None of us is as smart as all of us

An interview-based study of knowledge sharing with technology

Camilla Marie Thømt and Ingrid Somdal-Ámodt Vinje

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Camilla Thømt and Ingrid Somdal-Åmodt Vinje

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Camilla Thømt
Ingrid Somdal-Åmodt Vinje

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Abstract

This thesis is inspired by the experiences we gained during a five-week internship at BI LearningLab, where we spoke with students at BI Norwegian Business School about their view on learning management systems (LMS). To get a deeper understanding of the issues surrounding knowledge sharing and technology among higher education students, our thesis was framed with the following research question:

“What stimulates higher education study groups to share knowledge?”

To explore this problem, we proposed the following sub-research questions:

1. Which social factors and technical experiences are most prominent in the students’ knowledge sharing?

2. In what ways does the design of technology affect the students’ knowledge sharing?

As our query concerned knowledge sharing and technology, it was essential to refer to theories that might explain how people collaborate online. On that basis, the sociocultural learning perspective was used as an overall frame. Theories of scaffolding and community of practice was elaborated within this perspective. In addition, we focused on theories of collaborative learning, computer-supported collaborative learning (CSCL), and interaction design to support our hypothesis.

Method

Since our aim was to accomplish an understanding of how higher education study groups are stimulated to share knowledge, our choice of method was a qualitative approach. A qualitative method enabled us to talk and interact with the students, and was regarded as useful in terms of getting the deep understanding we were aiming for. In phase of collecting data, we considered it favorable to conduct semi-structured interviews. A qualitative content analysis approach was used for analyzing the data.

Due to the large amount of transcription, we selected to base our approach in whole answers and reflections, which was used as a base for the categories. Since our data material consisted
of five case interviews, we considered it essential that the categories of choice matched the
diversity of all the interviews. This way of classification could be understood as an iterative
process, where our constant adjustments helped us in creating refined and meaningful
categories.

Case and data description
Our data material was collected in the spring of 2016, and consisted of five different study
groups with a total of 15 students. Three different higher education institutes was represented.
As there was a broad variation as to sizes and ways of organizing study groups, we found it
appropriate to specify the type of study groups we aimed for.

The groups to be selected had to include three or more members and had to collaborate in at
least one course over a minimum of three years.

Conclusion
The five groups in our study illustrated how study groups with different social factors and
technological experiences could use technology as a tool for sharing of knowledge. The five
groups were based on different foundations, where some was understood as more compelled
than others. The findings in our study indicated that this distinction might not be significant
in regards to the students’ view of knowledge sharing, as long as the group was understood as
a community of practice.

Knowledge sharing was understood as one of the main functions in study groups. A
distinction between what was identified as internal knowledge sharing and external
knowledge sharing was indicated. The internal knowledge sharing was considered as the
sharing which took place within study groups, and the external sharing described the practice
of sharing with peers outside the groups. All of the study groups regarded both internal and
external sharing as beneficial, but we did find a somewhat evident division in terms of the
criteria for knowledge sharing. The criterias could be understood as different forms of
mindsets: The first mindset was understood as a sort of “pay it forward” mentality, where
knowledge sharing was regarded as a gesture that would be reciprocated at a later occasion.
The students that appeared to have a mentality like this, seemed to have an easygoing stance
towards the aspects of support and collaboration with other peers. The social aspect was
emphasized among these groups, and distant peers was not regarded as competitors.
The second mindset was identified as more of an “utility” mentality: The three groups with this mindset did not regard the sharing culture as optimal, and stressed their concern about ending up as content providers. Here, knowledge sharing within groups was regarded as straightforward, as the students found exploitation to less likely occur when they collaborate with trusted peers. The groups that were understood to have this mindset, represented three different studies from two different educational institutions and we did not have a reason to believe that areas of study or institutions affect their view on external knowledge sharing.

Factors such as group size and structure might have influenced the students’ point of view; two of three groups appeared to be larger and more loosely structured than the other groups. This may have caused the group members to not perceive any advantage in sharing knowledge with additional students - they already had a collection of trusted peers for this purpose. In addition, all of the three groups with the utility mentality were understood to be somewhat more competitive than the two other groups, as they stressed that sharing their knowledge could reduce their chances to get good grades. All of the five groups in our study did agree that in order for an external knowledge sharing to take place, less emphasis on grades and competition should to be in place.

The five study groups preferred to use platforms such as Facebook or Slack, instead of Fronter or Its Learning. The groups did not perceive Fronter or Its Learning as appropriate tools for knowledge sharing, although they considered most of the necessary features to be present. From the perspective of affordances, which helped us to understand how the students considered the usability of the different platforms, our findings indicated that the groups found the opportunities for knowledge sharing as unclear at Fronter and Its Learning. The ultimate role of technology was understood to function as a tool that supported and extended the students activities in effective and meaningful ways.

Understanding the students’ attitudes towards platforms developed for collaboration and learning was regarded as crucial - as did the understanding of the students view of knowledge sharing as a whole.

Our study revealed that students with interest in - and experience with - technology appeared more likely to have a positive approach towards various platforms. A possible interpretation
of this aspect was that the groups in this study could be understood to be based on different grounds. The students stressed the culture of knowledge sharing itself to be an obstacle. The concern of ending up as providers and being outperformed by other students was a recurrent subject among all the students. On this basis, it was indicated that, in order to stimulate study groups knowledge sharing, a platform designed to meet the needs of the students would in all probability not be sufficient alone. It would most likely require a greater effort when it comes to the sharing culture as well.
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Table of Contents

1 Introduction.........................................................................................................................2
   1.1 Background for our thesis ..........................................................................................3
   1.2 Research questions .....................................................................................................4
   1.3 Structure of the thesis .................................................................................................5

2 Literature review................................................................................................................7
   2.1 Knowledge sharing among students .........................................................................7
   2.2 Online collaborative learning environments ...............................................................9
      2.2.1 Higher education students’ assessment of e-learning systems .................................9
      2.2.2 Barriers and motivators of knowledge sharing in online environments ...............10

3 Theoretical framework ......................................................................................................13
   3.1 The sociocultural learning perspective .....................................................................13
      3.1.1 Scaffolding ........................................................................................................15
      3.1.2 Community of practice .....................................................................................15
      3.1.3 Collaborative learning .......................................................................................16
   3.2 CSCL ..........................................................................................................................18
   3.3 Interaction design ......................................................................................................20
      3.3.1 Affordances of a learning environment ...............................................................22
      3.3.2 Design guidelines of CSCL environments .........................................................25
   3.4 Summary of theory ....................................................................................................25

4 Research method ..............................................................................................................27
   4.1 Qualitative approach .................................................................................................27
   4.2 Exploratory interview-based study ............................................................................28
   4.3 Data collection ...........................................................................................................30
      4.3.1 Selection of informants .....................................................................................30
      4.3.2 Group interview ...............................................................................................31
   4.4 Content analysis .........................................................................................................32
   4.5 Framework of the content analysis ..........................................................................33
   4.6 Validity, reliability, and generalization ....................................................................35
      4.6.1 Validity in content analysis ..............................................................................35
      4.6.2 Content analysis and reliability .........................................................................36
   4.7 Ethical considerations .................................................................................................37

5 Key technologies ..............................................................................................................38
   5.1 Learning management systems (LMS) .....................................................................38
      5.1.1 Its Learning .......................................................................................................39
      5.1.2 Fronter ............................................................................................................39
   5.2 Facebook ....................................................................................................................41
   5.3 Slack ..........................................................................................................................42
   5.4 Google Documents .....................................................................................................44

6 Case and data description ...............................................................................................46
   6.1 Description of the study groups .................................................................................46
      6.1.1 Group 1 ............................................................................................................46
      6.1.2 Group 2 ............................................................................................................47
      6.1.3 Group 3 ............................................................................................................47
      6.1.4 Group 4 ............................................................................................................47
Figure 3.1: Various types of affordances determinates the usefulness (Kirschner et al. 2004) ..................................................................................................................................................23

Figure 4.1 illustrates the process of categorization .........................................................................................34

Figure 5.1: The screenshot shows how the interface of Its Learning is shown to Group 3 from BI. ........................................................................................................................................................................39

Figure 5.2: The screenshot shows how the interface of Fronter can be shown to students at University of Oslo. .........................................................................................................................................................40

Figure 5.3: The screenshot shows one of the uploads group 1 have done in their Facebook group. ........................................................................................................................................................................41

Figure 5.3: The screenshot shows the appearance of the interface of Slack........43

Figure 5.4: The screenshot shows how Google Documents can appear. ..................44

Figure 5.5 shows how the sharing function appear in Google Documents........45

Figure 6.1 illustrates the link between the overarching research question, the sub questions and the five categories .................................................................................................................................................49

Table 6.1 gives a short explanation of each category .................................................................................50
1 Introduction

According to the sociocultural learning perspective, the historical mandate of schools has been to build up social and collective memories and knowledge (Rasmussen & Ludvigsen, 2010). Learning concerns how societies, individuals, and institutions transfer, maintain, and make knowledge available for the next generation. Society expects schools to create responsible citizens, where the ultimate aim is to take part in different sectors of society (Rasmussen & Ludvigsen, 2010). According to Andy Hargreaves (2003), we are all part of what is perceived as a knowledge society. Schools serve in shaping a world filled with opportunities, where improvements and innovations are welcome. On that basis, there is a growing emphasis of teaching people how to work more flexibly, to reskill or relocate themselves as the economy shifts around them. Moreover, the value of working collaboratively and creatively is underlined as a significant matter (Hargreaves, 2003). A growing number of politicians, educators, and business leaders are united around the idea that students need “21st century skills” in order to be successful in today's society. Some of these skills include flexibility, critical thinking, problem solving, and collaboration (Rotherham & Willingham, 2010).

Dillenbourg (1999) claims that more and more professionals need to collaborate, and that educational institutions therefore should improve their students’ performance in collaborative situations (Dillenbourg, 1999). This is also supported by more cognitive researchers such as Kirschner, Strijbos, Kreijns and Beers (2004), who argue that the tasks in the traditional schools often are short in length, well defined, oriented toward the individual, clearly structured, and designed to fit the content and not reality. In contrast are the real life problems, that almost always are “ill structured and/or wicked” (Kirschner et al. 2004:55). Instead of having a clear definition and being oriented toward the individual, the problems are often so multifaceted and complex that the only way to solve them is to let multidisciplinary groups work together. Examples of such problems could be creating a new cure for cancer, developing safer airplanes, or restructuring the educational system (Kirschner et al. 2004).

Educators have acknowledged the new communication and information technologies integrated into CSCL as useful when it comes to enhancing cognitive performance (Kirschner
et al. 2014), as well as a stimulating way of knowledge construction (Stahl, 2003). In addition, research indicates that students in CSCL environments has been shown to participate more in the learning process (Fjermestad, 2004), to make higher quality decisions, and to report higher levels of learning (Hertz-Lazarowitz & Bar-Natan, 2002) than when working alone (Järvelä et al. 2015). Yuen and Majid, (2006) points out that students are expected to join the workforce after finishing their studies, and therefore a positive attitude towards knowledge sharing and collaboration would make them more useful to their employing organizations. On the other hand, if their unwillingness to share information and knowledge with peers is left unchecked, it is likely that this attitude could affect their personality and they will continue exhibiting the same mindset at their workplace (Yuen & Majid, 2006). The world is rapidly changing, and the educational institutions should be part of this movement. Technology has become well integrated into most societies, and the business sector is starting to request employees with 21st century skills. With this in mind, our study will be within the field of technology and learning.

1.1 Background for our thesis

Our thesis is inspired by the experiences we gained under our internship at BI LearningLab in the fall of 2015. BI LearningLab is BI Norwegian Business School’s competence center, which focuses on ICT and learning, and how technology can be used in school settings. The years past, BI has experienced that their current learning management system (LMS) is not very flexible when it comes to user management or facilitation of collaboration among students. On this basis, they have started to look for an LMS that encourages collaborative learning and knowledge sharing among students. During our internship, we were able to speak with students at BI, which confirmed our suspicion in regards to the students satisfaction of the current LMS. The current LMS did not give them a lot of possibilities to collaborate or share knowledge, and was first and foremost viewed as a formal platform where the students were regarded as recipients of information, instead of creators of knowledge. By being students ourselves, we could relate to the frustrations towards the LMS and the aspects of knowledge sharing. The findings at BI intrigued our curiosity, and we started to wonder if this was a coincidence, or if other students as well felt the frustrations of not having a proper platform that facilitates collaboration and knowledge sharing.
Collaboration has been an important part of our master study, and we have been encouraged by our lecturers to work in teams since the beginning. Being a part of a well-functioning study group has given us the possibilities to learn and develop knowledge beyond what we could have done as individuals. This enriching experience is also the reason as to why we have chosen to write this thesis together. By working together in a study group for at least one year, we knew each other's strengths and weaknesses, and have applied these to benefit our collaboration. The collaboration gives us the possibility to widen our horizons by discussion, mutual feedback, and sharing knowledge with each other.

1.2 Research questions

The previous sections serve as an overview of our inspiration and understanding of the field. Before we present our research questions, we want to elaborate some basic concepts. As the concept of learning is a broad and an extensive term, we will not delve into it here. We choose instead to focus on knowledge sharing, and therefore understand this term to be a part of the concept of learning.

According to Lee and Al-Hawamdeh (2002), knowledge sharing can be understood as an intentional act, where knowledge is transferred from one group to another and made reusable through this transfer. There are many available means and ways to achieve knowledge sharing, such as conferences, organizational learning, knowledge networking and face-to-face interaction. Organizations, teams, and individuals are involved in knowledge sharing, and the aim of sharing knowledge is to transform knowledge from individuals to organizations or teams. In other words, knowledge sharing is to promote knowledge transferring among the knowledge subjects, with the help of all kinds of knowledge sharing tools (Fengjie, Fei & Xin, 2004).

Knowledge sharing is henceforth understood as an inherent part of collaboration. With this in mind, we want to get a deeper understanding of the issues surrounding knowledge sharing, and technology among higher education students. We will frame our thesis with the following research question:
“What stimulates higher education study groups to share knowledge?”

To explore this problem, we propose the following sub-research questions:

1. Which social factors and technical experiences are most prominent in the students’ knowledge sharing?
2. In what ways does the design of technology affect the students’ knowledge sharing?

Knowledge sharing occurs between people, and can be understood as a common practice in study groups. Our unit of analysis in this thesis will therefore be collaborative groups. Each group will be analyzed separately and we will explore the differences and the similarities between the groups. The group interview technique gives us the opportunity to study the group’s evaluation of their own knowledge sharing.

### 1.3 Structure of the thesis

Chapter 2 is a literature review that address previous research on students use of technology for knowledge sharing. The review will focus on empirical findings on a general level.

Chapter 3 describes the theoretical framework of the thesis. Focus will be on theories that might explain how people collaborate and learn together online. Therefore, perspectives of the sociocultural learning perspective, computer-supported collaborative learning (CSCL) and interaction design will be accounted for.

Chapter 4 presents the research design, methodological approach, and strategy for analysis.

Chapter 5 provides a brief overview of the various platforms that are used by the study groups. Learning management systems such as Its Learning and Fronter will be presented initially, before technologies as Facebook, Slack and Google Documents will be described.

Chapter 6 is a description of the case and data material. A descriptive analysis of the study groups will be presented, where the main focus will be on social factors and technical experiences among the group members.
Chapter 7 is intended to assemble the analysis with the core elements from the theoretical framework. The two sub-research questions will serve as an overall structure. Firstly, the prominent technical experiences and social aspects of the groups knowledge sharing will be examined. Secondly, we will discuss how the design of Its Learning, Fronter, Facebook and Slack seems to affect the students interactions.

Chapter 8 contains a selection of our data that is central to the research questions, the theoretical frame, and the reviewed literature. Based on our research questions, a short summary of the key findings in the discussion will be given. The ending part of this section will present final reflections.
2 Literature review

In order to illuminate the challenges associated with study the group’s use of technology for knowledge sharing, this review will focus on empirical findings on a general level. First, relevant studies within studies of knowledge sharing among students will be presented. Here the focal point will be mainly on the students’ attitudes towards knowledge sharing, as well as which factors that may motivate or inhibit knowledge sharing. Secondly, we will explore studies on how online collaborative learning environments are perceived by its users. A more technological perspective will be underlined here, as the user’s perceptions of platforms such as learning management platforms will be emphasized.

2.1 Knowledge sharing among students

Yaghi, Barakat, Alfawaer, Shkokani and Nassuora published in 2011 a research article concerning how we can understand the student’s perception of knowledge sharing. The case study was conducted at the Applied Science Private University (ASPU) in Jordan. The data was collected by using a questionnaire, and 360 undergraduate students participated in the study. The findings revealed that most of the students thought knowledge sharing should benefit all, for instance through sharing Powerpoint slides, lecture notes, and other learning resources. Furthermore, it was found that the University’s culture did not provide sufficient support for knowledge sharing.

Although students were positive towards the idea that knowledge sharing reduced competitiveness among student peers, they would not share information voluntarily. Here, the students was asked about what they considered were the barriers to knowledge sharing, where 78.1% answered that they “strongly agree” that the University did not provide a sufficient support for sharing of knowledge. Furthermore, 76.2% of the students reported that they experienced the interaction between those who could provide knowledge and those who needed knowledge as absent. The article concluded with several dimensions of knowledge infrastructures that had to be considered by supporting knowledge sharing. These included; the university’s structure, the university’s culture, its students, and the information resources. When asked about trust, 73.4% students did “strongly agree” or “agree” with trust among peers as a major obstacle when it comes to sharing knowledge. Finally, 91% of the students
did “strongly agree” that the university did not have a system in place to help them identify colleagues or peers that they could potentially share knowledge with (Yaghi et.al. 2011).

In their study from 2006, Yuen & Majid explored the general attitude among students in regards to knowledge sharing, communication channels preferred for sharing, situations where the students are most likely to share knowledge, and which factors that motivate or inhibit knowledge sharing among undergraduate students. The target informants were undergraduate students from three public universities in Singapore. A questionnaire containing 14 open-ended and closed questions was used. The survey was conducted in April 2005, with a total of 180 students representing different subject areas such as engineering, arts, business, and computer science and IT, among other disciplines. Face-to-face communication was presumably preferred as it allows instant feedback, offers non-verbal clues, and helps the students seek clarification. Online message boarding was the least favored. When asked about why they prefer certain communication channels over others, two important attributes were identified by the respondents. The first one is the communication channels ability to convey messages precisely, while the second attribute were the possibility of fast feedback from the peers.

