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# **Collaboration Software use in E-Learning:**

**An interview study on how learners use collaboration software in higher education**

Bachelor's thesis 15 hp, course SYSK16 in Information Systems.

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# **Collaboration Software use in E-learning: An interview study on how learners use collaboration software in higher education**

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Abstract (Max 200 words): The research in this paper aims to describe how learners in higher education use collaboration software when working on completing group work in an E-learning setting. Prior academic literature regarding concepts of E-Learning, collaboration software and collaboration activities are presented to be able to collect and analyse relevant data from learners about their use of collaboration software. The collection of empirical material consists of five semi-structured interviews, with representatives studying different academic programmes located at two Swedish Universities. From our interviews, we have identified similarities and attitudes from learners about usage of collaboration software, both regarding which collaboration software they use and how they use it. These findings are presented and discussed, along with the software and activities categorised according to the literature.

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# 1. Introduction

## 1.1 Background

Many of the researchers involved in the early experiments of computer networking and E-learning in the 1960s were academics (Nicholson, 2007; Harasim, 2006). Following the invention of email and computer conferencing in 1971, they discovered the vast opportunities for communication and collaboration (Harasim, 2006). Learners constructing their knowledge and understanding of computers was an essential aspect for the use of computers in schools during the 1980s (Nicholson, 2007). During this time, the importance of computer conferencing was recognized as a critical contributor for collaboration and interaction in educational communication (Harasim, 2006). The evidence base that grew from research in educational communication in the 2000s contributed to E-learning earning its growth, credibility and overall success (Harasim, 2006).

E-learning, also known as online learning, refers to education with instructions delivered on a digital device to support learning (Nedeva, 2005). E-learning is a tool for learners in self-studies, but also for group assignments with the emphasis on the collaborative learning process (Nicholson, 2007; Clark & Mayer, 2016). In E-learning, collaboration software is used (Nicholson, 2007). Collaboration software is software that is designed to help people work together in groups and increase efficiency (Cambridge English Dictionary, 2020b; Koriati & Gelbard, 2019). Organisations have been looking to make use of E-learning collaboration software in order to create cost-efficient digital education tools (Clark & Mayer, 2016). Collaboration software is a program that operates on a computer system for storing, sharing and synchronizing data between different users (Peters, Himango, Backer and Clennon, 2012). Learning collaboratively in an online environment enhances learner's performance compared to learning individually in an online environment (Engellant, Guzik and Williams, 2014). The search for collaboration software has led to the gap between the more common on-site education and E-learning (off-site) shrinking, making E-learning more and more relevant (Clark & Mayer, 2016). Institutions conducting higher education have all been affected, and many are adapting with digital transformation (de Freitas & Oliver, 2005). The steady rise of E-learning can be seen as an effect of higher globalized competition in the academic and educational market (de Freitas & Oliver, 2005).

Furthermore, it can be observed that as of writing this thesis the pandemic of the Coronavirus, also known as SARS-CoV-2 (World Health Organization, 2020), has led to further restrictions regarding how higher education institutions operate, forcing action to be taken towards E-learning and remote digital collaboration (Utbildningsdepartementet, 2020). The pandemic has worked as a catalyst for digital transformation in education systems, with learners having to adapt on short notice to the use of E-learning collaboration software, but also to manage group assignments internally without being in each other's physical presence (Lunds Universitet, 2020). How groups choose to collaborate will have an impact on the quality of the work produced by learners, which illustrates the importance of research regarding how learners use collaboration software.

## 1.2 Problem

The research regarding E-learning collaboration often focuses on issues with the perspective of how tutors or organizations can achieve positive change in order to maximize the value of off-site education with little insight into how learners choose to conduct their tasks (Donnelly & McSweeney, 2009).

The use of new technologies has led to a larger variation in the form of techniques and tools used by learners (Zhang Zhao, Zhou & Nunamaker 2004). Informal ways of collaboration are commonly used in the academic setting (Stevenson, 2004). Research regarding the learners' experience is scarce, for example when integrating ICT (Information Communication Technology) the primary focus is usually establishing a technological infrastructure while ignoring aspects such as knowledge and expertise on how to use it properly (Zhao, Lei, & Conway, 2006). Ohei and Brink (2019) describe the lack of knowledge as a factor affecting educator's inability to properly integrate web technologies in facilitating teaching. The lack of understanding regarding how learners conduct their tasks by higher education institutions is problematic (Donnelly & McSweeney, 2009). Educators understanding their learners is central in education (Rodgers, 2002).

To summarize: the practical problems learners face regarding E-learning education are not fully reflected in the academic literature (Donnelly & McSweeney, 2009). Researchers (e.g. Donnelly & McSweeney, 2009; Hrastinski & Keller, 2007) see the need to conduct empirical research with the perspective of the learner to better understand how they conduct their assignment in the E-learning setting and how they use new and emerging communication media to do so, specifically regarding the understanding of collaboration software use when working with group-work related questions (Donnelly & McSweeney, 2009; Hrastinski & Keller, 2007). Hrastinski and Keller (2007) suggest research on the combination of different media in a blended environment. However, as this paper focuses on the use of collaboration software and not education in an online and offline setting, the focus will be on the digital environment.

Research in this paper is partly based on suggestions of further research from 2007 and 2009. Research conducted after 2009, concerning collaboration software in E-learning, focuses for example on describing which collaboration software academic institutions and other organizations choose to provide to learners (Oye, Salleh and Lahad, 2012) and challenges learners face in order to correctly use collaboration software (Mahanta and Ahmed, 2012). The literature regarding how learners in higher education use collaboration software is still slim to none and as technology continually evolves, there is a need to map out a current depiction of e-learners technology use.

## 1.3 Purpose

The purpose of this paper is to describe how learners in higher education use collaboration software when working on completing group tasks in an E-learning setting.

## 1.4 Research Question

*How are learners in higher education using collaboration software to complete group tasks in E-learning?*

## 1.5 Delimitations

The decision of the delimitations is made to establish a narrower research scope that will provide a more comprehensible data collection. Which in turn, will allow us to formulate a factual analysis and conclusion.

- Group tasks are limited to written assignments done by learners. These tasks are assigned by the school in which learners are attending.



## 2. Theory

To be able to answer the question “How are learners in higher education using collaboration software to complete graded group tasks in E-learning?” There is a need to understand the concept of E-Learning and its effects on the learning environment, common collaboration activities, different technologies that can be used as collaboration software in an E-learning setting and also frameworks for evaluation of group collaboration processes. In this chapter, these topics are explored by summarizing the current academic literature.

### 2.1. E-Learning

E-learning, also known as online learning, refers to education with instructions delivered on a digital device to support learning (Nedeva, 2005; Cowie & Sakui, 2013). E-learning courses can include activities such as quizzes and readings (Fellman, Lincke, Berge & Jonsson, 2020), content and instructional methods, often provided through a management system for education (Nedeva, 2005).

The hardware used can range from a desktop or laptop computer to a tablet or smartphone (Nedeva, 2005; Cowie & Sakui, 2013). With the help of cloud computing users are also not limited to a single computer, tablet or smartphone on a set location, they have access to their documents everywhere which reduce the risk of losing their data due to hardware failure, as it can be accessed online (AlCattan, 2014; Scerbakov, Ebner & Scerbakov, 2015).

Collaboration is defined in the Cambridge English Dictionary (2020a) as the situation of two or more people, working together to create or achieve the same thing. Collaboration involves different activities in order to be accomplished (Turban, Liang and Wu, 2011). Thomson and Perry (2006) argue that collaboration can be seen as a process where group members interact through formal and informal negotiation. In the collaboration process rules are created and structures govern relationships, involving shared norms and mutually beneficial interactions (Thomson and Perry, 2006). With collaboration on the cloud users can access, share and update data in the same documents in real-time (AlCattan, 2014; Scerbakov, Ebner & Scerbakov, 2015). E-learning can be designed for self-studies available on-demand, for example in the form of a solo or group assignment and/or instructor-led E-learning that is presented at a fixed time as for example a lecture (Clark & Mayer, 2016).

With the rise of E-learning, learners experience new ways to solve tasks presented in their education (Radvic-Markovic, 2010). A growing amount of technologies have diversified the possibilities of learner choice to tackle problems faced (Radvic-Markovic, 2010). Clark & Mayer (2016) describe E-learning's contribution to the learning environment in that it has given learners unrestricted license to navigate and piece together their own unique learning experience. How learners are able to conduct their tasks have changed due to E-learning (Clark & Mayer, 2016).

According to Svinicki (1998), techniques used for learning in the E-learning environment more often consists of inquiry-based learning that recognizes the learner's understanding and knowledge when solving problems with minimal teacher guidance. This means that tasks are presented as problems to the learner which are to be solved by the learner (Svinicki, 1998). Each learner has their prior knowledge and experience to rely on to solve the task (Svinicki, 1998). Mayer (2004) shows that without sufficient assistance from educators, learner's performance varies in this new environment. Still, self-governing and problem-solving are fundamental activities in the educational e-learning process (Dalsgaard, 2006). As a result of

greater freedom learners experience in an E-learning setting, social software is used in higher regard (Dalsgaard, 2006). Social software can be defined as software for sharing information used for educational purposes but created with other intent, which includes a wide range of different technologies, for example, Facebook Messenger (Dalsgaard, 2006).

### *2.1.1 Collaborative Learning in E-learning*

In the context of E-learning, collaborative learning has recently received the interpretation as computer-supported collaborative learning (Sumtsova, Aikina, Bolsunovskaya, Philips Zubkova & Michell, 2018). Collaborative learning implies social interaction between learners and educators where members obtain and share knowledge or experience (Zhu, 2012), with group discussion to develop learners cognitive learning strategies being a key activity (Zhu, 2012). Collaborative learning facilitates learners to communicate with each other, to draft and discuss common responses and to questions and write clear conclusions (Sumtsova et al. 2018; Wolz, Palme, Anderson, Chen, Dunne, Karlsson & Walker, 1997). This in turn forces learners to work through differences in opinions and effectively use their communication skills in their classes (Wolz et al. 1997). The central elements in collaborative learning are positive interdependence with individual accountability of their work, social skills and team interaction and reflection (Sumtsova et al. 2018). Traditionally, learners have been seen as passive receivers of knowledge, but with collaborative learning, learners are given a much more active role in their education (Wolz et al. 1997).

As new technologies emerge on the market, new ways of collaboration have been made possible, for example in the form of engagements and interactions (Beldarrain, 2006), allowing for unstructured collaboration to take place, collaboration initiated by the learner (Turban, Liang and We, 2011). Learning Management Systems (LMS) software used for delivering, tracking and managing education (Alomari, El-Kanj, Alshdaifat & Topal, 2020; Bara Ahmad, Modu, & Ali, 2018), which some E-learning platforms are, do not structure interactions performed in groups well compared to other systems (Talavera and Gaudio, 2004). This leads to a higher level of self-organizing and more agile way of conducting group tasks (Talavera and Gaudio, 2004). In order to facilitate collaboration social software technologies are used (Turban, Liang and We, 2011).

Turban, Liang and We (2011) describe this new wave of collaboration as “Collaboration 2.0” where the flow of information is unstructured and the use of supportive infrastructure high, in order to achieve flexibility, user-friendliness and cost-efficiency. As mentioned in the introduction, the use of collaboration software is not well known which in turn may affect collaboration techniques (Donnelly & McSweeney, 2009). There is also a lack of understanding regarding how the level of structure imposed on collaboration influences collaboration processes (Yetter, Gutkin, Saunders, Galloway, Sobansky & Song 2006).

### *2.1.2 Collaboration Processes in E-learning*

Collaboration processes have for a long time been researched, categorised and mapped out to be further understood, even before the existence of E-learning (Turban, Liang and We, 2011). Due to differences in structures of the collaboration software that are provided by the schools, learning and collaboration activities might differ (Reigeluth, 2013). Existing data collected through educational data mining from Learning Management Systems about learner behaviour in an E-learning setting is not well structured, making it hard to understand learners' behaviours and pinpoint their exact collaboration processes. (Bara et al., 2018).

Instead, models for analysing and categorizing data can be used in order to understand human behaviour when collaborating (Heames and Kalantari, 2010).

One old but well-established model for the human decision-making processes when collaborating is Simon's model, made by Herbert Simon in 1955 (Simon, 1955). Simon's model can be used to organize collaboration processes into four categories/phases: *Intelligence, Design, Choice and Implementation/Monitor* (Turban, Liang and We, 2011).

1. Intelligence: The phase of problem identification, data collection and goal setting.
2. Design: The phase of analysing feasible alternatives provided in the previous phase.
3. Choice: The phase of selection of alternatives.
4. Implementation: The phase of designing the employment of action and implementation of it.

The role of the intelligence phase is to identify the problem and collect relevant information (Turban, Liang and We, 2011). The phase mainly involves the group's way of finding, sharing and analyzing information regarding a problem, either in finding a solution to the problem or identifying and defining the problem (Turban, Liang and We, 2011).

Once the problem has been identified it has to be solved and to do so, potential courses of action need to be introduced, which is done in the design phase (Turban, Liang and We, 2011). Different alternatives can be generated by the groups synchronously or at different times using social software in the form of example, chats, voting systems or discussion boards (Turban, Liang and We, 2011).

Making choices, which is done in the choice phase, usually requires some form of analysis, discussion and negotiation, which can be done using social software in the same way as in the design phase (Turban, Liang and We, 2011). These collaborative environments enable the decision-makers to discuss issues, brainstorm and evaluate pros and cons to be able to agree on a final course of action using social software (Turban, Liang and We, 2011).

The major tasks in the implementation phase are the actual selection of alternatives, managing the project and report writing (Turban, Liang and We, 2011).

In more recent times, William Horton (2011), categorised the essential group objectives in e-learning into three groups: *Create, Do and Decide*. *Create* is a process of creating something that requires any form of innovation: for instance, a plan or a concept (Horton, 2011). *Do* refers to a process of doing something without having to make decisions: for example, applying for a course (Horton, 2011). *Decide* is an activity in which a decision is made not merely following an evaluation procurement: like deciding on a strategy (Horton, 2011). This model is directed towards creators of E-learning activities, it's less established than Simon's but focuses on activities in an E-learning environment primarily.

Even though Horton's model focuses on E-learning, our research is based on Simon's model for understanding the collaboration process. Simon's model is well-established regarding collaboration and decision-making process, while Horton's use sweeping definitions regarding group objectives. Horton's model focuses more on the activities of E-learning with a pedagogical viewpoint and is directed more towards creators of E-learning activities, rather than learners. Even though E-learning activities are an important part of this research, the primary focus is on collaboration and use of collaboration software. Therefore, Simon's model suits better than Horton's as a basis for this research.

## 2.2 Collaboration Software

Collaboration software (also known as groupware) is a software that is designed to help people work together in groups and increase efficiency (Cambridge English Dictionary, 2020b; Koriat & Gelbard, 2019). With it users can connect with each other synchronously, allowing information and knowledge sharing through different mediums such as instant messaging, conferencing and sharing of applications and desktop (Koriat & Gelbard, 2019). One important area of collaborative learning is the use of advanced technologies to support collaboration (Stahl, Koschmann & Suthers, 2006). Understanding and designing technologies to support collaboration has been a concern for a long time with rich theories about how people work together has influenced the design of these collaboration technologies (Ens, Lanir, Tang, Bateman, Lee, Piumsomboon, & Billinghamurst, 2019). The concept and current usage of collaboration software is therefore an essential part of this research to get a better understanding of learners' use of collaboration software. Collaboration software are categorised into Information Communication Technologies (ICT), Computer-Mediated Communication and Learning Management Systems (LMS) to separate them according to their usage and functionality.

### *2.2.1 Information Communication Technologies (ICT) as Collaboration Software*

Information communication technologies are generally related to technologies that are used to access, gather, manipulate, present or communicate information (Lloyd, 2005). These technologies include hardware such as computers, tablets and smartphones, software applications and connectivity to the internet (Lloyd, 2005). The term communication in ICT refers to the communication between individuals in human interaction with the help of technology (Lloyd, 2005). In some cases, ICT is viewed as “a silver bullet that cannot only fundamentally improve or change education, but also solve social problems” (Zhao, Lei, & Conway, 2006, p. 688). These ideas express high expectations on new technologies and its integration in schools; with this utopian view, ICT can set unrealistic goals that can cause a burden for schools instead of being beneficial (Zha, Lei, & Conway, 2006). New technological innovations usually take time for schools to adapt and even longer to integrate into the learning curriculum (Zhao, Lei, & Conway, 2006). The continuous chase for new technologies might also hinder learners and teachers from experimenting and getting familiar with the pre-existing technologies (Zhao, Lei, & Conway, 2006).

According to Crook (2011), ICT can be used as an effective method to deliver course content in which learners participate working in the form of a collaborative community. Albayrak and Yildirim (2015) stress that ICT can, in distance learning, promote collaborative learning and support knowledge development. Because of this, ICT is a rich source for learning (Dysthe, Lillejord, Wasson & Vines, 2010; Kirkwood, 2014).

When integrating ICT, the primary focus is usually establishing a technological infrastructure, while ignoring aspects such as knowledge and expertise on how to use it properly. (Zhao, Lei, & Conway, 2006). With the use of ICT, learners are getting access to quality information sources online, it is an indispensable part of the global information societies of today with digital literacy becoming essential, especially in higher education (Zhao, Lei, & Conway, 2006). However it is important to note that access to information is not equal to access to knowledge, it is a necessary skill to be able to select information that is true and of interest and create an informed opinion, both as a teacher and as a learner (Santos & Serpa, 2017).

### *2.2.2 Computer-Mediated Communication (CMC) as Collaboration Software*

The term CMC (Computer-Mediated Communication) is a broad term as a lot of different tools in diverse sets of learning environments can be classified as CMC (Wolz et al. 1997). It is defined as any form of interpersonal communication that uses computer technology to store, annotate, transmit or present information that has been created or modified by one or more participants (Wolz et al. 1997). Using this definition, CMC-tools include but are not limited to emails, video calls and conferencing, chats and chat rooms (Wolz et al. 1997; Hrastinski, 2007). These CMC-tools can be categorised as either asynchronous or synchronous (Wolz et al. 1997). Synchronous communication is communication conducted in real-time, for example by a telephone call or an online chat while asynchronous communication allows learners to log on at any time, think about what has been written and formulate a reply when they wish (Hrastinski, 2007; Oztok, Wilton, Lee, Zingaro, Mackinnon, Makos, Phirangee, Brett & Hewitt, 2014).

CMC usually enables both asynchronous and synchronous communication with tools such as emails and chats (Wolz et al. 1997). These tools enable groups to “close off” external individuals access to their work, but also let them invite external groups or instructors to view and edit (Wolz et al. 1997). CMC tools have previously mainly been used in an asynchronous fashion, which however have been argued to make collaboration difficult (Fidas, Kapsalis, Tranoris & Avouris, 2006). With the increase of bandwidth and technological advances the shift has gone to more synchronous solutions, however, most previous research has been focused on asynchronous communication with teachers enabling it through emails and discussion boards (Hrastinski, 2007).

The main advantage of CMC is the ability for learners to communicate and learn from each other (Hrastinski, 2007). In fact, learners are the main users of messaging in CMC systems compared to teachers where they sent 85% of messages in a synchronous setting and 80% in asynchronous (Hrastinski, 2007). However, these statistics date back to 1992 with little data in recent years. Techniques and tools like Collaborative learning and CMC are both used to actively involve learners in the study material, which has been suggested to increase learner's efficiency (Wolz et al. 1997; Hrastinski, 2007). A lecture can cover a lot of material but, that does not translate to learners' ability to learn (Wolz et al. 1997; Hrastinski, 2007).

CMC is classified as both asynchronous and synchronous, however, it is the usage of the systems that define the classification (Hrastinski, 2007). For example, emails are by definition an asynchronous tool, but a user having their email open and ready to respond immediately can change it to synchronous based on their usage of the tool (Hrastinski, 2007). Furthermore, a chat can be asynchronous with users doing something else and responding occasionally (Hrastinski, 2007). In recent years, the definition for asynchronous communication has shifted to be communication at different times that are stored until it is read by the recipient (Oztok et al. 2014). As a tool can be used as asynchronous while per definition being synchronous and vice versa, the classification of the tools might get convoluted. However, these tools were designed for either asynchronous or synchronous communication in mind and this paper will further explore the actual usage of certain tools in both categories.

### *2.2.3 Learning Management System (LMS) as Collaboration Software*

LMS is a software that is used for delivering, tracking and managing training and education (Alomari, El-Kanj, Alshdaifat & Topal, 2020; Bara et al., 2018). It is the system in which



learner's E-learning activities take place (Bara et al., 2018). E-learning activities refer to school-related activities done online (Fellman et al. 2020). Learning Management Systems are being used in the vast majority of educational facilities today (Scerbakov, Ebner & Scerbakov, 2015; Alomari et al. 2020).

LMS allows educators and administrators to build and administer courses online (Alomari et al. 2020). LMS works as a platform that stores the E-learning activities done by learners, which can be analysed to get a better understanding of their habits and track their progress (Bara et al., 2018; Fellman et al. 2020). In recent times LMS has transformed from being used as a purely asynchronous tool for educators to include online communication and interaction with learners (Alomari et al. 2020). In other words, these days educators and learners can use LMS to both communicate and make use of the systems educational tools (Bara et al., 2018; Alomari et al. 2020). These dynamic interactions are crucial for learning in a blended environment, with active participation from the educators showing a higher learner engagement (Alomari et al. 2020). A proposal of merging LMS with collaboration software functionality and social software was made by Du, Fu, Zhao, Liu and Liu (2012), pointing to the advantages of enhancing cognition, construction, and socialization process of learning.

## 2.3 Theoretical Conclusion

The purpose of this paper is to describe how learners are using collaboration software in group work in higher learning E-learning. In this research collaboration software is assessed as three technologies: Information Communication Technologies (ICT), Computer-Mediated Communication (CMC) and Learning Management Systems (LMS). E-learning activities can utilize each technology, depending on usage. ICT is generally related to technologies that are used to access, gather, manipulate, present or communicate information (Lloyd, 2005). CMC is any form of interpersonal communication that uses computer technology to store, annotate, transmit or present information that has been created or modified by one or more participants (Wolz et al. 1997). Lastly Learning Management Systems, which is used to deliver, track and manage education (Alomari et al. 2020; Bara et al., 2018).

E-learning has made new ways of collaborating possible, allowing unstructured self-governed collaboration to take place where learners can use social software for collaboration (Turban, Liang and We, 2011; Talavera and Gaudioso, 2004). The literature that describes how collaboration software is used and how learners in an E-learning environment conduct their tasks are slim (Bara et al., 2018). In the absence of information regarding E-learners' activities, models of group decision making can be used to understand processes that may be used by learners conducting group tasks (Turban, Liang and We, 2011).

