![Chalmers University of Technology logo]

![Hexagonal design method cards: Interview — Ask what you don't know. Don't interrupt. Ask one question at a time. Simplify — What can you take away? Experience prototyping — Prototype the experience of using your design. Extreme user interview — What aspect do you want to explore? Find users who are extreme in this aspect. Context of use — Where will it be used? In what ways? Lessons learned — Your most unhappy customers are your greatest source of learning. Experience design — Think about the total experience you want to achieve. Trust — Design for safety, recognizability and professionalism. Defining challenge — What is the problem we're trying to solve? Set smart goals. Accessibility — Can everyone use this? Moodboard — Communicate the design concept through a collage of pictures and texts. Draw the experience — Have users show an experience with drawings. Cognitive walkthrough — Have a tester think aloud while using the design.]

Tell the story
Trip – designing b2b e-commerce

Master's thesis in Interaction Design and Technologies

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Cover: Our design tool Trip.

Abstract

Business to business (b2b) e-commerce is a growing field. This means that more and more interaction designers can have the opportunity to design for these services. A literature review of the field showed that there are specific considerations to be made by professionals designing b2b e-commerce. This project was conducted within Chalmers University of Technology as a master's thesis, and set out to explore the type of support needed in such endeavours.

Many interaction designers within this field work in a project-based environment, with limited time scopes. Interviews with interaction designers showed three prominent needs of interaction designers working in b2b e-commerce projects: (1) to know what concepts to consider when designing for b2b e-commerce, (2) to communicate what interaction design can contribute to the project to team members and clients, and (3) to better structure and ensure learning in projects. A supporting design tool was produced that would cater these needs. Interviews with purchasers and a knowledge manager further explored these three points.

The result was a tool, named Trip, that consists of concept cards and method cards, that are to be placed in relation that illustrates the project plan. It can thus be used as a communication facilitator. The concepts provided attend to both general perspectives from interaction design, and specific attributes of b2b e-commerce. Certain cards are provided to encourage learning moments, and the tool can also be used retrospectively to support storytelling.

The tool was evaluated with workshops, and found to be interesting for further research. Providing the concepts incentivised interaction designers to consider them, and Trip was deemed helpful in communicating within the team as well as to the presumed client. Although other research indicates that a tool such as Trip could be beneficial to learning, this was not tested.

Keywords: interaction design, development of support, b2b e-commerce, design tool.

ii

Acknowledgments

Table of contents

1. Introduction

In this introduction chapter, we will provide an overview of the topic of interest for the thesis, and present the purpose of our study along with research questions.

1.1 Problem statement

We live in an era of consumption. As internet is becoming more and more of a daily or even hourly occurrence in our lives, stores are opening up online. E-commerce is an increasing sector in commerce today. Business to customer (b2c) revenues in e-commerce for 2013 are estimated at $252 billion in USA alone, while business to business (b2b) revenues are more than the double: $559 billion (Fredriksson 2013). B2b companies focus their sales on other companies instead of end customers; it can be Volvo selling machine parts to a service station, Astra Zeneca selling medicine to hospitals, or Bic selling pens to offices.

New solutions are elaborated to meet a wide array of customers and businesses. However, development and design of b2b e-commerce have been late on the train, and many businesses yet lack a satisfying solution for their clients (Andersson 2014). There are many similarities with business to customers (b2c) solutions: as for the product, price and information is important; as for shipping, the buyer might want to have the item ship or collect it at the seller's; as for the buyer, it is still a person with interests and whims sitting by the computer. But there are also specific problems and solutions central to b2b (Chen et al. 2013). One side of it is the complexity of these services: they often include a huge variety of goods, which leads to a problem of information overload. Another is that the clients are in a different role at work than at home. This would possibly lead to other foci and criteria from how they experience b2c e-commerce.

Interaction design deals with the meeting between systems and people, usually incorporating IT solutions. In many ways, it is about asking the right questions and using the right methods, to better understand user needs, goals and motivations. From an interaction designer's perspective, users should be regarded as intelligent but busy (Cooper 2014). This means that it is of great importance making products, systems and visualizations intuitive and easy to use, though the problem to be solved initially might not be. Design is not a goal in itself, but a tool to create a contact with a person. This contact can be curiosity, enthusiasm, or something else depending on the circumstances. The interaction designer's role is to provide that contact convincingly.

