Visibility Aspects Importance of User Interface Reception in Cloud Computing Applications with Increased Automation

Denis Haxhixhemajli

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Contact Information:
Author:
Denis Haxhixhemajli
Address: Rruga “UÇK” BII Nr:12, Pristina 10000, Republic of Kosovo
E-mail: redhaxhi@hotmail.com

University advisor: Hans Kyhlbäck
School of Computing
Blekinge Institute of Technology

School of Computing
Blekinge Institute of Technology
SE-371 41 Karlskrona
Sweden

Internet : www.bth.se/com
Phone   : + 46 455 38 50 00
Fax      : + 46 455 38 50 57
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ABSTRACT

Visibility aspects of User Interfaces are important; they deal with the crucial phase of human-computer interaction. They allow users to perform and at the same time hide the complexity of the system. Acceptance of new systems depends on how visibility aspects of the User Interfaces are presented. Human eyes make the first contact with the appearance of any system, thus it generates the very beginning of the human – application interaction. In this study it is enforced that visibility aspects are essential in application development. Furthermore, it is stressed that with practice of automation, habitual and functional visibility fades and users lose control. Users accept visibility loss only at certain points where it does not impact their skillset and understanding of an application. However, they prefer control over visibility aspects and automation to strengthen the reception of the User Interface. The environments used in this study are Google Docs, Dropbox and cloudHQ with a case study of collaboration involving five users.

Keywords: Visibility UI, Cloud Computing, Interface Design, Collaborative systems, automation, automaticity, HCI.
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INTRODUCTION

The introduction contains the following sections presented in sequential order:

1.1- Introduction, 1.2- Background, 1.3- Problem description, 1.4- Aims and objectives
1.1 - Introduction

I will start my journey with this paper to find out exactly what the title is indicating. That is the “Visibility aspects importance of User Interface reception in Cloud computing applications with increased automation”. Every User Interface (UI) supports visibility aspects such as (Colours, Navigation, Description, Habits, Features and Functions); each aspect is closely bound together and are important for application usability as this report will show in next chapters.

In this project, besides that Cloud Computing (CC) applications are increasingly automated to make things easier, this study also wants to see the impact it causes to users when collaborating on such UI after automation is applied, specifically in terms of functionality.

The paper opens up with Background (section 1.2) where it describes the changes application design is experiencing. It introduces the visibility aspects that will be evaluated and their importance to UI acceptance. Additionally, automation is described as a way to enhance collaboration thus indicating loss of control by utilizing it.

Then we move ahead to defining the problem (section 1.3) that is being studied. That correlates with a call for giving more responsibilities to users so that they can shape their environment by manipulating with the visibility aspects and automation. Once there is an understanding of what is the problem scope, the paper continues by posing the research questions for this thesis (section 1.4).

The research questions will assist us on finding out if the problem is true and what options and recommendations are available for it. Moreover the recommendations (options) are checked if they are already applied or should be applied. It is expected that they are applied in current and future UI designs for CC applications to increase usage reception (usability), therefore positively sensibilizing problem scope.

Choosing the appropriate research methodology and a particular environment to tackle (test) the research questions is important. Chapter II deals with research methodology and dictates the flow of this research. In Section 2.1 - 2.3 within chapter II, the report goes in more details how the research will be conducted from start to end. What techniques of data collection are used, why and for how long.

Chapter III explains and expands further on the CC environments, the collaborative flow being tested and the group of users present. There the report will overall show what will be the impact during collaboration with and without automation to some extent. Chapter IV provides the results based on strategies set by chapter II for data collection and the scenario set by chapter III.

All the results in chapter IV are divided into smaller sections covering each visibility aspect studied in more depth with literature review. Those sections will have entries from data collection techniques assisted by corresponding sources which don’t or do support, explain and suggest ways on how to overcome obstacles which have been found. The bulk data which is gathered as per chapter II will be attached in Appendix at the end of this paper; it can be used to see the output of the data collection techniques after analysis. Finalizing the paper will be done on chapter V; answering the research questions and talking about future work.
1.2 - Background

Collaborating in today’s dynamic world without the use of technology is unthinkable, so this makes it as a fundamental necessity. It is wonderful that we are finally able to express more and more of our thoughts to the world with such a fast speed. However, it is very expensive to maintain systems [58], counting frequency of changes appearing on a daily basis. This is especially hard for small organizations and individual users which depend on such collaborations.

To overcome those expenses CC [1, 2, 58] is utilized; so that users do what they do best, and that is collaborate or work. CC has revolutionized the industry by making a shift on how the application is developed, designed [59, 60] and also how the application is delivered [61]. Now we have collaborative applications such as Google Docs and Dropbox which are designed to accommodate all kinds of people. Yet, that does not mean that all users are accommodating.

Basically, future designs would be similar so that all participants can collaborate using them. Having mentioned the shift (designing, developing and deploying) collaborative systems are experiencing (moving to CC), i need to emphasize the importance of visibility aspects of these systems, particularly on the UI.

Visibility aspects importance has been mentioned in several studies [8, 9], actually it presents one of the most important directions in UI design. Visibility in essence has to do with the external representation (appearance) of functions in an application. Moreover, it makes it possible for users to interact easier with the application and allows better understanding of the application; that is when the task is finished and when a new one started (feedbacks). It all has to be presented somehow to be understood (visible).

Everything which we envision [9] in an application (see figure 1.0) such as Navigation, Colours, Features, Description and Habits have to do with visibility aspects directly or indirectly. The visibility benefit has to provide enough information to the end-user so that a task could be completed easily without the need for addressing built-in help

![Figure 1.0: Visibility aspects observed in this thesis](image)

For a successful UI design, reusing patterns even though users are unique is beneficial [9]. Users altogether perform several tasks - functions in a similar manner; at least they require the results to be same. Users of CC applications are diverse. That means that visibility aspects as per figure 1.0 do not convey the same message to all of them.

To make things less complex from a user – application perspective automation is introduced. This automation is very present in CC and is very beneficial. Especially at times
when it is necessary to collaborate faster or perform at higher speeds, automation is introduced as auto-file saving or auto-revision feature in document processing applications. However, the consequences might be high in terms of hiding visible functions to the end user, and thus removing any “visibility aspects” which they already know. Users should have good visibility of system status similar to airplane indicators in order to understand what is happening also at the same time they should be aware of auto functions so they would understand what is going on. It should be up to the user to have the control of disabling or enabling the automation features [like in auto-pilot or manual-pilot]. Same has to happen with UI of CC applications.

Better said an application needs to allow the user to easily interpret and understand its usage in order for it to be efficient:

> The human mind is exquisitely tailored to make sense of the world. Give it the slightest clue and off it goes, providing explanation, rationalization, understanding … Well-designed objects are easy to interpret and understand. They contain visible clues to their operation. [47:2]

This interpretation and understanding actually happens with the benefits of “visibility aspects” as stated above. The question arises that what if the users already poses interpretation of a similar application before CC application came into the picture. In such cases, per figure 1.0 and as per [9] it is important to capture habitual functionalities of old systems into these new applications when delivered globally via CC. This allows the previously known visible clue [47] to be easily re-used. Re-using is important since it makes the learning process much faster. After all every designer wants his/her UI to be accepted fast and used as much as possible but that’s the difficult part. It is very difficult to please everyone.
1.3 – Problem Description

In order to make an application used and accepted as much as possible it is important to include the users in the design process [62, 63, 64]. Nevertheless, including the users in design process does not guarantee success unless their recommendations are really implemented into the application. A normal process for building a system requires the designer to work closely with all stakeholders, in order to capture the required elements so that the newly designed application does what it is supposed to do for that target group [65]. A problem arises with the extreme processing power of CC, its ability to reach to all users across the world (diversity) and automation.

People are different from computers, and human-human interaction is not necessarily an appropriate model for human operation of computers. Since computers can display information 1,000 times faster than people can enter commands, it seems advantageous to use computer to display large amount of information and allow novice and intermittent users to simply choose among the items [66:294]

Users across the globe are diverse in terms of culture, language and character. They require different information at the same time. Particular information does not have same meaning for all of them. Because of this diversity and reach of CC it is necessary to have different approaches of application design. Especially for the UI, so that it talks easily to this diversity or better said allows the users to dictate the way how they should be approached by the system.

The first principle of human interface design, whether for a doorknob or a computer, is to keep in mind the human being who wants to use it. [67:8]

“… Keeping in mind the human being who wants to use it” [67:8] could be only true for some functions and features, as they are valid for anyone in a specific moment of usage (context), although the aesthetics aren’t. Aesthetics is fundamental, particularly for the applications UI. It is the WYSIWYG (What You See Is What You Get) offer of the application to the end users. If there are misunderstandings at this stage then the application is hard to use.

Designing UI which would get accepted by the end-users is not simple. And this study will show that currently it is impossible to please all people. Even if the design groups would contain graphic designers, psychologist and anthropologist since now we are dealing with user behavior towards the UI of the application [67], it still does not suffice to make everyone happy.

UI is the first thing users see when starting an application, it’s the first impression. If this doesn’t work out then the functions - features of the application become less efficient. To add more complication on the UI reception CC facilities are introducing automation as mentioned in previous section.

In many designs [68, 69, 70], automation is being called quite often to hide the complexity of features and other visibility aspects in the UI. This automation elevates usage of application but it hides the normal interactions users would do with the UI. This might increase invisibility of functions to the end-user, thus increasing the misunderstanding of the application and loss of control.

Users require more control over their environment, the application hosted in the CC facilities can easily facilitate but this is not being done yet. Moreover, CC hosted applications update on monthly basis, before users where able to decide whether to upgrade or not. Now this is not possible (seen in Google Docs [68] – Dropbox [69]) as every single change which is done impacts users. The costs of changes are always high and not all users like them [9]. Changes to the UI appearance should be still left in users control regardless of hardware or software updates. This behavior on future designs for applications hosted in CC should change.
1.4 – Aims and objectives

The aim of this study is to understand the current level of visibility aspects in CC, then if changes on any visibility aspect happen would that cause an important advantage or disadvantage. Moreover, it will try to apprehend that if users would prefer to have control over visibility aspects and automation. Finally, as CC is automating functions, the last aim is to gather information when an automated bridge service (more automation) is added what its impact would be on functional visibility.

