Pirates Group Project (PGP)
Department of computer science
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Dropbox Software Evaluation and Redesign for an Academic Environment

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Introduction

Cloud storage and file backup have become an essential component of online computer supported collaborative work (CSCW). Cloud file hosting services provide a means for individuals to store and share data in a public and private cloud, and also helps to synchronize files. Dropbox, developed by Dropbox Inc., is a popular online file storage application currently being used in CSCW. With 400 million registered users worldwide, Dropbox is being used as a tool for teams to store data, share files, and edit documents in a repository. This software has changed the face of the collaborative working environment (Chang, 2015). Dropbox allows for file sharing between users and is an essential software being used in CSCW. Filesharing is important in the academic setting for both researchers, academics, and designers. It is especially important in asynchronous work, which is a reality for many (Olson & Olson, 2014). Dropbox simplifies scholarly collaboration by allowing researchers to share files and data easily across various platforms (Hicks, 2014). Teachers and students find Dropbox an effective and successful tool since it allows for easy course management, thus showing that Dropbox is beneficial in an academic environment (Niles, 2013). Dropbox lacks features such as: user pathname resolution, API sophistication, and video and audio integration (Hicks, 2014). It also does not include features related to calendar integration, security, editing, and annotation issues (Quora, 2013).

A study done by Parmaxi and Zaphiris (2015) looked at the dynamics of social technologies, such as Dropbox, Wikispaces, Google Documents, Facebook, and blogs, as social microworlds. Microworlds are an element of constructionism theory, which believes that effective learning occurs when individuals make sense of the world around them by creating connections between old and new knowledge, while interacting with others to create important artefacts (Parmaxi & Zaphiris, 2015). This study found that all five social technologies used were needed to create a social microworld that would allow the participants to complete the tasks they were required to do (Parmaxi & Zaphiris, 2015). Parmaxi and Zaphiris (2015) believe that the design of well-structured microworlds must acknowledge the needs and expectations of both teachers and students, and that the design must also acknowledge the affordances of the technology being used. The technologies chosen must be based on cultural trends in order for the social microworld to be adopted in a learning environment (Parmaxi & Zaphiris, 2015).

Our goal is to design and prototype a “social microworld” based off the current design of Dropbox that will include support for the features that are not currently supported by Dropbox. There are a number of other softwares that contain positive features that we aim to include in this microworld. By doing this, we hope to create one tool that will support all the needs individuals trying to complete collaborative work.

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Motivation

With the study by Parmaxi and Zaphiris (2015) in mind, we believe that this project will help students and professionals who use a variety of CSCW software to have one software that will fulfill all of their communication and design needs. Furthermore, it will be a tool which will bundle together all of the features which have been found to be successful in a variety of other software programs. Using our methodologies, we are beginning to determine what makes a CSCW software effective. Furthermore, we have created a list of dimensions that we believe to be crucial for a successful CSCW tool. The impact will be far reaching as we plan to create a technical software mockup demonstrating our changes, and we plan to submit this feedback in a professional technical report back to Dropbox, along with guidelines on how and why they should be implementing these changes.