## 2.4 Summary of Literature

**Table 1:** Summary of literature.

| Category   | Aspects  | Literature  |
|------------|--|---|
| E-learning | <ul style="list-style-type: none"> <li>E-learning</li> <li>Collaborations processes in E-learning</li> </ul> | (AlCattan, 2014); (Bara et al., 2018); (Clark & Mayer, 2016); (Dalsgaard, 2006); (Donnelly & McSweeney, 2009); (Fellman et al. 2020); (Hareton K.N, 2003); (Heames and Kalantari, 2010); (Horton, |

|                        |  |   |
|------------------------|--|---|
|                        |  | 2011); (Mayer, 2008); (Nedeva, V, 2005); (Cowie & Sakui, 2013); (Radvic-Markovic, 2010); (Reigeluth, 2013); (Simon, 1955); (Scerbakov, Ebner & Scerbakov, 2015); (Svinicki, 1998); (Sumtsova et al. 2018); (Talavera and Gaudioso, 2004); (Thomson and Perry, 2006); (Turban, Liang and We, 2011); (Wolz et al. 1997); (Yetter et al. 2006); (Beldarrain, 2006); (Zhu, 2012);   |
| Collaboration software | <ul style="list-style-type: none"> <li>• Collaboration software in education</li> <li>• Learner to learner communication</li> <li>• LMS</li> <li>• Synchronous and asynchronous communication</li> </ul> | (AlCattan, 2014); (Albayrak, D., & Yildirim, Z. 2015); (Alomari et al. 2020); (Bara et al., 2018); (Cambridge English Dictionary, 2020b); (Crook, 2011); (Du et al. 2012); (Dysthe et al. 2010); (Fellman et al. 2020); (Hrastinski, 2007); Kirkwood, 2014); (Koriat & Gelbard, 2019); (Lloyd, 2005); (Santos & Serpa, 2017); (Scerbakov, Ebner & Scerbakov, 2015); (Oztok et al. 2014); (Wolz et al. 1997); (Zhao, Lei, & Conway, 2006); |
| Theoretical conclusion | • Theoretical conclusion   | (Alomari et al. 2020); (Bara et al., 2018); (Lloyd, 2005); (Talavera and Gaudioso, 2004); (Turban, Liang and We, 2011); (Wolz et al. 1997)  |

## 3. Research Method

In this research method chapter, our motivations for the method of choice are presented. How the collection and analysis of the data are made and from whom it is collected is described. Later, reflection regarding the research quality is conducted by analysing validity and reliability. Lastly, it is presented how the ethics of the research method was handled.

### 3.1 Collection of Literature

For our collection of literature, we have mainly used LUBsearch, the search tool provided by Lund University. It has been the primary tool for collection of academic literature and scientific articles, with Google Scholar being used complementing or confirming sources used. In some cases, the Google search engine has been used to look up information of non-academic character. Some keywords used to search for information online were: Collaborate Software use, Collaboration, Collaborative learning activities, E-learning tools, E-learning activities and Learning Management Systems. Books from the university library have also been used. Researching information systems and computing by Oates (2006) and InterViews by Kvale and Brinkmann (2009) have been used to develop our research method.

### 3.2 Selection of Research Method

The first step was to determine between a qualitative versus a quantitative research method. As the paper has a descriptive research question, open-ended questions were a requirement to get elaborated answers. Answering specifically ‘how’ learners are using collaboration software requires further questioning which a survey or poll are inadequate for, which in turn showed us that qualitative research in the form of interviews suited our research question.

Kvale and Brinkmann (2009) describe qualitative methods as a way to gain knowledge of people’s behaviour and interactions, which guided us towards qualitative research. Being able to follow up with questions and ensure that the respondents and we have a mutual understanding and interpretation of technological terms was of importance. In other words, to understand the point of view of the responders was key.

To answer our research question, we deemed personal interviews as the method of choice. As the research question focuses on people's perceptions and usage of collaboration software, trying to quantify the research would prove difficult. Interviews could give nuanced answers and provide clarification when needed. Frances, Coughlan, Micheal and Cronin (2009) describes interviews as well suited for gathering information about behaviour, attitudes and preference, which this paper focuses on. In our selection of research methods, we concluded that focusing on interviews would bring sufficient results to answer our research question. This conclusion was made after determining what kind of data we wanted and why.

### 3.3 Interviews

To generate data for our study we choose to conduct semi-structured interviews individually with learners. Conducting semi-structured interviews enables more flexibility, where questions could be altered, added or removed to suit each situation in order to discover things further and understand the individual interviewed, according to Oates (2006). It allowed for



the flow of the interview not to be disrupted and the interviewees to give their take on the subject discussed.

A list of predetermined guidelines, themes and questions were used in order to keep track of what had been covered and what had not when conducting the interviews. We choose to ask questions of open character, Oates (2006) describes that opening with words such as how, why, and what encourage the interviewee to provide extensive answers. Oates (2006) further advocates to put the interviewee at ease with some small talk, which took place at the beginning of the interviews, along with starting off with easy to answer questions.

When conducting our interviews clarity is a primary concern, both from us the interviewers and the interviewee, as the interviewee's answers can be ambiguous with statements implying different possibilities of interpretations or even contradictory statements (Kvale, 2007). While striving to not misinterpret the interviewee and the interviewee not misunderstanding us, different interview techniques for clarification were used. Oates (2006) recommend techniques such as definitions, checks and exemplification for these purposes, which we use when conducting the interviews.

The interview guide was constructed in order to collect data regarding how learners use collaboration software when collaborating in an E-learning setting, more precisely to understand which collaboration software are used, for what purpose, and in regard to which collaboration processes. We have categorised technologies and processes to be able to structure the collected data in our interviews for better understanding. To understand collaboration processes and to categorise processes and activities, inspiration was taken from Simon's model.

The interviews were primarily done through audio conferencing (Zoom) due to the current pandemic of the Coronavirus, also known as SARS-CoV-2. One interview was conducted face to face as the interviewee had issues with the audio conference tool and lived in close proximity to the interviewer. Interviews were recorded, with the approval of the interviewees, for transcriptions and analysing purposes.

### **3.4 Selection of Interviewees**

To be able to conduct our research, we selected learners in a higher education E-learning setting as interviewees. With the research question for this paper we want to answer how learners are using technology to support their collaborations in higher education, which set a certain requirement for correspondents of our interviewees.

To be able to take part in our interview we required that the interviewees have some form of experience with completing collaborative group tasks. The selection of interviewees is based on convenience as we are located in Sweden, being Swedish is therefore not a selection criteria. Since we wanted to interview people with similar access to technology we reached out to learners of higher education, with a minimum academic requirement of studying at a university or college. An overview of the interviewees can be found in Table 2.

In 2019 "Internetstiftelsen", an independent, business-driven and non-profit organization showed that 99% percent of Swedish citizens have access to the internet and 95% of them use it on a regular basis (Svenskarna och internet, 2019). They are the Swedish correspondent of the "World Internet Project" which is an international research project involving almost thirty

countries (World internet project, 2020). The report is based on interviews based on a random sample of the population in Sweden (Svenskarna och internet, 2019). This shows that Sweden has the infrastructure to provide internet access to almost all parts of Sweden, making sure data can be collected nationally.

Universities are also providing internet access to all learners through Eduroam (Education roaming), which is an international cooperation to provide internet access to universities (Skolfederation, 2020). By implementing free internet access to learners, universities help lower digital exclusion. With low digital exclusion and schools providing learners with tools to work and communicate with each other, we believe this is a suitable base to get sufficient data for our paper.

**Table 2:** Summary of interviews.

| <b>Code name</b> | <b>University/College</b> | <b>Level of education</b> | <b>Programme/Course</b>                         | <b>Type of interview</b> | <b>Length of interview</b> | <b>Interview date</b> |
|------------------|---------------------------|---------------------------|---|--------------------------|----------------------------|-----------------------|
| Person 1         | Lund University           | Bachelor                  | Criminology programme                           | Face to face             | 31 min, 18 sec.            | 26/04/2020            |
| Person 2         | Lund University           | Bachelor                  | Information systems programme                   | Audio conference (Zoom)  | 30 min, 23 sec.            | 26/04/2020            |
| Person 3         | Uppsala University        | Bachelor                  | Earth Science programme                         | Audio conference (Zoom)  | 25 min, 2 sec.             | 23/04/2020            |
| Person 4         | Lund University           | Bachelor                  | Political Science programme                     | Audio conference (Zoom)  | 45 min, 17 sec.            | 22/04/2020            |
| Person 5         | Uppsala University        | Master                    | Industrial Economics and Organization programme | Audio conference (Zoom)  | 41 min, 42 sec.            | 23/04/2020            |

### 3.5 Interview Guide

This interview guide has been created with a basis on the papers research question. The questions are based on the theory presented in this paper and have been categorised to ease the structure of our interviews and transcripts. The interview guide is presented below in

3.5.1, 3.5.2, and 3.5.3. First off, we start with an introduction, including ethical aspects, then we verify unified interpretations of terms and lastly, we ask our questions.

### 3.5.1 Introduction and Ethical Aspects

*Give a short presentation of the project and background:*

- We are two learners from Lund University doing our bachelor thesis in information systems. We are writing a paper on learners' use of collaboration software in group work in higher education.

*Describe the purpose of the interview:*

- In this paper, we want to get a better understanding of how you use software to complete tasks when collaborating in group tasks. The purpose of the interview is therefore to ask how you use collaboration software. (Explain collaboration software)

*Give assurances about confidentiality, anonymity and the possibility to withdraw from the interview partly or fully at any time:*

- We want to remind you that you will remain anonymous throughout the paper. You also have the possibility to withdraw from the interview at any time. We will after the interview is done send you the transcript of the interview and findings of the interview for clarification.

*Obtaining permission to record the interview and test recorder verbally:*

- We would like to record the audio of this session with your permission, would that be alright with you?

### 3.5.2 Verifying Unified Interpretation

- Before we start, we would like to discuss and explain the meaning of some terms and abbreviations that will be used in this interview. This is to reduce misunderstandings during the interview and make sure that we have the same understanding and interpretation of the terms. If you have any questions about them feel free to ask at any time during the interview.

**Table 3:** Term and abbreviation meaning.

|                                  |  |
|----------------------------------|--|
| Collaboration Software           | - <i>Collaboration software</i> is software that is designed to help people work together in groups. During this interview we will refer to collaboration software as software. Collaboration software can be everything from Google Docs, Facebook Messenger, to Dropbox, and Canvas for example. |
| Learning Management System (LMS) | - <i>Learning Management System</i> is software learners use to manage their electronic school tasks. Some examples of LMS are Canvas and Moodle. It is used to get information about  |

|  |   |
|--|---|
|  | courses, communicate with teachers, turn in assignments and get test results. |
|--|---|

### 3.5.3 Interview Questions

**Table 4:** Interview questions.

| Category  | Central themes  | Question  |
|---|---|---|
| Introduction  | <ul style="list-style-type: none"> <li>• Background of the interviewee</li> </ul>   | 1. At what university do you study?<br>2. What programme do you study?<br>3. At what level do you study?<br>4. How long have you studied?<br>5. Have you participated in group tasks during your time as a student?<br>6. How many members approximately are there in these groups?   |
| E-learning  | <ul style="list-style-type: none"> <li>• Collaboration process</li> <li>• Use of Software</li> <li>• Use of Hardware</li> </ul> | 7. Now I would like to ask you some questions about the different stages you go through when you are working on a group project of any kind. What is the first step you take when receiving a group task?<br>Do you use any sort of software during this activity? If so, which?<br>How do you use these software as a group?<br><br>8. What's the next step you take in your group?<br><br>Do you use any sort of software during this activity in this stage? If so, which?<br>How do you use these software as a group?<br><br>9. (Ask question 8 till the whole group work cycle is covered)<br><br>10. Which kind of hardware do you use to utilize these software? (For example, computer or tablet)<br>For what software/purpose do you use each hardware? |
| Group decision process using Collaboration Software | <ul style="list-style-type: none"> <li>• Information Communication Technologies</li> </ul>                                      | 11. How do you collect information for your group during group work?  |

|  |   |  |
|--|---|--|
|  | <ul style="list-style-type: none"> <li>• Problem identification</li> <li>• Goal setting</li> <li>• Evaluation of alternatives</li> <li>• Govern group work</li> <li>• Working synchronous or asynchronous</li> <li>• Structuring collaboration with software</li> </ul> | <p>Is some sort of software used when collecting information in your group? (For examples Google Scholar)</p> <p>11..1.If yes:</p> <p>11..1.1.Which ones are used</p> <p>11..1.2.How are they used?</p> <p>11..2.If no, why not?</p> <p>12.How do you share information with your group members during group work?</p> <p>Is some sort of software used for information sharing in your group? (For example, Google Drive or mail)</p> <p>If yes:</p> <p>12..1.Which ones are used?</p> <p>12..2.How are they used?</p> <p>If no, why not?</p> <p>13.How does your group evaluate different options when making decisions internally? (For example, deciding which assignment to do first or in which order to do them)</p> <p>Is some sort of software used to help with the decision making? (For example, communication software like video conferencing or voting system)</p> <p>If yes:</p> <p>13..1.Which ones are used?</p> <p>13..2.How are they used?</p> <p>If no, why not?</p> <p>14.Do you use some sort of collaboration software to plan, set goals, schedule or to monitor your group work?</p> |
|--|---|--|

|                        |   |  |
|------------------------|---|--|
|                        |   | <p>If yes:</p> <p>14..1.Which ones are used by you and your group?<br/>14..2.How are they used?</p> <p>If no, why not?</p> <p>15.How does your group work together logistically? Do you set a specific location and time to work simultaneously or do you set your own schedule and work at whatever time you think is best or a mix of both?</p> <p>What is your preferred way of working and why?<br/>How do you organize working within your group?<br/>How do you give feedback to each other about your work?</p> |
| Collaboration Software | <ul style="list-style-type: none"> <li>• Learning Management System</li> </ul>  | <p>16.(Repeat explanation of LMS) Are you using Learning Management Systems to do schoolwork? (For example, Moodle or Canvas)</p> <p>How do you use it?<br/>Which functions do you use and for what purpose?</p>   |
| Collaboration Software | <ul style="list-style-type: none"> <li>• Learning Management System</li> <li>• Information Communication Technologies</li> <li>• Computer-Mediated Communication</li> </ul> | <p>17.How do you decide which software to use to do group work?</p> <p>18.Does your Learning Management System such as Moodle or Canvas provide any software you can use and does you and your group use them?</p> <p>If yes, which software and how do you use them?<br/>(If not using) What makes you choose these tools instead of what the school offers?<br/>(If not providing move on to next question)</p>  |
| Collaboration Software | <ul style="list-style-type: none"> <li>• Learner to educator communication</li> <li>• Learner to learner communication</li> </ul>   | <p>19.Do you use some sort of software to communicate with group members?</p> <p>Which software do you use?<br/>Why do you use it? For what purpose?<br/>How do you do it? (For example, chat, email or video conferencing)</p>  |

|                    |   |   |
|--------------------|---|---|
|                    | <ul style="list-style-type: none"> <li>• Computer-Mediated Communication</li> <li>• Synchronous and asynchronous communication</li> <li>• Information Communication Technologies</li> </ul> | <p>20. Do you use some sort of software to communicate with your professors?</p> <p>Which software do you use?<br/>For what purpose do you use it?<br/>How do you use it? (For example, chat, email or video conferencing)</p> <p>21. Does the software usage differentiate between close friends and strangers?<br/>How does your relationship with your group affect your choice of software to work and communicate?</p> |
| Closing statements | <ul style="list-style-type: none"> <li>• Last statements</li> <li>• Ending interview</li> </ul>   | <p>22. To wrap things up, are there any other tools you use that we have not mentioned or something you would like to add that you think would help us in our research?</p> <p>Lastly, we like to thank you for participating in this interview.</p>  |

### 3.6 Data Analysis

After every interview, we transcribed our conversation in a spreadsheet while listening to and replaying our recordings on reduced speed. Transcriptions were conducted in a literal manner to reduce the influence of faulty interpretation. To be able to better analyse the data, coding can be used, which involves attaching one or more keywords to text segments in order to identify important segments (Kvale & Brinkmann, 2009). Codes were used in the transcript and structured according to the interview guide in order to enhance data analysis. After transcribing each interview, we discussed the information we gathered, reflected upon how each of us perceived it and which parts could be relevant for our research. Then notes were taken regarding the most vital information and how we could use it in the analysis chapter of the research. Transcribed interviews were then summarized according to theme and interpreted in order to write the text in the result chapter.

### 3.7 Research Quality

To strengthen the research quality, arguments have to be valid, in other words, conclusions drawn from data are logical to follow (Sapsford, 2007). Furthermore, Sapsford (2007) argues the importance of reliability, “the extent to which repeated measurements yield consistent results” (Sapsford, 2007, p.15). Below, validity and reliability of the research is discussed.

#### 3.7.1 Validity

Validity is described by Kvale and Brinkmann (2009) as truth and correctness where a valid argument is justifiable, well-grounded and convincing. When carefully preparing and

conducting our research method we strove to design it in a way that made it possible to give logical and well-founded results, as recommended by Kvale and Brinkmann (2009). To validate our research our interview questions rest upon the logic of our theory chapter. We seek to be able to gather data that can be categorised for further knowledge about how technology is used for collaboration by learners. The internal validity, as in the evaluation if data is relevant and valid, was achieved by sending the transcripts to each interviewee who was thus given the opportunity to correct any inaccuracies or misconceptions. Furthermore, during the interviews we also strived to ask open-ended and non-leading questions of an objective character where techniques for limiting misunderstandings were used. External validity, as in the generalisability of the study, is hard to control due to the culture and technological setting of the Swedish higher education in 2020. Answers from interviews can differ depending on the context. We have designed our research to be easily repeated by other researchers in other contexts by being transparent about our method and theoretical framework, which the research is founded upon.

### 3.7.2 Reliability

Oates (2006) describes the reliability of one's research as how reliable or credible the gathered data is. Our role and identity as interviewers can have an impact on how the interviewees decide to answer our questions. How one perceives the person asking questions determines what information they decide to give as an answer (Oates, 2006). The aspects we as interviewers can and are aiming to affect regarding the reduction of bias is to act professional, polite and natural. Oates (2006), describes acting in such a way is well suited for the purpose of minimising bias. There is no age gap nor difference in social status between us and our interviewees. These factors might result in an increase in willingness to answer our questions according to Oates (2006). Furthermore, we strive to act the same towards all interviewees to minimize the risk of being perceived differently and therefore receiving different answers because of it, as well as trying continuously to reach an understanding of each interviewee's answer by verbally self-interpreting their answer in order to let them correct or clarify things if needed, as recommended by Kvale and Brinkmann (2009).

## 3.8 Ethics

When designing our interviews, collecting data for the research paper and throughout the entire project we operated with ethical aspects in mind, in the forms of principles, formulated and described by Brian Oates. Oates describes in his book *“Researching Information Systems and Computing”* (2006) the importance of research ethics and focuses on the legal rights of respondents but also responsibilities and professional codes of conduct for researchers. We follow Oates five principles of respondents' rights, which are:

1. *The right not to participate:*  
*Respondents should only participate in the research if they want to. No external pressure to take part of the interview from researchers or anyone else can take place.*

As we asked people without pressuring them, we don't see that we violated this principle. External forces outside our research group can of course have an influence on respondents to answer our survey but we view that possibility as unlikely.

2. *The right to withdraw:*



*Respondents always have the opportunity to withdraw fully from the research at any point throughout the whole research process. If respondents want to opt out part data from which they will or have participated in that is their right.*

We have not faced a situation where respondents requested to do so and would not refuse such a request.

3. *The right to give informed consent:*

*Informed consent means that the respondents must first be fully aware of the nature of the research and their involvement before accepting to participate.*

Our interview is designed so that all the information about our research is presented before the recording and interview start. We then ask for their consent before conducting the interview. The information they are given are concise and about the purpose of the research, who is undertaking the research, what will be involved, that they won't be given any incentive to participate, how their data will be used and lastly that they can withdraw at any time or choose to not participate. This gives the respondent the ability to themselves give informed consent.

4. *The right to anonymity:*

*Participants have the right to have their identity and location protected.*

We will not collect any data about respondent's personal information such as name and gender, anonymity will always be given. Location of school which interviewees are attending will not be made public if interviewee does not consent to it.

5. *The right to confidentiality:*

*The respondents collected data is kept secure and confidential.*

Information given to us is managed on established Google cloud servers. The information gathered can only be traced back to the respondents if conversations on Facebook, where our interview request took place, were leaked.

## 4. Empirical Findings

In this chapter, we compile the findings from the five semi-structured interviews. The answers from the interviews are summarized in order to highlight main themes and be able to understand the results more easily. The structure of our empirical findings is based on the interview guide. The transcripts of our interviews are to be found in appendix 1-5.

### 4.1 The Interviewees

The participating interviewees were all learners of higher education from two universities in Sweden: Lund's University and Uppsala University. All the interviewees studied different programmes, four at bachelor's level and one at master level. Furthermore, the interviewees had experience of working in groups where the groups contained two to six members.

### 4.2 The Collaboration Process and Use of Software

The interviewees gave similar answers regarding how they choose to start off group work tasks. Person 2's (P2) first course of action after being assigned to a group was to contact the other members through their Learning Management System (LMS). The way the other interviewees made contact with the group members were by the social software Facebook Messenger. If the members already are "friends" on Facebook they add each other in a Facebook Messenger chat group, otherwise, the interviewee first has to make a friend request on Facebook with the ones they are not "friends" with. One of the interviewees, Person 5 (P5), described that WhatsApp could be used as well for the same purposes, but only if the members in the group knew each other beforehand and had each other's phone numbers. Apart from that, WhatsApp was referred to in the same way as Facebook Messenger by P5.

The group chat applications Facebook Messenger and WhatsApp were used for a variety of purposes by all the interviewees. In the next steps of the collaboration process they all described how they used these group chats in order to create a common project understanding, discuss and book meetings, divide the group work and communicate in general.

Thereafter in the collaboration process all interviewees described how some form of cloud platform for writing and sharing documents was commonly agreed upon, shared through email and used by the members, a platform which could be synchronously updated in real-time. The software used by the interviewees were primarily Google Docs, but also Google Drive. Microsoft Word Online was used by P2 on sporadic occasions and P4 could use Google Sheets or Google Slides if the situation called for it. In Google Docs, a document for writing was created where members created drafts of the most important subparts regarding the group task, mostly for the purpose to facilitate the dividing of the group work. Multiple Google Docs documents could be created, documents consisting of drafts but also of the refined text aimed to be used for final submission. P2 and Person 3 (P3) used different folders in Google Drive to organize their work. The purpose of using cloud platforms which could be synchronously updated is described by P4 "to see the progress made in real-time" (Appendix 4, #24). Still P3 and P5 describe how some group members prefer to work in an offline setting with Microsoft Word and then transfer their texts to the shared Google Docs document later.

One other tool used by all the interviewees in Google Docs was the comment function. In Google Docs group members can mark areas of text and leave a comment for the other group members to see. Comments were used for discussion, reviewing, aiding and giving feedback to other members regarding the structure, grammar and content of the text. P4 describes comment being of more professional character than communication in chat groups.

After choosing which platform to use for synchronous text sharing and dividing the work between the members, each group member or subgroup was made responsible for a part of the group work. Group members or subgroups were thereafter able to work individually to finish their part how they saw fit, some by directly writing in the Google Docs document and some by first writing in Microsoft Word and thereafter transferring the text to the shared Google Docs document. Lastly, when the groups were done writing each individual part one person in the group had the responsibility to compile and refine all the group members parts into one Microsoft Word document. Even though the use of Google documents were widely used for writing the majority of the interviewees' groups used other software when finalizing their written work. Microsoft Word was used for finalization of the document due to preferred text formatting functions of text compared to Google Docs. After finalization of the document intended for submission, Facebook Messenger was used to send the document to the rest of the group before submission in the Learning Management System, P5 sometimes used WhatsApp for the same purpose.

