An Entrepreneurial Perspective on Developing a Negotiation Simulator

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May 2007

Acknowledgements

First, I would like to thank Associate Professor Dr. Thomas Hoff for inviting me to participate in this project. The project was a privilege to be able to participate in, and through the academic as well as the process challenges, it have made a impact for years to come.

Second, I would like to thank my fellow students and partners at Simoveo. Benedicte Biørnstad have challenged me more than anyone has before, which have made me a better professional and team-worker. I would like to thank Ina Kook Rambøl for being so supportive and encouraging for me personally and for the group. Kjell-Morten Bratsberg Thorsen is the first person I would hire, and the last person I would fire, without his knowledge this project would never have reached the level its in.
And lastely, I will thank Paul Andreas Lundeby for sticking out with me everyday since ex.phil. Its been some fantastic six years, and looking forward to many more.

Then I would like to thank Associate Professor Dr. Thomas Hoff for being my lead advisor through the year. Karina Corbett for being so extremely kind to do the proof reading on my paper. Thanks to the university of Oslo, Department of Psychology, for lending us facilities and equipment through the year, for all the participants that took their time to be interviewed, observed, and tested. Thank you to NetLife Research for the use of their facilities.

Thanks to my mum and dad for all kind of invaluable support through the year, and my friends and rest of my family for keeping me in the loop even if I used all my time on the project. Thanks to all the lads at Hammersborg FK and D.F.K.V. to keep me in shape.

Lastly and most important I would like to thank to the two most important things in my life, Solveig and Liverpool F.C. Solveig for being the love of my life and Liverpool for being sure that I'll never walk alone.

Kjell-Are Furnes
Oslo, 2007

Abstract

Motivated by the challenge of combining psychological theories and methods with high-tech gaming and simulating technology, a project was carried out to develop a simulator that could train people in the skill of negotiation. An analysis of the existing theory, interviews with experienced negotiators and observations of negotiation in action formed the basis for a User Centred Design process. Through the application of Contextual Design methods, traditional qualitative methods, and a Usability test, this process has currently resulted in the overall design of a training program and an early design prototype. This work is described in the following document. In addition this paper will add an exploratory perspective to the scarcely researched area of establishing a venture that is spun off from the university, with the goal to make it easier for other companies, students, and faculties to establish venture companies, by elaborating the process and the experiences connected to developing a venture spin-off at the university. The paper compares a case with four other university spin-offs, described through four different process theories; the life cycle, teleological, dialectic, and the evolutionary. The main findings indicate that the universities role for the spin-offs are varying but that the universities impact could inhibit the process through administrative formalities, and difficult tehnostructure.

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Simulating Skills

—exploring skill development through the design of a game-based training simulator

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Preface

This document is the end result of a research project conducted by five master's students in Psychology. As individuals we were united by the common wish to use the thesis as an opportunity to produce something other than the traditional research we had worked on earlier in our academic careers. We saw a need for a more practical approach to research within the field of Industrial and Organisational Psychology at the University of Oslo, a need we strongly wanted to address. Doing research that would apply psychological theory to an everyday work situation was something that was important to us, as well as developing a product that could benefit an end-user.

There are many areas where this type of research is needed but seldom carried out, which served as an inspiration for us. It is not difficult to speculate as to at least one of the reasons why this type of research is so seldom done. The level of innate insecurity is high, demanding that any researcher throws him/herself out into the unknown without a safety net. For us this knowledge served not as a hindrance but as something exhilarating. Knowing that we would be able to carry out exploratory research and break new ground within our academic field was an inspiration to all of us. In addition to breaking new ground theoretically, embarking on this journey as a group was an innovation in itself. We knew that this would allow us to acquire skills within the area of teamwork and at the same time to develop and grow as individuals.

In the document "Simulating Skills—exploring skill development through the design of a game-based training simulator" the group's work is described, giving a detailed picture of both what we did, how we did it, and why we chose the methods we did. The document is divided into two, with the first section detailing our activities in chronological order. In the spirit of Action Research this part is important in order to fully comprehend our focus on the procedural aspects of our work. The processes were in and of themselves considered part of our project and therefore explaining them is of central importance. The second part of the document is dedicated to presenting the methods we used in the development of our product. The User Centred Design process that was gone through is described, as well as the methodological choices we made throughout the project period.

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From idea to simulator

Initiating the project

On February 8., 2006 a group of seven master's students were presented with an idea for a possible master thesis project at a meeting at the Department of Psychology, University of Oslo. Associate professor Thomas Hoff initiated this gathering, having met the students through his work as a lecturer in Work- and Organizational Psychology on the master's degree. At the meeting he presented the concept of developing a game-based work simulator founded on relevant psychological theory, through User Centred Design methods[1]. On the basis of this raw sketch six of the students committed themselves within a few weeks to this project, and formed the group MOP (Master Oppgave Prosjektet)[2]. During this spring the students met regularly as MOP in addition to finishing their obligatory courses in Work- and Organizational Psychology and Quantitative- and Qualitative Methods. The students met again after summer break and early that autumn we decided to change our name to Simoveo, which is the name of the group today.

At the first meeting we were presented with the idea of developing a work simulator based on gaming technology. The question in focus was whether it would be possible to combine high-tech simulating technology with basic organisational theory, cognitive psychology and human factors. In his presentation Hoff used as examples large international companies as potential users of such a simulator. It was suggested that the simulator could be sold to the end users in the different firms. After extensive simulator training the employees would develop skills they could use in their professional lives. This concept was presented both as a research project and as a potential business idea.

Three ideas as to the content of the simulator were introduced; negotiation technique, decision making, and conflict management. At the group meetings of spring 2006 additional ideas were developed and worked on. The concept of making a simulator in order to learn or practice on different skills was the foundation for the group's further work on developing and brainstorming new ideas. Spanning as wide and broad as possible the group wanted to

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[1] These methods are described in a later section of this document.

[2] The group was later reduced to five students and this will be elaborated on later in this document.

explore the academic and business potential of the different ideas and also explore the excitement the different ideas evoked in the group.

Additionally and in parallel with developing different ideas concerning the simulator, the group members started to orientate themselves towards different areas of individual focus. This process started off with a workshop in mid-April 2006 where the group members were invited to reflect upon their possible future roles in the project. Three main focus areas were outlined; business, management, and sales; design and development; and the theoretical and scientific content of the simulator. This workshop put focus on important topics and aggregated questions that the group had to spend time discussing and working on during this spring. It was important to decide what roles the different members should have, and how and in what ways the different group members could complement each other. Should the different theses be dependent or independent of each other, dependent or independent of the product? Who wanted to write about what? The dynamics of this process developed over time. The result of this is reflected in the individual sections of the theses.

Deciding on an idea

The group had its first official meeting in the middle of August. We picked up on the work we had started before the summer break and continued the process of developing ideas for the simulator and individual suggestions for master's theses. (For a detailed plan of our work, see Appendix A.)

During the summer the University had made a decision to allocate one of its rooms to innovation, and they put this room at our disposal for the duration of the project. The innovation lab contained working areas for all of the group members, presentation and technical equipment, as well as plenty of wall space suitable for our creative processes[3].

A workshop was arranged in order to focus on the process aspects of the groups' work. It was important to reach a decision concerning the roles of the different members of the project, as well as spending time on deciding on rules for intra-group interaction. In order to facilitate this work, our focus was to compose a group statement that included this information as well as decision-making protocols, visions and future goals.

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[3] An illustration of the importance of the walls will be given in a later section of this document.

In the process of developing ideas for the content of the simulator, the group made a list of different criteria regarding the development of the simulator. Our goal was to attempt to develop a product within an area that would not be considered controversial in the sense that psychological theory would be used to take advantage of or manipulate specific groups. In addition, the developed product needed to be firmly grounded in academic theory. The project had to be manageable within the scope of the project period and within the existing knowledge in the group and/or the knowledge within the reach of the group for instance through the network of personal contacts of each group member. It had to be manageable regarding technology as well, and the use of technology should be looked upon as valuable in itself. There also had to exist a demand in the marketplace for the simulator and a potential for profit. Additionally, it was important for the group to carry out a project we believed in and one on a topic we considered fun. We wanted the project to be meaningful both for each of the group's members but also serve a greater purpose. The reason for this list was to ensure that we at all times focused on what we regarded as important and that we continuously included these reflections in our work.

As already mentioned, the group had taken on a broad perspective and aimed widely in their work on developing ideas for the simulator. To this end the group had several brainstorming sessions where lists of potential ideas for the simulator were the end product. From this list, that at one point contained over twenty ideas, the group considered each idea thoroughly in order to eliminate the ones that were of least interest. This elimination process resulted in a list of eight ideas. At one point it was decided that the group should split into three teams and rotate the different ideas between them. Inspired by parallel design (Nielsen, 1994), this was carried out to expand on the different ideas as effectively as possible, and also to avoid anyone having personal favourites. In order for the different teams to inform each other about the different findings and developments of ideas, the group had dedicated meetings where we all gathered and new material was presented, evaluated and elaborated on with pros and cons. The different ideas were also evaluated against the list of criteria already mentioned. The goal of this process was to eliminate ideas or try to incorporate parts of the eliminated ideas into new ones. The core activity was consolidating ideas with the ultimate aim of ending up with three main ideas. These three would represent an aggregate of the best of the whole pool.

At the same time as the group developed the different ideas they continuously consulted research literature and different references and Internet sites in order to find out what had already been done in the different areas and on the different topics. This included a presentation of a similar project conducted by a research group in the U.S. (Aldrich, 2004).

In parallel with the work detailed above, each group member worked on his or her individual project description that was to be handed in mid-September. The members presented their outlines to each other in order to coordinate their writings with the group.

Early in September, three weeks into the semester, the group was reduced from six to five members as one of the students decided to quit the project. It was then up to the rest of the group to make a decision on which one of the three remaining ideas to move forward with. A panel of in-house experts was invited to give us input on the remaining ideas and comment on which of the three was the one with the greatest potential. The panel's evaluation coincided with the evaluations of the group itself, and when choosing which of the three ideas to develop, the decision fell unanimously on the negotiation simulator. Developing a negotiation simulator was from now on the main focus of the groups work.

Exploring the idea

Different topics and questions emerged as the group started working on the negotiation idea. Important questions were how many users should be able to play the game simultaneously—one or many users at the same time, whether the user(s) should be alone in the game or interact with some of the other users in order to achieve a common goal or not, or just play against the machine, or perhaps both? The group discussed the possibility of making different versions of the negotiation game implementing different alternatives to the issues that were discussed. Additionally the question regarding whether we should have one or more moderators and the degree of their involvement, was addressed. We also focused on what the main learning outcome of the simulator training would be, and brainstormed ideas regarding the best technical solutions. As well as that, we decided to implement some of the most promising features of one of the other ideas that we had already eliminated. Our aim was to implement as much psychological theory as possible both in the simulator itself and in the training course package.

The group then repeated the successful method of dividing itself into smaller groups in order to work on different topics regarding simulation and negotiation in parallel. One group focused on negotiation and explored the literature in order to gain an overview of the main theories and research. The other group researched the topic of simulation and learning effects of using simulators in training. An extensive literature search was needed in order to gather information about these topics. Evaluating these searches as well as identifying literature of particular interest was focused on (Aldrich, 2005; Allen, 2003; Balachandra, Bordone, Menkel-Meadow, Ringstrom, & Sarath, 2005; Max H. Bazerman, 2006; Cohen, 2002; Dreyfus & Dreyfus, 1986; Florea et al., 2003; Gentner, Loewenstein, & Thompson, 2003; Gillespie, Thompson, Loewenstein, & Gentner, 1999; Hunsaker, Whitney, & Hunsaker, 1983; Poole, 2004; Quinn, 2005; Reeves, Wellman, & Grosof, 2002; Reilly, 2005; Schweitzer & DeChurch, 2001; Stark, Fam, Waller, & Tian, 2005; Suchman, 1987; Vecchi, Hasselt, & Romano, 2005; Watkins, 1999). Several books were also summarised in presentations, in an attempt to discover the overreaching themes and directions within negotiation (M. H. Bazerman & Neale, 1992; Fisher & Ury, 1981; Karass, 1970; Kochan & Lipsky, 2003; Kremenyuk, 2002; Marsh, 1984; Plous, 1993; Pruitt, 1981; Raiffa, 1982, 2002; Rubin & Brown, 1975; Steele, Murphy, & Russill, 1989; L. L. Thompson, 2001; Von Neumann & Morgenstern, 1953; Walton & McKersie, 1991). The results of these searches were presented to the group with the aim of keeping all the members fully apprised of each other's findings. Several presentations were held by the group members, for instance on the topic of the McGill Negotiation Simulator used at the University in Canadian by the same name (Ross, Pollman, Perry, Welty, & Jones, 2001; Roston, 1994) and articles or books considered to be of particular interest to the group at the stage we were; trying to introduce ourselves quickly to the central themes in negotiation research (Boven & Thompson, 2003; Brett & Gelfand, 2004; Loewenstein & Thompson, 2000; McAndrew & Phillips, 2005; Nadler, Thompson, & Boven, 2003; Poitras & Bowen, 2002; Shapiro, 2002; L. Thompson, 1990a, 1990b). Literature searches, reading and updating on articles, books and journals were part of ongoing processes that involved all members of the group.

As well as familiarising ourselves with the literature we needed to get to know the future users of the simulator. In accordance with the User Centred Design paradigm, we carried out a workshop in order to define our typical user. Our target user was defined as male/female and of 25 to 45 years of age. Nationality would be primarily Norwegian and he/she would speak both Norwegian and English, having completed high school. His/her field of

occupation would be as a professional, primarily but not exclusively within the field of advertising, consulting, telecoms, accounting, law, sales, media, IT, or human relations. The relevant segments would be management, employees and even whole departments. Regarding experience with the domain of negotiation, the user would not need to have any academic background and could have varying practical experience. In the area of technological skills the user would need some basic computer skills and need to be familiar with the Windows and/or Macintosh interface. S/he would not need experience with games.

When it comes to the motivation for wanting to use the simulator, our main group of users would most likely participate in order to learn skills they consider to be useful and important. Some participants, however, would be there because their employers would send them. The group had a discussion regarding how to best balance the pure entertainment effect of playing a game with the seriousness of a scientifically developed training device, and consequentially how to best ensure an optimal learning effect combining these two. All these needed to be continuously taken into consideration at all times during the development process. Additionally the group decided not to develop a game that necessitated a heavy manual in order for the user to master it—we wanted a game the user could simply sit down and start playing with minimal instruction.