From an interaction design perspective, b2b e-commerce is not only a prime example of information visualization, but also demands an understanding of the user in a complex role, as both the cognitive and social setting is very different from that of a user in b2c e-commerce. E-commerce in general has been explored by researchers by ways of customer experiences, usability and trust. As an example, Lindgaard et al. (2011) found that trust and perceived usability increased for webpages that were visually appealing. On the same note, attractive services are deemed more persuasive and more credible than unattractive ones (van Gorp & Adams 2009). There are thus important features worth considering in designing a b2b e-commerce service that does not have to do with functionality alone. How can these questions be considered when creating b2b services?

As the field is in development, there is not that much research into the process of creating b2b e-commerce services. A few researchers have focused on b2b within health organizations, but mostly the research is about the economic or organizational advantages and not about what perspectives are important for an interaction designer (eg. Li & Li 2005; Beige & Abdi 2015; Fearon et al. 2014).

B2b e-commerce has its specific aspects that differentiates it from other products, such as: it targets professionals and not private individuals; it often involves huge product sets; the products often demand a high level of knowledge from the user; a single purchase might involve several professionals at different levels of decision. It stands to reason that the process to design such a service might in some respects be different from other design processes. For interaction designers in this area, a tool that would support the process of design should take into consideration the necessary aspects.

1.2 Research question

Our purpose with this thesis is to support interaction designers by creating a design tool for designing b2b e-commerce services. The goal of creating a tool for building these types of services is to support and/or strengthen the process of building such services. This could mean pinpointing the necessary considerations to be made, what is specific and important for b2b e-commerce, but also more general aspects such as facilitating planning and learning. Research on such a tool will necessarily include mapping the design space and considering which perspectives and methods can be fruitful in the work of creating such designs. The purpose of creating this design tool would be to help interaction designers in future work.

Our main research question is:
- How can interaction designers be supported in projects, when designing b2b e-commerce services?

Further questions that are raised are:
- Are there problems specific for b2b e-commerce, from an interaction designer's perspective?
- What aspects of the work in projects of interaction designers need to be considered?

We will address this problem by exploring research within the conjuncture of interaction design and b2b e-commerce. We will also explore how interaction designers work when building such services, as well as how they work in general. From this, we will attempt to construe a supporting tool to be used by interaction designers when designing b2b e-commerce services. This tool will be evaluated in a trial.

1.3 Delimitations

We will not be building a guide for constructing b2b e-commerce services, but will delimit our work to the process and methods available to an interaction designer to explore the design space. The purpose is not actually building a b2b e-commerce service, but rather the creation of a support to strengthen the process of building such service. The design tool will thus provide methodological help, but not hands on instructions for how to design b2b e-commerce services. We will therefore not touch upon specific details to be included in the finished e-commerce design, such as

shopping carts, contact forms etc. Instead, we will also focus on the needs of an interactions designer. Another delimitation is that we will refrain from recommending methods to be used by developers.

We will also delimit our work to the type of work conducted by the company for which we do our project: Maverick. This means that we will first and foremost look into project-based interaction design, where work is based on missions from different clients to produce designs during a limited scope in time. This means that the design work often has a start and an end, and is not focused on a continued process. We will also therefore focus on the internet-based side of the service, and thus leave out any wider business implications that have to do with other channels or distribution structures.

Another important delimitation is that for the scope of this thesis, we will not be able to test our design in a real setting. Instead, we will focus on the development and building of the tool, and not on the evaluation of it. Evaluation will take place, but be in a lab setting. We will therefore not be able to say if our design tool makes the design process more cost effective or better for the end user. Instead, we will evaluate how interaction designers receive and use our tool in a test trial. The final evaluation will be of a formative type, as the bulk of this thesis project will be exploratory: an attempt to describe the field of b2b e-commerce from an interaction design perspective, and to find out what type of support interaction designers need when designing such services.

