

Understanding the process of innovation through a  
sociocultural framework

*A case study of an organizational workshop within an oil  
industry company*

Lotte Furuvik Sand



Master Thesis in Education  
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# Abstract

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<b>By:</b> Lotte Furuviik Sand	
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Lotte Furuviik Sand

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# Abstract

The purpose of the thesis is to investigate the collaboration within an organizational workshop where the aim is to achieve an understanding of which factors influence the initial phase of the process of innovation. I seek to understand how the group collaborate through communication within the dialogue, and how they construct knowledge and generate ideas within the collaborative activity.

Innovation processes are in the literature identified as an important priority for competitiveness of organizations. As further referred in the thesis, organizations are meeting new challenges in terms of changes within our society, innovation is therefore considered critical regarding competitive advantage. Practitioners and theorists have traditionally focused mostly on earnings and the result of the innovation process. The initial phase of innovation is not that often the primary focus in spite of that is where businesses possibly can achieve the greatest benefits. The thesis is therefore investigating creative processes that occurs in the first phase of a process for innovation, which often can be invisible when evaluating the result of the innovation process.

Innovation and creativity are two concepts closely related to one another, which will be further emphasized in the thesis. Creative ideas are perceived as central contributions regarding innovation work. Creative solutions require some kind of activity of problem solving, and even organizations we do not immediately think of creative are in fact, active problem solvers. Through a sociocultural framework, the data material is analyzed and discussed in light of contributions from the representational spaces of Glăveanu (2011; 2014), basic sociocultural concepts from Vygotsky (1978; 2004), the notion of dialogism of Bakhtin (1981; 1984; 1986), knowledge activist and tacit knowledge from Nonaka, Toyama and Konno (2000) and resourceful practitioner from Edwards (2005; 2010). The sociocultural perspective on creativity was chosen on the basis of a throughout review of the research field, where the lack of group oriented studies in relation to sociocultural understanding was appearing.



The main question which frames the thesis is:

*How does a multidisciplinary group generate creative ideas through collaboration in the initial phase of the process of innovation?*

The data material in the thesis consists of a video from the conducted Workshop, as well as interviews with two of the team members from the Workshop. The analysis is divided into four themes, which is a result of a thorough review of the available material. The different themes are:

1. Conduction of the Workshop (descriptive)
2. Inquiry and exploiting of existing knowledge
3. Communication characteristics
4. Creating a room for creativity

The result of the study indicates that sharing knowledge was crucial for development of creativity. The collaboration was characterized by an aim of reaching a common representational space, but it was also tension within the group, which is referred to Bakhtin's (1984) concept, alterity. In addition, moderate criticism and informal communication appeared during the Workshop, and is recognized as crucial factors in terms of preventing and stimulating the collaborative activity and the generation of ideas. Visualization seemed to impact both the creation of understanding, but also in relation to unleash assumed crucial knowledge.



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Oslo, June 2016

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# 1 Introduction

## 1.1 Actualization

During the past decade, it seems to have appeared an increasing focus on the ability of being creative and innovative within our society. Due to the challenges through the development of new technology and knowledge, as well as frequent changes within different industries, they are considered as crucial abilities in relation to meeting these challenges (Sawyer, 2012).

An emphasis is placed on creativity and innovation as a major contributor for organizational success, and innovation has become more important with respect to organizational performance and long-term survival (Anderson, Potočnik & Zhou, 2014). The research field also reflects this increasing focus. However, traditionally, the concept of innovation and creativity has been limited to fields such as music and arts where the individual genius has been positioned as the source of the creative result (Sawyer, 2012). In modern times, numerous of fields have acknowledged the ability to be creative in terms of succeeding and making progress in their organization, and research studies on creativity is no longer limited to the aesthetical field. In addition, it has been an increasing awareness of the possibilities within collaboration. The researchers, as well as organizations, have discovered that you cannot explain, neither develop organizational creativity and innovation using a strictly individualist approach, as organizational creativity occurs in complex social systems (ibid).

That something is new and original is a common element in defining creative ideas. However, it is difficult to evaluate the quality of it. Even if all creative thinking is original, does not necessarily mean that all original thinking is creative. The creative ideas need a connection to the relevant problem or the objective. Relevance in relation to the definition of creativity confirms the role of the group or other actors in relation to creativity and creative collaboration. It is group consensus that determines whether an idea can be used to solve the specific problem (Gardner, 1993).

Success in innovation is depending on creativity and originality. However, in business, originality is not enough. To be innovative it requires a creative idea that must be appropriate, useful and actionable. It must somehow influence the way business gets done, by improving a product or by opening up a new way to approach a process. Generating new and valuable

ideas suitable for the company is a complex matter which consist of several components such as the individuals level of knowledge, organizational structure, tools available, the group dynamic, and so on (Sawyer, 2012).

## **1.2 Background for the thesis**

In the late 1950s, few believed that the oil and gas along the Norwegian coast could give meaningful income for the national economy. Little did we know, how significant the petroleum industry would be for the economy when the first licenses were awarded mid-1960s. 50 years later, the industry has become Norway's most important and we are dependent on this income, partly in terms to maintain crucial functions in our society, i.e. our solid established welfare society (Olje- og energidepartementet 2016; Grønning, Moen & Olsen, 2008).

However, the companies operating within the oil industry are now forced to think in new ways in terms of competitiveness and long-term survival. The oil industry is currently in a crucial phase as their incomes are significantly reduced as a consequence of the reduced oil prices (Olje- og energidepartementet 2016). The companies have to consider other possibilities, this includes developing new and improved products as well as new ways of doing established practices.

The current situation for this industry was my main motivation for collecting data from this field. I was motivated by getting insight in a supposedly high pressured company, and achieve an understanding of how they organize in pressured situations, and further, how they collaborate for developing new and creative solutions.

Through my internship in October 2015, I got an overview of the many different departments in this specific Company, and eventually I got in touch with one department with reputation for working with product innovation. Further, I was introduced to a specific working method, which was in the early stages of implementation. This method has been implemented in other departments over the world, with substantial evidence of success. In light of this, I was engaged in experience this, and eventually I got in touch with a project manager. I got the opportunity to observe a conduction of a workshop, including taping a video of the whole process. In addition, I interviewed two of the participants of the Workshop.



## 1.3 Research questions

The main question which frames the thesis is:

*How does a multidisciplinary group generate creative ideas through collaboration in the initial phase of the process of innovation?*

In terms of answering the main question, one needs to operationalize the question, and divide the elements into categories. In this case, this has been done by dividing the main question into three research questions:

**Research question 1:** How does creativity appear through collaboration, if at all?

**Research question 2:** How does the group construct a common understanding within the collaboration?

**Research question 3:** Which factors seems to stimulate or prevent the generation of creative ideas?

The main question, as well as the research questions can be approached from different angles, an appraisal has therefore been necessary. Theories can help to refine further and the purpose of this thesis is to see creative collaboration through a sociocultural perspective with focus on communication through the dialogue and the existing resources within the multidisciplinary team. The review of the research field helps to limit the framework further, as it is shows that it is a lack of group oriented studies within the field. The basic premise within the theoretical framework is that creativity emerge through collaboration where it exists different knowledge and perspectives, and it is through this meeting the development take place and that innovation may occur. My theoretical framework includes the creation of a common understanding through knowledge sharing within the dialogue, along with the mediating function of the artefacts.

## **1.4 Conceptual distinctions**

As already mentioned, innovation and creativity are two similar concepts. Both innovation and creativity can be seen as a not clearly defined term whose meaning differs depending on the perspective of the user, the context it appears in, the discipline within which is used, and the object of its use (Anderson et al., 2014). In this case, innovation is understood as a process, where creativity is a crucial component. Creativity can also be seen as a process within the innovation process. In other words, innovation and creativity are understood as integrated and dependent on each other.

Another central concept in this thesis is multidisciplinary, and multidisciplinary collaboration. In regards to the team member's different experiences and educational background, I define this composition as multidisciplinary. In spite of them working in the same company, as well as in the same department, they all contributed the collaboration with different expertise knowledge and experiences. In addition, during the interviews, the formal qualifications appeared to be diverse. A formal definition of multidisciplinary teams can be: "Combining or involving several academic disciplines or professional specializations in an approach to a topic or problem." (Oxford dictionaries, 2016)

Within collaboration, communication is a central factor. In this thesis, the concept of communication is understood as the ability to send and receive messages via some means of interpersonal communication, such as face-to-face interaction. When communicating, one has the ability to collaborate (i.e., in work activities), and this thesis is concerned with achieving a common ground in these activities. With a place of common ground or intersubjectivity, the individuals have a common understanding about the communicated topic.

## **1.5 Context: The Company and the case**

The company has requested anonymity and I have done my best to follow this request. This regards both the Company and also too much details of the structure and the content of the Workshop. This will of course limit my freedom to explain processes in detail, but in my opinion this will not influence the quality of the thesis. In light of the Company's competition with several of other businesses, I need to respect their request. However, it is not my intention to elaborate or discuss in details the specific ideas that occurred, neither detailed explanations regarding the Company's business strategy and I am in no position to evaluate

the quality of the ideas, as I have limited knowledge of the domain-specific content of the ideas.

The Company is recognized and rewarded as an innovative company, as they have had a long history of technical innovations. Today, it is a supplier of technology and equipment for the oilfield service industry. The Company has become global with departments all over the world, and the Company's vision is to drive a culture of performance through innovative collaboration and to unleash the unique potential of the employees. Several different departments exist in every region where the Company is present. The employees work in the same field, but are located in their own regions.

### **1.5.1 The Case**

My raw data consists of a video tape of a conducted workshop and interviews with two of the participants. The interviewees were the facilitator of the Workshop and one "regular" participant. The Workshop had distinctive phases, each with limited duration. A predetermined schedule regulated the process as they followed a certain "recipe", developed internally in the Company. Eight employees were present during the Workshop. As already mentioned, every one of the team members were engaged in the same company, and they were located in the same department, except one of them; he was from a department in Great Britain.

In the thesis, I call the group multidisciplinary based on their different expertise which appeared during the observation. All of them are located in the same area or field, but with different types of expertise knowledge. Some of them were more technical, others were more oriented towards mechanical issues, while some of them had more experience in project management. In addition, the group consisted of people with diversity in both formal educational and experiential backgrounds.

## **1.6 Structure of the thesis**

Further in this thesis, I present previous research connected to the areas creativity and innovation. Through this presentation, the lack of focus on creative collaboration appears. This element provides necessary limitations for the composition of the next chapter, The theoretical framework. Chapter 3 will present different perspectives and concepts in relation

to a sociocultural approach to creativity and development. Further, in chapter 4, the research method is explained. I emphasize how and why I have made the choices that has been made through this process, and securing that what I have done is a result of thorough reflections. The chapter also includes ethical considerations and a discussion of the quality of my research project. In chapter 5, the analysis of the data appears. This consists of selected data from all of the collected material. The analysis contains extracts from both interactions from the video, extracts from the interviews, and also interpretations of the different findings. The analysis is followed by a discussion, where the main findings are seen in relation to the theoretical framework and the research questions. Finally, the thesis presents a conclusion which summarizes the main findings and limitations of this study, and also, suggestions of further directions for research.

# 2 Review of previous research

## 2.1 Creativity and innovation in research

Creativity has been acknowledged for a long time, but a systematic approach in research first occur shortly after the second World War (Sawyer, 2012). Since then, the interest in research on creativity and innovation has increased significantly. Experts in several different fields are now studying the creative process, often with the attempt to stimulate innovation. Scientists, engineers, doctors, professional marketers, composers and several others realize that creativity can be the key to success and long term survival (Anderson et al, 2014).

### 2.1.1 Bringing the concept together: Innovation as a product of creativity

Creativity has generally been perceived as generating valuable, useful and new ideas, whereas innovation has often been described as both production and implementation of creative ideas (Anderson et.al, 2014). However, the literature shows that the line between innovation and creativity is not distinctive or clear. Partly because quite similar studies use different approaches to both of these concepts (ibid). While some researchers have argued that we are in need of one clear distinction between creativity and innovation, others have argued that creativity and innovation not necessarily needs to be divided into two separate concepts.

Several researchers have argued for creativity as a “first step” in the innovation process. Newell, Robertson, Scarbrough & Swan (2009) show, with their conceptual framework, that creativity not only exists as a first step in innovation, but as a continuing circular process in both the generation of the ideas and the implementation, and with this we see an integration of creativity within the whole process of innovation (ibid). In light of this, Newell et.al (2009) approach innovation as a tripartite process: (1) Generating ideas, (2) Spreading/sharing the idea(s), and (3) Implementing the ideas (Newell et al., 2009:189).

Innovation is also often referred to as a noun, or more specific; a product or a result. But it is also a process consisting of several phases (Newell et al., 2009). Therefore, it is important to distinguish between what an innovation is and what the process of innovation is. Most scholars agree that an innovation is an idea that has been commercialized, i.e. put in the

marketplace (Garcia and Calantone, 2001). An innovation should further provide economic value and be dispersed to others than the ones coming up with the original idea. This is related to the definition of innovation as a result or a specific product. The process of innovation on the other hand, means bringing an idea to the market and thus the process of turning the idea into an innovation (Garcia and Calantone, 2001).

Either way, creativity and innovation are clearly in relation to one another. There is a general consensus among the scientific community, that creativity and innovation are similar concepts with a strong or a less strong connection to one another. Whatever point of view, one can assume that research on creativity workplace can contribute to a better understanding on how to facilitate creative expression, and further, increase the organization's potential for innovation. Anderson et al. (2014) propose the following integrative definition of creativity and innovation:

«Creativity and innovation at work are the process, outcomes, and products of attempts to develop and introduce new and improved ways of doing things. The creativity stage of this process refers to idea generation, and innovation refers to the subsequent stage of implementing ideas toward better procedures, practices, or products. Creativity and innovation can occur at the level of the individual, work team, organization, or at more than one of these levels combined but will invariably result in identifiable benefits at one or more of these levels of analysis» (Anderson et al., 2014:2).

As Anderson et al. (2014) expresses; innovation is a product of creative act. Additionally, innovation and creativity may occur at different levels; individual, work team and organizational level. The following section emphasizes the components of this definition further, the level of the individual, group and organization.

