

Unity Benchmark Testing - April 2011

Introduction

First and last impressions of Unity were that it is quite user-friendly, and pleasing in its design and ease of learning. The majority of participants left the session with very positive feelings and were looking forward to Unity's release so they could download it. In short, participants in this testing session were considerably more positive about Unity than participants who tested the previous version in October.

This improvement, no doubt, is due to the significant changes we have made since the last testing, often in response to problems uncovered during that testing. Many of the serious issues discovered then have been resolved. Most significant, as it stands now, there are no longer any "show-stoppers".

However, there are still a few interactions that are at odds with the product's general ease of use.

Executive Summary

Four points of particular prominence have emerged.

First, it appears that those of our participants who were Mac users seemed to have had more facility with the Unity interface than Windows users, especially those using anything previous to Windows 7. Generally, Windows users tended to rely on right click, and they sought menus from which they could find and launch applications as well as move and delete. They did not immediately take advantage of Unity's visual assets. Accordingly, Windows users will need to be encouraged to manipulate icons and to develop a more physical relationship with Unity than the more text-heavy relationship they have with Windows.

Second, Unity's concept of Home (Nautilus File Manager) is different for most of our users, even Mac users, and they did not immediately understand it. They had a tendency to go to the Home icon at the top of the Launcher, not only to find information about their computer, but for any programme or application they were looking for. Essentially, many navigated from one application to another using Home. For example, almost every participant first looked into Home to find computer settings and to change their wallpaper.

Third, most participants were not able to figure out how to reveal the Launcher from the upper left corner. They immediately devised work-arounds, like closing windows or moving a window away from the left edge of the screen. They expected to be able to reveal the Launcher by approaching any point along the left side with their pointer. As the Launcher is one of the most important features of Unity, it should be either always visible or at least very

easy to bring out.

Fourth, the Dash is hard to discover. The icon is too small and understated compared to the icons in the Launcher. By its size and placement, it is easily associated with the window management buttons. Participants who discovered the Dash found it very useful, but were more inclined to use the Files Lens and the Applications Lens at the bottom of the Launcher. This was, I'm convinced, partly due to the fact that there were, at the time of the testing, no data, pictures, music or documents on the computer that they would want to access through the Dash, whereas the Applications Lens, in early use, is more adapted to general exploration. The Dash needs to be more visible -- it needs to be accorded its rightful place as a major feature of the interface.

Notwithstanding these problems, it is fair to say that this test showed that we have made significant progress since the October testing.

Some Major Issues that Have Been Resolved since October

Visibility of icons at the bottom of the Launcher

During the April testing, participants experienced difficulty seeing the bottom of the Launcher when it was accorded, and then, when the Launcher expanded, it hid the bottom icons. At the time of the testing, it was very difficult to reveal these bottom icons even by scrolling down. Recent updates have resolved this problem by making the Launcher automatically scroll down when users move the pointer down along it. This way, the icons that were previously hidden are effortlessly revealed.

A related issue that has also been resolved is that, during testing, participants wanted to make the Launcher visible by touching any part of the left side border – whereas, in fact, the only way to reveal the Launcher was by reaching with the pointer to the upper left corner. With the updated version, users can now reveal the Launcher from any point on the left side of the screen.

Changing the order of icons in Launcher

During the October testing, when the interaction to move an icon in the Launcher was to select it and bring it outside of the Launcher before giving it a new position, many participants failed to do it. The new interaction supports users' natural way of moving an icon. They were able to move icons by selecting them and moving them vertically up and down. It should also be noticed that the feedback provided when users selected an icon they intended to move helped them understand that they had initiated an action. Knowing that the icon had effectively been selected afforded them more freedom to move it around and to find a way to make it work.

Adding icons to the Launcher

Participants were able, even during the October testing, to drag and drop the icon of an application from the Applications Lens into the Launcher. However, their first attempt, especially for Windows users, was to right click on the icon they intended to move after which they expected to be offered an option to attach to the Launcher in a drop down menu; and second, to look at the top of the Launcher for a Launcher menu.

Identifying running applications

Most participants were able to see immediately which applications were running by means of the white arrows beside the icon in the Launcher. However, they were not sure if they had made the right inference. In short, although participants were unsure about the meaning of the white arrows and bars, they were able to figure them out, which indicates that this is a feature that is easy to learn.

Changing the wallpaper

Most participants easily changed the wallpaper by right clicking on the desktop.

Deleting a document

Most participants easily deleted a document.

New usability issues that have arisen from the new design

- The top menu is unusual and what it does is not immediately obvious to participants. There was some confusion about its role.
- Finding system settings in the Applications Lens is not intuitive. Most participants did not succeed in changing the wallpaper by going into the Applications Lens.
- Notification of message received is not visible. The majority of participants did not notice such notifications.
- Semi-maximised and maximised states are not discoverable. Furthermore, some participants interpreted the blue preview shadow as signalling that they were about to make a mistake or to do something not allowed by the system.

To do

Overall, the following items emerged from the full benchmark testing as to be done:

- Consolidate me menu and messaging menu.
- Redesign Dash, Applications Lens and Files Lens icons

- Resolve confusion in relation to the top menu bar
- Make the semi-maximised and maximised states more discoverable
- Make the overview of 'system settings' obvious
- Resolve the ambiguity of 'setting' versus 'application'
- Provide better visibility for the Rubbish Bin
- Always provide feedback -- e.g., in relation to search boxes, and to deletions
- Make the Dash, Files Lens and Applications Lens easier to close
- Make the notification of a message received more visible
- Make the music player open by default when users import or listen to a song
- Make it obvious how to eject a USB key

Detailed Summary of Benchmarking - Comparison of the October and April Test Results

The points above are the highlights of the findings. Let us now examine individually the differences in performance as revealed in the testing of last October and the one just completed in April.

