



University College Cork

Assignment submitted as part of
MEngSc
Information Technology in Architecture, Engineering & Construction
Academic Year 2017/2018
November 2017

IMPROVISING A COLLABORATIVE TECHNOLOGY TO MEET THE NEEDS OF A SME

By School of Engineering

Lecturer: Dr Matevz Dolenc
Module: Computer Mediated Communication
Project Report
Shane Delaney

Declaration

I hereby declare that this report is my own work and effort and that it has not been submitted anywhere for any award. Where other sources of information have been used, they have been acknowledged.

Signature: Shane Delaney

Date: 17/11/2017

Table of Contents

Declaration.....	2
Table of Figures.....	4
1 Introduction	5
1.1 Identified Problems.....	5
1.1.1 Inefficient Organisation	5
1.1.2 Time Management.....	5
1.1.3 Cost	6
1.1.4 Poor Communication	6
1.2 Objectives for the SME.....	6
1.2.1 Easy to Use.....	7
1.2.2 Cost-Effective	7
1.2.3 Secure.....	7
1.2.4 Organised	7
2 Collaborative Technologies.....	7
2.1 Comparison.....	7
2.1.1 More Common Features.....	7
2.1.2 Teams & People	8
2.1.3 Communication.....	8
2.1.4 App Integration	9
2.2 Limitations.....	9
2.2.1 Limited Plug-Ins.....	9
2.2.2 Inadequate Access	10
2.2.3 Subscriptions.....	10
2.3 Slack	10
2.3.1 Organisation.....	10
2.3.2 Efficient	10
2.3.3 Notifications.....	11
2.3.4 Integration	11
2.4 Slack’s Problem	11
2.4.1 Distraction.....	11
2.4.2 Adoption	11
2.4.3 Limited Function	11
2.4.4 Conflict within Group.....	12
3 Case Studies	12
3.1 Positive Use Cases.....	12

3.1.1	RLoop	12
3.1.2	Zapier	12
3.1.3	Autodesk	13
3.2	Negative Use Cases	13
3.2.1	Computerworld	13
3.2.2	Fast Company	13
3.2.3	Medium	13
4	Guided Interview	14
5	Conclusion	15
6	References	16
7	Appendices	17
7.1	Appendix A	17
7.2	Appendix B	17

Table of Figures

Figure 1 – Collaboration Technology [1]	5
Figure 2 - Quality vs Time [2]	5
Figure 3 - Project Management Triangle [3]	6
Figure 4 - Objective Cycle	6
Figure 5 - Feature Comparison	8
Figure 6 - Team & People	8
Figure 7 - Communication	9
Figure 8 - App Integration	9
Figure 9 - Slack Implementation [6]	10
Figure 10 – Distraction [9]	11
Figure 11 - RLoop future view [13]	12
Figure 12 - Hard-Drive System	14
Figure 13 - Dropbox System	15
Figure 14 - Guided Interview Data Collected	17

1 Introduction

In completion of the module, computer mediated communication, the topic chosen for the project report is “improving a collaborative technology to meet the needs of a SME”. One of the main reasons this topic is chosen is to optimise the work output for a SME. The SME team works on lots of documents together and regularly share them with clients throughout the workflow. A collaboration technology can improve the existing process and keep it competitive when it comes to new job offers. In order to fully comprehend the need of a collaborative technology for the SME problems need to be identified.



Figure 1 – Collaboration Technology [1]

1.1 Identified Problems

There are many recognized problems that the SME faces day-to-day. These issues are often the weakness in the company and can be corrected in order for the SME to better itself. Listed are some of the main concerns that the SME faces;

1.1.1 Inefficient Organisation

The first problem is inefficient organisation for a construction based SME. It is difficult to go through emails to find files. Time is often spent on searching for past documents from old emails and not filed correctly. In some cases the details are lost and take a lot of time to retrieve. Details such as invoices, receipts, project information and data has to be organised better in this technology driven era where email and inefficient organisation just isn't working anymore to meet the needs of the SME.

1.1.2 Time Management

Time in between contact is often lost when working on-site or trying to reach office needs. Time lost from emails, text and phone calls are often problematic for effective work output. Figure 2 shows the relationship between time to complete a project and the quality of outcome. The Figure effectively shows that the faster the time it takes to do a task the more efficient it is. Management of time is necessary in order to fully get the potential out of the SME.