• Show if visibility aspects in collaboration systems are implemented at an acceptable level.
• Understand the need for more user control on visibility aspect in UI.
• Automation and impacts to functional visibility.

Leaning on the above aims and objective, the research questions have been formulated:

1) **Would changes on already known visibility aspects of UI in an application cause any important advantage or dis-advantage?**

2) **Is control over automation or visibility aspects important for users who are using User interfaces of Cloud Hosted Applications?**

3) **Will an automated bridge service between Google Docs and Dropbox decrease functional visibility for users?**

This report will answer those questions as per selected road-map in Chapter II.
CHAPTER II

Research Methodology

The Research Methodology contains the following sections presented in sequential order:

2.1 - Research Method, 2.2 - Data Collection, 2.3 - Data analysis, 2.4 - Literature review
2.1 – Research Method

This project calls for using a qualitative research methodology out of the quantitative and qualitative variance. According to [10], quantitative research is empirical research where the data is in the form of numbers and qualitative research in the other hand is empirical research where the data is not in the form of numbers.

I have chosen qualitative methodology, there is a need for more quality data as it is required to participate (to see, to listen, to discuss and to do) in order to better understand the real needs. The numerical form of data collection would not provide quality insight. In this report there is also numerical data which can’t be considered as part of quantitative approach due to having low number of sampling. Numerical data is gathered from a small survey which is acting as exploratory pre-interview questions. When an interesting amount (percentage) of numerical data (in our case preference) has been identified it triggers the activity to elaborate it further by the means of qualitative research (interviews).

Choosing the right research method is essential. Moreover, it sets up the complete journey and impacts how the results are understood and presented. That is also true on choosing appropriate environments (studied cases) for the selected method to be applied and more importantly the users which take part on those environments. For this thesis there is a particular scenario setup [see Chapter III] to assist on answering the raised research questions. The scenario with its components will contain all the visibility aspects of UIs mentioned in Chapter I and automation features in CC applications. It also provides space for understanding how users interact with their respective UIs. From previous chapters there was indication that CC application are built to support all users as per that this thesis has chosen IT professionals to test the environment. Reason for this is that they represent a specific target group where their higher demands should be/are fulfilled by current CC UI approach. It is the right scenario to test the research questions because:

1. The collaborative systems in the scenario are designed to accommodate all users.
2. Users present in the scenario are competent IT users. (specific target group)
3. The frequent updates these collaborative systems make.
4. There is increased automation with the introduction of another layer of service on top of existing ones.
5. The ability to capture preferences about the visibility aspects.

The overall process of this research will be conducted in 6 steps as proposed in [11].

Figure 2.0: Research Process Flow
The six steps of this flow are:

1) Identifying the topic.
2) Defining research questions.
3) Determining forms of data collection.
4) Collecting data.
5) Analyzing collected data.
6) Write the paper (results).

Step 1 and 2 are presented in the introduction chapter I. On the section (2.2 and 2.3) in this chapter steps 3 and 4 will be discussed further. Finally steps 5 - 6 are in the next chapters as they represent the overall paper results.
2.2 – Data Collection

As specified in the previous section, this report will be capturing qualitative data. This study concentrates on the visibility aspects of UIs and automation features in CC applications. In addition, data will be acquired on how users interact with their respective UIs. The data collection will utilize 3 techniques [13] of collection:

1. Participation (Qualitative data) - Participation data collections are done for 4 weeks. Involving five users as specified in chapter III.
2. Survey (Exploratory – pre-interview data) - Survey is done after 4 weeks of participation. In the survey five users which were in participation take part.
3. Interview (Qualitative data) – Interviews will be done as the last steps to provide better insight into the topic and expand on the participation and survey results.

To fully understand where the data is collected and under which circumstances (see chapter III). The collection techniques can be seen in more details in figure 2.1. That is a detailed version of figure 2.0 (Section 2.1).

Figure 2.1: Determining Data Collection Sources

In order to elaborate further on the components in figure 2.1, will starts by explaining activities under each data collection techniques:

2.2.1) Participation – Observation

The first qualitative approach will be Participation and that is participation in a tight connection with observation and listening. While the scenario of collaboration is ongoing i will observe users interactions with UIs of each environment. Furthermore, the introduction of cloudHQ is presented to the environment at the later stages (to understand better what cloudHQ is and how it works refer to chapter III). Observing and listening to users reactions would be important for capturing quality data while they are collaborating on both CC
applications. Important to note is that being able to actively take part in this scenario would provide better insight, awareness and introspection [14]. Participating at such activity would allow the data flow to contain quality details of the actual visibility aspects of UIs from the collaborative systems. The overall schema for data capture during participation will be:

1) Observe actions and reactions during collaborating.
2) Listen to comments about the collaboration, UI and environments.
3) Participate in several activities to get the feel of the environment.
4) Take remarks for further discussion in the interview sessions.
5) Capture important moments in notes for further review.

Participation notes and remarks are distributed in Chapter IV – Results and are reflected on as specified in section 2.3.

2.2.2) Questionnaires (Survey)

A survey is the next phase after participation. The survey is done before interviews they provide some sort of pre questions for the interviews and a small follow-up from the participation findings. Mostly i will use this statistical data to show what users prefer and attach them in Appendix A. That is if they are more into automatic features of an application, more functionality or it’s important for them visibility aspects in the UI and even importance of having control over all of those. Schema for survey is:

1) Preferential + Pilot Interview questionnaire.
2) Non – orderly, 2+ answers.
3) Close ended questions.

All 5 users who took part in the scenario of this thesis as explained in Chapter III will be part of the survey. Overall, the questionnaire will be preference oriented. Survey is also using questions with more than two answers in non-orderly placement. This is done so that there are more possibilities to reply and allow users to think of each answer before selecting - skipping possible pattern answering. The questionnaire is designed with close ended questions in order to get straight and short answers. There are a total of 19 questions in the survey. It contains enough relevancy, accuracy and legibility [16] because of already aware users of the information enquiry topic.

2.2.3) Interviews

Interviews are done as follow-ups based on the participation and survey results. The interviews here are used to strengthen the previous results and remove any doubts if still present. The schema for interviews is as follows:

1) Semi – structured
2) Open – ended

The length of the interview will be a minimum of 30 minutes and it will run only once. For the interviews it is decided to do a combination of semi-structured and opened ended questions, so i can assemble precise answers and at the same time get rich findings [15], thus gaining higher quality data. There will be a total of 16 questions prepared for interviews. Some of the questions are not relevant to all users due to different collaborative environments they are in. Interview results will be summarized and available for further analysis. [Appendix B]
2.3 – Data analysis

It is explained in section 2.2 how that data is being collected. There we saw a sequential order of data gathering:

1) Participation input  
2) Questionnaire input  
3) Interview input

Once this data is available (1), (2) and (3) i will perform an analysis using literature review to generate reflections. The literature is from different sources such as books, journals and discussion forums (see section 2.4). Utilizing different varieties of sources to assist reflections would enrich the paper in such a way that many obstacles present can be explained and many recommendations can be found.

Figure 2.2: Analysis of collected data with Literature review

From figure 2.2 it can be seen how this analysis is done. It starts by extracting out results from data collection part and expanding further using a literature review. The data allocated (1), (2) and (3) would have quite a few redundant entries from different collection techniques. Although, not all data deserves same level of analysis [17], only key or of primary importance data should be analyzed [17]. That would be data that explores and supports the answers to the research questions.
2.4 – Literature Review

Literature review is done by searching extensively available materials in order to understand or explains the results from data collection. The materials were gathered from ELIN (BTH Electronic library Information Navigator).

Journals that are studied are from ACM and IEEE which relate to findings in chapter IV. Moreover, in relation to the topic there are also used different thesis work from students where they have studied elements related to this paper.

Finally, forums and CC vendor specific blogs are referred to get more details on the systems. The complete literature sources present in this thesis can be found in the reference section of this paper. The overall schematic of literature review is shown below:

Figure 2.3: Literature review sources
CHAPTER III

Studied Scenario

The Studied scenario contains the following sections presented in sequential order:

3.1 – Studied scenario description, 3.2 - Collaboration without cloudHQ and
3.3- Collaboration with cloudHQ
3.1 – Studied Scenario Description

We usually collaborate while exchanging information, files or working on a case together using technology. The technology can be of any kind that enables us to collaborate in any format. For this thesis the collaboration environment consists of three systems hosted in the CC environments. What is being studied are the visibility aspects of UIs in two applications and the effects on the end-users experience with the presence of automation.

This scenario consists of five participants who are collaborating via cloud hosted applications. They have used similar applications but not hosted in CC [see Appendix A-B]. Not all of the participants have the same tasks but some of them share the same environment on which they perform their activities. Their tasks depend on the actual systems they are collaborating with. The environments they are working on are:

1) Google Docs
2) Dropbox
3) Cloud HQ

3.1.1 Google Docs

Google Docs is a collaborative environment [3, 6] hosted in Google data centers and offered to users as Software as a Service (SaaS) based on the CC service concepts [58, 73]. In its essential form it allows users with Internet access to collaborate with each other via sharing, editing and reviewing content. Following the Google Docs tour [70] its abilities are summarized as:

1). Create basic documents from scratch or start from a template.
2). Upload your existing files.
3). Familiar desktop feel makes editing a breeze.
4). Choose who can access your documents.
5). Share instantly.
6). Edit and present with others in real time.
7). Edit and access from anywhere.
8). Safely store your work.
9). Easily save and export copies.
10). Organize your documents
11). Publish your work as a web page.
12). Control who can see your pages.
13). Post your documents to your blog.
14). Publish within your company or group.

3.1.2 Dropbox and CloudHQ

Dropbox is also a collaborative environment [4, 5]. It is offered to users as Storage as a Service (StaaS) based on the CC service concepts [58, 73]. Although, the files are stored in Amazon S3 [72] (data centers) which is a different vendor. Dropbox enables users to share any type of file within a "free user" limit to anyone they please. Those files are replicated on every device this service is running based on allow policies for replication.