The set-up

The test machine was a Lenovo ThinkPad T410i running Ubuntu Natty with unity 3.8.2-0ubuntu1, compiz 1:0.9.4git20110322-0ubuntu5, and linux 2.6.38.8.22.

In preparation for the test, the Launcher was heavily loaded so that icons were folded at the bottom.

IRC was opened, ready to deliver a message to the participant.

The wallpaper was the default background.

Test Protocol

Part 1: Introduction

Thank you for participating in this research.

Let me tell you what we're going to do today. We are working on a new interface design for our product, which is called Ubuntu. Have you heard of it? [Short explanation if they haven't.]

We are working on this interface and we thought that, at this point, it would be good for us to

invite people like you to come in, try it out and give us feedback – so that we can know if our product is easy to use and where it might be a bit more difficult so we can build on what's working well and make improvements to what is difficult.

During this session, I will be asking you to try different things. While you are doing them, I will ask you to tell me what you are thinking. Let me know what you notice, what is different from what you are used to or expected and what you like or do not like so much. You should not worry if you can't finish something I've asked you to do. That's OK. It is evidence for us that we need to fix our product. Please, tell me what you really think. I have not worked on this interface and it won't offend me if you don't like it or if you find it difficult to use. I will provide the feedback to the Ubuntu designers and they can make the product better. Don't be polite, because at the end of the day, we will rely on what you say to make design decisions.

While you are going through this session, I will not answer any of your questions or help you in any way. That is because I want to see what you would do if you were alone at home. Be patient with me. I may ask you questions that seem elementary to you, but your answers will be important for my research.

Before we start, do you have any questions for me?

Part 2: Let me ask you a few questions about yourself

What kind of work do you do?

What are your hobbies?

What do you do on your computer?

What OS do you use?

Why have you chosen that OS?

Part 3: Unity Testing

Let's suppose this is your brand new computer. You have turned it on and this is what you see.

Can you tell me what you can do with this computer (interpretation of icons and launcher)?

The first thing you want to do on your new computer is check your email. Now, you want to open a new window in Firefox to conduct a search. How would you do that? Can you search for 'Ubuntu'? (Go on the Internet and discover the Firefox menu.) After you've checked your email, you want to change your wallpaper but you want to keep your email open so you can easily refer to it while you're doing other things (make the Dash visible, find Applications Lens).

After you've changed your wallpaper, (navigate through the Launcher) you want to organise your favourites in a way that what you use most often is at the top and what you used less often is at the bottom (move icons in the Launcher).

Now, you feel like playing a game. Your favourite is Sudoku (find the Dash and open the list of installed apps). How would you play it? Now, you're thinking that you are likely to use it regularly, how would you add it to your favourites? (Add to the Launcher.)

After playing this game, you need to write a document. You want to put in today's date - you need to check what the date is. Your letter will be addressed to Mr Smith, 2 Golden Road, London. Save and close your document. Before you close it, can you show me 4 different ways of doing that? (Find Files and Folders, word processor, write and save document).

It just occurred to you that you want to create a new document and cut and paste from the letter where you just wrote the address of Mr Smith to the new document but with a different date because you will send your letter only tomorrow. You want to put the 2 documents, the existing one and the new document, side by side and cut and paste the address from one to another. (Find document in Files and Folders, place documents side by side and discover the half-screen, full-screen features.)

You decide you don't need the old document any longer. Delete it(delete a document). As you are dragging it to the Rubbish Bin, you want to open it quickly to make sure it is the right document. How would you do that? (Can they discover the drag and drop feature to open an app? And can they find the Rubbish Bin?)

How many apps do you have running right now? How do you know? (Interpreting the indicators or running apps)

[Send IRC message] Moderator sends an unexpected IRC message while participant is busy doing other tasks. (Visibility of the change in colour of the Dash icon to signal a new message has been sent.)

If time permits: Now you have songs on a USB stick and want to listen to them(finding the music player). What about your photos? (Importing photos.)

Now that you have been using Ubuntu for an hour, can you tell me what your general impressions are?
Thank you

END OF TEST SESSION

Note: Removed from previous benchmark testing protocol: Testing of the Software Centre (task 9) because designers and developers have agreed as to the usability problems that it contains and have agreed on fixing it.

Participants

All participants were professionally recruited by an external firm.

Participant number	Gender	Age	Occupation	Current OS
P1	Female	19	Student (nursing)	Mac
P2	Female	33	Administrator	Mac
P3	Female	25	Student	Windows 7 and Windows Vista
P4	Male	32	ICT teacher	Windows 7
P5	Female	27	Head of compliance	Windows and Mac
P6	NO SHOW			
P7	Male	44	Life coach	Windows XP and Ubuntu netbook
P8	Male	30	Network manager	Mac
P9	Female	22	Student	Windows 7
P10	Male	21	Student	Windows
P11	Female	47	Teacher	Windows XP
P12	Male	34	Operations manager	Windows XP (has used Win7 and Vista)

Comparison of October and April Benchmarking tests

Have we made progress?

What was working well is still working well. Recent participants noticed with delight the same features that particularly pleased previous participants: the look and feel of the design, its simplicity and lack of clutter; the usefulness of the workspaces; the Software Centre as a significant resource. At the same time, many of the problems that plagued earlier participants have now disappeared; while a few remain, as the summary table below illustrates.