A final clarification might be in order: the intended user of our design work in this thesis is an interaction designer. We will however have to examine how the different users of b2b e-commerce services view these services, as a part of understanding the design space.

1.4 Outline of the thesis

In the *Introduction*, the conjuncture between interaction design and b2b e-commerce is presented. The research question is discussed and the thesis work is delimited in scope by further clarifying the purpose and goal. Finally, an outline of the thesis is drawn.

In *Background*, we present related work that is not from the academia. We present the company, Maverick by Sigma, who are stakeholders in this project.

In *Theory*, different design processes is presented, in order to describe how these processes have been thought of and conferred. The success factors of b2b e-commerce services identified by research are covered in relations to interaction design, and learning from projects are discussed as a contiguous field.

In the *Methodology* section, the ideas of research by design and iterative research are presented. The specific methods used in this thesis work are explained, as well as methods considered but not used.

In *Planning*, our work process is briefly presented, along with methods used.

In *Research process*, the results of each iteration and step therein is presented.

In *Final result*, the design tool Trip is presented, and each part of it explained. The design choices are motivated.

In *Discussion*, we discuss the process and the findings of this master's project. We also discuss and evaluate Trip, the design tool.

Finally, the *Conclusion* summarizes the results and the answers found to the research question. This is followed by a list of References.

2. Background

Although the world of b2b e-commerce is expanding, there are many services that are lacking in cost effectiveness. Sigma IT Consulting is a consultancy group working in the field of information technology (Sigma 2015). A the section called Maverick by Sigma, the employees have experience and knowledge within business development, design, interaction design, front-end development, project management and on digital communications such as e-commerce (Maverick 2015).

For them, the development of b2b e-commerce is a new field, and their interaction designers often experience a lack of time and resources to do a good job. The clients who want these types of services designed are sometimes less understanding of what advantage using interaction design could be, as, at least in theory, buyers in this line of business are more rationally and less emotionally directed in their buying decisions. It is assumed that the design of the interactions in these types of services is less important than in b2c e-commerce. Therefore, it is the explicit interest of Maverick by Sigma that we explore how interaction design can be used in a b2b e-commerce setting.

In this project, we have been collaborating with Maverick in exploring the field of b2b e-commerce, from an interaction design perspective. This collaboration has allowed us access to interaction designer working at Maverick, to interview and discuss our findings with. Maverick has not been involved with defining the research questions of our thesis, and the subject of our project has been our own choosing. We did however keep Maverick in mind for our results, as we specified our process to work in a project-based environment. This delimitation was made to better suit Maverick's needs, as they as a consultancy agency work in projects of differing lengths, and not with any own products.

During the work of this thesis, we have explored how interaction designers work. This has entailed researching how the design process has been visualized. As we have found many visualizations not founded in academia, we will present those findings here.

When looking at design processes, it seems as though there are as many visualizations and explanations of the process as there are designers. In many of these attempts to show how design works, there is a common flow: a starting point, consisting of a problem, a process of creativity and/or reasoning, and finally a design, or a solution to the problem. The way one describes this process can be seen as a symptom of one's view of design and design methodology.

An excellent collection of design processes has been produced by Dubberly (2005), with over one hundred models conceptualized by designers, business managers and software engineers. Reading this book, two camps can be discerned as it comes to view on what design is, differing on the scale of subjectivity/objectivity, or intuition/science: let us call them Black-box design and Design science. Black-box design

Figure 1. Tim Brannan's design process (from Dubberly, 2005).

can be exemplified at its simplest by Tim Brennan, when he described how his group at Apple was conducting design in the 1990s by showing a minimalistic drawing of a ball of yarn, the end of the yarn representing starting a project, the ball of yarn representing the work done by the group, and the other end representing the solution that earns money (Figure 1) (Dubberly 2005). Black-box design heavily draws upon the notions of creativity as something that is inert in the designer. The metaphor of the black box comes from the magic trick, where an inexplicable morphosis occurs. In design, this morphosis is one of problem into solution.

Design Science, in its turn, can be described as a rational step-by-step instruction, where ideally the same input always leads to the same output, regardless of the individual designer. This type of models typically incorporate more steps and iterations. Many design processes that we would characterize as stemming from design science can be found in academic literature, and will thus be described more thoroughly in Theory section. Lastly, there is of course a scale between these two extremes.

