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Company communication plan for customer projects

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The purpose of this thesis was to enhance the communication method of a software company that is specialized in creating web-based interactive educational applications. The aim was to create transparency with both internal and external communication. This goal was to be to achieved either through an application or by creating a communication model that all company employees could follow.

The project was started by interviewing the company's employees, including the project managers, where the needs of the personnel was outlined. Based on the interview results, the criteria for the project was set to reduce the use of email in daily communication as it was too formal for inter-office communications and caused file management problems with external communication. In addition, the managers wanted a clearer method to see the stages of a project without having to ask every individual involved in the project.

Various project management and content management applications were tested. Out of the tested applications one content management application, G Suite, was acquired by the company as the management did not believe that a project management software was necessary. Instead, a decision was made to enhance the use of current applications that were in use in the company by creating written guidelines for them. In addition, a checklist was to be created for gathering the necessary information for each project that would be available to all the project members.

The checklist was created with the help of other employees in the company, however, it did not get the change to be tested thoroughly in duration of this thesis and therefore can't be said whether it was a success or not or how it should be developed. The G Suite implementation was successful in regards to content creation and reduced the use of emails in that area. Based on the feedback of employees, they find G Suite helpful, however, they do not believe that communications of the company have been solved and to improve the external communication, other guidelines should be set within the company.

Keywords	Project management, communication, production process, content management

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1   Introduction

The goal of this project is to build and complement upon the current project management system and customer communication process of a software developing company specialized in creating interactive education based web applications. The goal of this thesis is to improve the company's communication methods both internally and with the clients to meet the requirements and to enhance the work of all the personnel within the company. It is to increase transparency, organization and clarity of each project without adding to its workload. The project also, should improve the communication between both all the staff of the company, and the client.

The criteria for this tool is to enhance workflow by displaying details, instructions, stages and type of each individual project. Moreover, it should state the different type of communication needed for each project and facilitate that said communication type. It should not be difficult to use, time wasting or add any extra cost for the client.

The company in question, Apprix Oy, specializes in creating interactive platforms related to education and it currently employs twelve employees. The staff consists of project managers, designers, copywriters and technical developers. Each of these groups/departments depend on each other for information to be able to further their work. Therefore, miscommunication in one department will cause damage to the work of other departments.

In this thesis, the process management of the company is introduced, discussed and adjusted to upgrade the workflow and add to the productivity of its employees. Moreover, a communication strategy should be introduced to add transparency in all levels of the company.

2   Communication as part of project management

Communication is vital to all projects and their management. There are growing evidence that a good communication method helps companies thrive and progress. The term "communication" may have a different meaning for each field. For instance, a sociologist will think of it in terms of social sciences, while a marketing agent will from the aspects of leadership and selling. [1] For project management, Dow and Taylor divide project communication into three crucial parts: communicating on time and regularly, outlining the right information to give and collecting, distributing and storing information [2].

However, communication in project management is a social interaction and at the core of it is each individual's own communication skills, which goes beyond any meetings or project management systems [3]. In this paper project communication is defined as every type of communication that might occur during a project between the people involved. The people involved are usually project managers, team members, stakeholders and suppliers. The purpose of this chapter is to outline the impact of communication in project management, and the management's role in creating an ideal environment for communication.

2.1   Research done in the field of project management

For a project to succeed, communication and personal relation skills are essential. Nevertheless, the role of communication is often overlooked in project management, and the term is used loosely without any plans or guidelines. Moreover, the literature on project management fails to go any further on the subject to define a good communication. Instead, it only focuses on its impact and involvement. The purpose of this chapter is to outline the impact of communication in project management, and the manager's role in creating an ideal environment for communication. This section will cover the research that has been done in this area.

Communication as a skill

One of earliest researches made on the human interaction side of project management was done in 1974 by Thamhain and Gemmill [4]. They discovered that there is a direct line between project manager's ability to communicate and the employee's effectiveness

in their work, thus making communication one of the most important skills a manager could possess. This finding was a start to a new era of discussion that put communication at the center of project management. Later on, in 2001, Sotiriou and Wittmer [5], through case studies, further proved Thamhain and Gemmill's [4] findings. Stating that a project manager's most important skill is negotiation and persuasion.

Slevin and Pinto [6], using case studies, showed that sharing information leads to the desired results of a project and that communication is a crucial part of every aspect of a project. Based on their findings, a project manager should be able to provide all the required data and proper networks to implement them to all actors involved, including the clients.

Henderson conducted two studies related to project communication [7;8]. Her data was collected from project teams in various industries. In both, she concluded that project managers' ability to deliver and receive information is directly related to employee satisfaction and productivity. Another study by Skulmoski and Hartman [9] showed that project managers and business leaders believed feedbacks and open questioning during the initiation of a project, have a positive impact on the end results.

The above-mentioned research show that in order to succeed, project managers have to develop their communication skills. The challenge of project managers and communication is that many of those managers have a background in their own field (e.g. technology, business etc.) and rarely they possess, or have a limited, background in communication or leadership. Based on these findings, a demand for educational programs for project management are growing among researchers [10]. Their aim is to train competent managers with enhanced communication skills to carry out successful projects.

Impact of communication and tools on process

Various studies have been done on the relation of communication to success. These studies looked at communication as a factor in relations to success and failure in project management. Majority of these studies were done within the context of research and development and the results were conclusive: communication of team members has a big impact on the outcome of the project and that a two-way communication creates a more positive outcome. [11]

Studies were also done outside of the research and development scope. Research done by Hoegl and Gemuenden [12] showed the positive effect of informal communication in software project teams. Their research put communication at the center of teamwork as the most vital feature. Their findings were confirmed by other studies, such as Ammeter and Dukerich in 2002 [13], where they concluded that regular meetings had positive impacts on how the team accomplished its goals. In Chiocchio's various research, he observed that more messages were exchanged between high performing teams than any other [14].

Tools enable communication between the team members. The type of tools varies vastly, from email, video conferences, phones and various project management tools among other things. Projects are complex and uncertain as they change constantly, project managers must come up with a communication method to hold the project team intact. A study by Gibson and Cohen shows that number of tools used is in correlation with how successful a project is [15]. However, not all tools suit every project equally. A communication tool is only good when it serves the needs of a project. A survey done by McKinsey Global Institute (MGI) shows that an average employee spends roughly 28 percent of its time managing emails and 20 percent looking for internal information. This means that in an eight-hour work day, employees spend roughly four hours searching for information through various tools [16].

The research and findings above show that managing projects are complex and difficult to maintain without proper planning. Therefore, project managers must invest more money and time on communication than they already do. Communication is a crucial part of project management and as every other part of a project needs to be developed as it goes on.