Figure 2 - Quality vs Time [2]

1.1.3 Cost

For a SME cost is a major issue faced on a regular basis. Most businesses find it difficult to get paid on time by customers. This in return can leave the SME in-debt sometimes when being owed for a job. The project management triangle below in Figure 3 illustrates that getting things done at high quality and in fast time means high cost. When working with low costs and doing things quickly results in low quality. The SME wants to be completing jobs at high quality but when cost is the problem it is often tough for the SME to do.



Figure 3 - Project Management Triangle [3]

1.1.4 Poor Communication

Lastly the final problem identified is poor communication. Many cases for poor communication take place in any work environment. Important emails may not have been sent or an order not delivered due to phone calls missed. No matter how small or large the lack of communication is, poor communication will strain the productivity of the organisation.

1.2 Objectives for the SME

The objectives of this report are to meet the needs of the SME and help find a collaboration technology that would optimise previous methods.

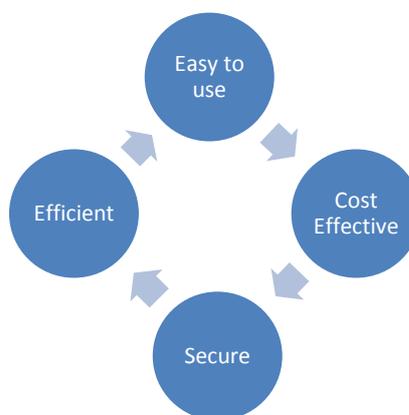


Figure 4 - Objective Cycle

1.2.1 Easy to Use

The technology would have to be easy to use in order for non-experienced users to successfully operate. The technology must be easily self-managed. Technology is often hard to adjust to when people are used to routine, so a simple easy-to-learn technology will have to be implemented. In a busy work environment time saving and productivity is essential.

1.2.2 Cost-Effective

Most collaboration tools have no upfront development costs and only cost the amount of users needed. Gone are the days of having to pay expensive annual contract fees, more and more solutions are “pay as you go”, plus the savings made on IT support as most these technologies are self-managed. Self-managing solutions become more attractive to businesses and require little training.

1.2.3 Secure

Collaboration technology offers bank-grade security to ensure all data is safe. Cloud storage is usually used for collaboration tools which associate high-bit security and physical security that can't usually be provided on-site the SME's network. Cloud storage minimises the possibility of hard-drive damage. Data centres have strict back-up procedures and have storage over multiple servers meaning in the event of failure there is less to lose.

1.2.4 Organised

Organisation is very important when it comes to optimising the needs of the SME. Organised team conversations and information regarding project work is necessary for the SME to progress competently. It should be organised so that all the companies' communication is at one simple location at the click of a button.

Keeping these four objectives in mind the aim is to increase the productivity of the SME by simplifying or speeding up communication by an effective collaborative technology.

2 Collaborative Technologies

In this section of the report collaborative technologies will be analysed by comparison and limitations. The collaborative tool will have to meet the criteria set up in the previous section and meet the needs of the SME.

2.1 Comparison

There are many collaborative technologies and tools available to use. A lot of these tools have better characteristics than others. In this section the characteristics will be compared to get a better understanding of what collaborative technologies have to offer. Please note that all data used can be viewed in Appendix A [4].

2.1.1 More Common Features

Some sharing tools have better features or more common features than its competitor. To better understand this, data is collected online to better appreciate what these collaboration tools have to offer. Using data collected from an online source the graphical representation below in Figure 4, shows how feature comparison score against each other. Each tool receives a score based on the number of features they have. Wrike is voted the best for features in this comparison study.