Marcin Treder and his colleagues (2013) conducted interviews with over fifty UX (user experience, often used as a synonym to interaction) designers, looking to learn what their real life design processes looked like. They found that going through all steps of a theoretically correct design process takes too much time, and is therefore most often not cost effective. The designers interviewed needed to be able to take pragmatic shortcuts, and they always did. This was interesting to us, as we wanted to build a support for actual projects, and not an ideal one.

3. Theoretical framework

In this section, we will present the theoretical framework on which we build our thesis, and in which we attempt to contribute. As the subject is interdisciplinary, we will here discuss work from design theory, interaction design, e-commerce and project management. The first section discusses the need for design processes and how such processes can be visualized.

3.1 Design process

According to Cross (2001), there was a shift in the general view of design in the 1960s, when many heavy voices were raised that designers should make design more scientific. Some of the more well-known advocates were Buckminster Fuller and Christopher Alexander. The idea was that by adopting rational, scientific methods, design could be used in better service of the human good. Bruce Archer's diagram of the Basic design procedure (Figure 2) (Dubberly 2005) can be seen as a representation of these ideals: in this process, the magic ball of yarn from Tim Brennan's design process (see section 2, Background) has been replaced with iterative steps to include collecting data, analyzing, evaluating, deducing and developing solutions.

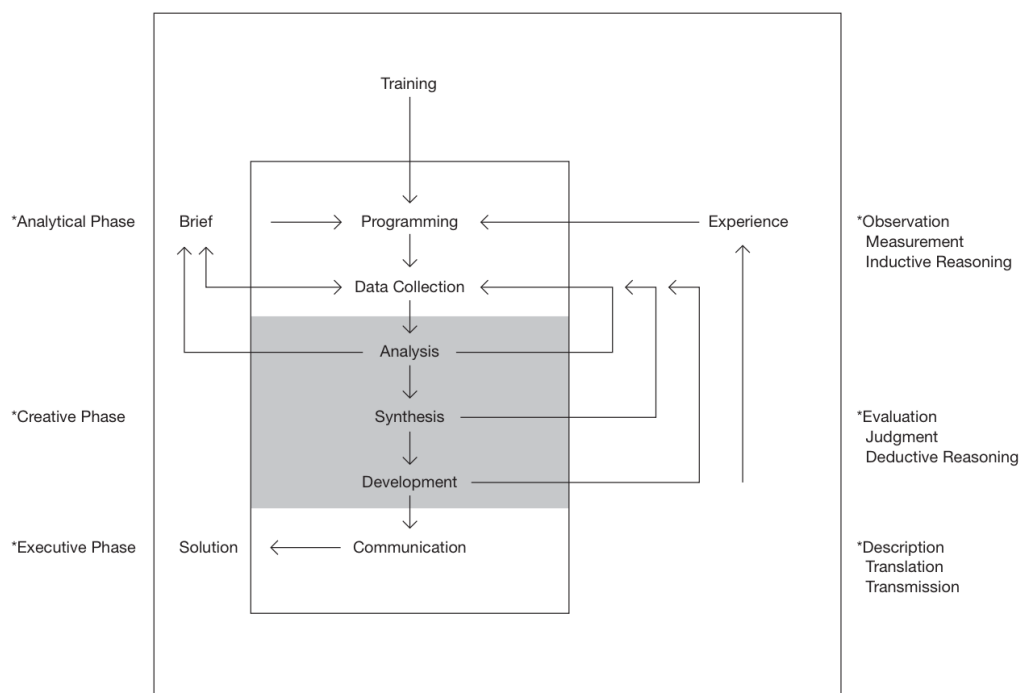*Figure 2. Bruce Archer's diagram of the Basic design procedure (in Dubberly, 2005).*