Two of the significant findings in Yuen & Majid’s (2006) study, acted on factors that inhibited the students’ knowledge sharing with fellow students. 76.7% of the students claimed that their peers did not share knowledge as they were concerned about being outperformed by other students, and 87.2% of the students believed that it could be caused by a lack of depth in the relationship between the students. On the other hand, the study found that main motivators for knowledge sharing among the students is based on two factors: the possibility to learn from others, followed by the urge to help others. More self-centered reasoning for knowledge sharing was less extensive. Only 17.2% reported that they shared knowledge for being rewarded, while 6.1% stated that knowledge sharing was an opportunity to take the role as an expert. When asked about how one could get more students to share knowledge with each other, a majority of the students underlined the need for developing a culture of knowledge sharing. The students believed that this could be achieved through reducing the amount of unnecessary competition and less emphasis on grades. In addition, sophisticated and user friendly features of online platforms was emphasized as a mean to stimulate knowledge sharing and discussion. On the whole, Yuen & Majid (2006) concluded
that the students believed that knowledge sharing was useful to all actors in the process, and
that gaining personal advantage from it was not an important aspect.

2.2 Online collaborative learning environments

This section will begin by exploring studies of online collaborative learning environments,
also known as learning management systems. In addition, how online collaborative learning
environments has been perceived, developed, and presented will be discussed through
relevant perspectives.

2.2.1 Higher education students’ assessment of e-learning systems

Ozkan and Koseler published in 2009 a paper where the aim was to broaden the
understanding of students’ perceptions when it comes to technical and social issues
associated with e-learning systems. The researchers attempted to submit an evaluation model
of e-learning, which included a collective set of measures associated with an e-learning
system. The proposed and conceptual model was empirically tested via a survey instrument
to demonstrate which dimensions were critical for the effectiveness of e-learning. Six
dimensions were suggested: learner attitude, instructor quality, system quality, information
(content) quality, service quality, and supportive issues. The selection of dimensions was
based on a literature review conducted by Ozkan and Koseler (2009). In the review, a number
of issues relevant to the success of an LMS was reviewed, and the suggested assessment
model for e-learning was therefore based on existing theory. All of the suggested dimensions
was proved as significant (Ozkan & Koseler, 2009). The findings are based on both
qualitative and quantitative data, and focus first and foremost on student perceptions. Ozkan
and Koseler (2009) ensures to emphasize that there are other stakeholders of e-learning
systems as well, among them are technicians, instructional designers, administrators, online
facilitators, system developers, and similar. The perceptions of these stakeholders has to be
understood as influential indicators for a complete evaluation of e-learning systems. This is
quite significant in the sense that it can challenge the view of e-learning systems as a black-
and-white formula. Further, Ozkan and Koseler (2009) claims that e-learning systems are to
be understood as open systems, therefore they will be affected by both the environment and
the users.
As cognitive and social advantages of group learning can be lost when learners do not collaborate effectively, understanding the learners’ attitudes towards web-based collaborative learning is regarded as significant. In their study, Liaw, Chen and Huang (2008) looked at how a web-based collaborative system could assist learners in collaborative learning, knowledge sharing, and exchanging ideas. To be able to enhance learning effects, an understanding of the learners’ attitudes towards web-based collaboration needs to be in place. The students’ attitudes are considered crucial, as it might help designers to develop appropriate platforms for collaborative learning - which can enhance the quality of the learning as a whole. On this basis, Liaw, Chen and Huang (2008) conducted a study with a sample of 178 students from a Taiwan university. After six weeks of using a web-based collaborative learning system, the students were asked to answer a questionnaire. During the six weeks, the system was used by the students to learn and share knowledge about medical informatics. A total of 131 responses were collected, where the students were asked to share their attitudes towards the system. The study showed that students with computer-related experience are likely to perceive technology more positive than students with less experience.

The students attitudes was divided into five different factors: System functions, system acceptance, learners’ characteristics, collaborative activities, and system satisfaction. Within these factors, the findings showed that the students recognized willingness of knowledge sharing in web-based collaborative learning and believed it to be an efficient and time-saving system. A willingness among the students to share their knowledge and experience with their peers was also shown. Liaw, Chen & Huang (2008) concluded that the five mentioned factors are highly correlated, and that they therefore should be examined simultaneously when developing digital systems for collaboration.

2.2.2 Barriers and motivators of knowledge sharing in online environments

Expanding the perspective of knowledge sharing was the aim of a qualitative study that were published by Hew and Hara in 2007. Barriers and motivators of knowledge sharing in three online environments was examined. The environments were related to various professional practices: Web development, literacy education, and advanced nursing practice. Data were collected through semi-structured interviews and online observations with 54 participants.
Different motivators for knowledge sharing were found: Personal gain, collectivism, respectful environment, altruism, technology, reciprocity, and interest of the seeker (Hew & Hara, 2007).

Sixteen of the participants revealed that they shared knowledge because they believed they could gain something from it. Three different forms of motivators were found to be related with personal gain: (a) a better professional reputation as an individual, (b) a better understanding of the subject of discussion, and (c) emotional support. Twenty-six of the participants reported collectivism as an incentive to share knowledge. Here, they explained that their knowledge was shared with the intention of improving the community or profession. Being part of a respectful environment was suggested as a motivation by fifteen of the participants. Being met with tolerance and respect when sharing one’s opinions, was emphasized as a key factor. Altruistic motives, where empathy and helping others were highlighted, was stated as a reason to share knowledge by fifteen of the participants. Seven of the participants reported technology as a key motivator to share knowledge. Within this matter, Hew & Hara (2007) found that the specific technology motivator varied between the three research sites. In two of the sites, convenience and ease of technology was reported as a motivator. In the last site, pseudo anonymity afforded by technology was underlined; the users reported the feature to help them focus on the specific theme or issue of discussion, rather than personal relationships. Thirty participants indicated reciprocity as a reason to share their knowledge. Since they had received help from others earlier, they felt obliged to share something back. Reciprocity was also shown to work the other way among the participants, as some users shared knowledge in the expectation of getting the gesture in return. Seeker interest was reported as a motivator by three of the participants. Here, the participants consider the attitude of other users before sharing their knowledge - and are more likely to share if the attitude is conceived as serious to the issue or topic. In the analysis of the study, Hew & Hara (2007) suggest that what is understood as the most common combination of motivators for knowledge sharing, was reciprocity and collectivism.

As for barriers of knowledge sharing, some of the significant findings in Hew & Hara’s (2007) study were as follows: unfamiliarity with subject, attitude, no additional knowledge to add, lack of time, considerations of confidentiality and technology. Fourteen participants reported that they would not share knowledge about subjects they were unfamiliar with. Arrogant or negative attitudes of people were indicated by two participants as a barrier of
knowledge sharing. Not having any additional knowledge to add was stated by seven participants, who only wanted to share something if it had not been brought out earlier by other people in the discussion. Lack of time was an issue indicated by eighteen participants. All of the participants were voluntary members of the platforms, and shared knowledge unpaid on their own time. Hew & Hara (2007) suggests that this barrier could be correlated with all of the participants being voluntary members, contributing for free at their own time. Three participants indicated that concerns of confidentiality could be a barrier of knowledge sharing; they did not want to share knowledge that was copyrighted or propriety of their respective organizations. At last, nine participants indicated technology as a barrier of knowledge sharing in all three platforms. Differences regarding each type of platforms were found, where the different professional practices seemed to impact the barrier in each environment. For example, the nurses reported it difficult to communicate certain complex health care procedures in written form. On the other hand, the developer found issues in regards to the way the platform managed discussions and formatted message postings (Hew & Hara, 2007).

One of the key findings in Hew & Hara’s (2007) study suggests that both barriers and motivators are found in individuals; barriers often act as forces, which reduce the motivation to share knowledge, and a motivator may also be a barrier in and of itself. One example here is technology, which was found to both hinder and motivate sharing of knowledge.
3 Theoretical framework

As our query concerns knowledge sharing and technology, it is therefore essential to refer to theories that might explain how people collaborate and learn together online. As mentioned in the introduction of the thesis, our standpoint is based on the view that more and more professionals will need to collaborate in the future. As a result, educational institutions need to take the consequences of this and improve their students performance in collaborative situations (Rasmussen & Ludvigsen, 2010). On this basis, we will use the theory of the sociocultural learning perspective as an overall frame, with the theories of scaffolding and community of practice within this perspective. In addition, we will focus on the theories of collaborative learning, computer-supported collaborative learning (CSCL), and interaction design to support the hypothesis of what stimulates higher education study groups to share knowledge. Here, the reader might notice that theories of Kirschner et al. (2004) are emphasized. Having more of a cognitive approach to learning than a sociocultural, the views of Kirschner et al. (2004) may be conceived as a counterpart to the other theoreticians. However, from a design perspective, we find the theories of Kirschner et al. (2004) suitable to explain the framework of how learning environments can afford different learning activities.

3.1 The sociocultural learning perspective

As we are aiming to understand how higher education study groups are stimulated to share knowledge, we will ground our overall approach in the sociocultural learning perspective. According to Vygotsky (1986), human action and higher mental functioning happens through interaction\(^1\) and both of the aspects are mediated by tools or signs (Wertsch, 1991). Tools and signs can be understood as mediating devices which we learn how to use through social interaction with others (Gee, 2008). From the sociocultural perspective, social interaction is regarded as a prerequisite for both development and growth of cognition (Donato & McCormick, 1994). By participating in activities with skilled others, humans internalize their language, values, norms, culture, and ways of acting and interacting (Vygotsky 1978; Gee 2008). A multitude of the developed sociocultural tools are used to manage everyday activities. Knowledge and skills like this are built up in a society bypartaking in interaction

\(^{1}\) Vygotsky's view on interaction is not understood as synonymous with the approach to interaction design we find within Human-Computer
with other people. One important aspect in the development of tools and signs is that they cannot be viewed as lifeless objects. Human knowledge, insight, conventions, and concepts are embedded in the appliances, and they become something we interact with when we act. In other words, our reality is artificial as it is filled with human-made artifacts (Säljö, 2001).

Having powerful resources in form of intellectual and practical tools, and using those resources to interact with others in different collective businesses can lead to remarkable results (Säljö, 2001). The tools can help us to exploit the restrictive assumptions given from nature, and allows us to deal with our surroundings in ways that are significantly different than our ancestors could ever imagine. The differences becomes visible when we consider how humans developed a system for collaboration. We have created phenomenas like schools, factories, offices, and other similar environments possible through learning how to organize human activity in what we can call institutions. In other words, humans use signs and tools in ways that allow us to build permanent and powerful social systems, which are based on sophisticated forms of collaboration (Säljö, 2001). Members of communities share knowledge amongst them, hence knowledge is not understood to be enhanced individually. People construct understandings collectively, through their involvement in events which are shaped by historical and cultural factors (Rojas-Drummond & Mercer, 2003).

Technology can be understood as one of the most powerful tools in which learning is transformed through. Notwithstanding, the significance of new technologies does not imply that learning becomes more efficient or better. What should be noted instead, is that if the technologies are powerful enough, they can transform the ways people communicate skills and knowledge and how the information is organized (Säljö, 2003). Digital tools are changing the balance of spectatorship and participation. Today, more and more people do not have to play the role of spectator. The digital tools help people to produce for example their own music, films, games, and news. They can now participate in what used to be practices reserved for professional or filmmakers, elite musicians, newspeople, and game designers (Shirky, 2008). Different forms of technology can be understood as a logic extension of the the human desire to communicate with others. Technology is also considered as a part of a pervasive transition towards new methods of production, which will set ever-higher standards for new literacy skills. A consequence of this transition is that learning to a large extent will be concerned about learning methods of mastering the technology in its different shapes (Säljö, 2001).
3.1.1 Scaffolding
In this context, the term *scaffolding* is also a matter of interest (Wood, Bruner & Ross, 1976). The scaffolding process enables children or novices to carry out tasks, solve problems or achieve goals which would be beyond their unassisted efforts. The process of scaffolding consists of an adult or an “expert” that manages the elements of the task that initially are beyond the learner’s capacity. As follows, the learner is permitted to concentrate and complete only those elements that are within his or hers range of competence (Wood, Bruner & Ross, 1976). Recently, computer tools have become used increasingly for educational processes and supporting learning in school and beyond. Pea (2004) argues that the social conception of support for learning and between-people scaffolding, is not primarily about the use of technological artifacts. Parenting and other forms of caring that have risen over millennia is what the social practice is about. The concept of scaffolding has become more commonly used to describe what features of computer tools and the processes are doing for learning, hence technological scaffolding (Pea, 2004). In this thesis, the essence of scaffolding will be understood in the traditional understanding of people helping people to reach a higher level of learning, by giving hints and support throughout the process.

3.1.2 Community of practice
As we are looking into how students collaborate and share knowledge, the term *community of practice* is another key aspect within sociocultural theory (Lave & Wenger, 1991). A community consisting of different participants can be separated into two different types of groups: communities of interest and communities of practice. A *community of interest* can be understood as an informal setting in which participants have a common interest, which is their reason for participating in the network. Golf or cooking could serve as an example of a common interest. On the other hand, a *community of practice* is linked to a common understanding of tasks, as well as a common interest around these (Lave & Wenger, 1991). Further, Henri and Pudelko (2003) argues that three basic criteria must be in place before a group can be understood as a community of practice. (1) All members of the group must share a common interest within a domain, and they need to have a common perception of what is most important for the group. This perception provides a foundation for relations. (2) These relations enable knowledge, collaboration, and sharing of information. (3) Relationship building creates a basis for a common repertoire that consists of stories, tools, experiences, and a variety of ways to tackle challenges. To put it another way, a community of practice
comprises participants who interact with each other over time, and who focus on developing their skills.

3.1.3 Collaborative learning

Our sociocultural perspective rests on the theory that individual agency can only be developed in and through interaction and relations with others in different contexts and settings in society and institutions (Rasmussen & Ludvigsen, 2010; Lin, 2015). Therefore, the concept collaborative learning will be significant in our effort to explain how learning as an inherently social process can be stimulated by technology.

Swain (1997) accentuates collaborative learning as one of the most effective and important methods where learning can take place. Dillenbourg (1999) is concerned that the word “collaborative” is used for more or less anything. When a term is overused like this, it generates two challenges that needs to be addressed. The first one is that it gives little or no meaning to talk about the cognitive effects of collaborative situations if one can label any situation as collaborative. Secondly, it is strenuous to use literary contributions from different authors when they have various approaches to the same term. One of the most common and broadest definitions of ‘collaborative learning’ is that it can be understood as a situation where two or more persons are learning - or attempting to learn - something together (Dillenbourg, 1999). The challenge with this definition is that it can be understood in divergent ways; “two or more” can be understood as everything from a couple of students up to several hundred. “Together” can be a variety of different forms of interactions; synchronous or not, computer-mediated or face-to-face, frequent in time or not, and “learn something” may be interpreted as most levels from close team work to people following the same course (Dillenbourg, 1999). Other researchers such as Baker, Hansen, Joiner and Traum (1999) also see collaborative learning as a complex phenomenon, which can be analyzed and interpreted on many different levels.

One of the most basic contrasts is between social and individual levels of analysis (Baker, Hansen, Joiner, & Traum, 1999). From one perspective, all learning and action can be seen as individuals who learn and act. Perceptions of group action and learning must be derived from these basic components. Additionally, collective actions should be seen as more than the sum of isolated individual acts. Collaborative learning, as described in many studies, can be both qualitatively and quantitatively different from individual learning. From another perspective,
culture or society is more basic than the individual, having a enduring historical presence, gradually developing as a consequence of the acquired action and thinking of individuals that have composed it. To understand the specific nature of human learning becomes the main challenge, and in turn, how this makes the accumulation of effort possible (Baker, Hansen, Joiner, & Traum, 1999). To justify the term collaborative, Dillenbourg chose to account for four elements. A situation can be characterized as collaborative if peers are more or less at the same level, have a common goal, can perform the same actions, and work together (Dillenbourg, 1999). This view is somehow supported by Gokhale (1995), who emphasizes that the students’ have a shared responsibility for their own learning as well as their peers’ learning. In other words, one student's success depends to a great extent on other students (Gokhale, 1995; Lin, 2015).

When one is to expand the understanding of collaborative learning, it would also be expedient to mention what kind of effects that can be expected. Specific effects as conceptual change and increased self-regulation have been described through previous research (Dillenbourg, 1999). Lin (2015) points out that positive interdependence can occur when members of a group is required to depend on each other to manage the task. The students collaborate to help each other out, and make sure that all the group members have learned what is necessary. Furthermore, as participation is an important element for the students’ success, students who collaborate have equal opportunities to participate both in the process and in the final product of the activity (Lin, 2015). Collaborative learning can through clarification, discussion, and evaluations of peers’ opinions, lead to a more critical way of thinking (Gokhale, 1995). Gokhale's (1995) view is supported by Hussain (2004), who emphasizes that web-based collaboration can help the students to expand and stretch their ways of problem solving and critical thinking.

As stated, both collaboration and learning can be understood as words with a variety of meanings, and we will describe our approach on this more detailed in chapter 4, where choice of informants will be discussed.
3.2 CSCL

Studying how collaborative activity takes an interaction-prone shape in the context of technological environments is one of the main challenges in Computer-Supported Collaborative Learning (CSCL). Amongst other things, it looks into the “black box” of how technical artifacts are accommodated to, interacted with, and shaped in varied and various practices. Within the CSCL research community, the main focus is on how people learn in the context of collaborative activity and how we can design and evaluate technological settings that support this activity (Overdijk, van Diggelen, Kirschner and Baker, 2012). Until recently, the use of textbooks and information provided by teachers and other students dominated the classrooms and the teacher’s lessons. Within the last years, digital tools and technologies as computers and other networked technologies has created new conditions of teaching and learning (Rasmussen & Ludvigsen, 2010).

According to Stahl et.al. (2006), there has been a gradual development from technology intended for the individual, to technology aimed towards collaborative learning. The potential internet have to connect people in original ways is understood as a stimulus for the research on CSCL. As CSCL started to develop, it became evident that the whole concept of learning required a transformation. This included the need for significant changes in being a student, teaching, and schooling (Stahl et. al. 2006). As follows, learning itself has moved from being a merely externally and individually programmed endeavor into learning with and in groups in a inquiry-based or problem-based situation. This movement does not only concern the classroom, but also distributed environments (Strijbos, Kirschner & Martens, 2004).