Looking at on the Dropbox tour [71], Dropbox service can be summarized as:

1). High availability of files
3). Due to replication in multiple places, data is available after any computer/phone crash.
It was briefly described Google Docs (SaaS) and Dropbox (StaaS), but also it is known Dropbox is utilizing Amazon S3 (Simple Storage Solution) to deliver to its client’s proprietary service, via their unique UI. This is a new trend, which has been called Cloud Aggregator Services [19].

A cloud aggregator is a type of cloud broker that combines and integrates multiple CC services into one or more services. [1,19]. This is exactly what cloudHQ is doing; it is integrating Google Docs and Dropbox services so they would enhance the sharing experience, in multiple data locations and with different user groups. The synergetic outcome of this integration would be simplified collaboration with less administrative overhead, although with more automation. The cloudHQ tour shows us that it has available these abilities below:

1). Backup Google Docs to Dropbox - Continuously and in Real-Time
2). Consolidate All Your Data in the Cloud
3). Archive Dropbox Data to Google Docs
4). Simplify Collaboration
5). Simplify Asset Management

3.1.3 The Collaboration

In our scenario with three systems and five users; the participants are gathered together to test computer networking devices and concepts. The users are competent IT professionals and do represent a specific target group for the study in order to test if CC UI supports them as part of all kind of people. This collaboration will last four weeks. The outcome will contain written technical manuals based on the findings. This group can be considered as a small research team (LABs Team) with same goal to achieve. The scenario goal is to generate a usable technical manual also known as white paper, which would solve problems as described in them.

These whitepapers are very important for organizations and peers within organization. Particularly when deploying corporate networks using those concepts (devices). It helps in understanding deployment problems while deploying and ways to overcome these.

The users are geographically spread across different locations. Some don’t have access to those devices (LAB) and some do. Working together in such a collaboration activity requires organization and timely deliveries. Since each task is depended on another finished task. Tasks are divided into three categories:

- Network concept (Device) explanations (using Google Docs to start/complete the paper)
- Network concept (Device) test results (using Dropbox to send/receive results)
- Revision and update (manually/automatic using all three systems)

Roles of users in this scenario session are:
User 1: Network Design Engineer
User 2: Network Design Engineer
User 3: Program Manager (Leading the project)
User 4: Network Testing Engineer
User 5: Network Testing Engineer

In sections 3.2 – 3.3 below, the flow of cooperation between the users and how CC applications are used is explained in more details.
3.2 – Collaboration without cloudHQ

Manual

The collaboration starts from left (User 1 – User 2) to right (User 4 – User 5) as in figure 3.0. The initiation of the white paper is done by User1 and User2 via Google Docs documents. User 3 (Program Manager) acts as the bridge, and reviews the Google Docs documents and collects “testing request file” if it is present. If such a file is present then User 3 saves a local copy and sends it to Dropbox system manually. User4 and User5 receive those files in their Dropbox folder (PC, MAC or Phone) and start working on a test lab so they can generate results. Once the results are known User4 and User5 drop the “test results” in Dropbox. This is where User 3 steps in again and moves the results back (uploads) to Google Docs documents.

Figure 3.0: Flow of collaboration and interactions between two Cloud Systems (Manual)

I studied [see chapter IV] the main visibility aspects issues based on this manual delivery setup (figure 3.0). Key to the whole collaborative process is User 3. User 3 is the bridge between two the collaborative systems, thus making his tasks crucial for the timely delivery of white paper content. This critical timely delivery can be automated, as User 3 isn’t able to exchange data 24/7. So introducing automation (cloudHQ) might make way for effectiveness. [Section 3.3]
3.3 – Collaboration with cloudHQ

Automatic

Tackling efficiency deficits is done via automation as per figure 3.1. Suppose User 3 would delay the exchange of data between two environments due to for example different time zones. This impacts the whole collaboration process.

cloudHQ is setup by User 3 to exchange folders and files between Google Docs and Dropbox. User 3 tasks change from manually sending and receiving updates to complete automation of information exchange process. When this is functional, i will be concentrating on the most impacted visibility aspects seen by users.

Figure 3.1: Flow of collaboration and interactions between two Cloud Systems (Automatic)
CHAPTER IV

Results

The Results chapter contains the following sections presented in sequential order:

4.1 Participation Results, 4.2 Interview Results and Survey Results
4.1 – Participation Results

This chapter provides a detailed outcome from the participation. Results of what was observed during 4 weeks of collaboration. The users present in the study never used Google Docs or Dropbox before. That meant that learning the tools was necessary, but it was not true as seen in the participation sections below. They actually used similar like vendors Microsoft Office and Open Office at certain times [see Appendix B]. Coming from that background they could easily map most of the features presented by Google Docs [7, 20]. On the other hand Dropbox was something new in term of functionality. They could relate it to a previous tool (visibly) – “Folder Sharing” and as a way how the application was behaving as per their experience. Such experiences are gained across all Operating Systems (OS) as the basic process of file sharing is always the same [18].

The distinguishing point of Google Docs and Dropbox from other vendors is the ability it provides to collaborate better. The delivery of such “ability” was not that appealing. Being a global application and to be loved by all of its users is an impossible objective. At least that is what this observation conveys. The observation was based on the visibility aspects of UI from figure 1.0 [see Background 1.2]. For us it is important to present the collaboration results as per those aspects for both applications at same time. Figure 4.0 shows that again:

![Participation Results Structure](image)

The participation results are divided into six sections [ 4.1.1- Colours, 4.1.2 Navigation, 4.1.3 Description, 4.1.4 Habits, 4.1.5 Functions/Features and 4.1.6 Changes with the Introduction of Automation.]
4.1.1 – Colours

Colour is a crucial aspect to a successful application reception by end-users. It is basically the first item users contact in a UI of an application. Colour theory has been around for more than 500 years [21]. Then those studies evolved toward colours as a language for communication [22], since properties of colour categories are functions of language and culture [23]. Continuing further, colours have psychological effects on human interactions, emotions and behaviors [24]. Colour schemes impact mood swings of persons while looking at them [39]. Many cultural differences have also impact on how a colour is perceived [25], so that would add extra difficulties in using colours to represent a meaning. Usually to overcome those differences, combination of colour with other components such as shapes or locality could be used to emphasize on the designed meaning [26].

There are two domains that colour can be used [26]:

1) We can design interfaces that use colour to impart important information to user
2) We can design interfaces that allow users to choose colours

Important to note is that the environment (background) colour is an information colour [26]. When the users first started working on the collaborative systems, their first contact with the application was of course with colours:

User 3 - about Google Docs: “When I first logged in, I saw so much grey, it looked a bit boring. Well we are not here for the beauty but to do some collaboration. Although, the HUGE colour difference between red and grey makes it easily distinguishable that we should start from there. I can’t understand the need for totally gray editing (background) interface.” Appendix C Figure C1.2 – 1.3

User3 – about Drop Box Web: “Comparing the Dropbox web interface to Google Docs web interface my vote definitely goes for Dropbox, it’s very clean, tidy and items are so visible. Most importantly I don’t get that bored of steering too long on the web interface. Definitely the combination of colour in Dropbox is well thought off.” Appendix C Figure C1.2, C1.6

User4 – about Drop Box App: “The best thing about Dropbox is that it integrates with my PC. If I change the theme of my box it also changes on Dropbox folder. So it’s adapting to my visual needs. Also the way how it reports when files are downloaded and uploaded is great. It’s all done via the colours.” Appendix C Figure C1.5

From the above comments it is understood that colour is fundamental for the initial contact with the application as it is the first creator of meaning seen by the eye and generated by the brain. Dropbox utilizes the resources of host OS to allow the 2nd point of [26] halfway to be present. Although, Google Docs and Dropbox use colour to impart information [26] but together they fail to accomplish 2nd point completely of colour domain usage [26]. Further observations of Google Docs show that colour consistency is important:
User 2 – Google Docs Login: “It’s so well designed, hovering over the user/password field boxes changes colour, a blue light colour appears once a box is selected, letting me know I am there and I can type” Appendix C figure C1.1

User 1 Google Docs: “I got my account and went in to read the document which was added recently by my peers. I had difficult time distinguishing a couple of functions and what they represent. The whole screen was grey, just the share button blue. I also had difficulties reading it in the beginning but it could have been much better like the some pages which were not that boring” Appendix C figure C1.4

Some are boring some are not; well that is not how it should be. UIs require colour consistency throughout the whole working process. If the main background colour is not accepted, then easily it should allow user to change it. I have observed a lot of colours in these UIs. A table of colours has been generated from participation activity while observing the most present (visible) colours. For each colour there is a meaning as per [35, 36, 37, 38]. The table shows approximately 9 most seen colours in these UIs.