This focus on the user made it necessary for us to consider the marketplace. We considered whether our end-user was in a position were he/she would be interested in, and willing to pay for, a product such as ours. We investigated whether similar products in the area of simulators already existed and found very few that could even be said to resemble what we were developing. At the same time we looked into different training alternatives in the area of negotiation. Here we found that there were many different alternatives, although most of them seemed to be different versions of the same idea. In most cases lecturing about the topic of negotiation was interspersed with group exercises and role-playing activities. We considered our product to be different enough from these that there could be a market for it.

The contours of a simulator emerge

At the end of September the group started planning and making the necessary preparations in order to conduct interviews with professional negotiators. This was done in order to gain access to practical information that would complement the theoretical information the group

already had. The interviews were carried out over a period of six weeks. This included identifying potential participants, recruiting them, developing an interview guide, and analysing the results[4].

The group had to consider whether the design of the project would call for an application to the ethical committee REK, in order to get an approval of our research. However, we found this not to be necessary. The primary reasons for this were that the research would not target any vulnerable groups, and would not entail misleading or manipulating the participants. The decision was made in close cooperation with academic advisors. This process lead us to be more aware of this topic area and spend a substantial amount of time developing detailed consent forms as well as briefing and debriefing the participants thoroughly.

In addition to looking at literature on the topic of negotiation the group decided it was important to immerse ourselves in gaming. To this end the group obtained an X-box game console, taking time to familiarise ourselves with the different types of game categories available. We got a hold of the simulator game developed by Aldrich and his colleagues based on their research mentioned earlier. It was our goal that the whole group would familiarize itself with this game. As well as this we had a workshop with an avid Internet gamer in order to gain insight into massive multiplayer online role-playing games (MMORPGs) that are gaining ground globally.

Over a period of a few days the members had presentations for each other of the different individual literature reviews[5] and at the same time did a recap of the knowledge the group had on negotiation theory and research, gaming-, simulation- and learning theory.

January 2007 started off with a period of design and paper prototyping based on the findings of the interviews conducted in November 2006, in accordance with User Centred Design (Beyer & Holtzblatt, 1998; Faulkner, 2000; Nielsen, 1994). The group worked on designing

[4] For details see the specific section later on in this document

[5] These literature reviews are a compulsory activity in the master's degree, and must be approved in order to successfully complete the degree. It is expected that the students hand in approximately 40 pages detailing the literature that makes up the theoretical background for their theses. These documents are considered separate from the thesis and are therefore not included in this document. The literature reviews were to be handed in at the beginning of December.

low-tech parts of the simulator and simultaneously wrote scenarios in order to be able to test the usability of some main ideas. The result of this work was a cardboard mock-up. Using this mock-up, the group conducted a series of Usability tests that provided useful feedback. At the same time, a second period of data collection was prepared. This was an observational inquiry into how professionals actually negotiate. In the same way as our earlier experimental enquiries this entailed designing the experiment from scratch, with participant recruitment, script development and data analysis[6].

[6] Both of these experiments are detailed in specific sections later on in this document

Development through User Centred Design

Two iterations of development

A premise for this project was that the simulator should be developed through User Centred Design methods. We based our analysis and design process on *Human-centered design processes for interactive systems* (ISO-13407, 1999), which describes four phases in an iterative and incremental development process (fig. 1): Understand and specify the context of use, specify the user and organizational requirements, produce design solutions, and finally evaluate designs against requirements. The four phases are repeated in an iterative process until the result of the evaluation phase is that the design fulfils the requirements.

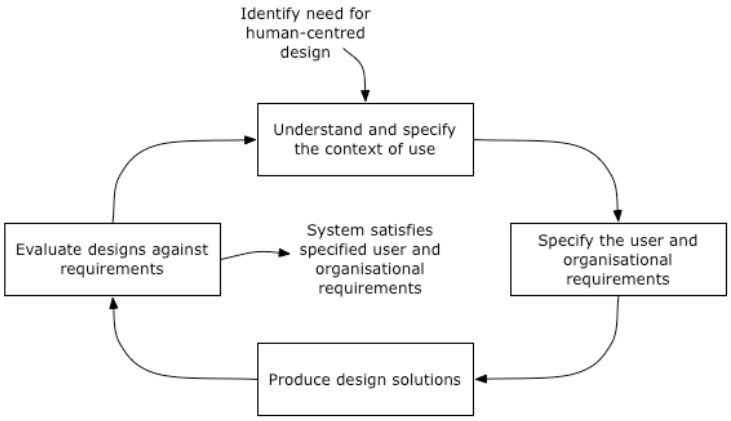


Fig. 1: The Human-centered design process for interactive systems. Reproduced from ISO-13407 (1999)

Within this framework, we based our activities on general methods from Usability Engineering (Faulkner, 2000; Nielsen, 1994) and, to a greater extent, on specific techniques from Contextual Design (Beyer & Holtzblatt, 1998). Contextual Design (CD) is an approach to User Centred Design, developed and refined over many years as a response to difficulties faced when working with design teams. Our reason for choosing CD was mainly that it offers specific techniques for analysing user data for the purpose of design, as well as an approach to the entire design process. We wanted to gather data about how people negotiate and base our design on this, so CD was a natural choice. In such an analysis, where the goal is well-grounded ideas for design, and not statistical significance or external validity, CD is better suited than more conventional research methods. Furthermore, CD is developed with teamwork in mind, and the results of its analysis and design methods are both produced and presented in ways that supports collaboration—its artefacts are mostly large and tangible. We also considered other methods, like Cognitive Work Analysis (Vicente, 1999), but we saw CD better suited for an innovative group effort like ours.

We considered that a project of this size could not be completed within one year, but we planned to get through at least two iterations. In this section, each of these two iterations is described[7]. Within each of the iterations the activities of the four main phases are outlined, as well as descriptions of the different techniques we used.

First iteration

Understand and specify the context of use

We discussed three possible ways of getting data from negotiations. In CD, data are gathered from the context of use through the technique Contextual Inquiry, where members from the design team observe the relevant tasks being done and ask questions to understand what the involved people do and why. In our case, this would imply that we had to get access to real life negotiations, or we could also set up our own constructed sessions with experienced negotiators as participants. The third possibility was to conduct more conventional interviews where we got negotiators to tell us about their experiences.

At this point, we concluded that it would be better for us to get access to negotiators for interviews than asking to observe them. Also, conventional interviews could give us a broader understanding of the topic, and a chance to compare the views of real life negotiators with the theories we have found through literature search. We could instead consider doing observations in the next iteration.

Getting participants

The process of getting participants for the interview started with a brainstorming session with the purpose of mapping potential negotiators. This mapping was done without any form of restriction such as availability, status or such of the participants, and the list contained names of lawyers, brokers, politicians, peace mediators, and representatives from both unions and employer organisations, some of whom were well known figures in Norway. The only requirement for getting on the preliminary list was that they had negotiations as an integrated part of their work. We composed a joint e-mail that we sent out to a group of the people on the list, made up of the professionals that we considered most attractive. The e-mail gave a

[7] To clarify, the iterations mentioned here are full iterations around the cycle of *The Human-centered design process for interactive systems* (ISO-13407, 1999), not the design–test cycles mentioned in literature on Usability Engineering (Faulkner, 2000; Nielsen, 1994), which are a part of the *Produce design solutions* phase.

brief description of the project we wanted them to participate in. Of the 35 professionals we e-mailed, 26 were willing to take part in our study. We got almost only positive feedback, and those who did not participate did not do so more as a result of other obligations than lack of interest.

Preparing the interviews

The interview was designed and conducted using several methods, such as Contextual Interview and Cognitive Interviews, along with suggestions from qualitative methods in general. We worked out some overall goals and lay down a plan for the structure of the interview to ensure that we touched upon all the different aspects of the predefined goals. This was a dynamic process were both the overall plan for the interview was embedded, but also more specific questions. The interview guide (see Appendix B) went through several rounds of testing and critical evaluation by the different group members. On the one hand we wanted the questions to be as broad as possible in order for the participant to freely express their thoughts on the topics without being tied to a specific context or without being lead by us. On the other hand the questions had to be specific to the degree that they gave us information that was not solely on a meta-level, but include details on topics we wanted to explore further. This is the reason we selected a method that included a semi-structured interview.

We prepared an interview guide that started with a section constructed with the purpose of "warming" up the participants, and to put them in the right state of mind for reflecting on their overall relationship to negotiations. Here we included questions on their background in terms of negotiation experience, their overall education, and what the participants found interesting and intriguing by negotiations, but we also wanted them to give us their definition of negotiations. Our reasoning behind asking them for their definition was to be able to find potential differences between the definitions provided by theory and the definitions provided by experience, and therefore have a more applied approach to negotiations. Through this we would also be better able to understand the interviewees' background and point of view.

Contextual Inquiry inspired the next section of the interview guide. As we obviously would not be able to observe negotiations in an interview, we included a question instructing the participants to visualize and verbalize a newly experienced negotiation they had participated in, and to be as detailed and specific as possible. In the next step, the participants would

"walk us through" the negotiation all over again, equally detailed and specific, but this time with the perspective of another participant. This technique was influenced by the Cognitive Interview (Memon, 1999), with the intention of getting as close as possible to actual negotiation experiences. Our role as interviewers would be to ask questions on what they did and why, to get to details on how they negotiated, as we would have done in a Contextual Inquiry.

The next section of the interview guide focused on the participants' own reflections on different areas of negotiations such as – *in your opinion, does there exist a core in negotiations?* Along with – *are different strategies used deliberately?* These questions were broad and non-specific in order to encourage them to think freely on these topics without facing the risk of anchoring the participants to any specific mindset.

The next questions in the guide encouraged the participant to continuously reflect on negotiations per se, exploring their thoughts and experience concerning group size/group composition and the use of mediators in a negotiation. The final section concerned whether or not negotiations can be taught, with questions such as - *what makes a good negotiator? Are there in your opinion expert negotiators? Do you consider yourself an expert?* These questions were included in order for us to get the participants to reflect on the questions as to whether or not it is possible, or to what extent it is fruitful to combine theory with practice.

We did one pilot interview in order to ensure the logical structure, and to get some feedback on questions that the participant had a hard time understanding. This input lead to some small adjustments to the original interview guide.

Conducting the interviews

The interviews were conducted "on site" at the interviewees' work place, with two interviewers. The latter was done to ensure a natural flow, to minimize the risk for interviewer errors, and to be better suited to ask follow-up questions. These two interviewers alternated between asking the questions so that when there was a change in interviewer there was also a change in the topic or focus in the interview. The interviews lasted for about one hour, and the few times the interview exceeded this length, we asked the participants if it was ok for us to finish the interview. Every interview was, for several reasons, recorded after getting the participants consent. First, we wanted to be able to go back and listen to the tapes

in order to for us to clear up any potentially misunderstandings. Second, taping gave us the ability to fully direct our attention toward the participant without being preoccupied with taking notes. Finally, recording ensured us a degree of detail richness we otherwise would not get by simply taking notes.

At the start of the interview the participants were given general instructions where we repeated the reason we wanted to interview them. They were told that we already had a theoretical approach to the study of negotiation, and that we wanted a more applied approach. We then tried to put the interview in a broader context in order to make them understand that we were interested in their input in light of their practical experiences with negotiations. We told them we were not interested in testing their knowledge or comparing their knowledge to any of the other interviewees'. This was done to put the interviewees at ease and lessen any possible evaluation anxiety.

According to proper conduct regarding ethical issues, we then informed the participant that they were free to terminate the interview at any point without any explanation, and that we, if they allowed us, would tape the interview. Finally we asked them to sign a document to this effect.

This way of conducting an interview demanded that the participants were able to verbalize different settings and to walk us through a negotiation setting they had been in recently. Our participants displayed this ability in various degrees—some had little to say, while some talked mostly in general terms about what they *usually did* in negotiations. In addition, this way of conducting an interview required, to a great extent, that the participant was conscious about his or her own negotiation skills, and further that they felt secure enough to reveal their thoughts on the various topics to us. Many of our participants were able to do just that, to be specific, and they were eager to share their experiences with us.

After the interview was completed we debriefed the participants, told those who were interested more thoroughly about the project, and opened up for any questions they might have. Finally, we asked the participant if it was ok for us to contact them again for follow up questions. This gave us the opportunity to maintain the good relationship we had established, and have access to participants at a later occasion. We also followed up the participants through e-mail, thanking for their participation.

Analysing data

After conducting all interviews, data was analysed in order to use it in the design process. CD proposes two conjunct techniques for this: Interpretation Sessions and Consolidation Sessions. In the former, each interview is analysed individually and summarised in several models and a list of key statements. Through Consolidation Sessions, all interviews are compared, leading to models expressing commonalities across interviews and an Affinity Diagram where all key statements from all interviews are grouped and structured hierarchically to give a comprehensible picture of the data.

In the spirit of CD—the design team using the method is encouraged to adapt the techniques as needed in its design process. We decided to use two of CD's models to analyse our interviews, namely the Sequence Model—in our case used to describe the steps taken through a negotiation, and the Culture Model—describing the actors involved and their influences and attitudes towards each other.

We started out with an Interpretation Session of the first of 26 interviews with the entire group present, as is recommended in CD. One group member talked us through the interview, two asked questions, one wrote down key statements, and one drew models. This first session with the whole group was an important way of getting everyone familiar with this method of working, but we could see that it would not be an efficient way of analysing all of our interviews. On the other hand, an important effect of using this technique is to let all team members get an insight into and a common interpretation of all interviews. Our solution to this was to do Interpretation Sessions in the dyads that had conducted each interview, and then present the models and the key statements to the entire group.

After writing our individual Literature Reviews, we started up the teamwork again with Consolidation Sessions in the beginning of December. Our first task was to organise all key statements from the Interpretation Sessions on our walls in an Affinity Diagram.