## **2.2 Creativity and innovation at three different levels**

The history of creativity research is deeply rooted in the field of psychology, as creativity has been perceived as a personal attribute (Zhou & Hoever 2014). Creativity has for a long time been characterized as an innate personal capacity or part of a personality. There have been suggested several assumptions regards personality traits and ability to be creative; e.g. mental

illness has been connected to the ability of being creative (Sawyer, 2012). The personal attribute approach to creativity is still relevant, especially within the field of psychology, but the concept has naturally evolved since its inception. Since the 1970s, a social and diversified perspective on creativity has emerged. This concerns studies of dyads and groups of creative players, including a greater extent on temporary conditions, instead of focusing on stable variables such as personality and abilities. (Zhou & Hoever 2014). In addition to psychology, social science has increasingly addressed creativity as a phenomenon, especially in organizational theory and management research. In this development, a contextual perspective on creativity and innovation has become more widespread. In a context perspective, one investigates the effect factors in actors' surroundings on creativity and innovation (Zhou & Hoever 2014).

When an employee of an organization introduces and uses a new idea, method or practice, one says that he or she is innovative. However, as mentioned earlier, it is not necessarily one creative individual alone behind a new idea that may lead to innovation, it can be smaller or larger groups in organizations who generate ideas together. Individual, group or dyad-, organizational- and multi level are the analysis levels and units used in studies of creativity and innovation. The main focus has probably been studying creativity at the individual level, and innovation processes at the group or organizational level (Anderson et al., 2014).

### **2.2.1 Individual**

At the individual level there are three main themes that recur: individual factors, task context and social context. These studies examining the impact differences between individuals of different characteristics, values, identities, goal orientation, motivation, ways of thinking and different skills and abilities (Anderson et al., 2014). The results of studies that focus on personality traits advocate that the relationship between personality and creativity is complex and shaped by contextual variables (Madjar, Oldham & Pratt 2002).

Research of task context has shown that the complexity of the job and routines may have positive impact on creativity. Complex job factors like; autonomy, variety of tasks which where significant for the job and opportunity for feedback, shows impact on the ability of being creative amongst employees (Hackman & Oldham, 1980). Routines can have a positive effect in regards of tasks that are routinized, that require less effort and awareness, which are

released to other areas (Ohly, Sonnentag & Pluntke 2006). However, one can assume that routine work could lead to less creative workers, because of the assumed positive connection between diverse tasks and creativity. There is, however, little research in this. Objectives and requirements of the job, and reward systems also have impact on creativity, both positively and negatively (Anderson et al., 2014)

Studying creativity based on the organizations, does not necessarily lead to an increased focus the social context. Therefore, research has increasingly moved away from the notion that individual creativity comes only from personal qualities. Elements of social context that affect creativity in individuals are for example leadership and management (Anderson et al., 2014). Although some studies show that the various leadership styles have had influences on creativity, there is not enough research where the empirical results correspond to conclude with actual effects. Social networking, customer feedback and time pressure are other factors that are believed to influence individual creativity (Anderson et al., 2014; Zhou & Hoever 2014).

### **2.2.2 Group**

It is less research focusing in the group level compared to research focusing on the individual and organizational levels, but this is a level of analysis that is now getting more attention. Research on groups has largely been focusing on features and characteristics of the groups that are creative. Some of the factors that may affect creativity in a group are: orientation towards the task, group dynamics, composition and structure of the group and members' experience in similar tasks. The effects of factors have both been studied separately, and how they combined make impact on the group's creativity (Anderson et al., 2014; Zhou & Hoever 2014).

Group with a collaborative environment show stronger correlation with innovation than the groups' structure and composition. In fact, in some cases it has been difficult to demonstrate any correlation between the composition and innovation at all (Anderson et al., 2014). However, it is uncertain whether composition and structure affect the environment in groups, and further, have an effect on creativity and innovation. Group processes that contribute to the security, good communication and shared vision or goal seem to have a positive effect (Hülshager, Anderson & Salgado, 2009). It is also found that members' direct experience



with the tasks to be solved, unlike indirect experience or lack of experience, has a positive effect on groups creativity (Gino, Argote, Miron-Spektor & Todorava 2010).

Most of the research on group level has so far focused on the climate of cooperation and group processes as precursors for innovation, rather than follow the processes directly in organizations or through experiments (Anderson et al.2014:14). Studies that focus on how context affects creativity in groups have been rare, but it appears that this is becoming even more common (Zhou & Hoever 2014). According to Gilson and Shalley (2004), creativity enhances if there is a perception that creativity is contained in expectations of the group's work. They also assume that if members of the group are interdependent when it comes to solving the task, they will be more engaged in collective creativity. In contrast, other findings show that the quality of the creative contribution increases, if team members work alone with ideas before they are brought into the group (Girotra, Terwiesch & Ulrich 2010).

### **2.2.3 Organizational and multi level**

There are not yet many studies on multilateral and multi levels of analysis, but it is an area of increasing interest. Some of the studies that have been done are of the relationship between group/team and individual, and which effects they have on each other (Anderson et al., 2014). Orientation towards learning is positively related to individual creativity, if the group is characterized by decentralization and low formalization (Hirst, van Knippenberg , Chen & Sacramento 2011). Others have studied relationships between leadership and group or individual quality (Wang & Rode 2010). However, Bissola and Imperatori (2011:79) sees two particular problems with research on multilevel: it lacks a common understanding of the concept of creativity and one rarely examine the relationship between individual creativity skills and manifestations of collective creativity.

There are several studies on how organizational factors affect innovation and creativity. Much of this research has focused on human resources management (Anderson et al., 2014). Results from these studies show that organizations that show higher levels of innovation, are flexible and provide employees training programs, they emphasizes variety in tasks and autonomy in work (Shipton, West , Parkes, Dawson & Patterson 2006). It is also found that work environment that allows personal initiative and psychological safety, benefits process innovation and organizational performance (Baer & Frese 2003). Studies of organizations

using knowledge and knowledge networks (such as combining several individuals with different kind of knowledge into one community), show that knowledge sharing has a facilitative role for innovation. It is also shown that strong ties between different organizational units reinforce the use of new ideas (Kijkuit & Ende, 2010).

The impact of structures and strategies has also been studied, and decentralization, low power distance and low degree of formalization show positive effect on innovation (Anderson et al., 2014). Naturally, it is also found that larger organizations are in a position with more resources to spend on innovation activities compared to smaller ones. But the results are not conclusive - some studies have found a positive relationship between size, sufficient resources and innovation (Greve 2003), but others have not found a stable relationship between slack or available resources and innovation (Anderson et al., 2014). According to Anderson et al. (2014: 19), in the future, it should be developed better understanding and deeper theoretical explanations on how individual creative thrust is to organizational innovation.

## **2.3 Concluding remarks**

Further in the paper I approach the innovation process with different theoretical perspective on how creativity can appear through the social processes. There are many grounds on which to claim that creativity is a social and distributed action. The review has presented several of crucial factors in terms of both stimulation and blockading of creativity and innovation at different levels; individual, group and organizational. The focus area further in this thesis, is on the elements that are considered relevant both in terms of the available research data, but also, in relation to; what is the research field lacking? “Creative collaborations have been studied since the ‘80s but remained until recently quite a marginal subject in research” (Sonnenburg, 2004, p. 254). In light of this, the thesis presents a theoretical framework which will provide necessary concepts in the understanding and possibly explaining the creative collaboration. I look into the creative collaboration in the Workshop and examine the occurring processes within the collaboration. The choice of study and research method is in accordance with the review, as Anderson et al. (2014) propose “We thus call for re-invigorated attention to process studies using appropriate *observational*, diary study, *real-time case study*, and ethnographic research approaches within *organizational settings*”.

### 3 Theoretical framework

As already mentioned, it is difficult to see the process of innovation, as well as creativity, isolated as an individual act. Both creativity and innovation are often considered a multicomponent process as there are several of different factors contributing the process. These factors are existing within the context. In spite of the focus on the context, a sociocultural approach to creativity should not be perceived as neglecting the individual. A sociocultural understanding of creativity is to consider both the individual and the context, and further, study the outcome that appears within the dialectical relation between the individuals and the context (Sawyer, 2012).

Even though there has been an increasing awareness of the importance of social, cultural, contextual and organizational factors regarding creativity, it has been less focus on group processes and the generation of creative ideas (Glăveanu, 2011). Further, it has been less focus on collaborative creativity, or in other words, creativity in collaboration. Glăveanu (2011) emphasizes this by setting the socio-cognitive and the sociocultural approach side by side. The socio-cognitive approach is characterized by conducting studies of the group creativity, while the sociocultural approach has been interested in what actually happens between individuals working together.

“The sociocultural approach to creativity re-emerged relatively recently and has yet to develop suitable frameworks for explaining how people are creative together” (Glăveanu, 2011:11). As Glăveanu (2011) emphasizes, the development of framework for explaining how creativity appears within individuals working together is not yet “complete”. In light of this, there have been collected several theoretical components considered relevant in order to try to compose a sociocultural framework for creativity and further understand how people are creative together within a group collaboration context. This is a minor selection from a collection of existing formulated perspectives and theories. The following chapter brings up relevant concepts and theoretical perspectives that are used in the analysis and discussion. Glăveanu (2011; forthcoming), Nonaka et.al (2000), Edwards (2005; 2010), Bakhtin (1981, 1984; 1986) and Vygotsky (1978; 2004) are central contributors in the theoretical framing of this paper. Mediating artefacts, boundary object, representational space, tacit knowledge, resourceful practitioner, and Bakhtins notion of dialogism are concepts that are further emphasized.

### **3.1 A sociocultural understanding of creativity**

A central part of being creative is to be able to manage and create knowledge that results in new ideas for innovative products, as the development of something new requires new knowledge (Gardner, 1993). Although innovation is characterized as a change of something, or the development of something new, innovation is actually often a result of already existing ideas, skills, knowledge and expertise. The creative process therefore involves uniting already existing items, where the idea creators have a solid knowledge of these before they can develop new ones (ibid). Sociocultural perspectives present knowledge as an active and change-oriented process, where extended understandings are the target of the activity. Participants are both shaped by and also shape the practices they engage in, and it is a dialectical relationship between context and individuals. Knowledge involves capacity to interpret and to question established practices, where the argument is that we mediate and transform the world through social and material resources (Säljö, 2001).

One of the main component of the sociocultural perspective is based on the assumption that development and learning occur through the use of language and participation in social practice (Moran & John-Steiner, 2003; 61). The basic principle is that intellectual and physical tools mediate reality for individuals in specific contexts, which means that human activities exists in a cultural environment and therefore cannot be understood in isolation (ibid). Given that our mental structures and processes are a result of our activity, interactions with others is a crucial factor in terms of development and learning. In this sense, culture helps to create our cognitive structures and thought processes (Säljö, 2001).

Vygotsky was *one* of the first to promote learning, development and knowledge construction as a social activity. With his ideas, several others have developed similar and complementary theories and concepts with this in mind that people are developing and learning when interacting with the context. And through language and interaction, people develop meaning. Through a Vygotskian perspective, meaning is the socially agreed-on definition of something – e.g. dictionary definition of a word, or more related to the field in this thesis case context; an organization's acceptance of a technological solution. Creativity involves bringing something new into the realm of social meaning (Moran & John-Steiner, 2003), and social meaning occurs through the use of language.

Vygotsky's career was actually framed by work on creativity, starting with his study of the aesthetic reaction in literary works (Moran & John-Steiner, 2003). He formulated an important principle that creative work is profoundly social, and that the creative process includes interaction, tension and transformation (ibid). In Vygotsky's point of view, development and creative processes is internalization or appropriation of cultural tool and social interaction (Moran & John-Steiner, 2003:63). Internalization is in this context, not just copying information but rather a transformation or reorganization of incoming information and mental structures based on the individual's characteristics and existing knowledge.

In relation to development of creativity, Vygotsky (2004) sees two basic types of actions in humans; reproducing action and the combinatorial action. Reproducing action revolves around actions based on previous experiences, this type of activity is not innovative, but rather recreation of past actions. The combinatorial takes the experienced knowledge, and posting it together in new ways, and there are such actions that create development and creative processes (ibid). In light of the combinatorial activity and fostering creativity, it is vital to outline what one already know and can do, and further build on this foundation for developing and create new ideas and knowledge.

### **3.1.1 The mediation role of artefacts**

Previous presentations in the thesis has highlighted that creative activity does not lie in the private recesses of the individual's mind, nor isolated in the actions of skillful and creative execution. Creativity, development and learning exist within the dialectical interaction in the contexts of relational activities nested in conversation. The cognition does not lay inside each individual minds. It is distributed between humans and environment, and integrated in the environment where there are *artefacts* mediating the actions (Säljö, 2001).

Artefacts can be defined as an object created and developed by humans to make it easier to handle our practical and everyday tasks (Vygotsky, 1978; Wertsch, 1998). To understand learning and development as a part of social practice, it is important to understand how individuals think in situations where they act in social practices using artefacts (Säljö, 2001). Artefacts can be described as tools which can be both physical and intellectual, abstract (symbolic or epistemic) or/and concrete (material). I.e. a book can be defined as both an

abstract and a concrete where the physical aspect with the book is the paper and the pen writing, while the abstract content is the meaning within the writing.

An important aspect of sociocultural understanding of development and learning is that physical and intellectual tools *mediate* reality for people in different contexts. The term mediation reflects the fact that we interpret the world through tools that are rooted in various social practices. In light of this, it is not correct to assume that we are in immediate contact with the outside world. Human thinking cannot be studied alone, but must be understood in relation to the social activities that are part of the specific context (Saljö, 2001).

### **Boundary objects**

Physical and material artefacts can play a critical role in terms of collaboration within organizations (Newell et al., 2009). Artefacts can also have function as a boundary object around which conversations, negotiations, decision practices and sense-making can converge. In practical terms, objects such as drawings, flowcharts and work plans can reveal differences between people, and it can be useful in encouraging knowledge integration (Newell et al., 2009:202). Boundary objects are often technologies, although they can also be drawings, sets of rules, research projects and different kind of documents.

Boundary objects are of explicit relevance in organizational innovation processes, as Star et al. (1989:393) describe them as “objects which are both plastic enough to adapt to local needs (...), yet robust enough to maintain a common identity across sites”. Boundary objects have the ability to couple different social worlds in order to converge perspectives and give them meanings. Carlile (2002) argues that boundary objects have a particular role in supporting the different forms of coordination found in collaborative activity. When a situation is familiar and routinized, a simple boundary object, perhaps only a single word, is all that is needed for a group. However, even if an object mitigate boundaries, does not mean that actors need to understand it in exactly the same way. It can be different interpretations and meanings that occur amongst actors at boundaries (Carlile, 2002).