### **4.3 Use of Hardware**

Conducting our interviews, we asked what hardware learners utilized their software on, in order to understand further how software is used. Four of the interviewees' answers were similar. Stationary computers and laptops were used for almost all activities connected with software use with the exception of Facebook Messenger or other group chat software. To utilize communication software, smartphones could also be used. Person 5 (P5) only used a laptop for all software use due to finding it to be easier to only use one hardware for everything.

### **4.4 Managing Information**

#### *4.4.1 Information Collection*

All the interviewees collected information to their respective group through their school's search tools which contain literature, reports and books from the library. Lund University and Uppsala University have their own separate search tools. Other websites are also used to collect information. The majority of our interviewees use Google Scholar either instead of or in combination with the school provided search tool. Person 5 (P5) believes those two tools are similar. Person 3 (P3) uses Wikipedia to get an understanding of a topic which he is supposed to learn, but this is only used for information at the surface level of topics. Otherwise, the school's search tool is used. Person 1 (P1) used a website called Taylor and Francis which P1 used to get access to different databases and articles, P1 gets access to those by logging on using his Lund university email.

#### *4.4.2 Information Sharing*

The interviewees have different ways to share the collected information within their groups. The interviewees and their group share text paragraphs and links to books or reports in both

the Google docs documents and the Facebook group chat. Person 1 (P1) and P1s group have a separate Google docs document that works as a draft where everything useful related to the project is saved. Person 2 (P2) keeps all their shared files in Google Drive. There they have, for example, different files for the planning, the real paper and sub-tasks.

Whole documents are mainly sent to each other through Facebook Messenger, with Person 5 (P5) also using WhatsApp to do so and P2 using Google Drive. These documents can, for example, be their assignments which one group member has finalized. This is how P2 and P5s groups use information sharing.

## 4.5 Structuring Collaboration with Software

### 4.5.1 *Decision Making*

When asking about how the interviewees make decisions, we noticed that most of them linked division of labour to the question regarding decision making. All interviewees seemed to divide their group work into subparts where each part was divided by preference to each group member. The most common software used for making decisions was Facebook Messenger, mainly by discussion in the group chat.

Two interviewees have used polls, Facebook Messenger's own poll system has been used by both Person 1 (P1) and Person 4 (P4), with additional software, also used at other occasions. In one case, by P1, Doodle has been used to create polls. P1s groups polls are mainly about scheduling their work. P4 has utilized Straw poll; their polls are mainly used to decide which subject to write their group work on.

### 4.5.2 *Governing Group Work*

The result of the interview showed that the majority of interviewees used Facebook Messenger and Google Docs to govern their group work. Facebook Messenger was used to set short-term plans of various kinds. Google Docs was used for monitoring the group work and seeing in real-time how far along the project had come. Interviewees describe how separate Google Docs documents could be used for writing down and using agreed-upon deadlines, deliverables and goals. P3 reported use within the group of Google Spreadsheets to make a mutual schedule for the group.

Furthermore, the interviewees described that they both worked at the same location and time and at different locations and times. In other words, sometimes they conducted their work together and sometimes separately. It was described how they first meet in person or through some video conferencing software to decide upon a subject to write about, the structure of the paper, areas of responsibility per group member to later be able to conduct their work apart from each other entirely. The groups were dependent on each group member to complete their assigned part until a specific deadline. Whether or not group members worked together or apart varied due to different preferences from group members. P4 described that depending on how stressful a situation is, it affects how the group chooses to conduct their work.

## 4.6 Learning Management Systems

Between the five interviewees, four different Learning Management Systems provided by the universities have been used, in which three of them (Live@Lund, Canvas and

Studentportalen) were used on a regular basis for school assignments. The last Learning Management System Luvit was only used for one course by interviewee Person 1 (P1), but the usage was the same as the previous Learning Management Systems. Even though the majority of interviewees use different Learning Management Systems provided by their schools, the usage stays the same. The interviewees mainly use it to check their schedules, check information about their courses, take part in notes and literature shared by the teachers, communicate with their teachers, receive and hand in assignments. Other features such as being provided software or tools to do their schoolwork were either unknown by the learner or never used.

## 4.7 Choosing Software for Group Work

Among the learners we interviewed, there was a common theme of which software to use when the learners started a new group task, these were Facebook Messenger group chats for communication within the group and Google Docs documents for writing. The choice of software was never or rarely reflected upon. Interview Person 5 (P5) described it as “The one with the loudest voice decides” (Appendix 5, #78). Generally, one group member chose which software to use and started either a group chat or a document to write in. These software were generally Facebook Messenger and Google Docs. The choice of software was usually based on previous knowledge and usage. Low variety in the choice of software have been observed as all of the interviewees primarily have used Facebook Messenger and Google Docs during their time as a learner. P5 tried the software Slack because one group member was confident in its use and believed that the group would like it. P5 did however not like it as it was too messy and went back to Facebook Messenger, WhatsApp and Google Docs.

There were isolated cases where other software was used or preferred. P5 used WhatsApp to communicate; however, this was mainly done when in a group with close friends. Interview Person two (P2) preferred using Microsoft Word Online but was met by other group members with surprise of its existence. Interview Person three (P3) did however not like Microsoft Word Online due to its slow update frequency and went back to Google Docs.

The teacher took no or minimal part of the decision of which software to use for the group work. Instead, the majority of interviewees used their software based on prior usage during their education. However, interview Person four (P4) asked their teacher if there were recommendations for new software to use.

The use of communication software such as Zoom has increased with the interviewees due to the current situation with the Coronavirus, with learners being recommended not to meet each other or their teachers.

## 4.8 Communication

### 4.8.1 Communication Between Learners

The learners' methods of communicating could take many forms, from online chat groups to regular cell phones. The main communication software our interviewees uses within the groups are the chat Facebook Messenger, and sometimes WhatsApp by Person 5 (P5). The primary use of communicating through the chat is to discuss group work by splitting up the work, setting dates to meet up as well as setting the location where to study.

All our interviews show that the preferred way of communicating and working together is face to face. Person 2 (P2) has an easier time focusing when together with people as working from home can be distracting and Person 1 (P1) deemed the social part of it as important and fun. Being able to talk to each other in person is also mentioned as favourable by interview Person 3 (P3). P3 said, “it would not come as naturally and I think that it would be more distracting when people talk if they are all in a video conference or audio conference” (Appendix 3, #90) regarding sitting together versus having a video or audio conference. P3 believes you learn a lot more about the subjects and get a more in-depth understanding by sitting together in the same room.

Even though the preferred way seems to be talking in person by some of our interviewees, all of them use communication software to collaborate during their group work.

Zoom is sparingly used for learner to learner communication. For our interviewees, the usage of Zoom has increased due to the Coronavirus. For P5 it plays a role for more significant decision-making tasks that require more discussion, especially in the early stages of their group work. The usage of video conference software for P2 and Person 4 (P4) is more prevalent with groups that are not as close friends. P2 would, however, like to use Zoom more with friends as features such as screen sharing are said by P2 to be useful. P3 briefly tried using Discord, a voice conference software. It was used to talk and work on their bachelor thesis synchronously. However, when meeting up face to face again became possible, at school, they stopped using Discord.

Asynchronous communication is made by the majority of the interviewees using the comment function in Google documents. It allows the user to mark text and put a comment in the margin of the text document. It is used to highlight specific paragraphs that might contain errors, that they do not understand or that they think need extra work. P2 also used it to highlight sections of text to give positive feedback.

#### *4.8.2 Communication with Teachers*

The primary way of communicating with teachers is by email for all the interviewees. It is used to ask questions, discuss work and plan for meetings. The usage of Zoom is mainly due to the Coronavirus limiting face to face visits, limiting meetings and seminars to be online. Person 2 (P2) has regular meetings through Zoom with their professor and Person 1 (P1) has regular phone calls with their teacher instead of using Zoom or other similar video and voice conference software.



## 5. Discussion

In chapter five, we discuss the result in chapter four and analyse it by comparison to chapter two's literature review and theory. We identify similarities, differences to previous research and also register new findings.

### 5.1 E-learning

#### *5.1.1 The Collaboration Process and Use of Software*

The result made points to similarities regarding how learners choose to use software in order to conduct group work. Social software was used in the beginning stages and throughout entire projects for multiple purposes by all the interviewees if using Dalsgaards (2006) argumentation indicates high self-governing by learners. All the respondents also used cloud platforms for automatic synchronous version handling of text-documents. It is hard to tell if these found similarities go against Reigeluth's argument (2013) regarding that learning activities will differ due to school provided software. On the one hand, we see that our interviewees similarly conduct their group work, but we cannot be sure if this is due to the resemblance of the Learning Management Systems used by the interviewed learners at Uppsala and Lund University. Our interviewees expressed that they used different Learning Management Systems in the same way.

As well in case of the collaboration software used, we were also able to spot similarities in the collaboration processes learners performed with collaboration software. For example: how learners make the first contact with other group members, communicate, schedule meetings, and work on various text documents. One everyday activity all interviewees mentioned doing was dividing the workload in order for each group member to be able to work at a preferred time and location. As Bara et al. (2018) mention, it is hard to understand the group's collaboration processes due to lack of structure in learners' behaviour in an E-learning environment. Still, as we found that our interviewees conducted the same activities, it's hard to point out the exact order of these activities. Using Mayer's (2004) argumentation, the similarities of learners' performed activities and usage of collaboration software can indicate that learners do not operate in unfamiliar environments. The fact that learners prefer to conduct work in familiar ways points to resistance to change and their unwillingness to develop new ways of working. Our research shows that learners sometimes use their selected software in unconventional ways and do not use software intended for that specific purpose, meaning they create their own creative solutions to solve problems in software with a different specific purpose. For example, some interviewees plan and schedule their group work using the chat function on social software or by writing out their schedule in plain text in a synchronous text document.

Some of our interviewees preferred to conduct their work at the same location and time together with their group, while some thought it better to work alone where time and location could be chosen by each group member, which shows that different groups/individuals prefer to work differently. Still, the results from the interviews point to that even if some activities are performed in a sporadic way; interviewees had similar expectations and experiences of how group work in higher education is conducted. Talavera and Gaudio (2004) mentioned that the lack of structured interactions, provided by the LMS, leads to higher levels of self-organization within groups, which could be argued to have led the interviewed learners to conduct their work in different ways, depending on preference.

Simon's model can be used to understand the processes learners go through in order to finish their group tasks. In our study, Simon's model was primarily used for understanding activities conducted by groups to develop our interview guide. The result points to some similarities with Simon's models and our findings. Simon describes the intelligence phase as consisting of identifying problems, setting goals and collecting data. The interviewees described doing most of these in some form but some neglected formulating goals. We could see from our interviews that learners use higher levels of synchronous communication in the form of chatting and video conferencing during the intelligence phase. In the design and choice phase, where analysing and selecting feasible alternatives for collaboration is done, our results point to that what was primarily analysed and selected was the subject to write about, its subparts/headings and what they should contain. Internal analysis of alternatives was not reflected upon within the group. The choices, either made by discussion, preference of subject or by voting can be seen as an indicator that prior knowledge and social context influence the way self-organizing groups conduct their tasks.

### *5.1.2 Structuring Collaboration with Software*

Our interviewees had little experience working with software created explicitly for structuring collaboration. Structuring collaboration refers to governing group work, creating goals and making decisions. As earlier mentioned, synchronous text- and spreadsheet documents were used for governing the group work. Most commonly, decision-making was either done through discussion or voting conducted in social software group chats or in-person after data had been collected to make informed decisions. Clear goals were rarely set, instead, deadlines for deliverables sometimes were used. Some learners expressed that the need for controlling progress individually is low. One theory as to why there was no need for controlling members, that was mentioned during the interviews, was the common goal of finishing the task along with good communication leading to good results. Even though some interviewees expressed that members don't always finish their work on time, this was the preferred method.

Furthermore, results show that our interviewees all had a common understanding of how the structuring of group work is usually done in higher education when self-organizing and what software they used to do so. Radvic-Markovic (2010) shows that there are diversified ways to tackle problems and Clark & Mayer (2016) describe that E-learning gives learners the possibility to piece together their own unique learning experience. So, how come all our interviews conduct their tasks in a similar way without having worked together with each other and have a number of different software to choose from? Our interviewees didn't seem to have reflected upon how they conduct their work using software until we asked them about it, still, they preferred the same way of working to an extent. Prior knowledge can be used to solve tasks, as stated by Svinicki (1998), which may be the explanation to why our interviewees don't reflect on the matter.

### *5.1.3 Choice of Software*

Since the use of hardware does not differentiate between the learners, there is not much to reflect upon. Instead, more focus is put on the choice of software. If different hardware was used, we would (have) put more effort into understanding why and how it affects their group work during the interview.



Although the main focus of this study is on how learners use software, it is crucial to understand which software is used and how learners decide. With the help of Simon's model, understanding how learners identify problems and set goals in the Intelligence phase is possible. The Design and Choice phases are used to mainly analyse feasible alternatives provided in the previous phase to be later selected in the Choice phase.

We can see that the interviewees do not usually identify any problems with their software and instead kept using the same ones they previously used, even though sometimes they had to use other software to finalize text written in collaboration software. Arguably, the choice was made based on previous habits or knowledge and could be linked to a lack of options, interest in pursuing new software or being satisfied with the software and the way they work.

Since the choice of software is scarcely reflected upon and generally decided by a common understanding of which software to use, minimal analysis on feasible alternatives and selection was done in the design and choice phase.

## **5.2 Managing Information with Collaboration Software**

ICT, or Information Communication Technologies, are generally related to technologies that are used to access, gather, manipulate, present or communicate information (Lloyd, 2005). Our interviewees used ICT tools to communicate, collect and share data with their groups, with the primary software for communication being messaging services and synchronous services for document management in order to share, present and manipulate data.

As the technologies used were rarely mandated by the schools, the interviewees had free reins on the choice of software. Since new technological innovations usually take time for schools to adapt and even longer to be integrated in the learning curriculum (Zhao, Lei, & Conway, 2006), it can be argued that schools either have not caught up with the technologies used, enforced their own choices of software properly or adapted their use of technologies with learners.

The technologies used by our interviewees are not new and have been used by them for a long time. Their reasoning for using them can be argued to be based on habit and being satisfied with their functionalities, causing minimal reflection on why they use it. So the use of these software can be deemed to have improved their education in that pursuing new ways of communicating or working together is not a necessity, especially since the continuous chase for new technologies might also hinder learners and teachers from experimenting with and getting familiar with the pre-existing technologies (Zhao, Lei, & Conway, 2006).

### *5.2.1 Information Collection*

The data collection done by our interviewees and their groups is mainly done through their schools provided search tool. Google Scholar is used in combination with the schools' search tools or on its own. All interviewees use these mentioned tools to get information from reliable sources for their work, whether it is by recommendation by their schools, teachers or single-handedly chosen we do not know. We deemed that asking further questions about their sources for their group work would stray too far from our research on collaboration software usage and would create scope creep.

However, as the collection of data is an indispensable part of the societies of today with digital literacy being essential, especially in higher education (Zhao, Lei, & Conway, 2006).

Further exploration on how these tools are used and how learners decide on which tools to use can be made. This is especially true since access to information is not equal to access to knowledge and it is essential to select correct information that is of interest (Santos & Serpa, 2017).

### 5.2.2 Information Sharing

Learners have different preferences and ways for information sharing. Information sharing can also take different forms, for example, as a file, plain text for group work or a link to an article or website.

A common theme between all of the interviewees is using synchronous text documents in one way or another. Some interviewees use one synchronous text document for the whole project while some have several files for different purposes and share information on social software. Their reasoning for why they used a particular software was rarely discussed within the groups. As mentioned earlier in *5.1.3 Choice of software*, the choice is barely reflected upon. Arguably the same argument can be done for the selection and utilization of tools for information sharing. Further questioning on why they work in their particular way and how they perceive their way of working was not done as the focus was on how they use these software, further research on this topic could be made.

## 5.3 Communication with Collaboration Software

To communicate synchronously, the interviewees used chats, audio conferencing and video conferencing tools as the primary software. Hrastinski (2007) showed that learners are the primary users of messaging in CMC systems compared to teachers in his research. Even though the statistics used date back to 1992 with little data in recent years, the results correspond with the findings of our research with the interviewee having regular contact with the group members through different software, but only occasionally contact the teachers through email or Zoom. Zhu (2012) states that group discussions taking place is critical in education for learners' cognitive development. Educators' absence from partaking in these activities can be due to differences in the use of software, affecting the learning process.

The usage of the video conferencing software is mainly due to the Coronavirus limiting face to face visits, limiting meetings and seminars to being held online. Whether the usage of video conferencing software will stay the same after the pandemic is difficult to say and might require future research after the pandemic. It can be argued that learners use video conferencing software temporarily during the pandemic as they highly value face to face interactions. None of the interviewees had anything negative to say about their experience using video conferencing, for example, Person 2 (P2) even mentioned the value of the software and would use it more if the restrictions during the pandemic increased.

Google Docs is the primarily used software for writing by our interviewees, but it is also used in more ways than just sharing information and working on their group work. It is also used as a Computer-Mediated Communication tool with learners writing feedback, opinions and praise through the comment function in Google Docs. It can be used in both a synchronous and asynchronous manner, enabling discussion in a similar way as a chat or a discussion board. Hrastinski (2007) said that the main advantage of CMC is the ability for learners to communicate and learn from each other. Following that statement, it can be argued that Google Documents can be an adequate combination of an ICT-tool and CMC-tool used by

learners, depending on how it is utilized. It also shows that ICT and CMC might complement or blend with each other, depending on how a software is used.

### *5.3.1 Synchronous and Asynchronous Communication*

During this research, synchronous and asynchronous communication has been discussed, however since an asynchronous communication tool, can be used in a synchronous manner (Hrastinski, 2007) a synchronous communication tool, used as an asynchronous tool (Hrastinski, 2007), the definition gets blurred and software hard to define. One collaboration software that we found especially hard to define as either synchronous or asynchronous when speaking of communication is Google Docs. It is not typically a communication tool, but it is used by the interviewees both synchronously and asynchronously using the comment function as such.

Results show that synchronous and asynchronous tools used by learners are typically used in their respective way following the standard definition for synchronous and asynchronous communication tools, meaning a chat through social software is used synchronously, usually parallel while working together on their group work in a synchronous text document. Email was used asynchronously as a tool to communicate with their professor to ask questions or set up a video conferencing meeting.

## **5.4 Use of Learning Management Systems (LMS)**

One interviewee noted that the Learning Management System they used had the functionality that made it possible to communicate with other group members, share documents and access a synchronous file-sharing software. However, the interviewee never used their Learning Management System for these purposes as they were not sure about how it works and that it was easier to write to their group through other means. Arguably, Learning Management Systems per se are not forms of collaboration software. However, with these ICT and CMC enabling functionalities, it can be argued that LMS can be used as a collaboration software. However, only one interviewee used these functionalities, the other interviewees either didn't know or have never used software or tools provided by their Learning Management System. One interviewee argued that there is no need to use their Learning Management System to find the tools to use as they are easily accessed online.

Talavera and Gaudioso (2004) said that Learning Management Systems, which most E-learning platforms are, do not structure interactions performed in groups well compared to other systems. They also mention that this leads to a higher level of self-organising and more agile way of conducting group tasks (Talavera and Gaudioso, 2004). Our research shows the same result. The learners we interviewed mainly used their Learning Management System to get information about assignments and to turn them in. Since the interviewees, as mentioned earlier, either did not know or have never used software or tools provided by their Learning Management System, LMS was never used to structure interactions within the groups, instead; other software was used to do so.

The Learning Management Systems now compared to 2004 when Talavera and Gaudioso (2004) conducted their research, might have different functionalities. However, it is still not a tool used as a collaboration software according to our research even though it facilitates collaboration software functionality. Notation of the functionality shows that the Learning Management System has the capability to be a collaboration software but is not used in such away.

From the developer's point of view, having many features of the Learning Management System left unused could be problematic. It could be argued that having underutilized software or features could be costly in the way of having to maintain something that is not used. Although five interviews are hardly enough to state that these features are not used, it can be an indicator that it is something for the developers to investigate. One could argue that there are factors that cause the Learning Management Systems not to be used as collaboration software by learners. Some examples could be either lack of or difficulty in functionality, low user-friendliness, low accessibility, lack of information, lack of learner engagement or not being enforced by the schools.

## 6. Conclusions

Similarities could be found in how learners use software, both regarding what software they used and how they used it. The software used for communication is primarily social software in the form of chat and video conferencing tools, mainly Facebook Messenger or Zoom. Software used for structuring, monitoring and writing were synchronous text documents, primarily Google Docs.

Our study shows that activities performed with collaboration software by the interviewees indicate that the learner has a shared understanding of conventional processes in group projects. Learners used similar approaches when conducting group work with the main difference being working together or separately logistically. The social context regarding relationships could affect how learners used collaborative software, both which they use and how.

Furthermore, we concluded that the selection of software is mostly done without the assistance or consultation from the educator or schools. The research did also show that the interviewed learners barely reflect on which software to use. Learning Management Systems have the capability and functionality to be used as a collaboration software but is not used as such.

The results found in our research contributes to academic research and can be used by teachers in higher education and the creators of collaboration software. The contributions point to learners' attitude and approach to how they use collaboration software.

### 6.1 Future Research

We encourage other academics to replicate this study in different countries and regions to verify whether our results and conclusions can be verified on a larger scale.

This paper has been written during a pandemic; results can have been affected due to changes in learner's behaviour regarding collaboration software and its usage considering the circumstances during the pandemic. Therefore, we also encourage research regarding how the use of collaborative software differs during the pandemic compared to after.