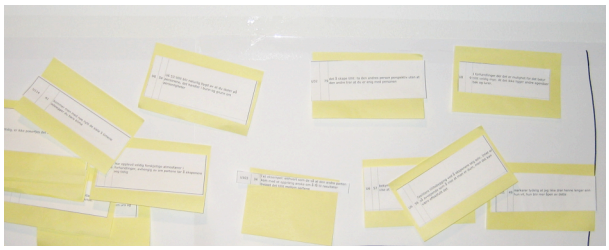


Fig. 2: Grouping statements

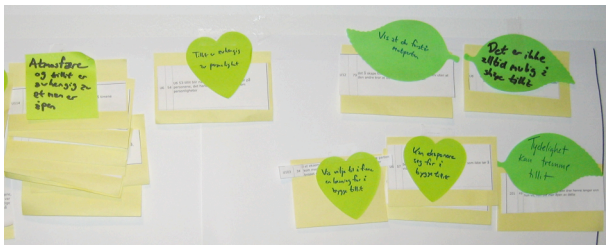


Fig. 3: Summarising groups in one sentence

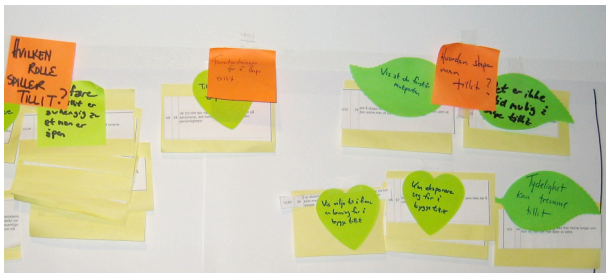


Fig. 4: Formulating questions for the green post-its to answer

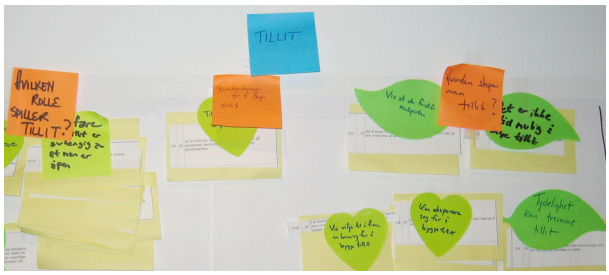
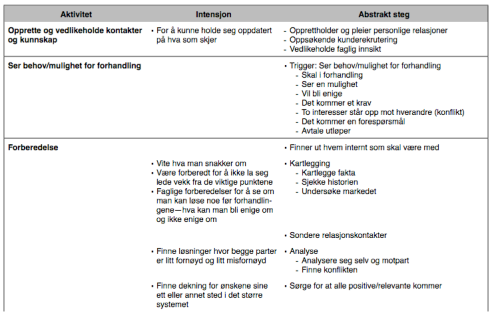


Fig. 5: Organising groups under themes

We printed out all the key statements and glued them onto post-its, and then tried to find those that said something similar about negotiation and put them up on the wall together (fig. 2). As groups of statements were formed, we wrote green post-its that summarised each group in one sentence (fig. 3). We then organised these groups again under orange post-its with questions that the green post-its answered (fig. 4). Finally, we organised groups of orange post-its under blue post-its, which named the theme of the groups (fig. 5). As an example, the blue post-it named «Trust» spanned the orange post-its «What part does trust play in negotiations?», «How to create trust?», and «[What are the] preconditions for creating trust?». Under the second one of these were the following green post-its: «Show that you understand your opponent», «Show that you are willing to find a solution», «You can expose yourself to build trust», «Clarity can promote trust», and «It is not always possible to create trust». And under these were the original key statements from the interviews that led us to create this hierarchy.

Fig. 6: Part of the finished Affinity Diagram.

Our initial goal was to do this rather quickly—CD recommends doing it in one or two days because this process can be taxing on the group when drawn out over a longer period of time. But with more than 1500 key statements, many of these rather general or fuzzy, and only five people to organise them, the process lasted for eight working days. This was an intense process that gave us a good foundation for the design process as well as an intimate understanding of the interviews (fig. 6).



Aktivitet	Intensjon	Abstrakt steg
Opprette og vedlikeholde kontakter og kunnskap	• For å kunne holde seg oppdatert på hva som skjer	- Opprettholder og pleier personlige relasjoner - Oppsøkende kundeerkutering - Vedlikeholde faglig innsikt
Ser behov/mulighet for forhandling		• Trigger: Ser behov/mulighet for forhandling - Skal i forhandling - Ser en mulighet - Vil bli enige - Det kommer et krav - To interesser står opp mot hverandre (konflikt) - Det kommer en forespørsmål - Avtale utløper
Forberedelse	• Vite hva man snakker om • Være forberedt for å ikke la seg lede vekk fra de viktige punktene • Faglige forberedelser for å se om man kan løse noe før forhandlingene—hva kan man bli enige om og ikke enige om	• Finner ut hvem internt som skal være med • Kartlegging - Kartlegge fakta - Sjekke historien - Undersøke markedet • Sondere relasjonskontakter
	• Finne løsninger hvor begge parter er litt fornøyd og litt misfornøyd	• Analyse - Analysere seg selv og motpart - Finne konflikten
	• Finne dekning for ønskene sine ett eller annet sted i det større systemet	• Sørge for at alle positive/relevante kommer

Fig. 7: Part of the consolidated Sequence Model

The next three days were spent on consolidating the Sequence and Culture Models. Similarities in the accounts of negotiations given by the different participants in the interviews resulted in a consolidated Sequence Model (fig. 7). The Culture Models were a bit harder, as the different negotiations involved very different configurations of people and groups, but we managed to condense and combine these into one Cultural Model (fig. 8).

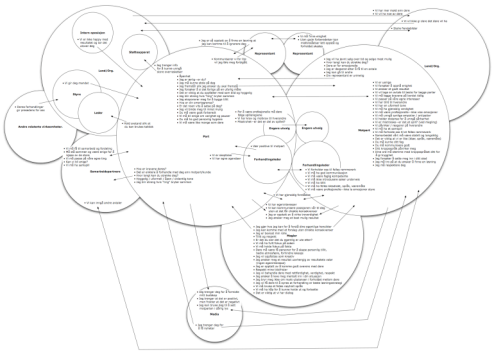


Fig. 8: The consolidated Cultural Model

Specify the user and organisational requirements

At this point we had the Affinity Diagram on our walls, as a picture of what our interviews had revealed about negotiation, the Sequence Model describing the general phases and steps in negotiations, and the Cultural Model showing the influences and attitudes that may exist between persons and groups involved in negotiations. Together these formed a description of the main aspects of the field we were going to develop a simulation of, and were therefore a set of requirements for our simulator. We also had the user profile created earlier.

In addition, each team member made a list of requirements for his or her area of focus, and this resulted in a tentative list of requirements to be explicated in the further process.

Produce design solutions

Design

This phase of the process involved creatively producing design solutions as a response to the data we had gathered. We continued to use the methods proposed in Contextual Design, in which the next step is to create a common vision for how our simulator and training course could be. In CD, a «vision» is a drawing of the product to be designed and the way it would be used. The focus is not on details, and the overall picture is drawn in simple sketches. It is important in CD not to design a product only, but to design a new way of working, and that should be reflected in the vision. In our case, we were not just designing a simulator, but a new way of learning to negotiate, and our vision should include the design of the simulator and the entire training course.

We started by "walking the wall" (Beyer & Holtzblatt, 1998, p. 275), i.e. going through the hierarchy of the Affinity Diagram to remind ourselves of what we had found. As we got ideas or questions from the data, we wrote them on post-its and put them next to the data that had triggered them. We did the same with the Sequence and Culture Models.

Then we went through the ideas and wrote a list of the most central ones. With these ideas as starting points we drew different visions of the simulator and training course. We brainstormed and drew sketches on a board. Some visions incorporated several ideas, while others were based on only one. When all ideas had been drawn out, we went through them again, writing positive and negative aspects for each of our 27 different visions.

Our next task was to incorporate these into a common vision. In fact, it was decided to make two visions—one for the training course and one for the interaction with the simulator. As suggested by CD, we tried to combine conflicting visions by using the positive aspects from both instead of picking one vision over the other. For example, in one vision a training course included several different negotiation exercises based on the same scenario, and would then allow us to use this scenario as a theme for the day, where the participants could really get into their roles of for instance being employees of an imaginary firm, wearing t-shirts with the firm's logo etc. On the other hand, we had a vision that made a point out of having different scenarios for each negotiation exercise, to give us more flexibility in tailoring scenarios to the specific learning outcomes of each exercise. Instead of choosing one of these, our common vision consisted of independent negotiation exercises, to give us the flexibility

of the second vision, while at the same time allowing us to make a set of exercises that fit together as a theme course as in the first vision.

The next step in Contextual Design is to draw out storyboards based on the vision. A storyboard is in essence a sequence of drawings visualising one possible trajectory through the system being designed. We wanted to get through at least two iterations before the end of the project period, and at this point in the project we knew we were running short on time. Therefore, we decided to do only one storyboard on the simulator to elaborate on our vision and generate more specifics for a Usability test. We also chose to focus on the simulator and not the entire training course to limit our focus in the first test. We spent the next two days on this, with an imagined case of an employee negotiating a contract with his potential new boss. We drew the interaction between a user and the simulator as it could play out in this scenario like a cartoon, where each frame represented an action from the user or a response from the simulator. At each frame we asked ourselves what actions the users might take, how to make the interaction natural, and how the simulator would respond. We tried to incorporate several of the ideas from our common vision, and ran into issues that we had not thought of in the visioning process and also came up with solutions to a lot of them.

After only one storyboard session we had a sketch of a user interface for the simulator and a much clearer idea of how the interaction could work, and we decided to make this the object of a usability test.

Usability test

Since our first prototype was more concerned with the user interface than with the simulated negotiation, we reasoned that it was not important for the participants to have any formal negotiation experience, and we recruited five master students for a usability test. This was considered a large enough sample to discover usability problems and to get an impression of whether the participants understood the general concept. Again our aim was to generate inputs to the design process, not to design an experiment with validity or statistical significance in mind.

We spent the day before the test making a cardboard prototype of the simulator interface as we saw it at this point. The prototype consisted of a main screen showing the opponent on the other side of a table, and a smaller screen with controls and buttons for interacting with the

simulator. The screens were going to be touch screens, so the user would interact by pushing the controls directly, as opposed to using for instance a mouse, a keyboard, or a stylus.

The prototype was based on a scenario similar to the one in the storyboard, where the user was to negotiate a contract with a potential employer. We wrote a script for the test (see Appendix C), and in order to limit the number of sentences and interface parts we had to prepare, we chose a set sequence of events through the negotiation. We printed out the sentences of the possible dialog and other interface parts, and glued them onto cards.

As the prototype was made out of paper, one of the team members would have to act as the "computer" and manipulate the prototype in response to the participants' actions—a technique known as "Wizard of Oz" (Faulkner, 2000). The participants would be instructed to treat the mock-up in front of them as an actual computer screen.

Before the test, we conducted a pilot test with one of our team members, who had had limited contact with the mock-up, as the test subject, both to test the script and the mock-up and give the test leader and the one acting as the computer a chance to practice.

We used a very simple test setup. The participants were presented with the prototype in a room with a table and a video camera, and in the adjacent room the team members not conducting the test observed the events on a TV screen while taking notes of the problems discovered and other interesting incidents. The tests were recorded so that we could look at the tests later, if needed.

Fig. 9: The Usability test

After an introduction, each participant was shown the screens and asked to tell us what they thought of the screens and what they believed they could do with them. They were then asked to use them as they would have had it been a finished computer-based simulator (fig. 9). Most participants hesitated in the beginning, but after a little while, they pressed the buttons on the control screen and waited with interest while the "computer" laid out the interface parts representing the response of the simulator. In accordance with User Centred Design methods,

they were continuously asked to think out loud and explain their actions and reasoning as well as they could. At each point in the dialog they would tell us what they wanted to do, complete that action, or if they sketched out an action that had not been completed in the mock-up, the test leader sitting next to them would direct them to the choices that had been prepared.

The test gave us the impression that our design worked rather well—the participants quickly understood what was going on and how they could manipulate the interface, except for some confusion with minor parts of the interface. Also, it seemed that they got an experience of having a conversation with the virtual opponent in the prototype, but they reported that the conversation was too much to the point—they wanted to involve more small talk with the opponent. This is a potential by-product of us not having had the opportunity to develop all the alternative statements the participants could choose.

Evaluate designs against requirements

This first iteration through the design process was ended on February 2., 2007 with an evaluation of our design against the requirements. We first went through the requirements we had written down for our different focus areas. For most of these we were either on track or at a place in the development where the requirement was not relevant, but we saw that we sooner or later would have to specify what the learning outcomes for the simulator and training course should be. We had implicit learning outcomes, but needed to get more specific and concrete in order to have a set of intended outcomes to evaluate against.

We also went through the Affinity Diagram, Sequence Model and Cultural Model, to see if there where central issues we had overlooked this far. We made a list of some topics that we would have to include when continuing the design in the second iteration.

This marked the end of the first iteration, with the conclusions from the above evaluation, the results from the usability test, and the current design of the simulator as outputs to the next iteration.

Second iteration

In the second iteration, we worked with three issues in parallel; preparations for an inquiry to observe negotiation in action, further design based on the inputs from iteration 1, and investigations on the business aspects of our project.

Understand and specify the context of use

In the second iteration we wanted to get access to, or arrange, a situation that would allow us to observe how professionals negotiate in practice. Through the interview data in the first iteration we had a substantial amount of information on how they represented their own negotiation skills in an interview, making it interesting for us to observe this behaviour as well. Also, the interviews had given us an overall picture and a framework for the simulator and training course, and now we wanted to fill this with more detailed data to base our simulation on.

Through planning this observation as part of an inquiry that also included a dialogue with the professionals about their behaviour we hoped to gain an even deeper insight into negotiation. Therefore the goal of the experiment became to design a method that would allow us to observe the professionals while they negotiated, and then follow that up with a Contextual Inquiry session.

Getting participants

It became clear early on in this process that in order to get as much information from the participants as possible the inquiry would take quite some time to conduct. Because of this the group decided to aim to conduct at least two sessions, each including two participants and lasting for about three hours. This meant finding professional participants that would put themselves at our disposal for three hours, allow us to film them as well as observe them while they negotiated something that we set up, and then let us interview them separately while taking them through the video of their negotiation. In the earlier interviews we had asked the participants if they would consider helping us in the future, and almost all of them had eagerly agreed. Three weeks before the inquiry we sent out questions to those that had agreed asking them whether they would be able to contribute their time, being specific about the time it took and what dates were scheduled. The immediate response was good in that two professionals volunteered to participate, which meant that we had one session covered. Two

other professionals replied that they were unavailable but could find someone with experience similar to their own from their own organisation that could take their place. This meant that we had reached the goal of at least two sessions.