<table>
<thead>
<tr>
<th>Colour</th>
<th>Association</th>
<th>Usefulness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dark Red</td>
<td>vigor, willpower, rage, anger, leadership, courage, longing, malice, and wrath.</td>
<td>Use it as an accent color to stimulate people to make quick decisions; it is a perfect color for 'Buy Now' or 'Click Here' buttons on Internet banners and websites.</td>
</tr>
<tr>
<td>Light Green</td>
<td>growth, harmony, freshness, safety and fertility.</td>
<td>It is the most restful color for the human eye; it can improve vision. Green suggests stability and endurance.</td>
</tr>
<tr>
<td>Blue</td>
<td>It is often associated with depth and stability. It symbolizes trust, loyalty, wisdom, confidence, intelligence, faith, truth, and heaven.</td>
<td>Use blue to promote products and services related to cleanliness (water purification filters, cleaning liquids, vodka), air and sky (airlines, airports, air conditioners), water and sea (sea voyages, mineral water).</td>
</tr>
<tr>
<td>Dark Blue</td>
<td>knowledge, power, integrity, and seriousness</td>
<td>Blue is a masculine color; according to studies, it is highly accepted among males. Dark blue is associated with depth, expertise, and stability.</td>
</tr>
<tr>
<td>White</td>
<td>light, goodness, innocence, purity, and virginity</td>
<td>use white to suggest simplicity in high-tech products.</td>
</tr>
<tr>
<td>Gray</td>
<td>Indicates a lack of commitment, Depression. Colour of neutrality. Creates confusion. Balance, or stalemate. [37]</td>
<td>Gray is a perfect neutral, which is why designers often use it as a background color. [37]</td>
</tr>
<tr>
<td>Light Gray</td>
<td>Fear [38]</td>
<td>Gray is controlled and inconspicuous and is considered a color of compromise, perhaps because it sits between the extremes of black and white. Gray is a perfect neutral, which is why designers often use it as a background color. [38]</td>
</tr>
<tr>
<td>Black</td>
<td>power, elegance, formality, death, evil, and mystery.</td>
<td>Use Black to contrasts bright colors</td>
</tr>
<tr>
<td>Yellow</td>
<td>joy, happiness, intellect, and energy.</td>
<td>Use yellow to evoke pleasant, cheerful feelings.</td>
</tr>
</tbody>
</table>
From all of those the most used one is white and gray. Even though they really represent cleanliness and neutrality, in practice with a huge diversity of people it is not likely to represent the same for all. Colours are also helpful for creating user feedback of a started task, a completed task or a failed task. For Dropbox the feedback via colours has been used well:

User5 about Drop Box colour feedback: “When I drag and drop a file on Dropbox the blue rotating logo appears on the folder, which lets me know that it’s being sent to other peers. Once it is done it becomes a green circle with a tick. This is very good since I am able to see as it is happening. Also when I am receiving a file I get a pop-up, sometimes I miss it so I don’t know if the pop-up appeared. For that I have to check manually!” Appendix C Figure C1.8, C1.9

A lot of effort is put into generating appropriate colour combinations; at any possible results that does not make everyone happy. Each UI must allow colour manipulation by users themselves.
4.1.2 – Navigations

Knowing where you are and knowing where you want to be [29, 52] is what navigation is about.

User3 about Google Docs: “Since my daily activities consist of reviewing and copying the document to a new location, Google docs assists me in such a way that basically it opens a new window for each document I am working on so I do understand where I am. I just have to go tab by tab to be on the desired place.” Appendix C Figure C2.8

In recent studies [30, 31] importance has been given to navigation of UI in application, especially web delivered ones. Navigation in Google Docs is closely linked to the browser and the web content. Navigation in Dropbox is divided into two forms based on presentation: Web interface (thin client) and desktop interface (thick client). Due to the desktop interface re-using the navigational elements of OS it is hosted on, this paper only concentrates on the web interface. The way web UI operates depends on the browser and web content [27]. Each browser (IE, Firefox, Chrome, Safari, etc.) presents the content in a slightly different manner visually and functionally [32, 33].

For all applications, navigation has to have a structure within web/app content [9], there should be as much standardization as possible [28]. The navigational structure referring to [27, 28] is divided into three forms and it is presented as in figure below:

![Navigation structure](image)

Figure 4.1: Navigation structure

The results of the navigational visibility as expressed by users of Google Docs and Dropbox have been analyzed relying on figure 4.1 (navigational structure) divisions and the recommendations for navigation created by Usability.gov [34]. Each selected point created by Usability.gov [34] is used to understand if the studied CC applications have considered and applied properly the recommendations of navigation:

<table>
<thead>
<tr>
<th>Provide Navigational Options. (Do not create or direct users into pages that have no navigational options.)</th>
<th>Considered</th>
<th>Visible for Users</th>
<th>Hidden for Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Differentiate and Group Navigation Elements. (Clearly differentiate navigation elements from one another, but group and place them in a consistent and easy to find)</th>
<th>Considered</th>
<th>Visible for Users</th>
<th>Hidden for Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Use a Clickable ‘List of Contents’ on Long Pages</th>
<th>Considered</th>
<th>Visible for Users</th>
<th>Hidden for Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Considered</td>
<td>Visible for Users</td>
<td>Hidden for Users</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>------------</td>
<td>-------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Provide Navigational Options. (Do not create or direct users into pages that have no navigational options.)</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Differentiate and Group Navigation Elements. (Clearly differentiate navigation elements from one another, but group and place them in a consistent and easy to find)</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Use a Clickable ‘List of Contents’ on Long Pages (Anchor links). (On long pages, provide a ‘list of contents’ with links that take users to the corresponding content farther down the page.)</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Provide Feedback on Users’ Location. (Provide feedback to let users know where they are in the Web site.)</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Place Primary Navigation Menus in the Left Panel. (Place the primary navigation menus in the left panel, and the secondary and tertiary menus together.)</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Use Descriptive Tab Labels. (Ensure that tab labels are clearly descriptive of their function or destination.)</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Present Tabs Effectively. (Ensure that navigation tabs are located at the top of the page, and look like clickable versions of real-world tabs.)</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Keep Navigation-Only Pages Short. (Do not require users to scroll purely navigational pages.)</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Use Appropriate Menu Types. (Use ‘sequential’ menus for simple forward-moving tasks, and use ‘simultaneous’ menus for tasks that would otherwise require numerous uses of the Back button.)</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Use Site Maps. (Use site maps for Web sites that have many pages.)</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Use ‘Glosses’ to Assist Navigation. (Provide ‘glosses’ to help users select correct links)</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Breadcrumb Navigation. (Do not expect users to use breadcrumbs effectively.)</td>
<td>Yes</td>
<td>Confusing</td>
<td>Confusing</td>
</tr>
</tbody>
</table>

Table 4.2: Navigation Design Guide [34] applicable in DropBox.
Reviewing results from table 4.1 and table 4.2, it important to stop at several points which were seen as important during observation. Those points were not fully incorporated into the systems as recommended.

User1 about Google Docs navigation: “In Google Docs each time I open (create) a document it opens in new browser window. So it’s keeping main window always and the (new) document. From the document window it is not possible to go back, since browser does not have back function.” Appendix C Figure C2.0 [Point 1 in Table 4.1 failed]

User5 about Dropbox: “Dropbox web UI uses navigational options of the browser and within the web app it remains on the same page and does not open any new window. If I want to move back I can also follow the breadcrumbs” Appendix C Figure C2.1 [Point 1 in Table 4.2 OK]

In fact the back navigational functionality in Google Docs for assisting the navigation through the web interface is present. But for User 1 as it is observed, it wasn’t. Only after longer maneuvering of the system it became visible:

User1 about Google Docs: “I moved across the document page to check where is the mouse pointer and the back button appeared. If I would have not lost the mouse pointer and moved to find it that back feature would be unknown for me. It clearly needs to be available all the time.” Appendix C Figure C2.2
From the figure in Appendix C Figure C2.2 the navigation back button appeared later accidentally, as the user experienced. This way is not recommended [9, 34] and it should be visible at all times.

Going back to figure 4.1, all those forms of navigation do not appear in application at the same time. They are sometimes called upon individually depending on the complexity of the application’s UI. It is important that the different navigations that are separated by function get divided and grouped together [28].

User2 about Google Docs: "It’s great to see such nice groupings of available things to do in Google Docs. Some of them don’t appear until you perform something in their scope." Appendix C Figure C2.3 – C2.5

As it is seen (Appendix C Figure C2.3 – C2.5) the navigation is divided into three main categories within Google Docs, (C2.3) is navigation related with the document (creation, deletion, upload etc), (C2.4) is navigation related to search, (C2.5) is the navigation grouping of settings for the actual Google Docs with the center navigation space. Also Dropbox is contained within three navigational groupings as can be seen in (Appendix C Figure C2.6) but with the exception of being more user friendly and easier to navigate.

User3 about Dropbox: “Looking at each application, better navigational elements and easiness to follow up has Dropbox. I know they are different applications but in terms of looks and navigation there is a lot Google Docs could learn from.” Appendix C Figure C2.6

One of the reasons for Google Docs being harder to navigate than Dropbox is the functionality difference. The cloud hosted services actually provide different services but in terms of design recommendations [27, 28, 34] Dropbox web UI would win the race of most applied recommendations.

It can be seen [Appendix C figure C2.3 – C2.7] that Google Docs and Dropbox via many navigational groupings show the same information, in order for the users to choose what is easier amongst them. As per observation that was not the case since it was providing conflicting entries, especially via content listing (similar to breadcrumbs) seen in figure C2.9 [Appendix C]. This conflicting duplicate information show that the systems feedback to the end users was misleading, created confusion and caused re-navigation back and forth in order to get the desired result. Eventually it was not used anymore:

User 1 about Google Docs: "Many applications I have used present better the main page, at least the shortcuts. In Google Docs we had problems with understanding which folder (file) is inside which folder based on shortcuts in main page. Then I was using a site map to help me get what I wanted”. Appendix C Figure C2.9 – C3.0 [Point 12 table 4.1 Failed]

User 3 about Google Docs: “It happened that during folder and file creation we added same names to 2nd and 3rd hierarchical folder structure, the 1st name was unique. However, Google Docs could not follow properly this hierarchical struture so we came accross to misleading navigation at shortcuts”. Appendix C Figure C2.9 – C3.0 [Point 12 table 4.1 Failed]

User2 about Google Docs:"When there are many supporting documents like pdf’s we usually arrange them in their appropriate folder for easy listing. That’s important since when we have new pdf’s based on previous listings we add them there. Google Docs has been providing this perfectly via a content map. “ Appendix C Figure C2.7

Essentially, navigation should be consistent, non-misleading and easy to understand. Such navigations usually require assistance of other means not just proper grouping. Colour is one aspect that can be used. There are also descriptors of content which give additional hints for efficient navigation or functionalities of the application in general but not always as seen in section [Descriptions 4.1.3].
4.1.3 – Descriptions

There is always a need for different or more information sources about an entity. However, users should not be overwhelmed by them [40, 41]. This “more information” should be actually better information – the one which gives support if other means are not sufficient to generate a meaning [9]. In the UIs as observed this “more information” was being provided using descriptions. To enhance understanding short descriptions are placed on top of colours or icons for each button and function in the UI. Those descriptions do assist navigation as well [42].

The problem arises when trying to describe something in a short concise manner. This is not easy because not all phrases and symbols are understood correctly considering the diversity of users [43, 44, 45].