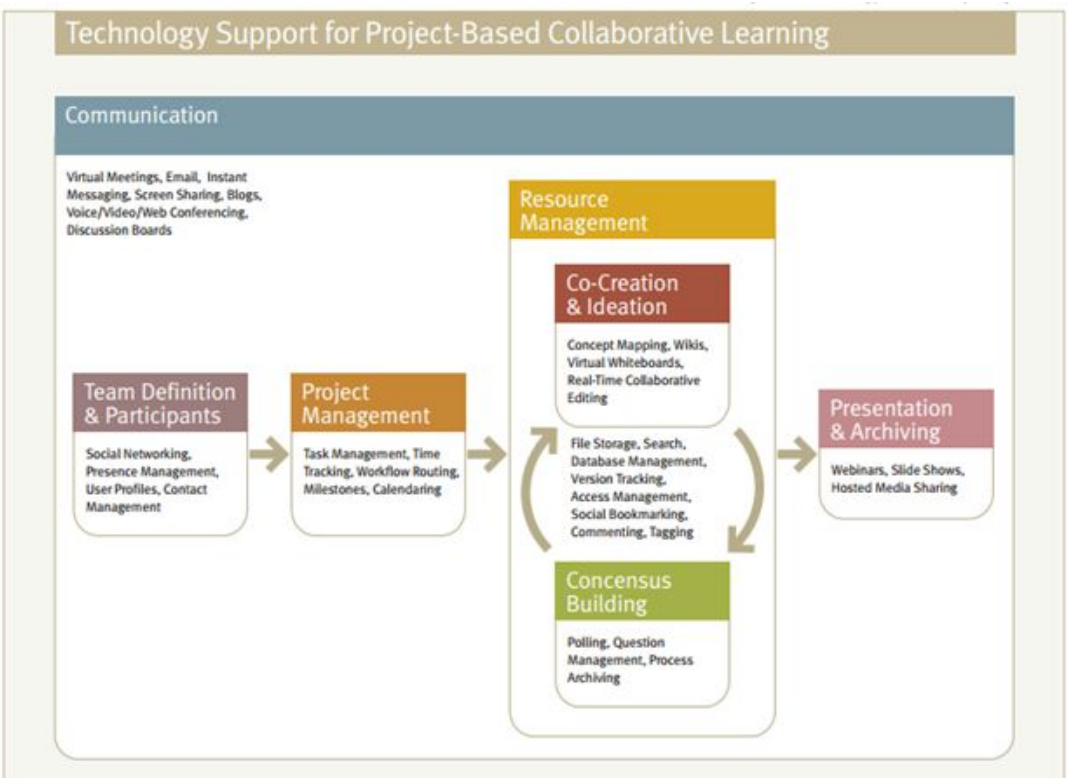
Related Works

One study done by Woodzicka, *et al*. (2014) implemented a multi-faculty, multi-project model that involved students and faculty from two different universities collaborating on a single research study. The students and faculty members used Skype, Dropbox and email to collaborate on the study (Woodzicka, *et al.*, 2014). The study found Dropbox to be vital in helping the students and faculty share literature, stimulus materials, and data (Woodzicka, *et al.*, 2014). Dropbox also allowed for synchronous file editing, which alleviated the need for email notifications every time a document was updated (Woodzicka, *et al.*, 2014). Skype allowed the students and faculty to have scheduled, collaborative meetings, which enabled them to have "face-to-face" conversations about their study (Woodzicka, *et al.*, 2014). The paper by Olsen and Olsen (2014) identifies four main barriers to successful collaboration: time zone differences, cultural boundaries and institutional differences, trust among collaborators, and communication between collaborators. Olsen and Olsen (2014) also identified four types of technologies that support distance work: communication tools, collaboration tools, information repositories, and computational infrastructure. Communication tools include: email and texting; voice and video conferencing; chat rooms, forums, blogs, and wikis; and virtual worlds (Olsen & Olsen, 2014). Collaboration tools include: shared calendars; awareness tools; meeting support; large visual displays; and workflow and resource scheduling (Olsen & Olsen, 2014). Information repositories include: databases; shared files; blogs or wikis; and online laboratory notebooks (Olsen & Olsen, 2014). Computational Infrastructure includes: system architecture; the network; large-scale

computational resources; and human computation (Olsen & Olsen, 2014). These definitions will help us to identify certain features in the different technologies we are investigating that will lead to the design of an all-inclusive collaborative tool.

Another study done by Rowe, Bozalek and Frantz (2013) looked at using Google Drive as a collaborative online authoring environment to facilitate a blended approach to authentic learning. Through technology traditional learning has changed dramatically. Our society is moving away from classroom learning and in some places adopting a blended approach to learning. Exposing students to enhanced communication and more engaging structures that encourage real life dialogue with no barriers to locations or class room books provides learners a unique experience that is developing important competencies such as critical thinking that is needed to be successful in the modern world (Rowe, Bozalek and Frantz, 2013). Empowering students to take control of their learning and developing the skills to do so is a shift from traditional learning. The standard of thinking within the confines and parameters of the textbook, is an obstacle in finding creative ways for solving problems (Rowe, Bozalek and Frantz, 2013).

Carnegie Mellon University published a paper about the role of teaching with collaboration tools (Deal, 2009), specifically how technology can be leveraged in project-based collaborative learning that require students to engage in design, problem-solving, decision-making and analysis to create an end product. These technology tools help facilitate team communication, project management, co-creation, consensus building, resource management, versioning and live/remote presentations.



Some other key takeaways from this paper include (Deal, 2009):

- Groups generate better range of ideas and group participation is more equal when collaboration tools are used because individuals can be more open and not feel inhibited compared to being in an actual group discussion
- Choice of collaboration tools should depend on the type and objectives of the project
- Technology can help instructors better monitor individual and group performance and prevent social loafing (likelihood that individuals piggyback on other group members)

Methodology

Below are the listed methodology steps. First, we started our project with an extensive literature review to develop a baseline knowledge of CSCW concepts and how these concepts can be related to our topic of redesigning Dropbox for an academic environment. We then created and submitted an ethics application in preparation for our user survey where we would be collecting data from various participants. Next, we generated a list of questions to evaluate how/why people used collaborative

software tools and other contextual and demographic information. After analyzing user survey results, we compared and contrasted Dropbox versus six other collaborative software tools and created a ratings matrix to quantify these results. Based on our group's literature review, user survey dissemination and software comparison and review we created a prototype mockup of Dropbox 2.0 which is an improvement over the current Dropbox. This prototype contained new features developed by our team and/or included features from other existing collaboration tools. After our prototype was finished, we conducted user testing on the prototype and recorded preliminary results. Finally, we will reflect back on our journey and propose alternative methods and discuss limitations of our current methodology.