2.2   Criteria for success and failure

Unsatisfied customers and passed deadlines in projects are mostly blamed on Excel sheets or system failures. However, that is not always case. Studies have shown that poor communication in projects in the root of 95 per cent of problems faced during the project. When a direct line has not been set for a project, it is very easy for it to go astray. However, companies still fail to include communication as an important part of their strategic plan and project managers often overlook its importance. [3]

Various surveys have been performed to uncover the factors that make a project successful or those that make a project a failure. A survey by The Standish Group in 1994 called CHAOS, defined a successful project as one that is on time, on budget and it works as it was initially intended. The same survey estimated the cancellation rate of software projects in the United States was roughly 31 per cent, while the success rate was only 16 per cent. The survey outlined the factors that make a project successful and the most important ones were: user involvement, support from the management and a clear statement of the requirements. In failed or challenged projects, lack of both user involvement and incomplete set of requirements were key factors of failure. It is to be noted that user involvement and a clear outline of the requirements both fall under project management and communication and this survey shows their importance in successful projects. The CHAOS survey has been criticized as its methodologies were not disclosed and therefore not peer reviewed. The survey also failed to consider customer satisfaction and software quality. [17;18]

As finding the actual failure rate for software is crucial for the industry, other surveys have been conducted to allow companies to benchmark their process and identify their weaknesses. To find this rate, El Emam and Gunes Koru [18] conducted an online global survey of IT departments in 2005 and 2007 and gathered a total of 388 responses. Their definition of success varied from the one done by The Standish Group [17], as they also took customer satisfaction, productivity of the staff and quality of the software into account. The estimated rate of unsuccessful projects, as in cancelled projects, during the time of their survey ranged from 11 and 15 percent while the success rate ranged between 48 and 55 per cent. This discovery shows improvement from the 16 per cent success rate of 1994 as shown in the CHAOS report [17]. However, similarly to CHAOS, the survey uncovered that the involvement of management and clear project requirements were fundamental to a successful project. [18]

2.3   Communication with stakeholders in the field of technology

Translating technology into words is not an easy task, especially if the communication is happening between two parties where one is not technology oriented. In these situations, engineers must pick their words carefully to deliver their message to the other party without any complications. In the case of this project, this communication is happening between an IT company and a client. [19]

As a service providing company, customer service is essential as it is the basis of every successful project. As discussed previously, in tailor-made software, miscommunication with the clients can cause misinformation in creation of software and thus lead to a faulty product which then results in the loss of business. Communication is especially important if it's the first time the client in question is conducting a business with the IT company, as no trust has been built beforehand [19].

Information such as maintenance, outages, changes or any bugs must be reported to the client honestly and the communication must be on point. Acronyms or any other technical words should be avoided. The message delivered should not be long, as the stakeholder does not need to know specific details, only the main message is sufficient enough. Users often want to know how these changes will affect them, therefore the delivered message should be from the point of view of the user. The company should also take into consideration what kind of communication method it is going to use. For example, when informing the client company about an outage or a modification, the users of that said company might not necessarily read the technology related emails, however, they might read the note left on the notice board, or vice versa. [19;20]

Often clients are not aware of the details of the project and are only interested in the final product. However, occasionally clients want to be involved in the project to ensure that the product is as they want it to be. During these situations, if a proper trust has not been built between the parties, the right type of communication is crucial as it helps to build a communication that allows both parties to reach their goals. The rest of this chapter will deal with the issues that might arise when communicating with stakeholders and how to interact with them. [19;20]

Problem reporting

Delivering bad news is never optimal and it's not an easy task. Often people tend to wait until the last moment to deliver bad news. However, when dealing with a client, it's a good habit to deliver the news to them as soon as they are ready for it. Holding off until the last moment to deliver the news will make the company seem deceptive and the stakeholder will assume that they are being deceived or that the company is incompetent. Furthermore, receiving a problem early on allows both parties to solve it on time and does not become a threat at the later stages of a project. [20]

The trust between the two parties defines project communication, in addition, the willingness of the client to be involved in the project has a big influence on how the communication will get conducted. [20] As seen in figure 1, if the trust and client's involvement is low, the communication is only superficial, as both parties prefer not to discuss the issues with each other. However, if the trust and client's involvement is high, then the communication will need guidelines so that both parties can keep the level of trust up.
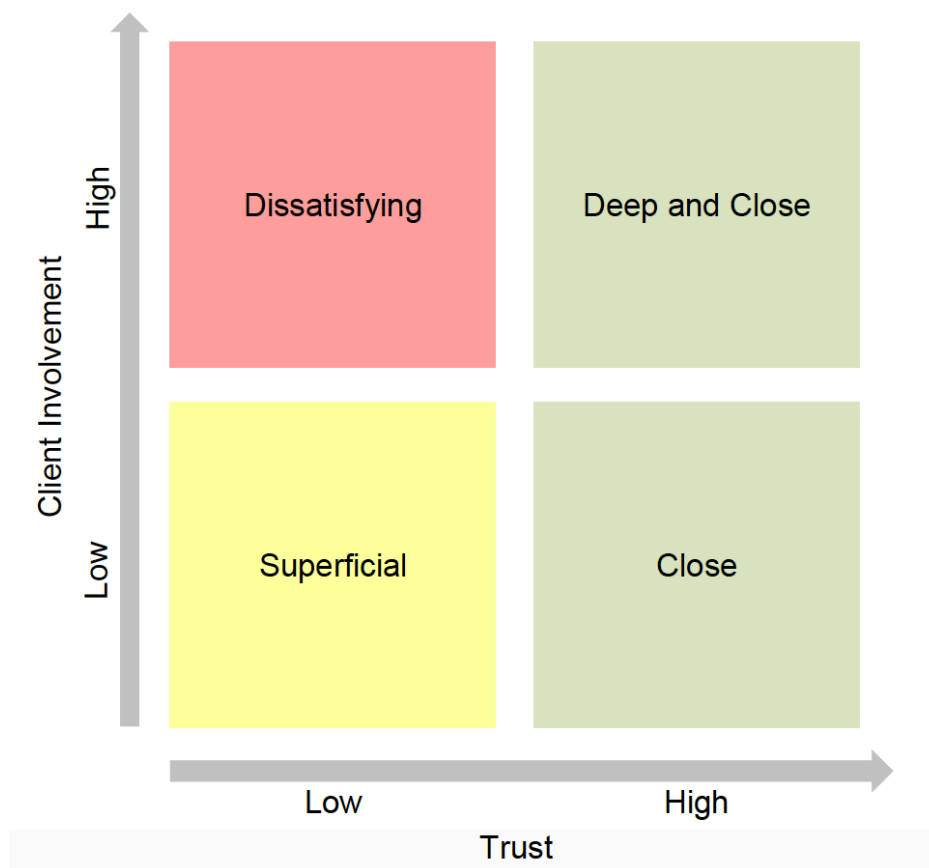

Figure 1. Relationships between the client and the company. *[20]*

Based on the trust between the two parties, the company can decide on what are the issues that the stakeholder should get involved in, as their time is important and should not be wasted with problems that the company can fix by itself. The company should also find out how much the customer wants to get involved and act based on that. [20]