## **3.2 Resources and potential within a diverse group**

“The basic resources of groups reside in their members. Group members bring knowledge skills, and abilities to the group” (Nijstad and Paulus, 2003:326-327). Nijstad and Paulus

(2003) emphasize the importance of the different resources that are to be found within group creativity. Concepts like “difference” and “multiplicity” stand at the very foundation of all major theories of group creativity, so much that this type of explanation has become known as “*value-in-diversity hypothesis*” (Glăveanu, forthcoming:3). The underlying assumption is that, in order to be creative, one has to be able to “think outside the box” or; to adopt a new perspective on what she or he already knows (knowledge) or can do (skills) (ibid:4). This is done by exchanging ideas and experiences with the other members of the group and consequently, the more diverse background and experiences, the more creative outcomes.

Clearly, diversity is a focus within the research field, but a crucial question in terms of this is: what diversity is the most fruitful for idea generation? Various conclusions have been made, and it is difficult to reach a final conclusion regarding this. However, a moderate level of heterogeneity is considered to be a composition which may have positive contribution on the creativity within group collaboration (Glăveanu, forthcoming). As already mentioned, new product development often involves cross- functional linkages, where the participants in a team have differing viewpoints. Diversity in background, experiences, age, gender, or just different viewpoints can therefore be a fruitful factor for the creative collaboration. However, Manix and Neale (2005) conclude that especially unobservable differences, like knowledge, skills and expertise can play a crucial role in the development of creative solutions within a collaborative environment.

### **3.2.1 Representational spaces**

“In a collaborative situation, individuals use symbolic resources intrinsic to their particular system of knowledge and, through communication, generate new and useful artefacts (the creative outcome) within a representational space of the group”  
(Glăveanu, 2011:12)

The concept of representational spaces is developed for understanding how creativity exists within group collaboration, and especially within a heterogenic, or a diverse group (Glăveanu, 2014, forthcoming). The concept explains that creativity takes place in a representational space, which is a symbolic place where we can “play” with our artefactual resources, including; language, technology, drawings, etc. The range of symbolic resources

employed in our current interactions is extensive, covering from argumentative strategies to concrete artefacts. And it is through the communication process the creativity appear, because it is only through dialogue we can nurture our representational space, construct and propose our ideas and finally obtain the necessary feedback in an on-going process of transactions (Glăveanu, forthcoming:8).

Each individual, when confronted with a creative task, whether it is alone or in a group, has a starting point with representing the situation he or she is in, and further, frames this representation in the wider system of cultural models that are activated by the specific task (Glăveanu, 2011). Glăveanu (2011), which can be classified as a cultural psychologist, claims that each one of us has our own unique representation space, which in context of collaboration contains of valuable resources. These resources should be shared in order to open up new representational spaces which also link to the emergence of new solutions (ibid).

Glăveanu's (2011) main argument is that creative acts involve adopting and coordinating two or more different perspectives on the same issue or problem and, as a result, expanding our action possibilities in relation to that particular issue or problem. Personal, unique representation spaces are not the same for everyone, and they have bigger or smaller areas of "uniqueness" in terms of personal and sociocultural differences. These unique representational spaces are the source of differentiation. It is by communication or sharing such resources, in form of ideas or experiences, that the spaces open themselves to a common representational space. "A common representational space requires efforts to accommodate divergences and tension because it is exactly from them that the potential for creativity arises" (Glăveanu, 2011:13).

Communication of unique representational spaces basically means revealing more unique information and procedural knowledge and discovering more about the information and procedural knowledge others hold. It is through these processes that the common representational space is constructed and we may hypothesize that whenever this process occurs, naturally the group will prove a higher level of creativity (Glăveanu, 2011). An important aspect in relation to this is that the learning that occurs in such spaces is not a matter of learning how to do the work of others. Rather it involves gaining sufficient insight into the purposes and practices of others in order to enable collaboration. The key to



collaboration in sites of intersecting practices is understanding the motives that are central to each practice (ibid).

### **3.2.2 Resourceful practitioner**

In communicating the unique representational spaces, there are different factors that are crucial for achieving a positive effect of the communication. According to Edwards (2010), in relational collaboration, it is necessary with relational agency within the team in terms of succeeding in the collaborative work. Relations agency means developing the necessary abilities which are crucial when working in relation to others. In light of this, in addition to domain-specific knowledge (specialized knowledge; such as engineering and technical insight in developing products), it is important that the team members are in possession of domain-general knowledge.

“This additional capacity involves recognizing how others interpret and react to problems and aligning one’s own interpretations and responses to theirs, to produce enriched understandings and practices” (Edwards, 2010:2)

Relational agency promotes and strengthens co-operation which is centered around solving complex problems, and relational agency is necessary in terms of being defined as a resourceful practitioner (Edwards 2005). Edwards (2010) emphasizes two important factors that are important in terms of being defined as a resourceful practitioner:

- (i) To understand and familiarize themselves with the unique resources within the collaboration
- (ii) To clarify and express its own unique resources, and understand problematic aspects within the collaboration

When this kind of expertise is integrated within the team work, the collaboration gets more fruitful and the complex problem will be analyzed through a stronger comprehensive understanding (Edwards, 2010). This means, that to establish a common representational space, a crucial factor is that the team consist of resourceful practitioner which are in possession of relational agency. It can be important in relation to typical situations when

tension within the communication, conflicts and criticism, and unconstructive collaboration occur.

### **3.2.3 The dialogue within a multidisciplinary collaboration**

Within this framework, it is through the communication process the creativity appear, because it is only through dialogue we can nurture our representational space, construct and propose our ideas (Glăveanu, forthcoming:8). In dialogues, it is essential to have and show mutual understanding and the opportunity to discuss one's thoughts and opinions.

Intersubjectivity is the concept that conceptualizes the psychological relationship between humans in conversation in establishment of a common understanding (Stahl, 2016).

Bakhtin's (1981) perspective includes how meaning, knowledge, and creativity are created in the tension between different voices, and how dialogue acknowledges different voices in order to avoid a monotonous mindset. Dialogue is in this way considered crucial to meaning making and the development of new knowledge and understanding. Meaning is constructed through tension and disagreement, although, within an environment of trust and constructive collaboration (ibid). In multidisciplinary groups' dialogues, several voices represent different opinions, educations and backgrounds. Through the dialogue, they will come together and compete, support and oppose each other. A dialogue with different voices is influenced by two opposing movements; one centripetal movement, which is unifying and one centrifugal movement, which is dividing (Bakhtin, 1981). The centripetal movement will work to push the dialogue toward increased understanding, support and agreement among the many voices, while the centrifugal movement will work to explicate the opposing and competing voices in the dialogue. The centrifugal movement will create tensions in the dialogue, and Linell (2009) calls the others as disruptive influences which introduce tensions for alterity. Alterity can by this be referred to as oriented towards otherness. Bakhtin (1986) connects the term alterity to the dialogical tensions and oppositions which arise when different perspectives are involved. A fruitful dialogue must have room for alterity, as this is a constructive force and not a negative aspect in the dialogue. According to Linell (2009), when communicating, we have an urge to reach a shared understanding (intersubjectivity), but also an urge to create new meaning through tension (alterity).

Consequently, it is not enough just to bring together different perspectives, but these perspectives also need to challenge each other to bring forward new understanding and knowledge (Linell, 2009). A fruitful dialogue is however also characterized by the fact that the individuals with different perspectives understand each other and manage to take the other's perspectives and achieve a mutual understanding. This process of shared understanding is in this case also referred to building a common representational space (Glăveanu, 2011).

“The idea lives not in one person's isolated individual consciousness — if it remains there only, it degenerates and dies. The idea begins to live, that is, to take shape, to develop, to find and renew its verbal expression, to give birth to new ideas, only when it enters into genuine dialogic relationships with other ideas, with the ideas of others”.  
(Bakhtin 1984: 87-88)

What Bakhtin (1984) illustrate here is the basic premises for understanding creativity in collaboration within this framework; ideas are developed between people and to create new knowledge one are dependent on both intersubjectivity and alterity within the dialogue.

### **3.2.4 Knowledge activist and tacit knowledge**

In relation to what already mentioned in terms of the innovation process as a reconstruction of already existing knowledge within the group/organization (Gardner, 1993), Von Krogh et al (1997) emphasizes this further by bringing the concept of knowledge activist. A knowledge activist can be referred to as a knowledge enabler that support platforms and cultures by enabling knowledge creation. A knowledge activist can be an individual, group or department taking on a particular responsibility for energizing and coordinating knowledge creation throughout the organization. The activist has three roles: to act as a catalyst of knowledge creation, to coordinate knowledge creation initiatives and to provide overall direction to these efforts (ibid).

The activist's main functions are to catalyze social processes of knowledge creation, as a knowledge activist formulates 'process triggers' and creates space or context for knowledge creation. This space has two purposes, both to make participants in knowledge creation utilize and leverage their personal experience, as well as to relieve themselves of past

experiences (ibid). This can also be connected to Glăveanu's (2011) concepts of common- and new representational space.

Another aspect of the knowledge activist is to make the participant utilize their knowledge and past experiences, this can be seen in relation to Glăveanu's (2011) emphasizes of the communication of each unique representational space, which means *revealing* others unique knowledge. In relation to this, Nonaka et al. (2000) separate two central concepts in relation to types of knowledge: tacit and explicit knowledge. Tacit and explicit knowledge are complementary, which means both types of knowledge are essential to knowledge creation. Explicit knowledge is verbalized, articulated and codified, while tacit knowledge is personal and hard to formalize verbally as it is rooted in action, procedures, commitment, values and emotions (ibid). It is the less familiar, unconventional form of knowledge, and it is the knowledge of which we are not conscious of. Tacit knowledge is not codified, and it is not communicated in a "language", as it is acquired by sharing experiences, by observation and imitation (Kikoski and Kikoski, 2004). Tacit knowledge represents knowledge based on the experience of individuals and it expresses itself in human actions in the form of evaluations, attitudes, points of view, commitments and motivation (Nonaka et al., 2000).

In relation to the aspect of knowledge as partly tacit (Nonaka et al., 2000), a central function of a knowledge activist is to reveal tacit knowledge into open space, and convert it into explicit knowledge which will be available for the organization (ibid). As already mentioned, usually it is difficult to express tacit knowledge directly in words, and often the only ways of presenting it are through metaphors, drawings and various methods of expression not requiring a formal use of language (ibid).

### **3.3 Theoretical perspectives and further direction**

This framework is based on innovation and creativity as a phenomenon of social construction where diversity has a certain function within this construction. Creativity does not appear within the individuals, but in between the collaboration in the specific context, where the people and the artefacts are in dialectical relation. The term tool has a distinct meaning in the sociocultural perspective. Both the intellectual and physical resources that humans have, access to help us understand and act in the world, as well as cross boundaries between

different disciplines and representational spaces. Further, the thesis delves into the mediation and artefacts found in the conduction of the Workshop.

In dialogue, it is essential to have and show mutual understanding and the opportunity to discuss one's thoughts and opinions. Intersubjectivity is a concept that conceptualizes the psychological relationship between humans in conversation to achieve a common understanding through establishment of a common representational space. This common ground is important within collaborative learning, where the aim of communication is to exceed the private worlds of the participants. Tension and alterity is additionally an important aspect in terms of developing creative ideas within a diverse collaboration.

The theoretical framework is further brought up in the analysis as well as in the discussion. The framework helps in understanding which factors in the Workshop contributed or stimulated the generation of creative ideas in the problem solving, and how the creative collaborative appeared. The analytical concepts that I will bring further on are: representational space (unique, common and new), boundary object, alterity, intersubjectivity, knowledge activist, resourceful practitioner and tacit knowledge. These are recognized later on in this paper. Next step is my research method, where I explain how I have collected the data material, and what kind of reflection underlying the choices that has been made during this process.



# 4 The methodological approach

Methodology for research revolves around how to gather information about a given phenomenon, which methods are appropriate to use in collection of the data, how these should be applied, and whether the selected method provides the data you are interested in (Lund 2002). Qualitative approaches can be considered as activities to seek information and create an understanding of the complex being studied, as well as the overall context (Ringdal, 2007). In this chapter, a discussion of what choices have been made before, during and after the collection of the data in this study appears. How this was done, and reflections upon why the decisions has been made. In addition, the chapter will look at the task constraint, validity, reliability and ethical perspective of this study.

## 4.1 Case study

Within qualitative methodology you have a choice of several strategies, as qualitative approaches are diverse, complex and nuanced (Braun & Clarke 2006). The assessment should be based on the objectives of the task, in other words; the research questions. In this case, I did a review of several strategies, as I simultaneously had practical limitations in mind, including time limitation, cost budget and other practical elements in terms of the Company's availability.

Case studies are considered to be a fruitful approach to the study of real phenomena in a social world, e.g. organizational processes in a company (Yin, 2009). According to Yin (2003:13) "a case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between the phenomenon and context are not clearly evident". The case study is a distinctive phenomenon as it operates within its natural surroundings. It provides the opportunity for a deeper understanding through coming closer to the analysis device. Additionally, it provides an opportunity to ask questions in regards to the "why", and not just ask for descriptions through what and how (Repstad, 2007). The purpose of using a case study is not necessarily to generalize the findings beyond the case study, but rather to collect and be left with deepened and improved knowledge about a particular topic (Yin, 2009). In light of my planned study is this

congruent, the purpose is not to generalize, but rather to achieve a deeper insight to illustrate my argument.

## **4.2 Research design and data collection techniques**

Research design explains and secure what kind of data that has been collected, in which way these should be collected and from whom (Jacobsen, 2005). The research design has a major impact on whether the main issue is properly lit, in light of this, the research design provides an overarching plan for how to carry out the research project.

After further review of the literature on methodology, I considered it appropriate to call it a critical incident technique study (CIT). This is compatible with a case study strategy, as CIT is suitable to collect a certain amount of quantity information regarding behavior in concrete and delimited situations (Cassel & Symon, 2004). It consists of a flexible set of principles that should be modified based on the research questions, where the method should be adjusted in the light of research interest.