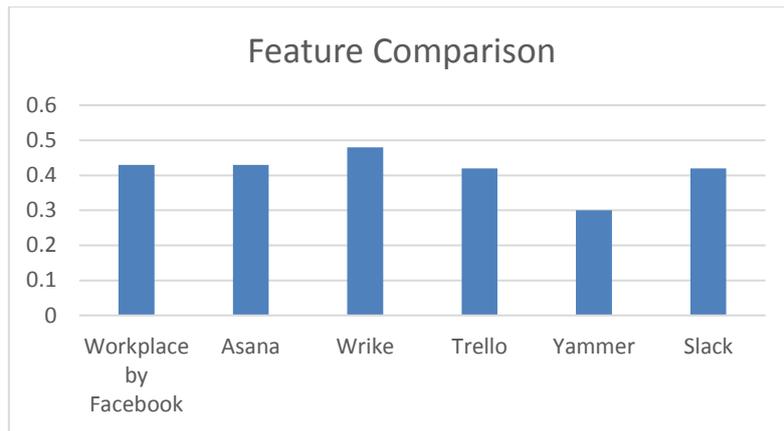


Figure 5 - Feature Comparison

2.1.2 Teams & People

Every company works in a team. Team work is very important on projects that involve a lot of time and which are complex. Different technologies treat teams and the members of the team differently than others. Figure 5 depicts what different characteristics are needed in order to have a fully functional team. In this case, Slack is the most effective team and people application which allows good sharing and proficient accessibility in order for the SME to work.

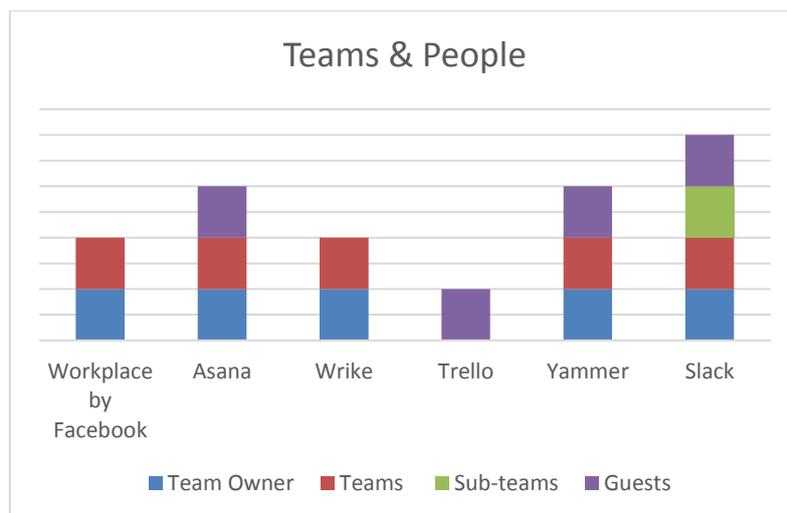


Figure 6 - Team & People

2.1.3 Communication

Communication within a workplace is extremely valuable to beat the problems of inefficient organisation and time loss. Communication without chaos makes work simpler and less difficult. A lot of collaborative sharing expertise improvise real-time communication to help teams share ideas better, speed up decision making and work in the same direction. Figure 6 shows the various ways of communication the platforms use. Slack is without doubt the most competitive application which allows the user to direct message, group chat, group video call, team chat and direct call.

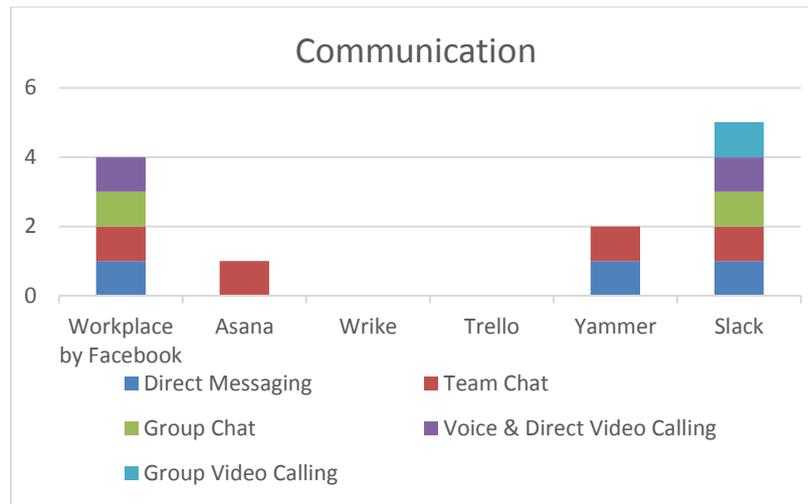


Figure 7 - Communication

2.1.4 App Integration

A lot of companies use applications within their organisation to share files, documents and even just to save information or data regarding projects. Strong integration with other apps makes the collaborative technology more valued. Document sharing apps such as Google Drive and Dropbox need to be easily incorporated into a collaborative technology in order for it to be wanted.