The company is to come up with a system to update the client with various news, such as accomplishments and problems. This sent message, whether it is in person or via a report, has be on point and devoid of any unnecessary information. While delivering the problems, their severity should also be mentioned to reduce unnecessary panic. The

client's opinion or solution on the problems should be acquired, as they might be able to solve it, however that might not always be the case. [20]

The two relationships should be so that both parties understand that there is room for mistakes, as both parties are human and errors happen. Sharing their flaws with each other allows for trust to grow between the parties. By including the stakeholder in the process, they can also carry some of its responsibility and will enable them to help the company in solving it. Moreover, by knowing all the length the company goes to, to create a software, makes the stakeholder appreciate them more. [20]

This approach, however, comes with its own negative effects. For example, constant meetings with a stakeholder will take up the time of both parties. Moreover, planning meetings could be difficult, as the schedules might not match. Furthermore, it is to be taken into consideration that the stakeholder might not have a technical background therefore, more time and energy should be reserved for explaining the process and its stages to them. [20]

Coordinating a project with a client

Occasionally service providers and clients might combine their forces and coordinate a project, where they both provide their sets of skills. In this scenario both parties are un-aware of each other's work as they are specialized only in their own field. This might cause the client to fail to see the importance of software related aspects of the project and therefore, cut its funding. [20]

During the above-mentioned relationships, the IT company should mostly discuss issues from their business aspects and avoid discussing technical issues unless it's specifically asked to. However, the company should not withhold any information from the client as it will break the trust between them. The being said, giving the client the information that they need to know in an understandable way, reduces frustration on both sides. [20]

The cost of each item should be mentioned clearly and understandably. Moreover, these items should include the price for bug fixing and testing. Furthermore, upon giving these estimates, the service provider should also include their benefits and state clearly their positive influence on the project. Giving a detailed estimation and insight on the project,

allows for a fair discussion on the topics where both parties can contribute justly. Moreover, this method gives a price range to the client, which will help him evaluate the risks and a create sales pitch for those who oversee the budget. [20;21]

2.4   Current era communication method

We live in the age of information and social networking. An era where a workplace is no longer equivalent to a physical office space it used to be confined to. It now possesses a more virtual meaning, where all places such as, hotels, cafes and bars can substitute as a working environment. However, companies have not all embraced this transformation and still rely on traditional methods of communication, even if this new definition renders the conventional office communication redundant. As memos, files and emails are perceived as inessential in the new era. Furthermore, with this change, the duration of work hours has changed and are no longer bound to the office. Employees might work on their own schedule that differ from each other both in duration and time zone. [21]

As the conventional definition of the office changes, another has to replace it. A place where employees can be in contact with one another and have access to any information that they might require at all times. As this workplace cannot be physical due to above mentioned restrictions, it has to be virtual as a social networking website and thus accessible at all times. Employees should be able to both gather and add data through this environment, this way they would also be participants in this information sharing rather than being only receivers, such as in social networking websites. [21]

This virtual space would also require a new kind of communication method, a creation of a kind of network that would be capable of reaching employees in various locations and time zones would be necessary. Furthermore, this network, despite of the location of its employees, should be able to help and guide them in building their team spirit and uphold the company culture as well as allowing the employees to thrive in their work.[21]

This virtual communication method might not directly affect those who are physically present at the office at all times, however, it would allow those who work remotely to be part of the organization and provide them with an opportunity to immerse themselves in the changing company culture. Moreover, the impact of having all employees of the company involved thoroughly in the process and communication would build a strong team spirit that would allow the company to prosper in its process. Furthermore, this would

also reduce workplace isolation, as the information is always available to everyone, and create a more united team. [21]

This virtual space would not only allow formal communication but it would also contain informal communication. Furthermore, it should be able to allocate space for different types of games and team building exercises. CEO of LinkedIn [22] Dan Nye has previously argued that an internal communication website could reduce the time employees use to check and send redundant email, which by an estimation of McKinsey Global Institute [16], takes roughly about 28 per cent of their time. [21]

3 Project background

As this thesis is addressing three different ways of communication as well as process management, this section will be dedicated to describing the current process and outlining the problems of each type of communication – employee, client and external communication.

Upon starting this project, the company had acquired multiple new tools for easing the process management, such as the element library [23], which allowed the new employees to see the functionality of each element. However, the communication with the client and the internal communication regarding the project was still lacking. The company's public image was also lacking as it was not present in any of the social media platforms such as Facebook [24] or LinkedIn [22], which was making the process of hiring new employees and creating a company image difficult. In addition to those, there was no project outline available and no tool or method was designed for the members of the team to acquire information related to the project.

Since I, myself, am an employee of this company and by the start of this project I had been working there for a few months only, it was easy for me to spot the problems. Furthermore, as I would also be part of using the new tools and methods, it motivated me more to come up with a viable communication plan.

3.1 Current customer communication process of the company

Apprix takes on many projects in various sizes. The projects are mostly education based, designed for training the employees of the client companies. The process of the company has been visualized in figure 2 and will be discusses further in this chapter.
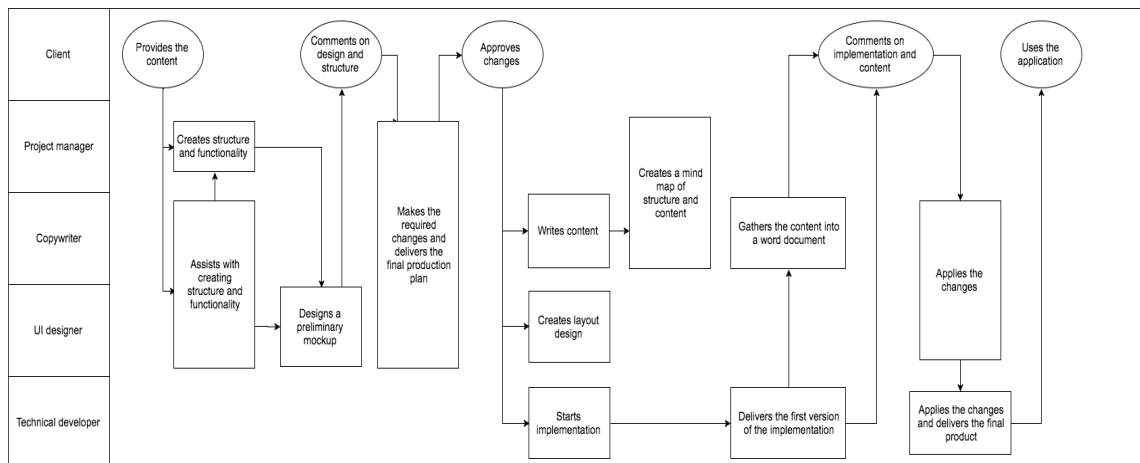
Figure 2. Company process.