"A critical incident is a positive or negative 'event' with certain perceptual and chronological parameters that is memorable to the individual concerned and has perceived significance in personal or business terms, or both." Cope (2003:8)

A critical incident can be described as one that makes a contribution either positively or negatively to an activity or phenomenon. Critical incidents can be gathered in various ways, but typically respondents are asked to tell a story about an experience they have had or observing interactions between humans (Cassel & Symon, 2004))

Selection of research design reflects existing knowledge in terms of what you have chosen to research. In thid case, it was difficult to predict the response as it existed limited background information of the work practice in this organization. In light of this, Yin (2009) distinguishes between explanatory, exploratory and descriptive case studies. Exploratory perspective lays in CIT's nature (Cassel & Symon , 2004). The study is therefore shaped by an exploratory design since the objective was to create insight and understanding of a working practice, and further, how this practice contributes to innovation. Ringdal (2007) points out that exploratory design is appropriate when there is little information on the issue that is to be



explored. The exploratory design is additionally appropriate in terms of flexibility, which allows you to make changes along the way (ibid). There was a need for adjustment of research questions during this process as several new perspectives on the case study occurred during the collection and analysis of the data. From a quantitative point of view, this may be seen as threatening in terms of research validity and reliability (Ringdal, 2007). This flexibility is, however, one of the foremost advantages of various qualitative approaches. If all options are taken in advance it may on the contrary be a threat to the quality of a research study. One of the key benefits of the application of qualitative research methods is that they may open to new and unexpected knowledge, which in turn could form the basis for new issues.

#### **4.2.1 Collection techniques**

During the Workshop, camera standing on a tripod behind the participants was used. A flat table microphone was located in the middle of the table, which captured all of the verbal interaction. The camera was a professional one (provided by *Intermedia at Forskningsparken, University of Oslo*) and it was equipped with several useful functions, e.g. the zoom function which was used when they were writing down things on the whiteboards and paperboards in the room.

The use of video as data collection tool was important to the research objectives, in terms of capturing all the elements in the collaboration. Video is suitable when the researcher is interested in the social interaction (Jewitt, 2012). The features of digital technology enable time to be both preserved and interfered with – slowing down and speeding up a video recording to see ‘naturally occurring events’ in new ways (ibid). By analyzing video data of social interaction, you get the opportunity to visualize behaviors that in other cases are hard to track, for example only by observing verbal and nonverbal communication. Video can provide an audiovisual reconstruction of complex social events and it gives the researcher(s) verified documentation when events can be played repeatedly (ibid). In addition, video sequences can be read more closely by freezing the situation or played fast/slow to reveal patterns. It was considered as not possible to capture all the complex and rapidly changing events of the group only by observation. The alternative to video would be to base the data collection on field notes, but in this case, a lot of interaction would be lost. Although, in addition to the video, field notes were made. Nearly 15 pages of notes with time and activity.

Different factors were noted, elements and interaction sequences that was observed as possible critical incidents which helped a lot in the work of the analysis. The field notes helped structuring the video material when analyzing it, as they were containing time and action of considered “critical incidents”.

During the interviews, there were used a tape recorder. This tool made sure of capturing all of the verbal outcome, and it was easy to capture all of the verbal communication between the interviewer and the interviewees.

#### **4.2.2 Transcription**

The raw material consists of video recordings and field notes from the observation of the Workshop, and recorded verbal communication from the interviews. After the collection, the data material was further processed. At first, the observation notes were processed. They were reviewed and rewritten short time after the observation, while the notes still were fresh in memory. Regarding the video material, which is the most extensive part of the analysis, the different working methods and phases and time spent on each method were structured into a scheme, as well as transcription of one or two interactions sequences of each phase. The choice of sequences was related to the research questions, as the sequences that was considered helpful in highlighting these questions were chosen. The processing gave a good overview of the different methods and phases, as well as a comprehensive picture of the whole Workshop. This made it easier to see what material that was available. Further, selection of situations that were found relevant or seemed interesting in terms of answering the research question occurred. This means that large parts of the video material was eventually transcribed, and the transcriptions consisted of two different documents. The first document contained a description of the methods of work and time spent on the different phases, which provided a good overview of the workshop. This is also further emphasized in the analysis. In the second document the different interaction sequences were transcribed, including verbal communication as well as some of the body language and expressions. The body language was just transcribed in some cases, as it was not evaluated as highly relevant in terms of the aim of the thesis. This, together with the observation notes and interview, made sure of a comprehensive written material that was suitable for a more thorough analysis.

### **4.2.3 The interviews**

Due to practical and necessary reasons, the interviews were conducted approximately one month after the workshop. One can discuss both the benefits and negative aspects in relation to this. There are both positive and negative effects related to interviewing several of weeks after experienced actions. Positive effects could be that the team members got the opportunity to reflect upon the Workshop and further, bring these reflections into the dialogue with the interviewer. Negative effects could be that too much time had gone by, and that they had forgotten something important. Subsequently, this is something that cannot be controlled, and one have to base the study on the collected material.

At the beginning of every interview, the interviewees were asked to tell general information regarding themselves, their educational background, how long they had been in the company and their experience with the specific working method referred to as the Workshop. By getting some information about them in advance of the questions and inquiries, it contributed to a comprehensive understanding of their situation and work responsibility in the company, their positions and general information that could help understanding them better. Even though an impression through the Workshop occurred, naturally it emerged a closer one during the interviews. Further, the interviewees got to talk about how they experienced the conduction of the Workshop, and more generally about innovation and creative work in the Company all over (the interview guide is to be found in appendix 2).

After conducting the interviews, they were transcribed more or less verbatim, however, some of the content was left out. Things that had no relevance for the thesis, e.g. when they talked about other companies they were/are in competition with. During the interviews, both the interviewer and the interviewees used Norwegian as communication language. First, the interviews were transcribed into Norwegian, then it was translated into English. Finally, the transcriptions consisted of 20 pages of text. The transcriptions were read thoroughly several times, while it was identified some possible themes and extracts that could be included in the analysis. As already mentioned, the video has laid the foundation of the analysis, while the interviews have contributed or complemented this material.

#### 4.2.4 Presentation of the informants

To ensure the informant's privacy, anonymous identities are made of those involved. In an attempt to make it easier for the reader and create a flow, It was decided to create fictitious names of the informants, except the facilitator, who is named “facilitator”. Two of the eight informants who were part of the observation, was also interviewed, which was the facilitator and “Shaun”.

It chosen not to add the role or background of the various informants, except the facilitator, this to strengthen the anonymity of those involved. The fictitious names are also used in presentation of empirical data and analysis. The table below shows the eight persons who participated in the observation and the two interviewees.

<b>Informants that has been observed and video taped</b>	<b>Informants that has been interviewed</b>
Facilitator	Facilitator
Axel	
Peter	
Shaun	Shaun
Derek	
Patrik	
Melek	
Louis	

Table 4.1 – Presentation of the informants

### 4.3 Data analysis: The analytical approach

Once data was collected, it was necessary to take position on how to organize the material, and further, how to work with it. Data analysis involves examining, categorizing, organizing, testing and then combining data in new ways to produce empirically based findings (Yin, 2009). According to Kvale & Brinkman (2009), there is no standard method for analyzing qualitative data. It depends on what is to be analyzed, and why. It is recommended to follow a procedure that enables a dialogue between researcher and material. In this way, the analysis

can be considered as a process of investigating the material, and further, decontextualizing of it, where the material is reassembled in a new way (ibid).

### **4.3.1 Thematic analysis**

Thematic analysis is a widely used qualitative analytic method within psychology and it is a foundational method for qualitative analysis. However, it is no clear agreement about how to go about doing it. It is therefore a flexible method to use (Braun & Clarke, 2006). Thematic analysis has its function in both to reflect reality and to unpick or unravel the surface of reality. Additionally; a good thematic analysis will make the theoretical framework transparent.

Thematic analysis is a method for identifying, reporting patterns (themes) within data. It helps organize and describe your data set in detail. Given the advantages of the flexibility, it is important to be clear about its limitation/disadvantages. The most important is that you are consistent in how you determine the themes within the analysis.

### **4.3.2 What is a theme?**

Thematic analysis involves a number of choices which are often not made explicit, but needs to be. What can be regarded to be a theme is one of them. A theme captures something important about the data in relation to the research questions and it represents some kind of pattern within the data set. An important question when it comes to coding is; what counts as a pattern/theme, or what size does a theme need to be? The “keyness” of a theme is not necessarily dependent on quantifiable measures - but rather if it captures something important in relation to the overall research question (Braun & Clarke, 2006). It is important to determine the type of analysis you want to perform, and the claims you want to make in relation to your data set.

Themes or patterns can be identified in one of two primary ways in thematic analysis; an inductive or “bottom up” way (1), or in a theoretical or deductive “top down” way (2). An inductive approach means that the themes are strongly linked to the data themselves. It is therefore a process of coding without trying to fit into a pre-existing coding frame, or the researcher’s analytic preconceptions. This kind of analysis is therefore driven by data. With this in mind, it is important to remember that no researchers can free themselves completely

from their theoretical and epistemological point of view/stance/commitment, the data is not coded in a vacuum without any conceptions. In a theoretical or a deductive thematic analysis, the researcher is driven by his/her theoretical or analytical interest. This form of analysis tends to provide a detailed analysis of selected aspects of the data set. In addition, you code for a quite specific research question, in contrast to the specific research question involves while coding the data (inductive approach).

The approach in this case can be defined as something in-between inductive and deductive approach; an abductive approach, where it is a dialectically relationship between data and theory, and you see theory as necessary for understanding the data material. In addition, theory and research questions develops through the analysis of the data (Ringdal, 2007).

Another decision revolves around the “level” of which themes are to be identified: at a semantic or explicit level (1), or interpretative level (2). With a semantic approach, the themes are identified within the surface meanings of the data, it is purely descriptions, and the analyst is not looking after something beyond the presented sayings or doings. Then, ideally, the analytic process involves from description, where the data has been organized to show patterns. Then to interpretation, where there is an attempt to theorize the significance of the patterns and their broader meanings. This is often done based on previous and relevant literature. In this case, I have approached the material in both ways; both a semantic and interpretative level. The first sequence of my analysis consist of a descriptive disposition of the phases in the Workshop. Further, I have themes that are on an interpretative level where I try to connect theory to the different interactions and in addition to sequences from the interviews.

Another approach is to examine the underlying ideas, assumptions and conceptualizations. Analysis like this tends to come from a constructionist paradigm. A thematic analysis conducted within a constructionist framework seeks to theorize the sociocultural context and structural conditions, rather than the individual. Which in this case are highly appropriate in relation to the theoretical framework.

### **4.3.3 Phases of thematic analysis**

(1) First, you need to familiarize yourself with your data. This includes transcribing, if necessary, reading and re-reading, making notes of ideas. In my case, I transcribed selected sequences of the video, while I was looking at it over and over again. Different sequences were selected during each new time while I was looking through the material. In the end I was left with 30 sequences of interaction, and a selection of these are integrated in the analysis.

(2) Further it is important to generate initial codes. Coding interesting features of the data in systematic fashion across entire data set, collating data relevant to each other.

(3) Then it is a necessary need to search for themes, which exists of collating codes into potential themes and gather all data relevant to each of the potential theme.

(4) This is where you review the themes. One needs to check if the themes work in relation to the coded extracts, and the entire data set, and further, generate a thematic map of the analysis.

(5) After reviewing the themes, you need to define them and name the themes. It is an ongoing analysis where you refine the specifics of each theme and the overall story that the analysis tells. Generate clear definitions and names for each themes.

(6) The last step is where you select vivid, compelling extract examples and final analysis of selected extracts, which is to be found in the chapter below.

## **4.4 Ethical considerations**

Qualitative research methods often include personal contact and meeting with sensitive information. In this project, the researcher is in possession of a videotape of expressions, actions and behavior of the participants, in addition to sensitive information from the interviews. In light of this, there was a need for some considerations regarding the ethical issues to avoid the abuse of sensitive and personal information. Consideration in relation to the ethical issues both regarding the videotape and the interviews was necessary.

Preparation before hand was needed, regarding permission to observe and video tape the conducted Workshop, including informing the purpose of the data collection. In addition, all the collected material is made anonymous and not recognizable in its presentation. The intentions with this project are beyond collecting personal information; rather, to seek an impression of the activity available and additionally, experiences with the activity.

Related to the interviews, Kvale and Brinkmann (2009) propose four important areas of ethical guidelines for qualitative researchers: informed consent, confidentiality, consequences and the role of the researcher. These guidelines were followed during the research project, this to ensure that the participants' information was safe. The interviewees and the participants of the Workshop received an information and consent letter, in which they were asked to consent in participating in the research project, furthermore, information regard the aim of the study and how their performance would be included in this (Appendix 3). Both Kvale and Brinkmann (2009) and Thagaard (2013) mention the procedure of making the participants anonymous, which can be done by removing their names, personal characteristics and other recognizable information. The information letter explained this, so everyone that was approached would know that the project would be based on anonymous participation. The recorded interviews, the video and the transcribed materials was stored with numbers, and information that was given during the interviews, which could have revealed something about interviewees personally, was removed from the transcripts. The video and the recorded interviews and the transcriptions are safely stored on the researcher's private computer, with names that cannot be recognized with this project, in different folders.

The third ethical consideration concerns the consequences that qualitative research may have on the group that was studied, and also the subjects. The parameters of this study do not call for personal or sensitive information, as the project's intention lies in the exploration of the working process within the team.

The researcher's role is the fourth and last ethical consideration, in which the sensitivity, engagement and the researcher's integrity is important. There is a need to consider the knowledge, experience, honesty and justice of the researcher. The findings must also be presented precisely and be representative of the area of research.



## **4.5 Quality in Qualitative research**

Frequently, questions considering the quality and credibility in qualitative research are asked. These often refer to the transparency of the whole research process, in which credibility relates to the validation of findings and results. Reliability of the methods and the validity of the data are issues related to quality (Seale, Gobo, Gubrium & Silverman, 2004). By making the process transparent and by describing, in detail, the research strategy and method of the analysis, the researcher achieves an enhancement of his or her project's validity, and the reader can follow the research process as it has been conducted (Thagaard, 2013).

### **4.5.1 Reliability**

The definition of reliability refers to the question of whether another researcher who applies the same methods would end up with the same conclusions as the first researcher. This is a critical assessment concerning whether the researcher has conducted his or her inquiry in a reliable and trustworthy way. It is important that the researcher makes arguments regarding the reliability of the development of the data during the research process. The quality of the research and the value of the results must persuade the critical reader (Thagaard, 2013). The importance of reliability is related to the researcher's reflections, regarding the context of the data collection and how the relationship to the participants can affect and have an influence on the information collected (Thagaard, 2013). If a reader questions the data, the material might be unreliable for answering the problem framing of the project. Reliability questions whether the observant or the interviewee will give the same answers if a different interviewer or observer asks or observe them, if the transcription of the interviews would be the same, if it had been done by another researcher and if the analysis would generate the same results (Kvale & Brinkmann, 2009). In this case, it was a thorough process to collect and transcribe material, always ensuring the reliability of the findings of this thesis.