Furthermore, educators have acknowledged the new communication and information technologies integrated into CSCL as useful when it comes to enhance cognitive performance (Kirschner et. al. 2004), as well as stimulating knowledge construction (Stahl, 2003). In addition, it is shown that students in CSCL environments appear to participate more in the learning process (Fjermestad, 2004), make better decisions, and to report higher levels of learning (Hertz-Lazarowitz & Bar-Natan, 2002) than when working alone (Järvelä et al. 2015). One other notable aspect is highlighted by Soller, Martinez, Jermann and Muehlenbrock (2005), which claim that the students are given the opportunity to learn on their own time, at different locations, as well as sharing ideas and knowledge with other students.
Moreover, it should be noted that online collaborative learning environments might never be able to provide the support we know from the face-to-face classrooms, and it might never need to. In this context, it is worthwhile to consider that these environments still have to provide students with quality learning experiences (Soller, Martinez, Jermann & Muehlenbrock, 2005). Soller et al. (2005) points out that the process of understanding and evaluating the collaborative learning tools and methodologies should not be regarded as a trivial task. Factors such as student motivation, prior knowledge, behavior, roles, language, and group dynamics interact with each other in ways that are impossible to predict, making it challenging to both measure and understand the learning outcome (Soller et al. 2005).

According to Johnson and Johnson (2004), the design of web collaborative learning environments must ensure that collaborative learning takes place. This will not merely be confirmed by a set of collaborative tasks aimed at the students, nor would a set of communication tools. Further, Johnson and Johnson (2004) have established five conditions that should be in place to help making collaborative learning superior to competitive or individual learning. (1) Positive interdependence, where everyone share the same goals, (2) personal responsibility where everyone is in charge of oneself, (3), promote interaction, mainly face to face interaction, (4) small group and interpersonal skills, where everyone works efficiently and function both as a part of the group, as well as with each other, and (5) a regular and frequent process of improving the groups function to improve its effectiveness in the future (Johnson & Johnson, 2004). An issue that should be stated is whether the collaborative tools are able to contribute to collaborative learning, and in which degree it serves as a facilitator that guides and supports the students, contrary to the opposite.

Environments designed for collaboration are built on the idea that knowledge is constructed as a collective effort, therefore the design tries to enhance the different principles that are concerned in such collective processes and products. With this in mind, social practices can be changed if specific features is redesigned, if we change the tasks and choose to build in new scaffolds (Rasmussen & Ludvigsen, 2010). In order to better understand how one can design, implement, develop and implement environments for collaborative learning, we will account for interaction design in the following section.
3.3 Interaction design

When trying to explain the field of interaction design, we find it hard to avoid saying some word about its akin field, Human Computer Interaction. Preece, Rogers and Sharp (2015) consider the main difference between human-computer interaction and interaction design as one of scope. HCI has traditionally had a more narrowed focus, being concerned with the study of major phenomena surrounding the evaluation, design, and implementations of interactive computer systems for human use. On the other hand, interaction design casts its net much wider, being concerned with the research, theory, and practice of designing user experiences for all types of systems, technologies and products. To reflect on the wider scope, we will emphasize interaction design in this thesis, but in order to understand interaction design and where it originates from, we will start by looking into Human-Computer Interaction first.

Human-Computer Interaction, also known as HCI, is a known term since the early 1980s. HCI research is trying to improve the interaction between computing devices and its users in the sense that interaction should become more user-friendly. It should also be better adapted to the needs and capabilities of the device and the users (Ebert, Gershon & Van der Veer, 2012). This can be related to the sociocultural perspective, where tools are understood as mediating devices in how we learn (Gee, 2008). The approach merges several additional aspects of different research areas such as data mining, cognition science, scientific visualization and psychology (Ebert, Gershon & Van der Veer, 2012). According to Carroll (2012), the only humans who interacted with computers were dedicated hobbyists and information technology professionals until the late 1970s, when the emergence of personal computing occurred. Personal computing includes both personal computer platforms and personal software. Examples of personal computer platforms is programming languages, operating systems, and hardware. Personal software includes for instance interactive computer games and productivity applications, such as text editors and spreadsheets. Personal computing enabled everyone to be potential computer users, and highlighted the weakness of computers with respect to usability for those who wanted to use computers as tools (Carroll, 2012). The traditional view in Human-Computer interaction was an equal view on the interaction between the computer and its human operator (Verenikina, 2010). Today, HCI is a multifaceted and a vast community, bound by the integrating commitment to value human
experience and activity, and evolving concept of usability as the primary driver in technology (Carroll, 2012).

According to Preece, Rogers & Sharp (2015:8), interaction design can be understood as “designing interactive products to support the way people communicate and interact in their everyday and working lives.” A central concern in this approach is to develop usable and interactive products. By this, the aim of interaction design is to develop products that are effective to use, easy to learn, and to provide a satisfying user experience. The design of interactive products require a consideration of the people who are going to use the product, how it will be used, and where it is going to be used. Another point of interest is understanding what kind of activities the users are doing while they are interacting with the product. A key question for interaction design is how one can optimize the user's interactions with an environment, system or product, so that they can extend and support the user's activities in useful, usable and effective ways (Preece et al. 2015). By basing the design decisions on an understanding of the users, the designer can be more orderly in the decision process. Among others, some of the highlighted aspects is: (1) Get people involved in the design and listen to what they want; (2) Consider what people are good or bad at; (3) Taking into account which elements that might provide good user experience; and (4) Practice tried and tested user-based techniques throughout the design process (Preece et al. 2015).

Today's educational institutions have a tendency to apply traditional pedagogy and classroom ideas in non-contiguous learning environments. Based on the idea that since these environments allow the same interaction we see in the classroom, we can still use traditional pedagogy (Kirschner et al. 2004). However, environments like shared applications, chat, and real-time meetings do not support interactions the same way as real life does. The result is often disappointed or annoyed students and instructors, poorly used environments, lack of motivation, and wasted time and money (Kirschner et al. 2004). In addition, today's learning environments can be understood as often loosely structured and fairly open, giving the learners a high degree of responsibility for monitoring his or her own learning. With insufficient guidance or adequate skills, the students may not reach productive and valuable collaborative activities such as explaining, elaborating, questioning, or arguing (Häkkinen & Hämäläinen, 2012). Kirschner et al. (2004) stresses that the solution to this is both simple and elegant; in order to accommodate this in a more convenient way, we need to attend not only
the technological requirements for collaboration, but also the social and educational prerequisites for allowing collaboration to occur (Kirschner et al. 2004).

While Häkkinen and Hämäläinen (2012) emphasize that general guidelines for designing future learning environments cannot be drawn, Kirschner et al. (2004) proposes that one rather should look at the framework when designing collaborative environments. This should be based upon those three prerequisites, (a) technological, (b) educational and (c) social. Further, it then goes into fairly greater depth with respect to non-surface-level factors central to collaboration. This is grounded in their claim that the current research on and design of CSCL, tends to focus mostly on surface-level characteristics (Kirschner et al. 2004).

3.3.1 Affordances of a learning environment

Because of possible unforeseen interaction between group members, Kirschner et al. (2004) suggests that a systemic or probabilistic view on design is more appropriate than a classic casual design view. When having a probabilistic design view rather than e.g. a classic casual or a systemic view, it is implied that more attention should be paid to learning and interaction processes. Rather than focusing on attainment of predefined goals, the designers focus on methods that support learning process. Interactions between learners in a group may lead to that each person in the group acquire a given skill through the method of choice, but is inclined to might only acquire a part of the skill, or the skill plus something unexpected (Kirschner et al. 2004). In addition, the chosen method could be abandoned and replaced with another, more distinctive method for the group. What should be emphasized here, is that this is not a question regarding what outcomes specific collaborative work forms and educational techniques might cause, but what kind of activities they afford. This often referred to as the affordances of a learning environment, where the specific types of learning need to be afforded in different ways. Affordances can be understood as opportunities for action; how the actual and perceived fundamental properties of a thing determines how it possibly can be used (Kirschner et al. 2004). Any environment in which an individual finds her or himself in, consists of affordances (Gee, 2008). Overdijk, van Diggelen, Kirschner and Baker (2012) views affordances in its original form as a thought-provoking concept which helps creating a sensitivity with respect to the complexity we find in the agent-artifact connection. Norman (2000) emphasizes that both the knowledge in the world and the knowledge in our head is essential in regards to how we perceive affordances. Much of the knowledge we need to do a task can reside in the world - and our behavior is determined by the combination of the
information in memory with that in the world (Norman, 2000). As Overdijk et al. (2012) further describes, an object's affordance alludes to the opportunities for action that is carried by the object in relation to the perceiver of the object. One example of affordance is the handle of scissors; the intuitive design leaves little doubt on how you should place the scissor in your hand. As affordances can be understood as what the individual can identify as feasible in, on, to, about or with the features of an environment, it cannot exist if the individual does not identify its presence (Gee, 2008). Hence, the affordance of the mentioned scissor can not be turned into action if the human actor doesn’t have the capability to use the scissor in the right way.

Kirschner et al. (2004) suggests that the use of technology in learning situations can be understood as an unique combination of educational, social and technological affordances and contexts. The technology mediates the educational and social context by inducing their properties and invite specific learning behaviors. Affordances can be linked to an object's usability, which is concerned with whether the system allows for an efficient, effective and satisfying way of accomplishing a set of tasks (Norman, 2000; Kirschner et al. 2004).

As for technological affordances, they are linked to an object’s usability, as they “provide strong clues to the operation of things” (Norman, 2000). If we neglect the usability criteria when creating CSCL environments, we risk ending up with a platform that contains all the
essential social and educational functionalities, but being too difficult to control, learn, and/or access by their users (Kirschner et al. 2004). Norman (1992) takes this scenario into consideration by maintaining that the main problem with most new technological programs and devices are that they are poorly conceived and developed, merely with the goal of using technology in mind. According to the theory of affordances, the human side and the user's abilities and needs are being completely ignored. To be able to take the users’ needs, as well as the usability aspect into account, a design process which is grounded in user-centered design research is considered necessary (Norman, 2000).

The social affordances can be understood as analogous to technological affordances; the properties of CSCL environments that serve as a socio-contextual facilitator is relevant for the learner's social interaction. By being designated social affordance devices, objects that are part of the environment can possess these properties. By perceiving the social affordances, the learners are encouraged to engage in activities which are in accordance with the affordance, making social interaction possible. Moreover, the social needs of members must be fulfilled by the environment as soon as the intentions emerge, while the the social affordance devices must be regarded as meaningful. To the end, a CSCL environment that is missing social affordances is assumably one that isolates the learners from their peers (Kirschner et al. 2004).

Educational affordances regulates if and how team learning and individual learning can take place. As all other affordances, educational affordances in distributed learning groups encompass the two same relationships: (a) As soon as the needs crop up, the environment must fulfill the learning intentions of the member. Further, the affordance must support or anticipate the learning intentions, and must be understood as meaningful. (b) As learning needs become salient, the educational affordances of a learning environment or device will both invite and guide the member to make use of a learning intervention to meet that need (Kirschner et al. 2004).

When studying learning and knowledge sharing from the perspective of affordances, the study can be understood as an exploration of the relation between learners and their environments. A matter of interest is which affordances that are available in the learner's environment, and which opportunities the learners have when it comes to transform the affordances into action (Gee, 2008).
3.3.2 Design guidelines of CSCL environments

By now, we should have a fairly clear picture of what that needs to be designed; usable CSCL environments that mediates the social and educational context. The next step is to look at how environments like this can be designed and implemented. Affordances are by far not easily designable and developable independent features of a system, but should be understood as quite the opposite; they are, rather, dependent on the relationship between the organism - the user - and the artifact. The way of designing them does not regard the interface design, but rather the design of interaction (Kirschner et al. 2004). Interaction design can be understood as “a discipline dedicated to define the behavior of artifacts, environments and systems (i.e., products) (Reimann, 2001) Interaction design determines what value a communication service has to its users, as well as the quality of experience the users get by using it. In addition, to be concerned with the usability, the utility of the system is an important factor when it comes to interaction design. The utility regards the set of functionalities incorporated by the system, and together with the usability matter, these form the usefulness of a system, and can be understood as the goals of interaction design. As Kirschner et al. (2004) states, a system is worthless if it is usable, but lacks the functionality needed by the user. Regarding CSCL environments, both the social and educational functionalities determine the the utility (Kirschner et al. 2004).

3.4 Summary of theory

In this chapter we have elaborated our main theoretical points of view for this thesis. Theories of sociocultural learning perspective, scaffolding, community of practice, collaborative learning, CSCL and interaction design has been emphasized in order to support our query. We will give a short summary of the most significant characteristics, before we move on to research method in Chapter 4.

The theories in the first part of this chapter focuses on how to understand collaborative groups. The sociocultural learning perspective is used as an overall theoretical frame, and emphasizes human action and higher mental functioning through interaction. Both of the aspects are mediated by tools and signs (Wertsch, 1991), and we learn to use mediating devices through interacting socially with others (Gee, 2008). Two important terms under the sociocultural learning perspective, which is mentioned in this chapter, is scaffolding and community of practice. The support and guidance through hints in scaffolding, and a
common understanding of tasks in the theory of community of practice, can be beneficial for us to get a deeper understanding of the group's composition and collaboration. This is also supported by the theory of collaborative learning, which emphasizes collaborative learning as one of the most important and effective methods where learning can take place (Swain, 1997).

The next section in the chapter has a more technological direction. The theories of computer-supported collaborative learning (CSCL) and interaction design is more related to the technological perspectives, toward knowledge sharing among study group in higher education. As mentioned earlier, Kirchner et al. (2004) is understood as having more of a cognitive approach to learning than a sociocultural approach. By emphasizing Kirchner et al. (2004) in our study, this is in light of a design perspective, hence during the technological section of this chapter. In regard to knowledge sharing among study groups, we also focus on interaction design. The main objective here is developing interactive products that are easy to learn, effective to use, and provide a satisfying user experience. The term affordances is also emphasized in this chapter, and can be understood as opportunities for action. This refers to how the perceived and actual fundamental properties of a thing, determines how it possibly can be used (Kirschner et al. 2004). The technological aspect can explain which platform the groups are using, and if technology is a factor that contributes or discourages the study groups to share knowledge.

The theories will function as our foundation, as the data material will be elaborated later in our thesis.
4 Research method

In this chapter we will present our research design and methodological approach. Initially, we will account for our research design and choice of method and strategy for analysis, before we describe how we approached and selected our informants. The data material consists of case interviews with five study groups in higher education. We will then elaborate on our choice of analytic approach. Finally, the chapter will end with a subsection regarding validity, reliability and ethical considerations. The study is approved by The Norwegian Data Protection Authority (NSD) (see Appendix 1).

4.1 Qualitative approach

As our aim is to accomplish an understanding of how higher education study groups are stimulated to share knowledge, our choice of method will be a qualitative approach. According to Silverman (2006) there is no right or wrong approach, but it relates to which method that is appropriate for the current research study. How and why students choose to work in groups and share knowledge is not an easy variable to measure, henceforth the quantitative method would not be an appropriate approach in our case. As a qualitative method enables us to talk and interact with the students, it allows us to get the deeper understanding we are aiming for. To genuinely understand the students needs and interactions, we find it essential to be able to adapt and tweak the questions and our approach during the interviews.

The qualitative approach has gradually become more accepted and practiced in the social science area, and can be characterized by a diversity of data and analytic approaches. It consists of a set of interpretative, material practices that transform the world and make it visible. The world is turned into a series of representations, including field notes, interviews, conversations, photographs, recordings, and memos of the self (Denzin & Lincoln, 2005). The method has traditionally been associated with research that includes close contact between the researcher and the informants, by having participant observation and interviews (Thagaard, 2009).
By trying to enable an easy and informal contact with our informants, we were able to gain their trust and willingness to share information about their practice. This seemed to make them feel more comfortable regarding sharing information about their practice with us. It also gave us a deeper understanding about the background of their practice and the social phenomenons surrounding the persons and the situations that were being studied. Interviews can be a good starting point to get knowledge about how individuals experience and reflect on their situation (Thagaard, 2009). Qualitative research involves an interpretive, naturalistic approach to the world. This means that qualitative researchers studies phenomenons in their natural settings, attempting to make sense of, or interpret phenomena in terms of the meanings people bring to them (Denzin and Lincoln, 2005). Knowledge about the field should also be considered important for the selection of method, and by being students ourselves, we could relate to the positive and negative sides about sharing knowledge and content with each other, as well as the upsides and downsides of working in groups (Thagaard, 2009).

4.2 Exploratory interview-based study

Exploration can be understood as a perspective, a way of carrying out or approaching a social study (Stebbins, 2001). Exploratory research is, according to Shields and Rangarajan (2013), primarily used in qualitative research and used on topics with limited or undeveloped research. Considering that we still have a lot to learn in the field of what stimulates higher education study groups to share knowledge, an exploratory perspective can be appropriate for this thesis. Another method that will serve as relevant for our thesis, is an interview-based study. According to Kvale and Brinkmann (2015), there is no standard procedure for conducting an interview-based study, but some approaches and techniques needs however to be chosen during the process. The process of an interview-based study can be presented in seven steps:

1. **Thematises** - Formulate the purpose with the research, and describe how you perceive the subject being researched before the interview process begins.
2. **Plan** - Plan your study, and take into account the seven steps, before you embark on the interview process. Plan with the purpose to collect the knowledge you wish, and with the study’s moral implications in mind.
3. **Interviewing** - Perform the interview based on the interview guide, and with a reflective approach to the knowledge you search for, and the interviews context. Also consider the interview situations interpersonal relations.

4. **Transcribe** - Prepare the interview material for analysis, which normally is transcribing from speech to written text.

5. **Analysis** - On the basis of the study's purpose and area of the subject, in compliance with the interview materials nature, decide which method of analysis that is most suitable for the interviews.

6. **Verification** - Examine the findings of the interviews generalizability, reliability and validity. Reliability refers to how dependable the results are, and validity refers to whether an interview study examines what it is supposed to examine.

7. **Reporting** - The findings in the study and the use of method imparted in a form that comply scientific criterias. Take into account the studies ethical sayings and results in a readable product.

The seven steps show how to conduct an interview-based study (Kvale & Brinkmann, 2015), and we will use the steps as a framework for our study. Nevertheless, we also find case studies as appropriate for our study, considering how each of the groups can be perceived as different cases. In light of our study about students sharing knowledge with each other, we will base our research on five different study groups. A definition of case studies is according to Yin (2014) twofolded. Firstly, Yin (2014) claims that “a case study is an empirical inquiry that investigates a contemporary phenomenon (the “case”) in depth and within its real-world context, especially when the boundaries between phenomenon and context may not be clearly evident” (Yin, 2014:16). By having an exploratory perspective and a study that goes in depth on cases that might not be clearly evident, a case study approach could be valuable for us. With five different study groups, and seeing each of them as separate cases, we can relate this to a multiple case study. By applying a multiple case study, it should be understood as essential that the different cases have some similarities (Stake, 2006).