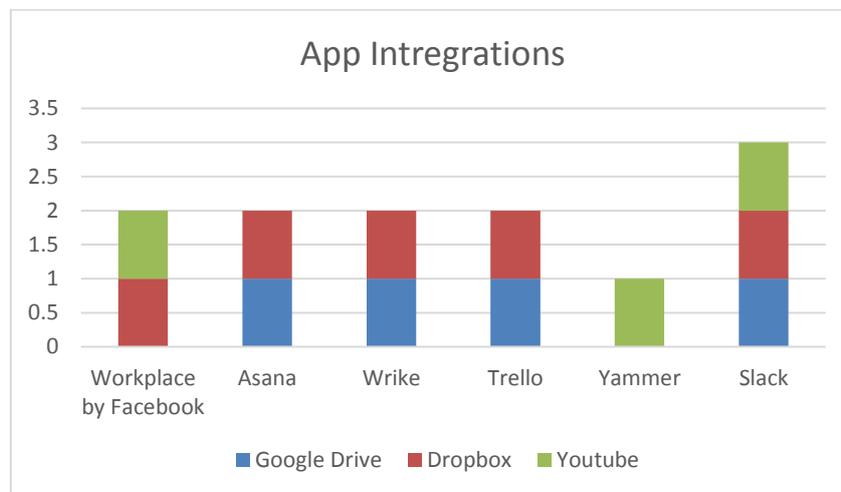


Figure 8 - App Integration

2.2 Limitations

When analysing the various types of collaboration applications available the main limitations came up time and time again. These limitations are what made the likes of Slack, Wrike and Workplace more convenient to use [5].

2.2.1 Limited Plug-Ins

Some technologies have limited plug-ins meaning the company can't use some of its daily software needed in order for the company to function. Applications such as AutoCad and Revit which are used on a day-to-day basis in most AEC SME's have no plug-ins in the collaborative tools.

2.2.2 Inadequate Access

Many collaborative technologies have inadequate access to use it. A lot of these companies only have desktop access which means it makes it quite restricted to use. In the modern era applications should be in-sync with mobile phone in order to get full productivity out.

2.2.3 Subscriptions

Subscriptions is the final limitation that was came across in comparing the technologies. Subscriptions make the tool less appealing for the SME who is looking for a cheap way of improving their business.

2.3 Slack

When looking at the comparative study it is quite clear that Slack is the market leader when it comes to collaboration. It is probably the best collaborative technology at the moment. Slack will be the proposed collaborative technology looked at and it can improve the SME by the following attributes.

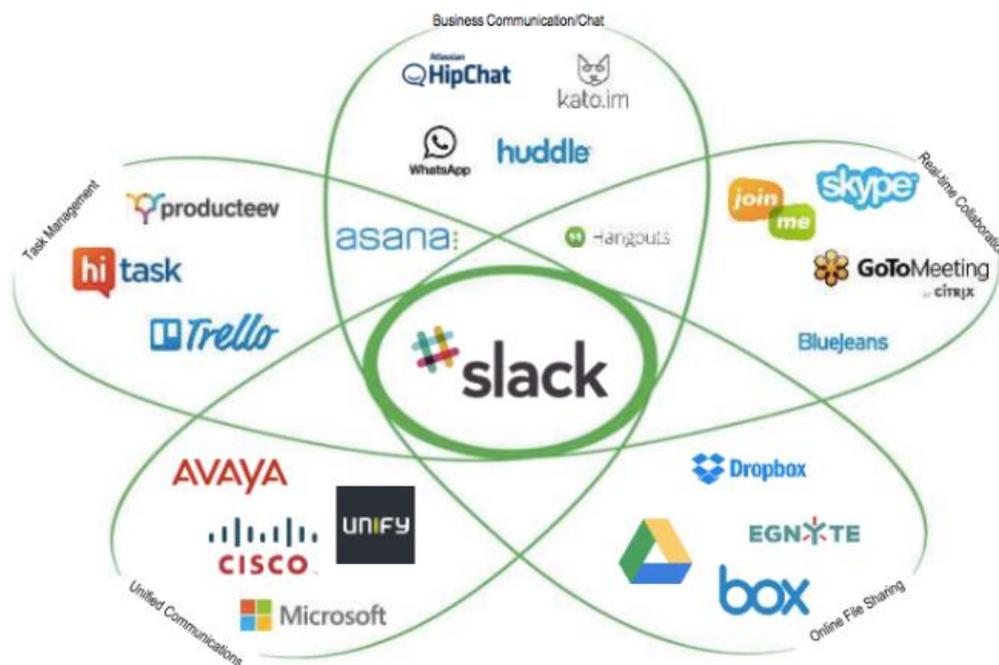


Figure 9 - Slack Implementation [6]