Literature Review

Emily/Brenda

User Survey and Results

Jason/Adnan
Why did we choose to ask those specific user survey questions?

Software Comparison and Review

Jason

Prototype Mockup

Emily/Brenda/Meric?

User Prototype Testing and Results

Why did we do user testing?
Adnan

Alternative Methods

Everyone

Limitations of Current Methodology

Everyone

Evaluating Computer Supported Cooperative Work software is a very difficult and intricate task. It is not simple and there exist a multitude of evaluation techniques to determine whether or not a software is effective (Dugan *et al.,* 2003). A researcher must determine which perspective they will take to evaluate the software, whether from a HCI or a social issue perspective (Dugan *et al.*, 2003). Our group has chosen to focus on our evaluation from a technological CSCW perspective.

We began by evaluating Dropbox in detail using an extensive literature review. We acquired our articles from online databases using Summon 2.0 (UVic library website) and Google Scholar. We chose which elements of the software based on the list of considerations provided by Olson and Olson (2014) when choosing a CSCW software. The list of considerations is as follows: Thus far based on our software evaluations, we have determined which elements are of importance for CSCW software and tools. We will consider these when we finalize our analysis of Dropbox and create our mockup. We will evaluate Dropbox and our mockup in depth based on the following dimensions:

- Speed of the software response
- Computational requirements (size of the message/data)
- Security
- Privacy
- Accessibility
- User control (who can read, write, and edit)
- Richness of data transmitted
- Ease of use
- Context information (who did what, and when)
- Cost
- Compatibility with other software and applications
- Communication

We evaluated these considerations in depth for Dropbox and six other major CSCW software: Box, MS Sharepoint, Google Drive, Slack, OneDrive, GitHub. Thorough comparison between these softwares and Dropbox have begun to determine which features Dropbox is lacking and which features Dropbox excels in.

We have completed our ethics application and submitted it. While completing the ethics application, we began work on our survey. Our survey contained 11 questions and attempted to discover what features of a software were important to our demographic in question

(post-secondary computer science students using CSCW software for research or study purposes). Our survey was sent via email and posted on Slack. We surveyed students from the class in addition to other post-secondary students at UVic. Also, we surveyed a few faculty and staff members of UVic. The goal of the survey was to determine what students do and do not find effective in Dropbox and other softwares from a subjective point of view, and to combine these results with the objective results obtained from our software comparison. Using this information that we now have, we will re-design Dropbox by creating a mockup using Photoshop and Invision. We will evaluate our mockup based on our findings in our extensive literature review. That is, once we have determined which features are necessary for a successful CSCW software, we will include these in our mockup and attempt to evaluate our final design based on whether or not these have been successfully and efficiently implemented.

Software Comparison Results

In our software comparison we have compared and contrasted Dropbox with six other software collaboration tools: Box, Microsoft SharePoint, Google Drive, Slack, OneDrive and GitHub. In the below table, for each software collaboration tool we have listed its audience, technical summary and advantages and disadvantages. Based off these results, we will analyze which areas Dropbox is most deficient in and propose which features from other collaboration tools can be reasonably implemented into Dropbox to improve Dropbox’s overall usability, efficiency and functionality.

	Audience	Summary	Advantages	Disadvantages
Dropbox	Primarily targets the consumer user with Dropbox (free version) but has launched Dropbox Business to enter the enterprise market[1]	Dropbox is a central repository for a user's documents, files, photos and videos. Anything added to Dropbox, will automatically sync changes with all connected devices and Dropbox website[2]	-Clean user interface -Free and relatively fast file syncing with most basic plan -Different pricing plans (including a free version) allow individuals and organizations to choose the right blend of functionality vs. cost -Compatible with Microsoft Online, Adobe, Slack, Salesforce, Trello, InVision and a host of other applications natively[3] -Can be accessed on all devices (web, mobile, computer) -Intuitive file sharing with other users	-Does not support real-time collaborative editing for hosted documents and files - Limited integration with many collaborative applications (Skype, WebEx, etc.) -Poor cost-to-storage space ratio[4] -Ambiguous landing page layout that show unnecessary features -Versioning history is not customizable by team/folder and temporary for 30 days
GitHub	Git repository that offers a version control system for software development primarily, however users can adapt GitHub for other purposes	Mostly used as a software development code repository and provides the following services through a web, mobile or desktop GUI: ● revision control ● source code management ● access control ● bug tracking ● feature requests ● task	-Users and organizations can create a free account or pay for a private repository with increased features[6] -Offers superior distributed version control/tracking using three features fork, pull request and and merge -Makes tracking of contribution on project teams easier[7]	-Unfriendly user interface for novice users -Not ideal for project teams that have simple workflows as GitHub would increase user overhead [8]-Not the best tool for capturing creative process or for recording ideas -Branching may create transparency issues as people cannot see what other people are doing