To amplify clarity and awareness of the surrounding in a UI as suggested there is a necessity to have additional well-formed descriptions. This must be applicable for all environments if the current one does not have or is misleading without descriptions. What is happening in Google Docs and Dropbox is that this descriptiveness is present, attractive and functional but only for pre-known functions (especially in Google Docs). Looking at figure 4.2 an active gloss description of buttons functionality appears, indicating what they do in addition to colour, icon and locality:

User3: “One of the most seen cases is the way how a description appears when I hoover above an option. These “more info” presented in Google Docs and Dropbox are quite helpful and they give me more details on a function”. Figure 4.2

User4: “It was nice to see that within web pops-up additional information, especially is you see the “rainbow folder” without description of “share a folder” you would not know what that is for.” Figure 4.2 – Dropbox

During observation there was a challenging moment where users 1-3 showed that they had no idea what to do with Google Docs “Paint format”. The “Paint format” contained all the elements (colour, gloss, correct navigational location and description) as others did. They still had difficulties understanding it. This resulted in no one using it while collaborating.
User1: “Well it does something otherwise it would not be there, had no time to Google it” - Figure 4.3

User2: “That is what I want to know as well” - Figure 4.3

User3: “You got me, I don’t know what that does, tried it and it did not work” - Figure 4.3

Figure 4.3: Not understandable even with the help of description

This feature was non-relatable to a previous functionality that they had worked with. It wasn’t habitual. When checked on Google Docs help, then only it was understood more [46]:

Google documents lets you copy the formatting you’ve applied to a specific section of text to another section using the paint format tool. To use this tool, select the text that’s formatted in the way that you want to copy. Then, click the paintbrush icon in your toolbar, and select the text to which you want to apply the formatting. The formatting from the original text will be copied to the selected text. [46]

To understand how it works, what it does and how to use a new feature with the help of short description, colours, gloss and correct navigational placement as used in Google Docs was not sufficient. A way to overcome this would be for cloud vendors to keep logs of user. New users would be handed more detailed description or even links for its usage. Old users which used a new feature successfully would be given shorter descriptions as in figure 4.3, because for them it would be considered as a gained habit.
4.1.4 – Habits

Generally speaking habits are bound to our daily activities; we tend to utilize them automatically [48]. Defined in [49] a habit is a “behavior pattern acquired by frequent repetition or physiologic exposure that shows itself in regularity or increased facility of performance”.

As per [9] while designers design new UI we should keep in mind the importance of these habits as they [49] increase performance. Moreover:

> Breaking old habits and learning something new takes energy, and a small improvement may not be worth the cost to the user. [9:12]

Essentially, the UI should capture as many patterns as possible from users or other UIs before (re)designing and deploying new ones [50].

Looking at Google Docs session, it was discovered that known habits can be removed from users with the introduction of automation.

User1: "While I was typing in documents of Google Docs, I was typing CTRL + S in order to save the file, it actually did nothing. Everything was saved automatically, after each letter I typed. I had to get used to this. I kept telling myself it will be saved by itself because often I lost electricity and I lose valuable work I have done."

Appendix D – Figure D1.0 – 1.2

User 2: “When creating a document in Microsoft Word, I usually make copies of it for review. Specifically when there are quite huge changes to the document. I can always go back. I started doing the same here, until I was informed about revision history, which keeps track of all changes. That was a relief!"

Appendix D – Figure D1.3

User 3: "It is important to know the file size you are consuming or the group of files. So you would understand the transport method of them to some other location. Like should I use USB Flash, External HDD or send via email. In Google I did not understand the file space used."

These automated habits increased performance and did not require user to re-learn something. They just had to stop doing it. In other systems, users can see several version of their work easily. From folder properties they can identify the total used space, or even size of each files. In the Google Docs case it does not seem to be that easy. It is quite hidden to the users the amount of space they consumed, unless you refer to help.

Documents Limit: 1,024,000 characters, regardless of the number of pages or font size. Uploaded document files that are converted to Google documents format can’t be larger than 2MB. [51]

Furthermore it is seen changes in habitual shortcuts design. Those initiate the process of re-learning. Learning to do something differently which was already known:

User1:” I always use shortcuts, CTRL + N (Making new file), CTRL + F (Find) etc. These seem not to be valid for Google Docs, they are different. Like Shift + T for text file. So I continued to manually create a text without shortcuts. Appendix D – figure 1.3.

In Appendix D figure 1.3 the complete shortcut map of Google Docs is presented and it is clear that shortcuts like CTRL + N (new file) as the user specified are not valid due to Google Docs being presented by the web browser. Browser (host) is already utilizing those shortcuts (resources). In this aspect, habits of this sort to be reused require better flexibility and integration between browser and web content.
Habits which can’t be removed (automated) play a big role in any application. Capturing the habitual elements of users requires time due to many studies needed. Not many vendors have this time on hand. Although, building a UI requires utilizing already captured habits as mentioned before, so that it increases acceptance and elevates usage of the application:

User 4: “I must say working with dropbox never felt easier, its just that sort of application that does what you always did but this time with increased functionality due to ability to share something with a single drag and drop movement to many people.”

User 5: “Because dropbox depends on Internet to share/receive files and because it uses colors to represent that functionality I am quite aware what’s going on, even if the internet connection fails the dropbox icon near the clock informs me of that by removing the green tick. When something is not working I usually check near the clock to see a notification.” Figure 4.4.

Dropbox on the other hand has understood the importance of habits better, by utilizing the host OS features in order to concentrate on their “file sync” brand. This cohesion is of very big importance for future application interface design. Looking at the web interface surprisingly they have mapped already known shortcuts to web interface also, making the re-map or re-learn not a necessity.

User 4: “For example most of the things which I can do with files on my PC like rename (F2), up/down folder navigation, select all etc. I can perform it same way in Dropbox web”.

Appendix D – Figure 1.4.
4.1 – Functions and features

Applications are built for a specific purpose, such as to share a file, to send a message or support some activity; this specific purpose could be understood as a function. Those functions are the engine of an application. Features represent “a distinguishing characteristic of a software item (e.g., performance, portability, or functionality)” [53].

Features and functions are the components to why an application is build and used. But as seen in previous sections, having the available features and functions is not enough to be accepted easily. It also needs also proper support of other visibility aspects to make it usable and understandable. Each new feature or function introduced should be tested before being placed into production. Not doing so the features and functions end up not being utilized or just ignored.

Like everything in life the more features and functions it contains the better is it or at least the more it can be used but this does not apply to applications. This was argued on [54] where there becomes a point on which less functionality is a preferable option in terms of usability; Simple to use and more appealing for the user and market.

From the observation, the following table below is created which shows results of functions and features of Google Docs and Dropbox against existing applications on the market. It clearly shows that they have new features. The most important one is “Collaborative Capability” to collaborate in larger scales with less cost. There are also re-used features and functions which can increase the software acceptance rate.

Based on the interview results [Appendix B, Section 4.2], these two cloud hosted applications have been marked as “better” especially for “Collaboration ability”.

<table>
<thead>
<tr>
<th>Application</th>
<th>Tested Against</th>
<th>New Features/Functions</th>
<th>Re-usable features/functions</th>
<th>Better/Worse</th>
<th>More Collaboration efficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Google Docs</td>
<td>Microsoft Office/Open Office</td>
<td>Yes</td>
<td>Yes</td>
<td>Better</td>
<td>Yes</td>
</tr>
<tr>
<td>Dropbox</td>
<td>Folders and Sharing (windows)</td>
<td>Yes</td>
<td>Yes</td>
<td>Better</td>
<td>Yes</td>
</tr>
</tbody>
</table>
4.1.6 – Changes with the Introduction of Automation

The previous sections (4.1.1 – 4.1.5), have captured valuable input from users in regards to visibility aspects of UI. However, the input has been without the introduction of the 3rd system called cloudHQ. Once cloudHQ was introduced it reduced a lot of overhead (re-login, re-sharing, re-uploading and re-deleting) of same task related components while collaborating in two CC applications.

User3: “After I setup cloudHQ my work load was reduced drastically due to automation. What i used to do i did not do it anymore. I wasn’t even sure that it is working. I had to manually check if it’s updating files from one system to another. After a week I received an email letting me know of successful file transfers... a week later that’s too late.” Appendix D Figure D1.8

The correct incentive for applying automation is to increase productivity, and/or quality beyond that possible with current human labor levels so as to realize economies of scale, and/or realize predictable quality levels. The incorrect application of automation, which occurs most often, is an effort to eliminate or replace human labor. [55]

Following the definition of automation and relating it to our scenario it should be thought of “production increase” in terms of efficiency, especially time. Increasing automation requires also the need to increase feedback. As user 3 stated that once automation was applied he lost sense of the systems, if files (documents) were being updated properly or not. During the observation session, with and without cloudHQ, it was seen that there are two type of automation:

- **Internal Automation (IA)** within Google Docs and Dropbox. Where [IA] – Deals with the daily activities users perform for completing a task. [56]

For these two types of automation, tables have been created to show the most impacting automations:

**Table 4.4: Internal Automation’s Observed (before cloud applications)**

<table>
<thead>
<tr>
<th>Before Internal Automation</th>
<th>After Internal Automation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Save File via CTRL + S</td>
<td>Automatic Save after each Type (Google)</td>
</tr>
<tr>
<td>Manual File revisions via multiple Docs</td>
<td>Automatic Revisions – System created (Google - Dropbox)</td>
</tr>
<tr>
<td>Manual File sharing (received) checks for new file</td>
<td>Automatic Colorful feedback for recent file upload (DropBox)</td>
</tr>
<tr>
<td>Manual File distribution to other devices (mobile)</td>
<td>Automatic file distribution to Mobile devices (DropBox)</td>
</tr>
<tr>
<td>More control (more responsibilities)</td>
<td>Less Control (less responsibilities)</td>
</tr>
</tbody>
</table>

**Table 4.5: External Automation’s Observed**

<table>
<thead>
<tr>
<th>Before External Automation</th>
<th>After External Automation</th>
</tr>
</thead>
<tbody>
<tr>
<td>More workload for users</td>
<td>Less workload for users</td>
</tr>
<tr>
<td>More control (more responsibilities)</td>
<td>Less Control (less responsibilities)</td>
</tr>
<tr>
<td>Manually synching files</td>
<td>Automatically synching files with manual confirmation</td>
</tr>
</tbody>
</table>

On the perspective of UI aspects as noted by users automation impacts mostly: 1) Habits and 2) Functionality.
4.2 – Interview and Survey Results

In this section are presented the key results from interview and survey activities conducted as in Appendix A and B. Survey results are summarized as in figure 4.5, where most of the results are above 80% except for Q15 [60%] and Q18[40%].

