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Usability Studies for Power Users applied for email desktop client



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*Start by doing what's necessary; then do what's possible;
and suddenly you are doing the impossible.*

FRANCIS OF ASSISI

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Abstract

Usability engineering field is related with human computer interaction (HCI), with at least 30 years, which has gained prominence in the technological world and currently it is the subject of several studies. Users give more value to their user experience so the market has to take into account their preferences.

A system with low usability will be a hindrance to the user making the user experience negative. This problem reduces the user productivity and his satisfaction.

Currently email applications have much use, however they present some usability problems which are meant to be solved with this dissertation. The main goals of this dissertation are the user experience study measuring the efficiency of use and the application improvement in order to please the expert users' needs. The application in study enables the visualization of the email messages as well as any operation inherent to ordinary email clients. In addition, the application has some innovative features which will have special attention during the study.

In this case study it will be applied four main usability engineering methods. Initially, the selected users will be observed directly in their natural environment. Then, a survey will be delivered to get background information from users about their experience with the email. The next step is to perform an heuristic evaluation to evaluate the interface architecture and navigation. The following method is usability testing, selecting representative users to execute some tasks on the interface.

After the completion of each method the data will be analyzed according to usability parameters. This is an iterative process since the interface design is refined every time before moving on to the next method.

In short, it is intended to release a product which satisfies the power users needs so that they have a high quality user experience.

Resumo

A engenharia de usabilidade é uma área relacionada com a interacção humano-computador, com cerca de 30 anos, que tem vindo a ganhar destaque no mundo das tecnologias e que, actualmente, é alvo de várias pesquisas. Os utilizadores atribuem cada vez mais valor à sua experiência de utilização, instigando o mercado a acompanhar as suas preferências.

Um sistema com pouca usabilidade irá dificultar o utilizador, levando a que a sua experiência de utilização seja negativa. Este problema induz a diminuição da produtividade e da satisfação do utilizador.

As aplicações de email são bastante usadas na actualidade e passam por problemas de usabilidade, os quais se pretendem resolver na dissertação proposta. Os principais objectivos são o estudo da experiência do utilizador relativamente à eficiência de utilização e a remodelação da aplicação de forma a satisfazer as necessidades dos utilizadores mais experientes denominados power users. A aplicação que será estudada permite a visualização e consulta de emails, assim como qualquer operação comum a qualquer cliente de email. Para além do esperado deste tipo de aplicações, existem algumas inovações às quais se devem prestar especial atenção durante o estudo.

Neste caso de estudo serão aplicados quatro métodos de engenharia de usabilidade. Inicialmente serão observados utilizadores representativos no seu ambiente natural do uso de email. De seguida é distribuído um questionário para se obter informação acerca da experiência de utilização do email por parte dos utilizadores. O passo seguinte passa por realizar uma avaliação heurística para avaliar a arquitectura da informação e a navegação. Por fim, são aplicados testes de usabilidade com o apoio de utilizadores, através da sua interacção com a interface.

Após a realização de cada método os resultados recolhidos são avaliados de acordo com diversos parâmetros de usabilidade. Este processo é iterativo, isto é, serão realizados vários testes, até que seja encontrada uma solução que vá de encontro aos objectivos delineados.

Em suma, pretende-se lançar no mercado um produto que satisfaça especificamente os utilizadores mais experientes, de forma a obterem uma boa experiência de utilização.

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Chapter 1

Introduction

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It is the pervading law of all things organic and inorganic, of all things physical and metaphysical, of all things human and all things superhuman, of all true manifestations of the head, of the heart, of the soul, that the life is recognizable in its expression, that form ever follows function. This is the law.

LOUIS SULLIVAN

HCI hardly existed 50 years ago since very few people interacted with computers. The revolution in computers induced its use by large groups of different users enhancing the significance of user interfaces. Nowadays, HCI investigation is needed, as a result of more people using computer technologies, aiming to study ways to improve the utility and usability of systems and improve the effectiveness of users tasks.

1.1 Context

The email is a simple communication channel with transmission of messages over the network. It allows the exchange of messages to and from anyone with an email address

from all over the world. The email was one of the first services of the Internet and remains
 2 the most popular since it is a fast, flexible and reliable solution.

Organizations take advantage of this service to improve communication within them.
 4 People's work has positively changed after operating with email during their assignments.
 Nowadays email is used to manage a project, to schedule meetings, manage tasks, and
 6 more. Email is seen has a tool for productivity in addiction to exchange of messages.

Over time, many email clients appeared with particular features. Knowing the benefits
 8 of email, the organizations started to look for a service which met their needs.

Even with all existing email clients, there are still dissatisfied users who continuously
 10 search for new solutions. Therefore there is the opportunity to launch a new email client
 to ensure user satisfaction.

A company reputation depends on the quality of the product being released, thus
 12 usability studies are essential to evaluate the usability quality through representative users
 14 before the product launch. Power users are the target audience of this release, so the
 product must focus on these users' needs.

16 **1.1.1 Mailcube**

The mailcube application is a client for email processing being developed for Mac OSX.
 18 Its target are users with email experience, called power users. Mailcube is an innovative
 product with a new approach of email focusing in the productivity and organization of its
 20 users.

The name mailcube evolved from the OLAP cube concept used in data warehouses ¹.
 22 In mailcube the email messages are organized in cubes which are multidimensional datasets
 of email. The main goal of this approach is the browsing of email using message attributes
 24 to filter the data until the expected final outcome. The data is filtered through dimensions
 known as faces according to the interface terminology, since it is a more familiar concept
 26 to any user. The user is free to determine the browsing outcome and to choose the faces
 that suits the expected outcome.

Figure 1.1 (p. 3) illustrates the mailcube application. The existing cubes are listed at
 28 the left side of the interface. At the center, it is displayed a set of columns which represent
 30 the faces of a selected cube. Selecting an item from a column only influences the filtering
 of all columns on its right, in other words, filtering is converged. The last column always
 32 matches the browsing outcome.

This solution allows one to search attachments more easily beyond organization and

¹ [https://msdn.microsoft.com/en-us/library/aa140038\(v=office.10\).aspx#odc_da_whatrcubes_topic2](https://msdn.microsoft.com/en-us/library/aa140038(v=office.10).aspx#odc_da_whatrcubes_topic2) [Online; accessed 17-June-2015]

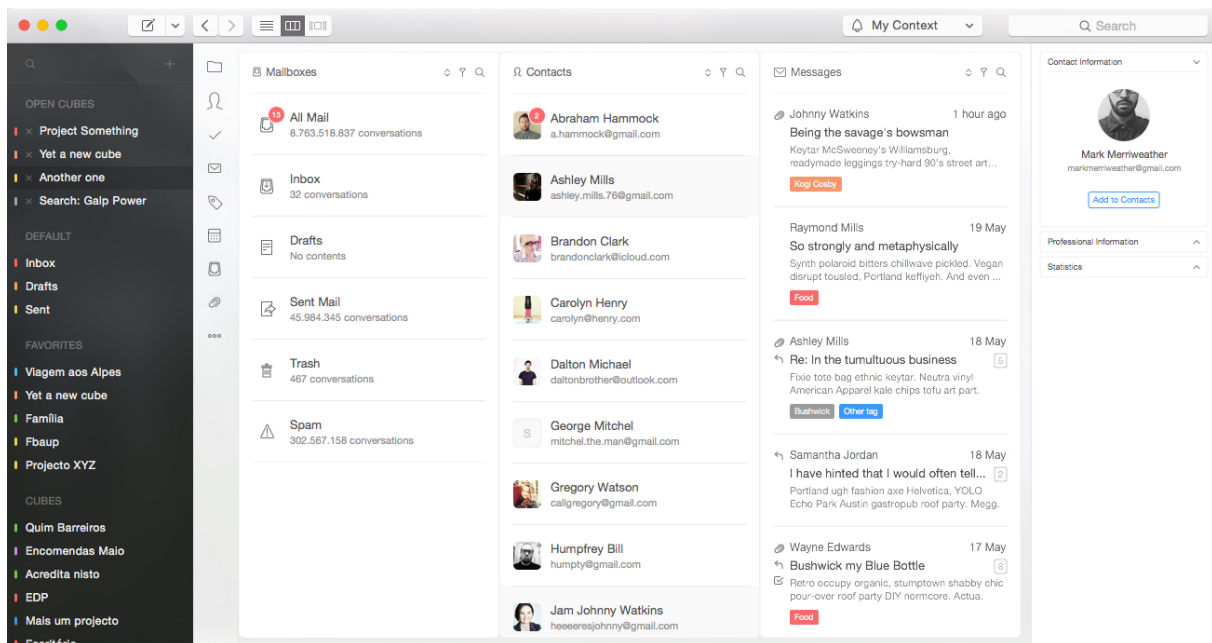


Figure 1.1: Mailcube interface

storage, even messages can quickly be found. It can be used by any user since it supports
 2 an interface similar with the usual email services.

1.2 Motivation

4 Email is the most popular service of the Internet. According to a conducted study by the
 Radicati Group, Inc. [TRG14] there was a total of 2.5 billion email users in 2014 and it is
 6 expected an increase of 300 million users by 2018. Email will remain the most common
 form of communication used on the business world. “Business users send and receive on
 8 average 121 emails a day in 2014, and this is expected to grow to 140 emails a day by
 2018”.

10 As Jeff Rubin and Dana Chisnell (2008) [RC08c] said “usability has become a market
 separator for products” which means the product with better usability wins the user
 12 attention. Furthermore, usability studying minimizes the risk of releasing a product with
 major usability problems promoting its credibility and a good impression of future releases.

14 An interface may have imperfections which must be uncovered by usability studies.
 This kind of studies are done before a product reaches the market. It is more efficient
 16 and cost-saving to integrate the usability studies at the beginning of project development
 to ensure the product does not undergo big changes later on. Given the results of Klein
 18 research [Kle06], redesigning a product in production phase is “10 times the cost of
 correcting it in the development phase”. Plus, it can cost as much as “100 times more to

correct a product once it has been deployed” [Kle06, Nie93a].

2 1.3 Objectives

Mailcube is an email client to be launched on the market by a startup company. Being the first product to be launched, the company image will reflect on mailcube, hence there must be taken steps to build a good reputation based on the quality of this product. Quoting [Nie93d]:

For a company that sells software or other products on the open market, the usability of each product will contribute to the company’s general reputation as a quality supplier, and just a single product with poor usability can cause severe damage to the sales of the entire product family.

The main goal of this dissertation consists on ensuring the usability of mailcube product. The focus of mailcube on market are power users, therefore the usability of the product should appeal to these users. To please them the interface must comply with the following attributes, explained in more detail in § 2.1 (p. 9):

- **Efficiency.** It refers the effort required to execute a task.
- **Low error rate.** It is related to the capability of completing a task without trouble.
- **User satisfaction.** It represents the user’s feelings while performing a task.

The achievement of product quality focusing on the power users goes through:

- research the end users and the environment in which they use the email;
- apply a review to the mailcube interface in order to uncover issues;
- perform usability tests to understand the difficulties felt by users;
- suggest changes to the design to improve product quality and user experience.

1.4 Expected Results

To ensure usability quality mailcube’s platform should be analyzed and evaluated. Additionally, end users themselves must be observed and their behaviors analyzed.

It is expected that this research results mainly in qualitative data, keeping in mind the quantitative data.

2 The qualitative data might clarify characteristics of power users like their behaviors,
their worries and their needs which are remarkable to design the interface. In addition,
the methods applied to the interface gather the description of every issue uncovered.

4 The quantitative data is collected using questionnaires to analyze the satisfaction of
the users.

6 The outcome of this study will be quite relevant since there is not much research work
done on usability for power users, as explained in § 4.1 (p. 21).

8 **1.5 How to Read this Dissertation**

The remaining of this dissertation is organized into six chapters which should be read
10 following the order presented below:

- 12 • Chapter 2, “Background” (p. 7), provides a detailed description of usability engi-
neering along with attributes, techniques and practices to be considered.
- 14 • Chapter 3, “Email” (p. 17), presents a list with email clients on the market as well
as a brief summary of email issues.
- 16 • Chapter 4, “Research Problem” (p. 21), presents the problem to be explored in this
dissertation and the methodology chosen to address the problem.
- 18 • Chapter 5, “Usability Studies” (p. 25), details the methods applied on the product
evaluation along with their procedure and results.
- 20 • Chapter 6, “Conclusions” (p. 45), presents the conclusion drawn from this study
and possible approaches for future work.

Chapter 2

Usability for Power Users

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HCI is the research area related with the human use and the computational systems. According to the definition of the Association for Computing Machinery’s Special Interest Group on Computer-Human Interaction (ACM SIGCHI) [HBC+92]:

Human-computer interaction is a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them.

Interaction design (IXD) is a design discipline concerned with HCI which corresponds to the conception of technological solutions to be used by humans to satisfy their needs and desires providing a good user experience [RSP11]. User centered design is the process that ensures the solution puts the needs of users before the design [Nor02a]. The iterative phases of UCD are presented in Figure 2.1 (p. 8).

The purpose of the interaction design is to specify access and handling mechanisms of a system [Nor02a]. The lack of understanding of the design principles results in less appropriate mechanisms contributing to deficiencies in human-computer interaction. Design principles are used by interaction design to achieve user experience. Norman (2002) identifies seven design principles [Nor02b]:

1. **Discoverability.** It refers to the possibility to determine what actions can be done on the system.

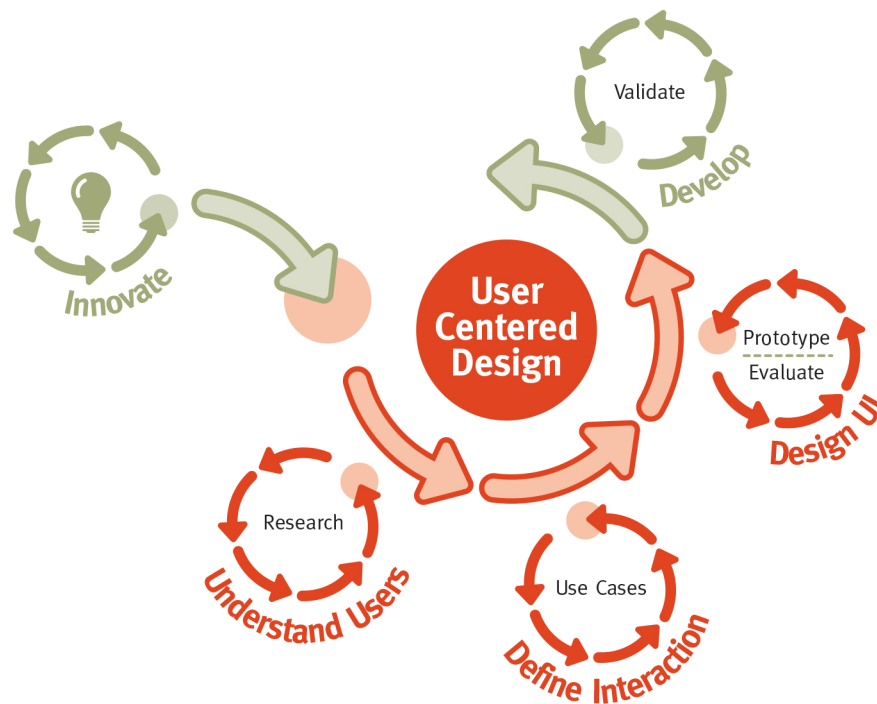


Figure 2.1: Three iterative UCD phases [Det07].