Of the four professionals we recruited two were women and two were men. Based on their schedules each session ended up pairing one male participant with one female participant. They were all professionals in the field of negotiation, spending a majority of their workday honing their skills in the area, within law or unions.

Preparing the inquiry

Having a place in which to conduct this experiment was important. Even though the office at the University of Oslo could have been used, we approached NetLife Research; a usability company we knew had a lab in which this type of activity could more easily be carried out. They were kind enough to let us use their lab and offices for the entire experiment, which meant that we had the use of a lab in which the participants could negotiate while being videotaped, an adjoining room where the group could observe the negotiation on a TV, and two areas in which the participants could be briefed before each negotiation session (see script in Appendix D). In addition, the lab and offices are centrally located, making them easy for the participants to find.

Keeping in mind that the central focus of the inquiry was to observe negotiation behaviour it was important to the group to identify a subject matter that would bias or skew the results as little as possible. In order to find this subject matter for them to negotiate about we conducted searches in published literature. The goal was to identify potential negotiation scenarios that would allow the participants to feel that they were negotiating something meaningful while at the same time keeping the subject matter within an area that was equally unusual for them—we wanted to attempt to create a level playing field for the participants. Through literature searches conducted earlier in the project, as well as new ones, we were able to find 3–4 different articles that included clear descriptions of the scenarios that had been used as well as information about how they had been introduced and what tools the participants had been given (Gelfand et al., 2002; L. Thompson, 1990a, 1990b; L. Thompson & Hastie, 1990). The tools that were most useful to us in order to replicate the use of a scenario was the pay-off schedule; the tables the participants were given to illustrate their most desirable outcomes. In the source literature the scenarios had been used for differing purposes, purposes that left the

scenarios secondary to what was being investigated. This gave us reason to believe that the scenarios could be used without impacting the experiment, giving us an experimental setting where we could simply observe the negotiation itself.

From the group of scenarios we had found, we considered two of them to be best suited for the experiment. Due to the fact that all of the scenarios were taken from source literature that was in English and had been used in the U.S. it was important to have situations that could most easily be transferred to Norway. For example some of the scenarios we found had issues that we considered would have been too hard for the participants to relate to, focusing on American commodities brokering, while another introduced the participants to aliens on a different planet (Boven & Thompson, 2003; Mannix & Neale, 1993). Therefore, based on our understanding of the scenarios we attempted to select the scenarios we felt the participants would understand most easily. The scenario we decided to use in the first exercise in order to familiarise the participants with the method and each other was a negotiation of an employment contract between an employer and a potential employee. This scenario gave the participants five categories to negotiate. The second and main negotiation that would form the basis for the contextual interview, was based on the purchase of a car, and included the car-salesman and the potential buyer. In this scenario there were eight categories to negotiate. The reason for choosing two scenarios was that one of them would be a scenario the participants could practice with, something which would make it possible to increase the quality of the data collected in the contextual interview following the second negotiation. Having selected the scenarios we translated the pay-off schedules and wrote the scripts that we were to follow (see Appendix D). After we had finished the scripts and the pay-off schedules we piloted the observation and the contextual interview. The pilot lead to some minor changes to the scripts, but more importantly served as a rehearsal for the group, helping us become more prepared for the sessions with the professional participants.

Conducting the inquiry

On the two evenings when the sessions were held, a dedicated group member guided each participant through the evening. In this way we made the participants feel a little more secure, something which was considered important in case they were inexperienced with an experimental setting or with being filmed. The participants were introduced to the group and each other first and then briefed by “their” group member. They were shown the rooms they would be in for the brief/debrief and the negotiations, as well as seeing the observation room

from which the group would observe them negotiating. This was done in order to put them at ease with the situation. In addition, the participants were given a standard consent form to sign, detailing their participation as well as their right to terminate the experiment at any time and without giving any explanation. In both negotiations the participants were given time limits in order to motivate them to reach an agreement. After the first negotiation, which the entire group observed from the adjoining room, the participants were debriefed by "their" group member, and again briefed for the next negotiation. When the second negotiation was finished, the participants were taken through the film of that negotiation separately, each with "their" person and one other group member. In this way we were able to carry out the contextual interview successfully, making sure that the participants both felt debriefed and gave us an insight into their motivations and thoughts throughout the negotiation. Before the participants left we gave them a small gift as a thank-you for participating as well as the source articles for the scenarios, so that they would be able to see examples of how other research had been conducted. The day after the experiment the participants were sent a follow-up e-mail repeating our thanks and making sure that they knew they could ask us about the experiment or their participation if they should have questions at a later date.

Both the participants and the group seemed to enjoy the evening, as well as considering it a useful and educational experience. Some of the participants had situations were they were surprised by their own or their opponent's behaviour, and this was an area we had to ensure that they felt debriefed on. However, the main impression was that they enjoyed themselves, forgetting the cameras within minutes of the negotiations starting. It was clear that some of the participants felt more competitive than others, and most of them were also concerned with the self-development they could gain from the experience.

The participants seemed to embrace their characters, easily becoming the car-salesman or potential employee. It also seemed as though each participant may have incorporated aspects of their beliefs about the role they had into their behaviour, and the group had a discussion when the observations were done as to whether that affected their behaviour in the negotiation. If the goal in this observation had been the reliability and validity of the experimental results we could have repeated the experiment and this time run the contextual interview on several of the scenarios, capturing the participants' experiences across situations were they had differing roles.

Analysing data

In comparison with the earlier interviews, the data collected through this inquiry was much more concrete, just as we had anticipated, and we got more detailed and clear data about what actually happens in a negotiation situation. Both the data collected through the Contextual Inquiries as well as the wealth of impressions and knowledge the group gained through the observations will be put to use in the further development of the negotiation simulator.

As in the first iteration, we did Interpretation Sessions to analyse the data. First, the team members that had conducted the different Contextual Inquiries went through them, extracting key statements and drawing Sequence and Cultural Models. These were then presented to the entire team, before we went on combining them through Consolidation Sessions. The statements from all four participants were recorded on post-its and added to the existing Affinity Diagram. At a later stage of development this Affinity Diagram will be re-evaluated using these last results, refining the diagram yet again and confirming its existence as a living, changing tool for the product development.

Produce design solutions

Parallel with the preparations for the inquiry, some team members continued on the design of the simulator with the inputs from the first iteration. As mentioned, the first iteration had ended with an Affinity Diagram, two models, a vision, a storyboard based on this vision, a prototype, and inputs from a usability test, and in the evaluation we had written down some issues that we wanted to go deeper into in this second iteration. We started a new storyboard to investigate these issues as well as test some new ideas based on the results from the usability test.

In short, we worked with the storyboard just as we had done in the first iteration, but now we wanted to look at a slightly more complicated scenario, one that involved more issues than last time, so the process took a lot more time and we had longer discussions about each issue. We also felt that we generated more questions than we solved, but through this process we pinpointed a lot of challenges with our design that we did not see when we drew the visions. Some of these challenges were simply choices we had to make, while others were problems with our design that needed to be solved for our simulator to work. At this point in the project we recorded these issues in order to discuss them with the rest of the team later.

Wrap up of the second iteration

The second iteration was not completed in the time we had available in our project period, and the rest of the process will be continued if and when the project acquires further funding.

The design part of our project ended with a vision and a prototype of a training simulator for learning to negotiate, grounded in theories on negotiations, interviews with negotiators, and observations of negotiation in practice, and tested on potential users. This also includes a vision of a complete training course based on this simulator. Furthermore, the Affinity Diagram, the Sequence Model, and the Cultural Model will be an important foundation for further development of both the simulator and the training course.

Final thoughts

After having worked with this project over the course of two semesters it is clear to us that our expectations of what the year would include were somewhat correct. However, it would never have been possible for us to fathom the enormity of what we have been able to accomplish, both in our user-centred design process and as a group. This method has allowed us to gather and analyse data from our area of interest in a way that extracts information that is well grounded and rich in detail. This has provided us with an excellent starting point for the creative processes and a solid foundation for development of the product. In addition, the incremental approach has allowed us to immediately incorporate feedback from the user into the design process.

As a group, we have also experienced development. As individuals none of us could have foreseen how much we would mature as a group and perhaps as importantly how much we would learn as individuals. Working as intensively as we have done cannot be compared to anything any of us have done earlier, even in full-time jobs. This has demanded of us a greater insight into our own behaviour and ourselves than anything else could have, and through this we have grown.

We have been able to take the product development far enough to see the contours of a proper product, one an end-user could sincerely benefit from. The feedback we have gotten from the end-users we have been in contact with has been more positive that we could ever have hoped for, confirming our belief in the need for the product, and the product itself. Based on this it is our genuine hope that this work can continue.

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Appendix A

Task	32	33	34	35	36	37	38	39	40
Deciding on an idea									
Process workshop									
Planning the methods									
Specify characteristics of the intended users									
Project literature search									
Presentations of literature									
Contact possible participants									
Conduct Interviews—negotiation									
Investigate other training / simulation / games									

Task	41	42	43	44	45	46	47	48	49
Specify characteristics of the intended users									
Project literature review									
Contact possible participants									
Conduct Interviews—negotiation									
Investigate other training / simulation / games									
Interpretation session									
Individual literature reviews									
Presentations of literature									

Task	50	51	52	1	2	3	4	5	6
Consolidation Session									
Requirements specification									
Visioning and storyboarding									

Task	50	51	52	1	2	3	4	5	6
Design and prototyping									
User testing									
Evaluation									

Task	7	8	9	10	11	12	13	14	15
Preparations for negotiation experiment									
Contextual Inquiry—observing negotiation									
Interpretation Sessions									
Consolidation Sessions									
Writing of group thesis									
Writing of individual thesis									

Task	16	17	18
Writing of individual thesis			

Appendix B

Intervjuguide til bruk ved samtaler med Forhandlingsfolk

Intro:

Takk for at du har tatt deg tid til en prat med oss. Som studenter har vi kunnskap om forhandling gjennom det fagbøker kan formidle. Samtidig oppleves det intuitivt at forhandlig er en kunst som beherskes på sitt beste ved/gjennom å samle seg erfaring. Vi er i gang med et hovedoppgaveprosjekt der vi skal skive om forhandling, og vi ønsker med dette å få førstehånds (ekspertise)kunnskap og erfaring med hva nettopp du opplever å være essensen i forhandling. (det kan tenkes at noen av spørsmålene virker som om de gjentas, men dette er for å sikre at vi dekker alt vi kan).

Dataene vi samler inn i dette intervjuet vil bli anonymisert, de vil bli oppbevart etter gjeldende forskrifter sikkert, og de vil ikke brukes senere til andre formål i andre sammenhenger.

Er du komfortable med at vi bruker båndopptager under intervjuet? Dette er for at vi bedre skal være i stand til å dokumentere gangen i samtalen og alt som blir sagt. Opptakene vil bli destruert før slutten av prosjektet vårt (dvs. mai 2007). Dersom du ikke er komfortabel med båndopptaker er dette naturligvis helt i orden.

Du står i tillegg fritt til på et hvilket som helst tidspunkt, å trekke deg fra intervjuet uten å måtte oppgi noen grunn, og be om at båndopptageren stoppes og at dataene destrueres.

Før vi begynner kunne du tenke deg å signere på et informert samtykke der du bekrefter at du har blitt informert om hva som skal foregå, hvordan dataene vil bli behandlet, og at du er blitt fortalt at du på et hvilket som helst tidspunkt kan velge å trekke deg fra intervjuet, eller be om at båndopptageren stanses og dataene destrueres?

1) I hvor mange år har forhandling vært en del av ditt arbeid?

2) Og primært innenfor hvilket felt?

3) Hva er, i følge deg, forhandling, kunne du definert det?

4) Hva liker du ved forhandling?

5) Tenk på en konkret forhandlingssituasjon du selv har vært i nylig:
    a. Beskriv hvordan du forberedte deg, hva du tenkte på i forkant av forhandlingen
    b. rapporter alt, fortell hele situasjonen, ta med så mange detaljer som mulig
    c. beskriv situasjonen fra et annet synspunkt enn ditt eget

6) Vil du si at det er mulig å snakke om en kjerne i forhandling? Finnes det ulike komponenter/en struktur/matrise?
    a. Hvis ja; hva tror du denne består av? Hvis du kunne beskrive kjernen i en hvilken som helst forhandlings-situasjon med kjerne begreper, hvilke ord/begreper ville disse være?
    b. Hvis nei; hvorfor ikke?

7) I hvor stor grad tar parter i en forhandling bevisst i bruk ulike strategier?
    a. Hvilke strategier har du erfart?
    b. Gjør det da forhandlingssituasjonen forutsigbar?
    c. Kan du beskrive et eksempel på dette?

8) Har du en fast forhandlingsstrategi?
    a. En plan eller et format eller noen rammer som du alltid bruker?
    b. Baserer du deg på noen former for teorier/metoder/strategier?

9) Innledningsvis sa vi at studenter kjenner forhandling gjennom teori og bøker de har lest, og i innledning til veldig mange av disse bøkene kommer man med utsagnet: ”Alle forhandler vi med hverandre hele tiden”? Er du enig i denne påstanden?
    a. Hvorfor?
    b. Hva er det da som skiller de ulike situasjonene fra hverandre?
    (Egeninteresser/fellesinteresser/økonomiske interesser/andre hensyn? Usikkerhet/kontroll/makt/historie (har man forhandlet sammen før/mot hverandre før, hvor godt kjenner man hverandre osv).)

10) Hva er dine erfaringer med gruppesammensetning i forhold til:
    a. Gruppestørrelse
    b. Antall (forhandlings)parter
    c. Bruk av megler

11) Hva gjør (noen til) en god forhandler? (egenskaper/trekk/personlighet)

12) Anser du deg selv for å være en god forhandler? Ville du anse deg selv som en ekspert?
    a. Hvis ja; hvorfor, og hva vil du si at disse egenskapene består i?
    b. Hvis nei; hvorfor ikke, og hvordan vil du i så fall definere ekspertisekunnskap om forhandlig? Kjenner du noen andre du heller ville karakterisere på denne måten?

13) Kan man lære noen til å bli en god forhandler?

Da er vi ferdige for i dag. Hvordan synes du at det gikk? (Gi personen anledning til å snakke om opplevelsen, en aldri så liten debrief).

Kunne du tenke deg å stille til nytt intervju dersom det skulle bli aktuelt? Eller bli kontaktet på en annen måte om vi har flere spørsmål?