During the first sales meeting with the client, the type and the duration of the training will be decided. Based on the information gotten, a draft of the contents will be created in a form of a mind map, which will be altered during the process by the copywriter and project managers based on new materials received. The educational contents of the training are mostly created by Apprix based on the materials received from the client, however, clients occasionally might want to design the training themselves, in that case Apprix only aids in creating the content.

To make the training interactive, different kinds of task will also be included among the information to evaluate the trainee's knowledge. The tasks and be multi-choice questions, sliders and true/false statements. There is also a final exam based on the content of the training that the users must pass. All the user interactions, such as answers and feedbacks, will be saved into a database to gather statistics on employees' knowledge.

Based on the initial mind map created by the project manager, the UI designer will create different types of layout for each page, that in the company are called as "elements". The designer will also define a theme for the training depending on the client and the type of training.

After the first draft of the contents and layouts have been created they will be sent to the client for the approval. The technical side of the project begins after receiving the approval. However, since the process management method can be described as agile, the contents and the layout might change mid process due to the client's request.

For each project, if not urgent, at most, two members from the technical team are assigned to it. The project usually goes on routinely for the technical developers, as there is no written process or checklist available. The developer might use an old project as the base of the new one, due to its familiarity and ease of use. This, for example, causes confusion among the new employees who are not familiar with the company's routine yet. For example, if they were to copy an older project made by another employee they would not be aware of different methods and technologies used without asking that developer.

After the technical development is finished and the content is in place, the project is sent to the client for final comments and request, during which time the developers continue testing the product in different environments. Upon receiving the client's comments, the final changes are made and the project is uploaded onto the Apprix servers, where it will be used. The files will also be saved on a GitHub [25] repository for safe keeping and for future projects.

In reality, the process doesn't go as smoothly as described and is not as straightforward. Due various reasons the designs and content might change mid-project or the client might think of new features for the training. Occasionally miscommunications happen between the Apprix employees, which leads to extra work hours on projects.

3.2   Employee interviews

As an employee of the company, I was aware of the internal communication problems and based on my own experience, I proposed this subject to one of the managers of the company. During our preliminary meeting, it was decided that to improve the communication, the company might need to define its process better since at that moment, there was none defined. Furthermore, tools were to be found that helped visualize the process, so that at every moment, all members of the team, including the project managers, would be aware of all the stages. It was also crucial that these tools would not cause any trouble or extra expenses for the clients.
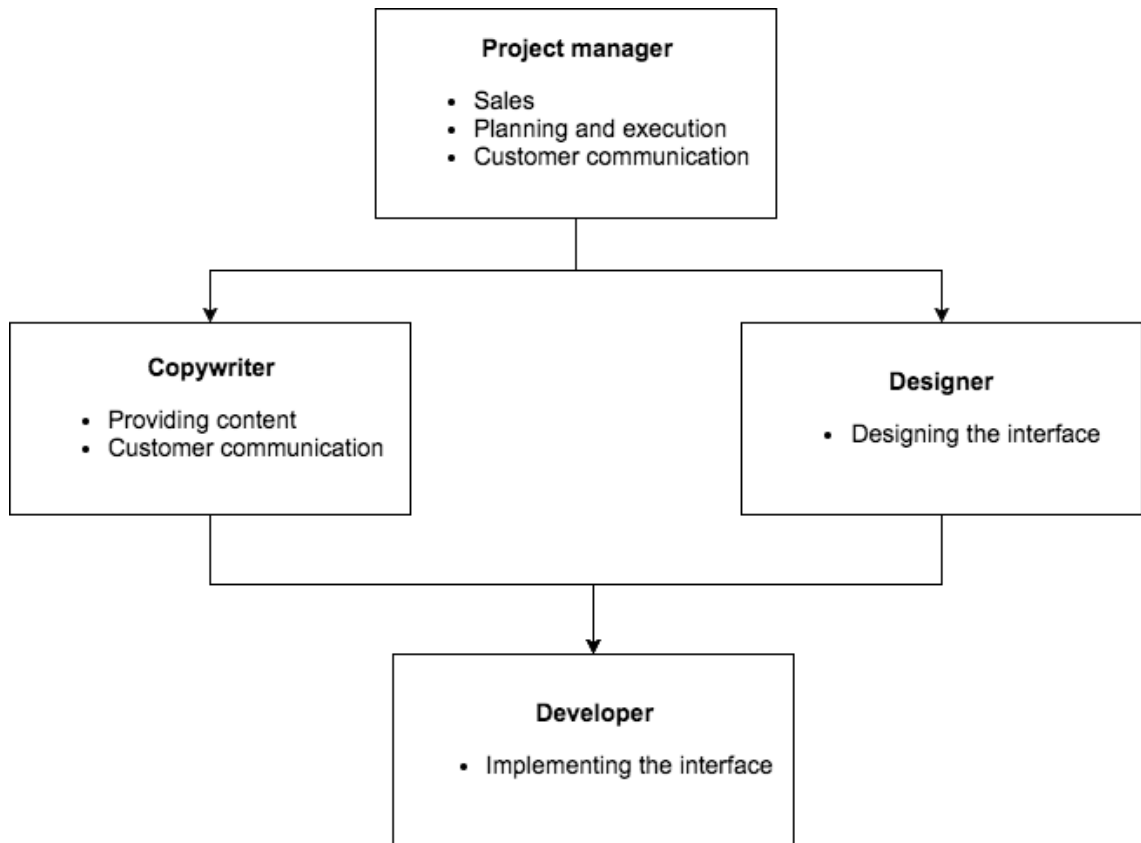
Figure 3. Role of the employees.

During this meeting the topic of social media also arose, however issues such as the content and the person in charge of those accounts also arose. The topic was not discussed much but the idea of creating social media accounts for Apprix seemed favorable, if an agreement could be reached on its management. However, it seemed that although the management seemed to like the idea of having a social media presence, it was not as keen on going further with the idea.

After the preliminary meeting, a meeting was held with the other employees of the company where each department discussed the effects of the current process and communication on their work. The role of each department has been described in figure 3. Since the job description varies for everyone who were present at the meeting, so did the problems, therefore, I will separate the problems as: general (problems that all the employees shared,) project manager (requirements of project manager,) copywriter (problems that the copywriter faces), and developers (problems that the technical developers face.)

General communication methods of the employees

All the employees were happy with the current tools that are in use in the company such as, GitHub [25] for version control and containment of the written code, Slack [26] for internal communication and Trello [27] for project management, as they improve their communication considerably. However, they were in the opinion that these tools are not used to their full potential due to lack of participation of all the employees. For example, if more than one person is working on a project, one might be using Trello or GitHub to document the code, while the other one does not and all the information then had to be communicated locally.