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# Appendix A

**Transcript of interview with Person 1 (P1).**

**Date of interview:** 26/4.

**Interviewer:** Daniel Saxin (D).

**Length of interview:** 31 minutes, 18 seconds.

| #  | Speaker | Sentence   | Theme                              |
|----|---------|--|------------------------------------|
| 1  | D       | Okay, recording now. So, uh, before we start, uh, I would like to discuss and explain the meaning of some terms and abbreviation that we'll be using this interview. Uh, this is to reduce misunderstandings during interview and to make sure that we have the same understanding and interpretation of the terms.  | • Verifying unified interpretation |
| 2  | P1      | Alright.   |                                    |
| 3  | D       | And if you have any questions, just feel free to ask at any time during the interview. Uh, so the first one is collaborative software. Uh, it is a software that is designed to help people work together in groups. And during this interview, we will refer to collaborative softwares as softwares. Collaboration software can be everything from for example Google Docs, Facebook Messenger, Dropbox, Canvas. |                                    |
| 4  | P1      | Hm okay.   |                                    |
| 5  | D       | And the next word is learning management system. It is a software students use to manage electronic schoolwork. Uh, some examples of learning management systems are Canvas and Moodle. Uh, it is used for getting information about courses, communicate with teachers, sending assignments, etcetera. Any questions so far?  |                                    |
| 6  | P1      | Nope.  |                                    |
| 7  | D       | Alright, then let's get started with the interview. So, uh, at what university do you study?   | • Background of interviewee        |
| 8  | P1      | Lund University  |                                    |
| 9  | D       | And, what program do you study?  |                                    |
| 10 | P1      | Criminology, doing my bachelor.  |                                    |
| 11 | D       | Bachelor?  |                                    |
| 12 | P1      | Yeah.  |                                    |
| 13 | D       | And how long have you studied?   |                                    |
| 14 | P1      | Uh, this is my sixth and last semester so that will be three years now.  |                                    |
| 15 | D       | Okay. And, uh, have you participated in group tasks during your time as a student?   |                                    |
| 16 | P1      | Yes. In different, uh, projects or essays that are written together with others.   |                                    |

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| 17 | D  | Yeah, and uh, how many members approximately are doing these group tasks?  |  |
| 18 | P1 | Uh, usually around two.  |  |
| 19 | D  | Two?   |  |
| 20 | P1 | Yeah, we've been everything from two up to five or six.  |  |
| 21 | D  | Okay. So from between two to six?  |  |
| 22 | P1 | Yeah.  |  |
| 23 | D  | All right. All right. Uh, now I'd like to ask you some questions about the different stages you go through when you were working with group projects of any kind... So what would you say is the first task, your first steps you take when receiving a group?                         | <ul style="list-style-type: none"> <li>• Collaboration process</li> <li>• Use of Software</li> </ul> |
| 24 | P1 | Uh, usually one of the first steps are creating a group chat. Um. Probably on Messenger just to get everybody in and have one place where you can, uh, where we can communicate.   |  |
| 25 | D  | So you start of with a group chat on Facebook Messenger?   |  |
| 26 | P1 | Yeah, yeah. And uh, I mean to get a good idea about the subject we're working with. But yeah, a group chat to know what the project is about.  |  |
| 27 | D  | Okay, and how would you say that you use Messenger?  |  |
| 28 | P1 | Uh, we, we write like everything, like where do we meet up? Who does what? Um, if anybody has any questions about the project, eh, you can ask the question there and, uh, if, if we're not together then we just talk about it there. Um, so yeah, it's mostly the logistical stuff.  |  |
| 29 | D  | Okay. And, uh, after the first planning step, what would you do next?  |  |
| 30 | P1 | I guess we start, um, like you, a Google docs document. Where everybody just enters their Gmails and get access to, to the documents. And first, let's say you would make some sort of draft or just kind of jot down what we, want to write and want to discuss in the project.       |  |
| 31 | D  | So you write all this in the document?   |  |
| 32 | P1 | In the document. And then once we get started, we create a new document, a Google docs, and just start writing there. And then people have their parts, which we have decided before, either in, uh, in the group chat or just like by mouth. And, um, yeah, just continue from there. |  |
| 33 | D  | All right, so you have two Google docs, documents, one for finalizing the project and one for, just writing generally?   |  |
| 34 | P1 | Yeah.  |  |

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| 35 | D  | Alright. And, uh, after you started writing in the final docs document, what will you do next?   |                   |
| 36 | P1 | When we're done? When we're done with the final?   |                   |
| 37 | D  | Yeah yeah.   |                   |
| 38 | P1 | Uh, well, when we're done with that, I guess we'll. Basically just check the details that everything is okay.  |                   |
| 39 | D  | Okay, and what is the next step you take?  |                   |
| 40 | P1 | Uh, so yeah, when we're finished, we, um, look through the text, uh, several times just to find grammatical errors or if there is sentences that, don't make any sense. And if we're sitting together, everyone in the groups then we just, uh, basically just correct it without any further discussion. Maybe someones like, what do you mean by this part and it is easier to discuss that when you sit together. |                   |
| 41 | D  | Okay. Do you have another way of working if you are apart from each other?   |                   |
| 42 | P1 | if we're apart from each other? Um, and yeah, if we're apart, we probably wouldn't do the whole, um, uh, final, uh, the final adjustments beforehand. We would probably make comments in the, in the margin, in the Google docs documents. Uh, and then just make sure everyone looks through the document. And then we set a date where we meet up and we together, uh, finalize it.                                |                   |
| 43 | D  | And uh, these comments can be about what?  |                   |
| 44 | P1 | It can be about grammar, grammatical errors, but usually more about the sentencing structures and more like the actual subject. Like, I don't understand this argument, or we should use a, a reference here, etcetera.  |                   |
| 45 | D  | Uh, and the next step after you, establish the final document, so to speak.  |                   |
| 46 | P1 | So, and when the final document is finished, we, um, we proceed to, uh, to hand it in and the way you do that, is through Live at Lund which is the portal we use for that. The management tool.   |                   |
| 47 | D  | So you would say that Live at lund is your learning management system?   |                   |
| 48 | P1 | Yes, that's right. So yeah, basically we write our names on the project, on the essay, and then one person hands it in, uh, in the specific tab, which is on the, on the website.  |                   |
| 49 | D  | Uh, and, uh, what kind of hardwares do you use to, to use these softwares?   | • Use of Hardware |
| 50 | P1 | Always computers while writing and handing it in. For communication, uh, since we use Facebook Messenger, uh, I use both computer and cellphones.  |                   |

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| 51 | D  | Okay. So computer and cell phone for communicating. And, the computer for writing?   |   |
| 52 | P1 | Yes.   |   |
| 53 | D  | And, uh, how would you say, did you collect information for your group, uh, during group work?   | • Information Communication Technologies (Information collection) |
| 54 | P1 | Uh, yeah. We kind of set up tasks for everyone. Like when we first meet up, uh, we can like discuss the topic and then decide who does what. Uh, for example, I'm going to look up the background to this, uh, to this case, and uh, someone else focuses on the method we're going to use.  |   |
| 55 | D  | Okay.  |   |
| 56 | P1 | And then, uh, each and everyone look for different, um, like relevant sources that we can use. And then when everyone's done that, we kind of discuss it. And, uh. Yeah. Go decide if through that or if we have to do some more. Uh. I don't know. Some more searching to do.   |   |
| 57 | D  | Is there any software you use to collect information?  |   |
| 58 | P1 | um, mainly Google, uh, the search, Google search function. Personally, I've used to Google scholar sometimes Tyler and Francis.  |   |
| 59 | D  | What is Tyler and Francis?   |   |
| 60 | P1 | Tyler and Francis is a database where you can find, um. Well, the version I use is Tyler and Francis online. There you can find mainly, uh, scientific articles, um, and through, through Lund university, uh, the Lund university network, you can access the articles. Uh, yeah, quite a lot of articles for that site.                            |   |
| 61 | D  | Ok, so that's where you search for academic texts?   |   |
| 62 | P1 | Yeah. It's just when you're in school and you're connected to the wifi network, and you're logged into your Lund account, then you get access to several articles on, Tyler and Francis. But we also use Lund university. They have their own website with different, uh. With links to different databases and articles through uh Lubsearch. Yeah. |   |
| 63 | D  | Yeah yeah. And how uh, are these sites generally used?   |   |
| 64 | P1 | Look for information and uh, uhm, references or sources that can kind of support our arguments and statements.   |   |
| 65 | D  | Okay. Um, and how would you share information with your group?   | • Information Communication Technologies (Information sharing)    |
| 66 | P1 | Uh, so we have. You have the Google docs, um, with one document for the essay itself, and then we have more of a draft document or, um, just kind of write whatever you find   |   |

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|    |    | document where everyone then can write what they find. And, uh. Just put up links to different, different sources. Um, so that's more of a, uh, yeah, it's more of a, more of a document with all kinds of stuff that could be, could be useful.   |  |
| 67 | D  | So you save everything in your Google docs.  |  |
| 68 | P1 | Yeah.  |  |
| 69 | D  | Okay. Do you have any structure to do that, or are you just paste it all in or...?   |  |
| 70 | P1 | Well uh, there, there has to be some structure where maybe, let's say if we're writing an essay or a thesis, for example, then we can set it up so. Okay, so here's the background and set up it like, what sources do we need? Like what information do we need to present? And same thing with method, but then we have, we have these kind of headlines for each section of the thesis, but then instead of having actually having actual text, we have more like, I don't know, short sentence or keywords or links. So mainly just for it to be easy for it to be easy to, to, uh, on, uh, to find, to find, to get an ideal or what we're writing about. |  |
| 71 | D  | Okay. Alright. And how does your group evaluate different options? We're making decisions internally. So for example, deciding which assignments to do first or in which order to do them.   | <ul style="list-style-type: none"> <li>• Goal setting</li> <li>• Evaluation of alternatives</li> <li>• Govern group work</li> <li>• Structuring collaboration with software</li> </ul> |
| 72 | P1 | Well, I think most of the times we have agreed on looking at background information. Um, that is like searching for sources, relevant sources, articles, books, literature, um, social literature. Just to, uh, make sure there is information about the topic.  |  |
| 73 | D  | Hmm. Is this just for a thesis or generally?   |  |
| 74 | P1 | In general. Uh, well, if there's a presentation, you might not necessarily do this same amount of research and usually we have most of the material, uh, given to us. But let's say if write a thesis or an essay that we have a, want to have a good amount of background information. Um, if we're doing a presentation, it's more like we start from, from eight, from A to B. Very basic.  |  |
| 75 | D  | So, very structured?   |  |
| 76 | P1 | Very structured. we don't really need to start in the specific, um, in a specific way or order.  |  |
| 77 | D  | Do you have like, um. How do you decide who do, who does what?   |  |



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| 78 | P1 | It's more of like someone asks who wants to, who wants to be right about the background? And someone says, yeah, I can do that. And someone who wants to write about the method part? I can do it. It's basically just people saying what they want to do   |  |
| 79 | D  | Okay. Um, but are there any software that you used for this, uh, decision making? Like a chat or a voting system...   |  |
| 80 | P1 | So if we're not together, if not everyone's not able to sit together, then yeah, we'll just talk about it on Facebook Messenger. And occasionally we have done polls in the group chat to decide who writes what and who wants to write about this?   |  |
| 81 | D  | So you would have a poll with, for example, all the subjects and then the person who wants to work on that part votes for that?   |  |
| 82 | P1 | Yeah, exactly. uh, yeah, I think most of the times we've, we've been all sitting together and then it's just been easier to just discuss face to face what we want to do. But then, in regards to voting, we mostly vote on which dates to meet up or which dates to finish. So then we use polls in the Facebook Messenger chat, or occasionally we've done a Doodle, uh.                |  |
| 83 | D  | And what is a Doodle?   |  |
| 84 | P1 | Doodle is, yeah. You basically, it's like a poll. Basically, you put up a. What do you call it? It could be a schedule with different dates and people get to write, uh, the date that works the best.  |  |
| 85 | D  | Is uh, is that a website?   |  |
| 86 | P1 | It's a. Yeah, you can access it through Google.   |  |
| 87 | D  | Okay. Any other functions you used with Doodle?   |  |
| 88 | P1 | Uh, we have not really used that many.  |  |
| 89 | D  | Any other systems regards to communication or general use?  |  |
| 90 | P1 | Well, I have not for school, it was more for work for, for my group in the military, we had it, we had a Dropbox system that was mainly a schedule or a lists with people and how to contact them and everything like that. So that was more for for work, yeah.  |  |
| 91 | D  | Okay okay. Um, yeah. Going back to the question, uh, about collaborative softwares. Do you use any to plan, set goals, schedule or monitor work?  |  |
| 92 | P1 | So we basically use Messenger to plan, pretty much. Um, and to monitor the work, we use the Google docs as everyone can access it. Basically, we might want to have a separate document too that works as a planner where. Like, we want to accomplish this and this and this for this day and then this, this, this, and then this for that day, then this is the due date, for example. |  |

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| 93  | D  | So you have Google docs as a planner?   |  |
| 94  | P1 | Yeah. it's more about just writing notes in the document. Like, what do we want to have, well, we want to have done and what we want to be finished at a specific date.   |  |
| 95  | D  | Okay. Um. And you say you feel everyone in your group uses in the same way, or anyone else have like different approaches?  |  |
| 96  | P1 | No, I'd say everyone uses Google docs.  |  |
| 97  | D  | Okay. And, uh, how does your group work together logistically? Do like set a specific location and time to work simultaneously or do you set your own schedule and work at the pace you want and get it done by a certain time or a mix of both?  | <ul style="list-style-type: none"> <li>• Working synchronous or asynchronous</li> <li>• Govern group work</li> </ul> |
| 98  | P1 | Mix of both, but most of the time we all meet together physically. And then once, once we're sitting together, everyone works on their part in their own pace, and then we can ask each other for help and advice. Um, if we decide to work apart from each other. Uh, yeah, it's basically the same thing we work on in our same pace. And if someone has a question, we ask it in the, in the Messenger chat. Um. |  |
| 99  | D  | But do you set like a, say for example, if you're separate, do you set a time that everyone works together or do you just expect everyone to do their own work?   |  |
| 100 | P1 | In that case, we expect, I want you to do their own work.   |  |
| 101 | D  | So there's no continuous communication during this work?  |  |
| 102 | P1 | No. No.   |  |
| 103 | D  | No. Okay. And what is your preferred way of working?  |  |
| 104 | P1 | I prefer working together in the same room where we can talk to each other face to face easier. But yeah, the social part of it is fun and important, I think.  |  |
| 105 | D  | And how would you organize working with the group?  |  |
| 106 | P1 | Yeah. We decide like, who writes what? Uh, uh, and then everyone, people who choose their certain parts are expected to, everyone's expected to do their part.  |  |
| 107 | D  | Okay. And that worked fine in your groups?  |  |
| 108 | P1 | Yeah. Yeah. I never had a problem with that. And I mean, in case someone doesn't, doesn't do his or her part, it's usually, it's not that big of a deal.  |  |
| 109 | D  | And how would you say you give feedback to each other about their works?  |  |
| 110 | P1 | Um. Comments in the Google docs document, write in the margin, uh, about a certain paragraph or sentences, or if there's something that's not really clear and, uh, occasionally we write, we write in the group chat, the Messenger chat as  |  |

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|     |    | well. Um, like, yeah, I finished my part, if someone wants to read through it, that'll be great.  |   |
| 111 | D  | So usually you, you might seek feedback from others through the Facebook chat?  |   |
| 112 | P1 | Yes.  |   |
| 113 | D  | Okay. Um, speaking of Facebook chat or Facebook Messenger, do you use only the chat function or do you use voice or video conferencing?   |   |
| 114 | P1 | No, I've only used the Facebook chat.   |   |
| 115 | D  | Okay. And, uh, speaking of learning management systems, just to repeat, it is used for you to, uh, for example access courses, um, get information about courses and communicate with teachers, sending the assignments, get grades for the assignments, etcetera. Um, so, which learning management system would you say you use?  | • Learning Management System  |
| 116 | P1 | We use live at Lund, uh, for this program. Uh, we, yeah, we hand in all our assignments and we, um, we're able to find like all the literature. We need the schedule, how to contact our teachers. Um, what's included in the course in the courses. Uh. So, yeah, basically everything we needed, webs and chat to chat rooms on the, on that way I get that system.             |   |
| 117 | D  | Which function would you say that you use?  |   |
| 118 | P1 | Um, as a, right now?  |   |
| 119 | D  | Oh yeah, or generally.  |   |
| 120 | P1 | Generally that'd be the schedule or to, um, get the schedule or finding the literature, because usually a teacher puts up different, uh, pieces of literature or articles that we need to read. Um, and now it's only gonna be the, the "hand in assignment function", I guess, for our bachelor thesis. But yeah, other than that, but the, it's the schedule or the literature. |   |
| 121 | D  | And uh, how would you say that your group decides which softwares to use to do group work?  | • Information Communication Technologies<br>• Computer-Mediated Communication |
| 122 | P1 | Uh, it's not really that much discussion. It's more like, yeah, we set up a Google docs cause that's so common for everyone to use. It's not really any question about if someone just started starts it and uh, opens up the document. And then everyone adds their emails and then we share it with everyone in the group.  |   |
| 123 | D  | Okay. Have you tried any other softwares or would you like to try?  |   |
| 124 | P1 | I have not. I have not tried any other software except for like Microsoft word, but then in that case, you write in your own document, you don't write, you don't share with anyone else.   |   |

|     |    |  |   |
|-----|----|--|---|
|     |    | Um, but that can be used for like writing something and then pasting it into the Google docs document.   |   |
| 125 | D  | Okay.  |   |
| 126 | P1 | So you've got some sort of a draft of your part and then adjust it until you're happy with it in the word document account. Then you paste it. That's so, you know, the text in the docs doesn't get that messy.   |   |
| 127 | D  | Okay, so it's more like an offline draft you have, to later paste into Google docs?  |   |
| 128 | P1 | Yeah.  |   |
| 129 | D  | Any, uh, software for communication that you tried or want to try or?  |   |
| 130 | P1 | Uh, no. I think everything works so smoothly with the group chats, and Facebook Messenger and the, and the comments function in the Google docs that we don't, it's not really necessary to try anything else.   |   |
| 131 | D  | Okay. So you're, you're happy with those functions?  |   |
| 132 | P1 | Yeah. Very happy. Yeah. It's very, very nice to have it to working so easily.  |   |
| 133 | D  | All right. Um, and does your, um, learning management system, in this case Live at Lund, uh, provide any software you can use? For communicating or working.   | <ul style="list-style-type: none"> <li>• Learning Management System</li> <li>• Information Communication Technologies</li> </ul>  |
| 134 | P1 | No Live at Lund doesn't, doesn't provide anything like that. Google docs is, uh, it's, it's access by just finding it online on Google. Uh. And Facebook. Yeah. Facebook is Facebook and everyone has the Messenger app basically. So yeah, that's not really, that's never an issue. And there's nothing really, you need to find at Live at Lund somewhere else. Cause we always know where to find the programs as Google docs is on Google and Facebook is Facebook. |   |
| 135 | D  | All right. And yeah. Speaking of communication, um, which one would you say you use? Only Facebook Messenger?  | <ul style="list-style-type: none"> <li>• Learner to learner communication</li> <li>• Computer-Mediated Communication</li> <li>• Synchronous and asynchronous communication</li> </ul> |
| 136 | P1 | Mmm, yeah.   |   |
| 137 | D  | And why only Facebook Messenger?   |   |
| 138 | P1 | Because it's been, I've used for as long as I can remember. And, and yeah, it just, I think it's just a very common tool to, to  |   |

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|     |    | use, uh, both for school and privately. So it's, um. Yeah, I guess it's just what is the most common.   |  |
| 139 | D  | Okay. And how would you say that you use it?  |  |
| 140 | P1 | Uh, other than school, you mean?  |  |
| 141 | D  | Uh, no, mostly in school.   |  |
| 142 | P1 | Yeah. So in school stuff, it's, it's group chats.   |  |
| 143 | D  | Only group chats?   |  |
| 144 | P1 | Yeah, we never call each other.   |  |
| 145 | D  | Okay. Do you use some sort of software to communicate with your professors?   | <ul style="list-style-type: none"> <li>• Learner to educator communication</li> <li>• Computer-Mediated Communication</li> <li>• Synchronous and asynchronous communication</li> </ul> |
| 146 | P1 | Uh, that would be email. In that case, we, yeah. Email back and forth. And then we have kind of a group email function. So everyone in the group gets the same email from the teacher. Okay. Uh, and in these days where we can't meet physically, we have a, we have phone meetings so that we call our professor or professor calls us.   |  |
| 147 | D  | Which, uh, how do you call each other?  |  |
| 148 | P1 | Normal voice call. So there's no Zoom, there's no Skype, no video call. It's just a normal call.  |  |
| 149 | D  | To a number?  |  |
| 150 | P1 | A number yeah, yeah.  |  |
| 151 | D  | Why can't you meet physically?  |  |
| 152 | P1 | Uh, because of the Corona virus, it's preventing us to actually meet as it's not recommended. So, uh, uh, as of right now, our professor and us, we've decided that, yeah, we do, we'll have voice meetings. Um, no, I mean, cell phone meetings. Cause it's easier. I mean, but otherwise, if things were not as they are now, then we would meet physically yes. Meet up in their office, for example to just discuss our, our project. |  |
| 153 | D  | Okay, and for what purpose do you communicate with your teachers in the either email or calling?  |  |
| 154 | P1 | Yeah. It's to get advice on our projects. Are we doing this right? We need help with this. Just very you know, teacher students stuff. To get help or to get feedback.  |  |
| 155 | D  | And which way do you prefer?  |  |

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| 156 | P1 | Calling on email? I prefer, uh, calling. Uh, cause then you get, you get an answer straight away, you don't have to wait. And easier to understand when someones talking than writing cause you can interpret an email in different ways. Um, but of course, preferably we'll be meeting everyone in person.  |   |
| 157 | D  | Okay. Yeah. Then would you say that your software use differentiate between close friends and strangers in group work?  | <ul style="list-style-type: none"> <li>• Learner to learner communication</li> <li>• Computer-Mediated Communication</li> <li>• Information Communication Technologies</li> </ul> |
| 158 | P1 | No, in my experience we have all used Facebook Messenger to communicate, and I, I never written papers with, uh, with people that I don't know that well. Uh, it's mostly been like different presentations, uh, that are with strangers and in that case, we've never needed a Google docs. We've just communicated through Facebook Messenger, kinda decided, okay, we reads everything, and then we'll meet up at this time before the, uh, the seminar. |   |
| 159 | D  | Okay.   |   |
| 160 | P1 | Yep.  |   |
| 161 | D  | So you wouldn't say that the relationship with your group affect your choice of software?   |   |
| 162 | P1 | No, it doesn't really affect that much. It's a, I would say even if I, if we are, if we're writing a paper and it doesn't matter if we know each other well or don't. The norm is usually just to create a Google docs document and create a Facebook Messenger group chat.   |   |
| 163 | D  | Uh, well to wrap things up, are there any other tools you have used? Or, uh, something else that you would like to add that you think could help us in our research?  | <ul style="list-style-type: none"> <li>• Last statements</li> <li>• Learning Management System</li> </ul>   |
| 164 | P1 | Um, yeah, well, we had, we had this other, um, system that we use for another course in forensic psychology, uh, which I can't remember the name of it. Uh, unfortunately. Um,  |   |
| 165 | D  | Okay  |   |
| 166 | P1 | But I, I can, uh, I can update you once I find the name of it. (Name of program, later disclosed after the interview. Later mentioned as Luvit)   |   |
| 167 | D  | All right. Um, how often did you use, or what it was used for?  |   |
| 168 | P1 | Same things as Live at Lund, uh, turning in assignments, accessing literature, uh, contacting professors. Um, yeah, schedule, uh, and all that. So, same thing, same functions, just that I can't remember the name.  |   |
| 169 | D  | Okay. All right. Well, uh, thank you for participating in this interview.   | • Ending interview  |

|     |    |                      |  |
|-----|----|----------------------|--|
| 170 | P1 | Thank you very much. |  |
| 171 | D  | Thank you.           |  |
|     |    | (End of interview)   |  |