2. **Feedback.** It is a concept related with the information about the result of an action. After an action is executed the system signals the new state.
3. **Conceptual model.** It is a simplified explanation of how something works. It leads to understanding and feeling of control. The conceptual model enhances discoverability.
4. **Affordance.** It is related with the relationship between the capabilities of a person and the properties of an object. An affordance allows the execution of an action.
5. **Signifier.** It is a mark used to communicate a behavior to a person. Signifiers enhance the discoverability and the feedback.
6. **Mapping.** It refers to a relationship between elements and their actions grouped in the same cluster enhanced in the layout.
7. **Constraint.** It restricts a possible behavior and reduces the set of possible actions.

Interaction design focuses on the model of the seven stages of action explaining how does the user interact with the system. There are two action stages: execution which means to perform and evaluation which means to examine and calculate. First, to exist an action there must be a stimulus. This stimulation may be a goal or an external event. As illustrated in Figure 2.2 (p. 9), in the first goes through the execution stage and the latter

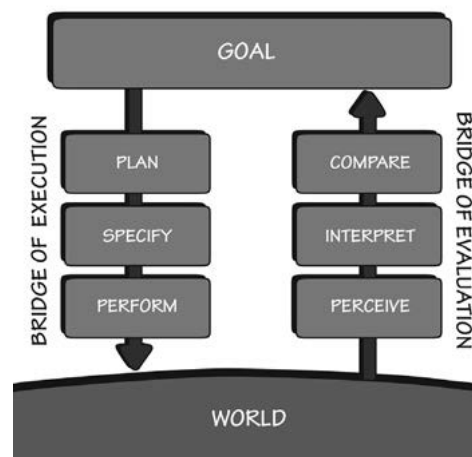


Figure 2.2: The seven stages of the action cycle [Nor02b].

goes through the evaluation stage. The seven stages of action are [Nor02b]: (1) form the goal, (2) the action plan, (3) specify an action sequence, (4) perform the action sequence, (5) perceive the state of the world, (6) interpret the perception, (7) compare the outcome with the goal. Three stages are comprised in the bridge of execution and another three stages are comprised in the bridge of evaluation, as seen in Figure 2.2.

The seven stages of action are affiliated with the seven design principles. If a stage of action fails, then it means the corresponding design principle is deficient.

The seven stages of action serve as a guideline to conceive new and innovative products.

2.1 Usability

Usability is described as being the quality of use of an interface to the users. According to the International Organization for Standardization (ISO), ISO 9241-11 relates usability to: [ISO98]:

Extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.

It is an aspect of user experience and is measured in terms of user performance and satisfaction. The quality of use is measured taking into account the following attributes [Nie93b]:

- **Learnability** is concerned with the intuitiveness of an interface, it means the design is clear enough to make the user easily learn how to use the system;
- **Efficiency** is involved with the agility provided by the interface such that users quickly accomplish their tasks contributing to their productivity;

- **Memorability** is related with the consistency and organization of the interface in order to ensure the user remembers how to use the system with little effort;
- **Errors** must be prevented and the interface must be designed to ensure a low rate of erroneous features as well as to support possible mistakes committed by the user;
- **Satisfaction** is concerned with the feelings and opinions of users while using the system.

Another attribute as important as usability is the utility of a system, which refers to the user needs, in other words, the effectiveness of the interface [RC02]. So, to achieve usefulness it is taken into account the usability and utility of a system [Nie12, usa13, Nie93b].

This attribute is essential in the acceptability of a product. In the everyday life if the users experience difficulties with an interface, they cease to use it. Plus, if the users face obstacles using an interface at work they can't simply stop using it so this will lead to high frustration and low performance. Usability brings benefits not only to users but also to project development process [Nie12, Kle06].

The usability engineering field provides techniques in order to improve the quality of user experience. It is impracticable to apply every technique in one project, but a project would profit from combining multiple usability techniques and study all the results [Roh14]. It is up to the engineer to choose which methods should be used and in which project development phase. For Nielsen (1993) "*in usability, the fastest and cheapest methods are often the best*" [Nie07].

Usability must be worked since the beginning of a project development. The sooner usability methods are applied the better, since a high-quality user experience is achieved [Nie12, Kle06]. There is an important detail when working on usability: the users must be involved earlier in the process to uncover the problems and fix them, this way there is less waste of time.

2.2 Usability Engineering

Usability engineering is a study field focused on HCI intended to improve the user experience. It is also known as user centered design (UCD) approach which, as the name suggests, focus on the end users. It offers several techniques, methods and processes applied in different stages of the project development.

The practice of usability engineering is advantageous for the product development process and also for the organization.

First, applying the appropriate usability methods, before the design process, ensures the consistency of the interface, since it undergoes less changes to achieve the established

goals [Nie93h]. Consistency is essential to ensure less commitment of errors as it is possible
 2 to predict the system behavior. This secures user satisfaction. In case of the product
 being new, consistency supports the user by allowing the transfer of skills from an existing
 4 system to the new one.

In addition, doing usability studies before the development stage is more profitable
 6 because, at the beginning, there are useless features which will be identified and removed
 before the implementation [Nie93d]. The results of these studies can be used on marketing,
 8 enhancing the product features as seen by the end users.

Usability engineering is described by Gould and Lewis (1985) to follow a cyclic model
 10 with well defined phases, which must be followed when using this approach [GL85]:

1. **early focus on users and tasks** – get information about the users, their background
 12 and their needs, as well as every task performed employing usability techniques.
2. **empirical measurement** – analyze and test the interface design through observa-
 14 tion and experimentation.
3. **iterative design** – change and refine the design according to the results of the
 16 empirical testing.

The early focus on users and tasks phase is achieved with two available procedures:
 18 goal-directed design and scenario-based design.

The goal-directed design focus on the needs and goals of the users and it provides a
 20 solution combining techniques like ethnography and user models [CRC07c]. This process
 is divided in six phases: (1) research, (2) modeling, (3) requirements, (4) framework, (5)
 22 refinement, (6) support. The most interesting phase is modeling because it is when the
 user is observed in order to model archetypes adopted in the research from then on.

The scenario-based design focus on how people use the system to accomplish work
 24 tasks instead of focusing on design [RC03]. This process resides on narratives which
 26 describe a sequence of events simulating how people will use the system. Unlike the
 previous procedure, this one does not have a formal analysis and it is not structured.
 28 Both procedures may be used simultaneously, scenarios may be written according to each
 modeled archetype [MHH12].

The methods applied during the usability lifecycle should be chosen according to the
 30 project circumstances. When it comes to usability studies, one intends to evaluate the
 32 system interface. This review is achieved from several usability engineering methods
 adopted to research, test and measure the usability quality. The next list presents and
 34 describes some of the options available for choice [RC08c, Nie93d]:

- **Ethnographic Research.** Users are observed as they use a product to get infor-
 36 mation about their behaviors, their habits, what tasks are they focused on and its

purpose. The gathered data is handled and defines the user characteristics and their needs which are the basics for the design.

- **Participatory Design.** A representative user is chosen to integrate the designers team and participate in the design process. The user express his feelings and show his abilities towards the design.
- **Focus Group Research.** Some representative users are chosen to form a group. This group is acquired to evaluate the product concepts to know if they are acceptable and understandable for users. This method may be used to support the gathered data concerning the users' characteristics.
- **Surveys.** Like other methods, surveys determine the preferences of users towards an existing or potential product. Surveys may be used in any stage of the lifecycle although are normally used in the early stages to collect as much data as possible about the skills and knowledge of the users.
- **Walk-Through.** The design leader analyze the drawn prototype putting himself in the user's place executing actual tasks. Throughout the process the remaining designers list hindrances and difficulties encountered.
- **Card Sorting.** A group of participants is chosen and with cards help evaluate if the content and functionalities of the interface are well interpreted.
- **Paper Prototyping.** The designed prototype is presented to users asking them questions about it. This method lets one know the acceptability of the interface and allows to figure out how the user handle it. At last, it gives feedback about the intuitiveness of the interface. The prototype can be changed before the code development has been started.
- **Heuristic Evaluations.** An expert in usability examines the interface applying usability principles and his knowledge about the domain area. The expert should think as the end user of the product therefore he should not be directly involved in the project.
- **Usability Testing.** Users are chosen to represent the end user and execute some tasks, which represent common scenarios, while being observed. This test is done iteratively to uncover usability defects and insufficiencies providing more acceptable interface.
- **Follow-Up Studies.** This kind of studies are done after the release of the product. The real users give some feedback about their interaction with the interface answering

surveys. The data collected with these studies are critical for designers to improve the interface for the release of a new version.

Table 2.1 shows where some user-experience research methods are usually used during product stages. It is not reasonable to think it is possible to employ every single method although it is constructive to use multiple methods throughout the project lifecycle since it offers more accurate results and ensures a more usable interface [Nie93g].

	I	II	III
ETHNOGRAPHIC RESEARCH	X	-	-
PARTICIPATORY DESIGN	X	X	-
FOCUS GROUP RESEARCH	X	X	-
SURVEY	X	-	-
WALK-THROUGH	X	X	-
CARD SORTING	X	X	-
PAPER PROTOTYPING	X	X	-
HEURISTIC EVALUATION	-	X	-
USABILITY TESTING	-	X	X
FOLLOW-UP STUDIES	-	-	X

Table 2.1: Research methods according to phases of product development lifecycle. Each column represents the following phases: (I) Requirements Analysis, (II) Design/Development and (III) Installation.

2.3 Usability Study

An usability study is a detailed investigation and analysis of the product interface in order to improve the experience of use and to ensure that users' needs are met.

There are different kinds of studies distinguished by the available resources such as the completeness of the product and the time available. Thus an usability study does not always use the same instruments.

So, there are two types of studies applied in different situations: the formative study and the summative study.

The formative study is usually done at the beginning of the product lifecycle when the interface is not fully designed [HH92]. The main goal of this kind of study is the detection of usability problems through an early iterative process. This technique is used to ensure high usability of the interface regarding the users' needs. The results are mainly qualitative however it may return some quantitative data in spite of not having statistical relevance.

As for the summative study, it is conducted after the release of the last version of design to evaluate the interface user experience [HAW01]. Its main goal is to evaluate if

the system meets its objectives and compare the product with other ones. The summative outcome is mainly quantitative and the results have statistical importance due to the amount of users who take part on the study.

Like it was said, an usability study may result in both qualitative and quantitative data. The qualitative data is gathered by observing or interviewing the users and having them talk during tests. Whilst quantitative data can be solicited by measuring the user experience with error and severity rates, efficiency and satisfaction scores.

The measurement of user experience, like any measurement, resort to metrics. Usability metrics measure the user experience which is similar to measure peoples' behaviors and attitudes [TA13a]. An usability metric may reveal information about the efficiency, effectiveness or satisfaction of the user while interacting with the system. Following are presented in detail several usability metrics:

- **Performance metrics** are really valuable since they are the best to know if the user is properly using the system. The outcome of these metrics rely on user behaviors and also on tasks. There are five types of performance metrics: task success, time on task, errors, efficiency and learnability.
- **Issues-Based metrics** rely on usability issues to improve an iterative design. These metrics are recommended to prioritize the importance of the issues using severity rates [TA13b].
- **Self-Reported metrics** are concerned with the users' feelings while interacting with the system. These metrics are collected through questionnaires designed with closed questions of specific scales.
- **Behavioral and Psychological metrics** refer specifically to users' behavior while performing tasks, like body language and verbalization.
- **Combined and Comparative metrics** rely on the previous data to combine the data and conceive a new metrics or to compare the actual results with the previous ones.
- **Live Website metrics** are really broad and there are not a specific definition. They consist on the rate of clicks in a link or the path the user took to visit a website, among others.

The choice of metrics depends on the study goals, the type of user and the available resources, like budget and time.

2.4 Usability for Power Users

2 A power user is a synonym for expert user. He is a user who uses advanced features of an
 interface, less obvious to other users, aiming for productivity. These users spend many
 4 hours using a system so they claim tools to increase the agility of their tasks at work
 [CRC07a]. Power users make use of memorization when using accelerators and shortcuts,
 6 this is crucial to speed up the interaction with the system [Nie93b]. Power users always
 seek new knowledge about the system and are aware of available features. Figure 2.3
 shows the expertise of an user and how it differs.

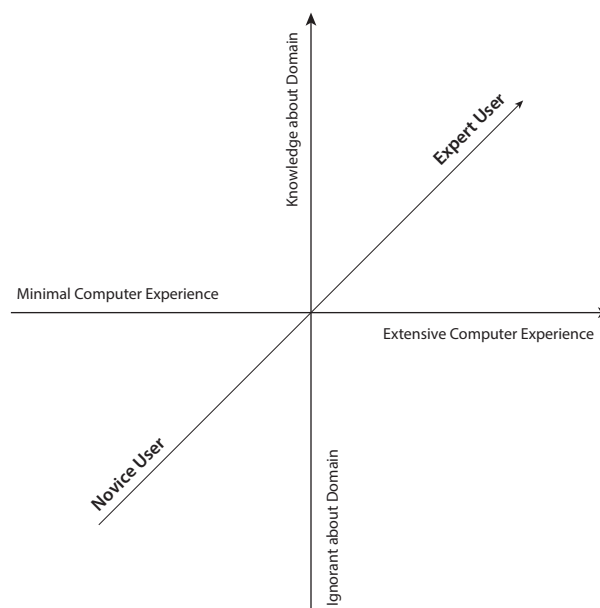


Figure 2.3: Graph which represents the difference between a novice user and a power user. A power user is someone who has great system knowledge and has experience with computers [Nie93b].

8

An interface usability depends on the type of user and it is measured taking into
 10 account different attributes. While a novice user wants the system to be easy to learn, an
 user with a high level of expertise do not wish for such feature. So, having learned the
 12 power user profile, according to § 2.1 (p. 9), these users think of a system with high-quality
 usability if it is efficient to use and has a low rate of errors. These two attributes ensure
 14 the power users needs are contemplated [May99].