[1] http://www.cio.com/article/2947902/online-storage/can-Dropbox-go-from-consumer-hit-to-business-success.html
[2] https://www.Dropbox.com/tour/1
[3] https://www.Dropbox.com/business/app-integrations
[4] http://online-storage-service-review.toptenreviews.com/Dropbox-review.html

		management ● wikis[5]		
Google Drive	Initially targeted the consumer user but has implemented new cloud and Docs features to target the enterprise user[9]	Primarily a file sync and sharing product used by hundreds of millions of users to securely store/access their files from any mobile or computer device[10]	-Default free account size that offers users 15 GB with option to purchase additional storage space or upgrade to Google Drive for Work -Intuitive UI because part of well-known Google Apps suite which many users have already adopted -Allows collaborative editing on a variety of file types: documents, spreadsheets, presentations and drawings[11] -Offers standard AES-256 bit encryption for all users -Good document searching functionality -Can be accessed on all devices (web, mobile, computer)	-Storage space is shared with Gmail inbox space -Sharing and editing privacy settings cannot be done in bulk for many files simultaneously -Need export Google Drive docs to preferred file format to edit in another program sometimes causing translation issues -Due to large amount of Google Drive features, especially real-time collaborative editing, this can negatively affect user performance
MS SharePoint	Targets teams of all sizes, primarily enterprise usage but can be used in an academic setting	Businesses, organizations and project teams can use SharePoint to create websites and/or as a place to securely store, share, organize and access information/files from any device[12]	-Highly integrated with other Microsoft products and other systems[13] -Can be implemented as a cloud or on-premise solution -Offers a robust set of features that covers almost all aspects of project management[14]	-No freemium version available and software is not ideal for individual users[15] -Increased UI complexity due to extremely rich set of features/capabilities -Steep learning curve for new users [16]-Lots of planning and

[6] https://github.com/pricing
[7] http://techcrunch.com/2012/07/14/what-exactly-is-github-anyway/
[8] https://www.g2crowd.com/products/github/reviews
[5] https://github.com/features
[9] http://www.computerworld.com/article/2491274/web-apps/google-targets-business-users-with-cloud-docs-advances.html
[10] https://apps.google.com/learn-more/gartner-mq-efss.html
[11] http://www.cio.com/article/2684057/cloud-storage/cloud-storage-users-share-pros-and-cons-of-leading-services.html
[12] https://support.office.com/en-us/article/What-is-SharePoint-97b915e6-651b-43b2-827d-fb25777f446f

			-Customizable security features and increased social networking abilities -File retrieval and access is relatively fast because SP is built on top SQL Server -Strong search functions and rights management -Offers many variable pricing plans for teams that only want a certain subset of the features	governance is needed for SP to be implemented properly for large project teams
MS OneDrive	Offers a standard and enterprise version of OneDrive and is suitable for all users	An online cloud storage service that integrates with Microsoft Office and available with all Windows 10 computers	-Allows users to simultaneously edit Office documents via computer or online browser[17] -Generous file storage space (10GB) with option to increase storage if needed -Tightly integrated with Office 365[18] -Allows repository-like document management functionality -Good at viewing multimedia presentations -Allows file tagging for easier search capability -Can be accessed on all devices (web, mobile, computer)	-Syncing can utilize a large amount of system resources inhibiting performance[19] -Limitation on number of file items but has option to upgrade -Requires a Microsoft account to use services[20] -Complicated folder structure and rights management -Known issues with filename format
Slack	Customizable and	A team collaboration	-Offers a powerful free	-Maximum capacity of 10K

[13]https://products.office.com/en-us/sharepoint/sharepoint-2013-overview-collaboration-software-feature
[14] https://www.g2crowd.com/products/sharepoint/reviews
[15] https://products.office.com/en-us/sharepoint/compare-sharepoint-plans
[16] http://www.softwareadvice.com/ca/bi/microsoft-sharepoint-profile/
[17] http://www.businessnewsdaily.com/6067-dropbox-vs-onedrive.html
[18] https://onedrive.live.com/about/en-ca/
[19] https://www.g2crowd.com/products/microsoft-onedrive-for-business/reviews
[20] https://onedrive.live.com/about/en-ca/

	scalable for students, academics, working professionals and any collaborative group	tool that offers real-time messaging, archiving and search that is divided by different communication channels (groups)	version for individual use and small groups[21] -Enables teams to organize conversations via project, top, team or any other group -Private channels and direct messages is available for sensitive communications -Files and documents can be shared via drag-and-drop functionality and allows file tagging -All messages, notifications and files in Slack are automatically indexed, archived and searchable -Possible to connect all your other collaboration tools via Slack to receive all notifications directly within Slack[22] -Can be accessed on all devices (web, mobile, computer)	messages for free version -Replacement for e-mail but not as a file repository/storage substitute -File sharing can be easily lost in the messages -Features tend to be hidden in various dropdowns/icons -Cannot view multiple channels at the same time
Box	Primarily targeting the business user	A web-based application that allows users to use cloud storage to store/manage all content and to share this content securely with other team members[23]	-Free personal version available for file storage and sharing capabilities -Relatively intuitive UI -Secure storage size of 10GB -Strong document encryption and other security controls -Microsoft 365 integration -Advanced user analytics available	-Maximum file size of 250MB for free version -Expensive to upgrade to Personal Pro edition ($11.50/month) for more flexibility and space -Emphasis on business documents means less robust photo and video capabilities [24]-No automatic synchronization between mobile and computer devices