The conduction of the research project has been transparent, to show the strengths and weaknesses of the study. The researcher has collected all material and done a thorough job with the transcription of the interviews as well as the video data, which is considered as contributing the reliability of the thesis. There are some issues that are very hard to avoid, especially regarding the video material. When a video camera is taping all of your actions, you might feel the need to act differently unlike when you are acting in natural environments without the aspect of videotaping. This reflects upon the common problem which is referred

as “*The Hawthorne effect*”; that the researcher’s presence affects the participant’s actions and behavior. This is an aspect that is hard to control. However, this was considered while observing and filming the Workshop. In relation to avoid this/reduce the negative effect, two methods were used. The first method was trying to place the camera as hidden as possible. Additionally, the researcher did not make a big scene out of the research project during the startup, as the presence of the researcher and the camera was presented as informal as possible. The participants were apparently not affected by its presence, but it is difficult to say, as one did not study, nor had the access to the participants’ mental processes during the Workshop.

#### **4.5.2 Validity**

When the data is collected, the researcher should assess its relevance regarding the research questions and the problem framing the project. Validity revolves around the aspect of interpretations. Have the researchers interpreted the data in a valid way, and is the interpretation valid regarding the reality that has been studied? Transparency is also an important aspect regarding validity, as the researcher must clarify the foundation of the interpretations by explaining how the analysis provides a basis for the conclusions in the project (Hellevik, 2009; Thagaard, 2013). Validity revolves around the truth, accuracy and strength of information. It concerns whether the chosen method is suitable in terms of answering the research questions. In relation to this, it is important to include all relevant data and to leave out the ones that are not that relevant. A typical pitfall is that a researcher might end up being too selective, and leave out relevant data or fail to consider data as significance (Kvale & Brinkmann, 2009). This is also connected to the other threat of validity in research, which is the danger for selecting in the researcher’s favor, the so-called “*Bartlett effect*” (Brown, 1992). By combining both video data and interviews, an effort has been made in avoiding these pitfalls and threats, and by this strengthen the validity of this study. The main prevention is that the data material in this study consists of more than one data set in relation to emphasize the findings in the discussion. Obviously, one could have collected other material, and several of other could have been interviewed in addition to the two interviewees in this study. But the time limit as well as other practical factors contribute to this selection of data material. Collecting material from another workshop had been an option, but it would be difficult as the Workshops are rarely conducted, additionally it is not a planned activity, as it is often a spontaneous decision when they feel the immediate need for it. In spite of this, the

data material was considered rich enough to be analyzed, and further, a fruitful grounding for discussion through theoretical perspectives.



## 5 Analysis of the Workshop

The purpose of the following chapter is to present the relevant empirical data, analyze it, and further, find the necessary links between empirical data and theory. The chapter present selected data from the video, which are defined as the primary data, followed by the secondary data, the qualitative interviews. The secondary data are integrated in the different themes/categories, where they are found to be relevant. The video data is naturally the material that provides most of the content in the analysis.

The analysis is divided into four themes, and the first of them is an obvious one; “*Conduction of the workshop*”. This is purely a descriptive summary of the Workshop, including the different routinized phases they went through during this, including descriptions of the facilitation. The intention is to give the reader a comprehensive picture of the Workshop, which is considered quite relevant for establishing a fundamental understanding of the different themes/categories further in the analysis.

The other themes of the analysis are:

- (2) “Inquire into and exploiting existing knowledge”,
- (3) “Communication characteristics” and,
- (4) “Creating a room for creativity”

These categories are based on thoroughly review of the data material, as it was sought to find similarities within, between and across the different routinized phases of the workshop, and further, find some repeating patterns. Additionally, some theoretical concepts helped in the process of coding and in the search of the themes.

In the analysis, the following symbols are used:

\*\* : This is for securing the Company’s anonymity

... : This is for someone not completing their sentences

(.) : Words or sentences that are omitted, they have no relevance in this context

“..” : I have changed names of the different concepts they use, for securing not to reveal secrets.

## **5.2 The conduction of the Workshop**

The Workshop was conducted December 2015 at their own offices in Norway. It was located in a typical meeting room, consisting of white walls and an oblong table with seats for 10 people. The room was equipped with tools which were used during the Workshop, i.e. whiteboards and paperboards, plus one projector.

The Workshop had a duration of approximately six hours. The startup was at 09 AM, and it ended 3.30 PM, this includes a 40 minutes' lunch break. The working process had distinctive phases with different duration and these phases were planned in advanced, as they followed a certain procedure. Some of the names of the phases have been renamed by the researcher, and the phases are named: (1) Problem statement, (2) Success criteria (3) Individual brainstorming, (4) Presenting the ideas (5) Evaluation, and (6) Selecting the ideas

### **5.2.1 The phases**

The Workshop started without any formal introduction, as they just started talking about the case and they ended naturally up in the first phase: the problem statement. During the first hour they discussed while all of the team members were seated around the table. They actively used the whiteboards in the room, where they both used writing and drawing as tools to elaborate their arguments, ideas and inputs. It was clear tension between the team members, as they all had different opinions regarding definition of the problem. In other words, they were not agreeing upon what the actual problem of the product was.

During phase 2, which consisted of defining the success criteria, visualizations were still regularly used. In addition to manual drawings on the boards, they used a power point presentation with visualizations of different solutions. During this phase they used 15 minutes on going physically out of the meeting room and into an actual workshop hall where they normally work with prototypes of technological solutions. All of the team members followed and one of the team members was responsible for showing them the specific solution. The collaboration was characterized by more tension than the first phase. During this phase, they also move backwards to the problem statement. One of the participant did not totally agree with the problem statement. They discussed practical issues in relation to cost capacity, as their aim was to develop a cost reducing product. Additionally, they asked themselves; do we want to introduce new mechanics or do we want to build on a commercial product?

After completing the first and the second phase, it was time for lunch break. After the lunch break, the team members conducted an individual brainstorming. Every one worked individually, where they used different colored post-its to write down their ideas. This phase was finished within 10 minutes. During the brainstorming, each of the members presented their ideas on the whiteboard. While they revealed their ideas by putting it up on the board, they explained, by limited amount of words, what their idea consisted of. All of the presented ideas were different from each other. Some were more commercial than others and some where more controversial. The most controversial ones lead to minor discussions within the group.

It was a natural transition to the next phase; the phase of evaluation. The whiteboard was then divided into different categories, and the team members job was to organize their ideas into the right categories. The five different categories were: (1) Manufacturing, (2) Technology (3) Layout, (4) Mechanical design, and (5) Media conversion. During the evaluation, they discussed the ideas, and linked it up to the success criteria. They also generated new ideas while discussing.

During the last phase, the team members got five votes each and they all voted on the ideas they thought had the most potential. At last, they counted the votes and the number of votes determined which idea was to be selected. In the end, there was a common agreement upon the one idea and it was selected to be prototyped and further developed.

***Shaun:*** *“I think we have something in gold here”*

They were clearly satisfied with the result of the Workshop, as they all left with a clear engagement towards the selected idea. One can therefor say that it was a successful Workshop, with a positive result. During the interviews, which was conducted approximately one month after the Workshop, they could tell me that the idea was in the phase of further development.

## **Facilitation**

A central aspect of the Workshop, was the facilitation of it. The facilitator's function was mainly to frame the routinized phases as well as structure the communication within the team. He was democratic in his style, and the facilitation was partly distributed during the collaborative activity. In the first phases of the Workshop, the facilitator had a clearer role compared to the last phases. During the last phases, the facilitation was characterized as distributed between the participants as they all was gathered around the whiteboard where they participated in structuring the ideas

The first phase of the workshop, the facilitator contributed a lot with respect to sorting and selecting the inputs and ideas. All of the team members were placed around the table, while the facilitator was standing in front of it. His role was to gather all important and relevant ideas and control the different discussion that occurred. He was rapid in questioning during the presentation of different arguments and ideas, not necessarily for not understanding, but for the participants to elaborate further. Both for clarity for the other participant, but also for the idea-maker to understand his own suggestion or idea.

In the phase of evaluation, he was not that visible in his given role. The facilitation was distributed, especially between two of the participants. In the end of the last phase he was a central figure, where they were deciding which idea/prototype they are going to develop. In the end he took control over the meeting, and made a clear conclusion of the Workshop to ensure that all of the team members were agreeing upon the ending result.

## **Conclusion**

With this, a short description of the Workshop is given, which gives insight in the different phases of the Workshop. The first two phases were characterized by intense discussions in relation to the problem statement and definition of success criteria. In these phases, the team collaborated a lot. In the third phase, all of the team members worked individually with their own ideas. It was basically without any collaboration or dialogue, except some discussions when the most controversial ideas were presented.

All the phases constitute a whole which lead to a possible product for innovation. When the Workshop ended, the members expressed engagement and positive attitude towards the final idea/product that was selected to be further developed. In light of this, one can say that the



Workshop had a successfully result. But which recognized factors contributed to this success? The following themes try to highlight the characteristics of different factors that contributed the development in the Workshop.

### 5.3 Structure of the analysis

Through the analyses of the video it appeared that the collaboration had different forms and intensity at different times during the Workshop. In the beginning, the collaborative processes were characterized by securing group diversity, before the members started sharing and discussing experience and knowledge. As the group communicated and interacted, the processes became more characterized by how the members used each other’s knowledge and ideas to develop new knowledge and ideas together. Finally, the best ideas were chosen and recommended for a concrete product that was ready for development. The six identified themes are named after the main characteristics of the different phases in the workshop and the following model visualize the six different phases in the workshop, followed by a model of the selected themes:

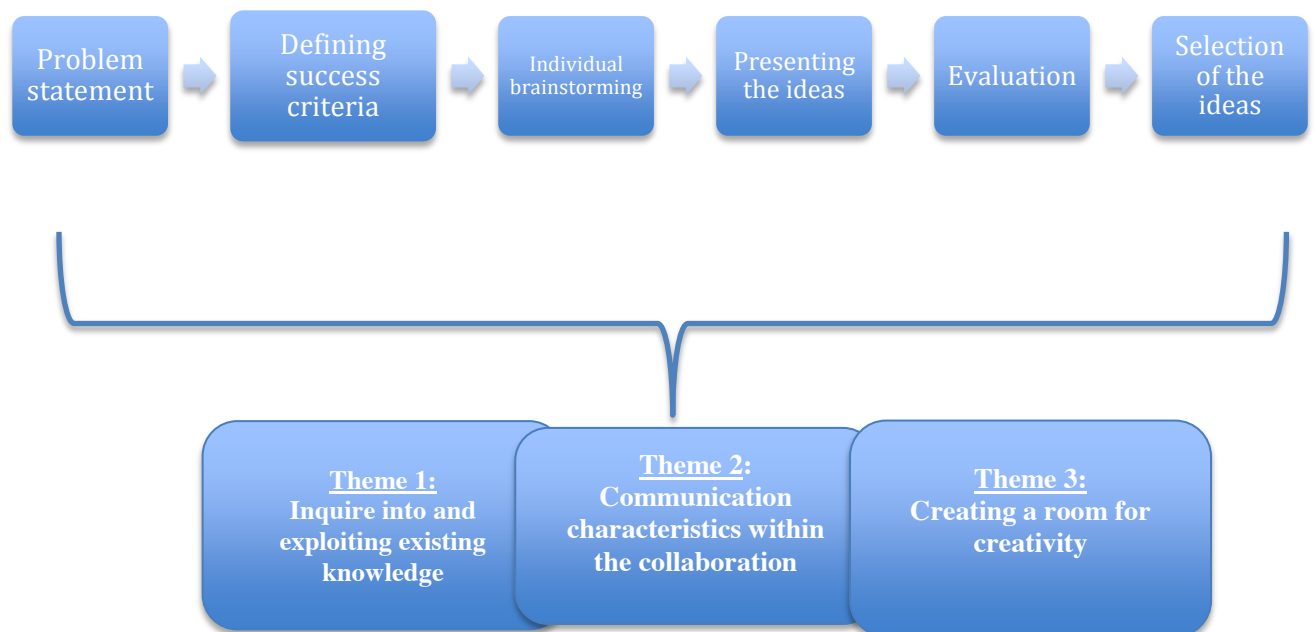


Figure 5.1 – self composed model: a visualization of the phases and themes

## 5.4 Inquire into and exploiting existing knowledge

Even if the group is already defined as a multidisciplinary group, the characteristic of the multidisciplinary was not an obvious element of the team. It was not mentioned during the interviews and it was not an obvious aspect during the observation of the Workshop.

However, through the interviews, the different formal background of the interviewees appeared, as well as differences in experience. Through the observation of the discussions in the Workshop, and through the analysis of the discussions, it became clear that the different team members were in position of different knowledge, perspectives and experiences which in this case is perceived as a contribution to a diverse collaboration in a multidisciplinary group.

In relation to the multidisciplinary collaboration, it was clearly important to the group to gather around a common mindset, both in relation to the phase of problem statement and also, the definition of the success criteria for the problem solving. Discussions went on, especially during the problem statement phase, the phase of success criteria and the phase of evaluation. The knowledge became distributed, as the group members shared and presented new knowledge along the workshop. The team members seemed engaged sharing knowledge with each other and helping each other to understand all the problems related to different topics. During the distribution, different terms and concepts were explained and demonstrated in detail. While explaining they used visualizations actively, as they drew sketches of different solutions/products.

*Axel: And then you have a fiber out of the connector that is terminated in a connector?*

*Derek: I could try and draw it a bit more.. (goes up front to the white board and draws the design while explaining the design the group is trying to understand)*

*Derek: (is still standing at the white board while explaining) They are connected after the "ESC", and there have been micro factors in the tip of the fiber that connects it.*

*Patrik: But is it also because it is pressurized? I mean that stuff on the top there..*

*Derek: I do not see a problem with that, the fiber itself is.. (points at the drawing at the white board while explaining) The steps around here is the same as a (..) the only one you have to have control of is this (..)*

***Patrik:** So why is the size like the other one?*

***Derek:** Well, because with fiber it does not pressure like the other (..)*

***Melek:** So, with fiber with it, it is (..)*

***Derek:** Yes*

In multidisciplinary collaboration, the different representational spaces are naturally more diverse than in group collaboration characterized by homogeneity. Glăveanu (2011) emphasizes the unique representational spaces and their function as a source to differentiation and their value in relation to creative processes. By communication the resources into the common representational space, it can contribute to a fruitful collaboration (ibid). This “fusion” of the unique representational space and the common representational space, creates a new representational space where new ideas and knowledge is created. Glăveanu (2011) state the importance this process has for the establishment of a shared understanding in the group. Creating a common understanding and common terms and shared concepts is helpful for the collaboration, by this you may avoid misunderstandings and the communication becomes more easily and less problematic.