Chapter 3

Email

4	3.1 Email Usability Problems	17
6	3.2 Email Clients	18

10 Since the beginning, email applications were the means of communication between co-
workers. Over the time, it evolved to a system used by employees to communicate between
12 each other and between different organizations [Car95].

The email is a simple communication service which grants the dispatch of messages
14 between clients, less expensive than any other communication channel [nI13]. This exchange
of messages is very agile granting a long distance communication in a few seconds. It is
16 an effective service which guarantees the delivery and receipt of messages at any time
[Dio10, Che03].

18 Over the years, there have been little changes in the email appearance. There are
plenty of email clients and all of them use similar design and organization. Despite the
20 significance of email in the work of organizations and in the personal life of users, the
email still don't follow their needs.

3.1 Email Usability Problems

22 Interaction with email clients may arise problems common to multiple platforms, since the
24 display and organization of an email system is very similar between applications. However,
the design of each platform can be quite different and, if it provides a poor user experience
26 it may lead the user to search for another service that meets his needs. Poor usability
regarding the design may be related to poorly marked buttons, icons misinterpreted,
28 hidden information or difficult access, wrong perception of elements, among others.

After an extensive research, there are no relevant results for usability problems in email clients. Some of the results are opinions formed by several users without expertise in the field of usability, but no data is obtained from usability measurement methods such as those mentioned in § 2.2 (p. 10) [Tai13, MS13]. According to the research, companies associated with some email clients, like Google, have done studies on user experience, however this data is not made public [Goo13b].

3.2 Email Clients

As said before, there are several email clients for desktop, mobile and web. The most significant ones for this research are the desktop and web applications.

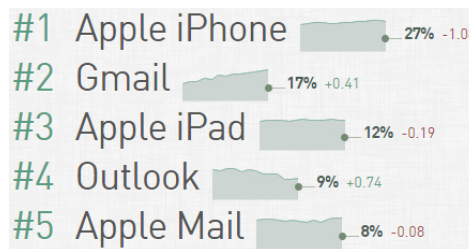


Figure 3.1: The top 5 most popular email clients in December 2014 [Lit15].

In Figure 3.1 the top five email clients in the market, in December 2014, are presented. Compared to the result of May 2013, these show a relevant change in market share. Every Apple email client remains in the same rank, although the Apple email for iPhone and iPad had a share increase of 4% and 3%, respectively. The Apple email for desktop remains with the same market share. Now, the most relevant change refers to Google Gmail, for web, and Microsoft Outlook, for desktop. The email client of Google had an increase of 12% moving to the top five list in second place. Unlike the others, Microsoft's mail client had a share decrease of 11%, still remaining in the set of the most popular clients, in fourth place [n13].

Following is the description of the most popular clients and also some newer clients that have importance for this research.

3.2.1 Google Gmail

Gmail is a free mail service with over 425 million active users. It was announced in April 2004 with a beta version which ended 5 years later in July 2009.

The email service provides organization of email messages by tabs and labels. The organization through tabs grants users the visualization of new messages at a glance. The labels are used to filter group messages given the user's will. This organization may help

during the search of emails. Furthermore, the conversation view is arranged in order to help reading new messages and old ones [Cor11].

In addition to the email service, Gmail has the hangouts chat. While consulting the email a user can communicate directly with someone or with a group of people through messages or video-conference [Goo13a].

3.2.2 Microsoft Outlook

Outlook is the service more used within organizations. It is developed to Windows OS though it has versions to Mac OSX.

This service provides management of messages, plus it has integration with calendar and contacts. Users feel comfortable with its user experience since it provides the necessary tools without much effort. It allows offline access to email. The user can read and answer to emails as if online and the application sends the message when it detects an internet connection [Mit13].

Outlook provides different kinds of search to find an email, so the user does not need to remember exactly what is written in the message. Furthermore it has a unique feature of creating rules. These rules gather the messages in folders defined by the users .

It is the most complete service however the available tools can be too much for the user [nI13].

3.2.3 Apple Mail

The Apple Mail has a simple interface with the basic tools expected of a client developed by Apple for desktop and mobile.

It has a quick search and an effective spam filter. One feature which is not common in other clients is the possibility to set tones for incoming messages. Each message can have an associated color as a pin [nI13].

3.2.4 Dropbox Mailbox

Mailbox is a recent client developed in partnership with Dropbox. It is different from the ordinary email taking into account the tasks management of users.

Some of the most simple operations of email are there, like read, answer and delete, in spite of the different concept around the tasks. This approach adds new features and interactions. Mailbox focus on the concept of zero inbox – email management to keep the inbox empty – so it is possible to add reminders to messages and mark them as done like one does with tasks [Mai14, nI13].

Mailbox interaction uses actions by gestures even for desktop through the trackpad.

3.2.5 Google Inbox

2 Inbox is the new product of Google launched in October 2014. It is currently accessed by
users with invitations.

4 This service was designed for the user *“to focus on what really matters”*. Following
the Mailbox concept, Inbox is an email service which focus on zero inbox. It is similar to
6 tasks management too having the same features as Mailbox to snooze emails and mark
them as done. Google Gmail has labels to group emails, this feature is sustained by Inbox
8 with a different name, bundles. The information and important messages stand out more
with this design [Pic14].

10 Like Gmail, Inbox still has the hangouts to chat with known people or to participate
in a video-conference.

Chapter 4

Research Problem

4	4.1 Problem	21
6	4.2 Methodology	22

Over the years usability has improved as the number of software IT users has increased. There is not enough gathered data of usability evolution although this evolution is visible [Nie93a].

4.1 Problem

Nowadays a part of the population knows how to interact with computers, something envisioned by Apple's Steve Jobs and Steve Wozniak who wanted computers to be available to a large public [Pan11]. To achieve this, it was necessary for software developers to distance themselves from power users – everyone who worked with computers in corporations at the time – and target novice users who did not know how to interact with computers, therefore it was fundamental to improve the system's learnability. As a result of focusing on the system's learnability eventually power users began to be overlooked as the interface lacked efficiency of use. Quoting [Nie93c]:

Unfortunately, it does not seem that user productivity has improved to the same extent that system learnability has [Landauer 1994]. Users can certainly do more things with computers than they ever could, and the richness of the interfaces has increased from zero and one dimensions to two and a half and three, but users may not always get their job done much faster as a result.

Figure 4.1 (p. 22) represents this problem through a Venn diagram which is intended to demonstrate the lack of data on the user experience of power users.

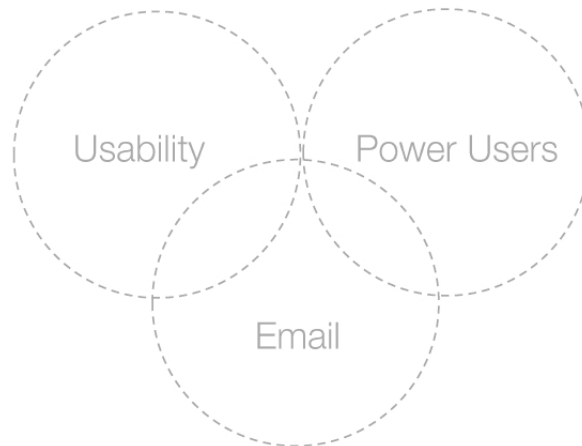


Figure 4.1: The lack of intersection between usability and power users represents the small number of studies between them. There is not much data about email power users' user experience.

Usability studies are aimed to measure user experience, to collect usability data and to ensure users' satisfaction. This kind of studies were not done formerly that is why today there is not much data recorded about usability for power users. Hereupon this dissertation will contribute to increase the user productivity, gathering data related to efficiency of use, and at the same time analyze email power users.

4.2 Methodology

As mentioned in § 2.3 (p. 13) there are two alternatives to implement on this usability study. The interface design is slightly advanced, plus it moved recently from the prototype stage, therefore it still has some features missing. Thus the formative study is the one to be put into practice. As explained before, this study is applied when the interface design is not completed.

Beyond the product development stage being at the beginning, the available resources must also be considered when planning the methodology. This study has limited time, which must be fulfilled, and it has a low budget. Given the constraints, the optimal approach would be a cheap usability approach, the discount usability engineering proposed by Jakob Nielsen (1993) [Nie93a]. The discount usability engineering comprises four techniques described in § 2.2 (p. 10):

- User and task observation
- Scenarios
- Heuristic evaluation

- Simplified thinking aloud

2 A study focused in these techniques is much simple and cheap, but it results mainly
 on qualitative data [Nie09]. Even though quantitative metrics are valuable to measure
 4 user experience they are also very expensive. The qualitative data ensures good results
 with greater validity and supports iterative design with frequent iterations.

6 Another element considered when choosing this approach is that “discount usability
 methods are a perfect match for Agile development projects” as mentioned by Jakob Nielsen
 8 [Nie09]. The development of the product to be studied follows the scrum agile software
 development methodology.

10 The agile engineering focus on functionality and on the iterative delivery of sets of
 working features to customers [Bro13, JHM14]. Customers give their feedback in each
 12 iteration and they may request changes.

Even though agile engineering and usability engineering are different processes, both
 14 of them have the same common goal of delivering a high quality product [JHM14]. Having
 the same goal it is possible to integrate them and have the best of both methodologies.
 16 As a result, usability engineering contributes with frequent interface analysis to ensure the
 end-user needs, since customers do not do this work, and the agile engineering adds frequent
 18 iterations resulting in periodic usability evaluations. Therefore, Figure 4.2 illustrates the
 agile UCD methodology applied to this study.

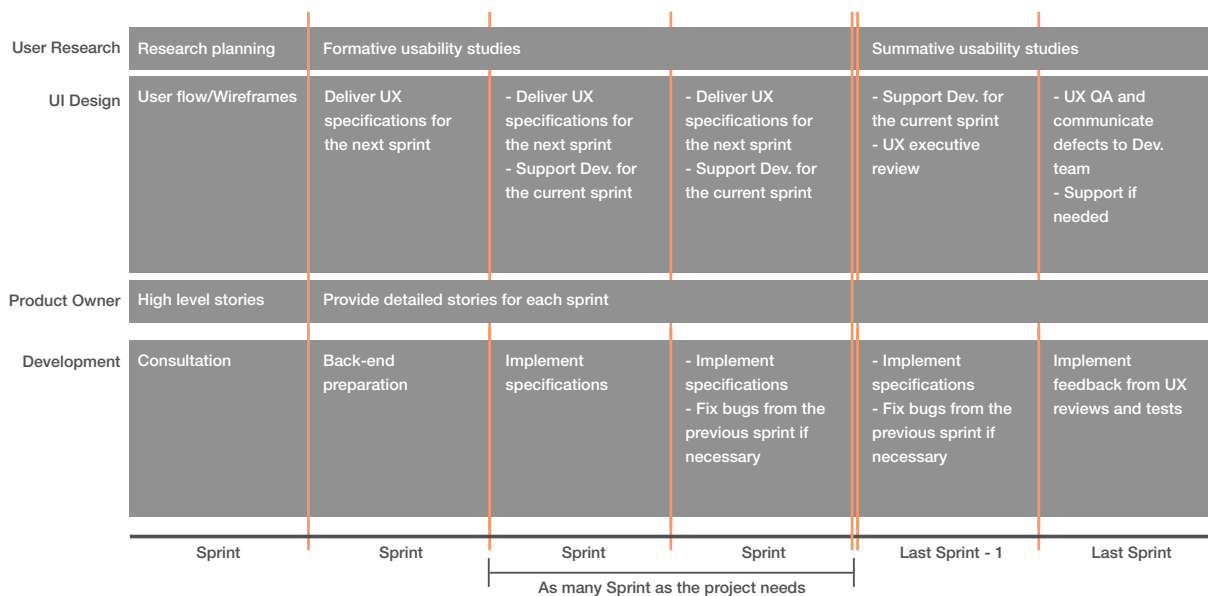


Figure 4.2: Agile user centered design planning used in this study [BJK09].

Chapter 5

Usability Studies

4	5.1 Ethnographic Research	25
6	5.2 Heuristic Evaluation	31
	5.3 Usability Testing	38
8	5.4 Outcome	43

As explained in § 4.2 (p. 22) the scrum methodology is an iterative process. In each iteration the available interface to the date is evaluated. As the improvements arise the design team revise the design, changing the necessary features, so that the next iteration evaluates the previous changes.

At this stage the design is already in an advanced stage, practically with all features drawn. Yet these studies follow an agile methodology iteration therefore this research starts slightly later than the design team. This decision does not adversely interfere with the studies.

5.1 Ethnographic Research

The first step of these studies is the ethnographic research which rests on techniques such as observation, interviews, or recording of representative users in their natural environment [AA05]. As described in § 2.2 (p. 10) this field research is done in order to study users' behavior, their needs and routines.

As said in Table 2.1 (p. 13), an observation research is carried out at the beginning of product development. The collected data in this stage is extremely useful for designers so they can draw the interface around the users.

All the information needs to be compiled and organized in a way that ease its visualization, the solution is to resort to models [CRC07b]. Models are used to represent

abstractions and complex structures, an user model represents an user abstraction called
2 persona. A persona describes the behavior of users towards an explicit context as well
as his motivation and goals. A persona is based on behaviors of real users however, it is
4 not a real user but only a personification. Personas are build up from behavior patterns
associated with a specific context. These patterns are identified through the analysis of
6 the collected data.

The ethnographic research is being made using the observation technique described in
8 the following section. The results from this method are interpreted in the persona section.

5.1.1 Observation

10 The observation technique is used to observe representative users, power users, directly in
their regular environment within the context in study, the email. The observation gathers
12 descriptive data collected from the analysis made by the observer who is responsible for
taking notes of interesting features, i.e. when the application is used unexpectedly in
14 different ways, and for the recognition of patterns in users' activities. This qualitative
data is handled to define a persona [Nie93g, AA05].

16 An observation may be structured or unstructured, in a more common language, it
means looking for or looking at something, respectively [TPS96]. A structured observation
18 provides quantitative data resulted from frequency counts, ranking or ratings, commonly
used when there are particular items, actions or attributes expected to be observed. In
20 other hand, an unstructured observation grants qualitative data collected through recording
of anything relevant to the context, it is an observation more out of the box, studying the
22 whole surroundings. The recording quality is upgraded using the two classes of observation.

The data collected from direct observation is further processed to be represented in a
24 lighter format to simplify its analysis.

Procedure

26 The implementation of this method requires three or more representative power users
[Nie93g]. Three power users are selected for the process according to resources availability
28 as time and number of volunteers. The volunteers are distributed through different sessions.

It is determined beforehand to observe specific actions expected to occur and to write
30 field notes during the session [TPS96]. During the observation it is important to examine
the interactions and surroundings of power users and focus on usage habits and unexpected
32 actions or decisions.