A note-worthy contribution to this debate was made in 1973 by Rittel & Webber, as they proposed the idea of "wicked problems". By this is meant that the design problem is never entirely encapsulated by one area of research. Instead, it draws on knowledge and experience from several fields of interest, some more and some less central to

finding a solution to the problem. Being this diverse, it is utmost difficult (many would argue impossible) for anyone to comprehend the full scope of the problem; to look at the evidence collected and be able to say: "Yes, now I know everything about this." Rather, a design problem can be said to be situated inside what we for all practical purposes might call an endless web of connotations. Wicked problems are problems that are characterized by indeterminacy (Rittel & Webber 1973). This implies that the boundaries of the problems are at most arbitrary, as well as the conditions in which it is set. They are dealing with the real world, which is ever changing. One consequence of this is that there is no ultimate solution to be found. As Rittel & Webber say, "Problem understanding and problem resolution ar concomitant to each other." (1973, p.161). This means that we see a problem and its solution at the same time, and we cannot distinguish one from the other. As our view of the problem shifts, so will our solution. Most importantly, this also works the other way around: as our solution shifts, so will our view of the problem. This could be one reason why prototyping is so heavily advocated in design: trying out a solution gives us new insights into the problem itself.

Jones (1992) described the design process as a process between three different phases: divergence, transformation and convergence. In divergence, the problem space is widened by gathering information. In transformation, patterns are created to make sense of the problem. In convergence, different alternatives are evaluated until a final solution is chosen.

In addition to this discussion on what actually happens during a design process, there is also a difference of opinion as to how iterative such a process is, and should be. The design funnel in (Figure 3) can be found in Buxton (2007), and is an adaptation of Pugh's design funnel (Pugh 1990). It is an example of how an iterative design process can be described. Notable in this process is the prevalence of divergence and convergence, as a wave-like motion of the designer between the world of the problem searching for more data, and the world of the solution. Comparing to Jones's design process (1992), the addition here is the iterative format.
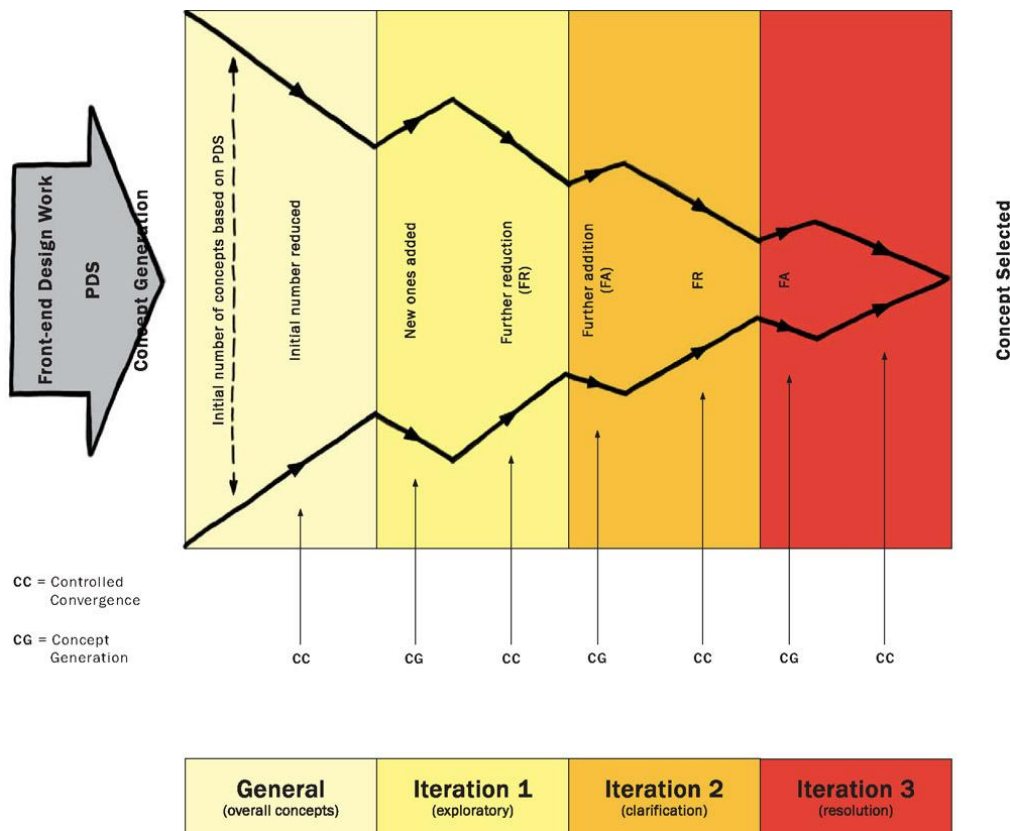
Front-end Design Work

