no concept of man pages, just Help. Therefore, the emphasis on 'integrated' help will only confuse them. We recommend rewriting this tooltip. Suggestions to user-test, as alternatives to "Integrated help system (info, man, HTML)", could include "GNOME User Guide" or "Online Help". We also recommend following the GNOME Documentation Style Guide and involving a technical writer in the review of any terminology, error messages, or other on-screen text delivered into GNOME. Developers are encouraged to ask terminology questions on the gnome-doc-list@gnome.org mailing list or the #docs channel on IRC.

Spider Foobar Icon (gnome-mnemonic.png/gnome-spider.png):

- **Relevant Usability Principle:** Aesthetic and minimalist design.

- The spider icon (gnome-mnemonic.png/gnome-spider.png) which appeared in the foobar, the menu bar along the top of the screen, provides an amusing example of users' reactions to indescriminable icons.

Spider foobar icon

All 12 users commented on the icon. Participants commented:

"Is that supposed to be recognizable?" (P4)
"I can't decipher it". (P2)
"What's that? It looks like decoration." (P5)
"Is it a quick link to the internet?" (P11)

Those who tried to decipher the icon offered the following guesses:

"a squashed bug", "a fish", "a crab", "a rose", "a sun", "a spidery thing"

- **Design Recommendation:** Icons at small sizes must be clear and simple designs. Most often, a large icon squeezed down to 16x16 will become unreadable. While the spider foobar icon might not be the most important icon for the average user, it illustrates a larger problem throughout GNOME, where one icon design is used at all sizes, much to the detriment of icon legibility.

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GNOME Usability Study Report :: File Management Tasks

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File Management Tasks

Participants were given the name of a file, *proposal.txt* and were asked to find and open it, but were not told how or where to find the file. They were not told that they had a file manager or that this file manager was called Nautilus. After opening the text file, they were asked to view the web page referenced in the text file, edit the text file and save it with a new name. Participants tried different approaches to find the file, including clicking on the Nautilus 'home' icon and looking for a Find option in the main menu. Participants overwhelmingly wanted to use a search to find the file rather find it through exploration.

Participants were unsure of how or where to begin looking for a specific file on the new system. We heard the following comments:

> *"I'm used to using a find menu or find key."* (P2)
> *"It was tricky navigating, I wasn't sure where to start."* (P4)
> *"It took me a while to look for words that I'm used to that would guide me to areas to do work."* (P8)
> *"Hitting on the right choices was difficult, [my] expectations were not met when applying experiences with other operating systems."* (P2)

Users did not immediately click on Pat's Home icon (Nautilus) to search for a file in their home directory.
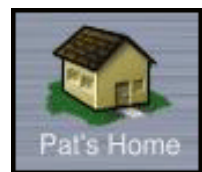
Nautilus Home icon

The house icon seemed to make users think of their location in relation to the web as opposed to their own files or data. Perhaps people are more accustomed to a literal hardware icon used to represent their home directory. For example, the Macintosh has an image of a hard drive and Windows has an image of a computer.

We heard the following responses when participants were asked what they thought Pat's Home was:

> *"I don't know, a web browser? My favorite place on the web?"* (P2)
> *"It goes to a homepage?"* (P1)
> *"A hard drive? A folder for a hard drive?"* (P3)

One user who opened Nautilus did not think she could search for files there. She closed the window and went instead to the Foot menu.

GNOME Main Menu:

- **Relevant Usability Principle:** [Match between system and real world](#).

- Roughly half of the participants tried first to use a Find menu. In fact, 5 out of 12 participants went straight to the Foot [GNOME Main] Menu first to look for a Find menu. One participant kept looking in Foot > Utilities for a Find menu. None of these people discovered the find tool that does exist a couple levels down: GNOME Main Menu > Programs > Utilities > GNOME Search Tool.

  A frustrated user commented,

"How do you find a Find [tool]?!" (P9)

- **Design Recommendation:** We recommend moving the Programs > Utilities > GNOME Search Tool menu item to the top level of the GNOME Main Menu, as illustrated in the following screen mock-up:

GNOME Search Tool added to Main Menu

Most users ended up in Nautilus, although some needed hints to get them there. Users first reactions to Nautilus included many comments that it was not what they expected:

"I expected a home page or company page." (P1)
"This is not what I expected. I expected more text, fewer icons." (P6)
"I didn't expect this...I didn't know what to expect." (P9)
"I expected a list instead of a bunch of icons." (P10)

As users explored Nautilus further, they discovered that it was a browser:

"This whole interface, Nautilus, looks like a browser. Pretty cool." (P9)
"This is a hard drive browser. It allows me to go to the net." (P3)
"Its a browser-type thing." (P5)
"It has a desktop file system feel and a web feel, from the icons and the throbber." (P4)
"This is apparently a browser." (P11)

Users commented that they liked the integrated functionality of a combined file manager and web browser:

"I liked how everything was in the browser. Its very integrated, [it takes me] from the desktop to the web" (P5)
*"I like it, I don't have to open so many windows."* (P3)
"Its pretty cool. Very convenient." (P9)
"The integration is cool." (P10)

Once in Nautilus, most users successfully searched for the text file with the Nautilus Find tool. However they ran into problems with confusing terminology and misleading feedback.
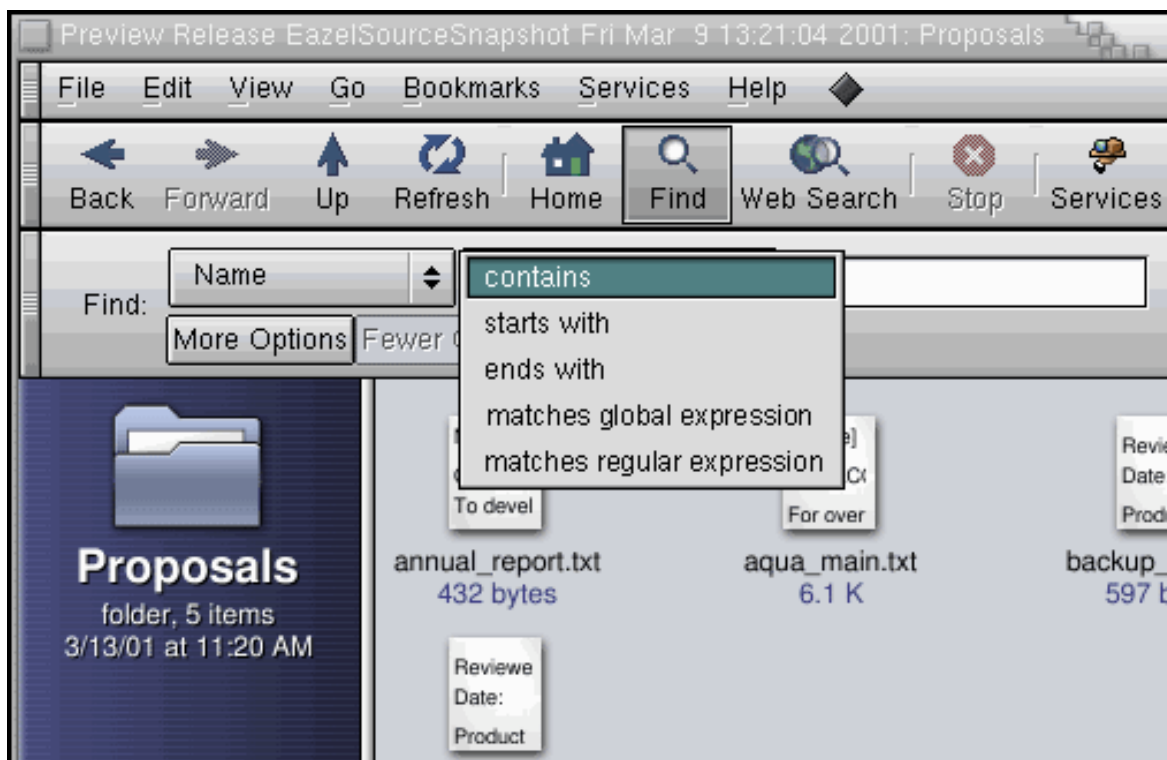
Nautilus Find Tool Menu Terminology:

- **Relevant Usability Principle:** Match between system and real world.

- Users who explored the Find tool menus were confused by the menu items 'matches glob' and 'matches regexp' in the second pulldown menu.
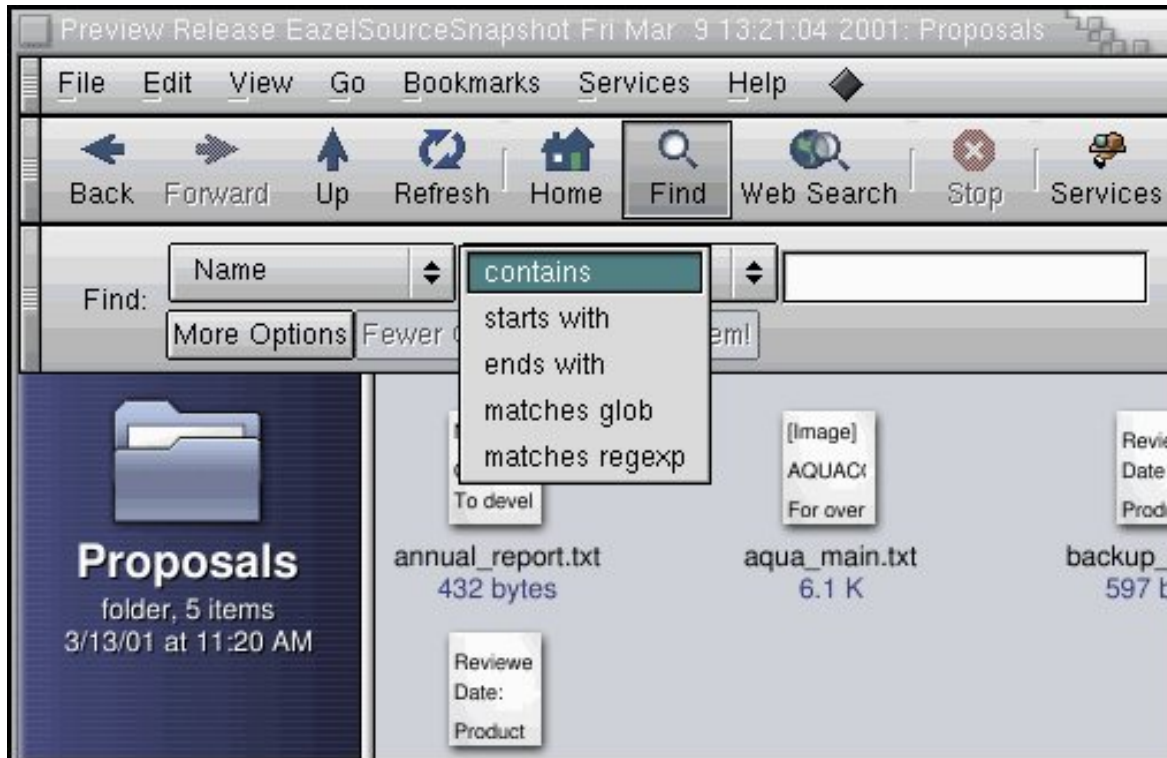
Nautilus Find pulldown with confusing terminology

- **Design Recommendation:** We recommend spelling out the terms 'glob' and 'regexp'. For example, instead of 'regexp', we suggest 'regular expression', as shown in the following illustration:

**Nautilus Find pulldown with expanded terminology**

Users should also be able to access online Help that will provide explanations of menu items and how to use the search syntax.

Again, we recommend following the [GNOME Documentation Style Guide](#). We encourage developers to involve a technical writer in the review of any terminology, error messages, or other on-screen text delivered into GNOME. Developers are encouraged to ask terminology questions on the gnome-doc-list@gnome.org mailing list or the #docs channel on IRC.