***Axel:** But if we develop something commercial, we do not get the opportunity to (..)*

***Patrik:** Yes, and it is the aspect of the other component (..), which can provide solid solution*

***Facilitator:** And also if you create the solution as it is (..)*

***Axel:** Yes, exactly, and I feel that it could be more important than the other one..*

This is a selected sequence where several of the team members contributing with their perspective in relation to a discussion regard the product development. They share their perspectives, as well as they assumedly build on each others contribution within the dialogue.

During the problem statement, a lot of questions were asked and answered. One team member (Derek) seemed to be crucial for establishing a mindset towards the problem

statement. He was actively answering questions from the other team members, and he had obviously a lot of expertise knowledge around the concrete product that was to be improved and developed. The other team members were naturally turning the questions towards him when it was something they did not understand or when they group was not agreeing upon something related to the problem.

*Axel: But it is kind of important for the solution that (..)*

*Derek: But, communication is more important than the solution*

*Axel: Oh, ok. It is an aspect there with the internal speed?*

*Derek: Yeah*

In the problem statement he seemed to be crucial for the knowledge development within the group. He contributed with answers to a lot of the questions being asked. Also, when the different team members came with suggestions and ideas, he corrected several of them with information that seemed to be very important in terms of understanding the product, the interaction above is a simple example of this.

*Patrik: I think this is crucial for the solution (..)*

*Derek (Is standing beside one of the boards while visualizing the current solution of the product): For me, I am not sure if that is the most important. What I really want to find out is about the connector and the arrangement inside.*

*Patrik: Ok. So it is kind of not that important which connector we have?*

*Derek: I mean, right now we do not have any work to make any new connector. So in that sense we need to support standard connectors with (..) We have a solution for the \*\*, we do not really have a good one for the \*\*. We could use what we have today, but it is very expensive and that is also because of the difficult mechanical interface.*

*Patrik: For, with the concept we have today, we do not have an obvious way to put it?*

*Derek: Exactly.*

*Patrik: Oh, ok*

In this interaction sequence, Derek corrected Patrik in his argument, because Derek had apparently knowledge about something that Patrik did not was in possession of. Several

similar conversations appeared during the Workshop, especially during the first two phases. This reflects how important it was for him, and others, to contribute with their knowledge in the collaboration activity.

## 5.5 Communication characteristics

Communication is fundamental in relation to collaboration in teamwork. Both my theoretical foundations and empirical material emphasizes different levels of communication challenges. It concerns both the ability to formulate interests, establish trusting relationships, transfer knowledge and create meaning within the group. In addition, Bakhtin (1986) emphasizes the characteristics that creates development and generation of creativity within the dialogue.

The first two phases had several similar characteristics, as they both were characterized by communication that was open and free. The arguments that were presented were therefore not blocked or closed. Below is an example of a discussion during the problem statement:

***Patrik:** It is also a solution to drop the fiber out, and \*\**

***Facilitator:** So the “HMC” is outside?*

***Patrik:** Yes*

***Derek:** But in my head that is kind of just not bringing in the “LMA”, I do not really mind, but for me it is important that (..)*

***Patrik:** But for me, I still think that (..) And I do not think that it is that important that (..) I mean, in my head it is really how we get the fibers in and out.*

This is a typically example of how they formulated their ideas and arguments as they often started the sentences with “*I think*” or “*I feel*” or “*In my head*” or “*In my opinion*”. One can assume that these kinds of formulations promote a positive environment for collaborative activity as the arguments are not “closed”. It opens up for several of perspectives, as they are presented as individual perceptions and not a conclusion of a plural. The team members often presented their thoughts and ideas in an apparently humble way, as they were open for suggestions and input when needed.

### 5.5.1 Tension and criticism

During the second phase; “*definition of the success criteria*”, a discussion across five team members occurred. In this interaction section, they were discussing what kind of criteria was important in relation to succeed in the problem solving. But during this phase, several of the team members suggested solutions, even if it was too early to bring up. However, this conversation represents interaction of one of the ideas that was presented during the definition of the success criteria.

*Derek: I would think that it would be the same, unless we find a way to put the “DLG”*

*Shaun (express a clear insecurity while presenting the idea): Ideally, if it is possible, I do not know, but... we could use the same equipment as the operator, and we do not have to have an additional...*

*Axel (Is very quick to interrupt Shaun): But we do not have any solution for that!*

*Shaun (Still insecure): No.. Ehm..*

*Melek: But we can add it as a suggestion for a solution when we get there*

*Shaun (while expressing a more confident attitude, compared to five seconds ago): That means that we need to design it and test it and qualify it.*

*Melek: Yeah, like a filter connector with a \*\* in it. In some way*

*Facilitator: Mhm*

*Shaun: Yes, in some way*

This phase was overall characterized by more tension in the communication compared to the other phases, especially compared to the phase of selecting the ideas. Tension was at its most explicit in this phase. However, it seemed clear that this tension was constructive, only if it did not influence the social climate in the group negatively. The group members searched for possibilities to build on each others knowledge and perspectives. Through the extract we see an example of both an idea that is being presented, and also (mildly) criticized during its presentation. However, the group backed the idea and showed engagement and positive attitude towards it, in addition build on it, in spite of criticism from the one team member. If

the other team members had been passive and silent towards the idea, one can assume that the team member could have difficulties with presenting other ideas later in the Workshop. Criticism can possibly, in some case, be experienced as a personal attack.

Another aspect of tension was when the group did not understand exactly what they did not understand, or what kind of information they were depending on for understanding the problem.

*Derek: What we need to know here is the measurements, it is 5 (pointing on the diagonal side of the visualized product)..*

*Axel: (With a raised voice) But we are making our drawings here! (while he holds up a piece of paper) and we do not care about plus or minus (..) but we need to know the approximately size!*

This also emphasizes the multidisciplinary collaboration. Axel was clearly not interested in the micro details of the design, for him, the visualization was not getting him the information that he needed.

During the interviews, the team member expressed his experiences in relation to challenges with this working method:

*As a group, it is important to encourage the participants in their suggestion to a solution and not criticize at the wrong time during the creative phase. One is very vulnerable when suggesting an idea, and one can assume that the person probably think that the idea is very dumb and inappropriate. When receiving critique during the creative phase, it often happens that the person not suggest other ideas later on in the process.*

His experience with conductions of the Workshops is that criticism too early is one of the main challenges. It is two critical aspects of criticizing too early in the process, it is the aspect of the person and the aspect of the idea. If the person gets critique, it can prevent him/her to suggest other ideas later on. And also, the idea can in fact be a good one. Although the idea can sound like an inappropriate one at its presentation, it could be developed as a better one through discussion in groups.

Another characteristic of the communication was reflecting stated statements/arguments. The reflections often appeared when the questioner apparently understood what the presenter meant with the presented argument or idea. An example of this is:

*Facilitator: We are trying to cover it without the fiber (..) So that would probably be a problem statement as well*

*Axel: So what you are saying is that you do not want the fiber to drive cost in HLM, so it does not need fiber?*

*Facilitator: Yes*

*Axel: (Express an attitude that he understand him, but he asks anyway) That is what you are saying?*

*Facilitator: Yes*

*Axel: In fact that you are..*

*Shaun: (interrupts with a raised voice): But it is not only cost that... It is.. If I could choose, I would like to have variance with other functionalities due to the fiber. I mean if I could have a separate solution that would mean that it would not mess up the other stuff.. I mean, what I am saying is if there is (...) there is probably a need for a separate function.*

Here we see reflecting as communication strategy in the dialogue. Axel's intention was obviously trying to get the facilitator to understand that his suggestion is not suitable or appropriate according to Axel's perspective. Through this, one can conclude that Axel is skeptical to the facilitator's suggestion. While Shaun interrupted the conversation and elaborated with another perspective of the presented argument, and through this, the dialogue developed into a fruitful discussion regard the suggestion from the Facilitator.

### **5.5.2 Closure and informal communication**

The communication in the phase of selection was not characterized by such openness, compared to the previous phases. Instead the group members sought closure, they focused on the product and the most cost-effective ideas were emphasized, which was established as success criteria earlier on. In this final phase the group communication was still active, but



the group members did not seek tension or diversity, but it seemed like they rather worked towards a common ground. The communication was characterized by an informal form. The informal communication was occurring during the whole Workshop, but in the last phase it was in a greater extent. More joking around, and it was characterized by a less formal communication. Despite the lack of strict focus, when they were to conclude, the collaboration was characterized by humor and laughter, which seemed to add energy to the whole group.

During the interviews, the facilitator brought up this aspect while I was questioning what characterizes the challenges with the different Workshops.

*Some of the team members often brings up "unserious" and "foolish" ideas, which is, in my opinion, very important for the collaboration. Shoulders are less high, and if someone is a bit left out of the collaboration, they often get in during these moments of "informal talk"*

Through this extract, the facilitator expresses a positive attitude towards unserious communication, with some foolish ideas, which is in this case defined as informal communication. He emphasizes the pressure the participant often feels within these workshops, and that informal communication contributes to release some of this pressure.

This was very clear for me as an observant during the conduction of the Workshop, especially during the closure of the Workshop, when they where selecting the ideas. Several moments where they all laughed at something another team member said, with no connection to the product innovation. When these sequences appeared, the environment became automatically more relaxed and it appeared as a function for un-pressuring the seriousness of the discussions.

## **5.6 Creating a room for creative collaboration**

During the interviews, both of the interviewees expressed that the room for creative ideas and innovative suggestions is limited, taken a regular working day in account. Their work in terms of development of products is primarily set to be in these routinized workshops, and it is through these kinds of gatherings that they can express their innovative and creative ideas.

Through the framework of this paper, it is assumed that innovation demands a creative act. The question regarding the data material is that; what affected the ability to be creative in the Workshop? It is difficult to measure the quality of creativity in this case, but a good possibility is to look for factors that enable and which may break down creativity. From the interview, the facilitator expressed his reflection upon this:

*It is all about being open and gather the right competence in relation to what you expect to accomplish, in regards the problem statement. In innovation processes and in group creativity in a company, you have to be aware of what we are going to do, and what we are good at. What are we developing, and what can we not develop?*

The facilitator highlighted competence and knowledge as crucial factors for generating creative ideas. In addition, one needs to be open for suggestions, even if the ideas are “way out there”. Additionally, it is important to have a common goal and be aware of the limitations within the group or within the company.

The other interviewee, Shaun, expressed his thoughts around group creativity and highlighted the important factors in relation to collaboration activity and the creation of new solutions:

*When I think about group creativity compared to individual creativity, I think of how we build on each others ideas. It could be a bad idea that in a group can be developed into an important one. This is really exiting.*

Shaun highlights the importance of the different knowledge that consist within a group. Through different perspectives, one can develop a really good idea, and for him, this is an engaging factor in relation to these workshops.

### **5.6.1 Blockages**

Several of moments where caught on tape where the participants were talking outside the team, and had several meetings in one meeting. This was also something the facilitator brought up during the interview:

*A challenge is often when several of meetings takes place in one room – they discuss in small groups, when it is intended that they shall be a part of the one meeting (..) This was also the case in the Workshop you (the researcher) observed*

Several moments were observed during the Workshop, where there were two-three meetings in the same meeting, small talk between the team members. Often, the other team members did often interrupt these meetings, and comment on them. Everyone took responsibility in this facilitation, and made sure of everyone participated in the same meeting.

Challenges in regards of the Workshop was expressed during the interviews. The facilitator emphasized one specific challenge in relation to facilitating collaboration:

*It is those who have their focus on own ideas, without even consult with the rest. In this case, it is my duty to lead them on right track.*

Also the other interviewee (Shaun) brings up this subject in relation to challenges with the working method:

*Challenges are if it one or two members steals the show, and the rest of the team are inactive - this is the facilitators responsibility.*

In light of this; the main challenge is that team members are not able to cooperate. Both the facilitator and Shaun place the responsibility to the facilitator in this kind of situation. It is the facilitator's job to guide the team members into the collaboration.

### **5.6.2 Mediating artefacts**

The data material reveal that the group actively used concrete tools during the Workshop. Both computer, post-its and boards of different sort. They used the computer for searching after knowledge, and presenting presentation of visualized solutions. They used the boards actively, often in terms of structuring the outcome of the different discussion, but also in drawing visualizations of different kinds. Visualization of ideas and visualizations of existing product occurred, and it obviously made the participants aware of different challenges which they at that moment, were not aware of. It appeared that they assumedly understood each other by using visualization as a tool.

During the transition between the problem statement and definition of the success criteria, a discussion about a specific design that some of the team member did not understand took place.

*Derek: It is attached to the other one, so it does not affect the (..)*

*Axel: And then you have a fiber out of the connector that is terminated in a connector?*

*Derek: I could try and draw it a bit more (..) (goes up front to the white board and draws the design while explaining the design while the other team members are trying to understand)*

*... (Derek draws draws while continuing explaining)*

While Derek is drawing all of the participants shows, through words and expressions, that they all get a broader conception of the existing product and what the certain issue about the product is; what it is necessary to improve. Derek contributes to a lot of information here, as it seems like he has expertise knowledge in this area.

## **5.7 Conclusion of the Workshop**

The main results from the analysis is that they seemed to use each others' knowledge and experience to create understanding of the problem, and through this, they established a common understanding of how the problem could be solved. In addition to verbal communication, the use of visualization seemed crucial for this understanding to occur. Sections of both informal communication and criticism are also recognized as significant elements of the Workshop.

## 6 Discussion

The previous presented data and analysis constitute the basis for the discussion. In this chapter, I discuss the findings in light of the theoretical perspectives presented earlier. The research questions are the basis for organizing this chapter, which aims to explore how the creativity and collaboration appears within the Workshop, and which crucial factors seems to prevent and stimulate the agenda of the Workshop which was generation creative ideas that could lead to innovation. The main question framing the thesis, and the research questions are:

*How does a multidisciplinary group generate creative ideas through collaboration in the initial phase of the process of innovation?*

1. How does the creativity appear through collaboration, if at all?
2. How does the multidisciplinary group create a common platform for collaboration?
3. Which factor(s) seems to stimulate or prevent the idea generation?

The analyses of the video shows that the predetermined phases and the collaborative processes had different forms and intensity at various times during the Workshop. In the beginning of the Workshop, the collaboration was characterized by initiation and securing group diversity, before the team members started sharing and discussing experiences and knowledge which seemed to play a crucial role for further progress in the Workshop. As the group communicated and interacted, the collaboration became more characterized by tension among the team members, but also building on each others knowledge and ideas. In order to understand each other and create a common representational space, as well as express tacit knowledge (Nonaka et al. 200), it appeared that visualization had a positive impact, as they used visualizations to explain both relevant concept and terms, as well as arguments and ideas. Crucial factor for both preventing and stimulating the idea generation was observed, and both criticism and informal communication are further discussed in this chapter.