Usability Issues Report November 2010	April 2011	Going Forward	
Performance	"The level of performance in this regard significantly impaired the flow of use and the user experience."	The performance of Unity was very good. The system was quick and responsive.	This is fixed
Multi-tasking: having many items opened and accessing them	"Thus, while working on a task, participants expected that Unity would provide them with a representation or visibility of what was available to them and how to easily access what they needed at any given point."	No problem with overlapping open applications and documents. Participants could easily move individual windows and reveal items placed underneath.	This is fixed.

General navigation	"Overall, participants found the navigation to be cumbersome."	Participants used Nautilus to find applications and documents as well as 'system settings'. This is not particularly efficient, however.	The Files Lens and Application Lens icons need to be more prominent in the Launcher. The recent renaming of Home as File Manager and changing of the icon from a home shape to a folder will definitely help users recognise the role of the File Manager. This will need to be tested.
Minimising a window	"When participants minimised a document, the document seemed to have disappeared when they expected it to be shown at the bottom of the screen."	A few participants were still expecting to see a trace of their minimised document at the bottom of their screen.	Since the usability sessions this interaction has been updated to show the window minimised into its Launcher icon even when the Launcher is hidden. This will need to be tested again.
Awareness of running applications	"They did not always see the white arrows that indicate a programme is running or that documents are opened. Consequently, they were not aware of what was available to them."	Almost all participants were able to tell which applications were running by looking at the white arrows. However, many were not sure at first and needed to 'try it out'.	The white arrows seem to be working well once they have been discovered. This will work.
Moving windows	"Almost all participants wanted to organise their work by opening several windows and physically positioning them in a way to maintain an awareness of all of them."	Participants were able to open several applications and/or documents at one time and to manipulate them.	This is fixed.
Displaying documents side by side	"No participant could find a way to resize his/her OpenOffice documents in such a way that they could be placed side by side while working on both at the same time."	All but one participant were able to display two documents side by side. However, they were not able to discover the semi-maximised state.	The original problem is fixed. Participants have a way to display their documents side by side and work on them simultaneously. However, the very neat feature of semi-maximised and maximised states are not discoverable and in some cases the visual guidance is misinterpreted. http://bugs.launchpad.net/ayatana-design/+bug/764729

Overview of computer	"Many participants wished they could have an overview of what resides in various parts of their computer, as is facilitated by Windows's 'my computer'."	This is still a problem. Participants in the April sessions were still looking for a place where they could do systems settings and have an overview of their computer.	None of the participants discovered 'system settings' in the top indicators area. They need an icon in the Launcher or a folder in Nautilus. http://bugs.launchpad.net/ayatana-design/+bug/764744
Delete a document	"Participants could not delete existing documents from their files and folders. "	Everyone was able to delete a document.	This is fixed. One remaining problem is that participants cannot see the Rubbish Bin at the bottom of the Launcher. http://bugs.launchpad.net/ayatana-design/+bug/764751
Copy and paste	"Copy and paste from one document to another didn't always work for participants."	Everyone was able to copy and paste from one document to another.	This is fixed.
Lack of feedback	"Unity is often slow, and as a result participants tended to be confused about what was going on."	Overall, the performance of Unity was much better and the system responded more readily to users' commands. There remain some issues with feedback, for example, with the Rubbish Bin and search boxes.	There needs to be some feedback confirming that an action has been successful; for examples, when dropping an item into the Rubbish Bin, the user should be given a quick indication that the item has been deleted; or when users bring a cursor into a search box there should be a change in appearance of the box. http://bugs.launchpad.net/ayatana-design/+bug/750311
Nautilus search	"When searching, they didn't know what the field and scope were that were covered by the search engine they were using."	Many participants searched for applications successfully. However, some problems remain. Participants made inappropriate searches, like in Nautilus, and did not get any results.	This is partially fixed. Some issues with search are related to participants' understanding of the structure of Unity. There should be some guidance hinting at the kind of results that can be expected from the various search boxes in the various parts of Unity.
Adding an icon to Launcher	"Many participants were not able to add a short-cut of an application to the Launcher."	Most participants were able to add an icon to the Launcher. Windows users though were challenged by this, as they tended to look for options in various menus.	This is partially fixed. The interaction is quite intuitive but some users will require more guidance.

Reordering icons in Launcher	"Most participants failed to reorganise the order of icons in the Launcher."	A few participants experienced difficulty reordering icons in the Launcher because they did not have sufficient feedback to understand when the icon had actually been selected by them so that they could proceed vertically.	This has been fixed in the latest update. This should still be part of the next benchmark testing.
Finding the Dash	"The majority of participants who found the Dash found it by accident. They were not sure what it was, and didn't know how they had gotten there if they accidentally had."	Participants still have difficulty finding the Dash and still discover it 'by accident'.	The Dash needs to be made more visible and promoted as a major feature of Unity, on a par at least with the icons of the Launcher. http://bugs.launchpad.net/atana-design/+bug/764771
Ubuntu Software Centre	The same features of the Software Centre were not tested this time. But some issues emerged nevertheless in the course of testing other interactions.	The Software Centre is not recognised and, during testing, was mistaken for systems control by a few participants.	The Software Centre needs to have a different look and feel and general presentation. Needs redesign.
Changing the wallpaper	"Many participants did not succeed in changing their wallpaper because the default screen of appearance was open in full screen by default."	Almost all participants were able to change the wallpaper by right clicking on the desktop. However, the target feature in this test was, in fact, the ease of use of the Applications Lens. This time, participants were not able to change the wallpaper by finding Appearance in the Application Lens.	The previous issue with the wallpaper window covering the desktop has been resolved. However, participants could not find Appearance in the Applications Lens. They were looking for system settings and not for an application.
Visibility of Files Lens, Applications Lens and Rubbish Bin	"Participants thought that the grey icons in the Launcher were inactive."	These icons still have issues of visibility, especially when they are folded at the bottom. For example, participants often did not find the Rubbish Bin at all.	These icons still need more visibility. Changing the colour would help, and changing their position in the Launcher might help as well. http://bugs.launchpad.net/atana-design/+bug/764751

All in all we are doing better with the user experience, and our users are closer to adoption. In the remainder of this report, I review in greater detail all the usability issues that emerged during testing. The discussion will cover not only the comparative features (as between the October and later April testing) noted in the table above but also some new issues that emerged with Unity during the April testing.