PDS

Concept Generation

Initial number of concepts based on PDS

Initial number reduced

New ones added

Further reduction (FR)

Further addition (FA)

FR

FA

Concept Selected

CC = Controlled Convergence

CG = Concept Generation

CC   CG   CC   CG   CC   CG   CC

General (overall concepts)	Iteration 1 (exploratory)	Iteration 2 (clarification)	Iteration 3 (resolution)

Figure 3. Pugh's design funnel (Buxton, 2007).

3.2 Designing interactions in e-commerce

E-commerce means selling and buying products or services via an electronic network such as internet. As such, it is an example of an information system (IS), involving a system for the transaction of information from one party to another. DeLone & McLean (2003) have constructed a model for how success in an IS can be achieved, called the D&M IS Success Model (Figure 4). This model has been used and revised by several researchers to assess success of information systems (eg. Bernroider 2008; Petter & McLean 2009; Urbach & Müller 2012). It states that the success of an IS can be measured by six interrelated aspects: (1) system quality, part of which is usability, adaptability, reliability and response time; (2) information quality, by which is meant that the information is to be relevant, complete, easy to understand, personalizable and secure; (3) service quality, as in the support offered by the service provider; (4) usage, as in how the service is used, eg. visits to websites, navigation; (5) user satisfaction, which should entail the entire experience of the customer, from getting interested in the service through to being happy with the buy and becoming a repeat customer; and (6) net benefits, such as balanced impacts on everyone involved, from customers to owners and employees, to the wider community. The D&M IS Success Model states that these are all interrelated, and may therefore have impact on each other. The six aspects build a foundation from which to evaluate an e-commerce service (DeLone & MCLean 2004). The interrelatedness of these aspects stems from the idea that better quality of system, information and service, would influence both the usage and the satisfaction of the user positively. It is also plausible that in some cases these influences go in the other

direction: the more a person uses a system, the more this person might learn it and think that it is of good quality. The D&M IS Success Model tells us that in order for an information system to be successful, it needs to not only provide the expected service, but to do it in a way that the users find satisfying while making sure that the benefits in relevant areas outweighs the costs. Making sure that the users' goals are met with an information system can be the job of an interaction designer. Making sure the projects ends with net benefits will be the ultimate responsibility of a project manager, but all team members will have a stake in this.
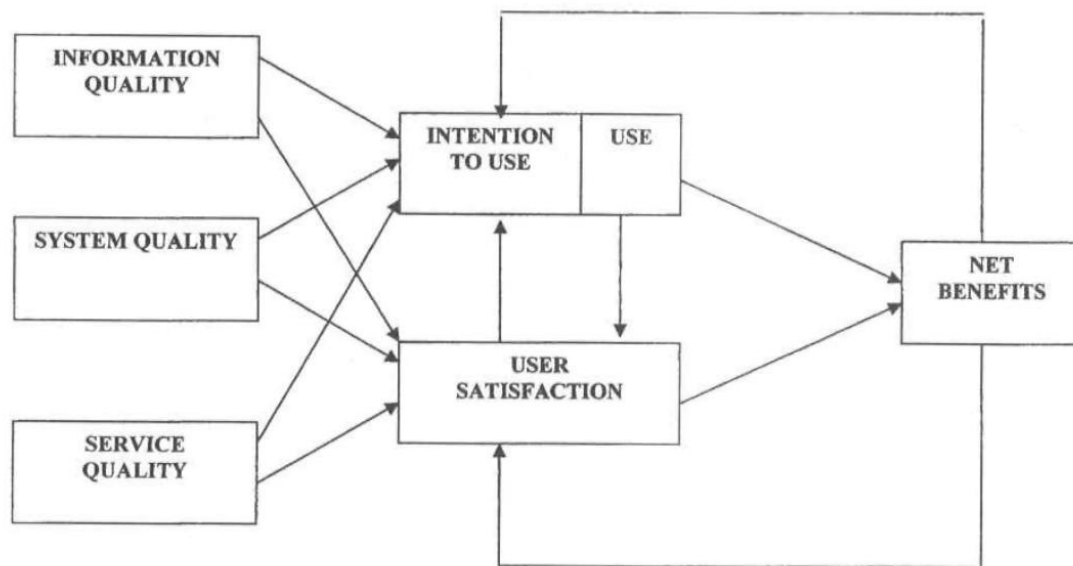