[21] https://slack.com/is
[22] https://slack.com/is
[23] https://www.box.com/business/products-and-features/
[24] https://www.box.com/pricing/personal/

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Software Comparison Ratings

Below is a table with a scoring breakdown on a five star scale of the different collaborative software. We analyzed the collaborative software based on the eleven dimensions from the Olson and Olson research paper "How to Make Distance Work" plus one more dimension, communication. The reason we included a communication dimension is that teams, especially distributed teams, require constant communication when working together. Below is a brief description of each dimension:

Speed of Software Response

- What is the total effectiveness of the system measured by throughput, individual response time, stability and availability

File Storage

- What is the amount of storage space offered

Security

- What are the different types of embedded security features such as password protection, remote wipe, data encryption, data loss prevention, access tracking, and configuration management allowed

Privacy

- What are the different customizable levels of privacy and file sharing settings available

Accessibility

- What devices (desktop, web-based, mobile, tablet) can collaborative software be used on and how accessible is the system to all people regardless of disability/impairment

User Control

- What collaboration, content editing and role management features are provided by the software

Richness of Data Transmitted

- What types of files, documents, videos, photos and other multimedia forms can be uploaded/downloaded and shared

Ease of Use

- How intuitive and user-friendly is the software user interface

Contextual Info

- What type of contextual information is accessible (ability to create teams, share files, make comments and do file versioning)

Cost

- What is the monetary cost of the software for a given set of features

Compatibility with other applications

- What other applications (documents, communication, project management, etc.) are integratable into the software platform

Communication

- What built-in communication tools does the software provide

	Dropbox	**MS SharePoint**	**Google Drive**	**Slack**	**OneDrive**	**GitHub**	**Box**
Speed of Software Response	★★★★	★★★	★★★★1/2	★★★1/2	★★★1/2	★★★	★★★1/2
File Storage	★★★	★★★★	★★★1/2	★	★★★★	★★	★★★1/2
Security	★★★1/2	★★★★★	★★★1/2	★★★1/2	★★★★★	★★★★	★★★1/2
Privacy	★★★★	★★★★1/2	★★★★	★★★★	★★★★1/2	★★1/2	★★★★
Accessibility	★★★★★	★★★★	★★★★★	★★★★★	★★★★	★★1/2	★★★★★
User control	★★★1/2	★★★	★★★★	★★1/2	★★★	★★★★	★★★
Richness of Data Transmitted	★★★★	★★★★1/2	★★★★	★★1/2	★★★★1/2	★1/2	★★★★
Ease of Use	★★★★	★★★1/2	★★★★1/2	★★★	★★★1/2	★★1/2	★★★★
Contextual Info	★★★★	★★★1/2	★★★1/2	★★	★★★1/2	★★★★	★★★1/2
Cost	★★★★★	★★	★★★★★	★★★★★	★	★★★★★	★★★★★
Compatibility with other applications	★★★1/2	★★★	★★1/2	★★★★	★★★1/2	★★★	★★★
Communication	★★1/2	★★★	★★1/2	★★★★	★★★1/2	★★	★★1/2
Overall	★★★★	★★★1/2	★★★★	★★★	★★★1/2	★★★	★★★1/2

These ratings are based from our internal software comparison research, various software review platforms[25] and Gartner Research[26]. Gartner Research is a very reputable market research firm that publishes information technology insights such as Magic Quadrant matrices and IT vendor ratings. It is important to note that we only compared the features provided by the free or lowest cost software option because this is the option most likely utilized within an academic environment and also to keep the comparison consistent.

Analysis of Survey Results

We were curious in what team collaboration tools students and faculty members had used and how they felt about these tools. Therefore, we surveyed students from almost all faculties and faculty members in the computer science department. 84 people participated in our survey. According to the responses, out of 84 participants, 82 participants had used softwares for collaborating with others as teams(Figure 3). In addition, 82.9% of the participants had used these tools mainly for school work(Figure 5). These statistics suggest the popularity of team collaboration softwares in the academic settings.

In the survey, we asked the participants about which team collaboration tools they used. Out of 84 participants, 55 used Dropbox, 71 used Google Drive, 25 used Slack, 41 used GitHub, 22 used OneDrive, 3 used Box, 11 used Microsoft Sharepoint and 4 used other(Figure 6). Compare the number of users of Dropbox to the number of users of Slack, GitHub, OneDrive, Box and Microsoft Sharepoint, Dropbox still has a huge market. However, if we compare 65.5% of participants using Dropbox versus 84.5% using Google Drive, it implies there are some potential factors causing fewer users to use Dropbox.