Detailed Findings

The findings are presented below as they emerged during the testing. One general observation should be made first though: If Unity falls short of expectations in certain areas, it is typically because some of its features are not discoverable. This tends to be the case particularly for Windows users, whose habits tend to take them in different directions from those offered in Unity. Overall, there needs to be a readjustment between what our target users know and take for granted and the fine experience we have created for them.

Positive first impressions: First impressions were very positive. Participants liked the look and feel and generally the design of Unity.

"It reminds me of my Mac with the tool bar rather than start button. I prefer that. I don't like a menu layout. I like the font at the top [menu]. [This is] better than Windows. I like it." (P11¹)

"I like the design with the icons on the side. It's pretty clear what things are. This is what I like about the Mac, there are big clear icons. (...) It's very instinctive where to go." (P2)

"Looks quite intuitive." (P5)

"It's very clean. I like the cleanliness and tidiness." (P12)

Double click can create a problem: A few participants had a general tendency to double-click. This caused a few problems. For example, when P7 double clicked on the applications icon in the Launcher, the lens opened and closed in a flash and the participant thought there was something wrong with Unity.

Menu icons are well understood except for the me menu: Only 3 participants recognized the me menu (P2, P5, P12). Others identified every icon in the notification area but the me menu (P1, P3, P8, P9, P11). There was some confusion with the initial 'x' of the me menu; 2 participants (P3, P9) interpreted it as the way to turn off the computer.

P3 looking at the me menu: *"It looks like it's for closing something down."*

P9 looking at the me menu: *"It shows that something is functioning - it ['me menu'] has a close button, it has a cross."*

One participant (P11) did not recognise the blue-tooth icon.

Recommendation: The me menu seems a bit at odds with the messaging menu; for example, chat can be found in both menus. These 2 menus should be consolidated into one.

1. These are participants quotes that have been noted down during the sessions. The parenthesis (...) signal that the participant said other things; and words in brackets [] are words that were missing or added by me to make the sentences clear. The P+number indicates which participant is being quoted.

Fix: This issue to be examined in the indicator specs.

Some Launcher icons are not meaningful: Several participants had problems with the Files Lens and the Applications Lens icons. The first one was associated with zoom and the second with search.

"The icon [files and folders] looks more like a zooming in tool rather than an application. Files and Folders looks like a searching tool." (P8)

[Participant is going down the Launcher] "Internet, games, calculator, shopping tool, not sure about the two at the bottom [Files Lens and Applications Lens]." (P1)

Recommendation: The Files Lens and Applications Lens icons need rethinking. They are not understood by participants and their grey colour adds confusion to their role.

Fix: Otto is currently working on resolving this issue.

Opening applications by clicking on icons is easy and straightforward: All participants were able to open webmail and found it straightforward. The goal of this task was to see if users could understand the role of the Launcher and use it.

One participant discovered that the last settings of a window are remembered – in this case, the size of the Firefox window.

[P7 was annoyed at first that Google was half-screen:] "I don't know if it'll save my preferences for a full window. I hope it will remember. I will close Google mail. Let's see if Firefox has saved my preferences. That is great!" (P7)

Opening a new window in Firefox and/or printing a webpage is easy as long as the window is full screen: This task was designed to verify if participants could find the top menu.

Finding the top menu when the application was full screen was not a problem for 8 participants. 2 out of the 8, however, were initially uncertain if this menu bar belonged to the 'computer' or the 'programme' they had opened.

"Not sure if the top bar has to do with the computer menu or the document menu because it sits at the top of the screen instead of sitting with the document. I don't know what to do if I want to drag the top menu. I do that often, I like to drag and drop my document and I would like to have it with it. [...] This is hard to have the menu at the top here. I would, at least, change the contrast. It might be clearer." (P2)

Furthermore, 3 participants were able to see that the top menu is connected to the selected application only when the window was full screen. They didn't associate the top menu with a

smaller window or when many different windows were opened on the desktop. For example, 2 participants thought that they could print only when a document was full screen.

"The menu disappears when the window is smaller. You have to make it bigger to print!" (P4)

Another usability incident caused by one participant's misunderstanding of the top menu was that she closed the wrong document because she did not realise that the window she wanted to close needed to be selected first (P9).

Recommendation: Almost half of our participants needed more orientation with the top menu control. They did not associate the top menu bar with applications once they had been detached (smaller screen). Accordingly, there needs to be a stronger visual connection between the menu bar and the application.

Fix: <http://bugs.launchpad.net/ayatana-design/+bug/764829>

Dash is not discoverable: Most participants did not find the Dash. Those who did find it opened it by arbitrarily clicking on the icon (P2, P9) or by accidentally clicking on the icon while trying to bring out the Launcher. Some, indeed, did not know how they had managed to get the screen to come up, and could not retrieve it. Overall, participants were not always clear about what the Dash was.

"This is like a shortcut button. I guess I can put my shortcuts and files there." (P2)

[Trying to bring out the Launcher, he clicks on the Dash:] *"I'm not getting the same set as before. This is not what I was looking for." (P7)*

"The bell icon [Dash] takes me back to the desktop." (P7)

[P7 went to the Dash and the Applications Lens:] "It's good that you can alternate the view."