2.3.1 Organisation

Slack can improve the SME's organisation. Everything on slack is searchable through a search bar. The files and documents that are lost can be retrieved by searching and avoid unnecessary time wasted looking for old files. Retrieving lost files is made easier with Slack.

2.3.2 Efficient

Slack provides the user with desktop accessibility along with a mobile application which can be downloaded in order to move forward with the business. This means that the company can work more efficiently as everything is in-sync to allow the company become more productive.

2.3.3 Notifications

Slack notifies the user when an item needs attention. The notifications help the company meet the immediate needs. It optimises the communication within the company by allowing the company work the way it should.

2.3.4 Integration

Integration to Slack from other frequently used applications helps it become more wanted. It integrates with many plug-ins such as Dropbox, Google Drive, Asana, Soundcloud and even Revit. A new plug-in developed called Slackit for Revit allows Autodesk BIM software to communicate with project team members via Slack. It also provides an interface for the management and maintenance of the model [7].

2.4 Slack's Problem

However Slack does have many identified problems. Collaborative technologies like Slack have many risks and limitations to overcome in order to fully function to the best of its ability. In this section the problems in which Slack has are looked at.

2.4.1 Distraction

Slack can create a distraction. Getting drawn into a Slack discussion can reduce productivity to a point. Slack has numerous beeps, buzzes and flashes that can distract the user from completing actual project work regarding AEC area. Slack has been said to be possessive and demanding of its user and distracts the user like social media. Critics have also said that they don't know how to quit Slack and "do not disturb mode" doesn't quite work. [8]



Figure 10 – Distraction [9]

2.4.2 Adoption

Adoption is sometimes difficult for companies who are afraid of change and using new technology when they argue that email is working. It is often hard to get people to change or adopt when they are so used to working in a manner which they are used to. Not everyone wants to work or collaborate in a way like Slack offers [10].

2.4.3 Limited Function

At the end of the day Slack is only a tool and does not run a whole project. It has to rely on existing software in order to function. There is not a massive need for Slack only when the need is to collaborate efficiently. Also Slack is only free up to 5GB and 10000 messages, which means if the company becomes totally dependent on it the cost may increase [11].

2.4.4 Conflict within Group

When the group is constantly at crossroads over key points the project can suffer. Clashes within personality occur when the group can't come to an agreement. Project objectives might not be met if people can't communicate accordingly [5].

3 Case Studies

In this section of the report an investigation into the use cases of Slack will be made. This will help give a better perspective on Slack and how it has helped companies in the AEC sector overcome its problems to make the most out of the collaborative technology. An investigation of negative use cases will also be looked at.

3.1 Positive Use Cases

3.1.1 RLoop

RLoop is an online think-tank that wants to democratize the Hyperloop by using open source and collaborative design and development. They want to change the limit of travel by using the concept of a Hyperloop. The Hyperloop is the idea of removing air in a tube for a pod or aircraft to travel. The aircraft within the tube shoots at very high speeds due to the tube being a vacuum [12].



Figure 11 - RLoop future view [13]

RLoop breaks the problem into parts where everyone in their team has their own specialty. Slack helps them talk to each other easily by organised conversations. Slack allows them have a distributed network of brains tackling the problem. They isolate and break RLoop down into small parts and then forward the parts to the rest of the team. Everyone on Slack has a piece of the project. “A team member from China does the design using CFD, a person from Alabama in the USA develops the aircraft body and a person from Australia specialises in electrical safety critical components. “ RLoop is a benchmark of how people from all around the globe can come together and solve any kind of problems using Slack. [14]

3.1.2 Zapier

Zapier is a web-based service that allows users integrate the web applications they use. The company successfully operates without an office and by a remote workforce. The key feature in which Zapier uses from Slack is the interactive screen sharing. The interactive screen sharing attribute that Slack offers means that users can work click, scroll and type what is on the presenters screen. It has enabled a pair of programmers thousands of miles away to simultaneously work on code. Having the ability of working in pairs and sharing screens allows for effective support for customers questions also. [15]