## **6.1 Creative collaboration or individual creativity?**

Through the analysis one can argue that the group were satisfied with the result of the Workshop, as they left with an expressed feeling of doing something new and right in relation to the product development. The main focus in the thesis is on creativity within and developed through group collaboration, rather than a cognitive approach which aims to explain processes of development of creative ideas by the individual mind. Before discussing how the group collaborated and established a common platform, and which factors seemed to stimulate or prevent the generation of the ideas, it is important to reflect upon whether it was individual creators behind the knowledge and ideas that occurred within the Workshop, or if it was in fact, a collaborative activity.

Despite the fact that everyone was naturally in possession of a common understanding of the field they were working within, the group consisted of different expertise knowledge and experiences. In relation to this, the exchange of knowledge among the group members seemed obviously crucial in terms of establishing a common understanding of the different challenges regarding the product development. During the first two phases, sharing of knowledge between the team members occurred frequently. The definition of both the problem statement, as well as the success criteria appeared to be dependent on the team members' contributions of their different perspectives. As presented in the theoretical framework, Glăveanu (2011) emphasizes each individuals' unique representational space's importance of and influence on the collaborative activity within a diverse creative collaboration. In spite of the assumed positive effects of diversity within collaboration for creativity, it is crucial for multidisciplinary groups to understand each other through a common understanding, with establishing a common representational space. The creation of these spaces are appearing through each individual's expressions of both their tacit and explicit knowledge (Nonaka et al., 2000).

Regardless of the team member's contributions in the sharing knowledge activity, it appeared that one team member (Derek) was crucial during the first phases of the Workshop. He answered and emphasized several of questions and challenges that occurred during the collaboration, as he corrected arguments and inputs when they were incorrect or unsuitable. While he explained different arguments and inputs, he often drew different sketches of i.e. technical solutions, in order for the team members to understand the presented argument. His

contribution within the group was quite noticeable. And in most situations, it seemed like he was the only one with the ability (knowledge) to answer the specific questions and problems that occurred. With this, one can assume that the development of creativity within the Workshop was dependent on *one* individual.

However, in relation to the theoretical framework, Derek may be defined as a “knowledge activist” (Von Krogh et al., 1997). Von Krogh, Nonaka & Ichijo (1997) emphasizes the importance of a knowledge activist in organizational development, including organizational innovation. A knowledge activist is a knowledge enabler that has its function as a catalyst for knowledge creation or construction in collaborative work (ibid). In light of this, one can assume that creative ideas were depending on his contribution, therefore, the ideas can be defined as depending on one individual’s mind. However, in spite of him being an important character in terms of construction of knowledge within the group, the creativity seemed to be a collaborative activity. In order for him to function as a knowledge activist, he was dependent on formulated and explicit articulated questions and inputs from the other team members. Furthermore, the other team members often contributed with additional information or concepts in relation to his arguments, by this, one can say that it was a collaborative activity in relation to the constructions of the knowledge and ideas that were developed within the Workshop

The Workshop was instinctive characterized as a collaborative activity, were all the team members contributed, from time to time, and communicated their perspectives, knowledge and ideas. However, one phase of the Workshop did stand out compared to the other phases; the individual brainstorming was not a collaborative activity as they formulated and wrote down their ideas individually. They presented the ideas on the white board in front, while the other team members listened without coming with comments or criticism. Some of the ideas created small discussions, as they were more controversial than the other ideas. But overall, this phase was not characterized as a group oriented activity, rather a purely individual act. This phase does not instinctive correspond with the main question of the thesis: *How does a multidisciplinary group generate creative ideas through collaboration in the initial phase of the process of innovation*. However, findings show that the quality of the creative contribution increases, if team members work alone with ideas before they are brought into the group (Girotra, Terwiesch & Ulrich 2010). Additionally, the activity was clearly dependent on what had been discussed earlier in the process; the phase of problem statement

and definition of success criteria. Through this, one can assume that the group had established a common representational space, and in fusion with the unique ones, the team members had possibly acquired a new representational space, which is referred to as the space where new and creative ideas develop (Glăveanu, 2011). Additionally, after the individual brainstorming, the group worked with the ideas in collaboration as they discussed and re-combined several of them. And in light of this, the final idea turned out to be a fusion of different individual ideas. With this, one can assume that collaborative activity had a crucial role in what was being generated by the individuals.

In terms of individual creativity, it is always a sufficient number of factors and elements that affect the individual in its generation of creativity. It is very difficult to see an individual act isolated from the environment, regardless of which perspective one takes in its investigation. However, creativity within groups is also a challenging phenomenon to describe. One can recognize several of important factors that may affect the group's ability to be creative, but it is very hard to establish and conclude the specific catalysts of the production of the creativity. However, as in this case, one can look after repeating patterns within the collaborative activity that seems to stimulate the group's ability in being creative together and building on each others ideas and perspectives.

## **6.2 Creating a common platform through collaboration**

A broad selection of literature on creativity (Glăveanu, 2011; Paulus and Nijstad, 2003) along with theoretical perspective of Bakhtin (1984) and Glăveanu (2011) focus on the diversity among individuals in relation to creative collaboration. However, if the group is to succeed in combining their different perspectives, they have to articulate their views explicit for others to understand. This is what Nonaka et al. (2000) relates to as explicit knowledge, as they draw a difference between tacit and explicit knowledge. Tacit knowledge is seen as difficult to express, as it is assumed as challenging to articulate verbally. But at the same time, tacit knowledge can be crucial to make explicit in a collaboration environment where knowledge is dependent on being shared, as the creative process often involves uniting already existing items (knowledge). One basic assumption is that creativity and innovation is consisting of developing new knowledge, but the idea creators have usually a solid knowledge of ideas before they can develop new ones (Gardner, 1993).



In multidisciplinary collaboration, the different individual representational spaces are naturally more diverse than in a common disciplinary collaboration. The different unique representational spaces function as a source of differentiation, and they can be valuable in relation to creative processes within a group (Glăveanu, 2011). The unique representational source can be defined as a symbolic artefact that mediates the collaboration. By exploring and communicating these resources that is to be found in each of the unique representational spaces, into the common representational space, it could lead to opening up for new perspectives within the group. This “fusion” of the unique representational space and the establishment of the common representational space, creates a new representational space where new ideas and knowledge can be developed.

The establishing of a common representational space was clearly important in terms of succeeding in the two first phases, and also crucial in relation to the progress of the Workshop. They were obviously dependent on to gather themselves around a common understanding of the agenda of the Workshop. The team members seemed engaged in sharing knowledge with each other, as the knowledge was characterized as distributed during the Workshop. During the distribution, different terms and concepts were explained and demonstrated in detail. In relation to this, it was a central team member (Derek), which contributed to a lot of understanding within the team, which is already defined as having a “knowledge activist” within the group. Through the analysis, it appeared that several of questions were answered through use of visualization as a tool in his explanations, however, he was not the only one who was using the boards within the room to draw different solutions during the Workshop, other team members did also use this to explain different topics.

In addition to the aspect of visualization was being used when the different team members did not understand different topics, it was also used in relation to when the presenter did not explain different topics, using only words. It seemed to be an appropriate tool for expressing their tacit knowledge, in other words, knowledge that are hard to articulate in words. While drawing, it appeared that the presenter had more words to use in relation to explaining the concrete topic, it was words that the presenter did not express before the drawing was presented on the board. This indicates that visualization was an important component for unleashing crucial knowledge, possibly in form of tacit knowledge, regard the creation of the common representational space. As Nonaka et al. (2000) emphasizes, both tacit and explicit knowledge may be possible contributors regard knowledge construction. Explicit knowledge

is highly available as it is verbalized and articulated. For unleashing important knowledge that are hidden in individuals, the theoretical framework highlights i.e. drawings as a catalyst in this process. It appeared to be the case in this situation. Through the visualization, the discussion got clearly more in depth compared to when the visualization was lacking from the board.

### **6.2.1 Visualization as a “boundary object”**

During the first phases, but also during the presentation and evaluation of the ideas, visualization was regularly used. Through the analysis of the dialogue, it appeared that the team members got an understanding of the specific topic that were discussed when visualizations were available for the team members. Several of the team members chose drawing as an aid in their explanations when the other team members did not understand their argument, idea or suggestion. When it was visualized, the communication got noticeable more in depth and they could discuss with an assumed enhanced understanding compared to when the drawings did not exist. Especially in relation to situations where it was a clear diversity in the different perspectives, the visualization seemed to mediate understanding and meaning for the team members in relation to the current discussion. Through this, one can say that visualization had its function as a “boundary object” in the collaboration, as well as in the construction of a common representational space. As Doll (2009) emphasizes in the thesis’ theoretical framework; boundary objects have the ability to couple different social worlds in order to converge perspectives and give them meanings. However, it does not necessarily mean that each of the team members drew on the exact same interpretation through the visualization, but the visualization had an assumed function of collecting the different perspectives together into a shared understanding of what was being discussed.

## **6.3 Factors that stimulates or prevents the creativity**

The creative solution of a problem is very often equivalent to reaching a new perspective, and in Glăveanu’s (2011) framework, this is called creating a new representational space. Both literature on creativity research studies (Glăveanu, forthcoming) and Bakhtin (1984) focus on the importance of diversity in the process of creating new ideas. However, if the group members are to succeed in combining their different perspectives, they have to articulate their views in order to make themselves understandable. This process of articulation resembles what Nonaka et al. (2000) refers to as going from tacit to explicit knowledge, which means

that the group members articulate their thoughts into explicit sentences, accessible to others through their interaction. As already mentioned earlier in the discussion, visualization seemed to contribute in unleashing the tacit knowledge, and when the group members articulated their expert views during discussions, it was noticeable how they experimented with words and concepts that enabled them to convey meaning for themselves individually, but also for the other team members listening. According to Bakhtin (1984), we all have individual voices, shaped through social languages. A profession, an institution or a department, develops its own social language. This is possibly why the group members with different backgrounds, from for instance project managing or mechanical development in the Company, used different concepts and terms. In relation to this, the team members often repeated what the other member said, to ensure that they understood correctly. To ensure that each and every one could make themselves understood, this seemed to have an impact on the collaboration. Therefore, the common sharing within the group can be seen as crucial regarding the group ability to avoid misunderstandings, and further, create a common understanding among the team members. The common understanding makes it possible for groups to share understandable knowledge and further, learn from each other. Learning in this case is a rather bold statement, as learning requires, among other factors, change in behavior. I cannot state that the participants went through a learning process, the data set is too limited for this conclusion. But the sharing of knowledge did obviously open several doors, and the team members seemed to develop a meaning through collaboration and exchange of information, experience and knowledge.

As the group members got further in their processing of information, they seemed to seek more discussion around the subjects, in order to learn even more. Over and over again they went back and forth in their exploration while confronting each other's individual expertise. Through these discussions, it was obviously tension within the group. Bakhtin (1986) says that a fruitful dialogue must have room for alterity, as this is a constructive force and not a negative aspect in the dialogue. When communicating, we have an urge to reach a shared understanding which is defined as the concept of intersubjectivity, but additionally we also urge to create new meaning through alterity. Different perspectives, concepts, and knowledge were obviously necessary to ensure the group's ability to produce new thoughts. By provoking and questioning each other's views, it appeared noticeable tension within the group, as well as the group members seemed to expand their perspectives. This particular exchange of different perspectives was quite intense in certain parts of the entire process.

At the same time there were, in argumentation and presenting ideas/suggestions, a repeated use of the words which seemed to open up for collaboration and free them selves for friction and tension. When looking in the analysis at how knowledge was built, and the underlying relational conditions for it, it seemed particularly important that the group members could engage in while respecting each other's views. They seemed to seek a positive climate in order for confrontations to be constructive. The oral formulations in the presentation of suggestions/ideas/arguments often started with: *“I feel that..”*, *“In my head it is..”*, *“In my opinion it is..”*, etc. In a multidisciplinary collaboration where different perspectives are confronting each other, one can assume that formulations like these are a fruitful approach for establishing intersubjectivity in the dialogue. Even though tension and alterity is important for creativity to appear within a group collaboration, it is important to create a shared and respectful understanding among the group members.

However, one central aspect that appeared during the interview was that both of the interviewees stated challenges with the method, and they highlighted the aspect of dominant participants as well as criticism to early in the process of innovation. Conclusions and criticism can often be related to unconstructive tension, and one can assume that it is not that easy to distinguish between constructive tension and criticism.

In Bakhtin's (1984) view, knowledge is created in the tension between different voices, in this case, the tension is assumed as a consequence of the multidisciplinary composition of the group. Creative understanding is a tool to be used in order to make sense of other people's utterances although they speak a different social language. In light of this, the friction and critical voices was actually observed as important in order to secure group dynamics. Thus, in the multidisciplinary group it seemed important to engage in respectful dialogue to avoid the discussions turning into conflicts between members, rather than discussing challenges from different angles.

Regardless, it is also the aspect of how the criticism or comments is served the receiver. This can be connected to what Edwards (2010) defines as resourceful practitioners and resourceful agency. In a collaborative team work for innovation, it can be considered important to be in possession of what she defines as necessary abilities in form of resourceful agency. This includes the capacity to recognize how others interpret and react to problems within the team work, but also the capacity to understand and familiarize the others unique resources, or their

unique representational space. In some interaction sections, it seemed like the criticism or the reaction to suggestions of ideas was communicated in an unfortunate way. However, once one or more of the team members criticized too early during the Workshop, the facilitator or the other team members often intervened and reduced the friction which appeared as a consequence of criticism.

### **6.3.1 Sections with low degree of formalization**

Both during the observation and the interviews, low degree of formalization was a clear contribution in the collaboration. The impact of structures and strategies has been studied earlier, and low degree of formalization is assumed to have a positive effect on innovation processes (Anderson et al., 2014). During the interviews the facilitator expressed his opinion regarding laughing and fooling around as an important contribute to the team work. In his opinion, without unserious/informal communication, something is lost in the teamwork. Additionally, during these Workshops, several of the team members experience a strong feeling of seriousness and pressure, informal conversations can therefor contribute positively in terms of repressing the situation which then again can lead the participants to willingly share and present relevant experiences, knowledge and ideas. During the Workshop, all of the phases consisted of some irrelevant talk and communication. Laughing, and fooling around appeared to lightened up the mood among the team members.