"Red Pencil" Icon in Nautilus Search Results:

- **Relevant Usability Principle:** [Feedback](#).

8 out of 12 participants were confused by the red icon that appeared in the sidebar while their search was processing in Nautilus.
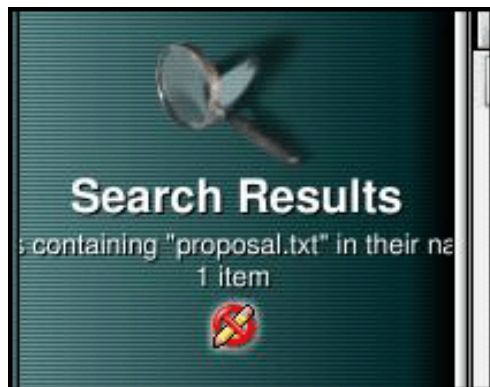
Confusing icon in Nautilus Search Results

Participants' eyes were drawn right to it and most interpreted it as something negative about their search results. Some were so distracted by the icon, and convinced that it meant their search was unsuccessful, that they didn't realize there were search results displayed in the list! When asked what they thought the icon meant and why it appeared, they responded:

> *"There are no items called proposal.txt?"* (P2)
> *"It means I could probably read but not edit?"* (P5)
> *"I have nothing? This really confused me."* (P7)
> *"Don't write? It is unclear if it means 'don't do anything' or that it didn't find anything."* (P9)
> *"I can't edit? Was it there before? I don't know why it is there."* (P10)
> and our favorite response,
> *"It means 'No Pencils'! Good question. No writing? Why would I want to write there?* (P11)

- **Design Recommendation:** Remove the red pencil icon. It is unclear why it appears in the sidebar or what it means. If it does mean the user can't edit a file, then for consistency it should remain in the sidebar when the file is double clicked and opened into a Nautilus viewer.

No Cursor Change:

- **Relevant Usability Principle:** [Feedback](#).

- Some users were also unsure of the success of their search because the cursor didn't change while a search was in progress in Nautilus.

- **Design Recommendation:** It is important to communicate to users that the system is busy and to provide feedback indicating that the system has received the users' input and is operating on it. During a lengthy search operation, when users must wait until the operation is complete, change the shape of the cursor. Because users are still able to click elsewhere in Nautilus while a search is in progress, we recommend changing the cursor to a combo cursor (arrow + hourglass), such as the combo cursor seen in xalf when an application is launched. However, this combo cursor only applies to the active Nautilus window with a search in progress. If the user clicks elsewhere, for example invokes a terminal or opens the Control Center, the cursor should return to the normal arrow cursor within
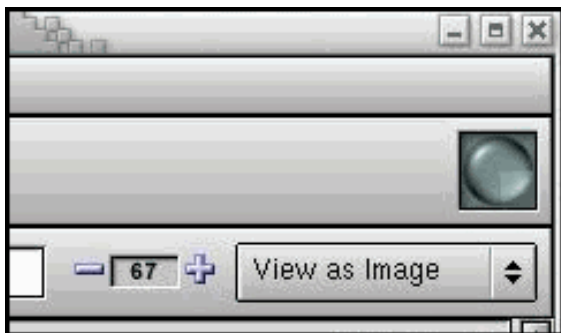
those applications.

Indistinctive Throbber:

- **Relevant Usability Principle:** Feedback.

- Users missed the subtle throbber animation in the upper left corner of the Nautilus window.
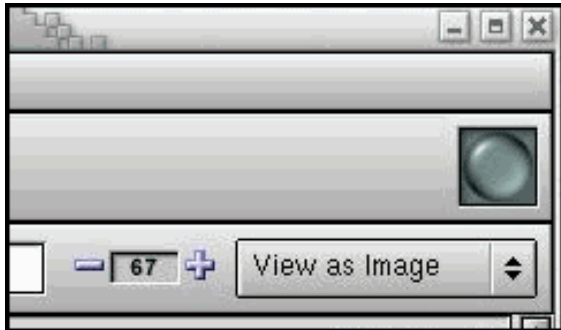
The inactive state of the throbber.

A snapshot of the in-progress state of the throbber.

- **Design Recommendation:** We recommend designing a more distinctive Nautilus throbber that provides better visual feedback to the user that the system is busy. To be effective, the inactive state of a throbber must be easily distinguishable from its in-progress state. The following is an example of an effective throbber animation, with an inactive state that is distinct from the in-progress state.

An effective inactive state.

An effective in-progress state.

Users double-clicked the text file in the search results and were able to view the text file. Next we asked them to go to the web page specified in the text file. Users tried several ways to get to the web. Some used the Location field in Nautilus, some opened a Netscape window, and others tried to click on the URL in the text document.

Non-Active URLs:

- **Relevant Usability Principle:** Consistency and standards.

- Users were quickly frustrated when they discovered that the URL was not active in the Nautilus viewer and that and clicking it would

not take them directly to the web. We heard the following comments:

> *"I can't click on an active URL...That's not easy."* (Pilot)
> *"The possiblility for human error [when typing] made it tough."* (Pilot)
> *"Other software does that...There should be a shorter way to do this."* (P1)
> *"It would have been nice to have that as a live link."* (P11)

Two users were so convinced it would be a live link that they highlighted the URL, double clicked it, and right clicked it before giving up.

- **Design Recommendation:** Users expect the ability to click on live links and be taken to the web. We recommend supporting live links and implementing appropriate cursor changes over live links in the Nautilus viewer. The cursor used over a live link in the Nautilus viewer should be the one that Mozilla uses for live links if Nautilus has been compiled with Mozilla support to render its HTML pages, or the cursor that GtkHTML uses if Nautilus has been compiled with GtkHTML support to render its HTML pages. This will ensure that the same cursor is used for live links whether Nautilus is used to look at a text file or a web page.

Carriage Return Symbols:

- **Relevant Usability Principle:** [Aesthetic and minimalist design](#).

- People commented on the carriage return symbols that appeared in both gedit and the Nautilus viewer window.
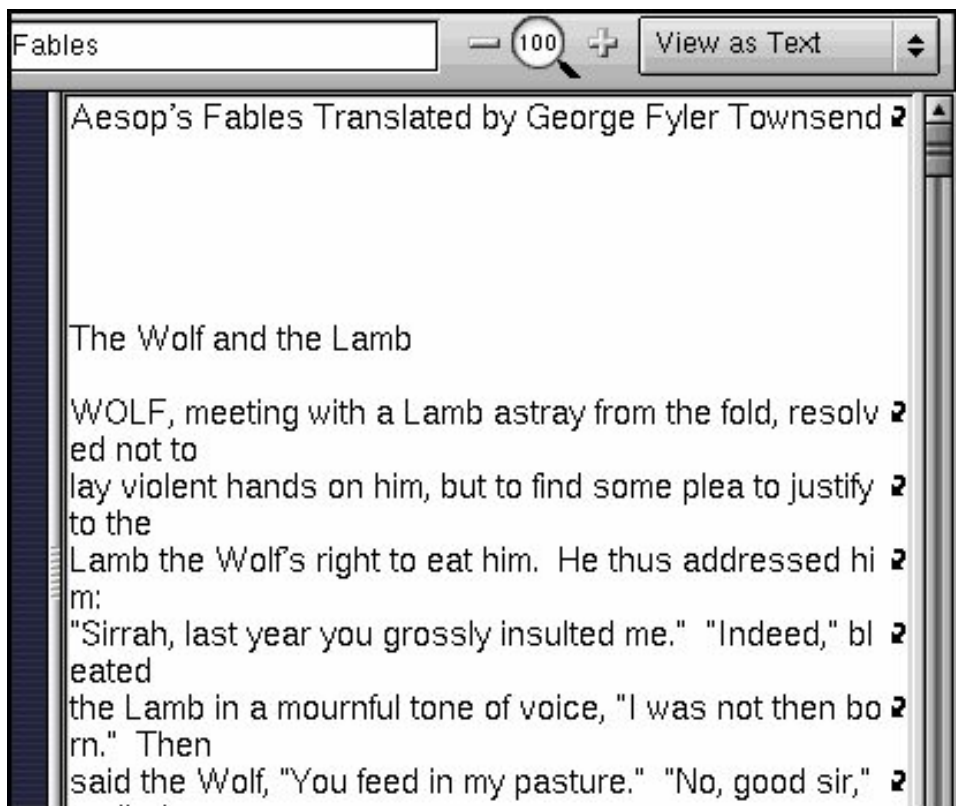
Awkward carriage returns

> *"I'm not a big fan of how it is wrapping."* (P11)
> *"Those are weird, would make it hard to read out loud, I don't care for it."* (Pilot)

One user tried to double click the carriage return symbols, asking hopefully,

> *"Is it an active link to a website?"* (P2)

- **Design Recommendation:** The carriage return symbols are an awkward way to represent line wraps. It is fairly standard to just wrap the lines without symbols. We suggest removing the symbols entirely and wrapping lines at word breaks.

We asked users to look at the web page and then return to the text file to answer some questions about an image on the web page. Now, with Nautilus acting as many users' web browser, we saw people confused while trying to navigate back to their original text document. As they moved between file management and web browsing tasks, users with earlier praise for the combined file manager and web browser, began to voice confusion. Users became confused about whether they were looking at their file system or the web and there was confusion around the Nautilus navigation buttons (Up, Forward, Back, Home). Comments included:

> *"Is this an OS or an app? Is it more than web browsing? It acts like a browser. The menus look like a browser..."* (P2)
> *"I had to get used to seeing stuff like a browser, [it] gives the impression of a browser; even though I'm not surfing I have bookmarks."* (P7)
> *"I was surprised I could open a text file and a web page in the same window."* (P9)
> *"I was confused when the text file opened in a browser type thing."* (P5)
> *"Its unclear if Find is for the web or the desktop. It took me from the desktop to the internet, handy. Then I clicked on Home, and it took me out of the web. Is Home on or off the web?"* (P4)
> *"It is confusing between the Up, Back and Forward buttons."* (P4)

Nautilus Viewer Mode:

- **Relevant Usability Principle:** [Feedback](#).

- Once users returned to their text document, they tried to type in the answers the questions. We witnessed various levels of frustration and confusion as users discovered they couldn't edit the text file. Reactions included:

> *"I would expect to be able to write once the file is opened...I'm not sure [what is happening] exactly."* (P6)
> *"I'm trying to think of why I would need to go somewhere else to open the file...it's just text, why can't I edit it?"* (P8)
> *"I can't work..."* (P4)
> *"I don't know that I like that."* (P7)

Guesses as to why they could not edit the file included:

> *"I can't change it because I am not in a text program?"* (P9)
> *"It looks like the document is read-only. I expected [this to be] a word processing application."* (P2)
> *"Okay, I'm in read-only mode as opposed to edit."* (P1)
> *"It looks like I am in viewer mode maybe."* (P3)
> *"Its not the full document, just a representation. I can highlight but not edit. Is this a viewing window?"* (P4)

Two users thought the viewer mode was meant to protect against overwriting the original file:

> *"Maybe [the read-only view] is the original file, so you can't overwrite it?"* (P4)
> *"Does it protect the original version of the file and the Open With... buttons open a new version of the file to edit?* (P1)

After learning that a read-only view of the file is opened within Nautilus, users' comments included:

> *"I was expecting a word processing app to open [the file]...weird."* (P9)
> *"It was not obvious that the viewer was read-only."* (Pilot, P8)
> *"It was letting me look but not edit, that is not what I am used to. I don't know if I like it."* (P6)
> *"It should say 'preview' so that you know it is [not the editable document]."* (P4)
> *"You should put something around the document to indicate that it is read-only."* (P6)