After the sessions, the collected data needs to be processed before reaching the personas.
34 The data is filtered resorting to diagrams and the final outcome displayed in tables.

The first step is to identify behavioral variables [CRC07b]. These are distinct aspects of behavior observed during the sessions, some are hypothesis identified before the study as being part of the persona. It is required to have between fifteen and thirty behavior variables. The next step is to map each subject to all the variables. The relevant information here is the clusters of subjects in each x-axis and the relation between the users. These clusters are used to identify behavioral patterns. A behavioral pattern comprises six to eight behavioral variables with the same cluster of subjects. At the end, the persona characteristics and goals are synthesized.

The outcome of this research is displayed and organized in tables, on Appendix A (p. 55).

5.1.2 Persona

The collected data needs to be processed before publishing the final results. The data was filtered and the outcome displayed in the form of diagrams.

The first step is to identify behavioral variables [CRC07b]. These are distinct aspects of behavior observed during the sessions, some are hypothesis identified before the study as being part of the persona ¹. It was recognized a total of eighteen behavior variables.

The next step is to map each subject to all the variables, as seen in Figure 5.2 (p. 29). The relevant information here is the clusters of subjects in each x-axis and the relation between the users. This clusters are used to identify behavioral patterns.

A behavioral pattern comprise six to eight behavioral variables with the same cluster of subjects. From this analysis resulted two behavioral patterns: the first one with eight variables and subjects 2-3, the second one with six variables and subjects 1-2-3.

This study has two personas, described in Table 5.2 (p. 30) and Table 5.1 (p. 30), which correspond to the amount of patterns. The patterns are used to synthesize the characteristics of the subjects and define the goals for each persona.

This research resulted in two personas described in Table 5.2 (p. 30) and Table 5.1 (p. 30). The persona Edna Jones is a primary type which means the interface must satisfy his goals and needs completely. Ian Ackerman is a secondary persona so her goal and needs are mostly met by focusing on the primary persona. Still she has her own goals and needs that, despite not being the priority, may be achieved adding slight changes to the interface if they do not affect the experience of primary person.

¹ <http://www.usability.gov/how-to-and-tools/methods/personas.html> [Online; accessed 17-June-2015]

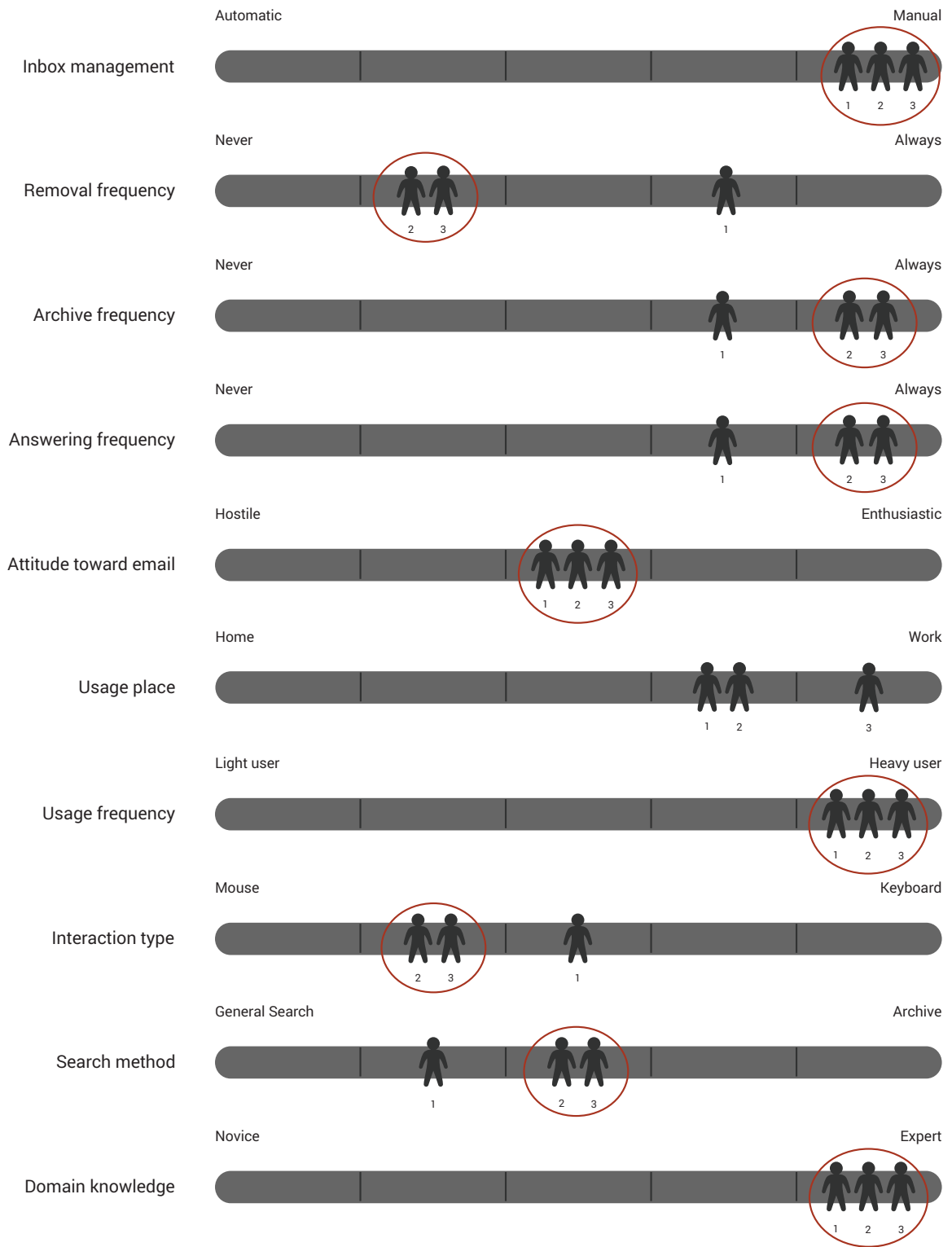


Figure 5.1

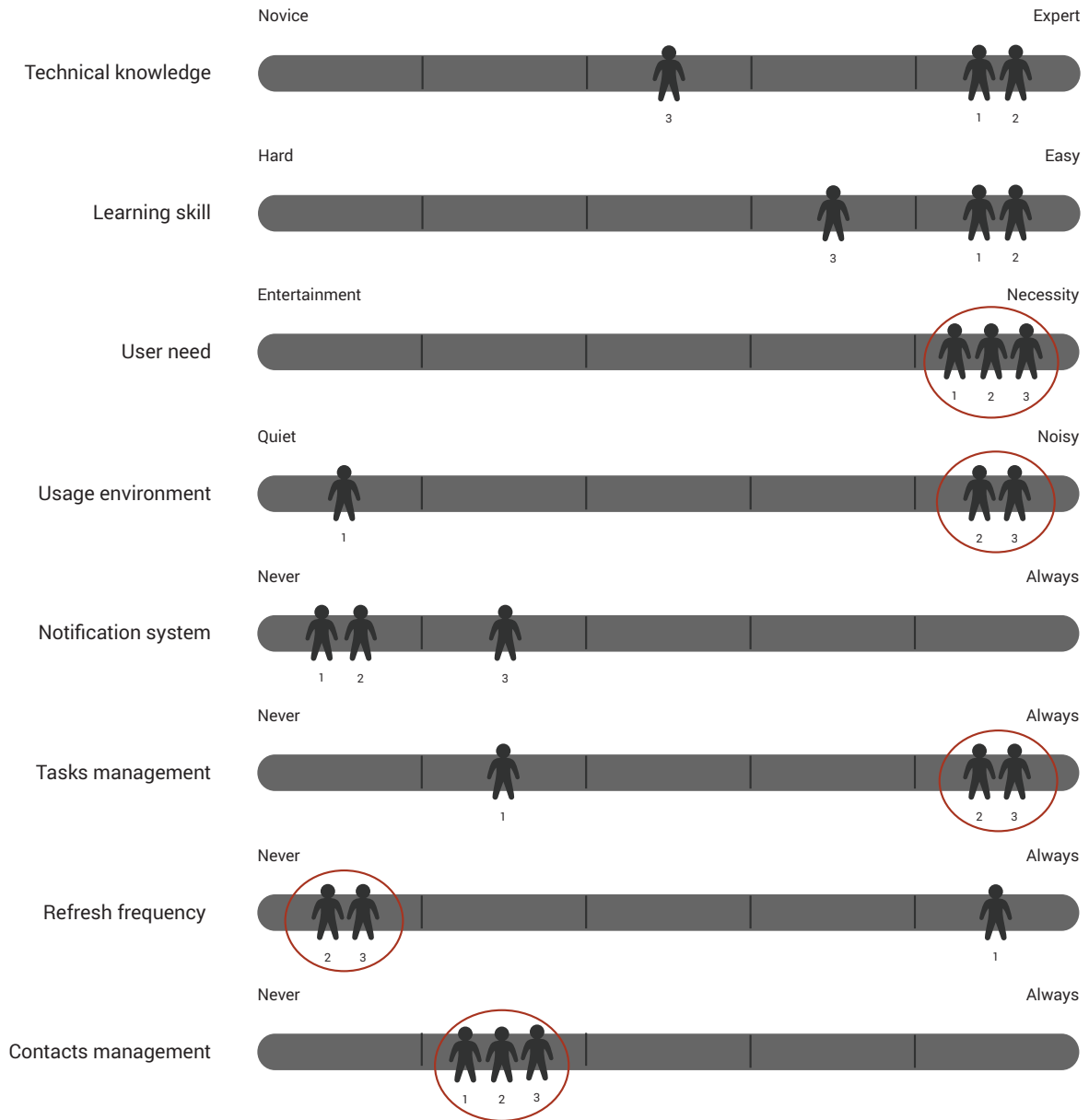


Figure 5.2: Map of observed subjects to behavioral variables. The clusters of subjects marked with a circle match two behavioral patterns.

NAME	Edna Jones
GOALS	<ul style="list-style-type: none"> – Consult email accounts – Do reports – Feel in control – Stay connected – Stay focused
CHARACTERISTICS	As a user who receives too many messages the notification system is turned off not to disturb. Very often she refreshes the email account to make sure new messages arrived. During a video call she consulted the email on the smartphone not to miss any information.

Table 5.1: Primary persona which represents the target of the interface.

NAME	Ian Ackerman
GOALS	<ul style="list-style-type: none"> – Empty inbox – Finish all the tasks – Respond to messages requiring an answer – Process messages quickly – Remain organized – Remain productive – Add tasks to agenda
CHARACTERISTICS	He spends many time consulting email since it is an indispensable tool to do his work. The management of the inbox, like removing or archiving messages, is done manually. The message search is done using mostly the archive, the global search is used only in case the archive search fails. In the middle of his work he needs to answer the phone and talk with other people. The interaction with the email client is done mostly using the mouse.

Table 5.2: Secondary persona which have extra needs which might be taken into account.

In addition to the modeling of personas it was also determined the research questions that should be replied with the following studies. These questions are related with the defined user's models. The list of research questions is as follows:

1. What are the major usability flaws that prevent users from completing tasks?
2. How easily and successfully can users switch between email contexts?
3. How easily and successfully do users prioritize their emails?

- 2 4. How well do users understand the symbols and icons? Which symbols are problematic? Why?
- 4 5. How well do users understand the information architecture?
- 6 6. How quickly can users perform common tasks?
- 8 7. How easily and successfully do users use the menu without assistance?
- 10 8. How easily and successfully do users find the tools or options they want?
- 12 9. What types of written information will be required?

8 5.2 Heuristic Evaluation

The second method used on this research is the heuristic evaluation. As the name implies, it is a method used to evaluate an interface analyzing its usability resorting to defined usability principles [NM90, Nie92, Nie93d].

The interface evaluation is done by evaluators, with experience on usability engineering field, who pinpoint usability issues on the interface attaching each problem to a violated heuristic [Nie93e].

There are several sets of usability heuristics correlated with well defined usability guidelines [Nie93e]. In interaction design the evaluations usually work with the principles of Nielsen. These principles summarize a set of several guidelines in the following ten heuristics with less complexity and greater efficiency [Nie92].

20 H1 Visibility of system status

The system should keep users informed about what is going on, through appropriate feedback.

22 H2 Match between system and the real world

The system should speak the users' language using concepts familiar to the user rather than technical terms.

26 H3 User control and freedom

The system should support undo and redo in case users want to leave an unwanted state. Users often choose system function by mistake therefore the system should have clearly marked exits so that the user do not have to go through trouble to pull back an action.

H4 Consistency and standards

2 The system should be very clear and the users do not have to wonder whether
 different words, situations, or actions mean the same thing. The system follows
 4 platform conventions.

H5 Error prevention

6 The system should have a design which prevents problems from occurring in the first
 place.

H6 Recognition rather than recall

8 Instructions should be visible or easily retrievable whenever appropriate so that users
 10 do not have to remember information from one part of the interface to another.

H7 Flexibility and efficiency of use

12 The system should support accelerators to speed up the interaction for the expert
 users allowing them to tailor frequent actions.

H8 Aesthetic and minimalist design

14 Dialogs should not contain information which is irrelevant or rarely needed. Every
 16 extra information on the interface compete with the relevant one and reduces its
 visibility. All information should be displayed in a logical order.

H9 Help users recognize, diagnose, and recover from errors

18 Error messages should be expressed in plain language, precisely indicate the problem,
 20 and constructively suggest a solution.

H10 Help and documentation

22 The system should have documentation easy to search, not too large, which lists
 concrete steps to be carried out.

24 In spite of being part of an iterative process, usability issues may be measured using
 issues-based metrics defined in § 2.3 (p. 13). Severity ratings are used in the measurement
 26 to obtain ordinal data and organize it through different categories. Each rate has a different
 gravity thus it also has a different priority:

28 **1** – cosmetic problem only: fixed if there is extra time on project;

2 – minor usability problem: fixing this should be given low priority;

30 **3** – major usability problem: important to fix, give this high priority.

Since the interface is already at a late stage of design, it is expected of usability issues to be more detailed, specific problems. That is to say, the usability issues must have high granularity [TA13b].

The heuristic evaluation has the cooperation of several evaluators aiming to identify the maximum number of usability issues as they can. A single evaluator only finds 20% to 51% of the usability issues, this matter is solved combining the results of several evaluations [NM90]. The aggregation of three to five evaluations is enough to guarantee a good coverage of the usability issues [Nie93e].

Procedure

This method relies on the participation of ten evaluators with experience in the HCI field. Each evaluator has already applied an heuristic evaluation at least once since all of them took a HCI course. Plus, since the study focus on power users, the results are more accurate if the evaluators have some knowledge about the end users [Nie92].

The volunteers are divided into different sessions. During a session it is presented a guide, included in Appendix B (p. 61), with a list of heuristics and the available severity rating. The chosen list of heuristics are those of Nielsen.