The aspect of creating a trusting environment for collaboration can be an important aspect of collaboration. In relation to present new and creative ideas, it can be experienced as revealing and uncomfortable for some. With informal sections of communication, this may contribute positively in regards to the team members' motivation and engagement in expressing ideas that occurs during the collaboration.

However, in spite of the assumed positive elements of informal communication, an overall structure seemed to be a necessary feature in the Workshop. Several of the team members clearly lost their attention when there was too much talking outside the relevant theme of the Workshop. The facilitator, as well as several of the team members, took responsibility in these situations, and made sure that everyone participated in the collaboration activity.

During the interviews, the facilitator brought up “several meetings within the one meeting” as a challenge. He highlighted the importance of everyone participating in the single collaboration activity, and not establish “communities” within the collaboration.

In relation to this, informal communication is not necessarily understood as a prevention of the collaboration. It appeared that the informal dialogue contributed building the team, as everyone participated in the dialogue when sections like these occurred during the Workshop. However, it seemed necessary to maintain a certain structure within the collaboration, as they clearly lost their attention when there were different topics that did not had relation to the work of the product development. In addition, several of small talks appeared both in the aftermath of to the joking, but also with no connection to the jokes. It was often small discussions within the group that was not observed as included in the team collaboration. In these situations, all of the team members contributed in guiding the team into a share collaboration. In relation to the informal communication in form of joking, it was obviously time consuming, but possibly it is a good investment in terms of building a trusting and fruitful collaboration for creative collaboration. As the interviewees expressed; these situations are often experienced as intense and pressuring, it can be healthy unleash this pressure by breaking it up with jokes and other irrelevant talk.

# 7 Conclusion

In this paper I have explored if and how creativity occurs within a collaborative activity, and what characterizes an organizational routinized Workshop for product innovation. I have studied how creativity is created in terms of a multidisciplinary group collaboration, where I have been focusing on the dialogue between the collaborators, including interaction with artefacts. In addition, I have recognized some factors that seemed to be crucial in relation to prevent and stimulate the generation of the ideas within the group. In order to explore these questions, I conducted an observation of the Workshop, where the material consists of both field notes and video. I combined the video data with qualitative interviews with two of the team members from the Workshop.

## 7.1 Final reflections of the discussion

Despite the complexity of creative knowledge development and explaining how creativity appears, through this study, central characteristics was recognized within the group collaboration, understood through a sociocultural framework. Each phase had different characteristics as they all had different agenda or purposes in relation to the product innovation. Clearly, the group prioritized time to establish a common understanding of the problem statement and success criteria. Through these phases, discussions appeared and the concept of alterity seemed to promote the group's ability to create new ideas, as well as creating a new representational space for developing these. However, the concept of intersubjectivity was crucial regards understanding each other's different views and perspectives and further, establish a common representational space.

One relevant question that has been brought up by several of researchers are if the creativity exists within individuals or within a group. If creative solutions are a result of an individual's mental structures, or if it is actually a result of collaboration. Clearly, it was dominant team members which held up their ideas as the ideally solution, but through constructive dialogues and collaboration, they discovered, as a team, which idea was the most appropriate one for being prototyped and further developed. Within the first phases, it was one particular team member (Derek) which contributed in regards creating understanding within the group. Clearly, he was in possession of relevant knowledge, both regards the product which was to

be innovated, but also in relation to crucial factors in the development of the product. His role in the team work may be considered as “knowledge activist”. The role description contains his ability to catalyze the process of developing a common understanding for the group, but also him and his visualizations as a contributor in unleashing tacit knowledge. However, him being a “knowledge activist” should not be perceived as it was a purely individual construction of the generated ideas within the Workshop. He was clearly dependent on the other participants’ contributions in terms of inputs, questions and additionally facts/knowledge.

In spite of him being an important contributor, it was collaboration in the group within all of the phases, except when they were working individually writing down their ideas. The dialogues which appeared before this phase, with the different discussions, seemed to be a contribution in the development of the individual ideas. Through analyzing the dialogue, it appeared that they constructed new knowledge through the existing knowledge among the individuals that were present within the group.

The analyses indicate that when specialists with different educational background, as well as different experiences, constructs a common knowledge as a platform from which they can move on to develop innovative ideas, they are able to recognize each other's competences and having openness, curiosity and respect for other's experiences and views. However, one can assume that it is not sufficient just to bring together group members with special expertise from different disciplines; they need additional relational skills for the collaboration to succeed. This is perceived in relation to Edward’s (2010) concept of relational agency.

Through the interviews, several of aspect were brought up as crucial factors in terms of establishing a constructive collaboration for idea generation. Dominant participants and criticism was highlighted. Criticism and tension did not seem like a destructive element in the collaboration, only if it did not influence the climate within the group. In addition, the team members took often responsibility when criticism occurred, through supporting the criticized idea, by nuance the critique, and also sometimes, support the one who suggested the idea.

The question of what affects idea generation in the initial phase of a project and creativity in collaboration is a complex matter. However, what affected most strongly, in this research study, understood through a limited theoretical framework, is that the interaction between



participants and the observed attitude of the participants plays a certain amount of role. The dialogue and discussions is assumed as a contribution in the development of the ideas and creation of meaning. Through the dialogue, they assumedly constructed ideas through combining existing knowledge within each of the unique representational spaces.

### **7.1.1 The thesis contribution**

Visualization was recognized as being a crucial factor with a double function – as it both assumedly functioned as a contributor in unleashing possibly crucial knowledge in terms of creating a common understanding, and further, developing a new representational space, but also as a boundary object within the team work, which are considered as two important aspects within diverse collaborative work. In light of this, my study reveals new and other aspects, compared to i.e. Aasen & Johannessen (2009). In their study they are also approaching the innovation process as a communicative process, by conducting data collection through a “close study” within an innovation process. As Aasen & Johannessen (2009) also suggests; the innovation process is fundamentally communicative, and in this interaction, the elements of pluralism in the dialogue and building a common understanding are crucial. However, it does not seem as Aasen & Johannessen (2009) has the same results as this study, especially in terms of understanding the tools and objects within the communication. This can be explained in light of them taking a management perspective in their understanding and explanation. The selected theories in this study have limited the view of the phenomenon. By selecting other theoretical perspectives, it would probably have generated different answers as the theoretical framework provide guidelines in terms of how to understand the data material. Due to the selected theoretical concepts, I am in no position to evaluate the individuals’ motivation in relation to the Workshop, nor other cognitive mechanisms impacts on the collaboration and the result of the Workshop. However, the sociocultural analytical approach may be considered appropriate in terms of reveal factors that other theoretical perspectives cannot do, such as the double function in the use of visualization.

### **7.1.2 Limitations and further directions**

The thesis has a number of personal and scientific limitations due to framing, time and choices made along the way. Personal limitations are mainly related to the role as a researcher. This paper is the author's first research work, where missing experience can lead

to novice mistake in terms of scientific restrictions, both choices about refinements and research design. I have tried to exploit a great amount of the knowledge that I have achieved during my studies in educational science. In addition to existing knowledge, I have also expanded a wider perspective on existing knowledge, especially in terms of elements in the theoretical framework. As I had an exploratory research design, I was committed to adjust the theoretical framework to the available data material.

In addition to the communication, there are a lot of other factors that determines if the collaboration ends up with a positive result. In this case, I had to appraisal the study and take a micro perspective in terms of focusing on selected factors and elements within the Workshop. The thesis is of course a small contribution taking the research field in account. My intention was to explore one simple case and achieve an understanding of how this case can be related to previous research, and further, understand the data material through a sociocultural framing. It is impossible and neither an aim, to generalize this contribution to other situations and contexts. For this to happen, it demands a broader data collection with several of different cases. Despite this, I experience that the generated results of this study could be a contribution for later research projects, in light of researcher's tradition in focusing on the individual within creative developments, and explaining creativity through socio-cognitive approaches. Further direction for research can therefore be in relation to Glăveanu's (2011) suggestion, combining both socio-cognitive and sociocultural approach where he suggests to bridge the "gap" between socio-cognitive and sociocultural approach. This also resembles with the review of the research field; there are not yet many studies on multilateral and multi levels of analysis, but it is an area of increasing interest. Both socio-cognitive and sociocultural approaches would potentially benefit from a closer dialogue. Group creativity (socio-cognitive) studies might be enriched by taking more into account processes outside the individual mind that contribute to the creative outcome. At the same time, researchers focused on collaborations might find it useful to consider the role of cognitive mechanisms (such as memory or attention) for both discovering and using these resources.

Finally, I want to repeat Glăveanu (2011:11) "The sociocultural approach to creativity re-emerged relatively recently and has yet to develop suitable frameworks for explaining how people are creative together". With the thesis, I hope not only to contribute in a greater understanding of how we are creative together, but also, contribute to later researcher's work in the development of a broader framework for explaining how people are creative together

in a sociocultural context. The theoretical framework was an attempt of integrate different components which was considered relevant contributions in terms of building on Glăveanu's forthcoming framework; The Shared Representational Space Model (Glăveanu, forthcoming).



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# Appendix

## 7.2 Appendix 1

Receipt from the Norwegian Social Science Data Services:

**Norsk samfunnsvitenskapelig datatjeneste AS**  
NORWEGIAN SOCIAL SCIENCE DATA SERVICES



Harald Høegsnes gate 29  
N-1007 Bergen  
Norge  
Tel: +47 55 58 21 57  
Fak: +47 55 58 95 50  
nsd@nsd.uib.no  
www.nsd.uib.no  
Org.nr. 985 371 884

Terje Grønning  
Institutt for pedagogikk Universitetet i Oslo  
Postboks 1092 Blindern  
0317 OSLO

Vår dato: 22.01.2016

Vår ref: 46190 / 3 / MBI

Deres dato:

Deres ref:

### TILBAKEMELDING PÅ MELDING OM BEHANDLING AV PERSONOPPLYSNINGER

Vi viser til melding om behandling av personopplysninger, mottatt 17.12.2015. Meldingen gjelder prosjektet:

46190	<i>En evaluering av workshop som metode for innovasjon av produkter/løsninger innenfor oljenæringen</i>
Behandlingsansvarlig	Universitetet i Oslo, ved institusjonens øverste leder
Daglig ansvarlig	Terje Grønning
Student	Lotte Furuviik Sand

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

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

Det gjøres oppmerksom på at det skal gis ny melding dersom behandlingen endres i forhold til de opplysninger som ligger til grunn for personvernombudets vurdering. Endringsmeldinger gis via et eget skjema, <http://www.nsd.uib.no/personvern/meldeplikt/skjema.html>. Det skal også gis melding etter tre år dersom prosjektet fortsatt pågår. Meldinger skal skje skriftlig til ombudet.

Personvernombudet har lagt ut opplysninger om prosjektet i en offentlig database, <http://pvo.nsd.no/prosjekt>.

Personvernombudet vil ved prosjektets avslutning, 27.05.2016, rette en henvendelse angående status for behandlingen av personopplysninger.

Vennlig hilsen

Katrine Utaaker Segadal

Marte Byrkjeland

Kontaktperson: Marte Byrkjeland tlf: 55 58 36 01

*Dokumentet er elektronisk produsert og godkjent ved NSDs rutiner for elektronisk godkjenning.*

*Avdelingskontor / District Office*

*OSLO NSD: Universitetet i Oslo, Postboks 1092 Blindern, 0316 Oslo. Tel: +47 22 85 52 11. nsd@uo.no*

*TRONDHEIM NSD: Norges teknisk-naturvitenskapelige universitet, 7801 Trondheim. Tel: +47 73 59 99 07. kjo@nsd.uib.no*

*BIKSJØEN NSD: SVS, Universitetet i Tromsø, 9037 Tromsø. Tel: +47 77 64 43 36. nsd@uib.no*

## 7.3 Appendix 2

The interview guide that were used in the interviews with the facilitator and the team member

### **Introduction:**

- Presentation of myself and of my project
- The aim with the interview
- Agreement for participation
- Permission to use sound recorder

### **Could you introduce yourself?**

- How does your educational background look like?
- How long have you been working in the Company?
- What is your occupation?
- Have you had other positions?
- What are your responsibilities?

### **Experiences of innovation and creativity within the Company**

- My main concepts for the thesis is innovation and group creativity – how do you experience these concepts?
- What is your experience with rethinking established practices within the Company?
- Do you feel it is space for suggesting rethought ideas during your daily work?
- Do you experience a greater focus on innovation now than earlier (before the reduction of the oil price)?

### **The Workshop**

- How many have you participated?
- How do you (and others) prepare for these?
- Why are you using this method for product development?
- What is, in your opinion, the positive effects of using this method?
- Have you experienced challenges during the conductions?
  
- If time: Is it anything you want to add?

## 7.4 Appendix 3

The information and consent letter, sent out to all informants who were asked to participate:

### **Will you participate in my research project?**

#### **Background**

I'm writing my thesis in "*workplace learning*", where the focus is on innovation, creativity and learning. In my thesis I want to see how you organize your workshops, and how the process is structured. Further, I want to find some "critical" characteristics, that seem to promote, or/and, prevent the generation of the creative ideas.

My research questions aim to explore: "How *does a group generate creative ideas in the initial phase of an innovation process?*"

#### **Participation in the study**

Participation in the study implies that your activity in the workshop can be used in the analysis of my thesis, and that we carry out an interview. The interview will last for around 30-45 minutes and will be taped. Personal information about you will not be used in the thesis, or in any other situations. Name, contact info and other personal details will be made anonymous. The organization will also be anonymous, as I will refer to "the organization" or "the company" in the final report. I will not include elements that can lead to, or risks, recognitions of both specific persons and specific organization.

#### **What happens after the collection of the data?**

All of your information will be kept confidentially. It will only be available for the student and the supervisor. Everything will be stored in a computer, locked with username and password. It is not an intention to use full names or recognizable information of you, not in the thesis or in other purposes.

My project will be delivered for evaluation May 2016/June 2016. When I have completed and delivered my report, all the collected information will be deleted.

#### **You are not forced**

It's voluntary to participate in this research project. You have the right to step out of the project, both during and after the collection of the data material. If you decide to step out of the project, all the data of you will be deleted. This study is also reported to the office of data protection of research, Norwegian Social Science Data Service Corporation (*Personvernombudet for forskning, Norsk samfunnsvitenskapelig datatjeneste AS*)

If you have any further questions or comments, do not hesitate to contact me, Lotte Furuvik Sand (+47 \*\*\*\*\*) or the supervisor Terje Grønning (+47 \*\*\*\*\*)

#### **Consent to participation**

I have received information about this research project, and I will participate:

-----  
(Signature

date)