## Appendix B

**Transcript of interview with Person 2 (P2).**

**Date of interview:** 26/4.

**Interviewer:** Daniel Saxin (D).

**Length of interview:** 30 minutes, 23 seconds.

| #  | Speaker | Sentence  | Theme  |
|----|---------|---|--|
| 1  | D       | Okay. Recording. So, um, at what university do you study?   | • Background of interviewee                  |
| 2  | P2      | I study at Lund university, at the school of economics and management.  |  |
| 3  | D       | And, uh, what program do you study?   |  |
| 4  | P2      | It's a bachelor in informatics, information systems.  |  |
| 5  | D       | All right. Uh, how long have you studied?   |  |
| 6  | P2      | This is my third year, so for three years soon in two months.   |  |
| 7  | D       | Okay. Have you participated in group tasks during your time as a student?   |  |
| 8  | P2      | Yes. We actually do it kind of all the time and we only have individual work basically when we have exams. Otherwise it's always, almost always group tasks and group work.   |  |
| 9  | D       | All right. And uh, how many members approximately are doing these groups?   |  |
| 10 | P2      | It's usually around four or five. But uh, now when we're writing our paper, we are only two or three, but before it has always been four or five mostly.  |  |
| 11 | D       | So between two to six approximately.  |  |
| 12 | P2      | Yeah, kind of yeah.   |  |
| 13 | D       | Uh, now I'd like to ask you some questions about the different stages you go through when you're working in a group project. Um, so what would you say is the first steps you take when you receive a group task?   | • Collaboration process<br>• Use of Software |
| 14 | P2      | Yeah, after I've looked up the people in my group, I usually send them a friend request on Facebook, and then I'm making a group chat in the message application. Because that's, that's the easiest way to talk to everyone. And almost, everyone has Facebook, so, it's really easy and simple, so, yeah. |  |
| 15 | D       | All right. So you would say that Facebook Messenger is your primary use to contact people?  |  |
| 16 | P2      | Yeah. Yes. I would say always. Okay. Always Facebook Messenger.   |  |
| 17 | D       | Yeah. And, uh, like how would you use Messenger, like in chat, or video or voice conversations?   |  |

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|----|----|--|--|
| 18 | P2 | No, it's always just the chat functions. All right. Yeah.  |  |
| 19 | D  | All right. Yeah. And uh, well, for the next step?  |  |
| 20 | P2 | Um, do you mean that next step, like to book a meeting or like kind of...?   |  |
| 21 | D  | Yeah, step-by-step, what's your process from getting a group to finish it? Pretty much.  |  |
| 22 | P2 | Okay. So the next step would be to book a meeting or we could all meet and talk about the project or the task to see how we want to do it. We will do this through Facebook Messenger and then would meet in the school.   |  |
| 23 | D  | Are there um, like no options or willingness to discuss this over, over the software, so to speak?   |  |
| 24 | P2 | I would say that you can do it. I think Facebook Messenger has that function, but I have never been in that situation. It has always been that we just book a time and a place and then meet there and talk in person.   |  |
| 25 | D  | Okay, and then after meeting in person, what's, what you do after that?  |  |
| 26 | P2 | Like when we are together, we talk about the things we have to do and make a plan. And usually we like talk about how many times we want to meet and how often, and if we want to work from home as well. And usually we're meeting together pretty often most days, but some, yeah, some people usually wants to work from home as well, since they have the better focus when they're alone at home. And in those cases we, talk through Facebook Messenger as well, and only text, I would say. |  |
| 27 | D  | Okay. For planning and scheduling, do you use some software for that or do you do it, uh, vocally or like verbally?  |  |
| 28 | P2 | It's mostly verbally, but sometimes we just ask in the Facebook group chat too. Like, oh, how about we meet tomorrow at nine?  |  |
| 29 | D  | All right, and uh, when you start writing, how do you do that?   |  |
| 30 | P2 | It's almost always Google drive, but sometimes even, word online. Okay. I actually like word online better, but not that many people use it. So it's more often Google drive documents.  |  |
| 31 | D  | Okay. Yeah.  |  |
| 32 | P2 | And then we make a folder and put different files in this folder, like maybe a, a plan or the real paper or I don't know, sub tasks and stuff. So we have a folder together where we can put all the files that we have to share.  |  |
| 33 | D  | Okay. So you have a Google drive folder with different documents and pictures and stuff.   |  |

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|----|----|--|-------------------|
| 34 | P2 | Exactly.   |                   |
| 35 | D  | Okay. And how come you like word online more than Google docs?   |                   |
| 36 | P2 | I would say that Google docs is not like, the format is not that good as in word and word online can open it on your, um, on your computer. Like a real word document. So it looks just like a real document, um, on your, um, computer application, kind of. So you can use all the, all the good stuff that weren't available online on docs.  |                   |
| 37 | D  | Okay. But you generally use Google drive then, right?  |                   |
| 38 | P2 | Yeah.  |                   |
| 39 | D  | And how would you say that. Okay. For example, when you start working with your group, how would you, uh, organize it using Google drive? Like second step after creating the folders so to speak, and started writing.  |                   |
| 40 | P2 | I've heard that some people make like different files for different persons because they don't like to work in the same file. But I have never done that, that we are actually all of us always writing in the same file, the same document. Um, however, some people usually write in their own file based on their computer, and then they just copy paste it into the file afterwards. But I usually just write directly in the file. If that answered your question. |                   |
| 41 | D  | Yeah yeah. And after you have written together what you do next with the group or project?   |                   |
| 42 | P2 | When it's done you mean?   |                   |
| 43 | D  | Yeah, well. Or about to finalize it.   |                   |
| 44 | P2 | One person in the group downloads the file and make it, makes it to a word document and after that they do, like the last steps and see through, maybe like misspellings or some other form of things that needs to be fixed. Um, so yeah...   |                   |
| 45 | D  | So that's the one man job to get the structure of it.  |                   |
| 46 | P2 | Mmm, exactly.  |                   |
| 47 | D  | Okay, and what is the next step?   |                   |
| 48 | P2 | Then when it's done, we usually send it through Facebook Messenger to each other so we can look at it and see if everyone is happy with the results. Um, so we use the group chat again and when everyone's good, with it, and pleased we send it in to the teacher through, the portal and nowadays it's Canvas, before it was Live at Lund.  |                   |
| 49 | D  | Right, right. Okay. Uh, next question then. Um, so which kind of hardware do you utilize when you use these softwares?   | • Use of Hardware |
| 50 | P2 | I have a PC. Computer. Windows, yeah.  |                   |

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|----|----|--|---|
| 51 | D  | Um, and you used that both for work and when communicating?  |   |
| 52 | P2 | Yeah. The same or maybe when I use Facebook Messenger, I can also use my phone. My iphone, yeah.   |   |
| 53 | D  | What do you, what do you mainly used to communicate?   |   |
| 54 | P2 | Yeah. The communication is actually more often through my phone.   |   |
| 55 | D  | Okay.  |   |
| 56 | P2 | It's easier and I can do it on the run when I'm on my way somewhere or some thing.   |   |
| 57 | D  | All right. How'd you say, that you collect the information for your group, during group work?  | • Information Communication Technologies (Information collection) |
| 58 | P2 | Um, I use different webpages that we kind of have to use, uh, with, um. Better kinds of resources like Google scholar or Lubsearch that we can get through the university to find good resources.  |   |
| 59 | D  | How are they used?   |   |
| 60 | P2 | How I use them?  |   |
| 61 | D  | Yeah.  |   |
| 62 | P2 | Oh, what do you mean like that I...?   |   |
| 63 | D  | Like what is their purpose, why do you use them?   |   |
| 64 | P2 | Ah well, the purpose is to find the resources with the best background. You can see say, um, but in most truth worthy content maybe.   |   |
| 65 | D  | Um, and how would you share that information with your group? During your group work?  | • Information Communication Technologies (Information sharing)    |
| 66 | P2 | Usually I use my own resources, but if I find something, which I think is really good and really well, I would link it in the Facebook Messenger chat or I put the link in the file to Google docs document. So they, so everyone can see it and find it and use it. |   |
| 67 | D  | All right. Do you just copy the plain text into the document or. How'd you do?   |   |
| 68 | P2 | No, no. The link to the paper.   |   |
| 69 | D  | Oh, yeah. Yeah. But do you just copy the link to the paper straight into the document or do you structure it his own way?  |   |

|    |    |  |  |
|----|----|--|--|
| 70 | P2 | That's, I would say that it depends how far in the process we have come. Like in the beginning when we doesn't have that much, we don't have that much text, I would say it would just put that in the documents somewhere. But if we have some, like, I don't know, gotten some time and we'll have a bunch of texts. I can make a, a place in document named called, I don't know, "resources" or something, and then put all the links underneath.                |  |
| 71 | D  | Okay. And, uh, how does your group evaluate different options when making decisions? Uh, internally, for example, deciding which assignment to do first or in which order to do them?  | <ul style="list-style-type: none"> <li>• Goal setting</li> <li>• Evaluation of alternatives</li> <li>• Govern group work</li> <li>• Structuring collaboration with software</li> </ul> |
| 72 | P2 | Oh, I would say it depends on what kind of people are in the group. Um, do you mean like how we decide who it's going to do what?  |  |
| 73 | D  | Yeah sure, for example.  |  |
| 74 | P2 | Yeah. I would say if we are people where they don't like to make decisions. I would say that I would ask them kind of, what do you want to do. Uh what do you think it's more fun to do? And if they don't know, I would just say maybe, can you maybe do this part and see if we are all people that are like, like to take decisions and talk and discuss, you know, then I think it's easier in a way that people would just say out loud like I want to do this. |  |
| 75 | D  | And, uh, like for deciding stuff like this. Have you tried any, uh, software to do so, like communication? You communicate that through Facebook Messenger, I guess, right?  |  |
| 76 | P2 | In the chat or verbally.   |  |
| 77 | D  | So, um, do you mean verbally by in person or on Facebook?  |  |
| 78 | P2 | No, in person.   |  |
| 79 | D  | Okay. Have you tried any like voting system stuff on Facebook or other sites?  |  |
| 80 | P2 | No. No, I haven't.   |  |
| 81 | D  | All right. Um, do you use any sort of collaboration software to plan or set goals scheduled or to monitor your group work?   |  |
| 82 | P2 | No, not that much. In some group works, we can have a file in the folder in Google docs just to make like a checklist or something like this has to be done and it has to be done by this date.  |  |
| 83 | D  | Okay. Okay, so separate docs document.   |  |
| 84 | P2 | Exactly.   |  |

|     |    |  |  |
|-----|----|--|--|
| 85  | D  | All right. Okay. Nothing else to schedule or monitor?  |  |
| 86  | P2 | No, I don't think so. I usually have it all in my head haha. I have a, I have a, agenda and write it in paper too, where I write some notes, but no software.  |  |
| 87  | D  | Okay. And how does your group work together logistically? Like do you set the specific location and time to work simultaneously or do you work on your own schedule, um, and have a agenda on what to do or a mix of both?   | <ul style="list-style-type: none"> <li>• Govern group work</li> <li>• Working synchronous or asynchronous</li> <li>• Goal setting</li> </ul> |
| 88  | P2 | We usually decide who is going to do what and by what date it has to be done.  |  |
| 89  | D  | Okay.  |  |
| 90  | P2 | Um, and sometimes like, mostly often I would say we meet together and sit together so we can discuss questions that can come up during the time, etcetera, etcetera. But nowadays, when we have this virus thing, maybe we have to be at home some more and be at different places. And, uh, then we usually. Just message through Facebook or call each other for the phone to discuss.   |  |
| 91  | D  | Okay.  |  |
| 92  | P2 | Buth uh, I always have a plan, like if, by this day, it has to be done and you are doing this.   |  |
| 93  | D  | Okay. But what would your preferred way of working be?   |  |
| 94  | P2 | I would say that I would prefer to meet my group every day since uh, that's the best way for me to work and I have the best focus when I'm with the people and preferably in school. It's a good place to be because when I'm home, I have all these different stuff to make me unfocused, like to look at the TV or, yeah, make some lunch every half an hour. So it's easier for me to be in school with my group every day. Um, maybe for four hours and then you can go home and do the last things for today by yourself if you need to have a time for yourself too. |  |
| 95  | D  | Could you repeat how you organize working within your group?   |  |
| 96  | P2 | Mmm. How to organize the work?   |  |
| 97  | D  | Yeah.  |  |
| 98  | P2 | We meet up and discuss how we want to do it, how and who is going to do what and by when. And then we can, we write it down and a Google docs document so everyone can find it and see it. And. Um...  |  |
| 99  | D  | Do you write down who does what or...?   |  |
| 100 | P2 | Yeah. Yes. Always. Who's doing what since all the groups that I've been, then I feel that everyone has to participate and do   |  |

|     |    |   |                              |
|-----|----|---|------------------------------|
|     |    | their of the work. So everyone thinks it's a good way to see who has done what in the end. So that's why.   |                              |
| 101 | D  | Alright, and how would you give feedback on each other about their works?   | • Govern group work          |
| 102 | P2 | Sometimes I would do it in person and say, Oh, you did this part really good. It's really a really good text, for example, and other times I would just write a comment in the group chat or directly in the document.  |                              |
| 103 | D  | With the comment function in docs?  |                              |
| 104 | P2 | Yeah, just to let them know that this part is really good. Don't change it.   |                              |
| 105 | D  | And if something is, not good?  |                              |
| 106 | P2 | I would do the same, right. This is not that good. It needs to be developed or something.   |                              |
| 107 | D  | And that works out well with your groups, that way of feedback, giving feedback?  |                              |
| 108 | P2 | I would say so. Yeah.   |                              |
| 109 | D  | Alright, so, uh, speaking of, uh, learning management systems. Just to repeat, that's used to, uh, like getting information about courses, communicate with your teachers, sending assignments, get test results, etcetera.   | • Learning Management System |
| 110 | P2 | Hmm.  |                              |
| 111 | D  | So, um, are you using any kind of learning management systems for your school work now?   |                              |
| 112 | P2 | Like at this time, I don't use it that much, but we have Canvas, which is the system where we can talk to classmates and students and professors and they can read about assignments and tandem and etcetera. But now when we are writing our thesis. I don't need it too much, but I'm there like some, sometimes just to look at older papers and guidelines to see how to write different parts of the papers since it's a really big paper with many instructions. Before we did this big paper and we had the courses, I would say I used it more and to look up all the assignments and, um, like when I have class and who's in my group, etcetera. Everything to know about the tests are on, um the website. This was however Live at Lund at that time, and it had everything, I would say that I needed to do my work. |                              |
| 113 | D  | Do you feel that the Canvas or Live at Lund is way or like which would you prefer?  |                              |
| 114 | P2 | I haven't used canvas that much, but I already thinks that it's better. It's easier to use. It's more beautiful to look at and it's pretty easy to find everything I would say. And I think it's really good that the schedule on the, uh, on the webpage and you can connect it to your phone and to, and to different courses and put in your own plans and, uh, dates and meetings.  |                              |



|     |    |   |   |
|-----|----|---|---|
| 115 | D  | Is that a function you use?   |   |
| 116 | P2 | I haven't, I haven't that much, but I tried it and, uh, it was nice.  |   |
| 117 | D  | All right. Any other functions you use?   |   |
| 118 | P2 | No, it's mostly the part of looking up information about the task. And maybe find the email address to the professor if I need to ask them a question or something.   |   |
| 119 | D  | Okay. Um, and how do you usually decide which software to use for your group works?   | <ul style="list-style-type: none"> <li>• Information Communication Technologies</li> <li>• Computer-Mediated Communication</li> </ul> |
| 120 | P2 | Do you mean the, the softwares I talked about, like Facebook Messenger and Google drive, Google docs?   |   |
| 121 | D  | Yeah, yeah.   |   |
| 122 | P2 | I would actually say it has just happened automatically. Uh, I it, I don't know. Usually people just use Facebook. It just happens. No one really asks just what we do and it's kind of the same with Google docs, but sometimes I also ask them like, do you prefer Google docs or maybe word online or something else? And everyone's just like, Oh, Google docs seems good and they will just do it instead.   |   |
| 123 | D  | And why do you think everyone's just used to stuff?   |   |
| 124 | P2 | I, I'm not sure actually. Sometimes people say, Oh, I didn't know word online is a think, what is that? And sometimes they're just like: Oh, no, but that's the easiest one. Everyone has an account, you know, blah, blah, blah.   |   |
| 125 | D  | So like a former habit or like, uh the norm?  |   |
| 126 | P2 | Yeah, the norm, something that everyone does and has always done.   |   |
| 127 | D  | Okay. All right. Um, do you know if you're a learning management system, canvas in this case, provide any software or tools you can use for your group?   | <ul style="list-style-type: none"> <li>• Learning Management System</li> <li>• Information Communication Technologies</li> </ul>      |
| 128 | P2 | Ooh, I don't know, actually. No. No. I'm not sure. Maybe the schedule thing, but I'm not sure. I think we can actually, uh, I think, Mmm. They make like a page for the groups. So there's, you can find your group and in that folder or that page, you can put like documents and. You can, I think you can write to each other too. I haven't used it, but I think you can and maybe you can even connect it to Google drive or something. I have seen that function, but I'm not sure how it works. |   |
| 129 | D  | Okay, but you haven't tried this.   |   |
| 130 | P2 | No, no, I haven't.  |   |

|     |    |  |  |
|-----|----|--|--|
| 131 | D  | How come you haven't tried it, so to speak?  |  |
| 132 | P2 | I think it is because since canvas became a part of my school life, I haven't had that many group works, only two and the, the last one, the one I'm in now, it's only me and one other person's on, then it's, it's easier for me to just write to her since we are really good friends too.    |  |
| 133 | D  | Okay. Alright.   |  |
| 134 | P2 | Yeah.  |  |
| 135 | D  | And uh, do you use some sort of software to communicate with your professors?  | <ul style="list-style-type: none"> <li>• Learner to educator communication</li> <li>• Computer-Mediated Communication</li> <li>• Synchronous and asynchronous communication</li> </ul> |
| 136 | P2 | It's through gmail, since I think the university has a collaboration or something with them, I guess since everyone has a gmail.   |  |
| 137 | D  | So it's just email contact?  |  |
| 138 | P2 | Yes, yes, and sometimes now during this time, virus time, we use Zoom as well to have our meetings and stuff   |  |
| 139 | D  | Okay. And for what purpose?  |  |
| 140 | P2 | I have a meeting, I don't know, every second week or something to talk about the paper and how, how we're doing and what to do better. Usually we would have them in person, but we can't now since we can't meet, so that's why we're using Zoom instead. They have some seminar, seminars too. |  |
| 141 | D  | All right, using Zoom?   |  |
| 142 | P2 | Yeah.  |  |
| 143 | D  | Okay. And uh. Okay. And why can't you meet?  |  |
| 144 | P2 | Because it's kind of not legal haha. No, it's legal, but we shouldn't as we can get sick because of the, the Corona virus.   |  |
| 145 | D  | Right.   |  |
| 146 | P2 | Yeah.  |  |
| 147 | D  | So you would say that you mostly contact your professors for email?  |  |
| 148 | P2 | Yeah. And ask them about can we set up a meeting through Zoom or can, what do you think about this or that and, yeah.  |  |
| 149 | D  | All right. And, uh, do you feel that software use differentiate between close friends and strangers, both in the communication and writing?  | <ul style="list-style-type: none"> <li>• Learner to learner communication</li> </ul>   |

|     |    |   |   |
|-----|----|---|---|
|     |    |   | <ul style="list-style-type: none"> <li>• Computer-Mediated Communication</li> <li>• Synchronous and asynchronous communication</li> <li>• Information Communication Technologies</li> </ul> |
| 150 | P2 | If it differs, hmm, I wouldn't have a Zoom meeting with my friend since it's, I don't know, it's easier for us to just call each other with a phone, but Zoom is really, really good. So we should use that too actually, when we work from home, since we can share our screens and stuff, it's really good. But somehow we don't. Um, but it's really, uh, I, I always used to with people that are not kind of my friends. I would say like group works where I don't really know them, but only now during this virus time. Um, and when I talk, when I talk with my professors, of course, cause they want to see us. It wants us to use the camera. |   |
| 151 | D  | All right. Um, but do you think that using Zoom with your friends would be something you wanted to do or what to try?   |   |
| 152 | P2 | I think so, yes. But I don't know. Maybe only when we actually cant meet. Now we can meet and then, like most of the days, since we're only two persons, people, we can meet at home and have our work done. But I guess if it would get even worse, and if restrictions that say that we shouldn't meet at all, then I absolutely think that we should use Zoom. Cause then we can share our screens and, it's easier for us to discuss since we can show what part we are talking about and similar stuff.  |   |
| 153 | D  | All right. Um, speaking of the like new softwares you tried or something, um, are there any other softwares you want to try with groups or have used but like didn't work out or something?   |   |
| 154 | P2 | No, I don't think so. I, I have always loved technology. I think it's a really good thing and it works so good mostly most of the times but I'm pretty pleased with the software that I use now. And I think it's enough since I, I'm a really social person and I want to, and I need to meet the people that I, um, that I do to work with. Because of this, the software that I use now, they, are fine. I'm glad and I don't need more.   |   |
| 155 | D  | So you're satisfied with the software you use?  |   |
| 156 | P2 | Mm, In the way we organize the work yes.  |   |
| 157 | D  | Okay. Um, so just to wrap things up, are there any other tools that you use, we haven't mentioned or something you'd like to add that you think would help our research?  | • Last statements   |
| 158 | P2 | Okay. No, I don't think so. I think we talked about it though.  |   |
| 159 | D  | Alright. Alright. Well, uh, we just like to thank you for participating in our interview.   | • Ending interview  |

|     |    |                    |  |
|-----|----|--------------------|--|
| 160 | P2 | Of course.         |  |
| 161 | D  | Thank you.         |  |
| 162 | P2 | Thank you.         |  |
|     |    | (End of interview) |  |