- **Design Recommendation:** We recommend providing more visual indication that the user is in viewer mode and cannot edit. One possible approach is to present the file surrounded by a gray border, to imply that the user is not looking at the actual file but at a view of the file. Adobe Acrobat Reader uses a similar approach successfully to indicate that files are read-only. In addition to displaying the

file within a gray border, we recommend adding help text to the top of the view pane and above the Open With... buttons in the Nautilus sidebar. These ideas are depicted in the following illustration.
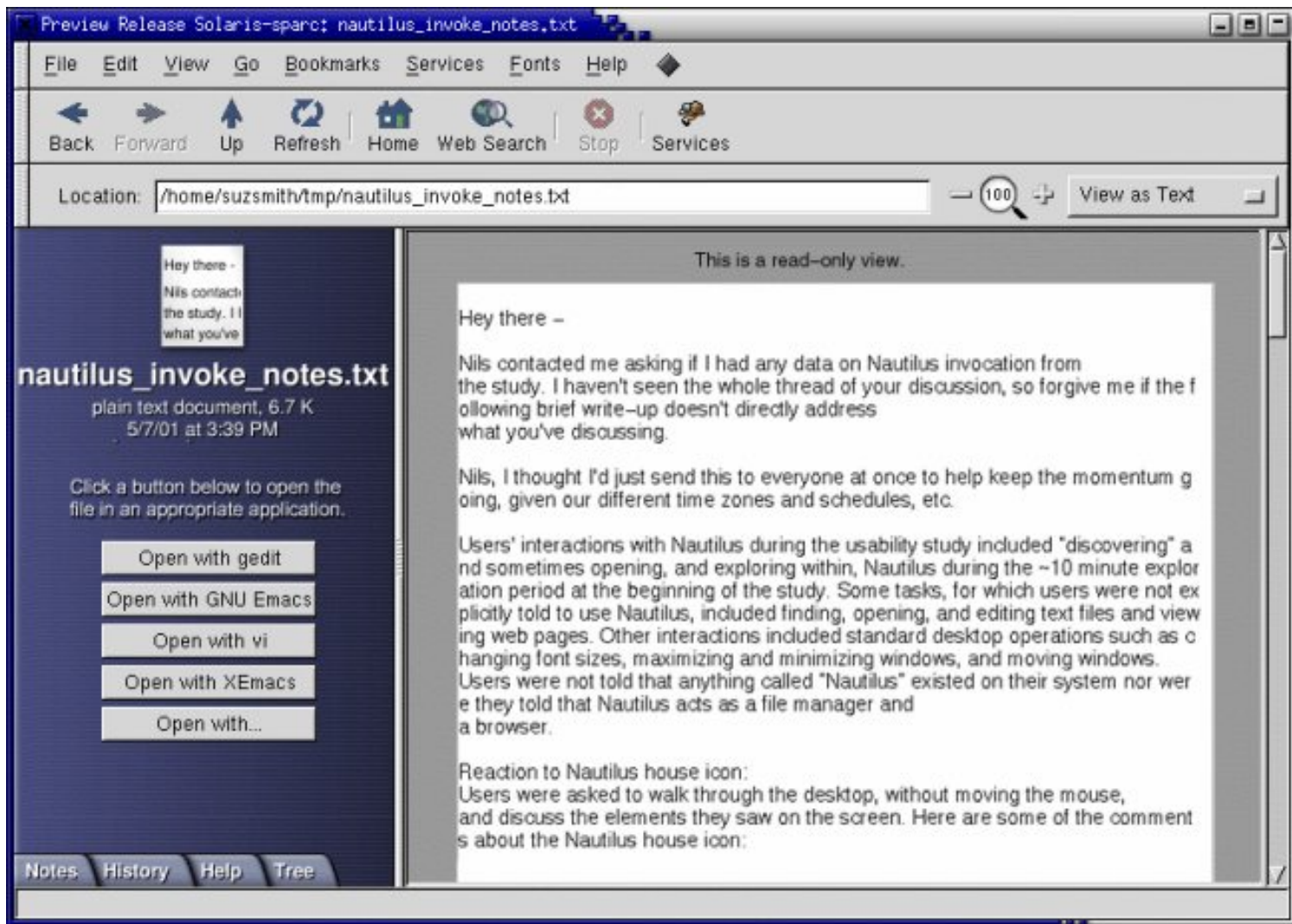
**Possible approach to representing read-only views in Nautilus**

Other alternatives might include popping up a tooltip if the mouse is hovered over the read-only view, with a message like "Read-only view. Use "Open with" buttons in sidebar to open the original"; or popping up a warning dialog with a similar message if the user tries to type into the read-only view.

We recommend involving a user interface designer when redesigning how Nautilus views are visually presented. Developers are also encouraged to ask UI design questions or solicit feedback on the usability@gnome.org mailing list or the #usability channel on IRC.

For any on-screen text, we recommend following the GNOME Documentation Style Guide. We encourage developers to involve a technical writer and to ask terminology questions on the gnome-doc-list@gnome.org mailing list or the #docs channel on IRC.

Open With... buttons:

- **Relevant Usability Principles:** Feedback. Match between system and real world.

- Users had to be pointed to the Open With buttons and some were not immediately sure how they would help accomplish the current task of editing the text file. Many users found the application names meaningless.
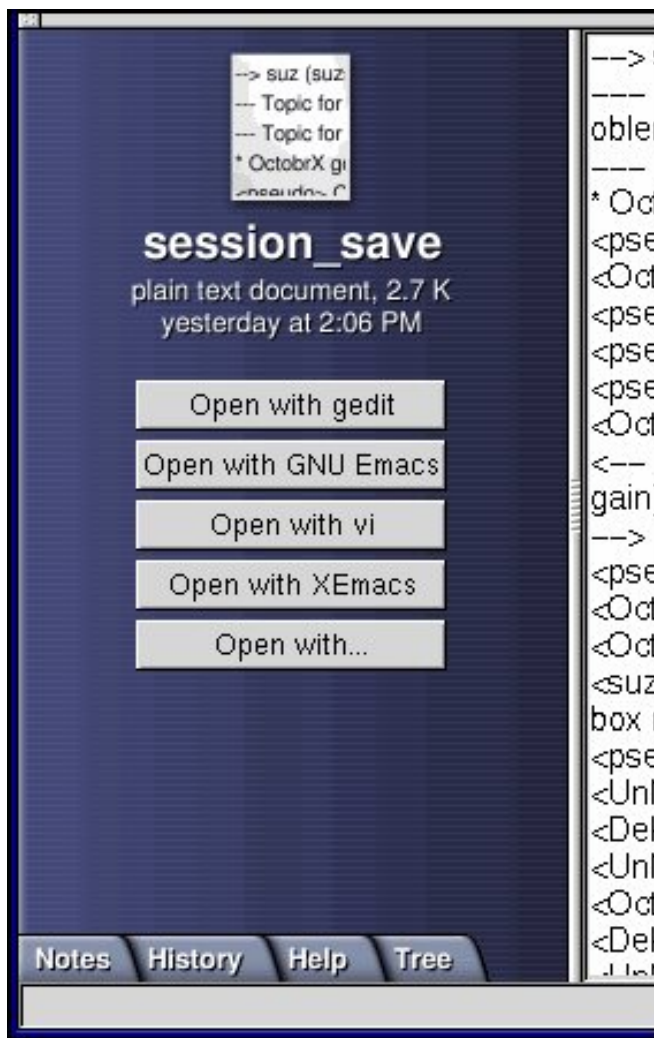
Open With... Buttons

> *"Open With... buttons application names made no sense. It was not obvious that they are applications."* (P1)
> *"What's the difference between gedit and GNU Emacs?"* (P4)
> *"Open With...GNU Emacs...gedit...that means nothing."* (P8)

Users did not recognize the applications so they often clicked on the general Open With... button. Clicking this invoked a chooser dialog which they found even more confusing. One user commented,

> *"I'm not sure what program or environment to use to open the file....there's too many choices."* (P2, P4)

The Open With [application] buttons, which were no doubt meant to be helpful defaults, were not helpful to new GNOME users. One user completely missed the Open With buttons because he had the Tree tab expanded on the sidebar. Needless to say, he became very frustrated trying to find a way to open the text file for editing.

- **Design Recommendation:** We recommend adding a text string above the Open With... buttons that reads, "Click a button below to open the file in an appropriate application."   We also recommend that, if possible, tooltips be implemented for the buttons that show the descriptive comment from that application's .desktop file, if it has one. To be consistent, though, tooltips must be implemented for all buttons, otherwise the application may just appear to the user to be broken. So for applications without a .desktop file comment, a generic tooltip should be used-- this could just duplicate the text on the button, to avoid extra translation effort. The proposed text string and tooltips will help novice GNOME users, unfamiliar with GNOME application names, to recognize that the buttons will launch applications. Both the text string and a sample tooltip are depicted in the following illustration.
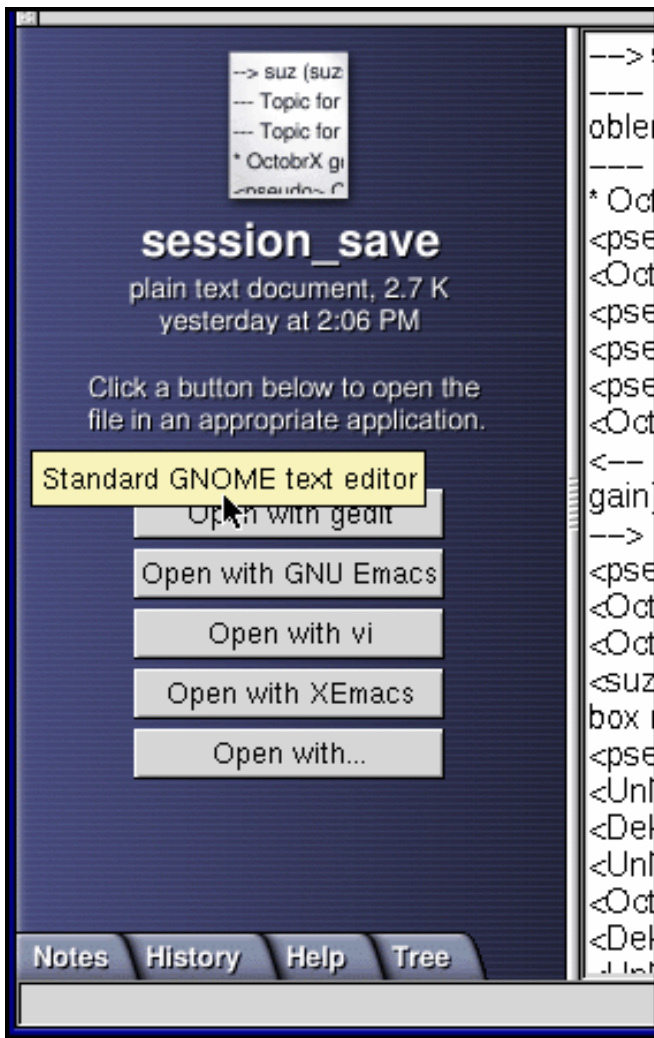
Open With... buttons with helpful on-screen text and tooltips

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GNOME Usability Study Report :: Customization Tasks

July 2001

Customization Tasks

As part of developing a baseline metric for usability issues in GNOME, we asked users to perform common customization tasks, including customizing the panel by adding, rearranging and removing items, changing the background and changing the fonts. We asked participants to customize the panel by adding a clock that displayed the date as well as the time. We asked for a specific type of clock so that users would have to search for it, and in doing so interact with the system more. In the wording of the task, we did not use the word 'panel'; participants were simply asked to add the clock to the bottom part of the screen so it appeared alongside the other icons. Users summarized the experience in the following words:

> *"I didn't know where to go for a clock, I needed hints...there were other things that were clock related that were confusing..."* (P2)
> *"It took too long to add a clock, it was tough."* (P3, P9)
> *"There were a lot of menus, a lot to go through."* (P3)
> *"The sheer number of possibilities for where a clock could be surprised me...if I had to do it again I'm not sure I'd know how or if I could find clocks again."* (P2)
> *"Some things were accessible that a novice user would not want or need, but other simple things were buried deep...you had to go far in to access something like clocks."* (P4)

The two major obstacles to users' success locating clocks:

- the term 'Applets' didn't resonate with users
- people didn't think to use the right-mouse button

The multiple ways to add a clock to the panel, shown below, all involve going to the Applets menu and in some cases using the right-mouse button as well.