As a research method, the case study can be used in several situations, serving as a contribution to the current knowledge about individuals, groups, social, political, organizational and related phenomenons. The desire to understand complex social phenomena, whatever the field of interest are, can be understood as the distinctive need the
case study research emerged out from. By focusing on a case and retaining both a real-world and holistic perspective, case studies allows researchers to study for example small group behavior, internal relations, individual life cycles, organizational and managerial processes, and the maturation of industries (Yin, 2014).

4.3 Data collection

This section concerns our process of collecting data, selection of informants from different higher education institutions, and choice of method. It is intended to be an overview of the data our study is based on, and will hopefully serve as a backdrop regarding our choice of approach. In advance of our data collection, we agreed that including at least three higher education institutions would be preferable. Even with three different institutions, the selection is too narrow to generalize the results. Nevertheless, we aimed to have a minimum level of diversity. Due to practical reasons and time limitations, we decided to select universities that did not require a long excursion, and hence were located in or near Oslo.

4.3.1 Selection of informants

Since our research question is based on how study groups are stimulated to knowledge, we considered it significant to select informants that works in groups, and who uses technology for knowledge sharing. It was desirable for us to find groups which can be seen in light of Dillenbourg’s (1999) four elements of collaborative learning. Groups with common goals, groups who could perform the same actions, groups who were more or less at the same level, and groups who worked together (Dillenbourg, 1999). The groups to be selected also had to include three or more members, and had to collaborate in at least one course over a minimum of three months. This specification of the desirable study groups are grounded in our own experiences as students collaborating in groups. We know that there is a broad variation when it comes to sizes and ways of organizing study groups, and we therefore found it practical to specify the type of study groups we aimed for.

As our target group was students studying at a higher education institute, we considered approaching the institutes as a convenient approach to find informants. However, contacting the administration and lecturers at the institutes and calling on their assistance became a time-consuming process, so we decided to find the students ourselves. By using social media and
looking for students in their natural habitat, for instance in the library, we found five groups that were suitable as informants in our study.

4.3.2 Group interview

Qualitative interviews was favored as a method to collect data, since we aimed for a deeper understanding regarding how study groups are stimulated to interact and share knowledge with each other. Considering our view that collaboration is related to knowledge sharing, we decided to conduct group interviews instead of individual interviews. Although interviewing groups takes more time then interviewing individuals, we found that group interviews could give us a deeper and a more thorough description around the sharing and social aspects of working in a group. We used about 45 to 70 minutes per interview, and our intent was to attain a discussion around the topics rather than a regular and formal interview.

We considered it favorable to conduct semi-structured interviews, considering it would give us the opportunity to have a structure that neither was too structured, nor too open (Kvale & Brinkmann, 2015). By using semi-structured interviews, we developed an interview guide (Appendix:3) that would help us to form the structure of the interviews, while also allowing us the freedom to discuss other topics that could benefit our thesis. Another advantage of conducting face-to-face interviews was observation of our informants. Group interviews should not necessarily be understood as better or more favorable than individual interviews, but group discussions can provide settings where every individual has to argue for their point of view. This can be effective when it comes to developing and clarifying the individual's experiences and viewpoints (Jacobsen, 2010). In addition, group interviews can be assumed as more demanding than individual interviews, since several informers is involved. Therefore, our goal was to interview a total of five groups with 3-4 persons per group, and preferably groups from different educational institutes.

Throughout the interview process, we aimed to learn about the process of interviewing and how to take field notes, so we made sure to take turns on leading the interviews every second time. The person not leading the interview took the role as an observer writing field notes, and stepped in with complementary questions when necessary. We also took an audio recording of the interview, considering the collection of data was in form of words, sentences, or stories. This enabled us to transcribe the interviews for a deeper analysis, in
addition to giving us the opportunity to return to the parts that were in need of a further examination.

4.4 Content analysis

Content analysis is a widely used qualitative research technique, which among researches is regarded as a flexible method for analyzing text data. Rather than being a single method, applications of content analysis can be understood as three distinct approaches; summative, conventional, and directed. The choice of a specific content analysis approach varies with the problem being studied, the substantive and theoretical interests of the researcher (Hsieh & Shannon, 2005), as well as the researchers technological capabilities and desired results (Kondracki, Wellman & Amundson, 2002).

When using qualitative content analysis in research, focus is on the characteristics of language as communication with concern about the contextual meaning of the text or the content. The text data might be in print, verbal, or electronic form, and may have been obtained from open-ended survey questions, focus groups, interviews, observations, narrative responses, or print media such like books, articles, or manuals (Hsieh & Shannon, 2005). The purpose is to obtain a broad and condensed description of the phenomenon, and the desired outcome is categories or concepts describing the phenomenon (Elo & Kyngäs, 2008). The coding process can be understood as a way of organizing communication content in a manner that allows for an easy retrieval, identification, or indexing of content significant to the research questions. Content components might be theories, words, topics, phrases, or other characteristics the researcher finds interesting. When identified, the components of choice may be subjected to qualitative or quantitative analysis, or both (Kondracki, Wellman & Amundson, 2002). Content analysis allows the researcher to test theoretical issues to enhance insight of the data, as the aim is to make valid and replicable inferences from data to their context (Elo & Kyngäs, 2008).

When selecting content analyzing as an approach, one has to choose between different methodological options. One of the options that is in need of an early clarification, is whether an inductive or deductive approach to the research questions is appropriate. Using an inductive approach, the first stage is to investigate the communication messages in question without preconceived categories or assumptions. The researcher then makes notes of
applicable keywords, themes, and content categories that either can be used independently or as a basis for constructing categories for the later quantitative analysis (Kondracki, Wellman & Amundson, 2002). As the categories are derived from the data, the inductive approach can be appropriate when the former knowledge about the phenomenon is limited or fragmented (Elo & Kyngäs, 2008). In contrast to the deductive approach, the inductive approach moves from the specific to the general, enabling the researcher to observe and combine particular instances into a general statement or a larger whole (Kyngäs & Vanhanen, 1999, ref. in Hsieh & Shannon, 2005).

Since the purpose of this study is to reveal how study groups are stimulated to share knowledge, coding and categorization are based on directed content analysis with an inductive approach. The advantage of using this method is that we can base our process on the present theory, which enables us to form categories on the basis of theoretical operationalizations. Further, the results of the analysis can be made thematically in an orderly manner to make it easier to highlight findings from the other methods.

### 4.5 Framework of the content analysis

Our primary data consisted of a total of five case interviews with study groups from three different higher education institutions. Individual preferences often play a large role when it comes to the selection of methods in content analysis (Kondracki et al. 2002). To be able to code the content from the interviews in relevant categories, we chose to use Microsoft Excel as a tool to structure our questions and the informants answers. By taking advantage of a technology we knew well from before, we could substantially reduce the amount of time it would take us to learn a more sophisticated software (Kondracki et al. 2002). Due to the large amount of transcription, we selected to base our approach in whole answers and reflections, and used this as a base for the categories. As we have a inductive approach, the category systems were developed inductively out of the concrete material (Mayring, 2014). The different categories can be understood as a division between the different factors that influence the students choice of technology for collaboration and knowledge sharing.

To avoid what typically is referred to as a “cognitive overload”, only a part of the data collection is used in building the coding frame. To do this, we broke all the material down in smaller ‘chunks’, followed by building the coding frame for one ‘chunk’ after another.
(Schreier, 2014). The key aspect of content analysis is that the many words from the text are classified into much smaller content categories (De Wever, Schellens, Valcke & van Keer, 2006; Elo & Kyngäs, 2008). As our intent is to understand how higher education study groups are stimulated to share knowledge, we found themes to be the most suitable unit of analysis. We began with sorting the students thoughts about social prerequisites and group dynamics, before we moved on to their reflections about their current use of technology. Once we had identified the coding frames for these topics, we started to look after what the students said about technological functions as features, followed by proposing appropriate categories.

Figure 4.1 illustrates the process of categorization

Thorough the process, we emphasized that the selection of material should reflect the full diversity of data (Schreier, 2014). Since our data material consists of five group interviews, we considered it essential that the categories of choice matched the material of all the interviews. As we went through the material, we discovered that some categories were inadequate or too shallow. In such cases, we had to adjust already existing categories, or construct new categories. Our way of classification can be understood as an iterative process, where our constant adjustments helped us in creating more refined and meaningful categories.
4.6 Validity, reliability, and generalization

This section will contain critical reflection on the research design, as well as our research process. The research design is a qualitative interview-based study of five study groups with a total of 15 students and the data consists of group interviews, field notes, audio recordings, and photos.

A directed content analysis has its challenges. Using theory carries with it implicit limitations; the researcher might approach the data with an informed but strong bias. For that reason, one might be more likely to find supportive evidence rather than non-supportive of the theory. The researcher should also be aware of that some participants may get cues to answer in a certain way, or that they somehow have to agree with the questions to please the researcher (Hsieh & Shannon, 2005). In our case, some of the students might agree with some of the challenges we are addressing when it comes to the technological platforms they are using today. Thirdly, overemphasizing the theory can make the researchers blind when it comes to the contextual aspects of the phenomenon (Hsieh & Shannon, 2005). On that account, it requires us to not let existing theories cloud our view on for example collaborative learning, but try to approach the data collection with an open mind as much as possible.

4.6.1 Validity in content analysis

In content analysis, validity is a concern in two major ways. First of all, selecting the communication to be studied and the sample selection methods is an important matter (Kondracki et al. 2002). For example, a study of advertisement aimed at men could have validity problems if it excluded Internet advertising. Secondly, sample selection methods that leads to an unrepresentative or biased samples, hurts the study’s validity. The rules to be followed are basically the same as in other studies: the population of text that is to be studied must be appropriately defined, and the sampling must be systematic (Kondracki et al. 2002). A successful content analysis obligates that the researcher is able to simplify and analyse the data, and form the categories in a reliable manner that reflect the subject of the study (Elo & Kyngäs, 2008).

Regarding qualitative interviews, one important aspect concerning the validity is our degree of subjectivity in relation to the data material. To accommodate this challenge, we need to
emphasize our role as researchers, both in the interview situations, in the analysis and in the interpretation process. As qualitative interviews builds on human interaction where intersubjectivity is a central aspect, it is essential that the opinions and viewpoints revealed under the interviews actual represent the informants experiences and perspectives, instead of being disconnected and out of context (Dalen, 2011). For our part, it could be challenging to keep our personal opinion about the different technologies and platform to ourselves under the interviews, as the students often sought confirmation. We managed to refrain from this by making a point out of emphasizing that we just were curious about their practice, and that no answers would be considered as wrong.

4.6.2 Content analysis and reliability

Reliability of a coding scheme can, according to Rourke, Anderson, Garrison and Archer (2001), be understood as “a continuum, beginning with coder stability (intra-rater reliability; one coder agreeing with herself over time), to inter-rater reliability (two or more coders agreeing with each other), and ultimately to replicability (the ability of multiple and distinct groups of researchers to apply a coding scheme reliably).” According to De Wever et.al. (2006), inter-rater reliability should be regarded as a critical concern in relation to content analysis. It is considered as the primary test of objectivity in content studies, and can be understood as to which extent different coders come to the same coding decisions when coding the same content. We find similarities and differences between inter-rater reliability and our own coding process. Considering that we are two researchers, the coding and category process have been precisely studied by the both of us. The categories has thoroughly been discussed, with the intention that both of us should have the same understanding and opinion about the categories. However, by working together throughout the whole process, we can have influence each others’ view and opinions about the meaning of the codes. Therefore we can not be seen as impartial toward the understanding of the codes, and our process can be seen as different then inter-rater reliability. Kondracki et al. (2002) highlights that intercoder “reproducibility” or reliability must be calculated. This will help ensure that categories are adequately defined so that both coders will come to the same conclusions. As of today, there seems to be no established standards available when it comes to interpretation of levels of inter-rater reliability. Moreover, there seems to be no real consensus regarding the percent agreement statistics (De Wever et al. 2006).
4.7 Ethical considerations

Ethical challenges often appear because of the complex conditions that are connected to the examination of peoples’ privacy, later followed by sharing the descriptions in public. Throughout our study, we aimed to follow four areas of ethical guidelines suggested by Brinkmann (2013): Informed consent, confidentiality, consequences, and the role of the researcher. These guidelines served as a suitable tool to assist us in making sure that ethical issues at all time remained at the forefront of our concerns. In a qualitative study like ours, we as researchers holds a significant responsibility to assure that the informants feels secure about sharing information and meaningful stories (Kvale & Brinkmann, 2009). When our research question and interview guide was finalized, we applied for approval at The Norwegian Data Protection Authority (NSD). The interview settings were initiated with providing the informants with information regarding the thesis, as well as their right to at any time resign as informants (Kvale & Brinkmann, 2009). They were, in addition, given documents outlining the study’s approval, which included national legal obligations concerning anonymity, data protection, and consent. (Appendix: 2).

Confidentiality means that the collection of private data will not be disclosed to anyone (Kvale & Brinkmann, 2009). From the start, the informants were given pseudonyms like “Informant 1”, and the transcribed, printed, and recorded material was stored securely in accordance to guidelines. The informants in our study are anonymous in accordance with The Personal Data Act §31. Information regarding age span, area of study, and educational institution are used, while all other information is held anonymous. According to Kvale & Brinkmann (2009), consequences are understood as the outcomes a qualitative research can inflict the informants, or the group they are representing. Our research does not contain sensitive information, but various understandings of the students reflections of knowledge sharing and technology.
5 Key technologies

As the groups in our study use various technologies to share knowledge, we find it relevant to give a brief overview of the platforms. Firstly, an understanding of learning management systems (LMS) in general will be given before introducing the learning management systems used by the students. All of the five study groups attend educational institutions that use either Its Learning or Fronter as LMS. Secondly, we will give a short introduction of the three more independent technologies used as tools for knowledge sharing among the informants: Facebook, Slack, and Google Documents.

5.1 Learning management systems (LMS)

A learning management system (LMS) is an information system that assists the process of online learning (McGill & Klobas, 2009). It is a software that permits creation of course sites and is often purchased and hosted by educational institutions (Sclater, 2008). An LMS provides students a space for online learning while supporting the institution's administration, as well as publishing and storing learning material. Teachers use them in a variety of ways to support student learning and course management (McGill & Klobas, 2009). The system is usually managed by the educator or the institution’s administration, who also have the authority to manage the uploaded information, to upload content to the course sites and discussion groups, and to delete inappropriate content from it. The student’s permissions are often more limited than the educator, and they usually use the LMS to view and download course material. The students also have the opportunity to take part in interactive activities, for instance in forums. They can also contribute content to specific parts of the sites, such as collaborative repositories purposed by the course manager. The students often use the LMS to deliver assignments and exams, allowing the educator to assess the students work. The educator also has the possibility to make reports of the user’s activities in the LMS (Meishar-Tal, Kurtz & Pieterse, 2012).
5.1.1 Its Learning

According to their homepage, Its Learning is designed to meet the needs of the teacher. It is a cloud-based learning platform which is used at all levels of education. The platform has built-in pedagogical applications and tools, which is intended to encourage students to use creative skills in educational settings. Its Learning emphasizes that every day tasks such as reporting grades and setting and collecting assignments is automated, so teachers will have more time to teach (Its Learning, 2016).

![Figure 5.1: The screenshot shows how the interface of Its Learning is shown to Group 3 from BI.](image)

The screenshot above demonstrates how Its Learning is presented to students at BI. A feed which is intended to show news and frequently updated information is integrated on to the front page. Notifications are shown as an orange square at the top menu, followed by a search function. BI and The Norwegian Police University College use Its Learning as their learning management system.

5.1.2 Fronter

Fronter was acquired by Its Learning AS in November 2015, and the two companies joined forces under the Its Learning brand. As of today, Fronter functions as a product under Its Learning’s platform portfolio (Its Learning, 2016). As Fronter and Its Learning is perceived as two different platforms by the students in our study, we will separately account for the two technologies. As of 2010, Fronter was used by more than 3000 learning institutions in Europe
(Bechina & Hustad, 2010). After the merger, the combined company is said to be Europe's largest producer of learning management systems (Its Learning, 2016). The structure in Fronter is based on different rooms, where each room can represent different subdivisions such as projects, lectures, or courses (Bechina & Hustad, 2010).

The different rooms in Fronter are only open to chosen participants, and the user's privileges are dependent upon their role in the room (Bechina & Hustad, 2010).

In their study from 2013, Arntzen and Hustad found that faculty staff regarded Fronter as helpful, considering it enabled them to gather all information in one place. The further findings indicated that faculty members mostly used Fronter as a supplement to traditional lectures, and that the asynchronous functionalities were the most used features. The instructors also emphasized that Fronter made it more straightforward to reuse learning material. This was appreciated, as the instructors claimed that by improving and reusing the learning material, they could see growth in learning outcomes and efficiency (Arntzen & Hustad, 2013).

In similarity with Its Learning, Fronter is also emphasized as a platform designed to support the teachers’ workflow, based on the intention that the teachers can be more productive under their planning and assessment of learning. Moreover, Fronter states that it is necessary to be teacher friendly to be able to improve education and make it more available (Fronter, 2016). The University of Oslo uses Fronter as their learning management system.
5.2 Facebook

Of the several hundred available online social networking sites, Facebook is one of the most popular one, with over 1.65 billion monthly active users and a 15 percent increase year after year (Facebook, 2016). Earlier studies have suggested the popularity of using Facebook among student populations, and while the use of Facebook in an academic context, there is still much more to examine when it comes to Facebook in a higher education context (Donlan, 2014).

![Facebook screenshot](image)

Figure 5.3: The screenshot shows one of the uploads group 1 have done in their Facebook group.

Facebook consists of several features, three of which the students in our study highlighted in particular: Facebook wall, groups, and chat. Facebook wall is also known as “timeline”, and shows highlighted information regarding other users’ activity. This could be content the users have commented on or shared, as well as birthdays and upcoming events. The Facebook chat, also known as “messenger,” is an instant messaging service that facilitates voice and text communication. Through the chat, users can chat with one or several other users at once, both on the main website as well through the mobile application. Groups can be created by any user, and group members are allowed to post content as documents, pictures, and plain text. It is possible to comment on all the items. When creating a group, one can choose between
three different levels of privacy settings; “secret,” “closed,” and “open.” Groups used by study groups are typically closed or secret, as the members prefer to have some privacy.

Originally, Facebook was developed by a group of Harvard students at the beginning of 2004. It was aimed towards college and university students, albeit its use quickly migrated into business, school, and domestic settings. It is understood as an everyday online environment for social-networking, where the users present themselves to others (Selwyn, 2007). Among higher education institutions, research shows that almost 90 % of the students are using Facebook for school-related matters (Smith, Rainie & Zickuhr, 2011). Although some students are worried about breaking their boundaries of personal space, there is evidence for Facebook being used in educational context, particularly for student-student communication (Schwartz, 2009). Furthermore, Kelm (2011) suggests that educators should observe how students use different social media technologies such as Facebook, and then implement the use in educational contexts. Distinctions are often drawn between student-initiated and tutor-initiated use of Facebook, where the most successful use seems to be the use initiated by the students themselves (Donlan, 2014). As follows, students appear to acknowledge some advantage of using social networks as Facebook for certain parts of their peer communication, where the focus often is on assessment (Schwartz, 2009) and group work (Madge, Meek, Wellens & Hooley, 2009). Selwyn (2007) emphasizes that the attraction of Facebook might lie in its easy way of facilitating education related interaction between the students, although these interactions are often seen as informal.