Figure 4.5: Summary of Survey results

Q15 [60%] and Q18 [40%] deal with preferences about control over visibility aspects and automation, where users had different opinions about them but still there were indications of preferring control and automation. (see Appendix A). Deducted from those results were six key elements:

1). Need for user customizable environments
2). Control availability
3). Functional dependency
4). Automation invisibility
5). Habitual – reusability importance
6). Changes on systems

Each of these elements represents direct feedback of users from the collaboration. Initially users call out for “Need for user customizable environments”:

User1: “If we consider the functions an application has, let’s say 100, but I use only 10 on daily basis. I would customize it with just that much of functions.” [Appendix B – Interview 1]

User3: “I would have loved if I could shape the environment as per my needs. When each user logged in to edit a document, my preferences would have had picked colors/images automatically for background.” [Appendix B – Interview 2]

This indication from the users, requesting dominance over visibility aspects in the UI should be taken seriously in future designs. Google Docs, Dropbox and cloudHQ did not provide as much customizable environments. Users failing to change the vendor can be easily related with Functional dependency, which is explained later.
Users relate visibility aspects to control capabilities of UI manipulation; this is true if definition of control is considered: “To exercise authoritative or dominating influence over something or to adjust to a requirement; regulate “[57] Users want to regulate [Q15] visibility aspects how they see, navigate, read and collaborate via them.

In survey result Q10 [80%), the users decided for a mixture of automation and visibility to be included in the UI. They did not choose one over another. Also, based on the interviews, having control over those two mixtures was required. It was communicated in survey Q2 [80%], Q3 [80%] that a high number of available functions and knowing all of these functions in an application does not make it automatically acceptable or likable. It should also depend on complete list of visibility aspects. Practically, it may skip some visibility aspects with what functionality or features it has:

User1: “sometimes functionality wins over many things you don’t like about an application”. [Appendix B – Interview 1]

The main reason why Google Docs and Dropbox were chosen was for their better collaborative functionality.

There were questions in the interview [Q13] and the survey Q5 [100%], Q6 [80%], Q10 [80%], Q17 [80%] and Q18 [40%] related to automation. Previously it was defined the existence of two sets of automations; internal and external [see section 4.1.6]. From the results of those questions [Appendix A and B], it is clear that for users who did not work with or setup the external automation (cloudHQ) was invisible. On the other hand the internal automation was visible.

Each UI in Cloud environments has its own automative functions, to reduce complexity or to make activities more efficient. In the survey Q19 [80%] answers i came across that internal automation mostly impacts “habits” of users while interacting with the UI. Also, if automation is used often, it removes the complexity and understanding what is going in the background of an application (impacting understanding of functionality). Unless feedback’s positive or negative are enforced [Q18]. Users are willing to change habits only for the cost of efficiency Q16 [80%] and this efficiency is diverse as are the users.

During interview [Q14], most of the users saw in action changes without their consent appearing to the UI while collaborating. The nature of the changes were: adding new functionality (features), changing product name (from Google Docs to Google Drive) and applying typography changes in text but still they did not increase the reception of the application. Users explained that only changes which make them “more efficient” are advantageous. This “more efficient” does alternate as to the different mental modes users have about each visibility aspect. (see Appendix B)

… mental modes are just models people have about themselves, others, the environment and the things they interact. People form mental modes through experience, training and instructions. [47:17]
Conclusions

The Conclusions chapter contains the following sections presented in sequential order:

5.1 - Answering Research Questions, 5.2 – Future Work
5.1 – Answering Research Questions

The sole purpose of applications hosted in CC facilities is to remove the load from end-users computers, thus reaching a larger audience. Those computing facilities have thousands of computers; as a result for a designer they remove the resource worries when building an application. Having that in mind, we have remarkable space for designing the best available UIs.

UI designers of a CC application should create structure and functionality but allowing the users to fill in the look and feel, that is allowing users to customize it as much as possible without losing the core functionality.

In this study it was observed that UI in these environments are still at their beginning. It was showed that there is a need for users to decorate their own environment – being UI exterior designers – implementers. The results can be summarized as:

1). Give control to users to modify the look and feel of the UI.
2). Allow users to select or deselect what functionality they need enabled.
3). Allow users to have control over what gets automated and what does not.
4). Enhance feedback once automation is enabled.
5). Inform users of updates (changes) to the visibility aspects before they happen, not after.

Each visibility aspect covered in this paper is vital for better application usage. Enabling users to tweak visibility aspects as much as possible would increase acceptance of the application, since time and pleasure it takes working and learning on those UIs depends on the visibility aspects.

1). Would changes on already known visibility aspects of UI in an application cause any important advantage or dis-advantage?

Yes and No. The answer depends on the circumstances and rate of usage of the known visibility aspect being changed (updated). Changes are a double-edged sword as any slight change which occurs within visibility aspects has a huge impact on users, and are considered either advantageous or disadvantageous in terms of efficiency. Users already have different mental model for the visibility aspects, so “efficient” for all of them does not have the same meaning. A completed list with the advantages - disadvantages is set below:

Advantages:

1). Increasing efficiency of a prior aspect.
2). Making app/UIs integrate better with web browsers.
3). Adding new features.
4). Fixing existing bugs.
5). Giving more control to users.
6). Supports existing habits.

Disadvantages:

1). Increasing efficiency of a prior aspect for some users is not considered efficient.
2). Decreasing the efficiency of a prior aspect.
3). Modifying current features and functions.
4). Removing control from users.
5). Changing the appearance of the environment.
6). Ignores existing habits.
2). **Is control over automation or visibility aspects important for users which are using User interfaces of Cloud Hosted Applications?**

Yes, control is important. To answer this research question I have used primarily the survey and interview as follow-up. The results show that control is important. The areas where users are asking for more control are:

1). Control what should be automated and what not.
2). Control presentation of visibility aspects.
3). Control to enable or disable features they don’t use.

In the survey results specifically for Q10, Q15 users showed that they prefer a mixture of automation and visibility but with possibilities to tune them. They were not able to separate them; both are preferred to be available in a UI, just that they required control over them.

3). **Will an automated bridge service between Google Docs and Dropbox decrease functional visibility for users?**

The more automation you add and don’t provide appropriate feedback using visibility aspects the users do feel a decrease of functional visibility.

Functionality of the bridge service for all users who did not interact with it was already invisible. The results show that they were not aware of this type of service ever existing. Only the user who acted as the bridge of two cloud vendors knew about it. His tasks as explained [see Chapter III] were replaced by cloudHQ.

In the initial phases there was visibility of functionality while the bridge service was being setup. Once it started operating on its own, user sensed decrease of visible functionality. What created decreased functional visibility was:

1) Low usage of visibility aspect to convey a positive or negative message.
2) Delayed feedback

The inability of the cloudHQ to show the user that it successfully synchronized Google Docs and Dropbox in real time without having to login on each of those systems individually, shows a lack of properly implementing visibility aspects to convey a message. The only message which was coming from cloudHQ were weekly reports of files which were synchronized, so this feedback is too delayed. User lost the sense of is it working or not without having to login on each systems and check it, or even ask around.
5.2 – Future Work

This work is based on users who used computers – applications for a long time. They can be considered experts for their previous experiences with computer (UI) interactions. Their expectations might have been higher than those of novice users for these cloud hosted applications. Although, their expectations are of importance since they also represent a “target group” for the cloud based application. Future work can be done on:

1) Impact of changes for increasing efficiency on CC based applications
2) Control over automation and visibility aspects delegated to users.
3) Enhancement of feedback mechanism.

This would require studying a higher and more diverse number of users, and including different forms of collaboration and environments. Finally, giving users more control over their environment sends a call for more research as to how they are going to cope with more and different responsibilities.


[46] Paint format description [online] Available at:


[49] Definition of habits [online] Available at:


[51] Google Docs Limits [online] Available at:


[54] Gabriel, R. P. Worse is better [online] Available at:

[55] Automation [online] Available at:


[72] CloudHQ Tour [online] Available at: https://www.cloudhq.net/dropbox/backup-google-docs [ Last accessed 30.11.2012]

Appendix A

Appendix A contains the following sections presented in sequential order:

A.1 Survey Questions, A.2 Survey Answers
A.1 – Survey Questions

1. Is Microsoft Office more user friendly than Google Docs?
   - Yes
   - No
   - Both

2. Does Google Docs provide more feature and functions than Microsoft Office/Open Office?
   - Yes
   - No
   - Maybe, haven't tested them all.