3.1.3 Autodesk

Autodesk offers a service to aid architects, engineers, structural designers, manufacturers, visual effects and game developers to bring their imagery to reality. They provide an open-source for the users of their products. They identified Slack as the right tool to help them meet the demands of their industry and potential new hires. The conversation allows ideas to be shared between product groups, engineering and sales groups. Autodesk says that open source-friendly is absolutely vital for the future success of the company as more and more companies move to cloud there is a lot more competition for the unique service that they provide.

The director of open source at Autodesk, Guy Martin, has developed programmes and classes to improve Slack usage for the benefit of the company. *“Slack has provided the only true cross-company, many-to-many collaboration platform. We saw immediate benefits, including people making comments on our #adsk-slack-successes to the effect of 'I've had more contact with other teams at Autodesk in the first six months of our Slack usage than I've had in 6 years at the company.”*[16]

3.2 Negative Use Cases

There is no doubt that Slack is a great tool for collaboration and communication for a SME. However not every company has positive use cases for Slack. In this part of the report the negative use cases of Slack will be looked at.

3.2.1 Computerworld

Computerworld is a digital magazine that serves information technology and business management with coverage of emerging technologies and analysis of technology trends. Computerworld explain that Slack has no Boolean search. Use two search items and Slack will return any message that has either item. When Slack notifications are turned off the user still receives notifications which shows that Slack can become a distraction if the unavailable status does not work. Computerworld believe that Slack is still rough around the edges and that there is still a few things that they should fix before they will fully convert to using Slack [17].

3.2.2 Fast Company

Fast company magazine focuses on technology, business and design. The Fast Company tried Slack to overcome the inefficiency of email. They quit Slack after using the service for two years. They describe Slack as being addictive and feel they have to stay constantly connected to keep up. The Fast Company believe that Slack is built for shallow conversations as it was nearly impossible to sustain a full conversation from beginning to end. Real time off is non-existent for Slack and if people are on vacation or simply unavailable to work it still notifies the user [18].

3.2.3 Medium

Similarly Medium is an online publishing platform that experiences negatives when using Slack. The key fault they have with Slack is the group chats it provides. They argue that starting a new group chat trying to solve a problem which needs multiple people involved to be solved is frustrating. In a new group chat in Slack the user finds itself having to re-explain the whole situation for each new person added. The group chats are not like the channels within Slack which means there are more chat windows open and keeping track of what is going on in each chat is difficult for the user. The group chats often make the project messy and hard to follow [19].

4 Guided Interview

In a guided interview the student met up with his old employer Energy Services Ltd. Energy Services Ltd is a SME based in Cork in the AEC sector. With a large focus on Energy Management, Energy Procurement and Energy Supply the company have clients globally. The company set up in 2008 and used hard drives to store all their information regarding projects. They now use Dropbox to collaborate and work more efficiently. It shows how computer mediated communication has helped their business defeat the issue of time management, inefficient organisation and poor communication within their SME [20].

The student asked the company for data relating to the hard-drive system and the Dropbox system that they now currently use. The data is shown effectively below in the case of bar charts to show what improvements in the company that computer mediated communication has made.

Energy Services Ltd said that the hard-drive system was inefficient in order for their company to grow. The hard-drive system made things slow to access information relating to projects and data which helped their clients. The hard-drive system also made the communication and collaboration aspect difficult for remote engineers to work from. The amount of emails and phone calls per day is shown in Figure 12. This data is taken for one week in 2009 and is available in Appendix B. In one week they had a total of 140 emails and 105 phone calls. The averages are broken down per day and hour they worked. Energy Services Ltd needed to optimise this because it was interfering with work that had to be done.