5.3 Slack

Slack launched in February 2014, and is a communication tool for teams. The company is based in San Francisco, founded by core members of another social network site called Flickr. Slack gathers team communication into one place and is instantly available and searchable wherever you go. Making people’s working lives simpler, more productive, and more pleasant is Slack’s mission (Slack, 2016).
In Slack, it is possible to divide the communication into three different ways. The first one is what is known as “open channels”, where all of the members can view the conversation. Examples of open channels can be seen in the left side bar, and is here called #general and #glimty. A second way of communication, is through what is known as a “private channel”. An example of a private channel is also seen in the sidebar, and have a padlock before the name “glimty”. The last option is communicating through direct messages, where one can reach chosen team members privately.

Slack allows its users to customize notifications through different options. The users can for example choose to highlight word notifications and get alerted when important words and phrases is communicated in the chat. One can also adjust the preferences for specific channels, and choose to not be notified of activity in specific channels (Slack, 2016).
5.4 Google Documents

Google Documents is a service that allows the users to access, edit, and create online documents from a computer, phone, or tablet (Google, 2016). Multiple authors can edit and create documents in real-time, and changes in a document can be tracked through a log. While enabling others to simultaneously read and write in the same documents, users can fine-tune and contribute content at the same time (Chu & Kennedy, 2011).

![Figure 5.4: The screenshot shows how Google Documents can appear.](image)

Some research of Google Documents as a collaboration tool has been conducted, where Chu and Kennedy claims that the technology has a considerable potential to serve as a platform to promote collaboration (Chu & Kennedy, 2011). As illustrated in the figure under, easy ways of sharing documents is a highlighted feature in Google Documents.
Figure 5.5 shows how the sharing function appear in Google Documents

The owner of the document can choose between giving different levels of access - or complete ownership. It is also possible to chat with others directly inside a document (Google, 2016), which allows the users to have subject related communication on-site.
6 Case and data description

When trying to understand how higher education study groups are stimulated to share knowledge, our starting point was that the key to gain knowledge about this phenomenon is to talk with students that collaborate with each other in groups. As mentioned earlier, we managed to include five different study groups, with a total of 15 students. This provided us with a big collection of data, and through our evaluation, we arrived at five categories we found fitting to match the full diversity of the data. In this chapter we will start with a case description, by introducing each group. We will be presenting a descriptive analysis of the groups, where the main focus will be on the social and technical conditions among the group members. Finally, each of the five categories will be presented with relevant guidelines and examples. As the categories are based on the collected data, they can be understood as data driven. For that reason, we will ground our analysis in the categories, but also point out the similarities and differences between the groups.

6.1 Description of the study groups

By choosing groups with different backgrounds, literal and theoretical replication might occur in our study. To get a broader understanding about each case, we will present a short description about each group. We will emphasize the number of students, range of age, how they display their collaboration, and which technologies the group emphasizes as useful.

6.1.1 Group 1

The first group consists of three members ranging from 21-26 years of age who are currently in their second semester of study in educational sciences at the University of Oslo. The group has worked together since around August, when the first semester started. They did not know each other before they enrolled at the university, but formed voluntarily due to cultural backgrounds and their common interests. Regarding their view on collaboration, the informants appear as utterly positive. They explain that they learn more by sharing and collaborating, and that they appreciate the social part of the collaboration as well. They emphasize that trust and having confidence in each other is the foundation of their teamwork. Facebook is underlined as the preferred tool for communication and knowledge sharing, and the group emphasized the chat- and group features as useful.
6.1.2 Group 2

The three students in the second group are between the age of 19 and 21 in their fourth semester of marketing studies at BI. Two of the members knew each other from before, while the last person joined a little later in the process. As a total, they have been working together for about seven months. They consider themselves as a voluntary study group, although their teacher strongly emphasized that the students should form groups. In addition, they were instructed to not form groups that consisted of more than three students. The group reveals that their level of ambition is high, and that they consider their collaboration practice as orderly and well-structured. The three students highlight that they prefer to meet up physically. In regard to their current use of technology, the students stated preference to using the Facebook chat and Google Documents. To get an overall overview, each of them uses folders on their own laptops.

6.1.3 Group 3

The third group consists of three students between the age of 19 and 21. All of them are studying economics at BI, currently in their second semester. As in Group 2, the students in this group were encouraged, but not compelled, to form a study group in the start of the semester. They met during the university enrollment in August 2015, and have been working together for about seven months. This group is a part of a loose collaborative network with a total of eight students, which often meet up to cooperate and discuss the curriculum. The three students stress that the main advantage by being a part of a study group is that they help each other when they get lost, and take turns at motivating each other to make an effort. As the group members mainly have quantitative courses with a lot of analog calculation, they tend to solve a large part of their tasks by hand on paper. Here, they emphasize that sharing calculations written on paper can be quite a challenge. In addition, they emphasize Facebook chat, Google Documents, e-mail, and their own computers as tools for collaboration.

6.1.4 Group 4

Group 4 consists of six students between the age of 23 and 29, currently taking a master’s degree in entrepreneurship and computer science at the University of Oslo. Three students were present at the interview, but the group consists of six students in total. They formed on the first day of class in January 2016, but have worked together in the previous semester as well. All in all, the students have been collaborating for about seven months. The students
were instructed to work in groups, but could form groups based on interests and ideas related to the course. Although the formation of the group is understood as voluntary, the students mention that most of the formation came from previous groups that were done in other classes. The students present at the interview describe being in a group of six students as “a bit painful,” as they need to put some effort in organizing meet-ups and decide the direction for their work. Additionally, the group stresses that they think a smaller group might be more efficient. The group uses technologies such as Google Documents, Facebook, and Slack. When it comes to the technical skills, Group 4 differs somewhat from the other groups. The members have their background in computer science, and is understood as highly updated - and interested in - the functions and features of the different platforms.

6.1.5 Group 5
The last group consists of three students between the age of 20 and 21, who have been collaborating since early fall 2015. The students are currently in their second semester at The Norwegian Police University College. The group was voluntarily formed on the basis of common social interests. The students reveal that they originally were put in different groups in the beginning of last semester, but that they find it more natural to collaborate with each other when they have the possibility. They claim that this is due to the different social cliques among the students following the course. The cliques formed by the students is somehow viewed as the contrary to the original groups, which cause the students to prefer collaborating in groups based on their social interests rather than the the predefined groups. The group describes their collaboration as informal and unstructured. Concerning the use of technology, the group members are using Its Learning, Google Documents, private e-mail, school e-mail, Facebook chat, and folders on their own computers.

6.2 An introduction to the categories
The categories are first and foremost meant to serve as a way to operationalize our research question. Even though our approach can be understood as data driven, our intention is to get a deeper understanding of what stimulates higher education study groups to share knowledge. As our research question is broad and serves as a framework for our thesis, we had the sub-research questions in mind when sorting out the different categories. The process was iterative, and we had to clarify and alter the categories numerous times. The categories are
data driven, but also linked to the sub research question, and further linked to the main research question.

By operationalizing our research question and sub research questions, we established five categories that would serve as a solid grounding to our data. As shown in figure 1, the categories are lined for left to right, form the social aspects towards the more technological aspects of knowledge sharing. Before delving into the analysis, we will give a short explanation of each category (Table 6.1).
## 6.3 Data Analysis

In this part of the thesis, we will begin with a presentation of our data material. The data will be presented under the appropriate categories and can be understood as a category-specific summary. The thematic categories arose from the collected data, but the research questions has had a significant role in the process. The interpretation of the various interactions will initially only deal with the analytical process by thematizing the analysis in the overarching categorical framework. A fuller interpretation will subsequently be given in the following discussion section in Chapter 7.

### 6.3.1 Social prerequisites and group dynamics

As illustrated earlier, this category emphasizes how the study groups are formed and in what ways the collaboration is structured, in addition to the students’ reflections regarding what it takes to form a successful study group.

**Group 1**

The students in Group 1 are concerned about the positive outcome of being in a study group, and tend to highlight motivation as a key aspect when it comes to collaborate.
“We motivate each other in a way, like, if you feel discouraged and in lack of motivation” (Gr.1, inf. 1).

They do not seem to be eminently concerned about the learning progression, although they reveal that doing well on the exams is an important matter. The strong social bond between the students in this group is often mentioned. Trust is a recurring phase during our talk, and the students seems to base their collaboration on an equal trust instead of a tight schedule of progress.

Group 2
In Group 2, the students stress the importance of updates and communication. Factors such as motivation or the social part of being in a group, is not underlined as an important factor. The students appear to be motivated by progression and grades, and is therefore emphasizing the process of reaching their academic goals.

“Giving each other updates is important, it really is necessary for us to keep control of our tasks, progression and what needs to be done to be able to write a complementary assignment” (Gr. 2, inf. 1).

In contrast to the first group, this study group is not emphasizing trust as an important factor. It seems to be clear that they to a great extent are depending on each other to do their part, although they choose to be clear about their goals when it comes to the progression and final outcomes. This is probably correlated with their high expectations, as well as personal objectives.

Group 3
The matter of mutual support and guidance is particularly highlighted by the students in Group 3. This group is the largest group with the loosest structure, and the students explain that helping and motivating each other is an important function of the group.

“Often if you don’t get the right answer, we send the book over, so you can see what the others are doing. And then you understand it, or if you don’t, one of us will explain it to you” (Gr. 3, inf. 1).

“As long as we are working on the same topic and everyone is at the same level, it works out pretty good” (Gr. 3, inf. 3).
The group emphasizes that everyone has to work and follow the rest of the group in order for the collaboration to work out. If someone needs help, they help each other. Furthermore, the study group explains that they are constantly making sure not to lag behind the groups’ progression, since it would be hard to later catch up with the rest of the group. This is probably because of the students following quantitative courses with a great extent of analog calculation. A vast part of their tasks are solved by hand at paper, which - according to the students - make sharing somehow challenging.

**Group 4**

As in Group 3, Group 4 consists of a larger number of students than the rest of the study groups. Being a total of six members, the students get several opportunities to reflect over their collaboration practice.

“It is definitely also a useful experience, because I think that in the future a job is not just going to be like you want all the time. You are of course gonna work with some people, maybe some bosses you don’t like. When working in a group I think you can see your weaknesses, you can see want you do better than others and then how you can try to make a balance in your group” (Gr. 4, inf. 2).

The three group members we met seemed pleased with the collaboration, and focused on future jobs where they probably have to collaborate with other employees. Although they admit it could be challenging for six people to agree on different matters, the students did not dwell too much with what can be described as the “downsides” of collaboration within a big group. They chose instead to highlight what they could learn from this collaboration.

**Group 5**

The students in Group 5 are the ones who to a highest degree choose to emphasize the importance of social prerequisites and dynamics. Instead of working with their predefined groups, they formed their own group on the basis of common interests and social chemistry.

“I would say our group somehow is formed on the basis of social cliques in our study. In a way, our class is to a high degree divided into different social cliques, which differs a lot from the basis groups we are supposed to work in. But, I don’t feel that I can’t collaborate with the students in the other groups, it’s just that it is easier to speak with the people you know better” (Gr. 5, inf. 3).
Nonetheless, they stress that they don’t want to exclude other students - they just have found a way of collaborating that they find enjoyable and relaxed.

**Key takeaways from social prerequisites and group dynamics**

While Group 1 emphasizes the importance of trust and being able to motivate each other, we can identify Group 2 as more concerned about the desired academic results that are depending on group progression with clear goals and task control. Group 3 highlights mutual support and guidance as an important factor, but in order for this practice to be effective, they need to make sure that everyone is making progress. Group 4, which is formed on the basis of common academic interests, consider their study group as a valuable experience, while Group 5 chooses to underline the social aspect of working in a study group.

### 6.3.2 Perspectives of sharing

Within this category, the students reveal their view on sharing course-related content and knowledge, both inside the group, as well with peers on the outside. Discussion regarding benefits and downsides of content sharing is also discussed.

**Group 1**

In relation to sharing content with each other, the students in Group 1 express that they consider content sharing inside the group as a natural practice. Although they don’t necessarily have a strong tradition for sharing their content outside the group, they appear to be utterly positive to do so.

“When you share with others, they get happy, sort of relieved. You know that feeling when you are delayed with your work when you have been sick for a week, it turns out to be a lifesaver” (Gr.1. inf. 2).

Here, the students base their reflections on their own experiences regarding being delayed with schoolwork, and declare that they would be happy to help a fellow student out. It should be noted that Group 1 stands out from the other groups when it comes to their view on external content sharing; they do not stress an instant content trading as crucial. Instead, they emphasize that it would be nice to get something back if they would need it in the future. This would not be regarded as a “payment” or trading, just a friendly gesture.
Group 2
In Group 2, the students underline the importance of what they regard as a harmonic trading culture. They reveal that the current practice of trading in their class is somehow unfair, with some students ending up as “providers”.

“The way it is now, some people put more effort in their work than others do. And those who don’t, get extreme advantages by the sharing. So the people making a lot of effort ends up being providers” (Gr. 2, inf. 3).

The students stress that a practice like this is perceived as unfair, and in order for them to share their school-related content with students outside their group, a more structured practice is required. This view could be caused by Group 2’s high expectations to both their performance and academic outcomes. Sharing content they have invested a lot of time and effort in is regarded as risky when they don’t know what to expect from the other students.

Group 3
Group 3 explains that in order for them to share content outside the group, the norm should be that all students contribute in the sharing. Similar to Group 2, the students in Group 3 highlight the unfairness of the current sharing culture.

“It depends on whether it is mutual or not. If the norm is only two-three people sharing, I wouldn’t appreciate being one of them. I guess it would be great for those who can escape the work, since other people are doing the work for them. The norm should be that everyone contributes” (Gr. 3, inf. 2).

The students would not be comfortable being one of few sharing their school-related content with others, based on the concern of ending up doing the work for other students. As a large and loosely structured group, Group 3 may already fulfill their need for input and feedback - and might not see further sharing as having any potential value.

Group 4
The students in Group 4 somehow underpin Group 2 and Group 3’s concern regarding other students harvesting the benefits of their work;
“Usually you don’t want to share your answers before the deadline because other people can use it. That indicates that there are some work that is like everyone trying to converse in the one man’s work” (Gr.4, inf.3).

The group seem to be somewhat indifferent when it comes to sharing their assignments after deadlines. This might have something to do with the students feeling secure only once their assignment is handed in - other students replicating their work after the hand-in would probably not affect the group members’ overall grades.

**Group 5**

In Group 5, the students express a quite positive and easygoing stance as to sharing their work with students outside the group. Here we can see some similarities with Group 1, who also declare themselves as open to helping other students in need.

> “For my part, when people have missed the class... I don’t think the class is stronger than the weakest link. Our teacher really emphasized that last semester, and asked us why we weren’t more united. So that is what I think, help others to get to a higher level” (Gr. 5, inf. 2).

The classroom experience as a whole is emphasized by the students in Group 5, followed by the thought of mutual support and guidance, as mentioned in Group 3. As the citation shows, Group 5’s teacher might have had something to do with their mindset of sharing. Regardless of who or what influenced the group, they are understood as genuine when they underline the need to help their classmates.

**Key takeaways from perspectives on sharing**

While Groups 2, 3, and 4 underpin the concern of other students harnessing their work, the students in Groups 1 and 5 have a more relaxed stance as to sharing their content and work with people outside their groups. As mentioned earlier, Group 3 appears as a large and loosely-structured group, which may cause the students to not see any value in sharing their work with others - each of them already have seven trusted peers for that purpose. This might also be the background regarding the standpoint of Group 4; being a group of six students, they may feel their need for sharing covered. On the other hand, Group 2, consisting of three students, did to a large extent emphasize their need for task control- and management, and regard their current practice as the most adequate.
6.3.3 Reflections regarding current use of technology

In this category, the students are sharing their reflections regarding which technologies they use for schoolwork, as well as why they are using them.

Group 1

The students in Group 1 state that they are aware of the big selection of different platforms, but that they personally prefer to use one platform for most of their needs, both private and academic.

“Because... I know that many people are using different platforms like EverNote and all that stuff, but I am not a fan of being at many different platforms. Since everybody are at Facebook, they are familiar with how to use it, and then you don’t have to learn something new” (Gr. 1, inf. 3).

Facebook is cited as their preferred platform, as the students find the platform familiar and easy to use. It doesn’t require them to learn something new, in addition to the view of “everyone” being on Facebook.

Group 2

In Group 2, the members focus in particular on one of the functions in Google Documents, which is an editing tool that facilitates collaborative writing. The group reveals that they prefer to use the editing tool when they are collaborating on assignments, as it enables all of the members to work in the document at the same time.

“When we collaborate on assignments, I appreciate the function that enables us to write in the same document at the same time, both in Word and Excel” (Gr. 2, inf. 1).

Although the students work in the same documents, they stress that they always meet up physically when collaborating on assignments. This is probably because of their need for task control, as well as the possibility for quick and easy communication.

“We usually write our assignments in Google Docs, so we all can edit at the same time. But we always meet in person when we write the assignments. And then one of us makes a Word document, so we can get the right format and structure on the assignments. Then we save it and send it on Facebook to the rest of the group” (Gr. 2, inf. 3).
The group explains that they use Facebook chat to share the finalized documents. Using Facebook for this matter seems to be due to two reasons: All of the group members have a Facebook account, and the chat allows for straightforward uploading and sharing.

**Group 3**
The students in Group 3 reveal that they don't have an established, common platform that is used by the total of eight group members. The use of individual platforms among the students seems to be somewhat random, although it may be indicated that their choice of hardware is affecting the software in use.

"I often use Google Drive, since I work on my iPad. It makes it easy to transfer content to other devices, as well as sharing it with other people. I usually save my work at my stationary Mac at home, then it is effortless to let others get access to my documents in the same process" (Gr. 3, inf. 2).

Switching between different platforms and hardware devices is common for the three group members we spoke with, and they emphasize the importance of using technology that enables them to easily share content with other devices, as with the rest of the group. In addition, the group explains that they prefer to use Facebook chat for communication purposes.

**Group 4**
Group 4 is the only group who uses Slack, and highlight that they especially appreciate that Slack doesn’t send push notifications to them.

