Building tools from the outside in
(or how to bring UCD to embedded Linux)

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15. Usability Evaluation
by Gilbert Cockton. How to cite in your report.

Put simply, usability evaluation assesses the extent to which an interactive system is easy and pleasant to use. Things aren’t this simple at all though, but let’s start by considering the following propositions about usability evaluation:

1. Usability is an inherent measurable property of all interactive digital technologies
2. Human-Computer Interaction researchers and Interaction Design professionals have developed evaluation methods that determine whether or not an interactive system or device is usable.
3. Where a system or device is usable, usability evaluation methods also determine the extent of its usability, through the use of robust, objective and reliable metrics
4. Evaluation methods and metrics are thoroughly documented in the Human-Computer Interaction research and practitioner literature. People wishing to develop expertise in usability measurement and evaluation can read about...
“Like industrial design, the discipline would start from the needs and desires of the people who use a product or service”

Bill Moggridge, Designing Interactions (2007)
Back in 2011 ...

I saw a demo of Suse Studio when I was in Vancouver (...) It did have a really nice, smooth sort of feel to it and a lot of thought had been put into how the user interface interacted with people.

I was with a couple of other people from the Yocto Project, and we looked at it (...) We dream of having a user interface that looks a bit like that.
The nail

Because there are so many permutations and so many ways for things to go wrong it seems like, at any point in time, if I try to config my conf files in Yocto and run a build, I have about 40% or 50% chance of it failing. That has been really the frustration.
GUIs are good at handling complexity

- Visibility of system status
- Error prevention ("defensive design")
- Recognition rather than recall
- Anticipation
- Metaphors
- Progressive disclosure
In my development environment I actually have machines in other rooms that I do most of my builds on, because they are noisy and I don’t want them near me. Sharing some kind of web server that I just connected in from my desktop or my laptop or something, I’d be more than happy with that.
Yocto community survey results

The vast majority of respondents uses Linux as their main OS. Ubuntu, the most popular distribution, is used by 41% of respondents.

Which operating system do you use to get your job done?
Information is Beautiful
Ideas, issues, knowledge, data — visualized!