Based on our preliminary literature reviews and in-depth software comparisons, we found that Dropbox had the following weaknesses:

- potentially ambiguous landing page layout (user interface)
- unclearly explained functionality leading to poor affordances(user interface)
- unsupported real-time collaborative editing for hosted documents & files (communication)
- lack of built-in communication channels(communication)

These weaknesses related to user interface and communication, and we wondered how people would rank the importance of user interface and communication. As shown in the survey, 65.4% of the participants rated the importance of user interface as 4 or 5(Figure 11). Also, 54.3% of the participants rated the importance of having video or audio calls as 4 or 5 while 24 out of 84 participants thought it was important to have chat functionality included in the team collaboration tools. Since user interface and communication were considered to be important as

[25] https://www.g2crowd.com/

[26] https://www.gartner.com/doc/3098819/magic-quadrant-enterprise-file-synchronization

suggested by our survey results, but Dropbox had some weaknesses in user interface and communication, we decided to come up with our new Dropbox 2.0 Prototype.

User testing of Dropbox 2.0 Prototype.

Objectives:

Our mockup is heuristically designed for editing, sharing, and manipulating files. It implifies the use of the existing Dropbox and alike tools. It takes the user straight to the point to complete her or his task on hand. We hope to learn from these user tests on how our mockup/interface could be made better in terms of usability, visual appearance, design minimalism and flexibility of file/data presentation.

Method:

Multiple participants were involved in our user testing. They are between the age of 25 to 40. The participants were asked to perform 2 tasks. These tasks took the participants to every aspect of the system as to give them full understanding of the tool. The exact task breakdown is attached in the appendix.

The users were initially given a verbal description on how a typical user would use it, but they were not given any practice time since we wanted to test the affordances and intuitive decisions in the design. The user study took place in a meeting room ECS 124.

We gave each participant a laptop with the prototype initiated at the main screen and a sheet of paper listing the tasks. They were told that they were timed on their completion of each task. The participants were also asked to talk aloud about what they think the system is doing, what they were trying to accomplish, and what was confusing at that point in time. At the end of each task the prototype was reset to the main page by the researcher so that the next task could be started afresh.

Results:

All four participants showed improvements in terms of task completion timing from one task to the next one. The mean time from task 1 to 2 were 1.320 and 1.275 respectively, with

some improvements from task 1 to task 2. This could mean that after getting familiar with the system, the participants could easily accomplish their tasks.

Table 1: Participants task completion timings for each task

User	Task 1 (min)	Task 2 (min
Beijia (Frances) Yu	1.17	1.00
Meric Demiriz	1.45	1.25
Jason Chen	0.49	0.80
Adnan Duale	2:17	2.05
Mean	1.320	1.275
Stdev	0.6954	0.5484

Appendices

Appendix A. Individual Contributions Summary

Adnan

Brenda

Emily

Frances

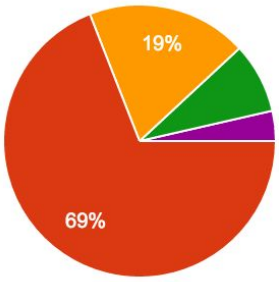
Jason

Meric

Appendix B. Team Roles

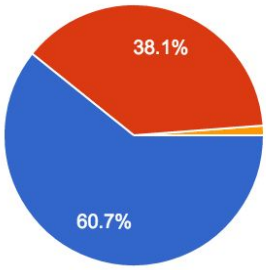
Appendix C. Milestones

Appendix D. Summary of Responses from Survey



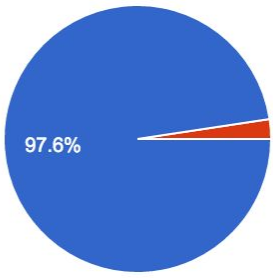
12-17	**0**	0%
18-25	**58**	69%
26-35	**16**	19%
36-65	**7**	8.3%
65+	**3**	3.6%

Figure 1. What is your age?



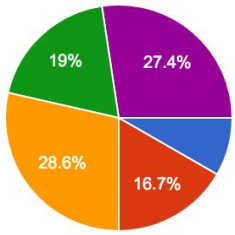
Male	**51**	60.7%
Female	**32**	38.1%
Other	**1**	1.2%

Figure 2. What is your gender?



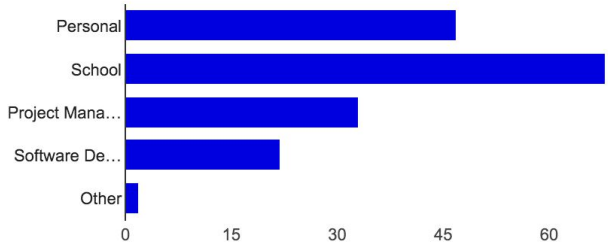
Yes	**82**	97.6%
No	**2**	2.4%

Figure 3. Do you use software as team collaboration tools?