"...Slack doesn’t notify you. Slack doesn’t tell you anything. Just to give you some rest" (Gr. 4, inf. 3).

In some contrast to the other groups, the students in Group 4 seem to be the ones that to a highest extent appreciate a sort of division between social and academic conversations and sharing, as Slack in their case appears to be exclusively for school-related matters. Furthermore, the students emphasize one other key aspect they find appealing with Slack: it doesn’t distract them in the way they feel Facebook can, since its primary task is used as a chat tool and doesn’t have the feature of news feeds as Facebook has.
Group 5

Group 5 expresses that Facebook is their preferred platform, both when it comes to social and academic matters. The students explain that one of the main advantages with Facebook, is that “everyone” is present.

“To me, Facebook is a habit. I do not spend a lot time on Facebook, although I spend a lot of time there nonetheless. Everyone is there, and you know that’s the place where you can get updated. And if a lecture is boring, I tend to quickly check Facebook, based on old habits. Facebook is easy accessible, and it is just to scroll downwards” (Gr. 5, inf. 3).

As Facebook doesn’t require any login - unless the user prefer it and change the specific settings - the platform allows for easy and seamless access. In addition, the use of algorithms allows Facebook to serve the group the information they’re most likely to engage with by tracking each user’s actions. This may appeal to the group’s need for immediate and straightforward updates.

Key takeaways from reflections regarding current use of technology

Group 1, 2, 3 and 5 emphasize Facebook as their preferred choice of platform, as they find it familiar and easy to use. One other aspect of importance seems to be that “everyone” is already on Facebook, which seems to make it a natural choice of collaboration tool to the students. Not having to use time on logging in with a username and password is also highlighted. All the groups, except Group 1, explain that they use Google Drive in addition, as it allows for collaborative writing. Group 4, which appears to be the most technologically skilled group, favors Slack for both communication and sharing of content and knowledge. Slack doesn’t distract them in the way Facebook might, and helps them make a distinction between school-related work and private life.
6.3.4 Design and affordances

This category is concerned with the distinct features of the technology used by the students. Particular attention will be aimed towards how the design and affordances affect the students’ actions, as well as what the students reveal to be their likes and dislikes.

Group 1

In Group 1, the students emphasize usability and accessibility as important aspects regarding the platforms they prefer to use:

“It depends on how user friendly it is, and how accessible it is. If you have to constantly log in, make a new user and all that, it tend to be a burden” (Gr. 1, inf. 3).

Not having to bother with log-ins or having to spend time on learning how to navigate the platform is considered positive. As follows, time consuming log-ins and complicated interfaces are undesirable among the students. When asked about Fronter, the group reveals that they tend to use it only when they feel it is necessary:

“I only use Fronter to download the most important stuff, to see messages and things like that” (Gr. 1, inf. 1).

Using Fronter for collaboration and sharing of knowledge was not regarded as an alternative among the students in Group 1. The platform was viewed as a place where information is collected, but not processed and developed further.

Group 2

Being able to easily find the desired content is accentuated among the students in Group 2. Here, the features found in Facebook chat are used as a prime example.

“I like the search function you have in the Facebook chat, it makes it so much easier to find stuff. You just search, and find it. Its Learning lacks that function, and I really miss it. Often the lecturers says they have uploaded stuff at Its Learning, and they you have to search for a hour to find it” (Gr. 2, inf. 1).

As the students are encouraged by the school administration to use Its Learning to upload and distribute school related content, they find it natural to compare Its Learning with their preferable template: Facebook and its chat function. Using their time searching for content is
not favored among the group, and it seems to be one of their main frustrations when it comes to Its Learning.

**Group 3**
As revealed by Group 2, Group 3 is not too fond of Its Learning and its functionality either. This is illustrated by the following statement:

> “Most features are covered in Its Learning, but it is badly executed and inconvenient” (Gr.3, inf.1).

However, Group 3 states that Its Learning does have the desired functions - the obstacle is that the functions are hard to find. Because of the low usability the students find with Its Learning, they only use the platform when in absolute need; as in handing in assignments, or when looking for information from teachers or administration.

**Group 4**
Group 4 has earlier claimed that they appreciate not having to deal with too many notifications from Slack. However, they seem to value that Slack gives them a minimum of indication whenever someone has wrote something new.

> “Another thing on Slack which is nice, is that if it is in the general, like in the group conversation, it comes out like a red dot on the Slack icon, whereas if you've been privately messaged by someone in the group. It would come up with the number of messages. So, you will at least know, just by looking at the little icon on the bottom” (Gr. 4, inf. 1).

As Slack’s main purpose is to serve as a tool for communication, it seems like that the group welcomes the indications or notifications to some extent, as long they are understood as relevant and/or crucial. One other aspect the students appreciate with Slack, is the possibility to adjust the sensibility of the notifications, based on for example which channels they consider as important.

**Group 5**
As the other study groups, Group 5 is dependent on checking Its Learning to find any updates or messages from the lecturers or the administration. As the students feel that they should
check Its Learning everyday, they have downloaded the mobile application to get easier access.

“Its Learning has an app, but is it really bad. You only get to see the front page, and whether the courses are updated. So you basically end up having to login through the web page anyway” (Gr. 5, inf.2).

The application did not meet their expectations, and the students prefer to log into Its Learning through the regular webpage instead. Exactly which functions the students are missing in the app is somehow unclear, although their need of quick and easy access to the information in Its Learning is evident.

**Key takeaways from design and affordances**

The students in Group 1 emphasize that they prefer to avoid spending time on log-ins or complicated platforms that require the users to invest time in learning how to navigate it. Neither Group 2 or Group 3 give the impression of being too impressed of the functionality in Its learning, although their reasoning is somewhat different. While Group 2 points out that searching for content is a time consuming process in Its Learning, Group 3 points out that Its Learning has most of the desired functions - the problem is that the functions are hard to find. As the only users of Slack, Group 4 underlines that they appreciate the possibility to adjust the sensibility of the notifications, which most likely is based on the preference of avoiding an overload of information. Lastly, Group 5 shares their experience with the Its Learning mobile application. Due to their need of quick and easy access to the content in Its Learning, the app was tested by the group. The app’s usability was perceived as low, so the group continues to log in at the Its Learning using the regular web page.

**6.3.5 Missing functions**

Within this category, the groups address the functions they find appropriate to help them collaborate and share knowledge with each other.

**Group 1**

Having a page where the structure is based on categories derived from distinct courses is emphasized by the students in Group 1.
“It would be nice to have a kind of page... Where everything was sorted in categories based on the different courses, making it easy to find things quickly” (Gr. 1, inf. 1).

As University of Oslo (UiO) use Fronter as their main learning management system, the students already have access to a structure that is somehow similar to the one they describe. UiO’s Fronter is organized on the basis of the courses the students are following, although the group consider this structure to complicated and poorly implemented.

**Group 2**

Group 2 accentuates the need of only having to deal with only one platform. As Group 1 suggests, this group would also prefer a platform where categories are based on the courses they are taking.

“It would be nice if there was only one platform, something similar to Its Learning, where the lecturers and students could share their content. The categories could be based on the different courses. It should also have the functions we mentioned earlier, as chat, and easy ways of sharing. Documents for collaborative writing is also a very nice feature” (Gr. 2, inf. 1).

In addition, social functions such as chat and an editing tool for collaborative writing is highlighted by the group. As of today, Facebook chat and Google Documents are used by the group to cover these needs, which seems to be considered as somehow inconvenient among the students.

**Group 3**

Finding and sharing knowledge in an efficient way is emphasized as essential elements among the students Group 3. As of today, the students mostly use Facebook for sharing files, unless they wish to share several files at once.

“It has to be easy to find files, that is maybe the most important feature, which Facebook is lacking. And that you can send bigger and several files quickly. You can use mail to do that, but it is a bit old fashioned. Then you have to open a new page instead of just using Facebook. Not that it takes that much time, but if you could gather everything at one place, it would be more complete” (Gr. 3, inf. 3).

When in need of sending several and/or large files, the students use their private e-mail to do so. They experience the Facebook chat as hardly appropriate when it comes to this matter. As
a result of this, e-mail services become another platform that the students need to deal with, which may underpin the students desire to gather all school related work in one place.

**Group 4**

One of the students in Group 4 point out the platform he used at his old university as an example of a user-friendly platform that facilitates high activity among both students and lecturers.

“I really enjoyed the one I used back home. I can’t remember what it was called, but it was like just a simpler version of Fronter. But everyone chatted on it, like even the lecturers used to get involved and chatted on it. And you would get... you would post all of your assignments through that Fronter, and the lecturer would comment and post it back through. It was just nicer. And I remember that I used to have that side as my homepage, because I could do everything through it” (Gr.4, inf. 1).

One particularly interesting point here is that the student claims the platform to be a simpler version of Fronter. Which functions that were simplified or lacking in the platform at his old university is not mentioned, although we know that it had a chat function, which is not included in Fronter. The high level of activity at the platform may have been caused by several students thinking the same as the student in Group 4: since the platform can facilitate “everything”, using it as a front page or having it open in one of the tabs might have been a common practice. Some thoughts about the group's current learning management system, Fronter, were also shared:

“Well, it’s the only access to any of the documents the teachers put up. That is the only thing we really go in there for. We don’t use it for group discussion, i know it has that feature, but no one’s using that. It generally seems to run pretty slow, compared to other websites” (Gr. 4, inf. 1).

Fronter being the group’s only access to information provided from the teachers is emphasized, and we also get information about what is regarded as a downside of Fronter. In contrast to other websites the group is using, they find Fronter to run slower - which may be an obstacle for the students to spend time on the platform.
Group 5

A similar search function as the one found on Facebook is emphasized among the students in Group 5. Finding other students easily is appreciated, but the group doesn’t think this feature is sufficiently covered by Its Learning.

“It must be possible to search and find people in the same way you do at Facebook, or something similar. Its Learning has a function where you can search courses and find persons taking different courses, but there you get this huge lists of all persons. Because there is a lot of situations where you only know the first name and not the surname” (Gr. 5, inf. 3).

According to the students, when only having the first name of the person they want to reach, Its Learning has its shortcomings. Having to scroll through a list of persons with the same first name is perceived as time consuming and unnecessary. The students mention that a photo of the different students and lecturers would be valuable, as it would help them identify the persons on the list. As of today, the students say that they often use Facebook to help them ensure that they found the right person, as most people on Facebook have a profile picture of themselves.

Key takeaways from missing functions

Both Group 1 and Group 2 highlight that a structure based on categories from the courses they are following would serve as an expedient framework for a platform. Group 2 adds that social functions such as chat and an editing tool for collaborative writing would help them to collaborate and share their content. Group 3 is concerned with an easy way of sharing and finding files as important, while Group 5 emphasizes that finding particular fellow students should be a straightforward process. At least one of the students in Group 4 shares his experience with a platform that was used at his old university. The platform is described as similar to Fronter, yet simpler, and with a great more deal of activity among the students and the lecturers.
6.4 Summary of the data material

In this chapter, we have given a presentation of our data material which can be understood as a category-specific summary. As five different groups are connected with five distinct categories, we find it expedient to give a summary before we move over to the discussion in the next chapter.

The five groups were formed on different grounds, where Groups 1, 3, and 5 are perceived to be the ones with the strongest social core. On the other hand, Groups 2 and 4 seem to have stronger common academic interests, which to some extent is reflected in their practice of collaboration. Furthermore, the social and academic distinction appears in the students’ discussion regarding their use of technology - and how they prefer to communicate. The two-folded contrast between the groups’ preferred choice of communication channels may have a correlation with whether the groups were compelled to work together or not.

When it comes to their view and practice of sharing, there is little doubt that all five groups are practicing an internal sharing of knowledge within the groups. This sharing is understood to be one of the main functions of the group work. All the groups express a positive stance in regards to sharing their content and work with peers outside the group, all though we identify an evident division when it comes to the criteria for sharing of content. Groups 1 and 5 express a mindset where they believe that the sharing is a gesture that will be reciprocated at a later date. Both groups also emphasize the friendly aspect of the sharing; it is a nice gesture that can help others out. Groups 2, 3 and 4 are concerned about the justification of the present practice of sharing, which they believe is in need of improvement. The reasoning behind this conviction is their concern of ending up as providers, with other students benefitting from their work. Neither of the three groups are motivated to share with other students unless they are guaranteed to get content of an accurate quality in return. The sizes of Groups 3 and 4 might also influence their view on external sharing: when consisting of respectively six and eight students, the need of further collaboration might be reduced.

All of the five groups need to use either Fronter or Its Learning to some extent. None of the students are satisfied with the technologies, but reveal that they are aware that most of the desired functions are present on the platforms. Their user experiences are described as frustrating and time consuming, which can be result of the functions being difficult to find. All groups report use of Facebook, but we can see a distinction when it comes to the extent in
which they use Facebook as an informal communication tool, and/or a tool for sharing school-related knowledge. All of the groups aside from Group 4 use it as their primary communication tool. Group 1 uses both the chat- and group function to share knowledge, while Groups 2, 3, and 5 mainly use the chat for knowledge sharing. Group 2 emphasizes that a lot of their work is done in Google Documents as well, as it allows them to simultaneously read and write in the same documents. Group 4 is the only group that uses Slack for both purposes, with can be correlated with their desire to keep schoolwork and private life somehow separated. Group 4’s choice of Slack might also be correlated with the students’ background in computer science - and their high interest in technology.

Finally, all the groups reveal that they would appreciate one platform that is dedicated to school-related matters. The platform must allow an easy way of communication, sharing files, and facilitate collaboration. Chat is underlined as the preferred way of communication. The overall structure must be simple and user-friendly, and a structure based on categories derived from the courses permits a logic interface.
7 Discussion

This chapter is intended to serve as a way to assemble our previous analysis with the core elements from the theoretical framework. The two sub-research questions will serve as an overall structure, where we will start by looking at which social factors and technical experiences that are most prominent in the students’ knowledge sharing. The discussion will focus on the social aspects with regards to the students’ collaboration and knowledge sharing, as well as how their technical experiences might affect their current use of technology. We will then discuss in what ways the design seems to affect the students interactions. Here, the main focus will be on how the features of Its Learning, Fronter, Facebook, and Slack is mediated through the technological affordances.

7.1 Which social factors and technical experiences are most prominent in the students knowledge sharing?

This section will focus on the social factors of the study groups’ collaboration and knowledge sharing, and how their technical experiences might affect their current use of technology. The groups are a mixture of voluntary and partially voluntary groups, but the attitude towards collaboration are positive. They seem to consist of peers with common interests, which might have an impact on the general group dynamic and their collaboration practice. Prior knowledge, roles, motivation, behavior, and language are important factors for the collaboration to succeed, but the factors can be hard to predict (Soller et al. 2005). This might be one of the reasons that the students base their selection of peers on social cliques and/or common interests. As follows, this is understood as a need for a shared point of view on the process and aim of the collaboration.

7.1.1 How does group dynamics influence the students’ collaboration?

The social factors and group dynamics have been an important part of our study, as we have used it to help us gain understanding of how and why the students collaborate and share knowledge. Our findings reveal that all the groups - both the voluntary and the more compelled ones - have a positive attitude towards collaboration and group work. The students find that working with several others to learn or attempting to learn is more suitable and
motivating than working alone (Dillenbourg, 1999). Group 1 expressed how mutual 
motivation was an important factor for their collaboration. By being inexperienced first-year 
students at the university, the group found collaboration to be motivating. Hew and Hara 
(2007) found that emotional support was indicated as significant motivator of knowledge 
sharing. This finding was indicated by Group 1, who express that the responsibility for their 
own learning can be overwhelming, and that they motivate each other to work harder, or to at 
least make an effort: “We motivate each other in a way, like, if you feel discouraged and in 
lack of motivation” (Gr.1, inf. 1). Similar to Group 1, Group 3 also consists of first-year 
students, and they highlighted that motivating each other was one of the main advantages for 
collaboration. Group 5 is also made up of first-year students, but emphasizes social cliques as 
an important factor for their collaboration.

“I would say our group somehow is formed on the basis of social cliques in our 
study. In a way, our class is to a high degree divided into different social cliques, 
which differs a lot from the basis groups we are supposed to work in” (Gr. 5, inf. 3).

Group 5 considers it easier to collaborate with people they have stronger relations to, and 
with people who are in the same social cliques as them. Groups 2 and 4 have more 
experience in being higher education students, and emphasize common interests and goals as 
significant factors of their collaboration. Even though some of the groups emphasized 
different factors for collaboration, all of the groups had an underlying understanding that 
collaboration had something to do with common interests. This might have been motivated 
by the social or the academic aspect of collaboration. The common interests can also assist in 
helping the students gain a common understanding when it comes to different school 
assignments or other types of tasks. From a theoretical point of view, we can see similarities 
to Lave & Wenger’s (1991) sociocultural theory of community of practice, where common 
understanding and interests are emphasized.

According to Henri and Pudelko (2003), three basic criteria must be in place before a group 
can be understood as a community of practice. The first criteria emphasizes common interest 
within a domain and the common perception of the essential aspects of the groups. Group 2 is 
especially concerned with the academic side of their collaboration, and keeps control over 
each other’s progression: “Giving each other updates is important, it really is necessary for 
us to keep control of our tasks, progression and what needs to be done to be able to write a 
complementary assignment” (Gr.2, inf.1). Having a steady progression is underlined by the
group, and is understood as the group's common perception of what they think is most important for their collaboration. Group 2's high ambitions is understood as a common interest, and collaboration is used as a method to push each other to succeed at school, by getting good grades. These relations enable collaboration and sharing of knowledge, which is the second criteria for a group to be understood as a community of practice. The last criteria, then, focuses on how the relationship building creates a basis for a common repertoire. The repertoire consists of experience, tools, stories, and a variety of methods in which to tackle challenges. This is indicated by Group 3, which states that their collaboration is successful as long as everyone is at the same level and works with the same subject. To put it briefly, a community of practice contains participants who focus on developing their skills and interacts with each other over time (Henri & Pudelko, 2003). All the five groups in our study have worked together over a period of time, and express common interests by motivating and challenging each other to succeed both academically and personally.

7.1.2 Does the student’s mentality affect the sharing of knowledge?

All of the students expressed positive attitudes towards working in groups, and regarded collaboration and knowledge sharing as a meaningful and efficient way of learning. What should be noted is that our research revealed that there were different opinions in regards to sharing content with students outside the groups. In this context, sharing content concern sharing assignments, lecture notes, or summaries. We discovered a pattern based on the student's view on sharing content within and outside of the groups. We then divided the answers into two types of categories. The groups in the first category have some sort of “pay it forward” mentality, which was found in Groups 1 and 5. The mindset of the “pay it forward” groups could be described as wanting to help others, by doing a good deed as sharing lecture notes with other peers. The group does not necessarily want something in return immediately, but does want the peer who got help, to help them or others out another time. The altruistic aspect of the mindset can be seen in the light of Hew and Hara’s (2007) findings, where the concern of the welfare of others was highlighted as a motivator for knowledge sharing. Group 1 explained the feeling of helping someone that had been sick, and were delayed with their work: The feeling of being a “lifesaver” was encouraging and motivating enough for the group to share content with peers outside of the group. This aspect can be supported by Yuen & Majid (2006) findings in their research about general attitudes among students in regards to knowledge sharing. The study revealed how one of the main
motivations for knowledge sharing was the urge to help others, which also was emphasized by Groups 1 and 5.