World's Biggest Data Breaches
Selected losses greater than 30,000 records
<table>
<thead>
<tr>
<th>Requirement</th>
<th>Feature</th>
<th>Grouping</th>
<th>In order to...</th>
<th>As...</th>
<th>I want to...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create a collaborative error database to parse all crashes and error codes (e.g. bitbui)</td>
<td>Collaborative error database</td>
<td>Community</td>
<td>improve community-sourced error data</td>
<td>Web Hob</td>
<td>create a collaborative error database to parse error logs and codes (see GNOME bugzilla)</td>
</tr>
<tr>
<td>Enable search of recipes</td>
<td>Recipe search (and browse)</td>
<td>Browse &amp; Search</td>
<td>benefit from the Yocto community</td>
<td>a user</td>
<td>use a tool to search and browse recipes</td>
</tr>
<tr>
<td>Enable user to investigate build errors by viewing community-sourced information about them</td>
<td>View community-sourced build error database</td>
<td>Community</td>
<td>improve community-sourced error data</td>
<td>a user</td>
<td>have Web Hob phone home with my build and error log data to improve the resource database</td>
</tr>
<tr>
<td>Phone home with build &amp; error logs into shared location which could be analysed and used as a resource</td>
<td>Send build and error log data to resource database (‘phone home’)</td>
<td>Community</td>
<td>find and use known good source code and builds</td>
<td>a user</td>
<td>use a tool to share and use shared source code and builds (on a team or global basis)</td>
</tr>
<tr>
<td>Enable secure sharing of source code and builds within a team (duplicate, may not exist)</td>
<td>Source code and build sharing (within team)</td>
<td>Browse &amp; Search</td>
<td>find and use known good source code and builds</td>
<td>a user</td>
<td>use a tool to share and use shared built toolchains</td>
</tr>
<tr>
<td>Enable sharing of built toolchains</td>
<td>Sharing of built toolchains</td>
<td>Browse &amp; Search</td>
<td>find and use previous known good built toolchains</td>
<td>a user</td>
<td>use a tool to share and use shared built toolchains</td>
</tr>
<tr>
<td>Enable sharing of intermediate build sets</td>
<td>Sharing of intermediate build sets</td>
<td>Browse &amp; Search</td>
<td>find and use previous known good intermediate build sets</td>
<td>a user</td>
<td>use a tool to share and use shared intermediate build sets</td>
</tr>
<tr>
<td>Enough user account support to allow for different permissions/access to different functionality</td>
<td>User account management</td>
<td>User management</td>
<td>control access to different functionality</td>
<td>an administrator</td>
<td>use a tool to set permissions and manage individual user accounts</td>
</tr>
<tr>
<td>Individuals in teams can specify builds locally or on servers (scheduled)</td>
<td>Build management tools (scheduled)</td>
<td>Build management</td>
<td>schedule builds for specific times and machines</td>
<td>a user</td>
<td>use a tool to manage build jobs</td>
</tr>
<tr>
<td>Manage resource usage and availability on shared build servers</td>
<td>Build server management (resource usage and availability)</td>
<td>Build management</td>
<td>manage shared build servers</td>
<td>an administrator</td>
<td>use a tool to manage resource usage and availability on shared build servers</td>
</tr>
<tr>
<td>Reusability of previous builds—to leverage CPU time as well as allow users to find previous known good builds</td>
<td>Reusability of previous builds</td>
<td>Browse &amp; Search</td>
<td>find and use previous known good builds</td>
<td>a user</td>
<td>be able to search and reuse known good builds</td>
</tr>
<tr>
<td>Support multi-user teams (multi-user accounts, permissions, team tools, etc)</td>
<td>Multi-user team management</td>
<td>User management</td>
<td>support multi-user teams</td>
<td>an administrator</td>
<td>use a tool to manage multi-user/team account and their permissions</td>
</tr>
<tr>
<td>Teams must be able to do work separately on local machines and then submit changes to the team server, to allow for coordinated builds</td>
<td>Team workflow management</td>
<td>Team support</td>
<td>support team workflows</td>
<td>Web Hob</td>
<td>allow individuals in a team to do work separately, then submit them for coordinated builds</td>
</tr>
<tr>
<td>To use web interface to launch build jobs on remote machines</td>
<td>Build management tools (basic)</td>
<td>Networked WH</td>
<td>use remote machines for build jobs</td>
<td>a user</td>
<td>use a tool to launch build jobs on remote machines</td>
</tr>
<tr>
<td>Enable to work offline for demonstration or local work purposes</td>
<td>Has offline mode</td>
<td>Security</td>
<td>use Web Hob offline</td>
<td>a user</td>