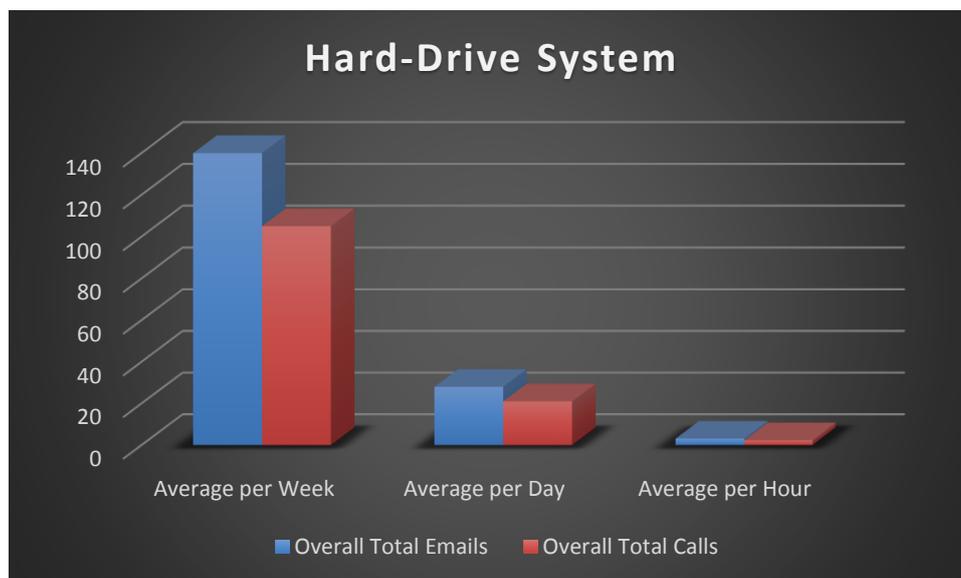


Figure 12 - Hard-Drive System

The Dropbox system that Energy Services Ltd implemented in 2013 has tackled some of the problems that the hard-drive system made. The amount of phone calls dropped by 57% for a week taken in 2013 to 60 per week. Dropbox not only reduced the amount of phone calls but also cut the amount of emails to do with projects as everything could sync into the system easier from remote locations as well as at the office. The Dropbox system allows everyone to collaborate and share files easier.

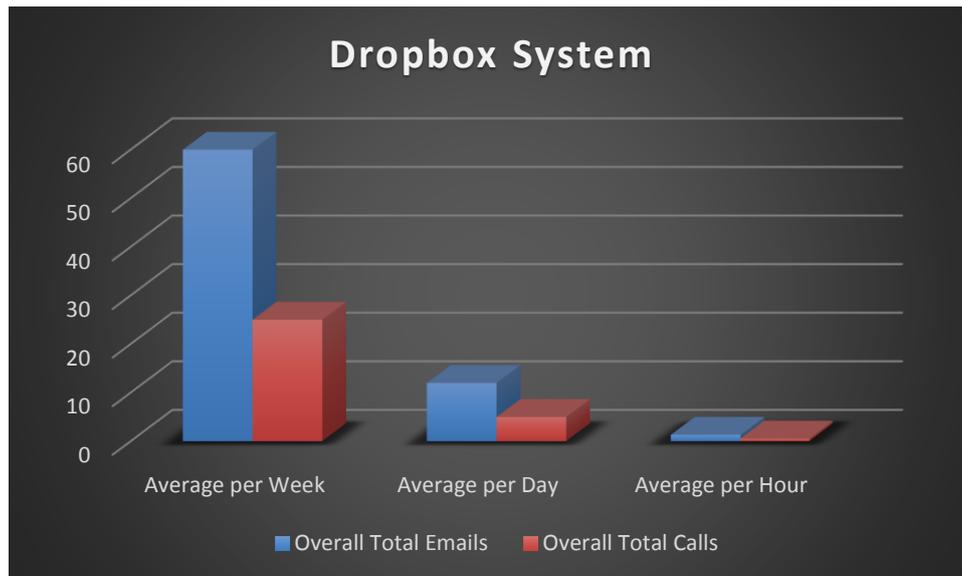


Figure 13 - Dropbox System

Dropbox allowed the company to improve the organisation, time management and communication while also helping the productivity of the company. The productivity was enhanced by people spending less time searching for documents and being on the phone. The company is happy to keep on using Dropbox as they use it purposely for management of projects. The student tried to offer them Slack to better communicate within their company for team projects but rejected the offer. Energy Services Ltd are happy with Dropbox, Email and old fashioned phone calls. They do not want to change to a new collaboration technology as they have built relationships with clients and other companies using email and phone calls.