- Programs (top menubar) > Applets > Clocks
- GNOME Main Menu (foot) > Applets > Clocks
- Right-click panel > Applets > Clocks
- Right-click panel > Panel > Add to Panel > Applets > Clocks
- Right-click and panel icon > Panel > Add to Panel > Applets > Clocks

Despite the multitude of ways to find a clock, there was a strong pattern among users' expectations of where to find clocks. Only 1 out of 12 users went directly to the panel to add a clock, adding it by right-clicking on the panel and choosing Panel > Add to Panel > Applets > Clocks. It took one user, who in previous tasks demonstrated familiarity with the right-mouse button, 10 minutes of unsuccessful searching before he thought to right-click on the panel.

All remaining 11 users looked for a clock elsewhere. Of those, 8 looked in the Settings menu. One user, who received a hint while in Programs > Settings that clocks were not in the Programs menu, looked two more times in the Settings menu before moving on. This confirms the strong expectation users had that clocks should be in the Settings menu.

In addition to the Settings menu, 3 users clicked the Control Center icon, searching the Control Center for clocks until they received hints from the study moderator that no clocks existed in the Control Center.

Two users, given hints from the study moderator to look at the panel, were unsure of how to add a clock even as they moused over the very options that would let them complete this task. Both were guided to the panel and went to the GNOME Main Menu (foot) > Panel > Add to Panel, but were not convinced they had found a successful way to add a clock. They did not open the Applets submenu where they would have found clocks.

Applets Menu:

- **Relevant Usability Principles:** [Match between system and real world](#).

- Once users found the clocks, they unanimously commented that the menu title "Applets" was confusing. Most said they didn't know what the term "applets" meant, and some guesses included:

    "They have something to do with Java?" (P5, P7, P11)
    "Small applications?" (P2)
    "Little programs?" (P9)
    "Something that runs in the background?" (P1)
    "A bunch of random things not in one category." (P5)

    When asked how they would categorize the items in the Applets menu, users responded:

    "Accessories" (P9)
    "Settings or utilities" (P5)
    "Additions, add-ons" (P6)

    When asked what she perceived as the biggest stumbling block to successfully adding a clock, P9 responded, "I didn't know what 'Applets' were." She commented that the name seemed too technical, "like it would open a scary black screen."

- **Design Recommendation:** There is currently a discussion taking place on the [GNOME usability mailing list](#) about applets, gagdets, and panel gagdets. We feel this discussion is going in the right direction towards addressing the issues raised in this usability study around the Applets menu. We recommend referring to and becoming involved in that discussion.

Clock Names:

- **Relevant Usability Principles:** [Match between system and real world](#).

- Users were surprised by the number of clocks available in the Clocks menu. They were also confused by the names of the clocks.
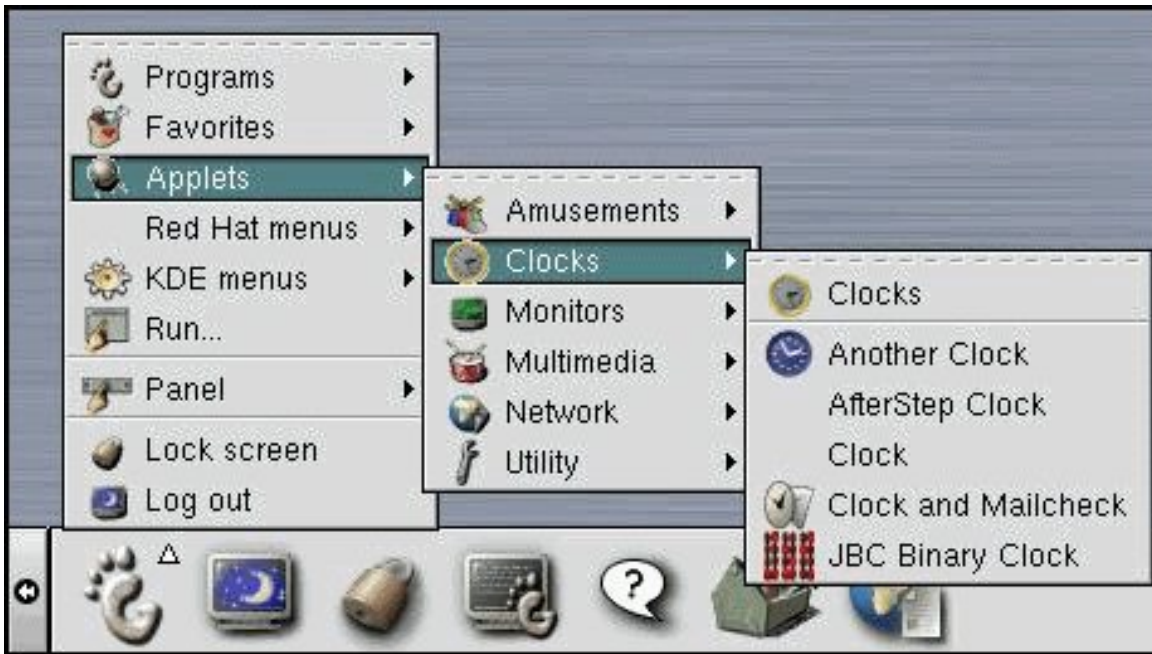
Clock menu

Repeatedly, users commented that names such as "Afterstep Clock" and "JBC Binary Clock" were not meaningful or informative. Most laughed and/or were confused when they saw "Another Clock" as well as "Clock" as a menu items. Comments include:

> *"[These names] don't mean anything to me."* (P2)
> *"These clock titles are confusing."* (P3)
> *"The descriptions of the clocks aren't very good."* (P5)
> *"I don't know what 'Afterstep' is...what 'Clock and Mail Check' is. These [names] are not clear."* (P2, P7, P8)
> *"You could probably do better [naming the clocks]."* (P11)

Users were looking for a clock that displayed the time and the date. The clock names did not convey which clock might be the correct choice. Most arbitrarily chose 'Another Clock' because they already had a clock on their desktop in the top menu bar.

- **Design Recommendation:** We recommend simplifying the Clocks menu by removing some of the clocks. User do not need that many choices. For any clocks that remain in the menu, we suggest renaming them with more meaningful and descriptive names.

Confusing Submenus:

- **Relevant Usability Principles:** [Aesthetic and minimalist design](#).

- Menu titles for submenus are implemented inconsistently. Throughout the desktop, several submenus have titles containing the name and icon of the parent menu.

Programs submenu has menu title.
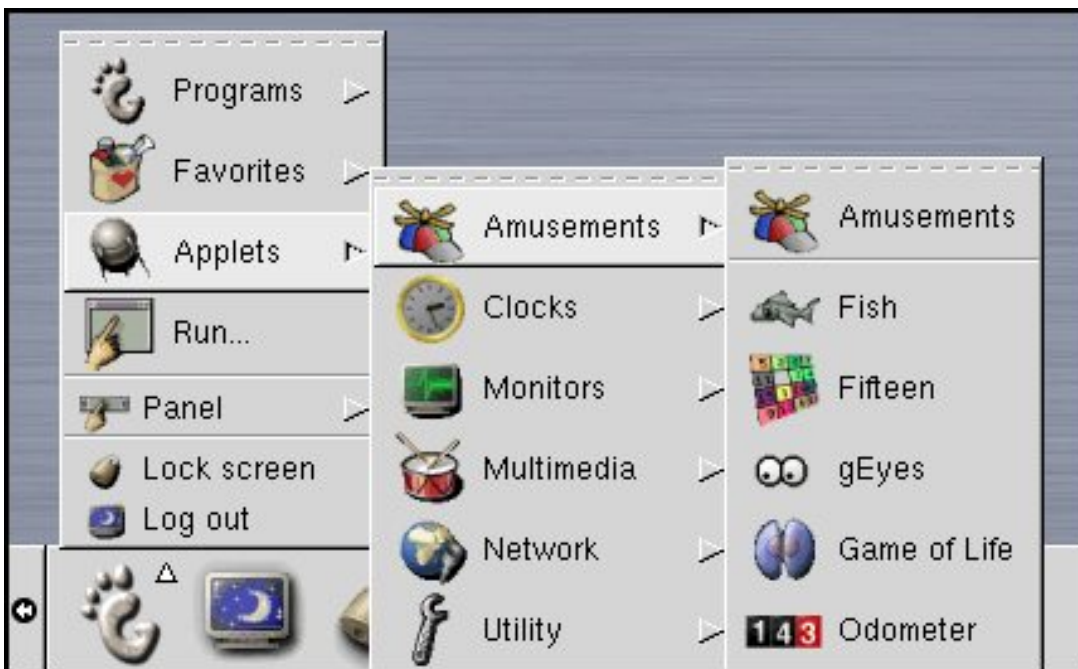
Applets submenu has no menu title. Items in Applets have menu titles.

Users found this information redundant and confusing, commenting:

> *"The repeat of menu titles could be confusing."* (P11)
> *"What does the foot mean? Why is it duplicated in the toolbar and in the Programs menu?"* (P7)
> *"Why is the same icon used for Programs inside its own menu?"* (P7)
> *"Its confusing that the same icons are used in different places."* (P7)

Users also repeatedly clicked on these headers and in doing so repeatedly lost and had to reselect the submenu. Roughly half of the users encountered problems with this throughout the study, continuing to accidentally dismiss menus even after encountering the problem in earlier tasks. Frustrated comments included:

> *"Nothing happened!"* (P5)
> *"I don't like that."* (P7)
> *"Why does it have that title?"* (P8)
> *"[The title] won't take you anywhere?"* (P10)
> *"It all went away. That could be confusing."* (P11)

- **Design Recommendation:** We strongly recommend implementing submenus so that clicking the menu title does not dismiss the menu. If this is not possible, then we recommend giving the menu titles better visual affordance so it is clear they are not the first selectable items in submenus. Approaches to create greater visual affordance can include displaying menu titles in a bold font, using a thicker line to separate menu titles from menu items, or removing icons that appear beside menu titles.

  We also recommend consistently implementing menu titles for every submenu. To be consistent, the Applets menu should be implemented with its own menu title.

Next we asked users to further customize their panel by removing a clock from the panel.

Contextual Menu:

- **Relevant Usability Principles:** [Accessibility](#).

- The functionality to remove an item from the panel is only available in the contextual menu (invoked by clicking the right mouse menu). This negatively impacted the amount of time it took for users to successfully complete the task of removing an item from the panel. 4 out of 11 users required hints and spent over 10 minutes trying to remove an item from the panel. One user explored for 12 minutes, searching for a way to remove a clock from the panel. This user needed a hint that "there are two buttons on your mouse". Another user, who was successfully using the contextual menu to complete tasks after receiving earlier hints about the right mouse button, searched for over 10 minutes and required 2 more hints before he succeeded to remove an item from the panel. We heard the following comments:

> *"There should be another way to do it, I expected some options if I clicked on the clock."* (P1)
> *"It doesn't occur to me to use more than one button. [Removing an item] was difficult because I'm not used to different mouse buttons; I rarely use the middle or right button."* (P6)
> *"I've had 15 years of Macintosh experience and 3 years of PC and I didn't think of the right button menu."* (P4)

- **Design Recommendation:** We suggest duplicating the "Remove from panel" menu item somewhere in addition to contextual menu. Hiding this option behind the right mouse button penalizes users who do not use more than one mouse button. Everything in the contextual menu should be duplicated somewhere accessible without using the right mouse button.

Icons in Menus:

- **Relevant Usability Principles:** [Aesthetic and minimalist design](#).