There is no process management type defined for any project but it does resemble the agile method, as the content and design might change mid project, however there are no weekly meetings or prioritized tasks. This makes the transparency within the teams difficult and often team members and project managers are not aware of the current stages of the project. Another concern was that, since everyone working at the company have different task, backgrounds and job descriptions, everyone prioritizes certain information or tasks that others might not. And as there is no agenda or any kind of memos from the meetings held with clients, it is difficult to determine what each team member should focus on.

The employees felt, that sending emails might not add to their daily productivity and they viewed email as too formal and time consuming. They would rather be in contact with the clients or each other through boards and forums where everyone would be able to see project related information.

Project manager

As mentioned above, the project manager required a type of tool or model that would be clear and understandable. Furthermore, wanted it to clearly indicate in what stages the project was without having to consult every member of the team each time, which is something that other employees seemed to agree with, as was discusses above. The project manager also wanted to know the amount of time creating each element or feature would take so that he could give the customer a precise timeframe.

Another issue was the use of Trello [27], as he thought was messy and unreadable. He believed that it needed structure and as he's mostly interested in the stages of the process, the technical details made the board seem crowded to him.

Copywriter

Since the copywriter oversees and provides the content and the pedagogical part of the projects, apart from the project managers, she is the only one in direct contact with the clients. The copywriter also attends the meetings with clients and is aware of their requests and ideas. However, she is not part of the technical team and therefore is unaware of the technical aspects of the project and cannot respond to the clients' questions regarding that part.

The project managers are mostly out of the office in meeting and cannot always be reached. In these situations, the copywriter will provide information regarding the project. However, as she stores this information in her email or composure, they cannot be found in anywhere accessible to other employees. Therefore, if the copywriter is out of the office, this information cannot be accessed.

For this problem, the copywriter suggested a Slack [26] channel where clients could be added and the information would be available to everyone on the team. However, if that's not possible, she suggested a structured document or folder accessible to everyone in the company, where the project specific information could be stored and found easily.

The copywriter also found email to be outdated, and found it difficult to use it for communication with clients. For the purpose of communicating with the client, the company uses email and Microsoft Office Word [28].This method causes multiple problems:

1. The project manager and occasionally the copywriter are the only one in contact with the client. And the information received in the e-mails not always reach all the team members.
2. When facing technical problems, the client will ask either the project manager or the copywriter, who are not familiar with the technical aspects of the project.
3. Occasionally, members of either party might forget to include everyone in the email chain. For example, sometimes, some of the project managers might not be included in the mails sent or received.

4. The content might change every week, which leads to creation of new Word documents. This leads to redundant file management and multiple emails that is hard to take track of.

5. The internal communication method on the client side might be lacking, and staff from the client side cannot agree on an issue, which causes multiple comments left on the Word document and multiple chain emails.

One of the biggest problems mentioned above is the file management, as with each alteration a new document is sent and occasionally she would have to go back and forth between the documents. Therefore, if a client wants to refer to an older project or renew one of their project finding the right document can be challenging and time consuming.

Technical developers

In their daily tasks, most of the developers use: GitHub [25], Trello [27] and Slack [26] to keep track of the project. However, not all the employees use these, and upon pairing up with someone who is not using these, can cause confusion with the process. The reason why some don't use these tools as often as they should, is due to lack of construction and information regarding these applications. For example, using Trello [27] in a team project can help with dividing tasks, which allows to keep track of the project, however if it's not decided beforehand on the practices of Trello in that said project, not all the employees will remember to use it.

The technical team is not in contact with the clients at all, and does not attend the meetings. They receive the project requirements in the project 'kickoff' meeting, where the requirements might not have been finalized. After the initial meetings, there will be no other meetings to check the progress and to inform the team members of the changes or client comments. This occasionally causes the technical developers to redo some aspects of the project after they have finalized it.

The team also would like to get regular feedback on their work and would like to have a wrap-up meeting to end each project, to act as closure. During these meetings, they would like to discuss what went wrong and what went well and how to improve their next project.

The technical team also showed willingness to be directly in contact with the client and

to be aware of all the aspects of the project. They were in the opinion that the more the client knows all the members of the team, the more at ease they will be and they would know whom to contact in case of a question.

3.3   Needs for customer communication reengineering

Based on the interviews, it could be concluded that the employees might not always be on the same page with each other and they are not always aware of the changes in the project. They would like be involved in all the aspects of a project, including the communication with the client.

For the purpose of communicating with the client or each other, they find email redundant and too formal and would like to find a replacement. The problems of the external communication have been outlined in figure 4. For the internal communication, they need more structure and a more planned out project outline.
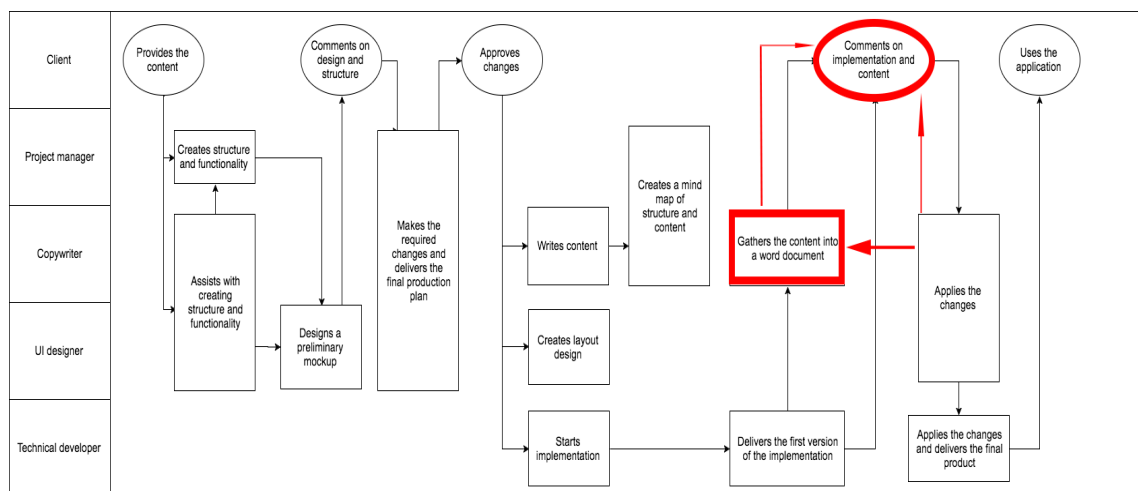

Figure 4. Problems with the current process.

Overall, the employees and the management would like to have more transparency, with each other's works as well as with the project in general. Furthermore, they would like to extend that transparency to the client.

4   Search for viable tools

4.1   Research of similar companies

Before starting to look for tools and models, I created a questionnaire that can be seen in appendix 1 aimed at others, who work in similar technology fields. Its purpose was to discover how various companies manage their projects and what kinds of software, if any, they use for project management. The questionnaire was answered by a total of eight (8) people. The answers of the questionnaire were relatively identical to each other. Almost all had, at least, weekly meetings with their project managers and received weekly feedback on their work. The most common project management software was Atlassian JIRA [29] and the company employees were not in direct contact with the clients.