<td>be able to use Web Hob in an ‘offline mode’ for use locally or in locations without an internet connection (e.g. demonstrations)</td>
</tr>
<tr>
<td>Allow greater control over individual config options</td>
<td>Advanced configuration tools</td>
<td>Advanced</td>
<td>have more control in Web Hob</td>
<td>a user</td>
<td>be able to use advanced configuration tools from within Web Hob</td>
</tr>
<tr>
<td>Prioritise view of diagnostic and forensic data from colleagues</td>
<td>Set level of comparison of diagnostic and forensic data</td>
<td>Forensics &amp; diagnostics</td>
<td>get more relevant help</td>
<td>a user</td>
<td>be able to specify ‘colleagues only’ or ‘everyone’ (or other levels of inclusion) when searching error database</td>
</tr>
<tr>
<td>Share diagnosis and forensic information (duplicate?)</td>
<td>Share diagnosis and forensic information</td>
<td>Community</td>
<td>help others diagnose and fix errors</td>
<td>a user</td>
<td>share my diagnosis and forensic data with other users</td>
</tr>
<tr>
<td>Allow cancellation of network check when in progress</td>
<td>Usability</td>
<td>Usability</td>
<td></td>
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</tr>
<tr>
<td>Feature</td>
<td>Core</td>
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<td>Allow teams to open and modify files on server quickly</td>
<td>File viewing/editing tools</td>
<td>Security</td>
<td>be able to change files more quickly</td>
<td>an expert user</td>
<td>be able to find packages by name/text when I know them</td>
</tr>
<tr>
<td>Provide a sandbox for creating test builds</td>
<td>Sandboxing for test builds</td>
<td>Security</td>
<td>test builds safely or without making extensive local configuration changes</td>
<td>an expert user</td>
<td>be able to use Web Hob in a sandbox mode</td>
</tr>
<tr>
<td>Provide a sandbox for new users to try out WH</td>
<td>Sandboxing for new users</td>
<td>Security</td>
<td>have lower barriers to learn and try out Web Hob safely</td>
<td>a new user</td>
<td>be able to use Web Hob in a sandbox mode/environment, with priority on my user experience</td>
</tr>
<tr>
<td>Enable sharing/duplication of configuration and setup process with others</td>
<td>Sharing of config and setup processes</td>
<td>Community</td>
<td>help others with config and setup process</td>
<td>a user</td>
<td>use tools to share my configs and setup processes with others</td>
</tr>
<tr>
<td>Lower overall volume of support requests by improving community tools</td>
<td>Provide more support in-application, or through wikis, mailing lists, etc</td>
<td>Community</td>
<td>get more information from build related data</td>
<td>a user</td>
<td>get, compare, and save graphical visualisations of build contents, metrics and forensics</td>
</tr>
<tr>
<td>Show data and graphical visualisations of build contents, metrics, and forensics</td>
<td>Display graphical visualisations of build contents, metrics, and forensics</td>
<td>Forensics &amp; diagnostics</td>
<td>get more information from build related data</td>
<td>a user</td>
<td>get, compare, and save graphical visualisations of build contents, metrics and forensics</td>
</tr>
<tr>
<td>Enable graphical browsing of available packages, by type and compatibility</td>
<td>Package browse and selection in a GUI</td>
<td>Forensics &amp; diagnostics</td>
<td>make browsing of packages easier for new users</td>
<td>a user</td>
<td>graphically browse and select packages in a GUI</td>
</tr>
<tr>
<td>Enable set up on networks with strict firewall rules without manual config customisation</td>
<td>Networking and firewall management</td>
<td>Security</td>
<td>use Web Hob even when behind a strict firewall</td>
<td>a user</td>
<td>use a tool to manage firewall issues (without manual config)</td>
</tr>
<tr>
<td>Support source control without surfacing its complexity</td>
<td>Support for source control</td>
<td>Security</td>
<td>observe existing source control rules</td>
<td>Web Hob</td>
<td>make changes in accordance with source control, without showing unnecessary complexity to the user</td>
</tr>
</tbody>
</table>
builds & metrics
builds & metrics
Personally I don’t like the idea to give so much control, because I think it’s going to be a nightmare for someone supporting users.
If you are going to provide this kind of feature I would expect to be able to disable it. Otherwise it’s going to be a nightmare”
builds & metrics
“I wouldn’t use it probably (...) It certainly doesn’t fit in my workflow (...)”
And if a particular task got an error and you can get this kind of thing really easily that would be nice. I can see that.
class Build_File(models.Model):
    bpackage = models.ForeignKey(Build_Package, related_name='filelist_bpackage')
    path = models.FilePathField(max_length=255, blank=True)
    size = models.IntegerField()