Related issues:

Another problem participants encountered relates to closing the Dash. The Dash does not close like other applications and programmes. Participants were looking for a cross somewhere at the top.

"I'm trying to locate a cross and I can't find it. I can't close this." (P12)

Recommendations:

- Bring visibility to the Dash by visually treating it at least similarly to the icons in the Dash. Its position alongside the top bar menu and the size of the icon add to the confusion.

- Make the icon distinctive through its visual treatment and position.
- Make the closing of the Dash consistent with the closing of other applications.

Fix: <http://bugs.launchpad.net/ayatana-design/+bug/764771>

Finding 'appearance' in Applications Lens proved to be difficult: The task of changing the wallpaper (from the October testing) was actually set up this time to see if participants could not only change the wallpaper but also find and open the Dash or Applications Lens and find 'appearance' in installed software.

Although most participants were able to change their wallpaper - which they were not able to do in the October testing sessions - they (i.e. all but 1) were not able to change the wallpaper from the Dash or Applications Lens. Most of them changed the wallpaper with a right click on the desktop, but would not have succeeded in finding other system settings.

Almost all the participants were looking for a system settings icon either in the Launcher or in Home (Nautilus). 2 participants went as far as opening the Applications Lens, but they were not able to see 'appearance' because they were not looking for an application but for system settings. No one looked into the notification menu to find it. Many focused on Home (alternating between desktop, file system, back to desktop, documents and pictures) in the Launcher and from there went several times up and down the Launcher (opening arbitrarily Assistive Technologies, Files and Folders, Applications), to no avail.

"I expect to see something in the Home folder that says 'computer settings' and you can change the wallpaper there. (...) Linux was easy because it had an icon on the desktop to change settings." (P2)

"There should be a system preference in the Launcher, an icon that has system preferences." (P2)

"I am a bit confused, I thought that Home would give me the desktop. I thought this would be the organiser, I assumed I could change my settings on the desktop and be able to change the wallpaper." (P1)

"I am looking for the control panel. (...) I feel it should be in the Home folder because it is quite specific." (P3)

"Applications is not what I'm looking for, I'm looking for settings. (Later:) This is describing it as an application which I was not expecting. Background is, I think, what I'm looking for. (...) I would expect to see a settings folder, I would expect to see it in the Launcher. I didn't think it was an application." (P5)

"There doesn't seem to be one place where everything is, like 'my computer'. I'm not sure. I would give up at this point." (P9)

"I expected it [a place for system control] to have accessibility like the Windows control panel, system restore, backup, set-up sounds, changing the interface, how much you got in various drives. It would be at the bottom, I would call it 'control panel'." (P11)

Related issues:

1) **Participants do not understand the icons in the Launcher:** Two icons in the Launcher appeared suitable to some participants for housing system settings : Ubuntu One and the Software Centre (P7, P8, P12): Ubuntu One because they were not familiar with the service and it has the name of the OS; Software Centre because its look and feel was reminiscent of system settings (particularly for Windows users). A few participants momentarily got lost in it, looking at graphics for a way to change their wallpaper.

"Ubuntu One – that must be a control panel. No, it's more of an Ubuntu advertisement. (...) Ubuntu Software Centre, it's the closest thing to a control panel. It has titles like sound and videos, fonts, development tools, access, internet, accessories - this is the control centre!" (P7)

"I think I figured out where I am with the Software Centre. I think I'm in the control panel. I can find system and I can find information about the system. (...) I got it now, I'm in something like 'add and remove programmes'. I'm trying to locate the control panel where I would have the control of the entire system but I can't find it." (P12)

Fix: <http://bugs.launchpad.net/ayatana-design/+bug/764744>

2) Many Windows users were looking for a start menu at the bottom left of the screen. A couple ended up clicking the bottom of the Launcher, at the very place where they would expect a start menu, and unexpectedly, they launched the Applications Lens even though they could not even see it.

3) There was a **bug** in Home (Nautilus). When participants accessed the desktop through Home, they got a message that "operations on this folder are disabled because there is no network connection". At the time, participants checked on their connection in the notification area and saw they were connected. They could not make sense of the message. No one noticed that this applied to Ubuntu One and only to Ubuntu One, in part because they were not familiar with the service.

4) When in Applications Lens and Files Lens, two participants (P3, P7) were looking for a back button or a close button to close the lens.

Fix: In case of 3) there has been a change in the search icon design that might solve this problem.

Changing icon position in Launcher is easy for some, but difficult for others. The goal of this task was to see if participants could tell when the icon had been selected and if it was ready to be moved.

7 participants had no problem reordering their icons in Launcher.

"It is quite nice, actually. I can remove them as well. This is easy. I like to be able to arrange the desktop quite easily. This is quite easy. I like it." (P1)

"You are given a real clear indication of where to put the icon!" (P7)

Others experienced some difficulties that were not fatal: 1) P3 first right clicked on the icon, then went to Home looking for an option to organise the Launcher but then figured out that he could drag and drop. 2) P5 looked for a Launcher control option at the top of the Launcher. 3) P7 wanted to be able to drag icons on his desktop. 4) Another participant could not make the drag and drop functionality work.

"There is nothing obvious in here and this is sitting at the top of the toolbar. My second thought is to click on the icon and move them." (P5)

One participant wanted to be able to bring the Files Lens and the Applications Lens icons to the top of the Launcher because he felt he would use them frequently. (P5)

"The grey boxes at the bottom seem to be fixed. I would like a shortcut to my files without having to move down. For me, it would be better to have instant access to them." (P5)

Fix: This problem has been fixed: now, after the icon has been selected, there is feedback and users can start moving it up and down. This should be tested in the next round of usability benchmark.