Figure 5.3 (p. 34) illustrates the complete interface of mailcube as it was presented to the evaluators. The marks on the interface figure correspond to its different areas.

After reading all the information, the volunteers start the evaluation. This heuristic evaluation is object oriented i.e. the evaluators examine particular elements of the interface like windows and menus [Wil14]. They register the usability issue associated with an object together with the violated heuristic, the assigned rate and the possible solution to the problem. Afterwards followed a brief discussion to review the results of that meeting and understand the reasons of the evaluator.

All disclosed issues are aggregated and those exposed at least twice may have more than one correlated heuristic, the severity rating is assigned considering the value assigned more often.

The outcome of this research is a list of usability issues fully registered in Appendix C (p. 65). The following section presents a result summary and it describes the most relevant issues.

5.2.1 Usability Issues

The outcome of this evaluation pointed out a total of 36 usability issues, given full details in Appendix C (p. 65). The chart of Figure 5.4 (p. 35) displays the results sorted by severity rates.

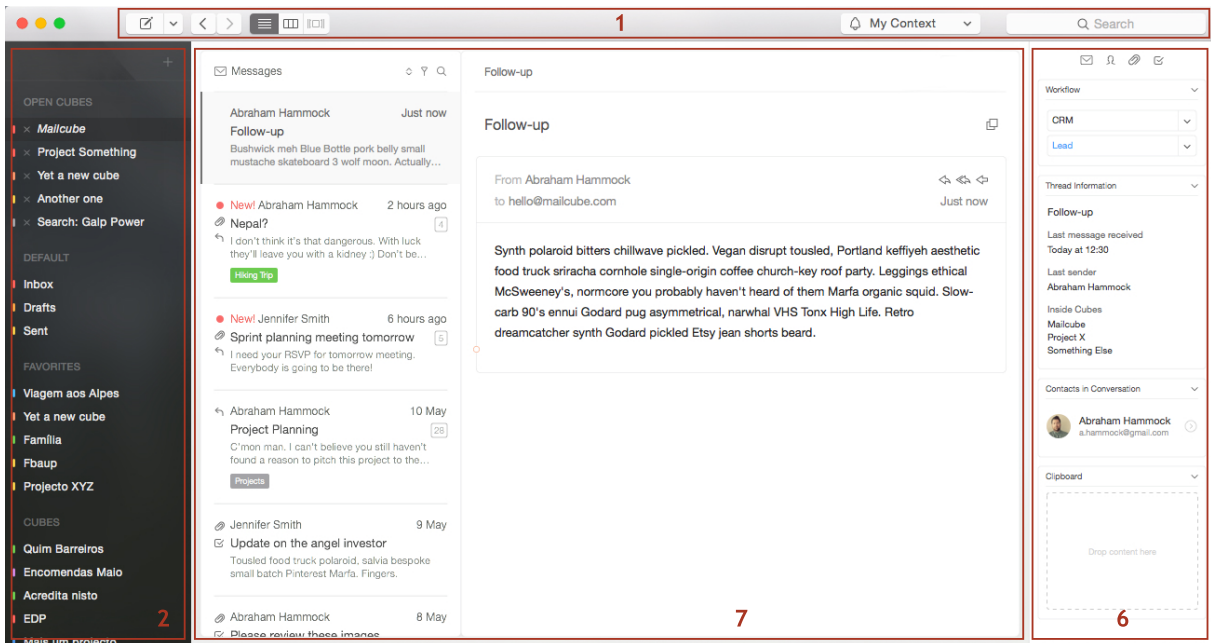
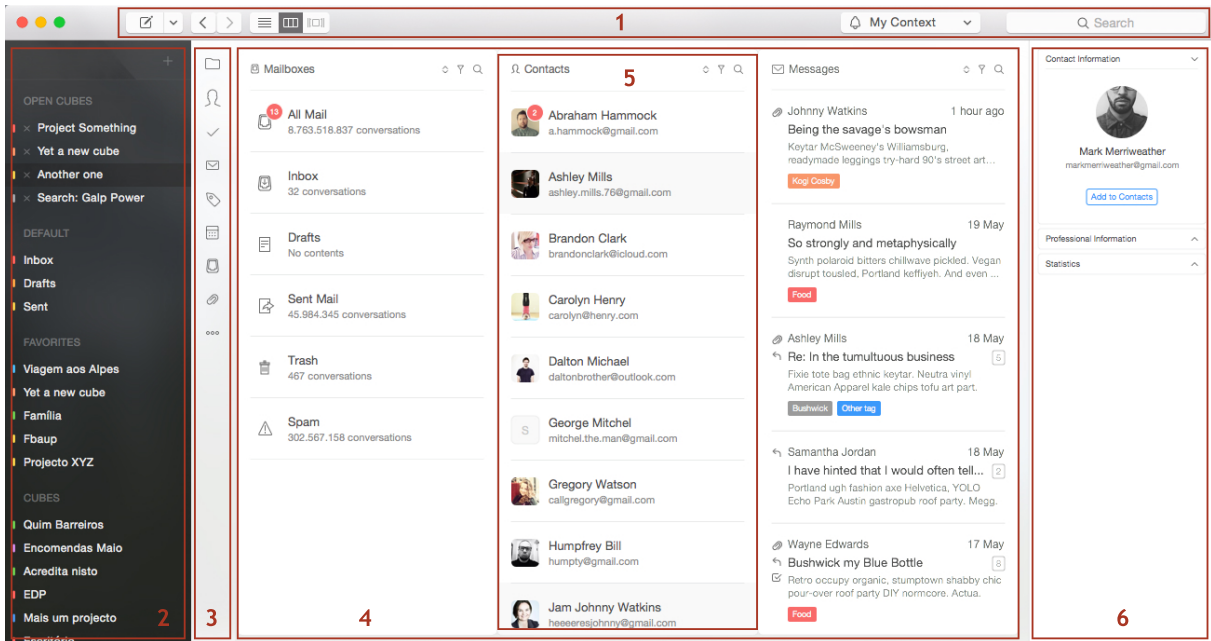


Figure 5.3: Mailcube interface with marked individual zones: (1) tool bar, (2) source list, (3) side tool bar, (4) faces' view, (5) face / column, (6) inspector, (7) reading view.

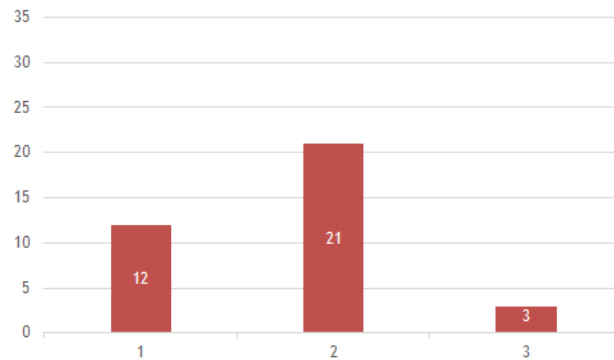


Figure 5.4: Graphical results of the amount of usability issues in relation to the severity rates: (1) cosmetic problem, (2) minor problem (3) major problem.

As expected of this kind of method, the amount of major issues is smaller than minor issues [Nie92], yet they are the first to be rectified since these have more probability for making the user to commit errors. The minor issues are related with the efficiency of use and the consistency of the interface. Minor issues are less “serious” than major issues still they are as valuable as the later because as mentioned in § 2.4 (p. 15) power users seek performance above all and efficiency of use is an indispensable usability attribute to grant it.

An interface should not contain information which is irrelevant or rarely needed [Nie93e]. This follows the motto “*less is more*” adopted by the architect Ludwig Mies van der Rohe known by his minimalistic design [Sch89]. In Figure 5.5 is illustrated an issue which goes against principle H8.

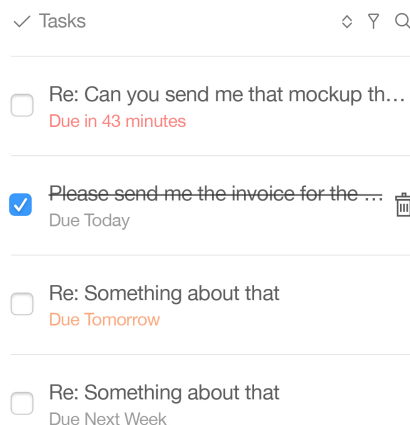


Figure 5.5: A checked task keeps its list position preventing the user to focus on the tasks that matter.

As soon as a task is marked as done, it ceases to have much importance, however, all tasks in this state continue in the exact same place, adding yet another element, a strikethrough, forcing the user to interpret it. As said by Jakob Nielsen [Nie93e], “*any*

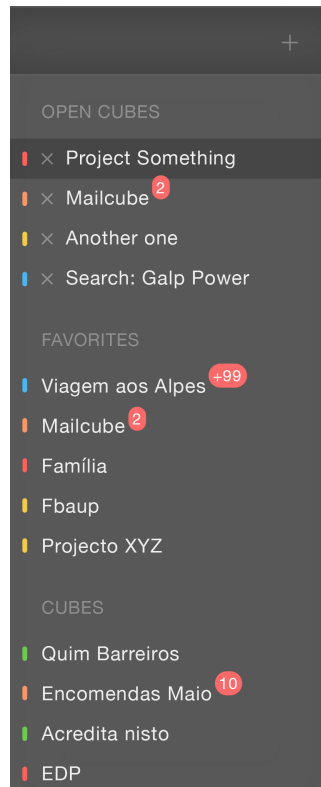


Figure 5.6: Source list fragment.

piece of information is something users will have to look at when they search the screen”

2 so the interface should remain as simple as possible since any additional element is another one the user must clarify. This issue slows down the user performance.

4 The source list prevents a cube to have no color associated as seen in Figure 5.6. The color feature is intended to enhance a cube, it is a designed feature to mark the most
6 important cubes. However, as all the cubes need to have an associated color this distracts the user from the primary information: quickly identify the relevant cubes. Quoting
8 [Nie93e]:

10 *Unfortunately, displaying too many objects and attributes will result in a relative loss of salience for the ones of interest to the user, so care should be taken to match object visibility as much as possible with the user’s needs [Gilmore 1991].*

12 According to persona **Ian Ackerman**, it is expected of a power user to have several cubes. As it was designed the source list does not afford the search of a specific cube.
14 Despite not being associated with an heuristic, it is not something to be discarded. This concern is related with the affordance of an interface, as explained in Chapter 2 (p. 7).

16 Another issue pointed out on the source list violates principle **H1**. The *Open Cubes*
18 section comprises a set of recently consulted cubes, however there is no element or mark on the design that distinguishes the edited cubes from the saved ones. The user does not

even realize the need for this section. This issue correction is illustrated in Figure 5.7 where the edited cubes are marked with a period and the corresponding text is in italics. Plus, this solution has the addition of a navigation tab which supports the *Open Cubes* section.

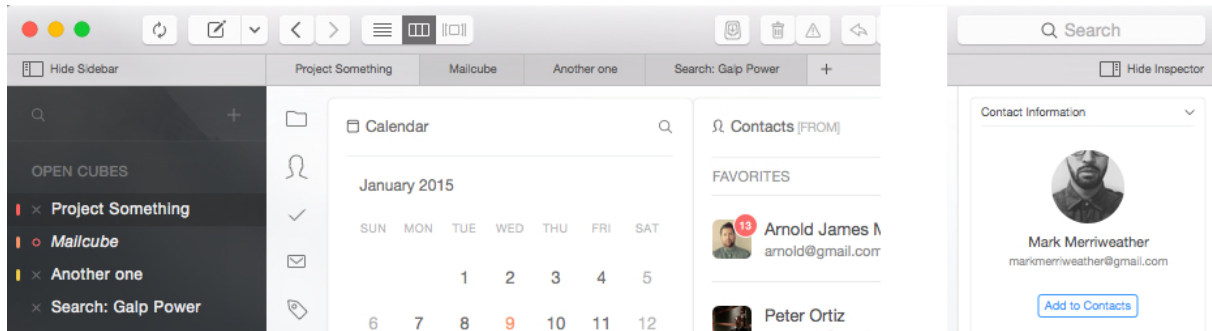


Figure 5.7: Correction of usability issues of the source list illustrated in Figure 5.6 (p. 36).

4

In Figure 5.3 (p. 34) there is no way to confer the browsing path which lead to the messages on the reading view. This feature violates principle H6. This way the user has to memorize the browsing of each cube, or switch to face's view, which is troublesome to power users since they may have more than a dozen cubes. Instead, the user should have the possibility to recognize the information which would be less demanding. Figure 5.8 illustrates the solution for this issue. As it is the user visualizes the browsing of a cube even when in reading view.

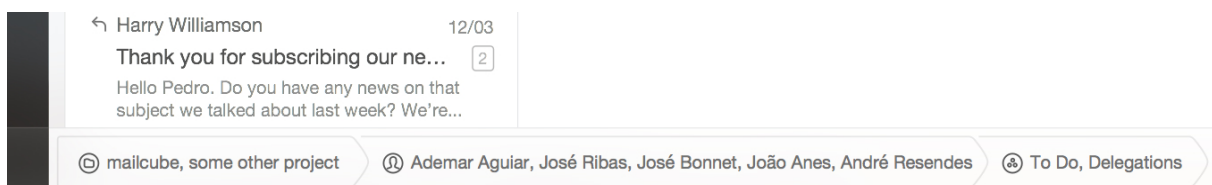


Figure 5.8: The path at the bottom of the reading view prevents memory overload through recognition.

12

Usability issues were also pinpointed in the interface tool bar. The compose message button is misplaced hence, it goes unnoticed, as illustrated in Figure 5.9 (p. 38). The compose message action is used to write email messages yet it is displayed close to navigation objects rather than close to email oriented objects. This issue disregards principle H8. Operation objects should be placed together matching the way users do things. Information that will be used together should be displayed close to each other [Nie93e].

18
20

The three clustered navigation objects, on the right of Figure 5.9 (p. 38), are the only option so far to switch between views, disregarding principle H7. There should be defined shortcuts to support power users needs. In addition, to switch views it should

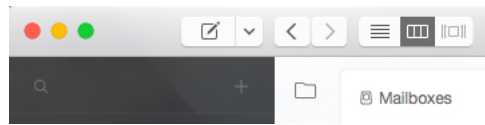


Figure 5.9: The compose message button, the first button on left, is misplaced. It goes unnoticed.

also be defined trackpad gestures. This feature is essential to meet the needs of persona
 2 **Ian Ackerman** who often uses the trackpad. According to Fitts's Law model, the time
 required to quickly move the pointer to a target area depends on the distance to that
 4 target and the width of the target. As seen in Figure 5.3 (p. 34) the navigation objects
 are placed on top of the interface area, distant from the main areas, and they have a small
 6 size making it difficult to place the pointer on top of them. As switching between views is
 a rather common action, as it is, it contributes to the decreasing efficiency of power users
 8 [TTS+13].