Surveying other companies was helpful to understand how other tech companies conduct their daily business. However, it is to be noted that despite of the fact that these answers were from individuals who worked in similar fields, their company structures were different, and therefore their answers might have not been comparable to those issues that Apprix was facing.

4.2   Testing

I began my search initially based on the answers received from the questionnaire and suggestions from the Apprix personnel. My aim was to find one application that would allow us to store all the details of the project such as, important dates, memos and to do lists. The application's ability to somehow involve the client and poses a content management feature, was a plus. Moreover, if the Apprix were to include customer related information, which on occasion might be of confidential and sensitive nature, in these application, it was also crucial that the physical locations of the application's servers would be within The European Union, or the application would abide by the laws and regulations of The European Union. However, since such an application hardly exists, it seemed more appropriate to divide these, at least, into two separate applications: project management and content management with an emphasis on its terms of service in regards to The European Union.

Table 1. Tested project management software.

Name	Calendar	Chat	"to-do" list	Boards	File stor-age	Cus-tomer side	Other
Basecamp [30]	x	x	x	x	x	x	
JIRA [29]	x	-	x	x	-	-	Suitable for software com-panies
Dapulse [31]	x	-	x	x	x	x	Suitable for bigger compa-nies
Kaseya BMS [32]	-	-	x	-	x	-	BMS software.
Zoho Projects [33]	x	x	x	x	x		

Table 2. Tested content management software.

Name	Ver-sion con-trol	Cus-tomer access	Security accord-ance with the Euro-pean Un-ion	Cloud based content altering	Other
M-Files [34]	Un-known	Un-known	x	Unknown	Works with windows computers only.
TeamDrive [35]	x		x	x	- Can edit files without downloading. - A separate software is to be downloaded. - Not user-friendly.
elfCloud [36]			x	x	- Can edit files without downloading. - A separate software is to be downloaded. - Not user-friendly.
OpenText [37]	x	-	Unknown	-	- A separate software must be downloaded for content altering. - Clients would have to create an account to access files.
	x	x	Unknown	-	- Customer must be-come a member to be added to the site. - Slow. - Not user friendly.

Alfresco [38]					- Not able to alter content on site.
G Suite [39]	x	x	x	x	Offers other services than content management and would be a good fit for the company.

A total of ten (11) applications were tested as can be seen by table 1 and table 2 and out of those two (2) project management applications and one (1) content management application matched the criteria.

4.3   Chosen project management application

From the project management application Dapulse [31] and Basecamp 3 [30] and from the content management application G Suite [39] were chosen. In the following chapter, these applications will be explained more thoroughly.

Dapulse

Dapulse [31] almost matched all the criteria for a project management software for Apprix, except for a chat functionality. It offers three different account levels with a 50GB storage. Users can create boards for each project, and within each board, a to-do list with priority, persons responsible and due dates can be created. Moreover, it has client side interface, which allows to include the client certain steps of the project, and its content management feature, which were the reason why is specific application was picked as one of the potential project management application for Apprix.

However, it is to be noted that the application seemed a little bit lacking in both design and functionality. The content management feature was not user friendly as its preview of the file was minimal, which made it hard to distinguish files from each other. Furthermore, its real-time document editing interface was very small and made the editing task difficult.

Basecamp 3

Basecamp 3 [30] filled all the criteria for a project management program for Apprix. This application was chosen as one of the potential solution for Apprix due to its client communication features.

One of the most suitable features of Basecamp 3 is that it would allow the client's emails to reach all the team members by sending them to a Basecamp 3 board instead of an email address. Moreover, it has a 500GB storage, and a space for all project related files to be stored in one place and allows Google Docs integration. Users could also send any document from a board to its clients, this feature allows for an organized file storing and sharing and would noticeably reduce time spent searching from a cluster of files.

G Suite

Google's G Suite [39] would fulfil the requirements of copywriter and would allow for an easier file organization and sharing, both internally and with clients by using Google Docs real-time editing feature. Furthermore, acquiring this application would allow the company to use all of Google's provided services, such as Drive and spreadsheets among other things.

The application also abides by the laws and regulations on The European Union, which will ease the safety concerns of some of the customers. However, there are other safety issues, as the account would be as safe as each individual's own account safety, but it's to be noted that, that is the case with any online application or service.

4.4   Proposal

After completing the testing, a meeting was held with one of the managers and the copywriter. During the meeting, the results of the interview with the employees and the outcome of the questionnaire were discussed. Based on these a more structured use of Trello, and a general checklist, for the projects were proposed. Furthermore, the tested applications were demonstrated and their used were explained and justified.

The proposals of use of Trello [27], G Suite [39] and checklist were accepted by the

manager. However, since Basecamp 3 [30] and Dapulse [31] would create a direct contact with the entire team instead of only one person, the manager deemed it unnecessary, moreover he felt it might cause confusion for certain clients, as they might not always know who they were in contact with.

5   Implementation

5.1   Checklist of necessary information

The purpose of the checklist was to gather information for the 'kickoff meeting,' which is held before starting the project. During this meeting the project managers and developers discuss the upcoming project and decide on what features it should contain. As the project managers do not have a technical background, they might not always know what type of information the technical developers will need. The checklist a list made by the technical developers to gather the information that they need to know before starting the project. The idea is that the project manager will gather the needed information and fill in the checklist before the meeting and during the meeting the checklist will be read through and agreed upon.

After the proposal, a document was created to gather the employee's' thoughts on what the list should contain. Two separate checklists were created, one for the technical team to agree on the practices of their upcoming project and another one for the information that needs to attained before the project begins from the project manager and the client. The contents of both checklists can be seen in appendix 2. The employees were urged to use this list, at least, at the beginning of each project to smoothen and ease the process.

A template was created for the information section of the checklist so that it would ease its use for every project. The template was created in a Microsoft Office Word [28] document, which would be easy to upload to G Suite [39]. It contained a table with three columns. The columns are respectively: the question, and empty field for the answer and other input and a checkbox to indicate whether this question has been discussed and receiving the required information has been successful.

The checklist for the developer team, was discussed in a meeting with all the members of the team. During this meeting, it was agreed upon developers of each team to have their own kick-off meeting before the project. During this meeting, they would go through the list and decide on a mutual practices and conventions for the upcoming project, as each of the developers have a certain way of doing their work. After the meeting, they would write all the decided methods and convention in the project's GitHub [25] repository's READ ME file, so that in the case that another developer was to edit the project, they would be aware of the implementation methods.

5.2   Web-based project management application, Trello

Trello is a web-based project management application [27]. The users can create boards for each project. Within this boards, they create lists and add new topic, called "Cards", to these lists. The users can move cards around based on their status. Labels, checklists, files and dates can also be added to the cards.