Finding a new application (game) is not straightforward. I asked participants to find and play Sudoku. This task was designed to see if participants would think to look in Applications Lens, would be able to 'see more results', and would scroll down to find and launch Sudoku.

Only one participant (P8) did not find Sudoku in Applications Lens. This participant searched for Sudoku in Files and Folders in Home under 'system' and selected it from the list of files retrieved. Successful participants did not look immediately into Applications Lens (3). Some went to Home (Nautilus) first (P1 and P2). Others were looking for a games folder and even though they went into Applications Lens, they did not see what they were looking for at first. Finally, one participant (P9) went to Files Lens.

"I would like to go on the side ['Launcher'] and find a game folder and it should be there." (P2)

"What I was looking for was a folder named 'games' in 'Home'." (P8)

Overall, finding a new application appeared to be not immediately intuitive but learnable.

All participants, once in Applications Lens, were able to 1) quickly locate the right rubric 'installed apps' to find the game; 2) open 'see more results'; 3) recognize the alphabetical ordering; 4) find Sudoku; and 5) open the game by clicking on it.

The search for Sudoku brought 3 participants to the Software Centre where they experienced the same problems as in the October testing, of not being able to find the game once it had been installed.

Related issues:

- 1) P2 and P7 tried to close the Dash by clicking on the search symbol at the top left.
- 2) P2 was not sure if he could do a search from the Applications Lens because when the cursor was placed in the search box, there was no feedback that the box was not ready to accept entering text.

Fix: <http://bugs.launchpad.net/ayatana-design/+bug/764859>

- 3) When looking at installed applications, P2 would have liked this section to open full-screen instead of staying in the context of the Dash.

Attach an icon to the Launcher. This task was designed to see if participants would figure out that a right click on the icon while the application is opened provides an option to attach an icon to the Launcher, or if they would rather drag and drop from the Applications Lens.

6 participants succeeded in adding a new icon to the Launcher (P1, P2, P3, P4, P8 and P12). The drag and drop option was favoured by these participants. None of them found the right click on the icon in the Launcher while the application was opened.

Those who failed or struggled (P5, P7, P9 and P10) were looking in the menus for a game settings option or right clicking to find that option. P5 right clicked on the icon in the Applications Lens. P7 searched through the top menu bar for the same option. Again, the Windows users looked for a settings option.

[After I show participant how to attach to the Launcher, P9 says] *"I would have not figured out to right click to keep it in the Launcher."*

"I thought there would be a tool in the menu. This would be a logical thing. (...) I would have thought that the right-click, it doesn't bring menu options often. (...) It is not really obvious, not to me anyway. (...) This is frustrating. (...) Not sure how to do it." (P10)

Opening, writing, saving a document are easy. This task took participants through finding the word processor, looking at the calendar and finding 'save' in the top menu bar.

Except for one participant, everyone was able to find LibreOffice Writer and to write a document. The one exception went to Nautilus, file, create document and empty. She ended

up, unknowingly, opening a Gedit document.

Everyone found the calendar immediately and said that it was nice, and that it had interesting features like 'add event'. Everyone liked it.

Everyone who wrote a document was able to save the document.

"It is nice to save with a password. This is quite good." (P1)

Closing the document with the top bar menu was difficult for 3 participants (P3, P9 and P12).

"Not sure if the top bar has to do with the computer menu or the document menu, because it sits at the top of the screen instead of sitting with the document. I don't know what to do if I want to grab the top menu. I do that often, I like to drag and drop my documents and I would like to have that with it." (P2)

Related issues:

1) **Calendar:** Participants liked the design and features of the calendar.

"I really like the calendar. I like the layout, you can see the weeks exactly where you are. It's nice you can remind yourself of things." (P3)

"All I would have expected is a display of time and date. This is interactive! I can add an event. This is connected to an email. It's quite interesting. Clicking on the date, if there were events could I see the events? This is quite handy." (P5)

2) **Minimising a document or a browser:** A few participants did not know where to find their documents after they had minimised them (P2, P4, P7)

"I have minimised that page and I can't see where it is. If I want to go back, I have to click on this icon, you need something at the bottom." (P4)

"My problem now is that I don't see anything. I press the minus icon on the top left, it has taken away the page but I can't find it on my page although it has been minimised. I don't know where it has gone. At this point, my initial impressions are that I will need a manual." (P7)

Fix: Since the usability sessions this interaction has been updated to show the window minimised into its Launcher icon even when the Launcher is hidden.

Cut and paste between 2 documents. This task was set to observe how participants find documents in Files Lens, how they open documents side by side, and finally, if they will discover the semi-maximised and maximised states.

Most participants went to Nautilus and documents to retrieve their existing letter instead of

going to the Launcher.

6 participants were able to put their 2 documents side by side. 2 of the 11 participants who performed this task had never done this before and had no use for the feature. They had no ideas about where to start. Only 1 participant discovered the semi-maximised state and that was because he recognised the feature from Windows 7. Two participants thought that the blue outline that shows a preview of the document in semi-maximised state was a warning that they were about to do something 'wrong' or prohibited (P4).

[About semi-maximised state, after I demonstrate to P1, she says:] *"I would have never guessed that. It is good. I would need a bubble or a little tutorial to show you. I like that but I would like to know how to do it."*

[Showing the feature to P5:] *"Now that I know it, I would use it. It's neat. I would pick it up from other people."*

Fix: <http://bugs.launchpad.net/ayatana-design/+bug/764729>

Deleting a document by pressing delete or right clicking. The task of deleting a document was included in order to observe if participants could 1) delete an item, and 2) find and use the Rubbish Bin at the bottom of the Launcher.