Both major and minor issues were fixed before moving to usability testing. The
 10 remaining issues were left to repair in further versions since they do not disturb the
 interaction.

12 5.3 Usability Testing

As described in § 2.2 (p. 10) an usability test rests on observation of a representative user
 14 executing a set of tasks [Kun03, Nie93f, RC08a]. It provides direct information about
 their troubles with the interface through direct observation. In this case, the selected
 16 users must represent the personas defined on § 5.1.2 (p. 27). Usability studies can be done
 throughout the project lifecycle as seen in Table 2.1 (p. 13).

18 Before and after a usability test it is usually included a brief questionnaire. These
 questionnaires are used to get extra data essential to understand users performance at
 20 some point of the test since there are facts which can not be noticed during the test, and
 to understand the strengths and weaknesses of the interface [RC08b]. The questionnaires
 22 were designed using the Likert scale and the semantic differential scale, the scale items
 have different formats still all formats have five points.

24 The usability testing is crucial in this study in spite of having a less coverage of usability
 problems than an heuristic method [KCF92]. This is due to users handling the concrete
 26 interface which may come up with problems not expected by previous methods.

For an usability test one may adopt different methods according to the required output
 28 (it may be qualitative, quantitative or both) also it depends on the development stage of
 the product since it may not be possible to use it for the time being. For this test it is
 30 used the think aloud method described in detail on the following section.

5.3.1 Thinking Aloud

2 Thinking aloud is an important method used during an usability test to know what the
 3 users are thinking while they express verbally their thoughts when executing a task [Hol05].
 4 Therefore the misconceptions are identified more easily since a problem is directly disclosed
 5 as the user speaks his mind.

6 As this method relies on representative users, for the thinking aloud method five users
 7 are good enough to get valuable qualitative results [Nie93g].

8 The outcome is relative to the defined set of tasks and it is used to improve the interface
 9 elements proven to be an hindrance to the users.

10 Procedure

11 Firstly, it precedes the selection of the individuals representing power users. As the
 12 thinking aloud method demands, five volunteers are picked to try out the interface ².
 13 Each individual is asked to do the usability test per session. Before going further the
 14 evaluator must read the test script in Appendix D (p. 75) to each individual which briefly
 15 explains what they are going to do, along with the task scenario they will perform using
 16 the interface.

17 As said before the product target are power users moreover the product resides in new
 18 concepts, therefore it is fundamental to instruct the users before they try it out. The
 19 instruction involves the individuals getting used to the new approach of email browsing
 20 explaining to them the philosophy behind the concept as well as pointing out its benefits
 21 through examples.

22 Before the test each individual answers a brief questionnaire to make sure they fit the
 23 persona defined in § 5.1.2 (p. 27). Besides, the individuals are questioned about their
 24 impression of the interface looking at it for the first time. In such a manner it will be
 25 understood if the user has grasped the new concept.

26 Afterwards comes the actual test where the individuals have contact with the interface
 27 following the test scenario given to them. A scenario represents a fictitious situation of
 28 work with a particular context as well as a motivation to perform the tasks [RC08a]. A
 29 task scenario covers several tasks arranged in a consistent way similar to how they are
 30 accomplished at work. The designed task scenario in Appendix D (p. 75) comprises the
 31 following tasks: (1) add cube, (2) add contacts column, (3) select contact, (4) search
 32 contact, (5) switch view, (6) switch context.

The test is performed with an arrangement of images, which simulate the interaction

² <http://www.nngroup.com/articles/why-you-only-need-to-test-with-5-users/>
 [Online; accessed 17-June-2015]

with the interface according to the list of tasks due to the early stage of development in which the product is at the moment ³, preventing it from being used.

At the end of the session the users answer another questionnaire. The post-test questionnaire is used to compare the interface impact matching the results with the previous one, since the impression of the user may change after experiencing the interface. Thus, some of the questions are the same as the ones in the pre-test questionnaire. The post-test questionnaire is also convenient to determine the satisfaction of the user experience.

5.3.2 Results

As expected, it was required some effort to keep users verbalizing their thoughts at the same time they performed the tasks because at some point they would divert their attention solely to the platform use.

The observation outcome is categorized into a list of tasks compiled in the task scenario. Each task is described below according to the users' experience and their understanding.

“Add cube for “mailcube” project” This task was completed by all users. However, some of them had trouble finding the add cube button, in Figure 5.10. After reading the scenario the users realized they had to add a cube, plus they expected the button to be on the sidebar even though they did not find it immediately. As soon as they found the button they did not have any doubts when clicking it. Two of the users mentioned the clarity of the button color as the reason to be unnoticed.

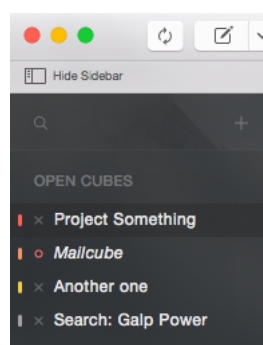


Figure 5.10: Interface to add cubes.

“Add column with contacts” All users completed this task successfully. The users understood the side tool bar, in Figure 5.11 (p. 41), was where they would find the button

³ <http://www.nngroup.com/articles/thinking-aloud-the-1-usability-tool/> [Online; accessed 17-June-2015]

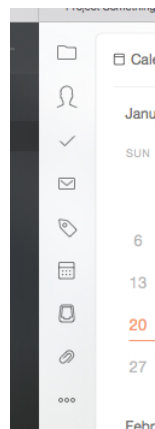


Figure 5.11: Side tool bar.

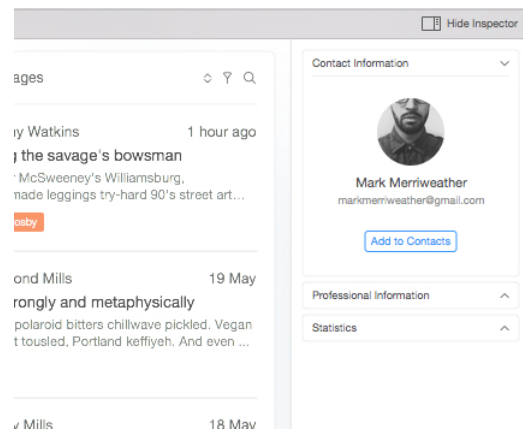


Figure 5.12: Column and inspector.

to add the requested type of column. In addition, they proved that they understand
 2 the column concept. Three users mistook the inspector side bar with a column, in
 Figure 5.12, explaining it had almost the same width as the columns and it had no contrast
 4 in comparison with the columns.

“Search contact and select it” Once again, the users performed these tasks until the
 6 end and they felt at ease as the messages were filtered. One user felt insecure when he
 was asked to search for a contact because there are several search icons on the interface
 8 although he completed the task without complications. Also, there were users who had
 trouble noticing the selection tilting the screen more than once in an attempt to see
 10 the selection, then they complained the selection color was too light as can be seen in
 Figure 5.13.

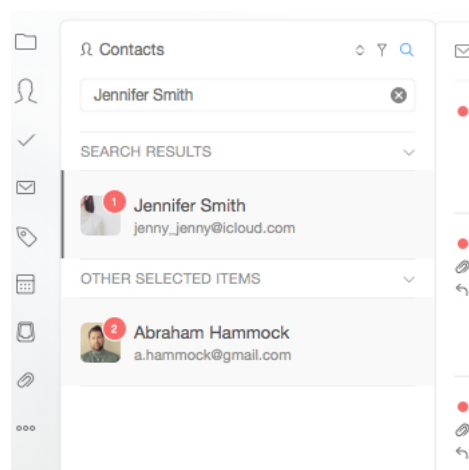


Figure 5.13: Search of a contact followed by a selection of the same.

“Switch view” This was the most critical task since almost every user had issues trying to solve it. Most of them did not finished the task by themselves. For the users the simplest way was to click on a conversation to read the messages, however as they understood this concept they knew that one click selects an item so they supposed double click would be the interaction to switch for the reading view. None of the users expected to switch the view on the top tool bar shown in Figure 5.14. They mentioned the icons were not perceptible, plus one of them said he never thought to use that buttons because as they are the same as the finder application he expected to see the same behavior.

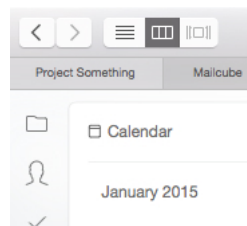


Figure 5.14: Top tool bar with navigation buttons.

8

“Switch context” The users felt at ease while performing this task. All of them correlated the icon of the combo box to notifications, shown in Figure 5.15, and one of the users mentioned the position of the combo box as an element which supported the task.

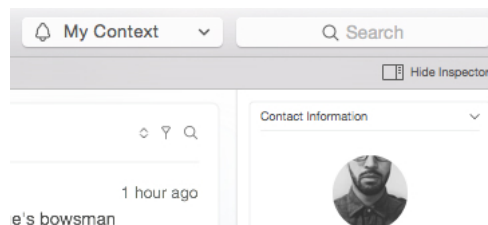


Figure 5.15: Position of the context combo box.

As said before the volunteers answered a questionnaire before and after the usability test. Both the pre and post test questionnaires used a Likert scale with five levels and they had three Likert items and one question in common.

The answers to these statements are compared to understand the impression the product left on users and if after the first touch with the interface their opinions remained the same. Table 5.3 (p. 43) displays the results from the pre-test and post-test questionnaires.

18

C1 The interface seems easy to use User V2 agreed completely that the interface seemed easy to use and once he tried it out his impression changed to neutral. User V1 remained neutral but after testing the interface positively changed his mind. The remaining

	C1		C2		C3		C4	
	(A)	(B)	(A)	(B)	(A)	(B)	(A)	(B)
V1	3	4	5	5	2	1	Y	Y
V2	5	3	5	4	2	3	Y	Y
V3	3	3	4	5	1	2	Y	Y
V4	4	4	4	5	3	2	Y	Y
V5	4	4	4	3	2	4	Y	Y

Table 5.3: Summary of the questionnaires' results by each volunteer (V). The questionnaire uses a Likert scale with five levels with the next format: (1) strongly disagree, (2) disagree, (3) neutral, (4) agree, (5) strongly agree. One of the items is a question with a yes (Y) or no (N) answer. For each question (C) are displayed the results of both questionnaires: (A) pre-test questionnaire, (B) post-test questionnaire.

users maintained their impression of the interface with positive values. Therefore it is possible to say that the interface is not difficult to use and appears it.

C2 The terminology seems clear The results of this statement have been positive since mostly users agreed or strongly agreed with the clarity of the terminology. V5 user agreed initially with the statement but after the test he changed his impression slightly for worse.

C3 This interface is similar to the one you use Most users think that the interface is different from that they are accustomed. No user has maintained his impression. User V5 found the interface different but after using it he thought it had similarities to the one currently used.

C4 Are you willing to try out this product? All the users are willing to use mailcube product even with its differences. Even though their impression has not always changed for the better they still want to use the product after finishing the test.

5.4 Outcome

The results obtained in ethnographic research were enough to create two user profiles used by the design team to continue designing the interface. From this analysis it was also defined research questions which were answered with the results of the following studies.

The interface evaluation applying the heuristic evaluation identified usability issues in all areas of the interface. The most serious problems were located in the source list, in the tool bar and somewhere in faces' view. These problems have all been fixed before moving to the next study to focus the following study on possible new usability issues.

Usability testing, through thinking aloud, identified more usability issues connected
2 with the interaction of the interface and the new concept of email. Only tasks related
with innovative features showed some difficulty. All common email tasks were executed
4 perfectly.

It was expected to found several usability issues since the interface was not evaluated
6 once before this research. These studies diagnosed and fixed many issues, so the overall
assessment is positive.

Chapter 6

Conclusions

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6	6.2 Future Work	46

10 Within this dissertation were implemented two usability engineering methods on mailcube client during the software development.

12 During these studies participated sixteen people in total, from specialists in human-computer interaction to end user representatives.

14 Through heuristic evaluation were detected issues with high granularity related to the usability of the interface. In this evaluation were used experts with knowledge on the behavior of power users which identified issues unique to this kind of user.

16 Usability testing was performed using volunteers who represented power users of email. It disclosed some usability problems, keeping the product unstable for use, and the means to solve it.

20 Research questions defined in the initial state of this work have been fully answered and the objectives were fulfilled.

22 The design of mailcube is not yet finished, but is already in its final phase. The platform is already a minimum viable product (MVP) version it already has implemented the revised design taking into account the results of usability studies.

6.1 Usability

26 Overall, the usability quality of the interface was satisfactory. Even though the interface had usability issues, it was noted that the design team carefully designed an interface to meet the needs of its users despite having gathered little information about power users.

Some interface features pointed out usability issues with different nature, fixed in following iterations.

The heuristic evaluation disclosed problems related to mismatch of some element, to the user memory overhead and to unnecessary or rarely used information display.

Usability testing using the thinking aloud method revealed that users felt a little insecure with the new concept of email browse and navigation presented by mailcube. Still it was revealed that the application interface is appealing to the eyes of those users, although considered different from the services they currently use.

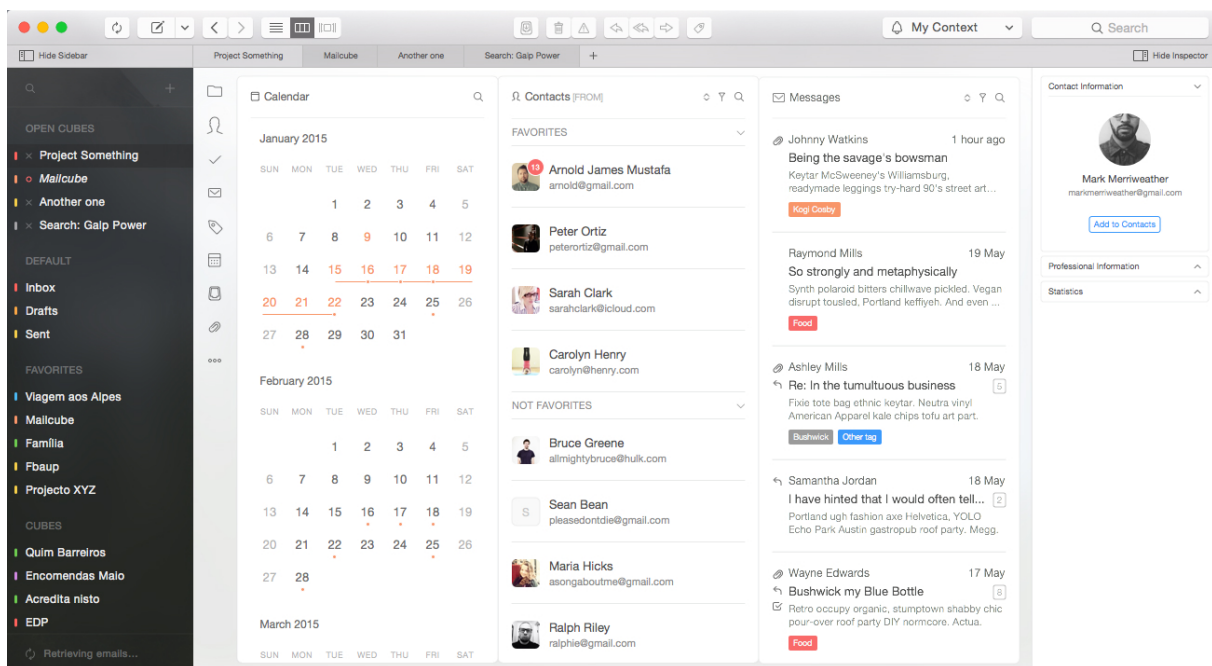


Figure 6.1: Interface with all the corrections resulted from the usability studies.