5 Conclusion

In conclusion to the module computer mediated communication it is clear that many issues that occur within the SME environment can be resolved by using a collaborative technology. Slack is looked at detail to tackle issues within the SME and is voted “the best” collaborative technology for companies to use. Although Slack doesn’t meet everyone’s demands and sometimes is hard for companies to adapt to the overall scenario with Slack is that it works for companies. It provides a solid and reliable platform for a company to work off defeating issues such as inefficient organisation, time management, cost and poor communication. It integrates well into current services or applications that the company uses. An article from the New York Times says Slack is the office application that may finally “sink email” [21].

In the case of the guided interview, Energy Services Ltd shows how a collaborative technology has helped their company grow and overcome poor productivity. They are happy with using Dropbox to share documents and update their organisation.

It goes to show that computer mediated communication can help a SME in the AEC sector grow and become more successful. There is so much variety of applications readily available for a SME to use in order to overcome some very common issues within the working environment. It is being able to adapt and accept change is where the real problem lies.

6 References

- [1] <https://diginomica.com/2017/03/31/collaboration-key-counterering-iot-security-concerns/>
- [2] <https://www.slideshare.net/BlackbaudPacific/how-to-ensure-successful-leadership-and-capacity-building-in-your-organisation-presentation-with-elise-sernik>
- [3] <http://cwstrategies.staffingindustry.com/sow-management-cost-speed-and-quality-a-delicate-balance/>
- [4] <https://www.samepage.io/collaboration-tools-comparisons>
- [5] <http://www.brighthub.com/office/collaboration/articles/73856.aspx>
- [6] <http://cunninghamcollective.com/insights/blog/2015/06/30/escape-the-box-three-great-ways-to-use-the-petal-diagram-for-strategy>
- [7] <https://www.espaciobim.com/slackit-slack-revit-bim/>
- [8] <http://uk.businessinsider.com/i-used-to-be-obsessed-with-slack-but-now-im-dropping-it-completely-heres-why-2016-3?r=US&IR=T>
- [9] <http://ryanmarciniak.com/archives/1898>
- [10] <http://captureapps.com/pros-cons-slack/>
- [11] <http://www.techrepublic.com/article/slack-the-smart-persons-guide/>
- [12] <http://www.rloop.org/>
- [13] <https://blog.colony.io/visions-of-the-future-e8bb374575cd>
- [14] <https://slack.com/customer-stories#rloop>
- [15] <https://slack.com/customer-stories/zapier>
- [16] <https://slack.com/customer-stories/autodesk>
- [17] <https://www.computerworld.com/article/3006988/enterprise-applications/5-things-wrong-with-slack.html>
- [18] <https://www.fastcompany.com/40433793/my-company-tried-slack-for-two-years-this-is-whywe-quit>
- [19] <https://medium.com/@chrisjbatts/actually-slack-really-sucks-625802f1420a>
- [20] <http://www.energy.ie/our-story/>
- [21] <https://www.nytimes.com/2015/03/12/technology/slack-the-office-messaging-app-that-may-finally-sink-email.html>

7 Appendices

7.1 Appendix A

Table 1 - Data Collected Online [4]

	Workplace by Facebook	Asana	Wrike	Trello	Yammer	Slack
Feature Comparison	0.43	0.43	0.48	0.42	0.3	0.42
Teams & People						
Team Owner	yes	yes	yes	no	yes	yes
Teams	yes	yes	yes	no	yes	yes
Sub-teams	no	no	no	no	no	yes
Guests	no	yes	no	yes	yes	yes
Communication						
Direct Messaging	yes	no	no	no	yes	yes
Team Chat	yes	yes	no	no	yes	yes
Group Chat	yes	no	no	no	no	yes
Voice & Direct Video Calling	yes	no	no	no	no	yes
Group Video Calling	no	no	no	no	no	yes
App Integrations						
Google Drive	no	yes	yes	yes	no	yes
Dropbox	yes	yes	yes	yes	no	yes
Youtube	yes	no	no	no	yes	yes

7.2 Appendix B

Hard Drive System	Overall Total Emails	Overall Total Calls
	Average Per Week	140
Average Per Day	28	21
Average Per Hour	3.11	2.33

Dropbox System	Overall Total Emails	Overall Total Calls
	Average Per Week	60
Average Per Day	12	5
Average Per Hour	1.33	0.56

Figure 14 - Guided Interview Data Collected