While the majority of participants found it easy to delete an item, more than half did not see the Rubbish Bin at the bottom of the Launcher when it was folded and were not able to delete a file this way (P2, P3, P4, P8, P9, P10). These participants right clicked on the document. One used the Rubbish Bin in Nautilus.

"It's hard to see [the Bin] at the bottom there. It was not obvious to me." (P10)

Related issues:

- 1) One successful participant was not sure that she had deleted the document after putting it in the Rubbish Bin. She had to open the Bin to check. She suggested that we provide feedback when users perform such an important action.

"I have no idea if that worked [dragging a doc into the Bin]. There were no sounds that indicated it worked or a dialogue box. It would be possible to accidentally delete something. The Rubbish Bin has paper in it - this is cute! (...) It is nice to have a signal that something has been done." (P5)

- 2) When the Launcher is selected, there is no visible sign that there are more icons below. Many participants did not notice the folded icons at the bottom because they only looked carefully at the Launcher when it was expanded. One participant commented that the Rubbish Bin was "a long way down". This was especially a problem when the Launcher was made visible only by means of bringing the pointer to the left top corner.

Recommendation: A visual clue should signal that there are more icons below the Launcher when there are. Also, visual or sound clues should let users know that their item has effectively been dropped in the Rubbish Bin and deleted.

Fix: <http://bugs.launchpad.net/ayatana-design/+bug/764751>

3) P2, who was trying to delete her document by dragging it into the Nautilus Rubbish Bin, found that when the Launcher was visible, it got on the top of Nautilus's left hand side menu. She struggled to put her document into the Rubbish Bin.

"I want this [Launcher] on the right because I can't use the menu of the Home when it overlaps with it." P2

Fix: <http://bugs.launchpad.net/ayatana-design/+bug/764879>

Notification of message received. In this case I send participants an IRC message to determine if they would see the notification and be aware of the change in colour of the messaging and Dash icons.

Of 6 participants who were sent an IRC message, 2 (P5, P8) saw the notification and noticed that the envelop icon had turned blue. They thought it was a good feature.

"If I click on this [envelop], it opens the window. This is quite intuitive. It makes a lot of sense." (P5)

Recommendation: The notification needs to be more obvious.

Fix: <http://bugs.launchpad.net/ayatana-design/+bug/764891>

Applications currently running: When participants were asked how many things were running on their computer, they were not immediately positive about the meaning of the white arrows, but they speculated that they might indicate that apps were running.

Only one participant could not tell how many applications were running because he did not see the white arrows beside the icons (P12). 4 other participants (P1, P3, P4, P5) thought the arrows might signify that applications were running but they were not sure. P3 further speculated that the many arrows (indicating many applications or documents) meant that these applications or documents were more recent.

"I would say 2 [apps are running]. I had not noticed the other triangle, perhaps it shows that it is displayed." (P5)

"I'm not sure how you would know what's running. I can see there are arrows, but I'm

not sure what they mean. I think it means that it's running, I think I get it." (P1)
"You don't have anything at the bottom showing which files are open. Maybe the arrow means something but I'm not sure. I pressed on the arrow and it comes up. I don't know what the arrows are for. (...) Yes, the arrows mean it is open." (P4)

The 6 others easily understood the meaning of the white arrows.

Recommendation: The white arrows are meaningful and learnable. We should keep them to signal running applications.

Participants found some workarounds to reveal the Launcher. As participants were doing the various tasks, I kept observing how they navigated and succeeded in showing the Launcher.

6 participants revealed the Launcher only by closing or moving windows away from the left (P4, P5, P7, P8, P9, P10). They didn't discover the way to reveal the Launcher from the upper left corner. One participant exclusively used the keyboard command.

3 participants used the upper left corner to reveal the Launcher (P1, P2, P3). They especially liked the feature, saying that it prevented them from opening the Launcher accidentally while doing other activities.

"This is good. It gives you a free screen when you need it." (P1)

"This is probably a good thing because you are not opening up the whole menu accidentally. That's a problem with my Mac. It wouldn't be the first thing I would do [click on the top left corner to retrieve it], but it would be an easy thing to get used to. It is better than it opening up every time you go to that part of the screen." (P2)

Many participants created workarounds to make the Launcher visible. Most closed down, minimised, or moved windows. This indicates that the left top corner that reveals the Launcher is not readily discoverable. Participants expected to touch the left edge of the screen anywhere to bring the Launcher into view.

Fix: This usability problem has been resolved by making the Launcher appear when the pointer is at the far left border of the screen. Revealing the Launcher requires more than just bringing the pointer to the left border: it has to remain there for a short time. This was designed in order to avoid revealing the Launcher accidentally when interacting with something else in the area.

When uploading a song to Unity, the media player opens instead of the music player which is expected by participants. This task was designed to see if participants could immediately use, listen to, or manage their music. As in the October testing, participants failed to discover the music player and were misled into thinking that the media player is, in fact, the music player. This was still the case in the April testing.

However, the fact that a window opened immediately when they clicked on the song pleased participants.

*"I like that it just pops up. Sometimes it is a bit fiddly. I like that it pops up like that."
(P1)*

Ejecting a USB key can be difficult: One participant, a Mac user, dragged the USB key into the Rubbish Bin. That did not work.

Fix: <http://bugs.launchpad.net/ayatana-design/+bug/764905>

Usability problems that arose from our new design

Participants encountered some new usability issues that the participants from the October session did not because these issues are related to some features of our new design. This section reviews these new problems.