6.2 Future Work

The application design may undergo some changes since it was not finished. It might be added new elements on the interface. When the design is changed new reviews should be conducted to ensure that the interface is amended before being implemented.

At a later stage of the product, summative studies are needed to measure the user experience. Through this study, quantitative data would be collected to measure the performance of users during the execution of their tasks.

The first product version launched on the market may include auto data analysis collected at the same time the user interacts with the application. This is a way to get user feedback more directly and with less effort.

Nomenclature

- 2 **HCI** Acronym for **H**uman-**C**omputer **I**nteraction.
- MVP** Acronym for **M**inimum **V**iable **P**roduct.
- 4 **UDC** Acronym for **U**ser-**C**entered **D**esign.
- UX** Acronym for **U**ser **E**xperience.

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Appendices

Appendix A

² Ethnographic Research Report

Ethnographic Research

Bárbara Correia

March 2015

Abstract

This report describes an ethnographic research which was performed resorting to observation and questionnaires. The research focus on power users of email client and it was completed under the dissertation “Usability Studies for Power Users: applied for email desktop client”.

1 Objectives

The target of this case study are the power users therefore the interest in knowing their background and common activities arises. This knowledge is valuable to design an interface which meets the needs and activities of the end users. In addition, focusing the design on the end users secures an interface with less imperfections.

The results from this research will be used by the designers team to draw an interface more suitable to users. The outcome of this research is critical to further studies such as heuristic evaluation and usability testing.

2 Method

This research resorts to direct observation of power users to collect more concrete information about their background and satisfaction with their actual services.

The observation method had the collaboration of three power users with different background. All of them use the email as an indispensable tool for their work.

3 Results

The collected data needs to be processed before publishing the final results. The data was filtered and the outcome displayed in the form of diagrams.

The first step is to identify behavioral variables [1]. These are distinct aspects of behavior observed during the sessions, some are hypothesis identified before the study as being part of the persona [2]. It was recognized a total of eighteen behavior variables.

The next step is to map each subject to all the variables, as seen in Figure 1 (p. 5). The relevant information here is the clusters of subjects in each x-axis and the relation between the users. This clusters are used to identify behavioral patterns.

A behavioral pattern comprise six to eight behavioral variables with the same cluster of subjects. From this analysis resulted two behavioral patterns: the first one with eight variables and subjects 2-3, the second one with six variables and subjects 1-2-3.

This study has two personas, described in Table 1 and Table 2 (p. 3), which correspond to the amount of patterns. The patterns are used to synthesize the characteristics of the subjects and define the goals for each persona.

The persona Edna Jones is of primary type which means the interface must satisfy his goals and needs completely. Ian Ackerman is a secondary persona so her goal and needs are mostly met by focusing on the primary persona. Still she has her own goals and needs that, despite not being the priority, may be achieved adding slight changes to the interface if they do not affect the experience of primary person.

NAME	Ian Ackerman
GOALS	<ul style="list-style-type: none"> - Empty inbox - Finish all the tasks - Respond to messages requiring an answer - Process messages quickly - Remain organized - Remain productive - Add tasks to agenda
CHARACTERISTICS	He spends many time consulting email since it is an indispensable tool to do his work. The management of the inbox, like removing or archiving messages, is done manually. The message search is done using mostly the archive, the global search is used only in case the archive search fails. In the middle of his work he needs to answer the phone and talk with other people. The interaction with the email client is done mostly using the mouse.

Table 1: Secondary persona which represents the target of the interface.

4 Conclusions

Direct observation provides the opportunity to see how representative users interact with an interface, most of the collected information is relative to unexpected actions [3]. It was expected to have at least two personas and the results were against expectations.

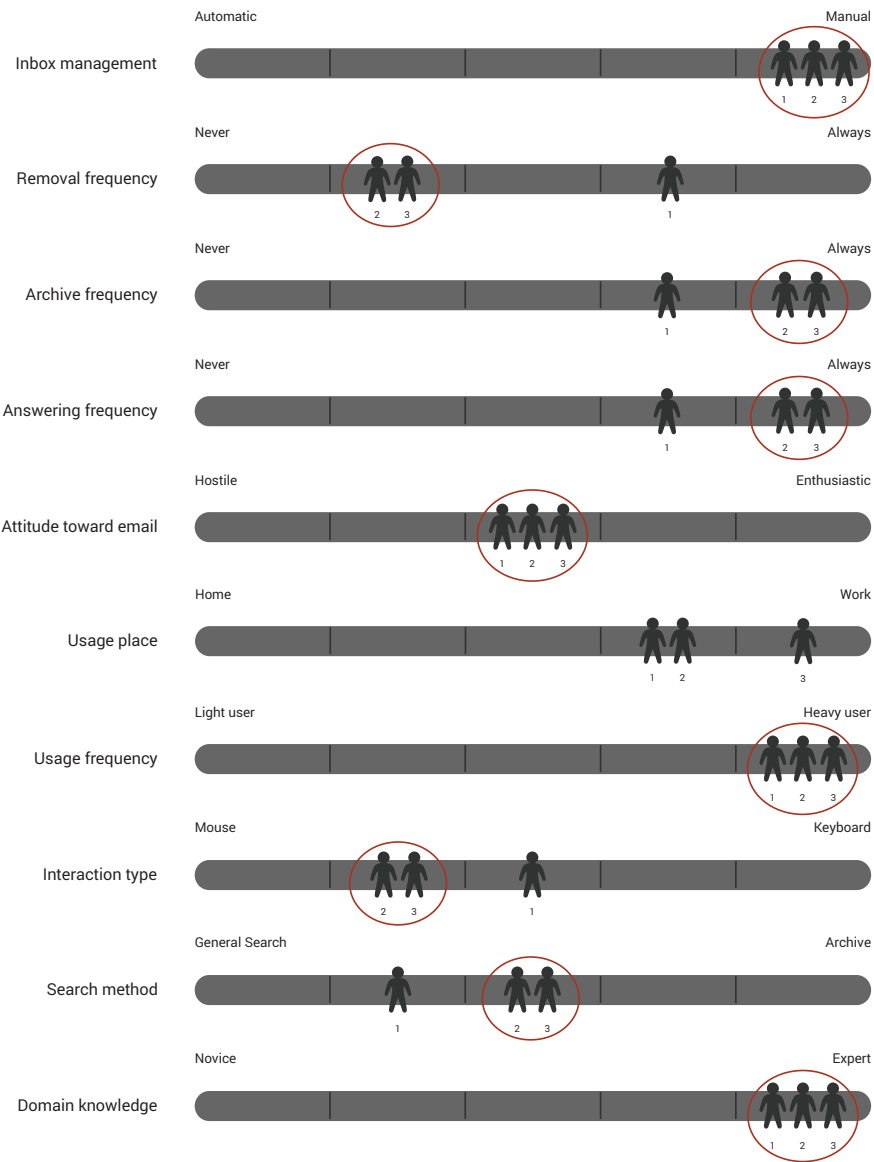
The resulted personas represent the users who must be considered when decisions are taken regarding the design.

NAME	Edna Jones
GOALS	<ul style="list-style-type: none"> – Consult email accounts – Do reports – Feel in control – Stay connected – Stay focused
CHARACTERISTICS	As a user who receives too many messages the notification system is turned off not to disturb. Very often she refreshes the email account to make sure new messages arrived. During a video call she consults the email on the smartphone not to miss any information.

Table 2: Primary persona which have extra needs which might be taken into account.

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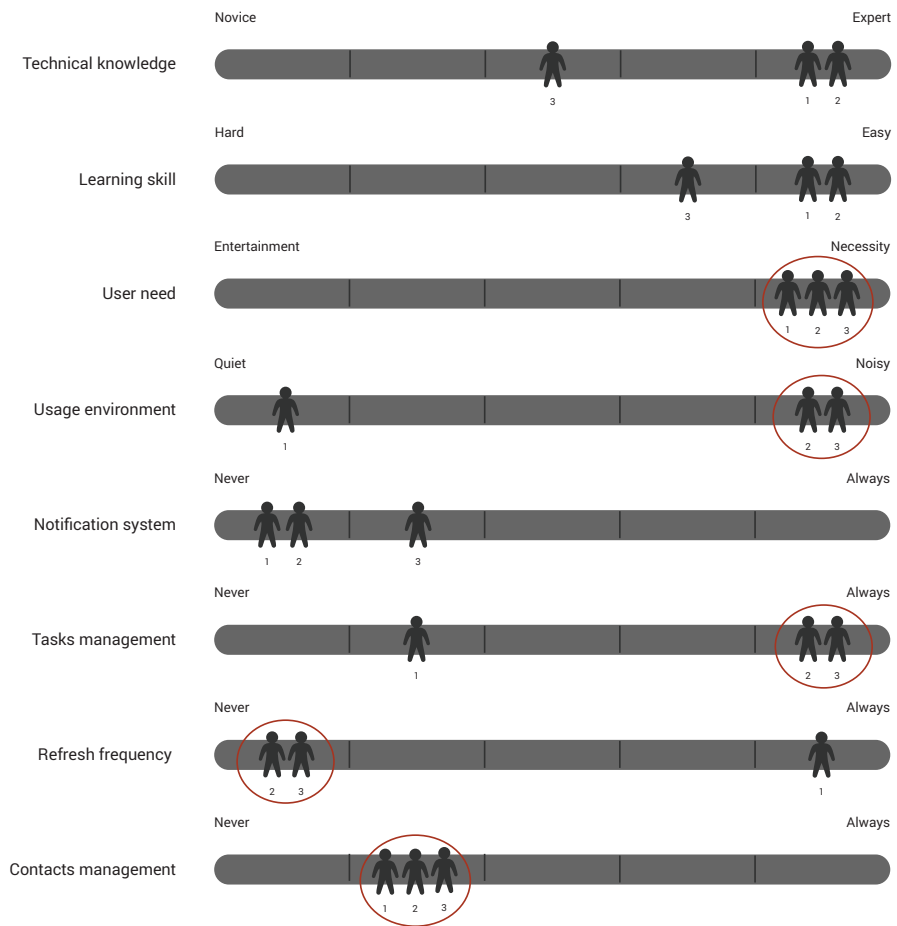


Figure 1: Map of observed subjects to behavioral variables. The clusters of subjects marked with a circle match two behavioral patterns.

Appendix B

2 Heuristic Evaluation Script

Heuristic Evaluation

Bárbara Correia

April 2015

1 Objectives

The main objective of this method is the interface evaluation of mailcube email client relying on the 10 heuristics of Nielsen.

In addition to human computer interaction (HCI) experts, it is expected the collaboration of email power users to compare both results. Since power users have singular needs this arrangement ensures the results reliability.

The collected data from the evaluation describes usability issues which will be shared with the designers team to improve the interface revising the design.

2 Method

The heuristic evaluation is an inspection method used to pinpoint usability issues on an interface. This inspection is carried on by usability experts who compare the interface against defined usability principles.

This method had the collaboration of ten volunteers divided into two iterations. The first iteration was held with five expert students who have had HCI course which ensures that they conducted an heuristic evaluation at least once. The volunteers from the second iteration were all representative email power users who played the role of experts.

After each session, all the exposed defects were registered on a table along with a feasible solution, an heuristic associated, a severity rate and the frequency of detection.

3 Nielsen Heuristics (H)

As said before, the Nielsen heuristics will be used in this evaluation. The following list describes the ten heuristics [2, 3]:

1. **Visibility of system status.** The system keeps users informed about what is going on, through appropriate feedback.
2. **Match between system and the real world.** The system speaks the users' language using concepts familiar to the user.
3. **User control and freedom.** The system supports undo and redo in case users want to leave an unwanted state.

4. **Consistency and standards.** The system is very clear and the users do not have to wonder whether different words, situations, or actions mean the same thing. The system follows platform conventions.
5. **Error prevention.** The system has a design which prevents problems from occurring in the first place.
6. **Recognition rather than recall.** Instructions for use of the system are visible or easily retrievable whenever appropriate so that users do not have to remember information from one part of the dialogue to another.
7. **Flexibility and efficiency of use.** The system supports accelerators to speed up the interaction for the expert user allowing users to tailor frequent actions.
8. **Aesthetic and minimalist design.** Dialogues do not contain information which is irrelevant or rarely needed.
9. **Help users recognize, diagnose, and recover from errors.** Error messages are expressed in plain language, precisely indicate the problem, and constructively suggest a solution.
10. **Help and documentation.** The system has documentation easy to search, not too large, which lists concrete steps to be carried out.

4 Severity Ratings (SR)

Sometimes it is not possible to solve every usability issue discovered in the interface, therefore it is given a rating for each usability issue according to its impact on user performance. Following is the scale of rates and its meaning [1]:

- 1 – cosmetic problem only: fixed if there is extra time on project.
- 2 – minor usability problem: fixing this should be given low priority.
- 3 – major usability problem: important to fix, give this high priority.

References

- [1] Jakob Nielsen, *Chapter 4 – the usability engineering lifecycle*, Usability Engineering, vol. 44, 1993, pp. 71 – 114. [2](#)
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- [3] Jakob Nielsen, *10 usability heuristics for user interface design*, January 1995. [1](#)

Appendix C

2 Heuristic Evaluation Report

Heuristic Evaluation

Bárbara Correia

April 2015

Abstract

This report describes the heuristic evaluation method applied to the interface of mailcube. The research focus on power users of email client and it was completed under the dissertation “Usability Studies for Power Users: applied for email desktop client”.

1 Objectives

The main objective of this method is the interface evaluation of mailcube email client relying on the 10 heuristics of Nielsen.

In addition to human computer interaction (HCI) experts, it is expected the collaboration of email power users to compare both results. Since power users have singular needs this arrangement ensures the results reliability.