- One user tried to remove a clock by right clicking on it, going to Add to Panel > Applets > Clocks and selecting the clock again. She thought clicking the clock in the menu would turn off the clock she had on her panel. She thought the menu item was a toggle switch to turn clocks on and off because only some of the clocks in the menu had icons.
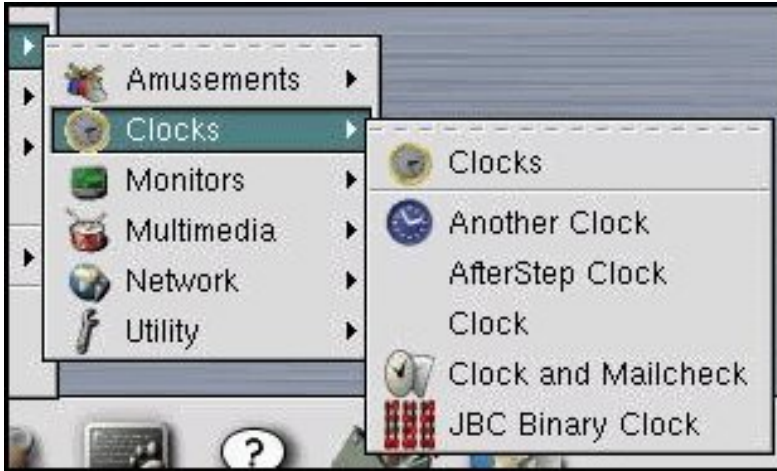
Clock menu with inconsistent icons

She thought the icon appearing had something to do with whether a clock was "turned on" or not. As a result, she ended up adding multiple clocks to the panel. Another user commented,

> *"I don't know why some don't have icons."* (P10)

- **Design Recommendation:** When icons are used in menus, it is recommended that all menu items have icons. If an icon does not exist for a particular menu item it is recommended that a generic icon be displayed, rather than no icon at all. It is important to be consistent so that users do not get confused or think there is a bug with the system.

Once users customized their panel, we asked them to change the image on the desktop background. Users successfully navigated to the area that would allow them to accomplish this task and, for the most part, they succeeded at changing the background. One user's experience did highlight an area where the Background Caplet UI could be made more intuitive.

Desktop > Background Capplet:

- **Relevant Usability Principles:** [Direct manipulation](#).
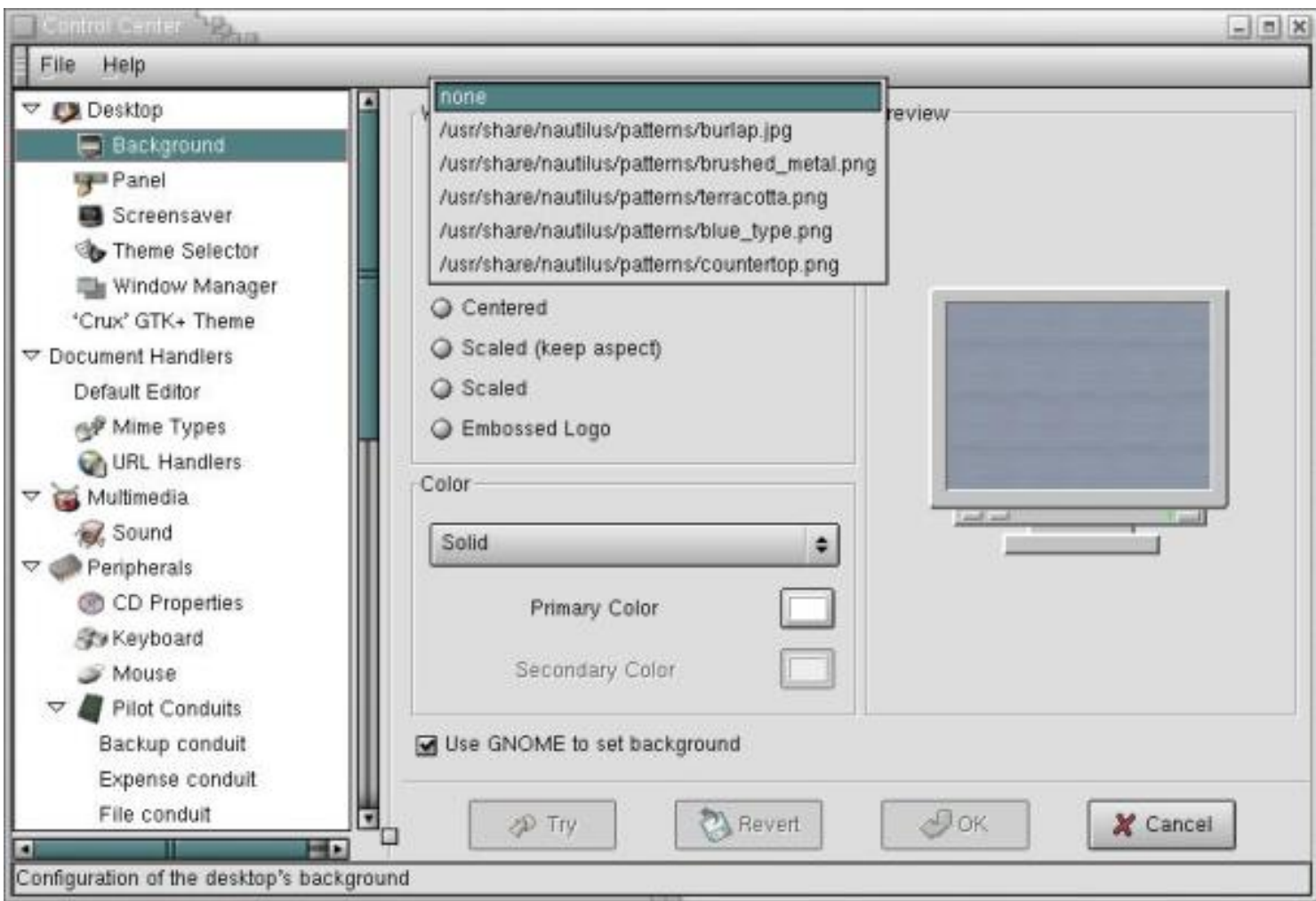
Desktop > Background capplet

- P11 tried to change the desktop background to a color instead of using a pattern. He commented that selecting 'none' in the the 'Wallpaper' pull-down before selecting a color was not intuitive. He also commented that he found it difficult to discern whether 'Wallpaper' or 'Color' had focus and which selections would be applied. He commented that he would "like it to be one way or the other".

- **Design Recommendation:** The relationship between 'Wallpaper' and 'Color' needs to be presented more clearly. 'Wallpaper' and 'Color' are mutually exclusive, yet they are not presented in a distinct way. One suggestion is add 'Wallpaper' and 'Color' radio buttons to the top of the capplet. This would allow a user to state whether he or she was applying a wallpaper pattern or a color. Currently, if users wants to apply to color they have to first select 'none' in the 'Wallpaper' pulldown. It is not intuitive to go to 'Wallpaper' when the desire is to manipulate 'Color'. Selecting 'none' in the 'Wallpaper' pulldown has the effect of toggling between 'Wallpaper' and 'Color'. It could be more straightforward to pull this step out of the 'Wallpaper' pulldown, where it was confusing and difficult for users to find, and to present it at a higher level using radio buttons.

  The confusion in the Background capplet is caused by layout and UI design issues. We recommend involving a user interface designer to redesign how users select and apply wallpaper patterns and colors to the desktop background. Developers are encouraged to ask UI design questions or solicit feedback on the usability@gnome.org mailing list or the #usability channel on IRC.

The last customization task we asked users to complete was to change the size of the font on their screen. There are three different locations in which to change fonts in GNOME:

- Control Center > Sawfish Window Manager > Appearance
- Control Center > Desktop > Theme Selector
- Nautilus Preferences menu (after Help) > Preferences... > Appearance

In order to change all of the fonts on the screen, a user must change the fonts in all three locations, but we did not tell users this.

Instead, we let them try and observed how they thought it could be accomplished, then, depending on time we either guided them to one of the remaining two locations or told them they had not completed the task yet. Then we got their reactions about the fact that there are three locations.

While users looked for a place to change fonts, they commented that they were looking for "properties", "settings", or something that said "font size". The majority of users went to the Control Center on their own, several getting there through the Settings > Desktop menu.

Overwhelmed by the choices in the Control Center, users needed hints to go to Sawfish > Window Manager > Appearance or Desktop > Theme Selector. One user admitted,

> *"I would never have guessed 'Theme Selector' for fonts."* (Pilot)

Sawfish Window Manager > Appearance Capplet:

- **Relevant UI Principle:** [Direct manipulation](#).
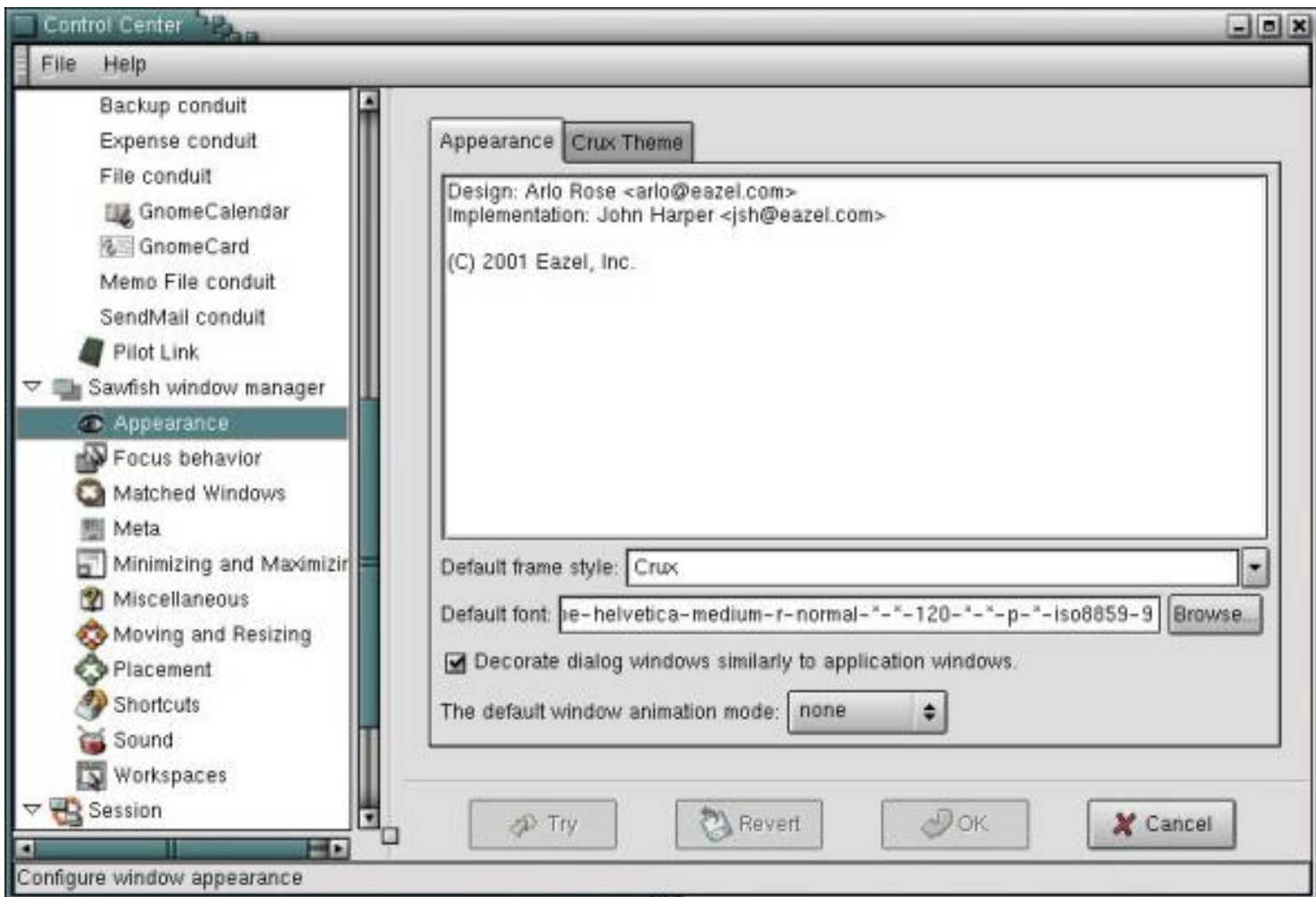
Appearance > Sawfish Window Manager capplet

- Even with hints, poor UI design and layout kept users from finding what they were looking for. One user spent almost 10 minutes in Sawfish Window Manager > Appearance and never saw the Browse... button to bring up the font selection dialog. Another, who received a hint, while lingering in Sawfish Window Manager > Appearance, said:

  "At this point I'm frustrated...I was in the right window and didn't even know it. Where am I?" (P5)

  A third, who went to Sawfish Window Manager > Appearance and clicked the Browse... button said:

  "I'm still not sure what I'll be affecting." (P8)

  So even when they found something that seemed like the correct choice, users were not convinced that they would be able to successfully complete the task.