Og kunne du tenke deg å stille til et eventuelt eksperiment dersom det blir nødvendig? Vi tenker oss da å invitere deg til å være en aktør i en forhandlingssituasjon der vi vil observere i den grad det lar seg gjøre, en virkelighetsnær forhandlingssituasjon med andre forhandlere. Disse seansene vil bli videotapet. Dersom du kunne tenke deg å delta i en slik situasjon, kontakter vi deg med ytterligere informasjon når tidspunktet nærmer seg.

Tusen takk for hjelpen! Ha en fin dag!

Appendix C

Script—brukertest 1. februar

[Video er av, prototypen ligger ikke framme]

Introduksjon

Hei og velkommen! Takk for at du tar deg tid!
Dette er en del av masteroppgaven vår. Vi holder på å utvikle en simulator for å lære forhandling, og dette er første test av hvordan det kan bli. Vi baserer utviklingen på psykologiske prinsipper og er veldig opptatt av å ha brukere med i hele utviklingen. Akkurat nå er vi midt i utviklingen, så det du kommer til å få se er litt halvferdig og enkelt, men det er meningen fordi du kan komme med innspill som vi kan ta med videre i prosessen. Det betyr for din del at du må bruke en god porsjon fantasi og innlevelsesevne og prøve å se for deg hvordan dette vil være som en ferdig simulator.
Evaluering vil ta ca. en halv time.
Kjell-Morten sin rolle: fungerer som datamaskin, prøv å lat som om han ikke er der ☺
Vi kommer til å starte med noen få spørsmål, og så vil du få se en skisse av simulatoren. Vi vil be deg tenkte litt høyt rundt det du ser, og så vil vi gi deg noen oppgaver underveis. Det er viktig at du sier hva du tenker underveis. Til slutt har vi noen oppsummerende spørsmål.
Vi kommer til å filme dette, slik at vi i gruppen kan gå tilbake og se senere. Vi vil ikke vise dette for noen utenfor gruppen, og noen av dem sitter ved siden av og observerer nå…
Så må du lese og signere denne consent-formen, for å bekrefte at dette er i orden for deg og at du har blitt informert om at du kan trekke deg når som helst.
[Video på]

Intervju

1. Hvilken erfaring har du med data-/tv-spill?
2. Hvis nei, du har aldri spilt noen sånne spill i det hele tatt?
3. Hvis ja, hva spiller du? Og hvor mye spiller du?
4. Hvilket forhold har du til databruk? Bruker du det mye og til hva?
5. Hva forstår du med begrepet ”forhandling”?
6. Har du noen erfaring med forhandling? I så fall hva og hvor mye?

Oppgaver

Nå skal vi straks vise deg simulatoren, og det er da viktig å huske på at det er ikke deg vi tester, kun simulatoren. Det er ingen riktige eller gale svar, fordi vi er ute etter å se hvordan du oppfatter det. Du er i en gruppe potensielle fremtidige brukere for oss, så dine innspill er verdifulle! Det som er viktig nå er at du sier høyt det du tenker til en hver tid og forteller oss hvorfor du gjør det du gjør. Vær heller ikke redd for å si ting du synes virker rart eller om det er noe du ikke forstår. Tvert imot—det er slike tilbakemeldinger vi ønsker. Og også om det er noe du liker. Vær så direkte som du kan. Vi blir ikke lei oss ☺

Har du noen spørsmål før vi begynner?

Er du høyre- eller venstrehendt?

Førsteinntrykk

1. Hvis du ser for deg at dette er bildet på to dataskjermer, hva er ditt første inntrykk?
2. Disse skjermene skal være touch-screen (forklar hvis nødvendig), og tanken er at det som er uthevet på skissen kan trykkes på. Hva tror du du kan gjøre her? Hva tror du vil skje om du trykker på de forskjellige?
3. Vil du umiddelbart kunne tenke deg forskjellen på bruken av disse to skjermene?

Scenario

Se for deg følgende: Før du kom til bildet i simulatoren, ble du satt inn i ett scenario og fikk mulighet til å forberede deg. Kort fortalt spiller du en konsultent som skal forhandle sin nye stilling i Nova Consulting. Du har ambisjoner og tenker at du har et godt utgangspunkt for å forhandle dine personlige betingelser. Du har mulighet til å forhandle om lønn, arbeidstid, fri mobil, leasingavtale på bil og ekstra ferie. I tillegg kan du tilby firmaet deler av din kunderegister, og du har allerede en mulig avtale med et konkurrerende selskap.

Vi har ikke laget alle valgene, så noen ganger kommer vi til å be deg velge noe annet, det vi har forberedt.

Da setter vi i gang:

[Klistre opp første snakkeboble: “Hva slags avtale ser du for deg?”]

Kan du si noe om hva som skjedde nå?

Se for deg at du nå skal begynne å forhandle. Hva ville du begynt med?

Kan du fortelle at du ønsker deg 450.000 i lønn gjennom simulatoren? (“Jeg ønsker meg 450.000,-”)

Hva tror du skjedde nå?

[Legg på “Det synes jeg høres mye ut. Det forutsetter 45 timers uke.”]

Kan du si at du kan jobbe 42 timers uke? (“Jeg kan jobbe 42 timers uke.”)

Hva er det det nå forhandles om/hva er det som er på bordet? (450 000 og 42 timer)
[Legg på "Da må du bringe noe mer til forhandlingen."]
Kan du si at du kan gå ned til 425.000 i lønn, men at du da vil ha en ekstra ferieuke? ("Jeg kan gå med på 425.000,-, men jeg ønsker meg én ekstra ferieuke.")
(Ghoste knappen med lønn)
Hva skjedde nå?
(Du ønsker å binde setningene sammen…?)
("Jeg kan gå med på 425.000,-, men jeg ønsker meg én ekstra ferieuke.")
[Legg på: "Det er en avtale det høres ut som jeg kan leve med. Er vi da enige?"]
Kan du si at du godtar avtalen?
(Legg på: "Jeg godtar denne avtalen")
[Legg på: "Velkommen til oss"]

Debrief
Hva synes du?
Hva er inntrykkene dine av skissen?
Det som kommer til å skje nå er at vi skal teste noen flere som deg, så vil vi videreutvikle skisse og prøve å inkorporere dine innspill så godt vi kan…
Tusen takk for hjelpen!!

Appendix D

Eksperiment forhandlingssimulering uke 8, 2007

Jobbsøker/selger

Velkommen og takk for at du tar deg tid til å delta på dette, det betyr mye for oss!! Det som nå skal skje er at jeg skal gi deg informasjon om det vi skal gjøre i dag, ca de neste 3 timene. Du skal altså forhandle med *NAVN* som du nettopp møtte, i et forhandlingsromm der det er satt opp to kameraer som gjør at vi kan observere dere. Dere vil bli presentert to forskjellige forhandlingsscenarier, det første vil være litt kortere enn det andre. Temaene vil også være forskjellige, men strukturen vil kanskje likne hverandre. Scenariene vil bli presentert hver for seg av meg, først det ene, så etter at dere har forhandlet det ferdig, det andre og du vil få muligheten til å stille meg spørsmål om innholdet før du begynner forhandlingen. Gruppen og jeg kommer til å sitte i et annet rom og se på, og samtidig tar vi det opp slik at vi i etterkant kan se på det sammen med deg og snakke om hva som skjedde.

Høres dette greit ut, har du noen spørsmål med en gang?

Her er en samtykkeerklæring på dette…

Scenario 1:
Hensikten med dette eksperimentet er å se på forhandlingsatferd. Du kommer til å forhandle med en annen i en oppgave der det er fem punkter som må avklares. I dette scenariet er du en jobbsøker hos Firmax og skal i ansettelsesmøte hos din potensielle sjef, *NAVN*. Tenk på at det er denne rollen du har når du går inn i forhandlingen. Som den gode jobbsøker du er har du gjort deg noen tanker om dine prioriteringer og de vil du straks se i en payoff oversikt (interesse oversikt).

Payoff oversikten (interesse oversikt) viser alle de forskjellige måter avtalen kan nås på, i tillegg til å gi en oversikt over hvor mange poeng du får for å oppnå hvert alternative resultat. Målet ditt er å få så mange poeng som mulig, men om dere ikke når en avtale i løpet av 25 minutter avslutter vi scenariet og dere vil begge få 0 poeng. Payoff oversikten er oversatt fra engelsk og det kan tenkes at noen av beløpene/begrepene virker sære på grunn av dette, men prøv å bruk dem allikevel ☺

NAVN får den samme instruksjonen som du får nå, men vil ha noen andre interesser enn deg, noe som vil reflekteres i hans/hennes payoff oversikt. Derfor er det viktig at du ikke viser din til han/henne også.

Spørsmål?

(gi ark)

Ta en titt på oversikten *(gi 2 min til det)*

Quiz for å sjekke om de skjønner payoff oversikt:

1. Kan du kort forklare kategoriene du ser?
2. Hva er det du får mest poeng for?
3. Hva er det du får minst poeng for?
4. Hva er ditt ideelle resultat?
5. Hvis du skulle forberedt deg og hadde dine vanlige ressurser tilgjengelig for deg, hva hadde du gjort nå? *(noter)*

Fint! Da skal du få møte din potensielle arbeidsgiver ☺ *(pass på at de har med seg oversikten) Alle 4 møtes foran forhandlingsrommet, de to ledes inn og Ina viser dem hvor kameraene står, Benedicte peker på vann/kjeks/evt. annen info.*

Da kommer vi tilbake når tiden er ute. Lykke til!

25min senere…

FPene tas tilbake til hvert sitt rom og roses. Vi skal snakke mer om dette etter at neste scenario er ferdig, men hvordan synes du dette gikk? *(KORT, noter)*

Gi tom oversikt

Her ser du en tom payoff oversikt som likner på den som ble gitt deg på begynnelse av denne øvelsen. Nå vil vi gjerne at du skriver inn tallene i denne oversikten for å fortelle oss hvordan

du tror *NAVN* sin oversikt så ut. Du kan bruke din egen oversikt når du skriver inn i den under. Det eneste hintet vi kan gi deg er at det laveste tallet på oversikten deres er 0 og det høyeste er 400.

Fint, da går vi videre til neste scenario.

Scenario 2:

Hensikten med dette eksperimentet er å se på forhandlingsatferd. Du kommer til å forhandle med en annen i en oppgave der det er åtte punkter som må avklares. I dette scenariet er du en bilselger hos BESTPRISBILER og vil gjerne selge en bil til, *NAVN*. Tenk på at det er denne rollen du har når du går inn i forhandlingen. Som den gode bilselger du er har du gjort deg noen tanker om dine prioriteringer og de vil du straks se i en payoff oversikt (interesse oversikt).

Payoff oversikten viser alle de forskjellige måter avtalen kan nås på, i tillegg til å gi en oversikt over hvor mange poeng du får for å oppnå hvert alternative resultat. Målet ditt er å få så mange poeng som mulig, men om dere ikke når en avtale i løpet av 35 minutter avslutter vi scenariet og dere vil begge få 0 poeng. Payoff oversikten er oversatt fra engelsk og det kan tenkes at noen av beløpene/begrepene virker sære på grunn av dette, men prøv å bruk dem allikevel ☺

NAVN får den samme instruksjonen som du får nå, men vil ha noen andre interesser enn deg, noe som vil reflekteres i hans/hennes payoff oversikt. Derfor er det viktig at du ikke viser din til han/henne også.

Spørsmål?

(gi ark)

Ta en titt på oversikten *(gi 2 min til det)*

Quiz for å sjekke om de skjønner payoff oversikt:

1. Kan du kort forklare kategoriene du ser?
2. Hva er det du får mest poeng for?
3. Hva er det du får minst poeng for?
4. Hva er ditt ideelle resultat?
5. Hvis du skulle forberedt deg og hadde dine vanlige ressurser tilgjengelig for deg, hva hadde du gjort nå? *(noter)*

Fint! Da skal du få møte kunden din ☺ *(pass på at de har med seg oversikten)*

Alle 4 møtes foran forhandlingsrommet

Da kommer vi tilbake når tiden er ute. Lykke til!

35min senere…

Fpene vises observasjonsrommet og hilser på guttene igjen deretter tas de tilbake til hvert sitt rom og roses. Vi skal snakke mer om dette straks, men hvordan synes du dette gikk? *(KORT, noter)*

Gi tom oversikt

Nedenfor er en tom payoff oversikt som likner på den som ble gitt deg på begynnelse av denne øvelsen. Nå vil vi gjerne at du skriver inn tallene i denne oversikten for å fortelle oss hvordan du tror *NAVN* sin oversikt så ut. Du kan bruke din egen oversikt når du skriver inn i den under. Det eneste hintet jeg kan gi deg er at det laveste tallet på oversikten deres er –6000 og det høyeste er 4000.

Fint! Det var de scenariene vi har forberedt, nå vil du få muligheten til å se gjennom opptaket sammen med Paul/KM og meg og samtidig snakke litt mer om hva du tenkte underveis.

Spørsmål? Vil du ha mer å drikke osv?

Arbeidsgiver/kjøper

Velkommen og takk for at du tar deg tid til å delta på dette, det betyr mye for oss!! Det som nå skal skje er at jeg skal gi deg informasjon om det vi skal gjøre i dag, ca de neste 3 timene. Du skal altså forhandle med *NAVN* som du nettopp møtte, i et forhandlingsromm der det er satt opp to kameraer som gjør at vi kan observere dere. Dere vil bli presentert to forskjellige forhandlingsscenarier, det første vil være litt kortere enn det andre. Temaene vil også være forskjellige, men strukturen vil kanskje likne hverandre. Scenariene vil bli presentert hver for seg av meg, først det ene, så etter at dere har forhandlet det ferdig, det andre og du vil få muligheten til å stille meg spørsmål om innholdet før du begynner forhandlingen. Gruppen og jeg kommer til å sitte i et annet rom og se på, og samtidig tar vi det opp slik at vi i etterkant kan se på det sammen med deg og snakke om hva som skjedde.

Høres dette greit ut, har du noen spørsmål med en gang?

Her er en samtykkeerklæring på dette…

Scenario 1:

Hensikten med dette eksperimentet er å se på forhandlingsatferd. Du kommer til å forhandle med en annen i en oppgave der det er fem punkter som må avklares. I dette scenariet er du en personalsjef hos Firmax og skal i ansettelsesmøte med en potensiell medarbeider, *NAVN*. Tenk på at det er denne rollen du har når du går inn i forhandlingen. Som den gode personalsjef du er har du gjort deg noen tanker om dine prioriteringer og de vil du få utdelt i en payoff oversikt (interesse oversikt).