## Appendix C

**Transcript of interview with Person 3 (P3).**

**Date of interview:** 23/4.

**Interviewer:** Daniel Saxin (D).

**Length of interview:** 25 minutes, 2 seconds.

| #  | Speaker | Sentence   | Theme                            |
|----|---------|--|----------------------------------|
| 1  | D       | Ok, recording now. Let's get started.  | Verifying unified interpretation |
| 2  | P3      | Yeah.  |                                  |
| 3  | D       | Okay. So before we start, we would also like to, discuss and explain the meaning of some terms and aggravations that we will use in this interview. Uh, this is to reduce misunderstandings during the interview and make sure that we have the same understanding, and uh interpretation of the terms. Uh, if you have any questions about them, feel free to ask and a time. So the first thing is collaborative collaboration software. It is a, a tool or a software that is designed to help people work together in groups. Uh, during this interview, we will refer to them as softwares. Collaboration Software can be anything from Google docs, Facebook Messenger, Dropbox, Canvas, for example. Any questions? |                                  |
| 4  | P3      | Like, programs to chat?  |                                  |
| 5  | D       | Yeah, uhm. Yeah softwares to chat and uh, share text, communicate, share files. Any of those.  |                                  |
| 6  | P3      | Okey. Yeah.  |                                  |
| 7  | D       | Seems clear? Or, any other thoughts?   |                                  |
| 8  | P3      | No.  |                                  |
| 9  | D       | Ok. The second term is learning management systems uh, this software students use to manage their electronic school task. For example, Canvas or Moodle. It is used to get the information about courses, communicate with teachers, sending in assignments and get test results. Any questions?   |                                  |
| 10 | P3      | No.  |                                  |
| 11 | D       | Ok. Let's get started with the interview questions. So, at what uh, university do you study?   | • Background of interviewee      |
| 12 | P3      | Uppsala University.  |                                  |
| 13 | D       | And what programme?  |                                  |
| 14 | P3      | Im doing my bachelor in earth sciences.  |                                  |
| 15 | D       | How long have you studied?   |                                  |
| 16 | P3      | For almost 3 years, so im on my sixth semester.  |                                  |

|    |    |  |  |
|----|----|--|--|
| 17 | D  | Alright, have you participated in any group work tasks during your time as a student?  |  |
| 18 | P3 | Yes, a lot of times!   |  |
| 19 | D  | How many members are there approximately in these groups?  |  |
| 20 | P3 | Two up to about ... five, I think.   |  |
| 21 | D  | So, generally between two and five?  |  |
| 22 | P3 | Yeah.  |  |
| 23 | D  | Okey, now I would like to ask you about different stages you go through when you're working in a group project of any kind. So what is the first step you take when you receive a group task?  | <ul style="list-style-type: none"> <li>• Collaboration process</li> <li>• Use of Software</li> </ul> |
| 24 | P3 | The first step... uhm, let me think. First we plan when to, to start working.  |  |
| 25 | D  | Yeah, do you use any software to do that?  |  |
| 26 | P3 | Yeah, we might use Messenger...  |  |
| 27 | D  | Facebook Messenger?  |  |
| 28 | P3 | Yeah, just to get the first meeting scheduled.   |  |
| 29 | D  | Okay... And what about after that?   |  |
| 30 | P3 | After that we meet up, we talk about how we want to do things, and we open a Google document and a Google Drive document. Which we work in together during the project.  |  |
| 31 | D  | And how do you use the Google Drive document?  |  |
| 32 | P3 | Well, we mostly put in our refined text, like you might work in Word individually. Then when you got something that you feel should be in the project you basically just print it in the document so other people can read it and have thought about it. |  |
| 33 | D  | Alright, what would the next step be? After putting in the refined text?   |  |
| 34 | P3 | Uhm, well, if we all have put in all of our refined text. Then we would read it and help each other out with language, concepts and stuff. But after were done with that in Google Documents, we always put it back into a Word document?                |  |
| 35 | D  | Ah okey, why do you do that?   |  |
| 36 | P3 | Because it is easier to use to uhm, make it look good. Creating a uhm... Innehållsförteckning? In english.   |  |
| 37 | D  | Oh yeah, a table of content?   |  |
| 38 | P3 | Yeah table of content. And page numbers, pictures - it's just easier to make the text fit with picture and create tables.  |  |

|    |    |   |   |
|----|----|---|---|
| 39 | D  | Ok, and after you finished your document, what do you do with it? Or what do you do with your group?  |   |
| 40 | P3 | Well, we might send it in. Or we talk in Messenger, you know. Should we send it in like it is now after putting it in a Word document. Usually I guess we have already met up, sitting in the same room when we send it in.   |   |
| 41 | D  | In what way would you say you use Messenger? Just to chat or voice..  |   |
| 42 | P3 | No we just chat   |   |
| 43 | D  | Okey, alright. And where do you send the documents?   |   |
| 44 | P3 | On eh, Studentportalen  |   |
| 45 | D  | Okay.   |   |
| 46 | P3 | So, it's our student portal where we can see, you know, courses and stuff.  |   |
| 47 | D  | Is that the Learning Management System you use?   |   |
| 48 | P3 | Uuh, yes, yeah thats the one we use.  |   |
| 49 | D  | Okay. And which kind of hardware do you see utilize the softwares? For example, a computer, tablets, smartphones  | • Use of Hardware   |
| 50 | P3 | Well on Messenger, might as well use both computer and smartphone. For my sake, when I work, it's always on computer.   |   |
| 51 | D  | Okay. Right... How do you collect information for your group during group work?   | • Information Communication Technologies (Information collection) |
| 52 | P3 | Ah well, if it's, um... it depends on the level of the work, you know, if I just want to know a certain concept that's not very challenging or in depth, you know, might just use Wikipedia to get an understanding of what I'm supposed to be learning. Yeah. But if it's a deeper projects, we often use, uh, the library search service from Uppsala university, which... in which you can find a lot of reports and books online. |   |
| 53 | D  | Okay. And how would you say that you're sharing information with your group? During group work.   | • Information Communication Technologies (Information sharing)    |
| 54 | P3 | Well, sometimes just, um, if it's a good a paragraph or something, just paste it into Google documents, to show somebody. Yeah. Uhm, sometimes we just send a link to a, to a book or a report through the Facebook Messenger.  |   |
| 55 | D  | Okey. So you would say you're using uhm, Facebook Messenger and Google docs to share information?   |   |



|    |    |   |  |
|----|----|---|--|
| 56 | P3 | Yeah, well, we have also used Discord now on our bachelor project. Me and my partner, just when we thought we couldn't be at the university, so we just sat and worked and talked at the same time.   |  |
| 57 | D  | Yeah... Why couldn't you be at the university?  |  |
| 58 | P3 | Ah, well, we thought they had shut it down because of the Corona virus. Apparently they hadn't shut everything down. So now, uh, we don't use Discord anymore.  |  |
| 59 | D  | But uh, how did you use discord? What is it?  |  |
| 60 | P3 | We used it to talk, to uh. It is a voice, voice chatting program.   |  |
| 61 | D  | Okay.   |  |
| 62 | P3 | Yeah.   |  |
| 63 | D  | And how does your group usually evaluate different options when making decisions internally? For example, deciding which assignment to do first or which order to do them.  | <ul style="list-style-type: none"> <li>• Goal setting</li> <li>• Evaluation of alternatives</li> <li>• Govern group work</li> <li>• Structuring collaboration with software</li> </ul> |
| 64 | P3 | Oh, how we decide. Um...  |  |
| 65 | D  | Yes. Like do you use some sort of, uh, uh, communication software like video conferencing or have a voting system of any kind?  |  |
| 66 | P3 | Well, I don't think we have come across that many uh, projects where we had to choose, you know, like, it's just, it usually, it comes naturally I think, you just start working haha. Maybe at the beginning of the program we did more of that, but I think we did it in person. But now we just, you know, I think everybody just knows what to do, you know, collect some information, we haven't really talked about it. |  |
| 67 | D  | Okay, so you would say that you have a common understanding of what to do so, so you don't use any software to decide?  |  |
| 68 | P3 | Yeah. Maybe, maybe a couple of words about it when we are in person getting the project, but we don't use software for it.  |  |
| 69 | D  | Ok. Yeah, uh, speaking of the question before. Do you use any sort of collaboration software to, to plan, set goals, schedule, or to monitor your group work?   |  |
| 70 | P3 | Well, we used a Google, what did we use... A Google spreadsheet to set up a schedule for, for the bachelor thesis, uh, for the work there. But, well, we have used Google documents too to set some dates.  |  |

|    |    |   |   |
|----|----|---|---|
| 71 | D  | How would you say that you use Google spreadsheet for the scheduling?   |   |
| 72 | P3 | Uh, well, we use, the rows, for days and the columns for times of different days. And then we just writes notes. And use colors to note weekends and holidays.  |   |
| 73 | D  | Alright um... And how would you say that your group work together logistically? Um, do you set specific locations and time to work simultaneously or do you set your own schedule and work at whatever time you think is best or a mix of both?   | <ul style="list-style-type: none"> <li>• Govern group work</li> <li>• Working synchronous or asynchronous</li> <li>• Structuring collaboration with software</li> </ul> |
| 74 | P3 | Uh, we usually set a time and a place.  |   |
| 75 | D  | To meet up or talk or   |   |
| 76 | P3 | Oh, yeah. To meet up, to meet up. We usually set the time and dates in Facebook Messenger.  |   |
| 77 | D  | Okay. So you would say that you're always working like synchronously, like together?  |   |
| 78 | P3 | Yeah.   |   |
| 79 | D  | Okay.   |   |
| 80 | P3 | We, we don't sit in the same room. We usually work during the same times.   |   |
| 81 | D  | So you don't sit on the same location uh, so to speak?  |   |
| 82 | P3 | Sometimes we do since the schools are open and it's uh, It's just better to sit together.   |   |
| 83 | D  | Okay.   |   |
| 84 | P3 | But with, you know, corona we don't do it as much.  |   |
| 85 | D  | Uh, what's your preferred way of working and why?   |   |
| 86 | P3 | Uh, in the same room, uh, together with everyone in the project so you can talk and discuss different topics and concepts. Uh, I think you learn a lot more about the subjects and get a deeper understanding if you do that. Otherwise, you might not keep track of what other people are doing, even if you have the same Google documents. |   |
| 87 | D  | Okay  |   |
| 88 | P3 | And I think you'll learn more about the subject as a whole. Yeah.   |   |
| 89 | D  | Do you think you could do the same thing, like doing a video conference or audio conference?  |   |

|     |    |   |  |
|-----|----|---|--|
| 90  | P3 | Yeah. I think you could do the same thing, but, uh, it wouldn't come as naturally and I think that it would be more distracting when people talk if they're all in a video conference or audio conference.  |  |
| 91  | D  | And how would you say you organize working within your group? Following that question about, uh logistics.  |  |
| 92  | P3 | Well, on the first meetup, we usually say, you know, I can take this part and I can take that part. Somebody researches some subject that we need. Somebody takes another subject. Usually everybody just starts with researching. And then, um. Well, we usually move it topic by topic and everybody works on it on the same time. Well, we, we can't really, like now with the bachelor thesis. We can't start on results until we have finished with our experiments. So we do the experiments together and then the results and then we talk about the results and then write the discussion together and make our conclusions together from that. |  |
| 93  | D  | Okay. And when you're saying that's you, uh, take a certain part of the task, do you write that down somehow? Or how would you communicate that?  |  |
| 94  | P3 | Well, that uh. Obviously when, when we start a project, we'll, we, we might feel that we need certain information to continue. So it comes pretty naturally. Well, and if somebody starts to work on our results with out the information. well then we might communicate that if we have met up. But if we're not together, well, then we might just write it in the Google document or, uh, in the Messenger, Facebook Messenger.   |  |
| 95  | D  | Okay. All right. So speaking of the learning management systems, Mmm. It is, the software you use to do school assignments that I've mentioned before. Just to repeat it.   | <ul style="list-style-type: none"> <li>• Learning Management System</li> <li>• Information Communication Technologies</li> </ul> |
| 96  | P3 | Yeah.   |  |
| 97  | D  | Um, and do you use any of these softwares? For example Moodle or Canvas.  |  |
| 98  | P3 | Well uh, Studentportalen? That's the same kind of software, right?  |  |
| 99  | D  | Yep.  |  |
| 100 | P3 | Yeah. Well, that's what we use.   |  |
| 101 | D  | Yeah. And how do you use it?  |  |
| 102 | P3 | Well, we, we usually get the assignments, you know, they tell us in a classroom that we get an assignment, but the documents for it are on the student portal and, you get all the instructions, what to do, maybe some, um, literature that can be handy. And then we have a part where you can hand in the assignments or part of the assignments with set dates and... Well, so you turn it in there and you get feedback there too.   |  |

|     |    |   |   |
|-----|----|---|---|
|     |    | And it might say that you're done or might say that you need to do something more and you get it all on the student portal.   |   |
| 103 | D  | Okay. Any other functions you use?  |   |
| 104 | P3 | Ah, well, it's the library search. Um, it's on there. It has the links for Ladok for the grades and to register to courses and, um, sign up for exams. And see, uh, the XM scores and grades.   |   |
| 105 | D  | And, uh, how would you say that you decide which softwares to use for your group works within in your group?  | <ul style="list-style-type: none"> <li>• Information Communication Technologies</li> <li>• Computer-Mediated Communication</li> </ul> |
| 106 | P3 | Uh, how we decide, well, usually, usually somebody just opens a Google document and says, well, here's the Google documents, because we all just. Kind of think that Google document is the easiest.  |   |
| 107 | D  | Okay. And why do you think that's easiest? Like do you have, have you tried anything else?  |   |
| 108 | P3 | Yeah, we've tried to share a document on word now or during the bachelor thesis. Um, it works, but it's, it doesn't update very frequently. Can take a long while. It might mess up the documents and it has done that a couple of times. Uh, the Google document is much better as it adjust updates very frequently. But, uh, we use Google in the beginning to write all the text and then we use the shared word document to make it look better, and to, work better for the final report. |   |
| 109 | D  | Okay. And about the other softwares uh, how, how did you decide to use Facebook Messenger?  |   |
| 110 | P3 | Well, I guess it's just because everybody has Facebook.   |   |
| 111 | D  | Okay uh. And does your learning management system provide you with any softwares you can use?   | <ul style="list-style-type: none"> <li>• Learning Management System</li> <li>• Information Communication Technologies</li> </ul>      |
| 112 | P3 | Like chat functions?  |   |
| 113 | D  | Yeah, chat functions or, uh, enabling you to do some text sharing, or something similar.  |   |
| 114 | P3 | I don't know. I don't think so. I haven't used any.   |   |
| 115 | D  | So uh, if there were any the information about it is, lacking?  |   |
| 116 | P3 | Yeah, but nobody's told me that there is, so I think there might not be any.  |   |
| 117 | D  | Okay.   |   |
| 118 | P3 | Yeah. I can't find any now when I'm looking.  |   |

|     |    |   |  |
|-----|----|---|--|
| 119 | D  | Okay. Speaking off the communication, what software did you say you used to communicate? Just to repeat   | <ul style="list-style-type: none"> <li>• Learner to learner communication</li> <li>• Computer-Mediated Communication</li> </ul>  |
| 120 | P3 | Facebook Messenger?   |  |
| 121 | D  | Yeah. Okay. Yeah. And how do you use it mostly?   |  |
| 122 | P3 | To chat, and uh setting dates and locations mostly. For studying.   |  |
| 123 | D  | Alright. And do you use some sort of software to communicate with your professors?  | <ul style="list-style-type: none"> <li>• Learner to educator communication</li> <li>• Computer-Mediated Communication</li> <li>• Synchronous and asynchronous communication</li> </ul> |
| 124 | P3 | Email. We have a. Well, we have a student email, uh, you can log into through the student portal. Also, I have, linked it to my, uh, regular email. So they send out the emails and they might write things on the course page on the student portal to communicate with us, but we can't communicate back to them there. |  |
| 125 | D  | Okay. So you can only send one way, text or email?  |  |
| 126 | P3 | Yeah, they can send that to us on the portal. Then we can send the emails to them.  |  |
| 127 | D  | Okay. For what purpose do you use it? To communicate?   |  |
| 128 | P3 | The emails?   |  |
| 129 | D  | Yeah.   |  |
| 130 | P3 | Well, to ask questions about assignments, if there are any unclear things or to ask questions about... Well concepts or information that I've come across that I don't understand. It doesn't happen very often because you know, you can usually find what you need somewhere else.                                      |  |
| 131 | D  | Okay. Um, and does software use differentiate between close friends and strangers?  | <ul style="list-style-type: none"> <li>• Learner to learner communication</li> <li>• Information Communication Technologies</li> </ul>   |
| 132 | P3 | No, no. When I've written reports with people I don't know, we've used Messenger and uh, Google docs aswell.  |  |
| 133 | D  | So you wouldn't say that your relationship with your group members affect your choice of what software?   |  |
| 134 | P3 | No.   |  |

|     |    |   |                    |
|-----|----|---|--------------------|
| 135 | D  | To work or communicate  |                    |
| 136 | P3 | No no.  |                    |
| 137 | D  | Okay. All right. Um, so just to wrap things up, are there any other tools to use that we have not mentioned or something that you would like to add that you think would help us in our research? | • Last statements  |
| 138 | P3 | No, I don't think so.   |                    |
| 139 | D  | Studying earth science are there any specific tools or software that you use specifically to do your research?  |                    |
| 140 | P3 | We'll not any specific communications, communication softwares except through those we have already covered.  |                    |
| 141 | D  | All right. All right. Lastly, we'd like to thank you for participating in this interview.   | • Ending interview |
| 142 | P3 | No problems.  |                    |
| 143 | D  | Thank you.  |                    |
|     |    | (End of interview)  |                    |

## Appendix D

**Transcript of interview with Person 4 (P4).**

**Date of interview:** 22/4.

**Interviewer:** Jesper Wedin (J).

**Length of interview:** 45 minutes, 17 seconds.

| #  | Speaker | Sentence   | Theme  |
|----|---------|--|--|
| 1  | J       | Okay. So at what university do you study?  | • Background of interviewee                  |
| 2  | P4      | Lund University in Sweden.   |  |
| 3  | J       | What program do you study?   |  |
| 4  | P4      | I'm doing my, I don't know. I'd say, I think I'm still at my bachelor's level, uh, of politics and economics candidate   |  |
| 5  | J       | Okay. And that's a program? Yeah. Okay. And for how long have you studied?   |  |
| 6  | P4      | Uh, in total? Two years  |  |
| 7  | J       | Okay. Two years. And during this time, have you participated in any group tasks?   |  |
| 8  | P4      | Yes  |  |
| 9  | J       | Okay. Uh, and the, how many members approximately would you say?   |  |
| 10 | P4      | There are in these groups, on average, I would say like around four in total, including me, sometimes five, maybe sometimes two and three.   |  |
| 11 | J       | Okay. So from two to five. Yeah. Okay, great. Now I would like to ask you some questions about different stages or the, the different stages you go through when working on a group project. So what is the first step you take when you receive a group task? Could you describe it for me? | • Collaboration process<br>• Use of Software |
| 12 | P4      | Could you start with point? If I'm, um, like if, if I'm friends with the people that I'm doing this with, I just text them on, uh, like I do a direct message on Messenger.  |  |
| 13 | J       | Okey   |  |
| 14 | P4      | Uh, and if I, if I'm not like friends with them on Facebook or something, I usually add them first and then send a text.   |  |
| 15 | J       | Okey   |  |
| 16 | P4      | Yeah thats the first thing.  |  |
| 17 | J       | Okey, and how do you know which the members in your group are?   |  |
| 18 | P4      | You usually get like included in groups by like the school's website, the school software, you pick your group and   |  |



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|    |    | sometimes people like random people join the group, but, and sometimes I ask my friends to do the group, like to join the group with me.  |  |
| 19 | J  | Okay. And do you know the name of a school software?  |  |
| 20 | P4 | It used to be a live@lund, but now it's a Canvas.   |  |
| 21 | J  | Okay. So after this first stuff of you getting a group Messenger them, what do you do?  |  |
| 22 | P4 | I usually, me or someone else shares a Google docs if we need to do like a PowerPoint or something, it might be like Google slides or Google Excel if we need to do something in the assignment that's like, that has to happen.  |  |
| 23 | J  | Excellent. And can you describe like how you work in Google docs and what the purpose for you working there is?   |  |
| 24 | P4 | The purpose is, to see the progress in real time and, I usually sit(with my group). But of course now it's more difficult to meet who group, like in a face to face situation. But I usually sit with my group and we all work with the same document, maybe adding like different parts. In a whole we work in the same document |  |
| 25 | J  | Okay. Um. and do you see any like, other functions that we use in Google docs? Outside of like, only getting the simultaneous text functions  |  |
| 26 | P4 | Yeah, I don't know if this is something to add here, but like, like the Google docs has like a spell correction.  |  |
| 27 | J  | Okey  |  |
| 28 | P4 | And you can add comments as well if, if something is unclear, but that's when you don't have each other like beside each other. So if I'm working from home and someone else's working from home, I can add a comment on the sidebar.   |  |
| 29 | J  | Okay and these comments, what, do you usually, what kind of comments do you usually?  |  |
| 30 | P4 | If something is unclear or if something is left out from the, from that part that I feel is, has to be there, it can like maybe give them some hints or maybe, make them be more, elaborate with their texts.   |  |
| 31 | J  | Okey, So you don't use any other form of communication when you like want to clarify your text or like leave these types of comments?   |  |
| 32 | P4 | Not in the same exact way, but sometimes I can write to them on Messenger as well. Okay. If I know the guy or the girl. I personally, I would be more comfortable.  |  |
| 33 | J  | Okay, so you're saying there's a difference if you know the person or not just to communicate?  |  |

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| 34 | P4 | Yeah, the like the, the comment is more anonymous or like more professional, I would say than direct messages for me at least.   |  |
| 35 | J  | So after you're taking the step to start writing in your Google docs, what do you do then?   |  |
| 36 | P4 | I'd usually like, I usually, try to, assign different, assignments, like, like sub, like, okay. If there's a, I don't know. If you need to write a text that includes four different countries. I don't know. We ask each member to write about one country, so the workload is shared equally.  |  |
| 37 | J  | Okay, so you make like a plan and the split the workload?  |  |
| 38 | P4 | Yeah, yeah.  |  |
| 39 | J  | Okay. Do you use any type of tool besides Google docs to split this workload?  |  |
| 40 | P4 | No   |  |
| 41 | J  | Okey, how do you monitor what each individual has done?  |  |
| 42 | P4 | By reading like the Google docs, and maybe it's not often that I actually like, uh, it's not often that I, like, how would I say it.. Actually confront people. if they're having, if they haven't worked enough, it's only, it's only like if someone is slacking, I might do their part, but, I would do their part before I would like tell them about it. I don't know. But there's not a good way for monitoring. |  |
| 43 | J  | Okay. So you would say there's a lack in monitoring and, you said, instead of a monitoring system, if someone is lagging behind you do the work for them.  |  |
| 44 | P4 | Yeah. So I know that there is a tool that you can check up on a Google docs. Like you can see how much people are active. One assignment that I did, I saw that one guy that he, he wrote like 10 words and I was like, what the fuck? But for me, like pointing that out is very intrusive, I would feel.   |  |
| 45 | J  | Okay, but do you use this tool?  |  |
| 46 | P4 | Only that time. Only because I suspected him slacking. It's not, there was nothing like, giving me a heads up. I found that out by because I wanted to.  |  |
| 47 | J  | Okay, so after you have done each parts, what do you do next?  |  |
| 48 | P4 | Preferably I would like, a couple days before we have our, maybe presentation or like when the assignment is do, I try to get everyone together and like do the finishing touches so everything as a follows red line. I don't know how to say it in English, but, yeah, so everything thinks sticks together, in a better way.  |  |

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| 49 | J  | Okay. And, do you do this in person where members are at the same location or do you do it in different rotation using some form of tool?  |   |
| 50 | P4 | In person, but with the, with the Microsoft, like with the Google docs.  |   |
| 51 | J  | With google docs?  |   |
| 52 | P4 | Yeah.  |   |
| 53 | J  | Okay. And after you have done this, what is your next step?  |   |
| 54 | P4 | Maybe doing like some rehearsing, if it's, a presentation, but that I only do it individually. Then maybe, like right right before we get up on stage, maybe a day before something we converse with each other. How long our takes will be and if it matches the time restrictions or, uh, And if it doesn't, maybe I need to add something. I don't know |   |
| 55 | J  | Okay. Do you use a software when presenting?   |   |
| 56 | P4 | Like stopwatch. Lika a digital stopwatch to see how far we come.   |   |
| 57 | J  | Okey. No presentation tool like powerpoint or anything like this?  |   |
| 58 | P4 | I do, I do but only if a had to. Sometimes its not necessary. Like if I have a seminar or something and there is no need.  |   |
| 59 | J  | How do you send your final work to your teacher?   |   |
| 60 | P4 | I don't know how to say it. Like the schools, software like either like live@lund before and now canvas. Just one of the group, one of the group members, eh, like uploads the PDF-file or something to the schools software.  |   |
| 61 | J  | Okey and which kind of hardware do you use these softwares on? For example a tablet or computer.   | • Use of Hardware   |
| 62 | P4 | A computer. A Mac Book Air. Sometimes I use the schools, like stationary computers. If I need to use a program that I don't have on my, yeah, my Mac book, I use the school computers, like programs such as SPSS, which is a statistic program. I would use the school's computers, but now I've downloaded it so I can use my own.                       |   |
| 63 | J  | Okay. And how do you collect information for your group during your groupwork?   | • Information Communication Technologies (Information collection) |
| 64 | P4 | It depends. It might by thought literature. It might be, like now for example, I'm doing like a research, a survey. I would post online, so people would like respond to this survey. But yeah, it could be any way.   |   |
| 65 | J  | Okay. And how would you describe, like how are they used when you're using them?   |   |