  Users commented that they were confused about how the font information was displayed as a text string in a field in the Sawfish Window Manager > Appearance capplet. Their comments revealed that they expected to see something more clearly labeled "Font".

- **Design Recommendation:** We suggest replacing the text field containing the string of font information with something more intuitive to users. The current representation looks like the string of code the system uses. This is an example of where the system architecture is getting exposed at the user level and confusing the user. It would be more intuitive to simply say, "Helvetica, medium. 12pt". We recommend looking at the way popular word processing applications display font information.

Desktop > Theme Selector Capplet:

- **Relevant UI Principle:** Direct manipulation.
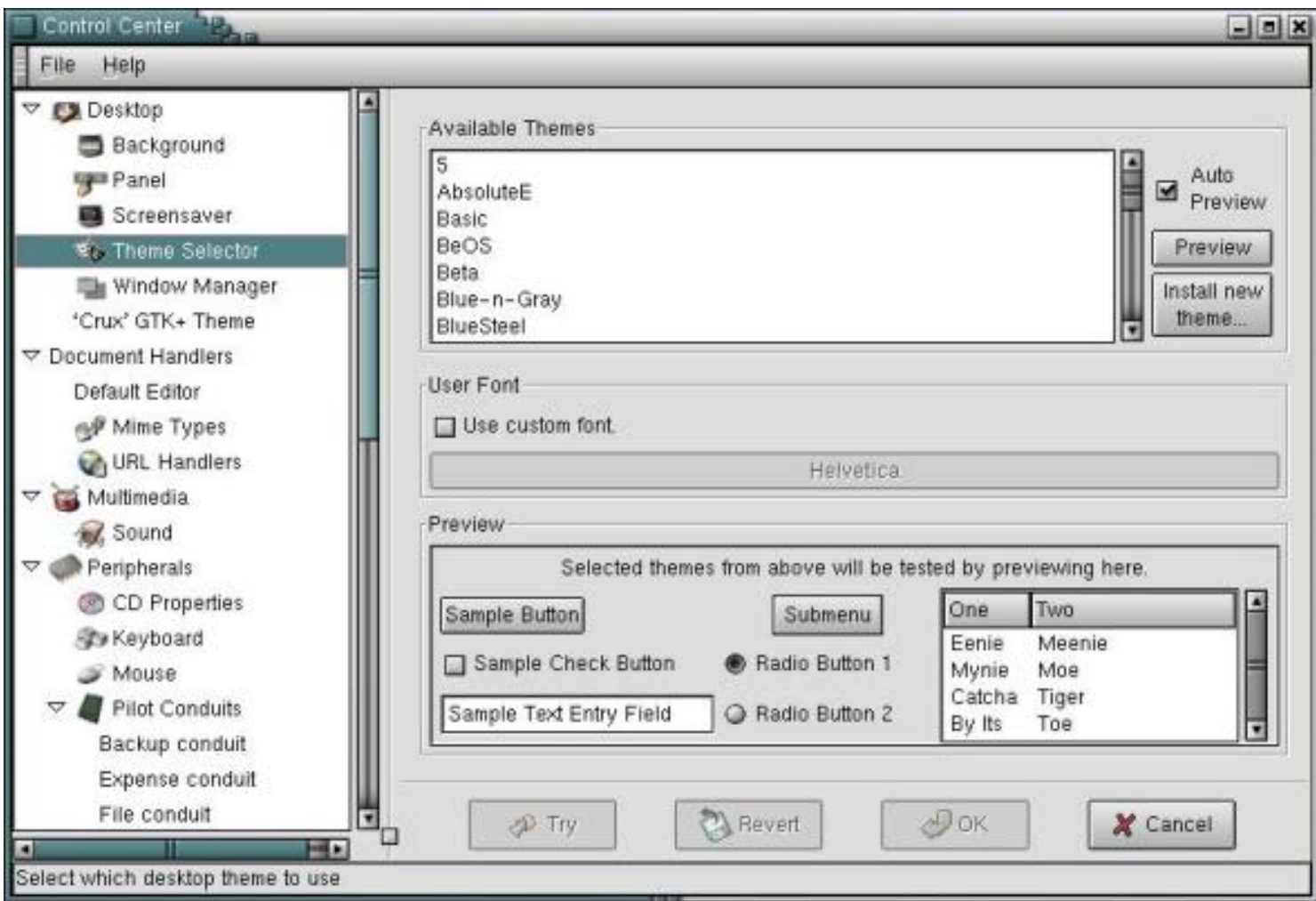
Desktop > Theme Selector capplet

- Those users who attempted to change fonts in the Desktop > Theme Selector capplet were also confused by poor UI design and layout. Several found the "Use Custom Font" checkbox "annoying" and "not useful". One said it was difficult to discern if the checkbox was on or off. Two users overlooked the checkbox entirely. Their eyes went directly to the large grayed out font button and they concluded that the button "was not an option" for changing fonts because it was grayed out and they did not know how to select it. Again, a user looking at the right area of the desktop, cannot complete a task because of confusing design and layout of the UI.

- **Design Recommendation:** The font information in the Desktop > Theme Selector capplet should be represented the same way it is in Appearance > Sawfish Window Manager capplet. This, the large font button should be removed. We also recommend removing the Use Custom Font checkbox if at all possible because most users did not see it.

After users changed the font in one location, we told them there was another place to change fonts in the Control Center. Depending on time, we either let them explore to find the other location or guided them to it. We had them change the font in this second location and pointed out that not all the fonts on the screen had changed. Several users commented on the redundancy between the information in Sawfish Window Manager > Appearance and Desktop > Theme Selector. We then told users that there was a third location to change fonts and heard the following reactions:

> *"Why is that? Why would I have to go to separate places? Why would you make it that difficult?"* (P8)
> *"[That's] unnecessarily complicated, why not have it all in one place?"* (P2)
> *"That is cumbersome. I wouldn't like it. It is annoying to have to go to three different places for fonts."* (P7)
> *"I don't like that, its not straightforward. I'd want all three of those [fonts] in one place. I wouldn't expect to go to three locations to change the font."* (P9)

Users expect to go one place for fonts, make one change, and have it apply to the whole desktop. The fonts example illustrates how users will become frustrated and confused when the underlying software architecture is exposed at the user level. The system architecture forces users to go to three locations to change fonts. In users' minds changing fonts happens magically with respect to how the system actually works. They just want to go one place and deal with fonts. We have to design to that model. We can't burden them with the distinction between fonts in the window manager, fonts in the current selected theme, and fonts inside Nautilus themes. We can't let the development process, of componentized, modularized pieces from different origins, permeate up to the user's level.

Control Center Impressions:

- While users were in the Control Center changing the background, we solicited feedback on the Control Center. As they explored the Control Center they encountered unfamiliar terminology and comments included:

  "Pilot conduits. URL Handler. Theme Selector. Don't know what those are." (P9)
  "I don't know what Doc Handlers are." (P8)
  "MIME Types. No idea." (P10)
  "I don't know what 'Crux Gtk+ Theme' is at all. 'Sawfish Window Manager'? I don't know." (P3)
  "I don't know what the 'Window Manager' does. 'Frame Style'? 'Themes'? I actually have no idea." (Pilot)
  "Some of this terminology I have no awareness of." (P4)

  More general first impressions of the Control Center included:

  "[This is] not stuff you know. I don't think it should be there...it should be condensed...to an advanced area." (P10)
  "There should be an advanced panel to hide stuff." (P11)
  "I'm not sure I'd use this Control Center all that much." (Pilot)
  "This is more control over appearance than I am used to." (P2)
  "I'm not the type to do a lot of customizing. I'd call an admin." (P5)
  "This is too much for somebody who [is a novice]...they'd be overwhelmed." (P7)

  and one user, who looked in the Sawfish Window Manager > Appearance capplet for the first time said:

  "Oh God no, [this is] a bunch of stuff I probably don't want to know." (P9)

  In response to questions about how the users felt about all the choices for controlling the appearance, we heard:

  "There is too much...[some people] would be overwhelmed."
  "There is too much stuff on the screen."
  "There is a lot to digest, it could be intimidating."
  "I didn't know where to look."

  More than one user made the suggestion that some of the information "should be condensed down into an advanced section."

- **Design Recommendation:**The Control Center needs a major redesign to address all of these issues. This work is already in progress and those involved need to bear these quotes in mind while creating a new design.

Send feedback to Sun-GNOME-HCI@sun.com

GNOME Usability Study Report :: Logging Out

Logging Out

At the end of the study, users were asked to leave their system in a state such that a coworker could use their machine. They were not told to "log off" or "log out". They were simply told to leave their machine so that the coworker could access his files from it, but would be unable to access the user's files. Some users, especially those with minimal UNIX experience, did not understand the task.

Halt option

- **Relevant Usability Principle:** Error prevention.

- Many people hovered over the lock icon before correctly choosing the logout icon. Users were asked not to select "Halt" from the list of choices in the logout dialog.

Logout dialog with 'Halt' option.

They made the following comments:

> *"It isn't the best thing to have there then,...it makes it really easy to hit it."* (P11)

"If 'Halt' is dangerous, I wouldn't have it there." (P10)

- **Design Recommendation:** 'Halt' is not a very intuitive term and does not clearly indicate that selecting it unintentionally could be harmful. We recommend replacing 'Halt' with a more intuitive term such as 'Suspend' and adding a text string explaining the severity of Halt, such that the checkbox label reads 'Suspend (Halt - stops the processor)'. Also, the placement of 'Halt' between the two other choices makes it very easy for a user to accidentally select it without realizing they have done so. We recommend changing the position of the Halt checkbox, or even separating it from the others, so that it does not appear between two very common choices. This possible solution is depicted in the illustration below.

Logout dialog with more attention called to 'Halt'.