3. Is it important for you to understand each function of buttons in the application?
   - Yes
   - No
   - Most of the time

4. Does Dropbox remind you on Folder sharing as in Operating system?
   - Yes
   - No
   - Maybe

5. Is automation impacting positively your ability to collaborate?
   - Yes
   - No
   - Don't know

6. Did you see any positive difference when Cloud HQ was introduced in the collaboration Environment?
   - Yes
   - No
   - Slightly
   - Not Used

7. Do you think that proper color usage in a User Interface would increase the chances of the application being accepted faster?
   - Yes
   - No
   - Might be

8. If you don't know how to find something, do you refer to different navigation panels for searching it?
   - Yes based if task needs it
   - No if task is not depended on it
   - Yes for future reference if needed
9. Which of the following automation activities you prefer in Google Docs?
   - AutoSave
   - File Revisions
   - Auto-Login to other Google Services

10. Would you prefer more automation [word/sentence auto completion, auto text formation etc] or visibility [Better colours, easier navigation, good descriptions] of functions in an application?
   - More automation
   - More visibility
   - Mixture of both but this more Automation
   - Mixture of both but with more visibility

11. Based on what you know that a file is received\sent via DropBox?
   - From pop-Ups
   - Manually checking it
   - From Color changes

12. In order to change anything on a Cloud based application, what is the best way to request?
   - By Calling
   - By Sending Emails
   - By Joining forums of vendor
   - No Ways to request change

13. Do you prefer complete customization control of User Interface in an Application?
   - Complete Customization
   - Static User interfaces
   - Minimum Customization possible

14. Do you change an application for new features or better appearance?
   - Features
   - Looks
   - Both

15. Do you prefer more control over the application to complete a task or as much automation as possible?
   - More control
   - More auto automation
   - More selectable automation

16. Is it an advantage to re-learn something you already know but to do it differently?
   - Yes, only if it is more efficient
   - No, if it is less efficient
   - Not at all

17. Is cloud HQ automation making your previous activities decrease, thus allowing you to do something else?
18. If you add more automation to your daily tasks and after long time would you be able to recall what is happening in background?
- Yes, if it is not working properly.
- No, if I am not interacting with it.
- Yes, if I get feedback of completed tasks.

19. Which of the following visibility aspects are impacted with the introduction of automation to your work environment?
- Colours
- Navigation
- Description
- Habits
- Functions and Features
A.2 – Survey Answers

1. Is Microsoft Office more user friendly than Google Docs?

2. Does Google Docs provide more feature and functions than Microsoft Office/Open Office?
3. Is it important for you to understand each function of buttons in the application?

- Yes: 80%
- No: 20%
- Most of the time: 0%

4. Does Dropbox remind you on Folder sharing as in Operating system?

- Yes: 100%
- No: 0%
- Maybe: 0%

5. Is automation impacting positively your ability to collaborate?

- Yes: 100%
- No: 0%
- Don't know: 0%
6. Did you see any positive difference when Cloud HQ was introduced in the collaboration Environment?

- Yes: 20%
- No: 80%

7. Do you think that proper color usage in a User Interface would increase the chances of the application being accepted faster?

- Yes: 100%

8. If you dont know how to find something, do you refer to different navigation panels for searching it?

- Yes based if task needs it: 100%
- No if task is not depended on it
- Yes for future reference if needed
9. Which of the following automation activities you prefer in Google Docs?

- Autosave: 20%
- File Revisions: 80%
- Auto-Login to other Google Services: 20%

10. Would you prefer more automation [word/sentence auto completion, auto text formation etc] or visibility [Better colours, easier navigation, good descriptions] of functions in an...

- More automation: 20%
- More visibility: 80%
- Mixture of both but this more Automation: 20%
- Mixture of both but with more visibility: 80%

11. Based on what you know that a file is received\sent via DropBox?

- From pop-Ups: 100%
- Manually checking it: 100%
- From Color changes: 100%
12. In order to change anything on a Cloud based application, what is the best way to request?

- By Calling
- By Sending Emails
- By Joining forums of vendor
- No Ways to request change

13. Do you prefer complete customization control of User Interface in an Application?

- Complete Customization
- Static User interfaces
- Minimum Customization possible

14. Do you change an application for new features or better appearance?

- Features
- Looks
- Both
15. Do you prefer more control over the application to complete a task or as much automation as possible?

- More control: 60%
- More auto automation: 20%
- More selectable automation: 20%

16. Is it an advantage to re-learn something you already know but to do it differently?

- Yes, only if it is more efficient: 80%
- No, if it is less efficient: 20%
- Not at all: 0%

17. Is cloud HQ automation making your previous activities decrease, thus allowing you to do something else?

- Yes: 20%
- No: 80%
18. If you add more automation to your daily tasks and after long time would you be able to recall what is happening in background?

- Yes, if it is not working properly. (40%)
- No, if I am not interacting with it. (40%)
- Yes, if get feedback of completed tasks. (20%)

19. Which of the following visibility aspects are impacted with the introduction of automation to your work environment?

- Colours (20%)
- Navigation
- Description
- Habits
- Functions and Features (80%)
Appendix B

Appendix B contains the following sections presented in sequential order:

B.1 Interview Questions, B.2 Summary of interviews
B.1 – Interview Questions

Q.1: What do you think of collaboration using technology?

Q.2: Does the technology accomplish more the desired goals of collaboration?

Q.4: Looking inside an Application hosted in Cloud computing facilities and the similar ones you used, what major changes do you see?

Q.5: To what extent do you think these changes impact your performance?

Q.6: Does Google Docs, provide an appropriate environment for collaboration or there is something you would change?

Q.7: Is it important to allow the user on a Cloud Application to shape its own environment, like colours, feature packs enabled etc.?

Q.8: Do you think that the only big advantage of Cloud Vendors (Google Docs, DropBox) is that they allow mass collaboration (functionality) or ease of use (visibility)?

Q.9: There where quite a few automatic functions [auto-save, auto revision, auto file upload etc] happening behind the scene. Do you mind having them turned on automatically or you prefer control over that?

Q.10: Where you able to accommodate easily into these environments?

Q.11: Could you relate Google Docs or Dropbox to any known application and what differences do you see between them?

Q.12: Could you map all the feature/functions/buttons in the cloud hosted application to the locally hosted ones?

Q.13: Would you prefer more automation than CloudHQ was providing, what would you automate?

Q.14: Have you seen any changes on the system while collaborating, if yes what do you think about it?

Q.15: What are the most annoying things you saw while collaborating in these systems?

Q.16: Would you collaborate again using these set of environments?
B.2 – Summary of Interviews

Interview 1
Name: User1
Function in Case Study: Network Design Engineer
Date: March 10, 2012
Start Time and End Time: 09:00am to 10:00pm

User 1 states that technology is very important while working with other peers. Especially for him, he works on many projects by using different tools. It actually increases his current abilities by allowing him to express himself better. Simply, it just becomes a tool for knowledge gain, abilities and results to be presented better and easier. He points out that technology allows for more ways to complete or do goals. There are many goals, suppose you are working on a rubber factory and there is a system which counts number rubber pieces fabricated (one goal). That system would allow us to create graphs (2), forecasts (3) and timelines of production ready for delivery (4). All are generated rapidly and expressed graphically good so that collaboration with clients or peers becomes easy when we have to present those goals.

For him Google Docs is designed to be simpler in what they offer, for example Google Documents is offering a word processing system with a simpler User Interface. Because of that there was no way to customize content inside. User 1 explained that he was a bit bored while he was working on Google docs due to its appearance. He was dropping occasionally back to Microsoft office to complete his tasks and then pasting the content back to Google Docs, all of this because of used prior habits/environment with Microsoft apps. User has experience with other word processing systems, they were running on his computer locally, there was no need for Internet access to update a document. He had to get used to that when he started using Google Docs. User 1 agrees that Google Docs supports the most needed activities he can perform in such word processing systems, like creating, writing and editing documents. He stressed that it’s important to allow customization of main app UI. He would have been able to feel more comfortable while collaborating if that’s possible; after all each person has its own preferences. Allowing him to do such environmental changes is perfect. Example of customization can be also modifying the functions presence: “If we consider the functions an application has, let’s say 100, but I use only 10 on daily basis. I would customize it with just that much of functions to be present.”

User 1 absolutely agrees that the main function of the cloud based application is to allow mass communication and collaboration. Speaking of application control vs. automation, user prefers more control over. He explains himself that the more control you have the more aware you are on what’s happening in the collaboration process. Automation in the other hand is not that bad but at least he would like to have the on and off control for all activities. The main difference he sees between Local and cloud Systems (editing apps) is on the ability it allows to communicate and collaborate.

Speaking about the ease of re-mapping the elements in MS Office and Google docs the user could map only the ones which he used often. Although for him they looked a bit different in terms of presentation, like colour, size and location, so it took some time. He specified that Google Docs during collaboration was converted to "Google Drive" a new product. There suddenly the icons were changed, there was some text made bold to present what is a shared file what is local. Although even with the new product he specified again that Google Docs appearance was a bit boring to work with. Finally he would be willing to collaborate again on cloud hosted system even though they don’t meet his personal expectations. That is just because if they would provide the best available features for collaboration, since sometimes functionality wins over many things he does not like.
Collaboration is very nice, especially if we can make it more attractive by using technology. You know before there where whiteboards in trend. Now we have much cooler things such as Dropbox and Google Docs which work via combination of many technologies to assist on great end products. Speaking about accomplishing goals, user 3 agrees that collaborating via technology goal is achieved. He explains that in his collaboration effort the main goal was to prepare a white paper using technology to start it and completing it. He managed to do that very well in this collaboration. User 3 has used a lot of applications which he could relate these two (Google Docs and Dropbox) with, there are similarities especially if we check what they are supposed to assist us with. That is allowing us to create, share files and make it easier for us to do it from their platforms. One major change is Dropbox, as it shares the file to each individual PC/Mobile, plus it keep a copy in the provider’s servers. There is a lot of redundancy. This is all done automatically. On the other hand for Google Docs, if Google servers fail his files are lost. One of the reasons why he used Dropbox capabilities is to provide higher redundancy. He acknowledged redundancy of files in Dropbox as a change, new thing, provided by the cloud application.

There is another one which he saw; CloudHQ integrator (mover) of data between cloud vendors. This allowed him to be more efficient (better performer) when task processes where initiated and closed automatically. User brought up that Google Docs provides a great environment for collaboration but he would like to see more features and more user control of their “whiteboard”. On the questions “shaping you own environment” user 3 stresses that this is very important. Following up the example of whiteboard collaboration we used many pens with different colors to differentiate a meaning or make it more understandable. In Google docs we can do the same in this current technology where Web 2.0 Architecture is in place he would have loved if he could shape the environment as per his needs. When each user logged in to edit a document, his preferences would had their colour/images automatically picked for background. At least he would like to have had control on his profile. User 3 affirmed that a big advantage of using such systems is at same time mass collaboration and ease of use. If a system is not easy to use then it would end up being used by a certain group of people only but these are made for all. User 3 comments that control is okay to have. For small things like auto-save he would not mind, for bigger tasks he would definitely prefer control. Accommodating from him to these environments was easy. He had some difficulties setting up CloudHQ, it was new service not great instructions at the time he set it up. But once it was setup, he actually forgot about it. He sometimes used to get updates (weekly based) that what was transferred from one end to another. This made him realize that it’s working properly.