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| 66 | P4 | Sorry?  |  |
| 67 | J  | How would you describe, like how do you use them? How do you like create a survey?  |  |
| 68 | P4 | It could be like, I have only done one survey and that's through Google, Google, what's it called? Like the docs variant of a survey. Google forms. Google forms.   |  |
| 69 | J  | Google forms?   |  |
| 70 | P4 | Yes.  |  |
| 71 | J  | Okey great. How do you share information with your group members during work?   | • Information Communication Technologies (Information sharing)   |
| 72 | P4 | I would say within our, like Messenger group.   |  |
| 73 | J  | Okey  |  |
| 74 | P4 | Yeah.   |  |
| 75 | J  | Okay. So you only use the Messenger group. But you could say that you use Google docs as well because you like show comments there?   |  |
| 76 | P4 | Yeah.   |  |
| 77 | J  | Okey.   |  |
| 78 | P4 | But I would say like. Putting in stuff into the Google docs is, it's much more like, the text that you put there is more final than that you put in the Messenger group. The Messenger group is more like sporadic and you like toss different ideas with each other. But when you put stuff in docs, it's much more like, yeah, final. |  |
| 79 | J  | Okay, great. and how does your group evaluate different options when they are making decisions internally?  | <ul style="list-style-type: none"> <li>• Goal setting</li> <li>• Evaluation of alternatives</li> <li>• Govern group work</li> <li>• Structuring collaboration with software</li> </ul> |
| 80 | P4 | I would say....   |  |
| 81 | J  | I can mention an example if its easier to understand.   |  |
| 82 | P4 | Yeah  |  |
| 83 | J  | For example, deciding which assignment to do first or in which order to do them?  |  |
| 84 | P4 | I would say like through logic. What is more rational to start with or something. But I can, I would also say that some   |  |

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|     |    | people are better than deciding different stuff than others. Some people might control the flow. I don't know.   |  |
| 85  | J  | Okay. So one in your group takes charge and like decides for most?   |  |
| 86  | P4 | Yeah. In one way, but also, like other people can also question and they've, if the, like, the planning is very bad we might change certain stuff, but I would say a mixture between logic and one taking charge.  |  |
| 87  | J  | Okay, is some sort of software use to help with decision making. For example, communication software, video conferencing, or a voting system?  |  |
| 88  | P4 | Yes, like through Messenger, you, you could like arrange polls, before, but now I think they've removed it or they've like, they have done some maintenance. So now it's not possible. But I would say like, on Messenger polls.   |  |
| 89  | J  | Okey and do you use them?  |  |
| 90  | P4 | Yeah. But like, in our last assignment we use, like, I think it's called, PI charts, or I can't remember, straw poll.  |  |
| 91  | J  | Okey, and how did you use straw poll?  |  |
| 92  | P4 | It was me like, maybe taking charge of like, not making the decision, but, wanting the decision to be made. It was me this time, but one, one person, makes the options and and the, the whole group gets to vote. And if we have a majority on something, we can, we can do that way. |  |
| 93  | J  | Okey, Do you remember like, what was the incident that maid you used that?   |  |
| 94  | P4 | To decide like, like the question, the big, like what, what the poll is gonna or what the, the surveys are going to be about.  |  |
| 95  | J  | Okay, so the designing the subject almost.   |  |
| 96  | P4 | Yeah, yeah, yeah   |  |
| 97  | J  | Okay and do you use some sort of collaborative software to plan, set goals, schedule or monitor your group work?   |  |
| 98  | P4 | The only software that we use was the, like the teachers, the directives. We didn't like implement like sub goals or like goals of our own. We only did what the teacher was telling us to do.   |  |
| 99  | J  | Okay. So you didn't set any goals of your own? Did you make any plans or scheduling?   |  |
| 100 | P4 | No.  |  |
| 101 | J  | Okey. Did you make any plans or scheduling?  |  |
| 102 | P4 | Very like instinctive or like very, like how we would do it was like, okay, can everyone meet tomorrow at 12? Okay, and then you type yes or no? I don't know.   |  |

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| 103 | J  | Okey and what software do you use for that?  |  |
| 104 | P4 | Messenger.   |  |
| 105 | J  | Messenger?   |  |
| 106 | P4 | Yes, messenger groups.   |  |
| 107 | J  | Have you had any problems with that scheduling software? Like. If there's five people simultaneously saying five different, times has anything like that occurred?   |  |
| 108 | P4 | But if, if the situation calls for like. Clear cut answers, with the, with the person that I don't know from school I could use Zoom or Teams.   |  |
| 109 | J  | Okey and every time someone is not at the same location as you, when you have scheduled for an appointment, do you always use Google teams and Google docs to interact with them?  |  |
| 110 | P4 | If I know the person very well, I would call them like on Messenger or like a, a regular call, but yeah. Some, like if, if I, if the person is not like very, like, if I'm not super good friends with them, I might not even call them on teams. Just make them follow our google docs. |  |
| 111 | J  | Okay. and so it's not important that, they're on a teams call if they're not there?  |  |
| 112 | P4 | No, I wouldn't say so, but I, yeah. I would say there will, like the group wouldn't like them for them skipping out.   |  |
| 113 | J  | Okay. I understand. So to clarify, so if you knew the person better you, it's more likely that you use like teams, like teams to call them and otherwise they would just like be in the docs and work by without audio connection.   |  |
| 114 | P4 | Yeah.  |  |
| 115 | J  | Okey nice. How does your group work together logistically do you set like a specific location and time, where you work simultaneously or do you like have your own schedule and you can work at the time you want or is there a mixture?   | <ul style="list-style-type: none"> <li>• Working synchronous or asynchronous</li> <li>• Govern group work</li> </ul> |
| 116 | P4 | I would say a mixture and it's the, and it's the, it depends on how, how stressful the situation is. If, if the assignment is due tomorrow, then I would probably have everyone meeting, but if we have it in a week, we do it more sporadic.  |  |
| 117 | J  | Okey.  |  |
| 118 | P4 | Everyone can apply stuff to they want.   |  |
| 119 | J  | And how do you organize, your work when conducting your work, both, simultaneously at the same location and, at whatever time you want, apart from each other, how do you organize that?   |  |

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| 120 | P4 | It often like results in like people picking topics that they, or like sub, parts of the, the whole, assignments. Like, I want to do this one, so can I do it? Yeah. And everyone was fine with that. And then someone else picks something, different. And yeah, so on and so fourth. Okay. maybe by preference, maybe my preference.  |  |
| 121 | J  | Okey  |  |
| 122 | P4 | Yeah  |  |
| 123 | J  | And what is your preferred way of working and why?  |  |
| 124 | P4 | My preferred is like, people doing different stuff. But not like, but in a way, in a structured manner. Like people, we work towards the same goal, but we don't have to do, like, we don't have to discuss every single word that we have to put in the essay.   |  |
| 125 | J  | And how have you managed to get that structure that you described and still have the freedom?   |  |
| 126 | P4 | I would say like having a good dialogue with your group, like being very clear on what you're doing and why you're doing it.  |  |
| 127 | J  | Okey, do you use any software to have this dialogue?  |  |
| 128 | P4 | I think it's messenger again and google docs  |  |
| 129 | J  | Okey I understand.  |  |
| 130 | P4 | You do like headers   |  |
| 131 | J  | Okey  |  |
| 132 | P4 | And you write underneath it   |  |
| 133 | J  | Can you describe how you use these headers?   |  |
| 134 | P4 | I don't know if header is the right word  |  |
| 135 | J  | I understand, like the title of a chapter   |  |
| 136 | P4 | Yeah, yeah, yeah. You write, it can depend on super much. If we start by doing an assignment, we try to dissect the whole theme. What do we need to have in this text for it to, follow a red line or and don't know have to say it. But for like follow structured way, what types of aspects do we need to lift and don't, what can we leave out? And what type of theories can we implement in the text. Doing the headers, you can fill out text that describes it. And so, yeah. |  |
| 137 | J  | So you could almost say that there's two different parts of this right? Like one part you do with each other. Where do you structure everything and one you do alone?   |  |
| 138 | P4 | Yeah.   |  |
| 139 | J  | Okay. And the first part where you structure everything, do you do this in person?  |  |



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| 140 | P4 | Preferably with like a face to face conversation in person. But if, like, if it's a smaller assignment, we can do it, like with the software only.   |   |
| 141 | J  | Okey, and how do you do feedback to each other when you're doing the work separately?  | • Govern group work   |
| 142 | P4 | With comments in Google docs i would say, sometimes, if something is unclear you could use messenger.  |   |
| 143 | J  | I would like to talk about the learning management system now. Did you get an understanding of what the learning management system was from the intro?   | • Learning Management System  |
| 144 | P4 | Can you refresh my memory?   |   |
| 145 | J  | So a learning management system is a software student used to manage your electronic school tasks. So for example, I learned my system couldn't be Canvas or Moodle. It's where you get information about courses, communicating with teachers and sending assignments and get test results. |   |
| 146 | P4 | Okey   |   |
| 147 | J  | Do you have an experience working with one of these?   |   |
| 148 | P4 | Yeah, not that much, but Canvas , I'm starting to get the hang of it.  |   |
| 149 | J  | Okay, and you mentioned canvas. Is that the one you actively use?  |   |
| 150 | P4 | Yeah, like so maybe 80% of the time I have one course still one course on live@lund.   |   |
| 151 | J  | Okey so Canvas and Live@Lund.  |   |
| 152 | P4 | Yeah   |   |
| 153 | J  | And how would you say you use those? Like what functions and for what purpose?   | <ul style="list-style-type: none"> <li>• Learning Management System</li> <li>• Information Communication Technologies</li> <li>• Computer-Mediated Communication</li> </ul> |
| 154 | P4 | It's like a way to interact with the, with the, like, with, with my teachers, and my like mentors and everything. They write different stuff on it and I read it and try to do as I'm told.  |   |
| 155 | J  | Okay. Could you describe how you received the stuff they write in what form?   |   |
| 156 | P4 | It could be like, you could have, you get a, maybe a notification or a student email or something that. Made a mentor,, I don't know, like wrote an assignment to everyone or made a comment or something on canvas.   |   |

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| 157 | J  | Yeah. And these comments or these letters, are they sent out to all the class or just you? Do you have like any personal communication with your teacher?  |  |
| 158 | P4 | Only like if I have personal matters I would use my student's email and emailed them directly. But like a general notifying message, something that was super unclear to everyone, then the teacher makes a post on that writes a post on canvas.  |  |
| 159 | J  | Okay. And, information on it is sending you, in these kinds or types of situations?  |  |
| 160 | P4 | It could be anywhere from anywhere from like great job with the first meeting. Everyone passed, I don't know, something like that. To, it could be also be like, checkout this part of the website. And you can find like, uh. Different information that you need to have as a student. |  |
| 161 | J  | Okay, so feedback and information sharing?   |  |
| 162 | P4 | Yeah.  |  |
| 163 | J  | And do you use any other functions, like a returning assignments or stuff like that?   |  |
| 164 | P4 | Yeah, I do. You can do it like right there on the website. Just upload a file.   |  |
| 165 | J  | Okay, is there any more functions that you use?  |  |
| 166 | P4 | Mm, yeah. You have your, wait a minute. Your schedule. You can also find your schedule up there. Of assignments and also like lectures as well they can find on there.   |  |
| 167 | J  | Okey, and how do you decide which software to use in your group? Like how do, how do you make those decisions?   |  |
| 168 | P4 | By I would say by like past experiences, I've used Google docs during my whole, like two year student career. But also, if there's a new software that I need to use, such as Google forms that I never used before, I asked our mentor which one he recommends.                         |  |
| 169 | J  | Okay, and when we use let say Google docs, do you make that decision in your group, how do you make the decision in your groups to use google docs?  |  |
| 170 | P4 | I think everyone uses it. So there's never any objection of not using Google Docs.   |  |
| 171 | J  | Okay. And the decision to use a Facebook message?  |  |
| 172 | P4 | Both face to face on Zoom and also with a Messenger group.   |  |
| 173 | J  | Okay so choose your, if I, if I understand you correctly, you choose your software according to previous experiences, and if there is a new software that you need to use, you ask your teacher about what they recommend.   |  |
| 174 | P4 | Yeah yeah  |  |

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| 175 | J  | Okey I understand. And does your learning management system, like Canvas or Live@Lund, provide any software you and your group to use?  |   |
| 176 | P4 | Yeah. I don't think so.   |   |
| 177 | J  | Like that you actually use. Not like the stuff they provide. That you actually use.   |   |
| 178 | P4 | No I don't think so, I have like have a student's email and it's provided by, the university. And I also use like, like SPSS, as I mentioned before, the statistics program that is provided by the university, but I don't know if it's provided by the software, like Canvas or Live@Lund.  |   |
| 179 | J  | Okay. But it's provided by the university.  |   |
| 180 | P4 | Yeah,   |   |
| 181 | J  | I understand. And how would you say you use those softwares? Like how do you use the email?   | <ul style="list-style-type: none"> <li>• Learner to learner communication</li> <li>• Computer-Mediated Communication</li> </ul>   |
| 182 | P4 | I use it the same way as I would use my, like with like my other email. but the only thing, the only the differences. I'm only chatting with other students, email when it's students matters.  |   |
| 183 | J  | Okey and who do you communicate with through this email?  | <ul style="list-style-type: none"> <li>• Learner to educator communication</li> <li>• Computer-Mediated Communication</li> </ul>  |
| 184 | P4 | It could be like with my teachers or like if there's something I problem, there's a problem with my, I don't know. like the admin, the administrative, things like within institutions,   |   |
| 185 | J  | So talking with your teacher and regarding administrative work with your institution?   |   |
| 186 | P4 | Yeah  |   |
| 187 | J  | Okey, can you describe to me all the, like software used to communicate with your group. I know you said you use like Google docs for comments , Messenger to discussing and to create a, to, to start off to group projects. You also use email to communicate with your teacher, and and to your institution. Are there any more? Yeah. You said also the video, the video. | <ul style="list-style-type: none"> <li>• Learner to learner communication</li> <li>• Computer-Mediated Communication</li> <li>• Synchronous and asynchronous communication</li> <li>• Information Communication Technologies</li> </ul> |
| 188 | P4 | Teams and zoom. I'd use like all of the the Google software. It's like forms, sheets, PowerPoint, I don't know.   |   |
| 189 | J  | Okey.   |   |

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| 190 | P4 | Slides I think it's called. I can also use Excel if there is, another assignment that requires it. I use my usual word if I'm doing like a, a home exam like a, like an essay that I, where I'm not having a group. Microsoft word.   |  |
| 191 | J  | Okey and for what purposes would you say you use the video conferencing tools?  |  |
| 192 | P4 | To make decisions. I would say. Yeah. Like it gives a better, is a better medium than like Facebook Messenger. There's always some uncertainties when you only use texts, but if you get to talk to someone and even better seeing them, we can get more clarity, I would say.  |  |
| 193 | J  | Okay, so you use it to talk with, is it within, in your group?  |  |
| 194 | P4 | Yeah yeah   |  |
| 195 | J  | Okey, and we talked about this a little bit before. Does your software uses differentiate between friend and strangers.   |  |
| 196 | P4 | (Not understanding the question)  |  |
| 197 | J  | Like earlier you said something about you, if it's a stranger, you don't video conference and just let do google docs. Is there other examples of this that, you know?  |  |
| 198 | P4 | Short answer. Yes. Um. They do differ. I would really much more, I would, I would call one of my friends if I'm working with a friend of mine, like, it will be easier for me to call them, even though I maybe don't have to.  |  |
| 199 | J  | Okey  |  |
| 200 | P4 | But if, if the situation calls for like. Clear cut answers, with the, with the person that I don't know from school I could use Zoom or Teams.  |  |
| 201 | J  | Okay. So it's not only like dependent on if it's a close friend or a stranger, it's also dependent on if it's an important decision to make.  |  |
| 202 | P4 | Yeah yeah.  |  |
| 203 | J  | Okay. and like, is it just a frequency that differentiates, or is it a, what type of software that you use that differentiates?   |  |
| 204 | P4 | I would say like mostly the frequency, how often we would call each other. but also sometimes people don't know how to, like run the zoom meeting and maybe we can change the medium. Maybe not even have it. A video conference. Maybe we can only take it, on Messenger or like have the conversation Messenger. Then that may differ under some circumstances, if people don't know how to use the different softwares |  |
| 205 | J  | Okay to wrap things up are there any other tools you use that you have not to mention, the, or something else you'd like to add that you think could help us with our research?   | <ul style="list-style-type: none"> <li>• Last statements</li> <li>• Computer-Mediated Communication</li> </ul> |

|     |    |   | <ul style="list-style-type: none"> <li>• Learning Management System</li> <li>• Collaboration process</li> </ul> |
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| 206 | P4 | I don't know I don't think so something that I'm always annoyed with is, I don't know if this helps with the research, but I can, I just want to add it. Sometimes you don't even get to decide what group you're in. You get like put into a random random people. It's always difficult to, to find the person or to make the first conversation. Because for me, example, I will never answer. I will never like, see the. like a email sent by another student to my student email, in time like, I'm not , refreshing. I'm not sitting with my student email refreshing the site for new answers, so, okay. That's something that I found. was lacking in the Live@Lund. |   |
| 207 | J  | So you find it lacking, like that you don't get set off rights when your in a group.  |   |
| 208 | P4 | Yeah, it's not optimal  |   |
| 209 | J  | Okey, I understand. So instead you'd have to us, as I said before, use Facebook Messenger?  |   |
| 210 | P4 | Yeah. Sometimes even though I had to go to my teacher and like have them pointing out the students that I'm going to do the assignments with and that's bad.  |   |
| 211 | J  | Okay. would you like your teachers or the school to provide you with all the necessary software tools?  |   |
| 212 | P4 | Yeah, I would like what I want is done to have a good enough tool that I would like check every day or like, like having a good type of notification system.  |   |
| 213 | J  | Okey I understand.  |   |
| 214 | P4 | I think the Canvas is better than live@lund. But it took me like two days to see that one of the persons in my group, like had joined our group and we didn't know who that guy was. So it was very random.   |   |
| 215 | J  | So is it only like the setting up part and the notification, like the information from the school that is flawed and the, the like setup of the groups or would you also like, have all your tools in one place, like, in a, in a. Learning management systems. So you don't have to use, any like other communication tools or Google docs for, for writing?   |   |
| 216 | P4 | Yeah, both the, like the, the one that you said, like the second option was sounds very nice.   |   |
| 217 | J  | Okay. Okay. are there any other tools you can think of?   |   |
| 218 | P4 | No I don't think so.  |   |
| 219 | J  | Okay. if you think of anything, you can always contact with me after. and I want to thank you for participating in this interview   | <ul style="list-style-type: none"> <li>• Ending interview</li> </ul>  |

|     |    |  |  |
|-----|----|--|--|
|     |    | and I will be sending you a transcript of it later for you to read.<br>And, if you have any like concerns about it, just contact me. |  |
| 220 | P4 | Yeah okey.   |  |
| 221 | J  | Okey than I will stop the recording.   |  |
|     |    | (End of interview)   |  |

## Appendix E

**Transcript of interview with Person 5 (P5).**

**Date of interview:** 23/4.

**Interviewer:** Jesper Wedin (J).

**Length of interview:** 41 minutes, 42 seconds.

| #  | Speaker | Sentence  | Theme  |
|----|---------|---|--|
| 1  | J       | So now I'm recording. So, uh, at what university do you study?  | • Background of interviewee                  |
| 2  | P5      | I study at the Uppsala university.  |  |
| 3  | J       | Okey, what is your program and at what level do you study?  |  |
| 4  | P5      | I currently go my master's in industrial leadership and innovation, and I have one year left at university.   |  |
| 5  | J       | For how long have you studied?  |  |
| 6  | P5      | I've been studied, I studied for five years. First off, uh, one like base year. It's a year for. I'm reading up the natural science for having, like for being able to go for an engineering program, and then I went for industrial leadership, eh, in my bachelor. I moved to my masters in industrial management and innovation at Uppsala university later on.  |  |
| 7  | J       | Okay. have you participated in group tasks during your time as a students?  |  |
| 8  | P5      | I have participated in a lot of group works, a lot of courses that we can, the programs for, both from my bachelor and from my master consist of a lot of group works   |  |
| 9  | J       | How many members approximately are there in these groups?   |  |
| 10 | P5      | I think the teachers want us to be like, not to many, but not too less than every group. So around five, six person per each group. Approximately.  |  |
| 11 | J       | Okey, now I'd like to ask you some questions about the different stages you go through when you're working on a group project of any kind. So what is the first step you take when receiving a group task?  | • Collaboration process<br>• Use of Software |
| 12 | P5      | First off, I think it's very different depending on what kind of work you will do. First off, we have, like in some courses we have the opportunity to choose our group members ourselves. And then we usually like choose the ones that we know that we have been working with before and so on. But sometimes the teacher like divide us into groups. and the, then the first section will always be like an introduction. Everyone explains like, who are you, where you're from, what's your background? And so. And the the first phases, it's like you start to get to know each other. |  |
| 13 | J       | Okey and do you use any sort of software during this activity when you're getting to know each other?   |  |



|    |    |   |  |
|----|----|---|--|
| 14 | P5 | Yeah. First of it's a very freely and to choose what kind of software, It's usually the one who like creates a group on Facebook or on WhatsApp that has, has the opportunity to choose and everyone else's just following. And since it's no strict regulation on what kind of software you have to use the software depends a lot. So it's often on WhatsApp or Facebook,   |  |
| 15 | J  | Often on WhatsApp or Facebook?  |  |
| 16 | P5 | it's often on WhatsApp or Facebook.   |  |
| 17 | J  | And on Facebook, is it like Facebook groups or is it Facebook messenger?  |  |
| 18 | P5 | Facebook Messenger groups, just for chatting and the sharing documents.   |  |
| 19 | J  | Okey and do you use any other software.   |  |
| 20 | P5 | Yeah the WhatsApp and Facebook is often used for sharing documents, but the actual documents that we're writing is often in Google docs. Um, but sometimes some groups, in some groups we have like divided the work. So in person working on this part, person B on this part, and we set the deadline and like summarize all the document into one document, then just make use of Google docs because a lot of students prefer Microsoft Word. And then you can do your part, and one person summarize the whole thing and create the final documents.                   |  |
| 21 | J  | Okay, could I ask you like how do you use Facebook Messenger compared to Google docs when communicating?  |  |
| 22 | P5 | Yeah. Google docs has the, like the main focus on, to write down the the tasks given by the teacher. And Facebook is more like communicating, how should we approach this or do that? And we like schedule and put up standards throughout the communication groups of Facebook and WhatsApp.   |  |
| 23 | J  | You have mentioned scheduling and also structuring your work when you're not working on a Google docs. Could you describe for me like how do you schedule work and also how do you structure work when you're not working in the Google Docs?   |  |
| 24 | P5 | Google docs? Okay, so first off, when we're scheduling our work as a group throughout like Facebook and the WhatsApp, we usually like write just we have to do this, when, when can you like have the next meeting?, what should we do until the next meeting? And so sometimes in recent days with this Corona thing, we have been starting to use in this Zoom network where one student is like always giving us a link. It's just for, video calling, but we also have the WhatsApp and Facebook group, depending on which group it is. And what was the last question? |  |
| 25 | J  | I can get to that later, but can I ask another question regarding the Zoom, WhatsApp and Messenger? Is there a difference between how you use, WhatsApp, zoom and Messenger in like the content, you talked about the, is there a different purpose?  |  |
| 26 | P5 | The main difference is when you in Zoom, I have to fix my hair because there's a bigger camera. and the, The communication on   |  |