- There was some confusion about the role of the top menu: participants wondered if it pertained to 'the computer' or to the application they had opened at the time. When participants had many windows opened, they did not understand that the menu corresponded to the window that was selected. This said, participants who figured it out were very positive about the feature. They thought it would prevent them from opening the Launcher inadvertently.
- Finding 'system settings' in apps is not intuitive. Most participants did not succeed in changing the wallpaper by going into the Applications Lens. They were looking for a 'system settings' icon in the Launcher or somewhere in Home. No one discovered settings in the indicators area.
- 'Notification of message received' is not visible. The majority of participants did not see the notification that they had received a message. The change in colour of the icon was not noticed.
- The semi-maximised and maximised states feature is not discoverable. Only one participant discovered that it was possible to put a document into a semi-maximised state. This participant was a Windows 7 user and said that there is the same feature in Windows 7. Two other participants interpreted the blue shadow as signalling that they were about to make a mistake or to do something not allowed by the system. Users need both guidance and reassurance.

Participants' General Impressions after Using Unity

Here are participants' main impressions of Unity, after they had used it for 60 minutes. In a word, their general evaluation of Unity was positive. It looks as though it might well be nearly ready for user adoption.

"I like the layout and the screen (...) I want to customise it myself quite easily. It would be good to have a tutorial. (...) I like minimise and the fact that you can move things around. I like the casual font, aesthetically, it looks nice and it is easy to use. Nothing is really difficult. The important things are there and easy to use. It is nice." (P1)

"The reason it was annoying today is because it is a new package. I like the design and layout. Design is important to me. It is quite clear. (...) "I would like more time to play around with it. It's Ubuntu, I haven't used it. This is new, the way I learn is by playing with it. (...) It is good to use something that is a bit more independent. I like the idea that we can do things rather than being locked down in something more siloed like Windows or Mac. I would like to get it." (P2)

"I prefer this set up to the start menu. I like the icons. We are a generation to see things with icons. I think there are a lot of significant gestures, like saving documents and I would not have any problem doing these activities. I really like the dragging format. I like to be able to order what I want. I think it is much easier than Windows with Windows you have to go down menus. (...) I don't think it's complicated but it would take some time [to get used to it]. I've been working it out in an hour. It's very user friendly. Even within the hour, I've learned a lot about how to do different things." (P3)

"I really quite like it. I think it's intuitive with the exception of the favourites, making an application a favourite. I would not be baffled to use it without a manual. I like the look of the desktop. It is modern. It looks like a Mac more than Windows. It's quick." (P5)

[About the 'Software Centre'] "I didn't anticipate to have access that easily to new apps. Also, I like the rating on the side. It's quite helpful, I can see what I can trust. That's quite nice." (P5)

"It's OK. Quite intuitive but I was going from what I know from Windows. I use the right click a lot, it's nice to have it on the side. Generally this looks pretty good. It's a bit more intuitive, for me, though, the right click is vital. It always brings up a good menu." (P9)

"I think it's very pretty, very pleasing as it were." (P11)

"It's quick and responsive. It's very responsive, different from what I use, it would take a day or two to get acquainted. I wouldn't be discouraged. I would rather spend time than pay money." (P12)

Pain points

It is meaningful though that, at the end, the following difficulties still remained on participants' minds.

"I don't like the dragging to the Launcher up and down. I mean I didn't realise at first this is what I needed to do. It's difficult to get to the Bin. It's not easy to get to the top from the Bin, it is hard to drag things down a long way. I don't like the dropping down." (P1)

"My frustrations: I would like to know how to change the settings, I expect a button to change wallpaper clicking on a button right at the top. (...) The menu at the top bugged me." (P2)

"I didn't like when I have things minimised. There are many things I can't do without maximising the screen." (P3)

"It is hard to delete a file in this way. (...) You don't find the menu bar and you don't know what's open." (P4)

"I don't know how to make the Launcher visible [when a window is opened]. I'm struggling a bit. This window [Dash] has a tendency to disappear." (P5)

"I hated the Files and Folders, I didn't know what it would do when I click on it, if it will open or just let me select it. I wasn't able to select a document." (P8)

[About the wallpaper] "I couldn't find it. I wouldn't have thought of it as an application for some reason." (P10)

"I suppose my main thing is what I expected to have in terms of applications and control panel. I couldn't find it. If I could have found this at the beginning life would have been a lot simpler. I feel like I feel with Apple, I feel a bit stupid because I can't do the things I normally do with my PC. I like things in words a lot, I like the drop down menu. This is interesting because this is generally shown with an icon." (P11)

"I'm frustrated that I can't find something like 'my computer'. I want to find information about 'my computer' and what the hardware is, the drivers versions, and I want to know if there are updates on Explorer. Here you need to go into control panel to see if there are any updates. I still can't figure it out." (P12)

Conclusion

Overall, we have made progress and resolved many usability problems. There are still some problems that remain, however. Below is a list of the action items we need to address to make the user experience still more intuitive:

- Consolidate me menu and messaging menu.
- Redesign Dash, Applications Lens and Files Lens icons
- Resolve confusion in relation to the top menu bar
- Make the semi-maximised and maximised states discoverable:
<http://bugs.launchpad.net/ayatana-design/+bug/764729>
- Make the overview of 'system settings' obvious
- Resolve the ambiguity of 'setting' versus 'application'
- Provide better visibility for the Rubbish Bin

- Always provide feedback -- e.g., in relation to search boxes, and to deletions
- Make the Dash, Files Lens and Applications Lens easier to close
- Make the notification of a message received more visible
- Make the music player open by default when users import or listen to a song
- Make it obvious how to eject a USB key