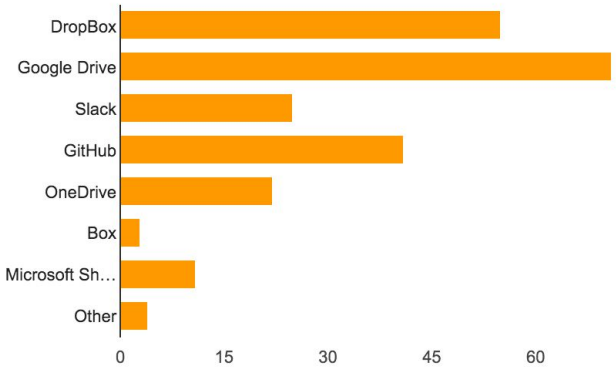
Never	7	8.3%
Monthly	14	16.7%
Weekly	24	28.6%
A few times a week	16	19%
Daily	23	27.4%

Figure 4. How often have you used these collaboration tools in the past month?



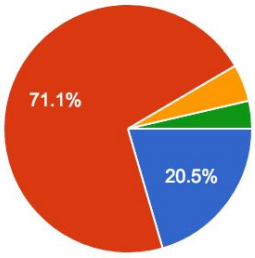
Personal	47	57.3%
School	68	82.9%
Project Management	33	40.2%
Software Development	22	26.8%
Other	2	2.4%

Figure 5. What are your main uses for software collaboration tools?



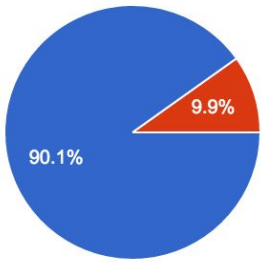
DropBox	55	65.5%
Google Drive	71	84.5%
Slack	25	29.8%
GitHub	41	48.8%
OneDrive	22	26.2%
Box	3	3.6%
Microsoft Sharepoint	11	13.1%
Other	4	4.8%

Figure 6. What software collaboration tools do you use?



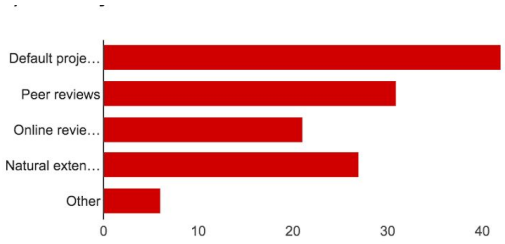
0 - 2	**17**	20.5%
3 - 5	**59**	71.1%
6 - 10	**4**	4.8%
11+	**3**	3.6%

Figure 7. How many people do you typically work with on a team project?



Nothing	**73**	90.1%
Other	**8**	9.9%

Figure 8. How much do you spend on team collaboration tools per month



Default project tool	**42**	51.2%
Peer reviews	**31**	37.8%
Online reviews/discussion	**21**	25.6%
Natural extension of your software ecosystem	**27**	32.9%
Other	**6**	7.3%

Figure 9. How do you decide which team collaboration tools to use?

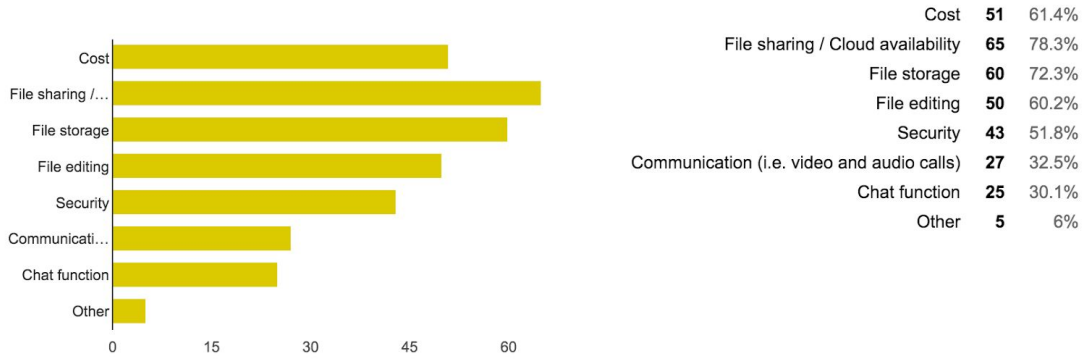
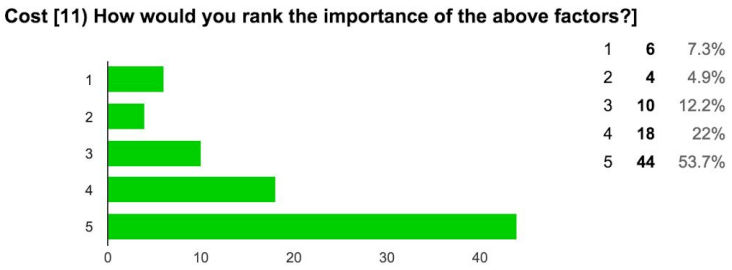
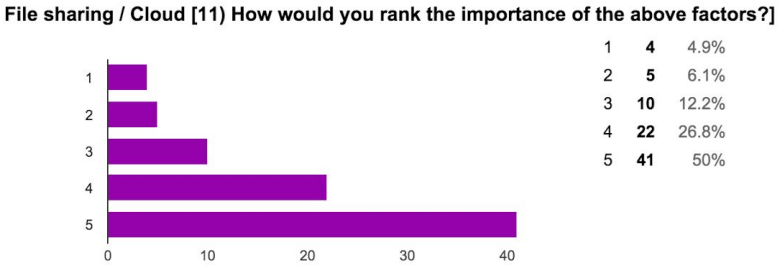
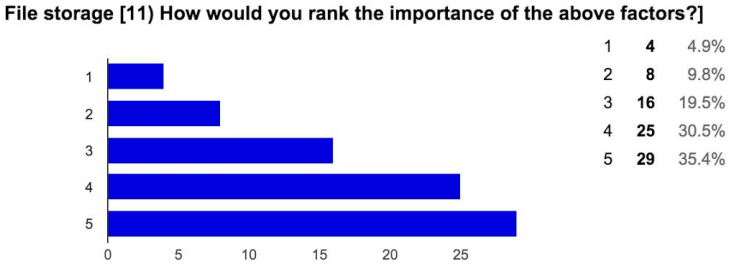