The collected data from the evaluation describes usability issues which will be shared with the designers team to improve the interface revising the design.

2 Method

The heuristic evaluation is an inspection method used to pinpoint usability issues on an interface. This inspection is carried on by usability experts who compare the interface against defined usability principles [1].

This method had the collaboration of ten volunteers divided into two iterations. The first iteration was held with five expert students who have had HCI course which ensures that they conducted an heuristic evaluation at least once. The volunteers from the second iteration were all representative email power users who played the role of experts.

After each session, all the exposed defects were registered on a table along with a feasible solution, an heuristic associated, a severity rate and the frequency of detection.

2.1 Nielsen Heuristics

Following is the list with the ten principles of Nielsen [4, 5]:

1. **Visibility of system status.** The system keeps users informed about what is going on, through appropriate feedback.
2. **Match between system and the real world.** The system speaks the users' language using concepts familiar to the user.

3. **User control and freedom.** The system supports undo and redo in case users want to leave an unwanted state.
4. **Consistency and standards.** The system is very clear and the users do not have to wonder whether different words, situations, or actions mean the same thing. The system follows platform conventions.
5. **Error prevention.** The system has a design which prevents problems from occurring in the first place.
6. **Recognition rather than recall.** Instructions for use of the system are visible or easily retrievable whenever appropriate so that users do not have to remember information from one part of the dialog to another.
7. **Flexibility and efficiency of use.** The system supports accelerators to speed up the interaction for the expert user allowing users to tailor frequent actions.
8. **Aesthetic and minimalist design.** Dialogs do not contain information which is irrelevant or rarely needed.
9. **Help users recognize, diagnose, and recover from errors.** Error messages are expressed in plain language, precisely indicate the problem, and constructively suggest a solution.
10. **Help and documentation.** The system has documentation easy to search, not too large, which lists concrete steps to be carried out.

2.2 Severity Ratings

Sometimes it is not possible to solve every usability issue discovered in the interface, therefore it is given a rating for each usability issue according to its impact on user performance. Following is the scale of rates and its meaning [3]:

- 1 – cosmetic problem only: fixed if there is extra time on project.
- 2 – minor usability problem: fixing this should be given low priority.
- 3 – major usability problem: important to fix, give this high priority.

3 Results

The usability issues were registered in a table with the succeeding format, where H means heuristic, SR means severity rate and F means frequency of detection:

PROBLEM	SOLUTION	H	SR	F

Figure 1 (p. 3) illustrates individual interface zones referred on the list of issues. All the uncovered usability issues are displayed in Table 1 (p. 7).

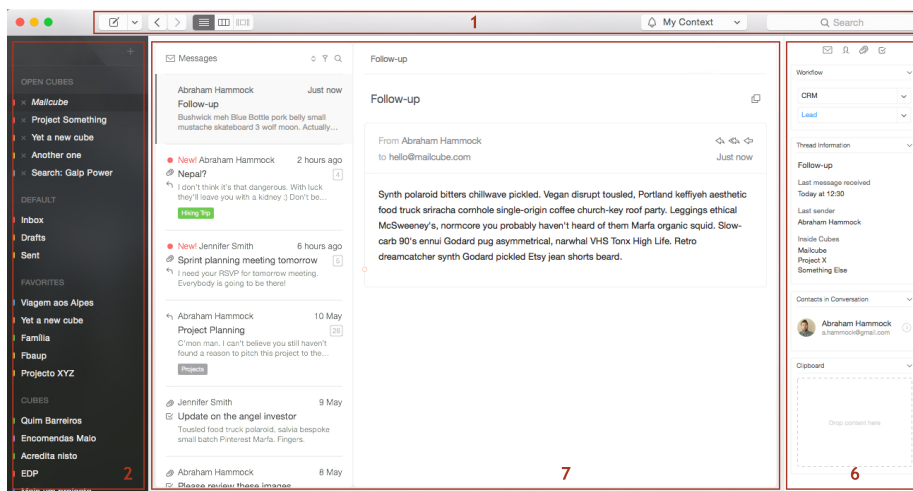
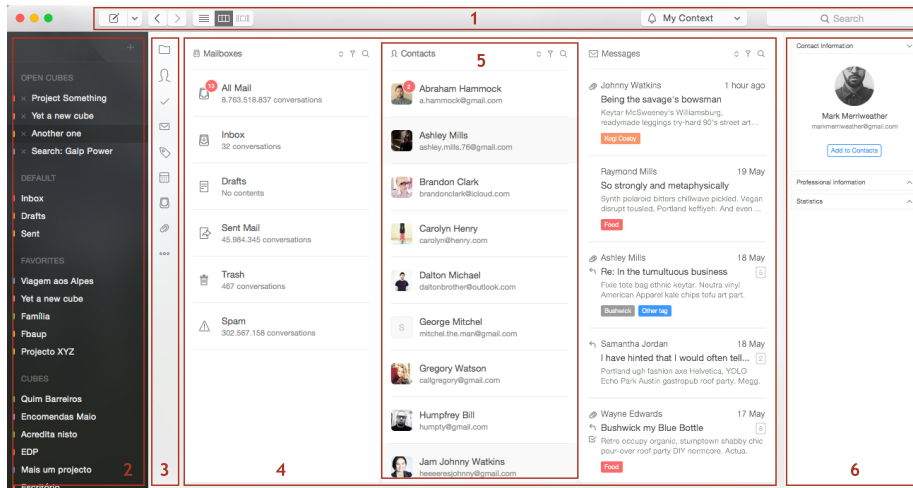


Figure 1: Mailcube interface with marked individual zones: (1) tool bar, (2) source list, (3) side tool bar, (4) faces' view, (5) face / column, (6) inspector, (7) reading view.

PROBLEM	H	SR	F	SOLUTION
The sort icon in the columns is not intuitive.	2	1	6	Replace the icon.
The folder button and the dots button positioned at the side toolbar are incoherent.	8	2	7	Remove buttons.
The task button positioned at the side toolbar is inconspicuous.	2	1	3	Add border around the check like a checkbox.
The total number of conversations and the number of unread messages at the contacts column are confusing together.	4,8	2	4	Exchange the total number of conversations for the email address of the contact.
There are no buttons of remove and spam in a conversation.	3	2	6	Add buttons at the top of the thread.
The search feature at the sidebar gives the impression that clicking beside the icon activates the text box because there is a large white space between this icon and the add cube icon.	1	1	3	Make the white space interactive to open a text box when clicked.
The definition button of the side tool bar is unnoticed and unnecessary.	4	2	2	Remove this button.
The user does not realize there are hierarchical levels in the labels column.	8	1	2	Slightly increase the indentation of each level.
Despite being in the reading view, the user must switch views, and perhaps edit the cube, to add a task related to the conversation that was being read.	4,7	2	5	The inspector should allow the addition of tasks to conversations while on reading view.

Although there is the possibility of associating labels to a conversation, the interface does not have any means to add labels.	4,7	2	2	The inspector should allow the addition of labels to each conversation.
While reading a conversation, there is no way to expand the messages all at once.	7	2	2	Add a button to the reading view to expand all the messages or a set of selected messages.
The send type buttons at the right top of an expanded message are very similar, leading the user to make a mistake.	1	1	3	When hovering these buttons it should appear their description.
The arrangement of items in a column does not allow the users to choose the ordination.	3,4,7	2	3	Include another combo box to choose the ordination.
After arranging manually column items there is no visual feedback to distinguish them from the ones staying in the same position.	1,6	2	4	Mark the arranged items.
In the faces' view, it will not be possible to visualize all of the faces if a cube have more than tree columns.	3,7	1	3	Allow the interface to collapse the columns at the user will.
The interface prevents users from refreshing their inbox.	3,4	2	5	Add refresh button in the tool bar.
Adding a task on its column by dropping there a message always places the task at the bottom of the list.	3	1	1	Allow the list arrangement while dropping the message.
The cubes on the sidebar always have an associated color, as all of them are marked the perception of importance is lost.	8	2	5	The user who adds a cube decides if it has or has not an associated color and therefore if the cube is important or not.

When a task is out of time it is missing visual information to warn the user and there is no behavior to indicate that this task has priority over the others.	1	3	2	The task list must be automatically arranged to put the delayed tasks at the top and highlight them to get the user attention.
It is not possible to see the contacts which are grouped together without the inspector.	1	1	2	Allow item expansion to see the grouped contacts.
To check trash or spam the user need to open a cube and browse the messages.	3,7	1	1	Add trash and spam to the default cubes.
When using the reading view, the user must switch views to scan the cube browsing.	1,6	2	2	Include the browsing path at the bottom of the reading view.
A checked task keeps its list position disturbing the view of the tasks that matter.	8	2	2	A checked task must be hidden in a collapsed list at the bottom of the column.
The trash icon that appears when a task is marked as done is not consistent with the interface, the user do not expect this to happen.	4,8	2	2	Remove icon and add the remove action to contextual menu.
Column navigation through shortcuts is confusing since there is no distinction between navigation and selection.	7	1	1	Change the selection color to be more dark and the navigation color must be lighter than the first one.
The “Open Cubes” section is a bit complex in this context.	2,4,5	3	5	Support this section with a navigation bar of tabs.
The unsaved cubes in the “Open Cubes” section are slightly enhanced.	1,5	3	3	Change cross icon to circle icon when the cube is not saved.

Within the cubes sidebar, the cubes which have unread messages are mixed up along each section with the ones which have none.	7	2	3	Allow sort of cubes by unread messages in the sidebar.
Adding two columns of the same type next to each other results on two columns with the same selection.	1	1	2	Prevent columns of the same type to be put next to each other displaying visual feedback to the user.
The name of the column "Messages" is inaccurate since each column item consists of a set of messages.	2	1	2	Change the column name to "Conversations".
When searching for a column item, the list of items disappears to show the outcome.	1,7	2	2	Add section in the column with a list of the selected items not affected by the search.
There is no way to make a group without dragging an item over other.	3,7	2	3	Include option in contextual menu to make group with selected items.
There is no possibility to clean the filters applied to a column.	3	2	2	Include an option to reset the filters in the column.
The interface has no way to remove a label associated with a conversation.	3	2	2	Hovering on label add the remove button.
It was not possible to hide the inspector when it was unnecessary.	8	2	2	Add button on top of the face's view to enable or disable the inspector at will.
The compose button is misplaced and it goes unnoticed.	3	2	5	Place the compose on top of the source list.

Table 1: Usability issues discovered during the interface evaluation.

4 Conclusions

The usability evaluation using the 10 heuristics of Nielsen returned a total of 36 usability issues. The results are distributed by severity rating in the following table.

SEVERITY RATE	NUMBER OF ISSUES
1	12
2	21
3	3
	36

Table 2: Total of usability issues by severity rates.

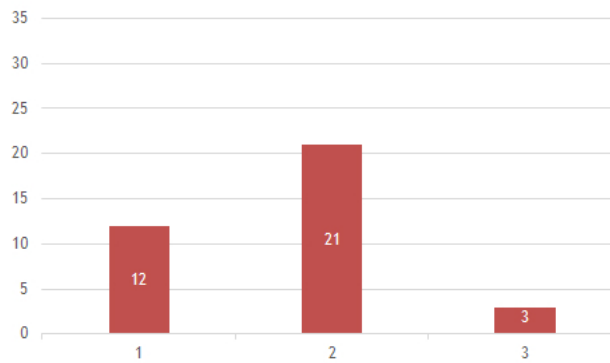


Figure 2: Graphical results of the amount of usability issues in relation to the severity rates: (1) cosmetic problem, (2) minor problem (3) major problem.

As expected of this kind of method, the amount of major issues is smaller than minor issues [2], yet they are the first to be rectified since these have more probability for confusing the user or making the user use the system in the wrong way.

The major issues were strongly related with the new idea of email organization, visualization and browsing. These features comprise interactions thought from scratch, hence it is reasonable to have had such issues. An example of such is that the email reading interface hardly presented any issues since it is similar to the existing ones.

The minor issues referred mostly to slight repairs to improve the efficiency of use and the consistency of the interface such as switching frequent actions from the contextual menu directly to the interface and ensure common actions are executed in similar ways.

Both major and minor issues were fixed on the design at the end of this method. The remaining issues were left to repair in further version since they

do not disturb the users. Further evaluations are made with a design without so many usability issues.

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- [2] Jakob Nielsen, *Finding usability problems through heuristic evaluation*, Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (New York, NY, USA), CHI '92, ACM, 1992, pp. 373–380. [8](#)
- [3] ———, *Chapter 4 – the usability engineering lifecycle*, Usability Engineering, vol. 44, 1993, pp. 71 – 114. [2](#)
- [4] ———, *Chapter 5 – usability heuristics*, Usability Engineering, vol. 44, 1993, pp. 115 – 163. [1](#)
- [5] Jakob Nielsen, *10 usability heuristics for user interface design*, January 1995. [1](#)

Appendix D

² Usability Testing Script

Usability Testing

Bárbara Correia

May 2015

Abstract

This report describes the usability testing method applied to the interface of mailcube. The research focus on power users of email client and it was completed under the dissertation “Usability Studies for Power Users: applied for email desktop client”.

1 Objectives

The main objective of this method is the interface evaluation of mailcube email client relying on real users who give direct information about their interaction with the system.

The data is collected performing measurements to the interface using usability metrics which grant the quantification of the user experience. It is still possible to collect a list of usability issues from the observation of the user executing some tasks.

The results from the measurements will be shared with the designers team, as well as the exposed usability issues, who are responsible for reviewing and correcting the interface at the end of each iteration.

2 Method

Usability testing is an engineering method used to measure the user experience through a reliable list of measurements. This method, unlike inspection methods, resort to users who match the target population of the product [1].

The output of this test is quantitative data collected from the usability metrics, in spite of being possible to collect qualitative data by observing the interaction of users with the interface.

This method had the collaboration of fifteen volunteers divided into three iterations, five users per iteration. At the end of each iteration all the sessions were analyzed and the results were used to upgrade the design ensuring the design evolution throughout the process.

3 Task Scenario

You are at work and recently you were allocated to a new project, the mailcube project, so you will be receiving a lot of messages related with it. You feel the need to arrange this messages in a way that ease the access to them. You know

that Abraham Hammock and Jennifer Smith are the ones who work with you on this project, plus you just want to see the messages received from them. You are having trouble finding Jennifer Smith in the middle of many contacts so you find a way to get it quickly.

Now that you have your inbox arranged, you want to read the two most recent messages from mailcube.

Meanwhile, before going home, you have an appointed meeting and you do not want to be bothered by notifications and you just want to have access only to fundamental cubes to avoid distractions.

References

- [1] Jeff Rubin and Dana Chisnell, *Handbook of usability testing*, 2nd ed., Addison-Wesley Professional, 2008.