Groups 2, 3 and 4 are more concerned about the justification aspect in sharing, and can be understood to have some sort of a “utility” mentality. The idea of justification is mentioned regularly during the interviews, which includes the feeling of inequality. Hence, Groups 2, 3 and 4 stress their concern about ending up as content providers. This is illustrated best by Group 2, that distinctively stated: “Some people put more effort in their work than others do”. The finding can be confirmed by Yaghi et al. (2011), which found that trust among peers was considered as a major obstacle in regards to students’ knowledge sharing. The students seem to aim for a sense of utility when it comes to sharing with others, and also seem to aim for a type of “trading-culture” among other students. If they are to share something, they want something in return. The students in the Yuen and Majid (2006) study also pointed out how the development of a culture of shared knowledge is needed. By reducing the amount of competition and less pressure on grades, the students believed a sharing culture could be achieved (Yuen and Majid, 2006). The perception of being a provider can be related to the five conditions that Johnson and Johnson (2004) claim should be in place to help make collaborative learning superior to individual or competitive learning. According to Johnson and Johnson (2004), the five conditions include: having the same goals, taking personal responsibility, working efficiently, functioning well both individually and as a whole, and improve the group's’ effectiveness (Johnson & Johnson, 2004). The conditions could work as a superior framework to make collaboration more desirable, and to make sure everyone contributes, are on the same level, and have the same academic expectations.

In light of academic expectations, we found this factor highlighted by Group 2. By sharing content with others, the group expected the content in return to be on the same academic level as the content they contributed with. As follows, they did not see the benefit of receiving content of a lower academic level than their own. Another issue with sharing was the concern about someone taking advantage of their writings. They could share content with students outside of the group, but it would have to be after their assignments were handed in. The reason was that other groups could claim the shared content as their own. This reflection was based on their concern of getting a lower grade, and in a worst case scenario get accused for plagiarism. This concern was also stressed by both Groups 3 and 4, which seemed to have
higher academic expectations than expressed by Groups 1 and 5. According to Dillenbourg (1999), a collaboration should be based on justification. We find this aspect being emphasized in our findings, as justification is indicated as a motivator for knowledge sharing among the students with an “utility” mentality.

Another interesting discovery in our research showed how the students supported and guided each other in the collaboration. This can be related to the traditional sociocultural theory of scaffolding, which aims to help learners to reach a higher level of learning by giving them support by way of guidance and hints throughout the learning process (Wood, Bruner & Ross, 1976). Group 5 states how their class is not stronger than the weakest link, and helping each other to a higher level is important for them:

“For my part, when people have missed the class... I don’t think the class is stronger than the weakest link. Our teacher really emphasized that last semester, and asked us why we weren’t more united. So that is what I think, help others to get to a higher level” (Gr. 5, inf. 2).

We found the principles of scaffolding in all groups except Group 2. This might be because of their high academic ambitions and that they all feel the need to have the same knowledge in the different topics. On the other hand, Groups 1, 3, 4, and 5 emphasized how someone often has more knowledge in different topics, and that they take advantage of each other's strengths. “When working in a group I think you can see your weaknesses, you can see want you do better than others and then how you can try to make a balance in your group” (Gr.4, inf.2). According to Wood, Bruner and Ross (1976), the traditional perspective of scaffolding indicate that an ”expert” or adult guides the younger learner. In our study, scaffolding can be understood as a temporarily and asymmetric process. The students take turns in being the “tutor” in topics they have more knowledge about than the rest of their peers. The possibility to learn from others and the urge to help others were suggested as the two main intentions for sharing knowledge in the study conducted by Yuen and Majid (2006).

7.1.3 Why do the students prefer specific technologies for collaboration?
An essential part of our study was to understand how the students collaborate, as well as which methods they use for knowledge sharing. Here, the prominent social factors and technical experiences will be accentuated. Our findings show that the students prefer platforms that are efficient and easy to use for communicating with others. The emphasis on
communication and interaction can be related to the sociocultural perspective (Säljö, 2001). All of the groups in our study prefer to communicate through chat when using technology, and explain their preference with the instant way of communication. Groups 1, 2, 3 and 5 prefer to use Facebook for communication on school-related matters. Selwyn (2007) explains how this might be because of Facebook’s informal and easy way of facilitating education-related interactions between students. Group 4 is the only ones that uses Slack instead of Facebook for this purposes. As Donato and McCormick (1994) states, social interaction can be understood as a significant aspect for growth and development of the students understanding.

With a background in computer science, Group 4 stands out from the rest of the groups. With a generally higher interest and expertise in regards to technology, this can explain the reason why they have chosen Slack as their preferred platform for collaboration and sharing of knowledge. As stated by Hew and Hara (2007), specific technology motivators may vary between different users and platforms, but convenience and ease was indicated as a key motivator. While several of the other informants explain that they get easily distracted by Facebook, Group 4 stresses that Slack gives them some rest from distractions so that they can concentrate on the task. On the other hand, the rest of the groups favor Facebook because “Everyone is there...” (Gr.5, inf.3), and “…you don’t have to learn something new” (Gr.1, inf.3). Facebook is understood as convenient as they already know how to use it, and the students is not required to spend time on learning how to navigate the platform.

In addition to Facebook and Slack, all the groups except Group 1 mention Google Documents as a convenient technology for school related matters. Having the opportunity to write together in one document makes the collaboration more straightforward, as well as the group’s progress being easier to manage. The managing aspect can be related to Johnson and Johnson’s (2004) condition of a group's’ effectiveness, which is underlined particularly by Group 2. The need for efficient collaboration is also mentioned by Groups 3, 4, and 5, although not emphasized at the same level. Group 1 is the only group that do not have any experience with Google Documents. The students in this group appear to be the least experienced with different technological tools, which can explain why they have not gotten around to try out different platforms. Our findings seem to further indicate that they are less progression-orientated than the other groups.
As we have discussed which social factors and technical experiences that appear to be most prominent in the student's knowledge sharing, we will now look further into how the design of the platforms might affect the students interactions.

### 7.2 In what ways does the design affect the students’ interactions?

The distinct features of the technology used by the groups is of high interest in our study, as we are aiming to understand how technology can stimulate to knowledge sharing among students. Our analysis of the data material showed a clear distinction when it comes to Its Learning and Fronter, which the students are compelled to use, and the way students are using more voluntary chosen technologies such as Facebook and Slack. From a sociocultural perspective, the use of tools (Vygotsky, 1986) is highlighted, as they are used to understand and act in our surroundings. As the students use technologies as tools for knowledge sharing, we find it expedient to look closer at how the features of the platforms might affect their interactions.

Kirschner et al. (2004) suggests that the use of technology in learning situations can be understood as a unique combination of educational, social, and technological contexts. When certain properties induce and invite specific learning behaviors, the technology is understood to afford learning (Kirschner et al. 2004). We consider this combination as relevant for our discussion, as it might be appropriate to help us understand the students use of the distinct platforms. As we are not looking into learning as a whole, but knowledge sharing as a method, we will pay particular attention towards how the combination of technological, social, and educational affordances can stimulate the students knowledge sharing. Based on our analysis of the data material, we will in the following sections discuss how the four platforms facilitate knowledge sharing from a student perspective.

#### 7.2.1 The students’ use of Its Learning and Fronter

All of the groups in our study are required to use either Fronter or Its Learning, depending on which university or college they belong to. During our interviews, we asked the students to tell how and when they use Fronter and Its Learning, as well as what they think of the different opportunities of action, as we here consider it to be affordances.
When speaking generally about Its Learning, group 3 stated following: “Most features are covered in Its Learning, but it is badly executed and inconvenient” (Gr.3, inf.1). When the students in Group 3 want to communicate or share proposals for solutions, they tend to use either Facebook chat, Google Documents, or their private e-mail instead. The group’s work with assignments seems to be rather hectic in periods, and the Facebook chat is emphasized as an efficient way of communicating and helping each other. The group’s hectic periods can be correlated with the structure of their courses in economics, which is characterized by frequent submissions. Communication and knowledge sharing seems to go hand in hand according to the students in Group 3; they appear to prefer features that enables them both to communicate and share study-related content. The students’ needs can be understood in the light of Kirschner et al. (2004) view on educational and social affordances. The educational affordance of a learning environment must support or anticipate the learning intentions, which in this case is knowledge sharing. A learning environment that is missing social affordances can assumedly be understood as one that isolates the learners from their peers (Kirschner et al. 2004). The fact that the students find it hard to communicate in Its Learning, may be related to unfulfilled social needs in study situations. From the students’ point of view, Its Learning is understood as time consuming and inconvenient, as the features do not allow for the immediate interaction and sharing. If the students want to share something in Its Learning, it needs to be done through the integrated e-mail service, which is described as more static and inadequate than, for example, the Facebook chat.

When it comes to Fronter, Group 4 declared that Fronter is their only access point to information from teachers, and that they refrain from using the available collaboration tools in Fronter. According to the group, the somewhat poorly organized interface is one of the main reasons they prefer to use other platforms. Another key aspect is the lack of features that allow effortless interaction and sharing of files; the current discussion forum and opportunities for file uploads is regarded as inconvenient. Here we can see some similarities to Group 3’s reflections of Its Learning in the light of social and educational affordances. As affordances is understood as opportunities for action (Overdijk et al. 2012), it does not seem like neither group 4’s social or educational needs are met by Fronter. This might be correlated with the aspect of Group 4 having an expertise in computer science as well as a high interest in technology. The combination may explain the group's strong preferences regarding what features they favor. Since Group 4 does not find Fronter suitable for
collaboration and knowledge sharing, they use Slack as their preferred platform. As the other groups, the students in Group 4 are members of Facebook, but prefer to keep school-related matters somewhat separate from their private life. It appears as if this could be linked to Group 4 being the most compelled group; they formed on the basis on academic interests rather than social interests.

As we have discussed the social and educational affordances of Its Learning and Fronter, it would also be expedient to take a closer look at the technological affordances. The technological affordances are linked to an object’s usability (Norman, 2000). As stated by the students, both of the platforms contain most of the essential educational and social functionalities, but these features are challenging to access and use. The educational and social affordances are not perceived by the students, which may be caused by a neglected usability criteria (Kirschner et al. 2004). As follows, the groups in our study avoids using Fronter and Its Learning; other platforms like Facebook and Slack are used to cover their need for knowledge sharing instead. Norman (1992) maintains that the main challenge of most of the new technological devices and programs is that they are developed solely with the aim of using technology. In the case of Its Learning and Fronter, the low usability may be caused by an isolated focus on educational and social affordances (Kirschner et al. 2004), while the technological affordances received little attention. In our case, blaming the technological affordances alone would most likely not be appropriate, as the students clearly are missing specific elements like chat features. However, most of the other features that can facilitate sharing of knowledge is present, but the low usability might cause the students not to use them.

From an overall perspective, the rest of the groups support Groups 3 and 4 in their view that most of the desired functions and features is included in Its Learning and Fronter, but that the low usability makes it challenging to use. Both of the platforms do to some extent facilitate knowledge sharing, as they have features like group rooms and discussion forums and allow for document sharing. The groups explain that they find this feature time consuming and difficult to use, and that they would benefit more from a chat function. None of the groups were understood as motivated to spend their time on the platforms unless they considered it utterly necessary, as for example when they have to deliver assignments, or look for updates from the lecturers. This lack of motivation among all of the groups is to the highest degree interesting, as the students’ view on the platform’s design might help us to gain an insight in
why the students prefer other platforms. An understanding of the students’ attitude towards web-based collaboration is crucial if we are to understand how we can enhance technology mediated knowledge sharing (Liaw et al. 2008) In the next section, we will take a closer look at why the students appear to be more motivated towards the use of platforms like Facebook and Slack.

7.2.2 Facebook and Slack – designed to stimulate user activity?

When speaking about favorable features of the technologies used for collaboration and sharing, the Facebook chat is referred to by Groups 1, 2, 3 and 5. Group 1 appears to be the group with the lowest interest in technology, which may explain why they prefer to use Facebook. Groups 3 and 5 seem slightly more interested, which might cause them to be more curious and open-minded towards other technologies than Facebook. This can resemble with the findings of Liaw et al. (2008), who found that students may be more likely to perceive technology positively when they have computer-related experience. Group 2 does not differ much on the level of interest, but seems to have somewhat higher expectations to the platforms than the previous groups. Their expectations may be correlated with their need for efficiency, as stated earlier in our thesis. We will elaborate on Group 4 a little later in this section, as they are the only group that use Slack.

Not being required to log in, or having to spend time on figuring out a complicated interface is emphasized by Groups 1, 2, 3, and 5. The accessibility of Facebook is mentioned among the students in Group 1, as they consider the practice of typing username and password as a time consuming burden. In addition, the study groups highlight that “everyone” is present on Facebook - which allow the users to easily interact with each other. Facebook is commonly understood as an online social networking service, and not as a e-learning system. Nevertheless, the majority of the students in our study use Facebook to communicate school related matters. From the perspective of affordances, the students have probably perceived the social and technological affordances (Kirschner et al. 2004) as the platform is easy to use, and allows for social interaction to take place. The students find Facebook's opportunities for action detectable, which might cause them to take advantage of the different features.

The chat feature in Facebook is emphasized as an important tool for knowledge sharing by four out of five groups. Similar to Facebook as a whole, the chat can be understood as to
include social and technological affordances. Group 2 emphasizes the search function in the Facebook chat as a desirable feature, since it “makes it so much easier to find stuff.” Being able to find study-related content in an effortless way is pointed out as a crucial feature among Groups 1, 2, 3 and 5. As emphasized Yaghi et al. (2011), most students find knowledge sharing as beneficial. This is supported by our study groups, who claim that a large part of the purpose of being in a study group is to share knowledge with each other. They go on to explain that a lot of the exchange consists of written information. In the perspective of educational affordances, the chat function in Facebook might be the feature that to the greatest extent meet the student's need for knowledge sharing. The educational affordances can be understood as perceived by the students, as it fulfills their needs for knowledge sharing and communication as soon as the intentions crop up (Kirschner et al. 2004). The students do not report other features like the Facebook “wall” as useful tools for knowledge sharing; it is the private, customized group chat that is emphasized as a favorable tool. The student's need of a somehow “private” knowledge exchange can be seen in light of Yuen & Majid’s (2006) findings: The students prefer to share their knowledge with close and trusted peers, as they are concerned about being outperformed by remote students.

Groups 1, 2, 3, and 5 all find Facebook's mobile application expedient, as it allows them to access Facebook from their mobile phones. Giving each other quick and effortless updates is possible through the application, and help the students to keep a steady progression. Here, we can see similarities to some of the conditions Johnson & Johnson’s (2004) claim should be in place to make collaboration superior to individual learning. The groups are emphasizing the importance of interaction between the members, as well as a progression that improve the groups effectiveness. The easy access to the platform is probably contributing to the students’ positive view on Facebook’s usability. Group 5 have made an effort to use Its Learnings own mobile application, but described it as “really bad.” The interface of the app was described as somehow static, where the students only got to see the front page and whether the courses were updated. They did not have access to the updates itself. As the usability of the app was considered low and their need of quick and easy information were not met, the students ended up logging into the desktop websites from their laptops instead. The use of mobile applications is understood to be popular among all the groups, but they prefer to use their PC when they need to make more thorough inquiries, or re ad documents. In addition, the all of the groups reveal that mobile applications must serve as an extension of the original platforms; one must be allowed the same access as in the web-based, original platform. In the
case of Its Learning mobile application, the access was limited, and the usability was regarded as low.

Similar to Facebook, Slack is not intended to serve as an e-learning system, but as a communication tool. As a straightforward tool for communication, the social features of Slack are understood as strong. Group 4 describes Slack as straightforward and easy to use, and express that they are satisfied with using Slack as a tool for both knowledge sharing and communication. The students’ perception of Slack’s social features can be linked to the social affordances. Social affordances make social interaction possible, as the social needs of members are fulfilled by the environment as soon as the intentions emerge (Kirschner et al. 2004). As the social aspect is emphasized, it is relevant to look at which opportunities the students have to transform their social needs into action (Gee, 2008). In the case of Group 4, the students explain the importance of being able to adjust the sensibility of the notifications in Slack. It appears that the group welcomes the indications or notifications to some extent, as long as they are understood as relevant and/or crucial. Here the group mentions, inter alia, the ability to get alerts for important phrases and words, or being able to adjust the preferences for specific channels.

“Another thing on Slack which is nice, is that if it is in the general, like in the group conversation, it comes out like a red dot on the Slack icon, whereas if you’ve been privately messaged by someone in the group. It would come up with the number of messages. So, you will at least know, just by looking at the little icon on the bottom” (Gr. 4, inf. 1).

With Slack, the students can provide information whenever they want to, but they also have the opportunity to choose what information they wish to be notified about. On this basis, it seems as if the social affordances of Slack allows the students to transform their social needs into action. As with affordances as an overarching concept, social affordances are understood as existing in the relation between the students and their environments (Gee, 2008). The students further describe the operation of Slack as forthright, and seem to be aware of most the functions on the template. The fact that the students find Slack easy to navigate, might indicate that the technological affordances of Slack are perceived (Norman 2000). The technical affordances are related to the usability of the platform, where it seems like the students are provided with strong clues as to the operation of Slack. This may be due to Slack having an overall easy and user-friendly design, as well as Group 4’s strong technological expertise. As the rest of the groups seems to perceive the educational affordances of
Facebook and its chat feature, Group 4 appears to do the same with Slack; the platform fulfills the students needs (Kirschner et al. 2004) of effective communication and knowledge sharing.

As stated earlier, we are not attempting to estimate the students learning outcome from their use of the tools, but are rather focusing on how the technology can stimulate their knowledge sharing. Based on the statements from the five groups, it seems they regard Facebook and Slack as easy and straightforward when it comes to knowledge sharing and communication. Both of the platforms seem to be designed to stimulate user activity, although the social factors and technical experiences of the groups appears to affect whether the students prefer Facebook or Slack. Here, we can see a clear distinction between Group 4, with their background in computer science (Liaw et al. 2008), and the rest of the groups. In the following section, we will attempt to explain how e-learning platforms can meet the students need for knowledge sharing to a higher extent.