Payoff oversikten viser alle de forskjellige måter avtalen kan nås på, i tillegg til å gi en oversikt over hvor mange poeng du får for å oppnå hvert alternative resultat. Målet ditt er å få så mange poeng som mulig, men om dere ikke når en avtale i løpet av 25 minutter avslutter vi scenariet og dere vil begge få 0 poeng. Payoff oversikten er oversatt fra engelsk og det kan tenkes at noen av beløpene/begrepene virker sære på grunn av dette, men prøv å bruk dem allikevel ☺

NAVN får den samme instruksjonen som du får nå, men vil ha noen andre interesser enn deg, noe som vil reflekteres i hans/hennes payoff oversikt. Derfor er det viktig at du ikke viser din til han/henne også.

Spørsmål?

(gi ark)

Ta en titt på oversikten *(gi 2 min til det)*

Quiz for å sjekke om de skjønner payoff oversikt:

6. Kan du kort forklare kategoriene du ser?
7. Hva er det du får mest poeng for?
8. Hva er det du får minst poeng for?
9. Hva er ditt ideelle resultat?
10. Hvis du skulle forberedt deg og hadde dine vanlige ressurser tilgjengelig for deg, hva hadde du gjort nå? *(noter)*

Fint! Da skal du få møte din potensielle medarbeider ☺ *(pass på at de har med seg oversikten) Alle 4 møtes foran forhandlingsrommet, de to ledes inn og Ina viser dem hvor kameraene står, Benedicte peker på vann/kjeks/evt. annen info.*

Da kommer vi tilbake når tiden er ute. Lykke til!

25min senere…

FPene tas tilbake til hvert sitt rom og roses. Vi skal snakke mer om dette etter at neste scenario er ferdig, men hvordan synes du dette gikk? *(KORT, noter)*

Gi tom oversikt

Her ser du en tom payoff oversikt som likner på den som ble gitt deg på begynnelse av denne øvelsen. Nå vil vi gjerne at du skriver inn tallene i denne oversikten for å fortelle oss hvordan du tror *NAVN* sin oversikt så ut. Du kan bruke din egen oversikt når du skriver inn i den under. Det eneste hintet vi kan gi deg er at det laveste tallet på oversikten deres er 0 og det høyeste er 400.

Fint, da går vi videre til neste scenario.

Scenario 2:

Hensikten med dette eksperimentet er å se på forhandlingsatferd. Du kommer til å forhandle med en annen i en oppgave der det er åtte punkter som må avklares. I dette scenariet er du interessert i å kjøpe en ny bil og snakker med en *NAVN* hos BESTPRISBILER. Tenk på at det er denne rollen du har når du går inn i forhandlingen. Som den gode kjøper du er har du gjort deg noen tanker om dine prioriteringer og de vil du se i en payoff oversikt (interesse oversikt) straks.

Payoff oversikten viser alle de forskjellige måter avtalen kan nås på, i tillegg til å gi en oversikt over hvor mange poeng du får for å oppnå hvert alternative resultat. Målet ditt er å få så mange poeng som mulig, men om dere ikke når en avtale i løpet av 35 minutter avslutter vi scenariet og dere vil begge få 0 poeng. Payoff oversikten er oversatt fra engelsk og det kan tenkes at noen av beløpene/begrepene virker sære på grunn av dette, men prøv å bruk dem allikevel ☺

NAVN får den samme instruksjonen som du får nå, men vil ha noen andre interesser enn deg, noe som vil reflekteres i hans/hennes payoff oversikt. Derfor er det viktig at du ikke viser din til han/henne også.

Spørsmål?

(gi ark)

Ta en titt på oversikten *(gi 2 min til det)*

Quiz for å sjekke om de skjønner payoff oversikt:

6. Kan du kort forklare kategoriene du ser?
7. Hva er det du får mest poeng for?
8. Hva er det du får minst poeng for?

9. Hva er ditt ideelle resultat?
10. Hvis du skulle forberedt deg og hadde dine vanlige ressurser tilgjengelig for deg, hva hadde du gjort nå? *(noter)*

Fint! Da skal du få møte bilselgeren ☺ *(pass på at de har med seg oversikten)*

Alle 4 møtes foran forhandlingsrommet

Da kommer vi tilbake når tiden er ute. Lykke til!

35min senere…

Fpene vises observasjonsrommet og hilser på guttene igjen deretter tas de tilbake til hvert sitt rom og roses. Vi skal snakke mer om dette etter at neste scenario er ferdig, men hvordan synes du dette gikk? *(KORT, noter)*

Gi tom oversikt

Nedenfor er en tom payoff oversikt som likner på den som ble gitt deg på begynnelse av denne øvelsen. Nå vil vi gjerne at du skriver inn tallene i denne oversikten for å fortelle oss hvordan du tror *NAVN* sin oversikt så ut. Du kan bruke din egen oversikt når du skriver inn i den under. Det eneste hintet jeg kan gi deg er at det laveste tallet på oversikten deres er –6000 og det høyeste er 4000.

Fint! Det var de scenariene vi har forberedt, nå vil du få muligheten til å se gjennom opptaket sammen med Paul/KM og meg og samtidig snakke litt mer om hva du tenkte underveis.

Spørsmål? Vil du ha mer å drikke osv?

University Spin-Off: A Comparative Case Study

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Abstract

This paper will add an exploratory perspective to the scarcely researched area of establishing a venture that is spun off from the university, with the goal to make it easier for other companies, students, and faculties to establish venture companies, by elaborating the process and the experiences connected to developing a venture spin-off at the university. The paper compares a case with four other university spin-offs, described through four different process theories; the life cycle, teleological, dialectic, and the evolutionary. The main findings indicate that the universities role for the spin-offs are varying but that the universities impact could inhibit the process through administrative formalities, and difficult tehnostructure.

The university is an arena where research produces new and exciting knowledge and ideas. This academic work may in turn serve as an inspiration for both students and departments to establish new ventures. This progression is propitious as university spin-offs are found to be very robust, having significantly higher survival rates than other start-ups (AUTM, 2001; Mustar, 1997). Gaining a better understanding of the process of the establishing a spin-off could benefit the universities, students, employees, and educational departments in order for university research to disseminate. Within the university lies skill and competence, which are never turned into a commercial product, at least not by the people who created the necessary tools or ideas. Even though there may be several reasons for this, e.g. like the lack of drive for capital gain, one contributing factor might be limited knowledge of how to go about the process. University spin-offs are usually the result of long and complex development paths (Roberts, 1991), and learning more about this path could enable researchers to move more readily down it.

The university is a complex institution with many particularities that could impact a venture spin-off's development. First of all, there are scientific traditions that could be in conflict with venture establishment and creating technology for commercialization, in particular since the university is based on sharing knowledge for everyone's benefit, not using the knowledge for one's own financial gain.

The second implication comes from Mintzberg's research on management in organizations (Mintzberg, 1989). He points to the university as a 'professional organization' where the whole system is based on pigeonholes where each professional works on their territory but at the same time gets paid by the same employer. This could have been an ultimate organization for innovation and venture spin-off's, but as Mintzberg points out that there is a heavy technostructure and middle-line management, meaning wide spread control over professional work and a mechanic-like support staff (Mintzberg, 1989). Because the middle-line management is often mechanically organized, the rigidity of rules and conduct put forward potentially inhibit the researcher from having the freedom necessary to start venture spin-offs in the university context.

This paper is a comparative case study of five university venture spin-offs. The paper will attempt to enlighten the different processes that most of the university spin-offs experience during their development. The paper will try to touch upon issues surrounding the university impact on the spin-offs, how entrepreneurial ability could play a role, and how external factors outside the university could affect the spin-off. This comparative case study is carried out in order to add information to this modestly investigated area, by adding an internal view as an involved researcher in a spin-off.

What is a spin-off venture and how to investigate them?

A university spin off can be defined as a *"new venture initiated in a university setting and based on technology from a university"* (Rasmussen, 2006, p. 3). Shane, however, defines a university spin-off as *"a new company founded to exploit a piece of intellectual property created in an academic institution"* (Shane, 2004, p. 4). This definition differs from Rasmussen's in one way: where Shane uses 'intellectual property' Rasmussen uses 'technology.' Shane's definition thus covers a broader set of potential spin-offs not limited to technology, but it could also entails 'soft' inventions like a type of service and consulting. This paper will use Shane's definition since it covers a broader set of inventions.

One way to describe university spin-offs is by putting them in a theoretical context. The theories that have been used to map the production of spin-offs are either variance or process theories. Mohr (1982) argues for process theories because the core in variance theory is to find the independent variables that are necessary and sufficient to explain the dependent variable (i.e. the spin-offs). Social science has found this difficult because there are no stable independent variables that explain the spin-off phenomena well enough (Ibid.). The tradition of social science has looked more at the process aspects of each spin-off and hence, the social science tradition has attempted to find similarities in each spin off, to cover commonalities in the processes.

The first process theories were directed at finding stage-like developments in the spin-offs. Stage-like development, or life-cycle theories, are tempting to use to describe much of the processes but have come somewhat short in describing what mechanism drives one stage to another stage, or the more external influences on the processes. Van de Ven and Poole came up with four process theories describing spin-offs (Van de Ven & Poole, 1995). These theories are not in direct competition with each other but rather complimentary. Each theory describe, to some extent, what the other theories fail to explain.

Process theories

Life-cycle theories.

Life-cycle theories are based on the assumption that business development often evolves through cycles or stages (Rasmussen, 2006). Most stage theories describe innovations as linear (Rosenberg, 1994) and some more as continuing cycles were the process goes back and forth (Bhave, 1994; Churchill & Lewis, 1983). Many of the models are rigid, and are therefore adjusted with feedback loops and overlaps (Fayolle, 2003). The strength of life-cycle models is that they provide a clear start and end to a process.

An example of a life stage model is proposed by Gartner (Gartner, 1985): The entrepreneurs locates a business opportunity, accumulates resources, markets products and services, produces the product, builds an organization, and respond to governments and society. This is a typical description of innovation in the corporate world were external influences like the university have no direct influence on the innovation process. In the cases described in this paper, the university influences are often to a great extent influential on the business

development. Some have pointed out that life-stage development are often more visible in a university context than in other contexts (Rasmussen, 2006). Take for example Gartner's (Gartner, 1985) first stage; *the entrepreneur locates a business opportunity*. To locate a business opportunity will be easier in a university context, because the university spin offs should be based on new ground braking technology, and opposing to already existing knowledge. Thus, university spin-offs are more prone to earlier discovering the need and the opportunity for new products, systems and services since much of university research is based on a deep understanding of users, context and technology.

(Vohora, Wright, & Lockett, 2004) has outlined a more dynamic theory that is based on several spin-offs. This theory is not as rigid as other stage theories. The four factors by Vohora et.al. (2004) is seen more as necessities in a spin-off, rather than stages or steps in a specific order. The first factor in Vorhora et.al (2004) is opportunity recognition. By seeking new technology, ideas, knowledge, and solutions, the University carries out possible opportunity recognition based on thorough analyses of the user and needs. The second contingency refers to the entrepreneur's commitment for the spin-offs. Commitment to take an idea the final step is often where a spin off is stranded, in the lack of risk-taking and entrepreneurial abilities. Entrepreneurial commitment is maybe not so simple as Vohora et al (2004) outlines. For example, Dorf & Byers (2005) not only see the commitment as important, but entrepreneurial competencies as equally important. There is often not a problem in terms of the will to do something, but a project also need core competencies to manage it. In the entrepreneur's case, core competencies in taking an idea to a business. The third contingency refers to credibility, which underlines the scientific environments upper hand. That conducting thorough research is a key criterion in the University, and that alone increases the spin-offs credibility. Fourth is the sustainability of a spin-off. The ability for the spin-off to seek growth, expansion, and most importantly to reach the need and users that the product are intended for, and to develop over time when new research and knowledge adds to the product's existing structure.

The critics of the life-cycle theories point out the clear rigidity between the stages, and that they are not stages in terms of one step as an antecedent to the next. The theories give little room for unforeseen changes or affections in the development process. The stage theories also give little explanation on how the development moves from one stage to another (Van de Ven & Engleman, 2004).

Teleological process

Teleological process theories inclines that spin-offs are moving toward goals, which are often set up during the whole process of development by the people involved (Poole & Van de Ven, 2004).This is a much more flexible approach than the life-cycle theories. Teleological process inclines that the goal setting must be flexible, that bumps in the process are inevitable, and therefore short goal setting is a must for success.

Uncertainty is an unavoidable part of the innovation process, and learning-by-doing is a significant part of the development. Some research claims that there is a certain amount of recourses that is needed to reach the goal of establishing the venture (Vohora, Wright, & Lockett, 2004). These resource-theories are a combination of life cycle theories and teleological process theories. These could better explain the pitfalls of the life cycle theory, but have some disadvantage in explaining what exact resources are needed in the teleological process. For example, is there a quality in a team that is more important than other qualities? The teleological process is based on the individuals in each project, in that establishing a firm is based on key features in individuals, which can change their path and vision in correlation with new knowledge regarding the product and user. With no individuals in a venture that can change a path because of for example strong identification with product or user then the venture will suffer and not adjust to the market it is intended to reach. The theory also inclines that it isn't necessary that each involved individual in a spin-off need to have entrepreneurial competencies, but that the individuals working with the business creation are best described as working in a teleological process.

Dialectical process

There is a dialectical process between the venture spin off and the starting grounds of the spin-off, i.e. the context, which in this case is the university. The dialectic process differs from the teleological and the life-cycle theory because it is a dynamic theory explaining how the context affects the spin-off, not how development stages (i.e. life-cycle) and goal setting from the involved impact the development (i.e. teleological). The complexity of the university regarding scientific and social traditions could have a negative impact on innovation. The universities have long traditions and rules of conduct that could make it harder for an innovation project, which relies on breaking boundaries to create new solutions. Either way, the university plays a direct and indirect role in terms of good ethical standards, demands of high scientific value, and conformity to administration of article

production, book writing, lectures, and deadlines, all of which can impact a venture spin-off, in both positive and negative ways.

The difference between the corporate world and the academic institutions might be salient in a spin-off. The universities demand for openness in all aspects of research is a significant part of the code of science. One challenge is that this could be a problem in terms of keeping a business idea secret. This is a potentially problematic issue, which a University spin-off needs to handle in terms of openness versus business secrecy.