|    |    |   |  |
|----|----|---|--|
|    |    | WhatsApp and Facebook is mostly in the text forms. On zoom, we use like the communication, webcam, microphone, etc.   |  |
| 27 | J  | And like the, what you're talking about to do that differ? Do you talk about different things on the different softwares?   |  |
| 28 | P5 | Let me think.Yeah. The thing is when we have like a zoom meeting, we usually have like. Um, a test, like a explicit goal with the meeting, we are going to discuss this or that, uh, about the group work and so on, but in WhatsApp and Facebook, we can like ask each other questions during the, the time period. Um, and if something pops up in someone's head, they can always like, write them off. We don't create like a Zoom meeting for every small question, but for big ones, then zoom has a big role.  |  |
| 29 | J  | Okey great. And the, for structuring your work, when you're not using Google docs, you said the students have preferred ways of working by their own. How do you structure the work when you choose to do it like that?   |  |
| 30 | P5 | Yeah, mostly we, if we have like a group of six persons, we like to like divide this group into smaller groups consisting of two persons. So there's a team of two persons are responsible for a certain area. And for instance, if we have a like of group work, you should do a report on this. And we try to like divide the report into smaller areas and every, like a sub team is responsible for a smaller sub area.   |  |
| 31 | J  | Okay. Do you use any software, during this activity for structuring?  |  |
| 32 | P5 | No, no.   |  |
| 33 | J  | Okay. So how do you communicate with each other regarding the process made and what's going on?   |  |
| 34 | P5 | It depends. A lot of, it's a lot of trust. We trust each other that everyone is doing their parts of, eh, we don't like give updates on how it's going. We like, yeah, eh, we divide with set a deadline and everyone has to do their part into that, that deadline. If there's any obstacles that's forced the students and not be able to reach the deadline, then you like communicate through Facebook or WhatsApp and say, Hey guys, something came . Can we like extend the deadline or can someone come and help us in our like subgroup or something like that. |  |
| 35 | J  | Okey and that has worked so far?  |  |
| 36 | P5 | Im still alive so yes.  |  |
| 37 | J  | Now you have describe for me that you use Messenger, WhatsApp and Google docs   |  |
| 38 | P5 | Sometimes Zoom  |  |
| 39 | J  | Sometimes Zoom. Can you the next step you as a group take?  |  |
| 40 | P5 | The next step is often. Like we divide the task upon the subgroups and then one person is responsible for like, summarizing everything in a common document done and create   |  |

|    |    |   |  |
|----|----|---|--|
|    |    | references and so on. There's always like something that we have forgot or some tasks that we did not divide. We like kept it for, for later, and then we like come up with a plan on how we should approach this. Usually we are almost finished, uh, when everyone is finished with their, sub parts.                       |  |
| 41 | J  | And if you're not using Google docs. How do you guys, complete this step done?  |  |
| 42 | P5 | then one person is responsible for, for summarizing and the report, and every group members send their part to a specific person and who done like create a common, no no, he creates a document. In the Microsoft words, summarize it, create a PDF file and shares it in WhatsApp or Facebook or whatever.                  |  |
| 43 | J  | Okey after that, what do you do?  |  |
| 44 | P5 | Hand it on Studentportalen, which is the platform used for the university at Uppsala.   |  |
| 45 | J  | Okey great and after that you are done, right?  |  |
| 46 | P5 | After that we are done.   |  |
| 47 | J  | Okey, so which kind of hardware ....  |  |
| 48 | P5 | If there is no kind of presentation of some kind.   |  |
| 49 | J  | Okay. How do you, if there's a presentation, how do you do then?  |  |
| 50 | P5 | I think it's often one person that is more technical and think it's more fun to create like a PowerPoint presentation with pictures and effects on so on. So it's usually one person takes the responsibility of creating the entire PowerPoint and then everyone like puts in some words for their part in the presentation. |  |
| 51 | J  | Okey and what kind of software is used?   |  |
| 52 | P5 | Often Google presentations.   |  |
| 53 | J  | And which kind of hardware they use to utilize these softwares, for example, a tablet or computer?  | • Use of Hardware                        |
| 54 | P5 | I think most students use their laptop.   |  |
| 55 | J  | Okay. And you, how do you do?   |  |
| 56 | P5 | I use my laptop   |  |
| 57 | J  | For everything, for communicating and the whole process?  |  |
| 58 | P5 | Eh, yes, I just think it's a more easy to handle all the communication when you use like one hardware. So I have downloaded the WhatsApp group for, for my laptop, and I also have Facebook Messenger on my laptop. So I think it's more easy to use one hardware   |  |
| 59 | J  | Okey, how do you collect information for your group doing your group work?  | • Information Communication Technologies |

|    |    |  | (Information collection)                                       |
|----|----|--|--|
| 60 | P5 | What do you mean?  |  |
| 61 | J  | Like, uh, information? How do you get the information that you write about?  |  |
| 62 | P5 | It depends a lot of what kind of project it is, but mostly we search on Google scholar or eh, for scientific articles. Sometimes there's books that I can like borrow online. I can go to a library, borrow some books there, and the, some books I have at home already.  |  |
| 63 | J  | Okey, so the library and Google scholar.   |  |
| 64 | P5 | Yeah.  |  |
| 65 | J  | Okey, are there any other software you use than that?  |  |
| 66 | P5 | Yeah, the, the school has a function on university webpage where you can like search for scientific articles, but I think it's pretty similar for as the Google docs, no, Google scholar.  |  |
| 67 | J  | Okey and you use that as well?   |  |
| 68 | P5 | Yeah.  |  |
| 69 | J  | Okey. Uh. I know we talked about communication earlier, but can you describe to me how do you share information with your group members during your group work   | • Information Communication Technologies (Information sharing) |
| 70 | P5 | It is mostly on a common, like Google docs document or if we have like a separate, if you're like have the responsibility of part and then you usually go for your private offline Microsoft Word. The communication flow through the group of WhatsApp and Facebook where you share some texts on that, uh, if you have questions to put them there.  |  |
| 71 | J  | Okey and could you describe to me how you use google docs?   |  |
| 72 | P5 | Yeah. Through the web browser.   |  |
| 73 | J  | Okay. Yeah. And what are you writing on Google docs? Do you use the comment function?  | • Govern group work  |
| 74 | P5 | Yeah. Yeah. I really liked the comment function because if we have like divided the group. So two members writing in one document, or if the entire team is writing on a common document, it just easy to communicate through comments that you put. You can mark the text and then put a comment and read like, what the fuck do you mean here? And "I think you can develop this one further", and "this is a really good approach". "Remember to use it in the conclusion" that, you know, stuff like that. |  |
| 75 | J  | How would you describe the difference between communicating in Google doc comments and on, let's say, a Facebook Messenger and WhatsApp?   |  |

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|----|----|---|--|
| 76 | P5 | I think it's mostly reminders and correcting, correcting other people's work. I think it's mostly reminders and correcting, correcting other people's work.<br>Putting reminders of what you can use later on in the project. I think that's the main purpose of the comments for us as a group.  |  |
| 77 | J  | Okey and how does your group evaluate different options when making decisions? For example, deciding which assignments to do first or which order to do them.   | <ul style="list-style-type: none"> <li>• Goal setting</li> <li>• Evaluation of alternatives</li> </ul> |
| 78 | P5 | The one with the loudest voice decides.   |  |
| 79 | J  | Okay. They use some sort of software to make decisions, for example, communication, softwares, video conferencing or a voting system?   |  |
| 80 | P5 | No. I think the main argument throughout which project you should do first and so on is, uh, beside that, with the, uh, with the deadlines in mind.   |  |
| 81 | J  | Okey but your don't use any software to do so? You talk with each other in person? How do you do?   |  |
| 82 | P5 | Yeah, it depends. Because if you have like lectures where you, you meet and you sit, you physically meet, and then you have like face to face meetings. We can like gather off the class. Come on guys. Let's have a small meeting and we like to discuss the next thing and what we have to do and so on. But in these days with corona and everything, we don't meet like physically and therefore we always like decide on Facebook or for big meetings, we use the Zoom, and so on. |  |
| 83 | J  | Okey I understand, and do you use some sort of collaboration software when you plan set goals, schedule or monitor your group work?   |  |
| 84 | P5 | No, I think it's very independent for every individual because we, we have sometimes different courses. So the scheduling thing is, uh, very independent. How, how, when, and where you will do things  |  |
| 85 | J  | Okey and on setting goals, how do you set goals, do you do that?  |  |
| 86 | P5 | No, we don't. The goals is to finish the project.   |  |
| 87 | J  | Okey and how does your group work together logistically? Do you set a specific location and time to work simultaneously or do you set your own schedule and work at what time you think is best? Or is there a mixture of both?   | <ul style="list-style-type: none"> <li>• Working synchronous or asynchronous</li> </ul>                |
| 88 | P5 | Mixture of both. We usually have like one main schedule that we agree upon. A deadline we should meet at this time, at this location. Uh, but that's like, yeah. Very briefly, every single individual in that team have to like schedule their own things because we have other courses. It's important to have like a, a good schedule that you can follow and therefore every person in the group has to like put some time on the schedule for their parts.                         |  |

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|----|----|--|--|
| 89 | J  | Okey. Can you describe to me the difference between you working together simultaneously or, uh, by our own, like what do you talk about? Is there a difference in these kinds of working situations?   |  |
| 90 | P5 | Take the question once again.  |  |
| 91 | J  | So if, is there a difference concerning what you do, uh, when you meet up at a specific location and work together, or if you, uh, worked by your own from another location?   |  |
| 92 | P5 | I think this depends on what kind of group you work with. If there's a new group in the team, I think it's, it's pretty efficient. Eh, early on in the process. But, eh, I have like one team that I've been sticking with for a long time and we really know each other. And when we're sitting physical it together, we, we laugh a lot. We do jokes and eh, non-efficient things. And therefore, sometimes it's more efficient for me to sit for myself at home. Eh, studying and having the communication through Facebook, WhatsApp, or Zoom because I get more things done than if I'm sitting with the group and joking all the time. |  |
| 93 | J  | Okey I understand. Let me see here. And how do you organize your work when you're working apart from each other?   | <ul style="list-style-type: none"> <li>• Goal setting</li> <li>• Evaluation of alternatives</li> <li>• Govern group work</li> <li>• Structuring collaboration with software</li> </ul> |
| 94 | P5 | I don't really know how the other group members does, but I do it like first off, I, if there's a new project starting, then I take like a piece of paper. I write down everything that has to be done, every milestone, deadlines, and so on. And, uh, then I open my schedule and my computer. I use the Apple's schedule for Mac and iPhone, and then I like filling every deadline when I have to do what and so on  |  |
| 95 | J  | And would you say that you, each member in your group does this individually or do you organize something together as well?  |  |
| 96 | P5 | Uh, honestly, I don't think, yeah. Um, my group, I think it's only me and one more who, who has a, like a schedule the other ones just take the day as it comes. And therefore they might have a really stressful day later on when they have to like deliver several things for a project or several things for different projects.   |  |
| 97 | J  | Okay. So you set a deadline in the beginning of the group and you divide the group work and then everybody is on their own until the deadline?   |  |
| 98 | P5 | Mostly yes.  |  |
| 99 | J  | Okey and, this might be hard to answer them, but how do you give feedback to each other about your work?   |  |

|     |    |   |                              |
|-----|----|---|------------------------------|
| 100 | P5 | First off, there's two different kinds of feedback I think the first one is like what the person has done really good, and I think that we don't communicate that kind of feedback as much as we communicate the things that someone has done badly. So the feedback takes place, like on the Zoom meetings or if we're sitting together at school and, yeah, places just like that.  |                              |
| 101 | J  | Okey, so you do it like not face to face, but it's face to face and video conferencing. You, you're not using any formal texts, uh, when you give feedback?   |                              |
| 102 | P5 | No, because I, I think, yeah, writing feedback, it's not done through, uh, two sentences. It's, it requires a more, so I think it's more easy to take the feedback and when you talk to the person throughout a video call or a physical meetings.  |                              |
| 103 | J  | Okay. You've talked earlier on about, making comments in the Google docs when you're writing. Could that be considered feedback?  |                              |
| 104 | P5 | Oh, of course. But that kind of feedback it's more like, eh, small adjustments. "You can't write this". "You can't write that and so on". Uh, "think of this grammar", uh, "how the fuck do you formulate this sentence?" And so on. And then the explicit feedback through Zoom or physical meetings. It's more like, how can you approach this in a better way? Maybe you should like, think of this instead of this, or think of this and this, you know?  |                              |
| 105 | J  | Okey, I understand, So, or larger questions, are met in person and in videoconference and smaller adjustments in the Google docs?   |                              |
| 106 | P5 | Yes.  |                              |
| 107 | J  | Okay. now I would like to talk about learning management systems. A learning management system is a software students use to manage your electronic school task. Some examples or LMS are canvas or Moodle. It is used to get information about courses, communicate with teachers, send in assignments and get test results. Do you understand what a learning management system is and how we used it?  | • Learning Management System |
| 108 | P5 | Yes and yes.  |                              |
| 109 | J  | Okay. And, uh, which learning management systems have you used?   |                              |
| 110 | P5 | First off, Uppsala university has their own, eh, what was the name learning management system, namned Studentportalen. I don't know if it's something universal or if other, if it's another name behind it or something like that, but his name is Studentportalen. The teacher is like posting information. Yeah, about like the course memo, they post the lectures and results you hand in your works there and everything. So yes, we used it the last, but for one course there was a teacher who did not use Studentportalen . He used the Canvas and I think it was pretty much the same, but like it looked different and it was another web page. |                              |
| 111 | J  | Okay. And can you describe to me which functions you use and for what purpose in these Learning Management Systems?   | • Learning Management System |



|     |    |   |   |
|-----|----|---|---|
|     |    |   | <ul style="list-style-type: none"> <li>• Information Communication Technologies</li> <li>• Computer-Mediated Communication</li> </ul> |
| 112 | P5 | First off, I like to download every course document on Studentportalen . I think I will start to just talk about Studentportalen from now, but I will mean Canvas as well. I like to download everything from Studentportalen to have it on my personal computer for me to like organize it in a better way because I think, yeah, some teachers, it's like missing the competence of the organizing work.  |   |
| 113 | J  | Okey and do you use any other functions besides downloading information documents?  |   |
| 114 | P5 | Yeah, the hand in we usually hand in documents, report and,things that the teacher wants us to deliver thought Studentportalen.   |   |
| 115 | J  | Are there any other functions?  |   |
| 116 | P5 | The teachers communicate through, um, through "the wall". I think it's name, where they kind of like post information, but we also receive it through the email. Um, so I usually read it from my email instead, but then one thing that I really liked is that. Eh, notification area on Studentportalen where I can see, because we have like several courses. It's usually three courses at the same time and if one teacher posting something in their course, I have like a notification center that show me this is the most recent, uh, recent happenings on Studentportalen, where I can see that this teacher posted this document for this course and so on. At the same time, I don't like the notifications center because it gives me too much notifications. For instance, if I hand in a document, I would get like a three notification for the same eh, happening. |   |
| 117 | J  | Okey, So if I summarize, you mainly get information from the studentsportal and, you put in assignments there as well.  |   |
| 118 | P5 | Yeah.   |   |
| 119 | J  | Okey and that's it?   |   |
| 120 | P5 | That's it.  |   |
| 121 | J  | Okey, how do you decide which software to use when you're doing your group?   |   |
| 122 | P5 | You mean like Google docs? WhatsApp. Facebook?  |   |
| 123 | J  | Yeah. Like everything is it decided by you the students are assigned by the teacher?  |   |
| 124 | P5 | Yeah. It's decided by us, the students, because they gave us like the opportunity to sometimes choose our groups of self. If we have like the same group as we had the last project, we usually go for the same software for communication and that software  |   |

|     |    |  |  |
|-----|----|--|--|
|     |    | depends on who creates the group on for communication first. So if you create, if there's a formed group and you create a Facebook group before everyone else, then you use the Facebook group. If you create a WhatsApp group before everyone else, and then you use the WhatsApp group .   |  |
| 125 | J  | Okey, but have you used any other than the Facebook group or WhatsApp group, say like a new student, uh, is the first to create a group, but on a unknown software for you, do you start using that software then?   |  |
| 126 | P5 | Yes. Once, there is this guy, he's from Greece, he, he's, he had a company and they use another platform named Slack and Slack is a platform where you can create folders from where you name the folder for a project, project A. You can have another folder for project B. And if you have to communicate anything, share a file or anything, just comment, ask questions. You go to that folder of product a and you, you navigate to chat to sharing files and so on. It's a way of making everything easy, but the thing is, I did not like the Slack platform because it was too, messy too much to many folders to manage things to do. I like having Facebook, WhatsApp, then have like Google drive for sharing documents. |  |
| 127 | J  | Okey, But, but just still used the Slack because he was the first one to suggest a software?   |  |
| 128 | P5 | Yes, exactly. And he was so confident in, in that we would like it so, and we gave it a shot.  |  |
| 129 | J  | Okay. So if I understand you correctly, the main way you use the software is that the, the first person in the group, uh, chooses his or her preferred software and then sends out an invitation to the other in the group?  |  |
| 130 | P5 | Yeah and if there is a, a new group, um, that is formed and you don't know the members in beforehand. There's always one person that creates a Facebook group because it's easier to navigate through the search function on Facebook to find the names of the group members and then collect them. But if you have like the phone numbers of the group members, it's easy to create their WhatsApp group.   |  |
| 131 | J  | Okay. Understand.  |  |
| 132 | P5 | Do you see the pattern there? If there is a new group, it's open on Facebook. If there is a new group with members that you already know, it's often WhatsApp.   |  |
| 133 | J  | Okay. I'm going to come to, uh, later in the interview we'll talk about like different software use, uh, between close friends and versus strangers. But for now, could I continue asking questions about learning management systems?   |  |
| 134 | P5 | Of course  |  |
| 135 | J  | Uh, okay. So, does your learning management system, such as canvas or Studentportalen provide you, uh, any software? And do you use the software in the groups?  |  |

|     |    |   |   |
|-----|----|---|---|
| 136 | P5 | I don't really know, we do not use any software provided by studentportalen or canvas, but honestly, I don't know if there is any software provided by Studentportalen or Canvas.   |   |
| 137 | J  | Okey, I understand. Now I'd like to continue to talk about communication. I think we have talked a little bit about it, but can you go through again, like, do you use some sort of software to communicate with group besides what you already have mentioned?   | <ul style="list-style-type: none"> <li>• Learner to learner communication</li> <li>• Computer-Mediated Communication</li> </ul>   |
| 138 | P5 | No it's Facebook, WhatsApp, Canvas, Studentportalen and Google Docs.  |   |
| 139 | J  | Okey, and when you communicate with your professor, how do you do?  | <ul style="list-style-type: none"> <li>• Learner to educator communication</li> <li>• Computer-Mediated Communication</li> </ul>  |
| 140 | P5 | Nowadays, we email a lot because we are forced to stay home. forced to, not physical and meet, but, a regular school day we communicate with the teacher by attending the lecture and also afterwards, but uh, in some courses there, like one lecture a week and so on.  |   |
| 141 | J  | And what do you usually talk about when you're communicating via email with your teacher?   |   |
| 142 | P5 | The communication with the teacher is usually about stuff that you don't really get. What are the, what, what is it that we have to do? Eh, how much do you like it and need from us? Some questions like that.   |   |
| 143 | J  | Okey, It's more getting to know what the assignment actually is and what the teacher expects from you?  |   |
| 144 | P5 | Yeah.   |   |
| 145 | J  | Okey. Now we can get back to talk about the different software use between close friends and strangers. So, uh, does your software use differentiate between close friends and strangers?   | <ul style="list-style-type: none"> <li>• Learner to learner communication</li> <li>• Computer-Mediated Communication</li> <li>• Information Communication Technologies</li> </ul> |
| 146 | P5 | Yeah. Well, as I said with the study buddies that I can name a friends that I have the phone number of, then we usually create like a WhatsApp group. But if there's a new, a group with like members you barely know you, you find the name of Facebook. someone creates a Facebook group for communication. Because it's more easy. |   |
| 147 | J  | Okay. And do you have any other example of different use between a software regard to close friends or strangers?   |   |

|     |    |  |   |
|-----|----|--|---|
| 148 | P5 | Sometimes, yeah. I have like one friend from my bachelor that is, attending this master program together with me. . And, uh, we, we have like, developed a friendship. So for us it's okay to call each other if we have any questions. So the, the phone has a significant role in the communication with him   |   |
| 149 | J  | Okey, could you say that you, it's not only the, the medium of communication, like say phone versus Facebook Messenger, is there a difference in the frequency of communication as well?   | <ul style="list-style-type: none"> <li>• Learner to learner communication</li> <li>• Computer-Mediated Communication</li> <li>• Synchronous and asynchronous communication</li> </ul> |
| 150 | P5 | Can you take that question again?  |   |
| 151 | J  | So, uh, you described to me that they use the phone when you talk to close friends and you use a Messenger when you talk to people you don't know as well. Is there a difference between when you're talk to a stranger and you talk to a friend in how often you speak to them? Like how often you communicate.   |   |
| 152 | P5 | Yeah. I think if you are in a project with the group members that you've, you can call friends that you have done a lot of group works with. then you can, like, if you have a question you immediately send, the question throughout the WhatsApp group or Facebook. But if there is a new formed group and you have a question, then I would go to a friend or someone in another product group and ask, how did you approach this one? So, so I, I investigate a lot more in the question before asking the group members. And that is probably a because in a new group you don't want to look or have the view of being stupid or something like that |   |
| 153 | J  | Okey, I understand. And to rep things up are there any other tools that you use that we have not mentioned? Or is there something that you would like to add, you think would help to in our research?   | <ul style="list-style-type: none"> <li>• Last statements</li> </ul>   |
| 154 | P5 | No, I, I think, yeah, we have covered all the software that I use, including physical meetings.  |   |
| 155 | J  | Okey, great, then lastly, I would like to thank you for participating in this interview. I'll be sending you a transcript of this interview for you to check out and, uh, yeah, thank you.   | <ul style="list-style-type: none"> <li>• Ending interview</li> </ul>  |
| 156 | P5 | Welcome  |   |
| 157 | J  | Then I stop record.  |   |
|     |    | (End of interview)   |   |