Figure 10. What features in a team collaboration tools are most important to you?







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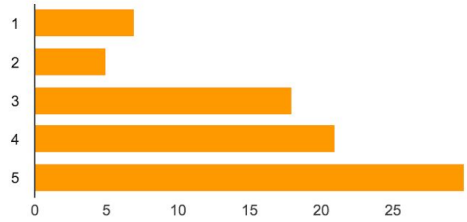
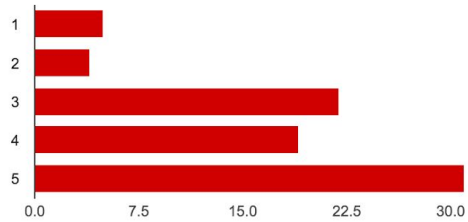
File editing [11) How would you rank the importance of the above factors?]



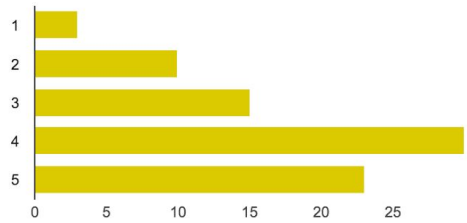
1	**7**	8.6%
2	**5**	6.2%
3	**18**	22.2%
4	**21**	25.9%
5	**30**	37%

Security [11) How would you rank the importance of the above factors?]



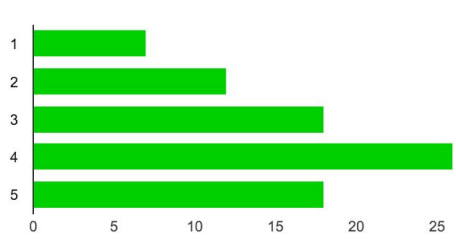
1	**5**	6.2%
2	**4**	4.9%
3	**22**	27.2%
4	**19**	23.5%
5	**31**	38.3%

User interface [11) How would you rank the importance of the above factors?]



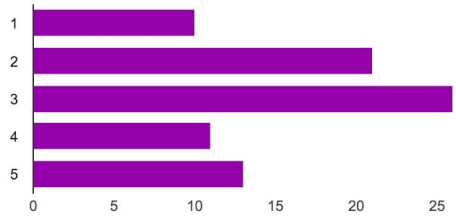
1	**3**	3.7%
2	**10**	12.3%
3	**15**	18.5%
4	**30**	37%
5	**23**	28.4%

Communication [11) How would you rank the importance of the above factors?]



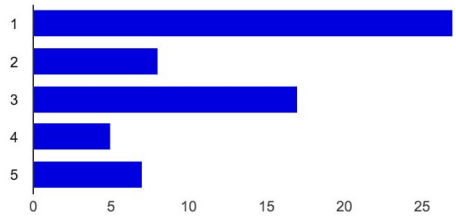
1	**7**	8.6%
2	**12**	14.8%
3	**18**	22.2%
4	**26**	32.1%
5	**18**	22.2%

Chat Function [11) How would you rank the importance of the above factors?]



1	**10**	12.3%
2	**21**	25.9%
3	**26**	32.1%
4	**11**	13.6%
5	**13**	16%

Other [11) How would you rank the importance of the above factors?]



1	**27**	42.2%
2	**8**	12.5%
3	**17**	26.6%
4	**5**	7.8%
5	**7**	10.9%

Figure 11. How would you rank the importance of the above factors?