7.2.3 What does it take to design e-learning platforms that meets the students needs?

None of the groups in our study reflected on Slack or Facebook as tools for learning - both platforms were referred to as tools for quick and easy communication and knowledge sharing. The students’ view on Slack and Facebook seem to be consistent with Säljö’s (2001) understanding of different forms of technology; it can be understood as a logical extension of the human need to communicate with others. Even though neither of the platforms are designed specifically for learning and knowledge sharing, all of the groups prefer to use either Facebook or Slack instead of Fronter or Its Learning - which are the institutions’ preferred choice of technology. On this basis, we find it interesting to take a closer look at why the students choose to not take advantage of the technologies provided by the institutions.

As mentioned earlier in the discussion, affordances can be understood as an object’s opportunities for action that is carried by the object in relation to the perceiver of the object (Overdijk et al. 2012). Moreover, the actual and perceived fundamental properties of an object regulates how it possibly can be used (Kirschner et al. 2004). As the students claim their social and educational needs for knowledge sharing is hard to fill in Fronter and Its Learning, it does not seem like the platforms allude its opportunities for action in a way that
is apparent to the students. There is some indication of the students regarding Fronter and Its Learning to having uncertain possibilities for action, as none of the students find the platforms user friendly. This finding can be supported by Gee (2008), which claims that affordances are understood as what the individual identifies as feasible in, about, on, to, or with the features of an environment. As the students do not consider the opportunities for action as achievable, the affordances do not exist to the students. According to Johnson & Johnson (2004), the design of web collaborative learning environments must ensure that collaborative learning takes place. In our case, it is the sharing of knowledge between students that is emphasized. As our research shows, a set of collaborative tasks or communication tools will not automatically confirm this, the features needs to be afforded by the users.

The students in our study reveal that most of their needs for knowledge sharing are met in both Fronter and Its Learning - it just takes too much time and effort. Both of the platforms have features which are supposed to cover the student's need for communication. From the students’ point of view, these features do not facilitate communication in the form in which the students want to interact, which is understood as a more informal and dynamic way of interaction. As our study is based on a sociocultural approach, interaction and communication between the students is necessary for the learning to take place (Vygotsky 1986). In contrast to Slack and Facebook, Fronter and Its Learning seems to base their social and educational features on a design the students somehow find difficult to navigate in. In addition, the groups find the opportunities for knowledge sharing unclear. As follows, the social and educational affordances of the platforms might not be perceived by the students. As of today, communication and knowledge sharing is required to happen through an integrated e-mail or discussion forum, while all of the groups emphasize chat tools as their preferred tool for collaboration. Being able to share and communicate through chat in an informal and dynamic way is valued among the students, and might lower the threshold for participation. Interactive products such as e-learning systems require an understanding of what kind of activities the users will do while interacting with the product (Preece et al. 2015). Our analysis shows that this may not be the case with Fronter and Its Learning, as the current features do not meet the students needs for efficient and immediate means of communication and content sharing.

Kirschner et al. (2004) found that affordances hardly can be understood as straightforward, designable and developable features of a system. Rather, they should be viewed as the
opposite. Affordances are particularly dependent on the relationship between the users and the object (Kirschner et al. 2004). This is indicated in our study by the way the platforms are considered by the different groups. Additionally, one should take into account that the platform as a whole will be affected by both the environment and its users (Ozkan & Koseler, 2009). Even though the groups in our study differs when it comes to social factors, educational prerequisites, and experience with technology, our conservative estimate is that they do have one thing in common: they want straightforward platforms that help them to collaborate and share knowledge in efficient ways. This would be consistent with Yen & Majid’s (2006) findings, where the students emphasized the possibility of getting fast feedback from their peers, as well as the communication channels ability to convey messages precisely. As Kirschner et al. (2004) further states, the design of e-learning platforms is not a matter of designing interfaces, but rather the design of the students’ interactions. Finally, our findings indicate that the more computer-related experience the students have, the more likely are they to perceive technology in positive ways (Ozkan & Koseler, 2009). This was particularly evident with Group 4, which differed from the other groups with their background in computer science.

7.3 Key takeaways

In this chapter we have discussed the social aspects around the groups’ collaboration and content sharing, and how the students’ technical experiences effects their approach to the technologies. We then further examined the distinction between the platforms the students are compelled to use, such as Fronter and Its Learning, and technologies preferred by the students, such as Facebook and Slack. To support our discussion regarding the social factors and technical experiences, we have used CSCL, collaborative learning, community of practice, and scaffolding as a theoretical frame. Moreover, theories of interaction design and affordances were applied to our discussion of how the design affects the students’ interactions. The sociocultural perspective has served as an overall framework through the discussion as a whole. We will continue with an explanation and an elaboration of our main findings in Chapter 8.
8 Conclusion

The broader aim of the study was to examine what stimulates higher education study groups to share knowledge. Our sub research questions aimed to understand which social factors and technical experiences that are most prominent in the student's knowledge sharing, and how the design could impact the students’ knowledge sharing. To be able to answer our query, we conducted an explorative interview-based study consisting of qualitative interviews with five different study groups. Based on our research questions, we will give a short summary of the key findings in the discussion.

8.1 What stimulates a study group’s knowledge sharing?

The five groups in our study were based on different foundations, where some were understood as more compelled than others. Our findings indicate that this distinction may not be significant in regards to the students’ view of knowledge sharing, as long as the group is understood as a community of practice. Groups with members who interact with each other over time, and who have a common interest in succeeding, are believed to have a positive attitude towards knowledge sharing. Sharing of knowledge is understood to be one of the main functions of the groups, both the voluntary and more compelled ones. We ended up with a distinction between what we identified as internal knowledge sharing and external knowledge sharing. This was not our intention, but provided us with useful insight when it comes to the students’ view of knowledge sharing as a whole. The internal knowledge sharing is understood as the sharing which takes place within study groups, while the external sharing describes the practice of sharing with peers outside the groups. The groups being based on a compelled or voluntary basis does not seem to affect their view of internal or external knowledge sharing.

All of the groups in our study regard knowledge sharing within their study group, and with peers outside the groups as beneficial for all participants. An interesting finding is our indication of a somewhat evident division in terms of the criteria for knowledge sharing. Groups 1 and 5, which are understood to have the strongest social core, expressed a mindset we identified as a sort of “pay it forward” mentality, where knowledge sharing is regarded as a gesture that will be reciprocated at a later occasion. The students’ mentality might have something to do with what was understood as an easygoing stance towards the aspects of
support and collaboration with other peers. The social aspect was emphasized, and they did not regard their more distant peers as competitors. Although the students emphasized a “pay it forward” mentality, they expressed that they realized that most other students do not share their view. Here, the groups suggested that the lack of motivation in regards to external knowledge sharing could have something to do with a competitive attitude among students in higher education.

On the other hand, the students in Groups 2, 3, and 4 expressed a mindset we identified as more of a “utility” mentality. The students stressed their concern about ending up as content providers, and the idea of justification were mentioned regularly. The three mentioned groups did not regard the sharing culture at their respective schools as optimal, and explained their fear of ending up as content providers. As the students in Groups 2, 3 and 4 regard knowledge sharing within groups as straightforward, but consider the factors of sharing with more distant peers as uncertain, one interpretation could be that they have a need for closeness. When sharing knowledge with close peers, the students are able to maintain some extent of control over the situation. The aspect of control can contain reflections of trust; it might be implied that the groups find exploitation to less likely occur when they collaborate with trusted peers. The groups represented three different studies from two different institutions, and we do not have a reason to believe that the institutions or areas of study did affect their view on external knowledge sharing. However, the group size and level of ambitions might have influenced the students’ point of view; for example, in contrast to the other groups, both Groups 3 and 4 appear to be larger and more loosely structured than the other groups. This may cause the group members to not perceive any advantage in sharing knowledge with additional students - they already have a collection of trusted peers for this purpose. Furthermore, Groups 2, 3 and 4 are understood to be slightly more competitive than the two other groups, and stress that sharing their knowledge could reduce their chances to get good grades. All of the five groups in our study did agree that in order for an external knowledge sharing to take place, less emphasis on grades and competition must be in place.
8.2 The role of technology in students’ knowledge sharing

When it comes to the use of technology in the student's knowledge sharing, we have found that all of the five study groups prefer to use platforms such as Facebook or Slack instead of Fronter or Its Learning. The groups do not perceive Fronter or Its Learning as appropriate tools for knowledge sharing, although they consider most of the necessary features to be present. From the perspective of affordances, which may help us to understand how the students consider the usability of the different platforms, our findings indicate that the groups find the opportunities for knowledge sharing to be unclear. From a sociocultural perspective, the role of technology is understood to mediate the social and educational context, but our research implies that the social and educational affordances of Fronter and Its Learning is not perceived by the students.

All the groups in our study emphasized that they would prefer one platform dedicated to school related matters and knowledge sharing. We received straightforward guidelines of what an ideal platform should contain. These include, for example, easy and dynamic ways of communication - preferably through a chat feature, effortless uploading of files, opportunities for collaborative writing in documents, and the ability to adjust notifications. In addition, the login procedure must be simple and immediate. Most students today are believed to make use of technology as a tool for collaboration and knowledge sharing. Social and cognitive advantages of collaboration might be lost when the students have to spend valuable time on figuring out difficult interfaces and search for content in various platforms. Here, the ultimate role of technology is understood to function as a tool that supports and extends the students activities in effective and meaningful ways. To be able to use technology in a way that stimulates a study group’s knowledge sharing, it is considered appropriate to take the students’ needs into account, and hence ground the development on a user-centered design. A user-centered platform which is developed to design interaction and facilitate knowledge sharing may save the students time by organizing content and enhancing the collaborative process. Understanding the students’ attitudes towards platforms developed for collaboration and learning is regarded as crucial - as does the understanding of the students view of knowledge sharing as a whole.
A noteworthy aspect from our study is that students with interest in - and experience with - technology appear more likely to have a positive approach towards various platforms. A possible interpretation of this aspect may be that the groups in this study can be understood to be based on different grounds. Groups 1, 2, 3 and 5 seems to have social factors as a foundation, and this foundation may influence their technological practice. On the other hand, Group 4 appear to have technological interest and expertise as a base. A probable explanation can be that their base of interest and expertise affects the social aspect of their group.

Although our study is too limited to draw conclusions in this matter, the students in Group 4 showed an interesting correlation between technological competency and use of platforms like Slack. A similar correlation can also be illustrated by Groups 1, 2, 3 and 5, where the social foundation seem to influence their choice of platforms as Facebook.

We do not believe that a platform containing of desired features automatically would lead to a higher degree of knowledge sharing among the students. Therefore, a unidirectional criticism of the usability and technological affordances would probably not lead to any useful guidelines from this study. As pointed out earlier in this section, the students stress the culture of knowledge sharing itself as an obstacle. The concern of ending up as providers and being outperformed by other students was a recurrent subject among all the students. On this basis, we believe that in order to stimulate study groups knowledge sharing, a platform designed to meet the needs of the students would in all probability not be sufficient alone. It will most likely require a greater effort when it comes to the sharing culture as well. This can be underlined by citing Michael Fullan: “A tool is only as good as the mindset using it” (Fullan, 2013:4).

8.3 Limitations and directions for further research

Our study is based on knowledge sharing among and between study groups, with data collected from five different study groups at three higher educational institutes. Having at least three distinct institutes was considered essential in order to see whether the groups’ practice of sharing was similar or not between institutions. We managed to find study groups at three different institutes, but a limited timeframe caused us to limit our research to institutes in Oslo. Our study can be understood as narrow as we did not include a broader variation of students and educational institutes.
On this basis, we do not consider our study as representative or valid. Our research only reveals how a small number of study groups share knowledge, and the data is considered too limited to generalize. It should be noted that some of the empirical data is selectively chosen to refer to the key findings of the interviews. The findings can therefore not be considered valid nor representative for all higher education study groups. Several methodological grips such as observation, surveys, and a larger number of informants would be preferable. A quantitative approach could be an interesting extension, as it would allow for greater focus on mapping an overview of the students’ reflections. Thus, this study can hopefully give some indications towards the field of student's knowledge sharing and technology.

Our research can be viewed as a starting point, as further research can expand the perspective we have presented in this thesis. For further research in this field, it might be reasonable to expand the number of students and study groups. This may lead to a broader and more extensive perspective, which can lead to further insight of what stimulates study groups to share knowledge. By extending the research of this thesis, the data would be larger in scale, which could lead to a higher degree of representativeness and validity. This can provide better conditions in terms of generalizing the findings. Lastly, we would like to point out that other findings from the empirical data could be interesting to look into.

8.4 Final reflections

The findings in our study shows, in line with similar studies, that technology might serve as a useful tool in terms of stimulating the students’ knowledge sharing (Yuen & Majid, 2006), although it can not be understood as an incentive in itself. As the shifting economy calls for skills such as collaboration, flexibility, critical thinking, and problem solving, we believe that a good start would be to allow students to work on these abilities. The majority of students are expected to join the workforce after graduation, and experiences with collaboration and knowledge sharing would most likely be considered as indispensable. We live in a world where sharing of knowledge is perceived as essential; we can not go alone in the 21st century.
References


Appendix
Appendix 1

Norsk samfunnsvitenskapelig datatjeneste AS
NORWEGIAN SOCIAL SCIENCE DATA SERVICES

Anders Kluge
Institutt for pedagogikk Universitetet i Oslo
Postboks 1092 Blindern
0317 OSLO

Vår dato: 02.03.2016
Vår ref: 47013/3/STM
Dennes dato: 
Dennes ref: 

TILBAKEMELDING PÅ MELDING OM BEHANDLING AV PERSONOPPLYSNINGER

Vi viser til melding om behandling av personopplysninger, mottatt 27.01.2016. Meldingen gjelder prosjektet:

- 47013 Teknologi og innholdsetning blant studenter
- Behandlingsansvarlig Universitetet i Oslo, ved Institusjonens øverste leder
- Daglig ansvarlig Anders Kluge
- Student Camilla Marie Thørnt

Personvernombudet har vurdert prosjektet og finner at behandlingen av personopplysninger er meldepliktig i henhold til personopplysningsloven § 31. Behandlingen tilfredsstiller kravene i personopplysningsloven.

Personvernomбудets vurdering forutsetter at prosjektet gjennomføres i tråd med opplysningene gitt i meldeskriften, korrespondanse med ombudet, ombudets kommentarer samt personopplysningsloven og helseregisterloven med forskrifter. Behandlingen av personopplysninger kan settes i gang.


Personvernomбудet vil ved prosjektets avslutning, 01.06.2016, rette en henvendelse angående status for behandlingen av personopplysninger.

Vennlig hilsen

Vigdis Namtvæl Kvalheim

Siri Tenden Myklebust

Kontaktperson: Siri Tenden Myklebust tlf: 55 58 22 68

Vedlegg: Prosjektvurdering

Dokumentet er elektronisk produsert og godkjent ved NSOs rutiner for elektronisk godkjenning.
Appendix 2

Forespørsel om deltakelse i forskningsprosjektet
«Teknologi og innholdsdeling blant studenter»

Bakgrunn og formål
Formålet med prosjektet er å se på hvordan studenter kan dele innhold med hverandre på best mulig måte og om teknologi kan bidra til dette.

Hvordan kan teknologi stimulere til kunnskapsdeling blant studenter?

1. Hva skal til for at studenter deler innhold med hverandre?
2. Hvilken rolle spiller teknologien inn her?

Prosjektet er en masterstudie forstått for Universitetet i Oslo, ved det utdanningsvitenskapelige fakultetet. Prosjektet ser vi etter informanter som studere høyere utdanning, og som har vært med i en studiegruppe over en lengre periode. Utvalget er trukket tilfeldig og det er frivillig å delta.

Hva innebærer deltakelse i studien?
Datainnsamlingen vil kun bestå av gruppeintervju, det vil ikke bli hentet data fra andre steder. Spørsmålene vil generelt omhandle gruppearbeid, hvordan man jobber sammen i grupper og hvilke teknologiske plattformer man bruker for å samarbeide og dele innhold med hverandre. Det vil bli skrevet notater underveis i intervjuene og intervjuene vil bli tatt opp med en lydoptaker, slik at vi får mulighet til å gå igjennom intervjuene i etterkant.

Hva skjer med informasjonen om deg?
Alle personopplysninger vil bli behandlet konfidensielt. Kun oss (2 studenter) som skriver oppgaven vil ha tilgang til personopplysninger og opptakene. Disse blir lagret på et sikkert sted i forskjellige mapper med passordbeskyttelse, hvor kun vi har tilgang. Opptakene og navnene vil bli anonymisert, og ikke gjøres vekslig i publikasjonen.

Prosjektet skal etter planen avslutes 01.06.16, etter dette vil personopplysninger og opptak alettes.

Frivillig deltakelse
Det er frivillig å delta i studien, og du kan når som helst trekke ditt samtykke uten å oppgi noen grunn. Dersom du trekker deg, vil alle opplysninger om deg bli anonymisert.

Dersom du ønsker å delta eller har spørsmål til studien, ta kontakt med
Masterstudent: Camilla Marie Thømt, 48270419
Masterstudent: Ingrid Sundal-Åmodt Vinje, 40765111
Veileder: Anders Kluge, 22840710

Studien er meldt til Personvernombudet for forskning, Norsk samfunnsvitenskapelig datatjeneste AS.

Samtykke til deltakelse i studien
Jeg har mottatt informasjon om studien, og er villig til å delta

(Signet av prosjektdeltaker, dato)
Appendix 3

Interview guide

We are interested in how you work together in groups, and how you share files and content with each other.

I Hva skal til for at studenter deler innhold med hverandre?

1. What is your major? Which year?
2. How many courses does this group work together in?
3. How did the group form?
4. Was it voluntary?
5. How long have you worked together?
6. Does your group have a name?
7. How do you share files with the group?
8. Could you describe what your group did during the last group session?
9. Could you describe how the group work is organized?
10. Why are you sharing content with each other?
11. Would you do that with other people outside of this group? why/why not?
12. What are the benefit of working with a group? What are the frustrations?

II Hvilken rolle spiller teknologien inn her - design?

14. What technology do you use for group work? (e.g Fronter, Facebook, Google Drive, OneNote)
15. Why are you using it?
   Visual design
   Look and feel of the interface
   Information architecture
   How you structure and organise content
16. Is it easy to find and search for content?
17. Could you show us how you organize course related content on your computer's (drive/dropbox)?
18. Why do you organize the files in this way?
19. Is it something that would make you share more content with other students?
20. Is there any specific things you would like to do, that the current technology doesn’t allow you?

21. If you could design your own template or technology for sharing content with your group, which elements would you emphasize? Why?