Another aspect is the transition from the spin-off at the University to an independent corporate setting; i.e. the move from safe non-profit institutions, to create a long-term profit industry. This transition is difficult and therefore highly influent on the spin-off process. The people involved are forced to think about market, sale, economy, investment, internationalization and so on, which are not highly prioritized subject in the scientific environment.

Evolutionary process

The dialectic process theory is based on the assumption that the university directly influences the spin-off process. The evolutionary process takes this one step further and points out the external conditions that influence the University, which then influence the venture spin-off in the University. Capital, governmental regulations, labour market conditions, and regional industry composition, are such external influences (Rasmussen, 2006). One such external influence is networking, which is not to be underestimated in venture spin-offs. A study by Shane and Stuart (2002) shows that firms which have prior contact with venture capitalist before the spin-off have started have much higher success rate in getting funding than venture spin-off without such a network. Other external impacts that will affect the evolution are geographical location, government regulations, university characteristics, and initial resources endowments (Rasmussen, 2006).

The evolutionary process theory attempts to describe impacts that can change the direction for a spin-off through different external impact. For example, external business cycles in the economy (evolutionary process), will affect the evaluation of the business opportunity (life-cycle processes) in that if you for example have an idea directed towards consulting or services, than it will be easier to see the benefits of your business opportunity because there

is money in the market to pay for such services. External business cycles will also affect the possibilities for venture capital (the teleological process), because investor's risk- analyses of the business opportunity are biased by for example the classic biases of proximity (Shefrin, 2000). And lastly, high peaks in business cycles will also impact the universities in pushing for new research areas, and research in new technology instead of safe expansions of already established technology (dialectic process). All these processes will affect a venture spin-off in a university. This will be discussed further in the case description.

A comparative case study between four venture spin-offs described by Rasmussen (Rasmussen, 2006), and one case study presented by this article will be carried out in order to enlighten the area of process theory, in the context of university venture spin-offs. Firstly, a description of the methodology used in the comparative case study will be provided. Secondly, an adapted summary from the four case descriptions by Rasmussen (2006) is presented. This is provided in order to give the reader an understanding of the cases. Then the new case is described by way of the four process theories, in order to have the same foundation as the ones described by Rasmussen, before the paper goes through each process theory and compares the four cases by Rasmussen and the new case added by this paper.

Methodology

The data was collected during the course of a year of a spin-off company. The spin-off described here was developed by the author of this article, as well as four other students. The spin-off development was a part of the master's thesis of this group. The cases that this spin-off will be compared to was carried out by Rasmussen (2006), which followed four spin-offs at two different universities in Norway. The data was gathered through interviews of the involved, memos, financial reports, market analyses, and analyses of business summaries. This article will add a new spin-off to the four described by Rasmussen (2006), and a comparative analysis between the spin-off processes will be provided. The new spin-off added is described as the 'MTP'. In the description of the novel spin-off, the same data collection techniques as Rasmussen (2006) used, except for interviews. As the author were involved in the project, internal memos relating to the decision-making and the processes of business development, were used as a replacement. This is methodologically different from Rasmussen's work (Rasmussen, 2006), and it has some advantages and some methodological disadvantages. The advantages are first hand knowledge; nothing is hidden or kept from view from the researcher; all data is available.

Methodological disadvantages could be a lack of objectivity and biased observation of the evaluation of the process, but this article describes the development of the university spin-off, not the meta-communication behind the development. Therefore it will not be biased through one-person's opinion. The description of the process and its development was agreed upon by all the members of the development team.

The four cases by Rasmussen

Spin-off Case Alpha within University A

Case Alpha is based on the specialized competence of the professors in the founding team, which have developed as two of the founders were pioneers in combining two engineering fields during their master and doctoral studies. The research group they are a part of is connected to two departments and is well-renowned internationally in their field. The initiation of the spin-off happened by coincidence. The professors usually had close relations to industrial partners, through projects or part-time positions. The professors discussed the possibility of starting a company. "All four of us professors were actually looking for some new industrial projects, and then this idea came up, and it was very good" (Founder Alpha). During informal conversations and based on their research-based competence combined with their industrial knowledge, they decided to explore the possibility to start a new venture. None of the professors had started a business like this before and they acknowledged a lack of knowledge about such a process, so they decided to include additional competence in the founding team. The founding team had to go several rounds with industrial partners and customers, and the final idea was a result of an interactive process. The founders managed to obtain a mixture of public and industrial funds to proceed with the development project and hire three employees. Alpha has successfully developed the product and signed the first contracts with costumers.

Spin-off Case Beta within University B

The history of case Beta started when a group of researchers partly by chance discovered a medical effect. The researchers obtained funding from a pharmaceutical company that gave substantial funding for research at the university. A research group was built up, which provided good scientific results, several PhDs, and promising results from an industrial viewpoint. After six years, just as the research activity was about to give the basis for more development work, the pharmaceutical company made a general decision to pull out of such projects due to economic difficulties. The process of taking over the project and the related

patents from the pharmaceutical company was long and cumbersome. The university was heavily involved in this process. “I do not know how this had ended if it had not been that we had this backing from the university management (Founder).” With considerable financial and administrative support from the university the two professors were able to retain ownership of the technology. Retaining the competence in the research group and learning about spin-off processes were important for the university which became a major shareholder in the company Beta that was established to commercialize the technology. The founders and the university managed to obtain funds from several public support programs and some new owners provided equity. “We got many advices and many contacts, so we came out much stronger in order to be able to develop a company (Founder)”. Based on this, experienced people were hired to strengthen the management of Beta. As Beta develops into an independent venture, the distinction between university activity and business activity creates discussion about calculating and pricing of time and resources. The university lacks experience on how to handle such cases, and even if the attitude is positive, this issue requires much attention from both parties. Beta has now built a professional team, obtained the first round of funding, and have started to commercialize the technology.

Spin-off case Gamma at university A

Although the university plays a central role, Gamma is formally a spin-off from another company that spun out of the same research group 8 years earlier. This first spin-off (SPIN1) was established as a continuation of a cooperation with an industrial partner which had led to the development of the core technology. SPIN1 maintained close relation with the research group at the university and was by the researchers seen as an entity for applied projects and acted as a development company for the technology base which the research group specialized in. During an idea search process at the department initiated by the university technology transfer office (TTO), this idea was discussed further. The idea is within a field of strategic importance to the university that has decided to invest in laboratory facilities and support a joint venture to commercialize the idea. Gamma is established as a subsidiary of SPIN1 and has become tenant in the university incubator. Gamma started on a prototype project where the university and SPIN1 play central roles and substantial funds from public sources and industry were obtained. The CEO built a business case including a broad industrial network and public funding for building a prototype in the university lab. Due to an internal conflict in SPIN1 the Gamma project ceases to develop. This situation is now cleared, and the project continues.

Spin-off Case Delta within University A and B

For more than 30 years professor renown for being innovative and his group at University A have actively commercialized several research results. Patents and technology from the professor's research have been managed by a company, which has been owned by the professor together with both industrial partners and the entrepreneurial graduate. This professor was also the source of the current idea, and the idea were developed through student thesis and finally in a PhD project from 1996 to 2000. The idea was attempted sold to the Norwegian industry, with little success. But one of the team members had family background among the potential users of the technology, and when he occasionally heard about the research project he saw its commercial potential and made contact. As the technology lacked an entrepreneur this request were highly welcomed, and the technology owners are now supporting him to commercialize the technology. The entrepreneur has not officially involved the university in the spin-off project, but support measures and advisory service connected to the science park at the university have supported the project. The entrepreneur has got a public grant to develop a prototype and has now left the university to focus on the project.

Findings & Results

The MTP as a life-cycle process

The development of the venture was driven forth by the product development, which was in the human-centered design tradition[1]. The human-centered tradition has its clear stages and levels, where each level has to be accomplished before proceeding to the next one[2]. The human-centered design process stage-based, and this also affected the development of the venture spin-off, on the one hand through the development from the perspective of human-centered design, and on the other hand through the business aspect of choosing the right idea. The business spin-off process in MTP was incorporated in the product development. The processes went through the user identification phase, were technical demands was decided. By the same token, this is how it was decided which segment, business area, and need, the user should have. This is central part of exploring the opportunity of the business

[1] For further information about Human-centered design, and the product development, read the article by (Biørnstad, Furnes, Lundeby, Rambøl, & Thorsen, 2007, this thesis).

[2] See chapter "Deciding on an idea", "Exploring the Idea", and "Specify the User and organisational requirements" in Biørnstad, Furnes, Lundeby, Rambøl, and Thorsen (2007, this thesis).

idea. In the same way the project went through user specifications, it also used two other stages of development to ensure the opportunity of the business idea. The first one was by listing criteria that the ideas had to accomplish to be evaluated in a next round. One such criterion was a demand for the product to be directed at the corporate environment (so-called business-to-business) in order to ensure that the market was involved in the decision making of the idea. This got the amount of business ideas down to three, which led to the last stage in the opportunity recognition process, which was inspired by Dorf and Byers´ (2005) entrepreneurial attractiveness analyses of business opportunity. Dorf and Byers (2005) put forward a qualitative equation intended to measure entrepreneurial attractiveness:

$$EA = \frac{n}{o}\int \left(w1Y + w2I - w3W - w4R\right)dt$$

Where Y=Income, I= Independence, W= Work effort, R= Risk, N is the amount of years, O=other work conditions, w=weighting factors, and dt is derivate over time.
This equation makes an actual utility of the business opportunity, were income and independence are positive valuations, work effort and risk is negative ones, on a scale from 0 to 5. Inspired by the equation by Dorf & Byers (2005), the author developed an additional equation with other values that could predict the opportunity of the business idea.

$$EA = \frac{n}{o}\int \left(w1Cu + w2S + w3Int - w4Co - w5P \right)dt$$

Where Cu=Customer, S=Strategy, Int=Internationalization, Co=Competition, and P=Potential loss. Here, customers, the strategy and the possibilities for internationalization are positive weight factors, whereas competition and potential loss is assumedly negative ones, in the same scale values 0-5.

An example of answers from one of the involved in the MTP venture is presented below:

Dorf & Byers 2005 Table 1

	Idea 1	Idea 2	Idea 3
Y	2	4	2
I	5	5	2
W	5	5	5
R	4	5	3
Sum	-2	-1	-4

$$EA = \frac{n}{o} \int \left(w1Y + w2I - w3W - w4R \right) dt$$

Furnes 2007 Table 2

	Idea 1	Idea 2	Idea3
CU	3	5	3
S	3	5	2
Int	3	5	1
Co	1	2	5
P	5	5	5
Sum	3	8	-4

$$EA = \frac{n}{o} \int \left(\; w1Cu + w2S + w3Int - w4Co - w5P \; \right) dt$$

The project ended up developing a venture based on idea number 2. Three out of the six in the venture said that the equations were helpful for them in making their final decision on what idea they thought was the best. The equation is a qualitative equation, in that it is not the number itself that is meaningful, it is the reflection around issues such as e.g. “why do I choose to rate ‘customer’ and “What is the qualitative difference in the two ideas that make me consider the one of them as better then the other?” The interesting part of this activity is that it forces you to make up your mind on the idea, on factors that could weigh heavily on your decision. This equation is therefore not for making general conclusions about what kind of ideas which are good; the equation is a personal instrument for reflection of one's business ideas. Because this is an individual tool, rather than a statistical tool, the aggregated data are not presented in this article.

The opportunity process described above is stage-like in its development, because of the human-centred design method used. The life-cycle process theory best describes this part of the venture spin-off because opportunity checking has a causal build-up. In MTP the opportunity process went through a stage development like this: Research stage->basic ideas -> idea processing (expelling the ideas) -> information gathering on each idea -> idea processing (narrowing the ideas) -> opportunity check -> spin-off and development from one idea -> investors and organizational structuring.

The MTP as a teleological process

As noted above, teleological process theories inclines that spin-offs are moving toward goals, which are often set up during the whole process of development by the people involved. Among the people involved in MTP there were different levels of motivation. Only one of the six involved in MTP reported that the main reason for joining the project was to establish a venture with international potential. The rest of the team reported that the process, the academic challenges, and working and creating together with a group was the main. In line with prescriptions from teleological theories, the persons involved in MTP changed the focus during the development of the project.

As the product got more defined, and the end result was more visible, the group's motivation for working with business summaries, budget, customers, and contacting investors was allocated more time in the development process. Also in line with prescriptions from teleological theories, this development process forced through new goal settings and entrepreneurial commitment.

The network of two of the involved became influential for the process in getting investors to MTP. MTP approached one industrial investor, and one non-profit organization with the agenda of connecting spin-offs and investors. Both the industrial investor and the non-profit organization were contacted through the network of the involved of MTP. This supports Shane (2004) in his findings that persons involved in a spin-off which know investors beforehand, has higher success rate in getting funds to the project.

The MTP as a dialectic process

The MTP developed through a year where five master students ran the whole development, while at the same time writing their final thesis. The university had a direct impact on the development in four ways. Firstly, the involved had to meet the formal criteria as master students, by writing project descriptions, literature reviews, and finally a master thesis. The main hinder for the continuation of the development was the writing of the project description. Here the group were met with hesitation from the department, even though the project had been initiated by one of the central professors in the masters programme. The main critique was related to methodological format. Whereas a traditional thesis is based on a clear hypothesis, this project was based on an action research paradigm, where hypothesises are the output of the project, rather than its input. Secondly, the academic

requirement that the project should be presented through the master thesis, made a positive effect on the development of the product because every step of the development was academically documented and evaluated. Thirdly, the role as students had an impact on establishing the spin-off as an official company, in the sense that the involved could not formally commit before the delivery of the master thesis. Lastly, the access to the knowledge bases like professors, literature, and students willing to participate in experiments, made the development easier and certainly increased the quality of the product.

To see that the university plays a role that makes the development dialectic is highly visible in MTP. The process of always adapting to university standards in both positive and negative way is on a meta-level also considered positive in the way that the involved always have to reflect on the development in terms of standards and methodological challenges. The dialectic process is therefore considered a positive process for a development, because to always defend and quality check one's venture is beneficial in the long run.