class Target_File(models.Model):
    tpackage = models.ForeignKey(Target_Package, related_name='filelist_tpackage')
    path = models.FilePathField(max_length=255, blank=True)
    size = models.IntegerField()

class Recipe(models.Model):
    name = models.CharField(max_length=100, null=True)
    version = models.CharField(max_length=100, null=True)
    layer_version = models.ForeignKey('Layer_Version', related_name='recipe_layer_version')
    summary = models.CharField(max_length=100, null=True)
    description = models.CharField(max_length=100, null=True)
    section = models.CharField(max_length=100, null=True)
    license = models.CharField(max_length=200, null=True)
    licensing_info = models.TextField(null=True)
    homepage = models.URLField(null=True)
    bugtracker = models.URLField(null=True)
    author = models.CharField(max_length=100, null=True)
    file_path = models.FilePathField(max_length=255)

class Recipe_Dependency(models.Model):
    TYPE_DEPENDS = 0
    TYPE_RDEPENDS = 1

    DEPENDS_TYPE = (
        (TYPE_DEPENDS, "depends"),
        (TYPE_RDEPENDS, "rdepends"),
    )
    recipe = models.ForeignKey(Recipe, related_name='r_dependencies_recipe')
    depends_on = models.ForeignKey(Recipe, related_name='r_dependencies_depends')
    dep_type = models.IntegerField(choices=DEPENDS_TYPE)

class Layer(models.Model):
    name = models.CharField(max_length=100)
    local_path = models.FilePathField(max_length=255)
    layer_index_url = models.URLField()
BitBake server

observer UI DSI

web back-end Django 1.4.5

controller UI Knotty, Hob

data store SQLite

XML-RPC

REST API
Usability testing

A process that employs people as testing participants who are representative of the target audience to evaluate the degree to which a product meets specific usability criteria.

Handbook of Usability Testing 2nd Ed., J. Rubin and D. Chisnell
Ethnography

Ethnography (...) has always meant the attempt to understand another life world using the self-as much of it as possible-as the instrument of knowing.

Resistance and the Problem of Ethnographic Refusal, Sherry B. Ortner
About ReD

Who We Are

ReD Associates is an innovation and strategy consultancy. The anthropologists, sociologists, economists, journalists, and designers who make up ReD employ the methods of social science to study human behavior.

Our teams in Copenhagen and New York work together to develop deep understanding of human behavior in order to create innovations that address the needs of real people and define the future of commerce.
Professor Adam Kuper

Adam Kuper is a specialist on the ethnography of Southern Africa, and he has written widely on the history and theory of anthropology.

Selected Publications


Professor Kuper on BBC Radio 4's 'Thinking Allowed'

Adam Kuper is one of a panel discussing "dirt and why it provokes such fear, loathing and occasionally desire" (broadcast 8 June 2011).
Ethnography

We also all imbibed the faith that field research (...) by participant observation would yield a more accurate view of another way of life than any other method. But how was it done? We put nervous questions to the faculty but were told that there was no fixed procedure, nothing that could be taught.

Anthropology and Anthropologists Forty Years On, A. Kuper in Anthropology of This Century Issue 11 (October 2014) - [http://aotcpress.com/articles/anthropology-anthropologists-forty-years/](http://aotcpress.com/articles/anthropology-anthropologists-forty-years/)
Please stand up everyone
Sit down if you have contributed to Toaster
Sit down if you have submitted a patch for BitBake, OE core or Poky over the past 6 months
Sit down if you don’t like beer
Sit down if you are absolutely terrified by the idea of being listened to
A task

Would you be able to help me figure out why the package **libkmod** was installed in the core-image-minimal root file system that I created on October 10th?
Credits

Slides 3 and 36: boring by Strevo under CC BY-SA 2.0
Slide 4: Modified toaster by zack leiws under CC BY-NC 2.0
Slides 5 and 35: grubby yet cute toaster by sharyn morrow under CC BY-NC-ND 2.0
Slide 7: AZERBAIJAN 2006 by Loom Studio under CC BY-NC-ND 2.0
Slide 9: Bill Mogridge Presentation by Garret Keogh under CC BY-NC-SA 2.0
Slide 11: Thomas Hammer HQ by Terry Bain under CC BY-NC-ND 2.0
Slide 15: On the Internet... by Alan Levine under CC BY-SA 2.0
Slide 31: LIFT08 054 Genevieve Bell by Stephanie Booth under CC BY-NC-SA 2.0
Slide 32: Jan Chipchase - PopTech 2011 by PopTech under CC BY-SA 2.0
thank you

https://lists.yoctoproject.org/listinfo/toaster

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