GNOME Usability Study Report :: In Praise of GNOME

In Praise of GNOME

Overall, users were excited to try out the new desktop environment. In previous sections of this report we have emphasized users' difficulties with icon design, mismatches between their knowledge of the specialized terminology and their handling of the inconsistencies in this version of GNOME. Their experiences were not uniformly dismal however. They had some comments that talked directly about their pleasure with the visual design:

> *"The icons and shading are nice and use nice colors, not dull, but not distracting."* (Pilot)
> *"Pretty, nice graphics that don't compromise performance."* (P3)
> *"The icons are big and easy to see."* (P9)
> *"I like the 3-D design of the icons."* (P7)
> *"There were nice choices for themes and screen savers."* (P2)
> *"This desktop has a cozy feeling."* (Pilot)

Users also were pleased when they were able to complete the tasks, whether they required hints and help from the staff or when they managed on their own:

> *"It has a familiar feel."* (P3)
> *"The response was fast. The tooltips were faster than Windows."* (P5)
> *"There are lots of games. Kind of neat. If I had time I'd try them."* (P1)
> *"It is easy to navigate around."* (Pilot)
> *"I felt there were avenues to explore for discovery."* (P9)
> *"It is personable. I can still relate to it [even though it is new]."* (P1)
> *"I liked clicking and learning, that wasn't a bad thing."* (P2)
> *"The basic feel was fairly intuitive; the menus were where I expected them to be."* (P6)
> *"It was easy to find things, like Windows. I can relate to everything."* (P10)
> *"It is like a cross between Windows and a Mac. It looks like it is designed for everybody."* (P10)

We should emphasize that we anticipate some of the issues which we uncovered result from the first time experience. For people who return to GNOME day after day, at least some of the visual elements and behaviors of the interface would become familiar. The importance, however, of a study such as this one is to remind ourselves of the many parts of GNOME that are part of the fabric of the GNOME community's life, but are absolutely mysterious to ordinary users. The inconsistences that remind us of the history of the product's development will be rough spots for users. To promote adoption of GNOME by others, we will be served well by the adage "We are not our users" and to evaluate the product again at frequent intervals in the development process.

Send feedback to Sun-GNOME-HCI@sun.com

GNOME Usability Study Report :: Participant Mix

July 2001

Participant Mix

Participants were screened to include a mix of men and women, with a minimum of at least 3 years using a graphical user interface (GUI). Each participant indicated that he or she had at least six months experience (and often a great deal more) with the web, used document editing software at least weekly, email at least 3 times a week with a volume of mail exchanged exceeding 25 messages. (All participants, except P12, completed the full study. P12 had to cancel her scheduled time, and our timetable did not permit rescheduling.) Each participant received $75 in gift certificates for completing the study. (We had one additional test participant, who fits the profile, but works for Sun. She was the guinea pig to give us practice with the newly configured laboratory and with our tasks and scripts. Since several parts of her experience differed from the rest, we have not included her data. The protocol for the Pilot subject, the participant who completes a "dress rehearsal" of the study, matched the rest of the participants, and therefore we have included his data.)

The participants for this study (Pilot, and P1 through P12) are experienced professionals in B(usiness), S(cientific) fields, or C(reative) endeavors. For example, the Pilot participant works in a creative industry, but his job is in finance: therefore we categoried him as B. Similarly, P12 works in Aerospace, but her role is in drafting and design, using CAD software, therefore we categorized her as C. Each participant can be considered a technical professional, but not in computer programming or information technology. Some of these people use industry-specific applications or productivity software for hours each day. We wanted to look at how people with prior experience using computers would respond to a new operating system and desktop environment.

We intentionally screened out people whose jobs included more than 25% time programming, where we were quite inclusive in what kinds of programming we asked about. Potential participants whose jobs or avocational programming included extensive Java, C or C++, LISP, SQL, Fortran or similar expertise were disqualified from this study. Potential participants whose work or hobbies included less than 25% time using HTML or Javascript or Lingo might still be included.

We selected these three types of professionals with several hypotheses in mind. Would business professionals be receptive to the integration of desktop services? Would creative professionals respond to the opportunities for customization in GNOME? Would those with a scientific bent be more likely to experiment? Would one or another group be more thrown off step by the unfamiliar? While we were careful to balance the types of participants by professional role (B, S, C), we did not observe strong patterns distinguishing them. Likewise, we didn't see strong difference between the men and the women. The only pattern worth noting is that the people with greater programming backgrounds had better predictions about what would happen next or where to look for clues to solve the tasks we had given them. This tendency suggests that GNOME needs some additional work to make it more usable by people unlike the developer community.

Participant	Profession	Industry	B/S/C	Completed study?	Years in position (or similar)	Mail Client	programming, HTML, Java, etc.	Self-rating 0 (novice) - 5 (expert)		
								Win	Mac	UNIX
Pilot	Financial Analyst	Industrial Design firm	B	Y	2	Outlook	n/a	5	1	0
P1	Customer Service Manager	ISP	B	Y	3	Outlook	n/a	5	3	0
P2	Analytic Chemist	BioTech	S	Y	20	Outlook	n/a	5	3	0
P3	Content Manager	Collateral Marketing	C	Y	>1	Outlook	<25% time HTML	4	4.5	0
P4	Graphic Design	Self-employed	C	Y	5	Outlook, yahoo	<25% time on authoring tool	5	5	0
P5	Director of Marketing	Equipment Reseller	B	Y	2	Netscape, Outlook	n/a	5	2	3 (Solaris) 2 (CDE)
P6	Videographer	Self-employed	C	Y	>5	Netscape	n/a	3	5	0
P7	Project Manager	Translation company	B	Y	>5	Outlook	n/a	5	3	0
P8	Director of Diagnostics	BioTech	S	Y	14	Hotmail	n/a	5	5	0
P9	Mechanical Engineer	BioTech	S	Y	2	Netscape	college only	4	3	1
P10	Business Analyst	Web Infrastructure	B	Y	>3			4	1	0
P11	Senior Research Associate	BioTech	S	Y	2	Lotus Notes, Eudora	<25% time HTML, Java, C++	5	4	2.5 (Solaris)
P12	Drafting, Design	Aerospace	C	N	20	Netscape	<10% Visual Basic	5	3	1 (Solaris) 1 (CDE)

GNOME Usability Study Report :: Procedural Notes and Technical Setup

July 2001

Procedural Notes

The study was conducted March 13-16, 2001, in the Sun Microsystems Usability Labs in Menlo Park, California, USA by Suzanna Smith, Dave Engen, Andrea Mankoski, and Nancy Frishberg. Recruiting and technical support were provided by Sun Microsystems Usability Labs and Services.

Common tasks for exploration, file management and customization in GNOME were derived by the Solaris HCI team from Sun, Arlo Rose from Eazel, and informed by discussions on GNOME IRC channels and mailing lists.

After completing the tasks in each scenario in the **Participant Script**, participants answered questions about what they liked and disliked about completing the scenario. Ratings, reflecting participants' satisfaction with the tasks, were gathered but are not included in this report. The ratings provide a tool for usability engineers to understand and interpret the participants' thoughts. Relevant comments from participants are provided instead of the actual number ratings.

Each session lasted approximately 2 hours and all sessions were videotaped. A usability engineer remained in the room with the participant for the duration of the session. The usability engineer did not answer questions other than to evoke the participants' thoughts. Additional usability engineers and observers watched from the control room.

An Engineering Script was used by the usability engineers and observers to record participants' comments and behaviors, and to record scenario completion times. It mirrored the Participant Script but contained additional questions and notes.

Hints were provided to participants when necessary (as noted in the Main Report). Participants spent a minimum of 7-10 minutes on a scenario before any hint was provided.

A 10-13 minute maximum per scenario was originally allocated. In most cases, however, this time was flexible and, if possible, additional time was allowed. Scenarios were cut short or skipped if, for example, the participant could not stay longer or it was clear that the participant would not complete the scenario in a reasonable amount of time.

Technical Setup for Study

- Operating System: Linux, version 2.2.16-3
- Distribution Version: Red Hat, version 6.2
- GNOME, version 1.2
- Sawfish, version 0.36.1
- Nautilus, version 1.0

GNOME Usability Study Report :: Summary of Design Recommendations

July 2001

Summary of Design Recommendations

Architectural Issues:

- **Design Recommendation:** These architectural issues, which are pervasive throughout GNOME, would best be addressed in a User Interface Style Guide for GNOME. To solve these issues, which have a large impact on the user experience, will require the coordination and cooperation of the community; to develop user interface guidelines, to implement the necessary changes, and to adhere to the guidelines.

Logging In:

- **Design Recommendation:** The term 'login' is unclear, as it is both a noun and a verb. We recommend that the field labeled 'Login' be relabeled 'Username' (see 'Logging In' for illustration).

  We recommend following the GNOME Documentation Style Guide. We also recommend developers to involve a technical writer in the review of any terminology, error messages, or other on-screen text delivered into GNOME. Developers are encouraged to ask terminology questions on the gnome-doc-list@gnome.org mailing list or the #docs channel on IRC.

- **Design Recommendation:** We recommend that the login dialog be made active by default. No matter where the cursor is, the user's entry should go into the text field. The text field should also be in focus by default. It should not be possible for the dialog to become inactive or the text field to lose focus. If it simply is not possible to implement this solution, then feedback, both audio and visual, must be provided if the user tries to type while the cursor is outside the dialog.

- **Design Recommendation:** Provide brief yet clear feedback to the user that communicates what went wrong, why, and what the user can do about it. We recommend providing error feedback within the login dialog itself. For example, the following text string could appear in the login dialog when users enter incorrect login information: "The username or password you entered in incorrect. Letters must be typed in the correct case. Be sure the caps key is not selected." This error message would appear above the username field to communicate that the user should try logging in again (see 'Logging In' for illustration).

  We also recommend following the GNOME Documentation Style Guide. We also recommend developers to involve a technical writer in the review of any terminology, error messages, or other on-screen text delivered into GNOME. Developers are encouraged to ask terminology questions on the gnome-doc-list@gnome.org mailing list or the #docs channel on IRC.

- **Design Recommendation:** If there are no technical reasons to the contrary, then consider putting the username and password fields together in the same dialog.

- **Design Recommendation:** We recommend supporting users who are more mouse-oriented as well as those comfortable navigating with the keyboard. To support mouse-oriented users, we recommend adding an 'OK' button on both the username and password screens. This button should be the active default. We also recommend consulting the proposed guidelines for accessible keyboard navigation.

- **Design Recommendation:** Not knowing what "marge-hci" was did not hinder users from successfully completing the task. However, novice GNOME users' confusion did highlight an opportunity for us to provide more assistance. To support new GNOME users we suggest including a Help button or menu in the login dialog. Selecting this button or menu should invoke Help with information about the elements and terminology found in the dialog. Again, we recommend following the GNOME Documentation Style Guide. We encourage developers to involve a technical writer in the review of any terminology, error messages, or other on-screen text delivered into GNOME. Developers are encouraged to ask terminology questions on the gnome-doc-list@gnome.org mailing list or the #docs channel on IRC.

Exploring the Desktop:

- **Design Recommendation:** The logout icon relies heavily on elements commonly associated with sleep, a moon and stars, to convey its meaning. A moon and stars can convey night time, but users did not associate night time with the end of the day and logging out. This icon also uses the same computer as the terminal icon, making it difficult to distinguish between the two. We suggest redesigning the icon and removing the moon and stars as well as the computer imagery. Alternate design elements that might communicate "logging out", "leaving", or "exiting" more successfully include arrows and/or doors. We recommend trying to illustrate the physical aspect of "leaving" rather than relying on "sleep" or "nighttime" imagery to imply "the end of a work day or work session". We recommend testing new designs with a wide range of users to ensure that they interpret it correctly.

- **Design Recommendation:** The terminal icon might be more clear if the logout icon is redesigned to not use the same computer imagery (see the logout icon design recommendation). However, we recommend testing a version of the terminal icon that does not have the small GNOME footprint overlaid on the computer. The footprint seemed to confuse users the most. The icon might also be improved by thickening or brightening the color of the small light gray lines on the monitor so there is greater contrast between the lines and the black screen. We recommend testing new designs with a wide range of users to ensure that they interpret it correctly.

- **Design Recommendation:** Consider using the existing application icon for the default browser in the default configuration of the panel. If Mozilla is the default browser, use the application icon for Mozilla in the panel. Likewise, if Netscape is the default browser, use the Netscape application icon in the panel.

- **Design Recommendation:** We recommend redesigning the GNOME Main Menu foot icon so that it is more obvious that clicking it will display a menu. The small arrow above the foot, that indicates a menu is invokable, needs to be made more noticeable. Possible redesigns could include enlarging the arrow or changing the color of the arrow when the user mouses over the foot icon.