The MTP as an evolutionary process

Macro-level effects upon a business development are often not easily visible. For instance the business idea of MTP was based on providing knowledge through technological services, a service that was intended for corporate human-recourse departments, which are often affected by their respective company's budgets. For example, the business idea of MTP was especially prone to the corporate business budgets for education of their employees through individual development. Good economy in the corporate world affords the opportunity to use recourses on such services, as opposed to an economy were money used on human-recourses is downplayed considerably. As one human-recourse manager in a large consultancy company said "unfortunately, when there is little cash available, then the employees are suffering because my department are the first to cut-down. This is bad because it is at times like these when the economy is tight you need you're staff to be at the best." In addition the money available in the market will affect the possibilities for funding from investors. The investor's risk-analyses of the market could be affected by proximity (Shefrin, 2000) rather then long-term benefits.

Because of the good economy in Norway, the difficulties of getting investment and interest from the corporate were not as difficult as it might have been some years ago. The interest

from different investors was very positive, and MTP got the investment it needed for further development.

The evolutionary process theory captures a very important aspect of venture spin-off, and is often the process that is to a degree a go or a no-go for a venture. The evolutionary perspective is appropriate to explain at the macro level, but in terms of the case of MTP it is difficult to measure how the macro level had an impact on the development. The teleological process seems to have more impact in the case of getting the investment than the evolutionary perspective. This will be discussed later in the article.

Comparing Rasmussen's four cases with MTP

Life-cycle comparison

Rasmussen's (2006) four spin-offs are comparable to MTP; in that all five of them went through a stage-like process. The difference was in the nuances and the number of stages. The spin-offs described by Rasmussen (2006) went from a research stage, where curiosity and accumulation of knowledge was the main motivation for the process. The next stage was opportunity identification related to exploring the market potential and making contact with the industry. This process was described as an iterative process where changes through the process were a necessity in order to end up with the final business idea and its opportunity. The two next stages can be described as resource gathering and organizational structuring. These four stages are fairly similar to MTP. Hovewer, the MTP process had more nuances, with respect to the fact that the MTP process was influenced by the User-Centred design tradition which lead the development through a predefined stepwise development; as described earlier in the article: Research, basic ideas, idea processing (expelling the ideas), information gathering on each idea, market check, idea processing (narrowing the ideas), iterative loops of prototyping and testing, opportunity check, benchmarking, spin-off and development from one idea, investors and organizational structuring, were the main steps involved. This is primarily different from Rasmussen's (2006) second stage, where the entire opportunity identification was melted into one stage. In MTP the opportunity identification process was separated into minor stages, where one stage was the antecedent of the next.

Teleological comparison

As described above, teleological processes relates to the individuals in the development, and how their ambitions and goals changes throughout the project. In the MTP, people were split

between a the business perspective and an academic perspective. This is actually also comparable to Rasmussen's findings, where differences in motivation and aim of the different stakeholders were noticeable.

Table 3

Role of individuals	Alpha	Beta	Gamma	Delta	MTP
Motiavation of Inventors	Create something, new challenges	See invention in use and fund research	Build new domestic industry	See the technology in use	Create something as a group, new challenges
Motivation of entrepreneurs	Create a success make a profit	Create a success make a profit		Create a profitable business	Create a success make a profit
Team development	Persons with business competence included as founding team members	Business competence added to management team	Joint venture established and CEO hired to run the project	Agreement made with entrepre-neur who develops the spin-off project	Joint venture established and used intern competence in business development

The information displayed in table 3 points to the similarities between the spin-offs. The clearest differences are found between the inventors on the one hand and the entrepreneurs on the other. Note that these are not necessarily different stakeholders, but people *within* the development project that take on different roles in the project. An example is from Beta, were the researchers were more into getting funding for further research, than taking the entrepreneurial role to commercialize the product, which then could finance further research. These kinds of situations might be more frequent in university spin-offs, than in other types of start-ups.

Dialectic comparison

Table 4 points to the similarities in the dialectic process between the university and the spin-offs.

	Institutional integration between university and spin-off project				
University involvement	Alpha	Beta	Gamma	Delta	MTP

University research as basis for the spin-off	Strong general competence	Research effort in cooporation with industry	competence from research and prior spin-off	Many years of research and Ph.D project	Idea spin-offed by academic work
Proffessors involved	4 professors in funding team	2 professors in funding team	3 professors involved in R&D	1 researcher leave university	1 assistant professor as project owner
Involvement by research team at university department	None, except of the founding team	Hired by Beta to do R&D project	Important partner in R&D project	Minor involvement at university A	1 assistant professor and 2 Ph.D candidates involved as supervisors
Use of university R&D facilities	No	Yes	Yes	Informal small scale use	Yes
Use of physical admini-strative facilities	University incubator on campus	Science park incubator near campus	University incubator on campus	No	No
Use of advisory/business services at university	No	University manage-ment and science park	University TTO	Science park	No
TTO involvement	No, direct, but informal and university policy	Yes, but university play the role as TTO	TTO involved and part owner	No	No
University resources employed to support spin-off project	4 professors on sabbatical year	Effort and funding to obtain patents and establish Beta	Technology partner providing research	No	No
University ownership	No, owned by founders	University, hospital and founders are major owners	Industry partner and TTO as eventual owners	No, inventor and founder as eventual owners	No, inventor and founders as eventual owners
Student involvement	Recruting base	Recruting base and doing thesis	Recruting thesis and doing thesis	Project thesis	Runned the development

There are clear similarities between the Delta venture and the MTP venture. How the university has played a central role in the development is therefore contingent upon the spin-offs in all the five cases. The role of the location, employees available, research, (as a source for spin-off,) and support from other researchers is comparable. The differences are the role of the university as a central part of the business development, where there is a split between Alpha, Beta, and Gamma on the one side, and Delta and MTP on the other side. The two sides utilization of the university are therefore different but also comparable in that each and every spin-off had used the university as a ground for development using research and competencies. The differences are in the business development where all of them walked different paths. There is therefore no reason to reject the dialectic process theory at any of these cases, since all of them have had more than less impact from the university as an institution and knowledge provider.

The experience of the dialectic process is in all five cases are mixed. MTP was as mentioned often affected by the academic standards with respect to format that the institute put forward as guidelines for how to conduct master thesis projects. MTP sought to carry out a completely new innovation project using research knowledge in a somewhat untraditional way (the MTP research format, is however, compliant with standard methodology at other Norwegian university institutions). This complicated the process of getting the project formally approved, which then forced MTP to use a lot of time editing their approach so that it could fit to the formal standard. This is supportive of 'the professional organization' put forward by Mintzberg, where the supportive technical department is not supportive and flexible but rather mechanical, which again makes it harder for an innovation project to succeed. The same was experienced in Rasmussen's cases where for example Alpha said: "*the nightmare of starting something as a professor is that it might be difficult keep the university tasks and company business separated, and in worst case you can be sued*" and "*this group is dependent on a good cooperation with the Research institute X, and that would not work if we were establishing companies*".

Evolutionary comparison

Rasmussen points out that the ventures went through radical changes where some of them were a direct result of external factors. For example drop in the stock market forced Beta to make changes, and Delta stopped the commercialization process until external entrepreneurs came into the project. The MTP is still in an early start-up phase, and hence it is difficult to

pinpoint evolutionary contingencies at this point in time. In addition, MTP guarded itself from external impact (evolutionary contingencies) because of the intention of making it a project where the involved had complete control over the whole process and all the decisions regarding its development. This does not mean that the evolutionary process is not valid, only that comparable data between Rasmussen's case and MTP is limited on this point.

Discussions and Implications

This paper has attempted to address four process theories as a multi-level explanation for a university spin-off by adding the MTP case to the research carried out by Rasmussen (2006), and comparing the findings. The perspective as an internal researcher and the view as a business psychologist, have altered some other perspectives than Rasmussen's (2006), which in the life cycle, teleological, and dialectic processes have reinforced Rasmussen's findings, but in the case of the evolutionary process it has been difficult to compare the results.

First, with respect to life-cycle process both the MTP as well as the four Rasmussen cases (Rasmussen, 2006), where highly describable in terms of stage-like sequences. The MTP followed a specific methodological tradition, but was nevertheless described by stages, if only somewhat more split up than the other cases. Opportunity recognition, as one of Vohora's (Vohora, Wright, & Lockett, 2004) four spin-off necessities, is also identifiable in the life-cycle process where all the five spin-offs more then less went through such an stage.

Secondly there is the teleological process, which is also found in the MTP in that it was a goal-oriented process, where it to a great extent was driven forth by one individual's entrepreneurial competence, entrepreneurial commitment (Dorf & Byers, 2005), and prior network. The process of achieving funding and investment was in the MTP as in the other four cases by Rasmussen, dependent on flexible goal setting developed during the whole process. The entrepreneurial commitment in the MTP also increased throughout the whole process, as it did in Rasmussen's study. Especially after getting positive feedback from potential customers, the individual's sense of ownership increased, not just to the idea, but also to the process, and there was a feeling that leaving the project after ending their personal study would be to leave something half done with not ever knowing the ending. The teleological process is also underlying Vohora et al (2004) period of entrepreneurial commitment for the process. All the five spin-offs did at one point in their development have

to deal with their entrepreneurial commitment and assemble the competency that was a necessity to get the spin-off off the ground.

Thirdly, the perhaps easiest measurable process on the development was how the university affected the process. This dialectic process was throughout the whole development the one process that had the most influence. The role of the university through the whole development is supported by the theory of professional organizations by Mintzberg (1989). The universities technostructure highly influenced the MTP development by their formality, and administration. This in positive ways by providing facilities and easy access to knowledge deliverers, and negatively through scarce openness for un-classical research and administrative formalities. There is reason to believe that the dialectic process had a different effect in the MTP than in the four mentioned by Rasmussen (2006), because the MTP was student ran, while the professors were owners and in charge of the development in the former. This needs further research to explore, because there is not enough data available to measure the differences on how the university either increase or puts constraints on a development process to a more or less degree to a student or a professor run venture development.

Fourth, the evolutionary process was difficult to measure in the MTP case for two reasons. First it was difficult to compare to Rasmussen's (2006) findings in the evolutionary process, because the ventures described by Rasmussen experienced changes over several years in the market, and industrial partners left the process due to a decrease in demand of the technology, which led, for example, Alpha to reinvent their scope and business idea. The MTP did not experience any of these problems mostly because of the scope of time (one year) and so it was too short a period of time to detect changes in the market. Secondly the MTP avoided letting itself be affected by external effects. This because the development was partly closed for others with respect to insight, and the investors involved in the spin-off were well-known by the involved and therefore there was more of an internal process between interested parties. On the other hand, there is no reason to say that external events do not affect university spin-offs, but in terms of direct impact on the MTP it was difficult to see. This paper has therefore not been able to replicate Vohora et al (2004) process of sustainability of the MTP spin-off since this paper only had the scope of seven months from MTP started with a business idea to the creation of the spin-off.

Other similarities were the role amongst the involved in the spin-offs to shift focus between being entrepreneurs and academics. In the beginning it was a clear rule in MTP that it was the academic aspect that was most important. Through the year of development the motivation changed somewhat, where the idea of keeping on developing after the study had ended, was stronger the more the technology was visible. From being a group of potential Ph.D appliers in the beginning of the year, the involved in the venture put that aspiration on hold for keeping on with the venture until it was commercialized. This supports Vohora et al's (2004) findings relating to the spin-off's credibility, in that the strong academic foundation each spin-off was based on was beneficial for the university spin-offs, which could display credibility behind their product.

Implications for further research

The university as a context for venture spin-offs is not a well-documented process, especially not in a Norwegian setting, where corporations have had a very small degree of impact on the universities. The pros and cons for corporate involvement are visible, where the clearest cons are that the corporations will not finance non-profitable research, and research that fails will not be published because of bad PR, when such knowledge is highly important for others doing similar studies. But there are clear pros too, in that the corporate world can finance R&D, and push the universities to risk investing time and knowledge in not just the research but also the commercialization of the product, system or service. It is important that Mintzberg's professional organization (Mintzberg, 1989) is be challenged and researched further, which could lead the university to more flexibility for new innovations but at the same time withholding the universities solid impact in terms of credibility.

This process has improved in the last years in some of the major universities, by the addition of their own institutions that have the intention of increasing spin-offs at the university (TTO's). These institutions need time to become established and before one will be able to see whether they will be successful or not. It is important to follow-up research in spin-offs because more knowledge about the process, could mean that students and employees at the university want to take extra step further and try to establish a venture, since the process does not seem so frightening and unknown when the process is described and people before have walked the steps for them.

Future research should focus on using more time to investigate the venture spin-offs over a longer period than this article represents. This is because time limitation restricted the possibility to test the sustainability of MTP (Vohora et al 2004), and further, evolutionary processes that could affect the spin-off over time (Van de Ven & Poole, 1995). First of all to see how the product evolves and if the product reaches the market, but also how the spin-off and the involved cope with resistance from market and the development itself. It is therefore important that the evolutionary process and the sustainability is investigated further from the internal researcher perspective to find out how the evolutionary process affects the development, not just at the spin-off level, but also on the individual level.

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Appendix

Table presents the four cases by Rasmussen (2006), in addition MTP with the central properties outlined.

Table 1

Properties of the four university spin off by Rasmussen(2006)+ additional spin-off

	Alpha Univesity A	Beta University B	Gamma University A	Delta University B	MTP University X
Founders	4 professors	2 professors	Joint Venture	1 researcher	Joint Venture
University Ownership	No	Yes, major	Yes,minor	Yes, minor	No
Time from initial research idea to spin off project	14 years	8 years	10 years	30 years	2 years
Field	Engineering/ software	Biotechno-logy	Engineering/ electromech-anical	Engineering/ electromech-anical	Engineering/ software
Source of Initial Idea	Industry need	Basic University research	Researchers and industry partners	University Research	University research/ researchers
Source of basic technology and compentence	University research and industry experience	Industry sponsored university research	University research and prior spin-off company	University research	University research
Most critical resource for oppurtunity development	One professor's industrial experience	Prior industry cooperation	Prior spin-off and industry network	Founder's own practical experience	Founder's own practical experience
Major performer of technology development	Founders	University	University	Founder	Founders
Other performers of technology development	Industrial partners	Additional research partners	Prior spin off (SPIN1) from same university group	Technology inventor at university	None
Major roles in market development	Founding team	Founders and new management	Interaction between CEO, professors, and industry partners	Founder and science park advisor	Founding team
First commitment for funding	Public grants	University	University	Public Grant	Investor
Major source of funding	Public grants	Public grants	Public grants	Public grants	Private investor
Additional funding resources	Industry	Investors	Industry	None	None