For Apprix, during a developers meeting, a structure for use of Trello was defined in the following way which has also been visualized in figure 5:

1. Five lists are created: To do, Doing, Bugs/Comments, Done locally and uploaded to the server.
2. At the beginning of each project, the graphic designer adds list of ready-made layouts to the "To do" list. He also adds the layouts that need to be done to that same list, however he is to note that these layouts are not ready.
3. Each technical member of the team assigns themselves to a layout.
4. On developing the layout must be moved to the "doing" list and once finished it will moved to "Finished elements" list.
5. The team is to also add any problems error or request to the "bugs/comments" list and once that issue has been resolved, it will be moved to the "Done" list.
6. Comments by the graphic designer, copywriter or client will also be added to the "bugs/comments" lists.
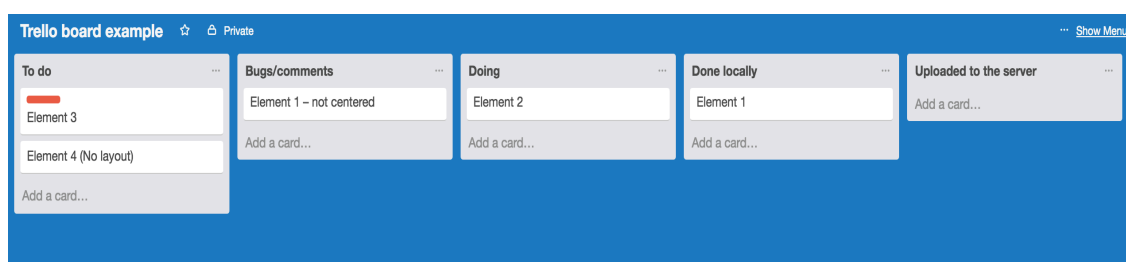7. Each card is to be issued with its own label that represents its priority.

Figure 5. Example of Trello board.

The to do-list is only meant for the layouts that need to be done. This way non-program-mers such as the project manager or the copywriter can see at what stage the project is. The project manager also wanted all the technical developers to write how many hours they have spent on each element. Other minor issues or bugs should be added to their

own list to avoid confusion, since not all the issues will be resolved by the end of the project.

Enforcing employees to use Trello in this way is not possible, as everyone is used to their own methods. However, this was given as a guideline or a template to all the employees so that if they wish, they could follow this method to ensure that the communication always goes smoothly.

5.3   File management and document editing, G Suite

There were complications with implementing this feature, as it was during the holiday season and the managers were on vacation. There were also some internal communication problems, as I was left out of the meetings and the feature was discussed with other members of the company, where it was decided that Apprix would not be acquiring G Suite [39], as they were in the believe that it does not follow the laws and regulations of European Data Protection law. Upon realizing what the problem was I conducted more research to assure the company of its safety, and discovered that the free version of the Google services does not abide those laws, however, the enterprise version, G Suite, does. This quote can be found on their website:

> Google provides product capabilities and contractual commitments to enable and facilitate our customers' compliance with EU Data Protection requirements, and follows the recommendations provided by the Article 29 Working Party (an independent European advisory body focused on data protection). [40]

After this discovery, this feature was then given the green light was ready to be implemented.

G Suite was mainly acquired due to its file management and real-time text editing feature. Therefore, only the copywriter and project managers were given access to it, as the service charges per user. However, Apprix is not going to be using G Suite's other features, such as Drive, to host other company data, such as layout designs.

6   Case studies

6.1   Using G Suite's Docs feature for content creation

G Suite's Docs feature was used with two different customers for content creation of the e-learning. As mentioned above, the copywriter and the project manager at Apprix create contents for the e-learning based on the material gotten from the clients. The created contents should be approved by the client in question, which is a complex process as it contains going back and forth with the clients to achieve the desired and correct information to be delivered to the participants of the e-learning. Due to the confidentiality of the contents and the clients the clients will be called Client X and Client Y respectively. Client X received their contents a week before Client Y, both cases will be discussed and compared in this chapter.

The process for both clients started as usual. A template was created in Microsoft Word for the contents, consisting of a table with two columns. Contents were placed on the left column and on the right column was reserved for the comments from the clients. Before uploading the document to G Suite, clients were informed of it and permission to upload the contents to G Suite was acquired the document was then uploaded to G Suite Drive and from there it could be accessed in the Docs. Clients were invited to the document by an invitation to their work email address, which was not hosted by Google. Client X was given permission to comments on the documents, while Client Y was given editing permissions.

6.2   Client X

Client X was the first client that Apprix has used G Suite with, therefore, the company had no guidelines or previous experiences to as to how a client would or should interact with the application. The initial problem that the client faced was logging into the G Suite, as when receiving an invitation to a non-Google account the user is required to somehow identify itself before being allowed to edit or comment on the document, otherwise they can only view it.

The user has two options, they can either sign up for Google with their current non-Google account which would require them to enter their phone number, gender and location among other things as can be seen in figure 6. The other option is to login with an already existing account. The contact persons of Client X decided to login with their personal Google account instead of creating a new one with their professional account. As the invitation was sent to another email that they had signed in with, another sets of permissions were to be given to them.

The client only had commenting rights, which means that they can comment on the document only and it will not be saved as part of the contents of the document. The commenting had gone well for most of the people with commenting rights. However, due to personal preferences one person had decided to download the document onto their own computer and edit its contents locally. Later on, the document was sent to Apprix via email. Furthermore, the "track changes" feature in the Microsoft Word documents that allows the users to see what has been edited, was not on. Therefore, it was not possible for Apprix content providers to see what was altered in the document without manually reading both documents. The Apprix copywriter tried to compare the two documents together, however, since it's a long document it was not an easy task. As the two documents, did not match each other, Apprix employees were to upload the newly sent document to G Suite and reinsert the comments made previously on the original document by other users to the new one. This approximately took an extra two hours of work.

Figure 6. Required information for sign up to Google.

Figure 6. Restricting permissions of users.

Besides the two problems encountered, the rest of the process went smoothly and the employees seemed satisfied with G Suite's functionality. As for solving the problems, Apprix can't do anything to ease the login issue for the future clients, as it's a Google policy that can't be altered. However, for the second issue Apprix can restrict the client's' rights when using G Suite by not allowing them downloading permissions as is seen in figure 7.

6.3   Client Y

The second case study was made to make sure no other problems occur in using the G Suite with customers. For this project, the customer was given editing rights. This means that the customer is able to alter the document completely and the changes will be saved in the documents history. The client however, was asked to comments on the document or if need be, write comments of the right column, which was originally reserved as the commenting section. The reason behind this change from the Client Y was to discover an easy way, for both parties, to edit the content, as before implementing G Suite, the client always commented within the document in the right column.