- **Design Recommendation:** Most future GNOME users coming from Macintosh or Windows will have no concept of man pages, just Help. Therefore, the emphasis on 'integrated' help will only confuse them. We recommend rewriting this tooltip. Suggestions to user-test, as alternatives to "Integrated help system (info, man, HTML)",

could include "GNOME User Guide" or "Online Help". We also recommend following the [GNOME Documentation Style Guide](#) and involving a technical writer in the review of any terminology, error messages, or other on-screen text delivered into GNOME. Developers are encouraged to ask terminology questions on the gnome-doc-list@gnome.org mailing list or the #docs channel on IRC.

- **Design Recommendation:** Icons at small sizes must be clear and simple designs. Most often, a large icon squeezed down to 16x16 will become unreadable. While the spider foobar icon might not be the most important icon for the average user, it illustrates a larger problem throughout GNOME, where one icon design is used at all sizes, much to the detriment of icon legibility.

File Management Tasks:

- **Design Recommendation:** We recommend moving the Programs >Utilities >GNOME Search Tool menu item to the top level of the GNOME Main Menu (see 'File Management Tasks' for illustration).

- **Design Recommendation:** We recommend spelling out the terms 'glob' and 'regexp'. For example, instead of 'regexp', we suggest 'regular expression' (see 'File Management Tasks' for illustration). Users should also be able to access online Help that will provide explanations of menu items and how to use the search syntax.

  Again, we recommend following the [GNOME Documentation Style Guide](#). We encourage developers to involve a technical writer in the review of any terminology, error messages, or other on-screen text delivered into GNOME. Developers are encouraged to ask terminology questions on the gnome-doc-list@gnome.org mailing list or the #docs channel on IRC.

- **Design Recommendation:** Remove the red pencil icon. It is unclear why it appears in the sidebar or what it means. If it does mean the user can't edit a file, then for consistency it should remain in the sidebar when the file is double clicked and opened into a Nautilus viewer.

- **Design Recommendation:** It is important to communicate to users that the system is busy and to provide feedback indicating that the system has received the users' input and is operating on it. During a lengthy search operation, when users must wait until the operation is complete, change the shape of the cursor. Because users are still able to click elsewhere in Nautilus while a search is in progress, we recommend changing the cursor to a combo cursor (arrow + hourglass), such as the combo cursor seen in xalf when an application is launched. However, this combo cursor only applies to the active Nautilus window with a search in progress. If the user clicks elsewhere, for example invokes a terminal or opens the Control Center, the cursor should return to the normal arrow cursor within those applications.

- **Design Recommendation:** We recommend designing a more distinctive Nautilus throbber that provides better visual feedback to the user that the system is busy. To be effective, the inactive state of a throbber must be easily distinguishable from its in-progress state. (see 'File Management Tasks' for examples.)

- **Design Recommendation:** Users expect the ability to click on live links and be taken to the web. We recommend supporting live links and implementing appropriate cursor changes over live links in the Nautilus viewer. The cursor used over a live link in the Nautilus viewer should be the one that Mozilla uses for live links if Nautilus has been compiled with Mozilla support to render its HTML pages, or the cursor that GtkHTML uses if Nautilus has been compiled with GtkHTML support to render its HTML pages. This will ensure that the same cursor is used for live links whether Nautilus is used to look at a text file or a web page.

- **Design Recommendation:** The carriage return symbols are an awkward way to represent line wraps (see screenshot in 'File Management Tasks'). It is fairly standard to just wrap the lines without symbols. We suggest removing the symbols entirely and wrapping lines at word breaks.

- **Design Recommendation:** We recommend providing more visual indication that the user is in viewer mode and cannot edit. One possible approach is to present the file surrounded by a gray border, to imply that the user is not looking at the actual file but at a view of the file. Adobe Acrobat Reader uses a similar approach successfully to indicate that files are read-only. Other possibilities include an explanatory tooltip for the read-only view, or a message box if the user tries to type into the read-only area. Additionally, we recommend adding help text to the top of the view pane and above the Open With... buttons in the Nautilus sidebar. (See 'File Management Tasks' for illustration)

We recommend involving a user interface designer when redesigning how Nautilus views are visually presented. Developers are also encouraged to ask UI design questions or solicit feedback on the usability@gnome.org mailing list or the #usability channel on IRC.

For any on-screen text, we recommend following the GNOME Documentation Style Guide. We encourage developers to involve a technical writer and to ask terminology questions on the gnome-doc-list@gnome.org mailing list or the #docs channel on IRC.

- **Design Recommendation:** We recommend adding a text string above the Open With... buttons that reads, "Click a button below to open the file in an appropriate application." We also recommend that tooltips be implemented for the buttons that mirror the application's .dekstop file comment, or, for applications without .desktop files, "Open with [executable name]". To be consistent, tooltips must be implemented for all buttons. The proposed text string and tooltips will help novice GNOME users, unlikely to be familiar with GNOME application names, to recognize that the buttons will launch applications. (See 'File Management Tasks' for illustration.)

Customization Tasks:

- **Design Recommendation:** There is currently a discussion taking place on the GNOME usability mailing list about applets, gagdets, and panel gagdets. We feel this discussion is going in the right direction towards addressing the issues raised in this usability study around the Applets menu. We recommend referring to and becoming involved in that discussion.

- **Design Recommendation:** We recommend simplifying the Clocks menu by removing some of the clocks. User do not need that many choices. For any clocks that remain in the menu, we suggest renaming them with more meaningful and descriptive names.

- **Design Recommendation:** We strongly recommend implementing submenus so that clicking the menu title does not dismiss the menu. If this is not possible, then we recommend giving the menu titles better visual affordance so it is clear they are not the first selectable items in submenus. Approaches to create greater visual affordance can include displaying menu titles in a bold font, using a thicker line to separate menu titles from menu items, or removing icons that appear beside menu titles.

We also recommend consistently implementing menu titles for every submenu. To be consistent, the Applets menu should be implemented with its own menu title.

- **Design Recommendation:** We suggest duplicating the "Remove from panel" menu item somewhere in addition to contextual menu. Hiding this option behind the right mouse button penalizes users who do not use more than one mouse button. Everything in the contextual menu should be duplicated somewhere accessible without using the right mouse button.

- **Design Recommendation:** When icons are used in menus, it is recommended that all menu items have icons. If an icon does not exist for a particular menu item it is recommended that a generic icon be displayed, rather than no icon at all. It is important to be consistent so that users do not get confused or think there is a bug with the system.

- **Design Recommendation:** The relationship between 'Wallpaper' and 'Color' needs to be presented more clearly. 'Wallpaper' and 'Color' are mutually exclusive, yet they are not presented in a distinct way. One suggestion is add 'Wallpaper' and 'Color' radio buttons to the top of the capplet. This would allow a user to state whether he or she was applying a wallpaper pattern or a color. Currently, if users wants to apply to color they have to first select 'none' in the 'Wallpaper' pulldown. It is not intuitive to go to 'Wallpaper' when the desire is to manipulate 'Color'. Selecting 'none' in the 'Wallpaper' pulldown has the effect of toggling between 'Wallpaper' and 'Color'. It could be more straightforward to pull this step out of the 'Wallpaper' pulldown, where it was confusing and difficult for users to find, and to present it at a higher level using radio buttons.

  The confusion in the Background capplet is caused by layout and UI design issues. We recommend involving a user interface designer to redesign how users select and apply wallpaper patterns and colors to the desktop background. Developers are encouraged to ask UI design questions or solicit feedback on the usability@gnome.org mailing list or the #usability channel on IRC.

- **Design Recommendation:** We suggest replacing the text field containing the string of font information with something more intuitive to users in Appearance > Sawfish Window Manager. The current representation looks like the string of code the system uses. This is an example of where the system architecture is getting exposed at the user level and confusing the user. It would be more intuitive to simply say, "Helvetica, medium. 12pt". We recommend looking at the way popular word processing applications display font information.

- **Design Recommendation:** The font information in the Desktop >Theme Selector capplet should be represented the same way it is in Appearance > Sawfish Window Manager capplet. This, the large font button should be removed. We also recommend removing the Use Custom Font checkbox if at all possible because most users did not see it.

- **Design Recommendation:**The Control Center needs a major redesign to address all of these issues. This work is already in progress and those involved need to bear these quotes in mind while creating a new design.

Logging Out:

- **Design Recommendation:** 'Halt' is not a very intuitive term and does not clearly indicate that selecting it unintentionally could be harmful. We recommend replacing 'Halt' with a more intuitive term such as 'Suspend' and adding a text string explaining the severity of Halt, such that the checkbox label reads 'Suspend (Halt - stops the processor)'. Also, the placement of 'Halt' between the two other choices makes it very easy for a user to accidentally select it without realizing they have done so. We recommend changing the position of the Halt checkbox, or even separating it from the others, so that it does not appear between two very common choices. (See 'Logging Out' for illustration.)

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GNOME Usability Study Report :: Usability Principles

Usability Principles

Match between system and the real world.
You can take advantage of the knowledge users already have of the world around them to convey the concepts and features of your system. By using metaphors involving concrete and familiar ideas, and by making them simple and straightforward, the user can apply their experience and set of expectations to your system. Follow real-world conventions, making information appear in a natural and logical order. The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Well-defined, intuitive terminology in error messages, tooltips, and documentation will facilitate a better understanding of the system. This is particularly important in GNOME, where an uncommon amount of developer jargon is visible in the UI and some commonly used terms are replaced with GNOME-specific terms, e.g, Wizards are referred to as "Druids".

Consistency and Standards
Consistency in the interface allows people to transfer their knowledge and experience from one application or environment to another. Applications can have consistency in many ways. Consistency in the visual design of an application allows the user to learn the visual language of the system more quickly and more confidently. For example, in a system where checkboxes are implemented consistently, a user who learns what a checkbox looks like and how it functions, will not have to relearn how to make a choice the next time they encounter a checkbox. Likewise, consistency in system behavior aids users in learning and working successfully within an application. A user can take knowledge from a previous interaction with the system and apply it with success throughout the rest of the system. Users will not have to wonder whether words, symbols, situation, or actions mean the same thing. Also, follow well-established platform conventions.

Feedback
The system should always keep the user informed about what is going on, through appropriate feedback presented in reasonable time. A user should never have to guess about the status of the system. When a user performs an action provide feedback to indicate that the system has received the input and is operating on it. Feedback can be visual, audio, or both. If the system will take a long time to process the request, provide as much feedback as possible about how lengthy the operation will be. Types of helpful feedback include but are not limited to: cursor changes, animated throbbers, progress indicators, audio feedback such as a beep, and error messages. Error messages should use simple language, clearly state the problem, and provide solutions or tell the user how to get out of the current situation if possible.

Aesthetic and minimalist design
Dialogs should not contain information which is irrelevant or rarely needed. Every extra unit of information in a window that is unnecessary or indecipherable competes with the critical information in the window, diminishing its visibility. Don't clutter the screen with too many windows, overload the user with icons, or put dozens of buttons in a dialog box. Keep gratuitous visual clutter to a minimum and ensure that the graphics that are presented are of top quality and legibility.

Accessibility
The system should always support multiple ways to accessing functionality. Ensure that all windows are keyboard accessible. Everything that is accessible with a mouse should be accessible through keyboard navigation. Items hidden in a contextual menu should be represented somewhere else in the system that doesn't require the right mouse button.

Designing for universal access makes the system easier to use for all types of users.

Direct Manipulation

Make objects, action, and options readily visible to the user. Users should not have to remember information from one part of the dialog to another in order to complete a task. How to manipulate the system should be readily visible and intuitive at all times. The user should not have to guess what to do next.

Error Prevention

Good error messages that are information and helpful to the user are key to a usable system. But even better is a careful design that prevents the problem from occurring in the first place.

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