DropBox is better than other sharing systems which he used (Sharepoint, share folder and torrents). It is easier to administer and work with, all thanks to neat design (functional and usable wise).

User 3 told that he could not relate all functions/features from previous systems. The ones which he did not use he can’t relate them. There was one exceptional icon with description where he had difficulties to understand how to use it. He actually went in Google Docs help to fully understand what it does and how it does it. In its current form it was not understandable. Talking about control VS automation he asserts more control over elements to be automated. In his example, when he just setup the automation from Google Docs to Dropbox and vice versa. It automatically started doing it. He wanted later on particular folder to be shared and some approval incomes before shares happened from one end to another. At that point this was not there but he heard that they are working on such features; OUR VOICE was heard in the provider’s forum. As he notes – that’s the only way to change
something. Speaking about changes user 3 also saw the shift Google Docs did to Google Drive, they even introduced a client application “drive” like their competitor Dropbox. They renamed the application, added couple of features but still failed to fix the navigation with breadcrumbs but some of the new features were quite nice. Annoying things user 3 specifies as bad looks of Google Docs and more importantly Google Docs can’t print, if you try to print, it will make a pdf file to be downloadable. Pretty non-efficient! He will keep an eye how these systems develop, he checks for new items constantly.

Interview 3
Name: User4
Function in Case Study: Network Testing Engineer
Date: April 02, 2012
Start Time and End Time: 11:00am to 11:45am

The collaboration he did was very good. Technology made it possible for very fast replies/responses to be shared between collaborating peers in different locations. Technologies complete the goals more efficiently, particularly speaking about file sharing. If you remember before we had floppy disks, CDs and USB Storage but you still had to move with them. Then we started sharing files via Networks. Currently Dropbox is one of the leading vendors in terms of file sharing via network. It is fast, secure and easy. When he would compare application such as Dropbox with a locally hosted application for file sharing like: FTP, torrents etc., he explains: ‘They all lack the “single step” approach of Dropbox. We always add files to a “shared folder”, and then someone picks them up from “shared folder” to their local folder (dual step). If you try to open it while it is stored on some other server it takes time. With Dropbox you just have to add the file, that’s it. It will soon come to you with no interaction.” This kind of change removes the “slowness” effect from a typical files sharing approach, as its coming to his folder directly, he explains. Dropbox is very good app to work on, although while its growing there might be other features introduced. He hopes they add components which are easy and already known somehow from different local apps {tagging, who is online and listening for updates on that folder, etc.}.

Speaking about shaping your own environment user 4 specifies that it is very important to allow a user to shape ambience where he wants to be or see. For example Dropbox “skin” appearance or colours are same as his windows theme. His windows theme is brown so Dropbox is also brownish this quite well completed his need. He explains that the term skin in this case is not as “skins” for Winamp. Those skins actually gave more and better ambience as per desire. These were outside the theme spectrum of Windows but for Dropbox they are not available. Speaking more about Dropbox, he can say it’s more about the ease of use, especially when we he checks how the main goal for sharing files was simplified to one Step as explained before. This simplification improves the waiting time for opening a file. As time is important this is a very good advantage. Talking about automation in DropBox user 4 experienced one feature of auto-upload when he added a USB Flash drive. Dropbox popped up a screen asking him if he should allow automatic upload from this devices. There were some options to choose. The good thing about this is that it asked what you want to do with it. Accommodating into these environments wasn’t a problem because he could recollect from other APPs how sharing was happening. Dropbox was so easy to adapt with. He could map most of the features which were carried over (like drag and drop).

There were some specific to the Dropbox application – as per example the connectivity setup/test functions, so for those he had to learn them. While collaborating Dropbox updated(changed) the UI. It integrated more with web browser and provided new - better details of each file size. He heard from other peers that Google Docs can’t do that yet. Even though he was not informed (via email) about this change, he still liked it. Overall Dropbox
isn’t perfect; here is an example to it: “Suppose someone shares a file to the Dropbox enabled folder, it goes to all users registered. One of the peers decided to take that file to another folder for his documentation or to USB drive. They do that via drag and drop of course. Doing like this makes Dropbox activate synchronization and will remove the file from other peers.” This is not a good designed functionality, it quite annoying user 4 concludes. This happened during collaboration he did couple of times. Ultimately, he would collaborate again via these systems but he hopes by the next time they would have resolved the most annoying issue he experienced.

Interview 4
User 5
Function in Case Study: Network Testing Engineer
Date: April 02, 2012
Start Time and End Time: 12:00Pm to 12:30pm

Working together to design and test something without technology is hard. That is so because technology is tested/designed via technology. In distance cooperation’s we use different ways to communicate and collaborate. User 5 thinks he could not collaborate properly without technology. Being a true believer in technology and seeing it in action he strongly agrees that technology does provide better way to complete a task while collaborating. Better ways as in easier, paced and controlled. The difference he sees from local and cloud hosted application is on the delivery of content. They are delivered by others means as we are used to. He explains that by envisioning the difference between Music CD, MP3 Player and now Youtube. The main difference from all these three is the spread range of that content and more features. Since on Youtube you can have discussions about the song with other peers while you are listening, this could be understood as additional feature. He states that collaborating via cloud services performance gets better. Example can be a lecture given to the world and the same lecture given to a single class. In the first case the lecturer is performing at a higher level because with a single lecture he reached anyone who is interested in.

Now relating this to Dropbox it is approximately the same instance. It allows us to extend our content at a larger scale, automatically, to whom is interested in. He would change the ability in Dropbox so that only one person can edit a file at a time. What happened during collaboration he did is that when two people opened same file for editing the latest one was overwriting. This is definitely not good. There has to be a locked by X or something, he notes. To overcome this each of us shared our testing results separately. Users should be able to choose themselves good from bad elements in an application based on their desire.

Relating to earlier reply that cloud vendors are giving opportunity for the content to be shared in a much bigger mass, but you can send mass content even without their help. Simply by manually pushing your content on most frequent visited spaces. The simplicity is what it matters. Dropbox offers simply a better and at same time easier mechanism to share files to anyone you wish, automatically.

The most frequently used options, which 90% of the time are saving, submitting and restoring he would keep them always in auto mode. Dropbox includes some package that you can have unlimited revisions for each file. He states that this makes time travelling possible, as you can always go back in time and revisit what was written at any instance of time. But there are also features that he would like to have control too. Those include more complex or less than 50% of times used like whom to share files and whom to remove from sharing.

Working on with Dropbox was pretty easy, he got used to it very fast. It accommodates you well because of being user friendly. There are many file sharing applications available which everyone uses, the main difference he would say is ease of use, speed, automation and
redundancy. In Dropbox there was a new form introduced to understand a feature or functions. Primarily they placed colours in the feedback mechanism of a send or received file. He did not have a button to ignite that. It was done by itself. Other features, share a folder, share a link and invite someone were new but easily learned.

There was one security flaw or lack of proper informing to end-user from vendor. Dropbox should have informed better end users about it. That flaw was when you installed Dropbox client and started adding files to the folders inside the main one, they would appear public to anyone. If he wouldn’t have known better this could have been a dangerous place to collaborate. He had to disable it. He hopes that not so advanced users don’t share content they shouldn’t before understanding the difference what is public and private. He believes in technology and is all up for it.

User 5 will continue to collaborate in such environments but will test all possible vendors. It is good that they offer free service to test before you buy or decide to use it.
Appendix C

Appendix C contains the following sections presented in sequential order:

C.1 Figures – Images of Collaborative Systems
C.1 - Figures – Images of Collaborative Systems

Figure C1.1: Login Page Google

Figure C 1.2: Colors are not in contrast, Grey Dominates
Figure C 1.3: Red Colour, used to notify users of importance of Button

Figure C 1.4: Document written in Google Docs – Document Editing interface

Figure C1.5: DropBox Folder in Windows 7
Figure C1.6: DropBox Web View (colours)

Figure C1.7: Pop-up representing file add to local PC.

Figure C1.8: Green/Blue Colour Notifications to of Completed/Non Completed activities
Figure C1.9: Figure 1.2: Manual file add/change lookup.

Figure C2.0: Browser has not navigation options (red regtagle)

Figure C2.1: Returning back to Home.
Figure C2.2: Web Application has navigation options but hidden (red circle)

Figure C2.3: Navigation 1 Grouping

Figure C2.4: Navigation 2 Grouping
Figure C2.5: Navigation 3 Grouping

Figure C2.6: Navigation Grouping
Figure C2.7: Listing of content

Figure C2.8: Knowing where you are based on TAB + filename

Figure C2.9: Content Listing

Figure C3.0: Site map clearness
Figure D1.0: Automatic Saving of Document

Figure D1.1: Notifying the user of result

Figure D1.2: Description of saving function
Figure D1.3: Opening revision history in Google Docs

Figure D1.4: Google Docs Shortcuts
Figure D1.5: DropBox shortcuts

Figure D1.6: CloudHQ possible vendor automation capabilities.
Save Your Photos to Dropbox

View and share your photos and videos from your computer or smartphone. Earn up to 3 GB extra space.

- Automatically import when removable devices are connected

Figure D1.7: Dropbox USB – External disk auto upload setup

Your Synchronization Report For 03/05 - 03/12

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Files copied last week</td>
<td>0</td>
</tr>
<tr>
<td>Data copied last week</td>
<td>0 Bytes</td>
</tr>
<tr>
<td>Total files (until 03/12)</td>
<td>23</td>
</tr>
<tr>
<td>Total data (until 03/12)</td>
<td>27.4 MB</td>
</tr>
</tbody>
</table>

See more in your synchronization console.

Details

- /google_docs
- /dropbox

Files copied last week: 0
Data copied last week: 0 Bytes

Figure D1.8: Weekly reports of file exchange.