This made the client's job easier, as they could interact directly with the document. However, they did not follow the instructions given by Apprix and edited the content on that was placed on the left column. To find the changes, the Apprix employees would then have to search through the "revision changes," and in the complete history, of the document, which saves all the changes made to the document. This was not and ideal outcome, as it required Apprix to do more to find the altered content. In the terms of usability, it was not ideal as it required more mouse clicks to achieve a goal that would be possible to achieve with less clicks.

These results brought the company to the conclusion that the client's rights to alter the document should be restricted as much as it is possible, which in this case meant that the client would only be given commenting rights and would not be able to download the document onto their own computer, as this would take Apprix back to emailing Microsoft Word documents to clients, a phase that the company is trying to leave from.

6.4   Information gathering prior to the beginning of projects

The checklist was used with one client only, as after finishing the checklist no new projects were started at the company. During the "kickoff"-meeting the checklist is to be ready so that the project manager and the developer team could read through it and agree on terms and practices. However, the needed information was not acquired by the project manager and the use of checklist was not a success at that meeting. Another meeting was held a week after, where the information was obtained and project could begin. The checklist with the information was put in the client's G Suite's Drive, where it would be accessible by everyone at all times.

This shows that getting accustomed to new ways and methods takes time and it will take a few projects for everyone in the company to be comfortable with the new communication method. As there was no chance to further study this list's influence and effects, it is impossible to say how it could be developed to further improve the communication.

6.5   Collected feedback

As mentioned before, Apprix, so far, is not planning on using G Suite's other features than the "Docs" service, which is meant for altering and creating text documents. Therefore, other than the copywriter and one other employee, other company employees do not have access to the service, as G Suite charges its customers based on the amount of its of users.

The feedback questionnaire in appendix 3 was created to find the effects of G Suite on the daily office life of the employees and whether it could be further improved. According to the questionnaire results, G Suite has improved the daily productivity at the office and has made content creating easier. Employees are happy that they no longer need to send physical files via email to customers, thus, making file management easier. However, they don't believe that their customer communication needs have been completely solved, as non-technical people are still receiving information that are not related to them and they are forced act as a messenger in between of the client and the technical team.

They also believe that a thorough instruction on how to use the service would be of use and very crucial, as they do not consider the service to be "usable" enough and the instructions would ease the use of the service for future clients and employees.

7   Summary

The purpose of this thesis was to improve a company's communication both internally and externally. The original goal was to increase transparency, where all members of the company would be aware of the stages of the project and would be in contact with the client. In addition, the employees wanted to eliminate the use of email as a form of communication as much as possible. However, this goal was not achieved, as the management did not agree with the notion of all developers being directly in contact with the clients, as they thought that would cause confusion and misunderstanding for the clients. Furthermore, they believed that, if all the employees were to be in contact with the clients, they would have to be trained for this new purpose. Therefore, instead of creating transparency between the company and the clients, it was decided to enhance the transparency within the company and set new guidelines on how to use the current tools that were already available.

Google's G Suite was acquired to ease the work of the copywriter as she was directly in contact with the clients, where she sent them the written content in a form of Microsoft Word Document, which caused for multiple emails and difficulty with file management. The other features of G Suite were not taken into use as the company did not have a use for them at the time of this project.

The implementation was successful and during the time of this project, the copywriter completed two project using G Suite. There was some confusion as to what types of permissions should Apprix give to the clients while using G Suite. However, based on the two case studies done, it was decided that the rights of the client should be as limited as possible.

According to the feedback, content creators were happy with G Suite and preferred it to the old way of emailing documents. However, they believed that there's still room for improvement in the customer communication department. Overall, the G Suite has been a success for the content creation but it has not influenced the rest of the company in any way.

A checklist was made for the project managers and it contained all the information that the developer team needed from the project manager and the client to start a project. Another checklist was created for the members of the technical team, where they would

agree on the types of practices and programming languages that was going to be used in the upcoming project. The checklist did not have enough time to be tested and studied, as not many of the developers had a chance to use them during this project. It is not possible to say if the checklist was a success or a failure as it was used only once. To estimate its effect and worth, it should be studied and developed further as the company and projects keep on changing.

As the results of this study, guidelines on how Trello should be used to enhance the spreading of communication from the technical team to the project managers and aid with task assignment were compiled. There were no surveys done to discover whether this method was in use or not, as enforcing employees to use this method is impossible. It was merely a guideline or a template for developers to see how it should be used to uncomplicated communication and show the stages of the project to all the members of the company.

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Survey of companies in the field of technology

A questionnaire was sent to those who work in the technology field, to find out how other company conduct their internal and external communications.

What does your company do?

What is your position at the company?

How often do you have meetings with your project manager regarding your projects?

How often do you get feedback on your projects?

Do you use a project management software? What?

How does your company keep in touch with its clients?

Are you directly in contact with the clients?

How much is the client aware of the current stages of the project?

How much are you aware of the current stages of the project?

How do you communicate internally?

Do you think your company could improve its communication method? How?

Checklist

Two checklists were created. One for the project managers to gather the needed information before the project begins, to prevent misinformation during the project.

Checklist made for project managers:

Which browsers and devices have to be supported?

Should the tool work on phone devices?

Should the page be responsive?

Should it be possible to navigate backwards and to jump to different sections/pages?

Should the user be able to do the module in sections?

Diploma or not? Just printable or can be also sent to mail?

What kind of statistics view is needed?

Does the data have to be returned from the database, so users can see their previous answers when they log in again?

How are points calculated? Should all elements affect passing the course or should there be a separate final test?

What kind of login is needed? (SSO, Scorm, individual, group, some specific dropdowns?)

The customer has accepted the structure of the project

The customer has accepted the list of elements and assignments

Detailed schedule (e.g. 1st draft deadline, final deadline). All important deadlines/meetings.

Do we have all the needed material? If not, when will it be delivered to Apprix?
Who is/are the contact persons regarding the content?

How do we communicate so that everyone in the team will be involved? Do we create a group on Slack?

Is Google Docs ok for commenting the content?

What integrations are needed?

Checklist created for technical developers:

Make sure you have the latest version of the files and layouts

Remember to mark your progress/problems in Trello

Add a READ ME file in the project's GitHub repository, and write down for example:
- Styles and conventions that the project team has decided to use.
- How to run the project locally (if for example Gulp is used.)
- Other information that might be useful for someone who has to edit something, but has not been developing the project.

Are there existing project files (if so, where are the latest project files.)

Are there any completely new element types (if not, utilize existing elements.)

Make sure you have an editorconfig file in the project.

Ensure that everyone is aware of the best practices that we have agreed to use

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Feedback questionnaire

A feedback questionnaire was sent out to the company employees to evaluate the whether this project was a success or not.

Has G Suite made your work any easier?

Is there anything that you would like to change?

Can the service be improved?

Do you think the service can be used in another way or for another purpose?

Would you consider going back to the way things were before?

Are there any other aspects of your work that can be improved regarding customer communication?

Do you have anything else to add? Doesn't need to be G Suite related.