Figure 4. D&M IS Success Model (DeLone & McLean, 2003).

In a model about purchases called the Service Encounter Model, a purchase is subdivided into three chronologically sequential parts: pre-purchase, purchase and post-purchase (Bitner et al. 1990). These three parts can create a basis on which to structure guidelines for designing business services (Tran et al. 2011). Tran et al. created guidelines for e-commerce in a virtual world, focusing somewhat on the specificities that a virtual world can offer: avatars and 3D modelling. Their attempt stems from research on how customers experience consumption and affordances in virtual world. The guidelines can then be used to build e-commerce services. As basis for the guidelines, the work of other researchers has been used. Wolfinbarger & Gilly (2002) investigated e-commerce service quality, and the user's perceptions thereof, and found that (1) reliability/fulfillment ratings predicts how satisfied the customer will be, (2) web site functionality ratings predicts loyalty and intentions to purchase, and (3) customer service ratings predicts intentions to repurchase as well as customer satisfaction. Even though most b2b e-commerce services are far from virtual, we found that many of the guidelines gathered by Tran et al. (2011) are applicable to other systems as well, such as facilitating product discovery by inviting to social events where the products can be explored, and making the products searchable on open networks, such as web search engines.

In a wider perspective, designing for emotion can be a way to address the emotional experiences of the user when interacting with a service, and thus addressing point 5 in D&M IS Success Model: the user satisfaction. Van Gorp & Adams (2012) argue that even when not explicitly designing for emotion, your design will arouse emotions. Seen in this perspective, it would be more effective to incorporate the emotional aspects in the design space, and thus being able to cater to them when formulating the problem. Van Gorp & Adams (2012) have developed the A.C.T. model as a tool to address emotional aspects. It focuses on a trilogy of design goals: Attract, Converse and Transact. The three terms can be seen as a chronological division of a buy, although they might all have bearing on the entire process. Attract refers to how desirable the product or service is to the user. Converse encapsulates not only usability, but also how well the product or service manages to convey its message to the user. Van Gorp & Adams make an interesting case for involving social norms as a factor when designing, so that the product takes the correct stance towards the user in order to get the message through most effectively. An example used by the authors is when someone is trying to be helpful but ends up cutting you off in the middle of a sentence: although the intention is good, the execution turns the service into a disservice. For transact, it is important to make the user feel confident enough to invest in a transaction. This requires that the former stages were successful in building trust and confidence in the product or service. The transaction is formative in the relationship between the user and the product or service, and will have bearing on how the user evaluates it in the future.

Designing with emotions in mind can help create a user experience that is more successful (Desmet et al. 2007). Desmet et al. investigated how a conscious choice of which emotional responses were wanted in the user, enabled designers to strive for and achieve this response. Again, in the word of van Gorp & Adams: "all design is emotional design" (2012, p.16). A user will have emotional responses whether the designer designs for them or not, and there are benefits of taking control over this aspect. A reason for using the A.C.T. model is that by using emotions consciously a designer can build trust and credibility for a product or brand. The A.C.T. model can be used while creating an e-commerce service; it would be a suitable fit as it focuses on user experiences and product trustworthiness. Also, Lindegaard et al. (2011) describe how customers that experience a positive feeling or willingness to a b2b e-commerce site are more likely to complete an online purchase than customers who do not, when discussing visual appeal, trustworthiness and perceived usability of homepages.

3.3 B2b
B2b e-commerce is different from b2c e-commerce in many ways. For one thing, a user do not always have a choice to use the system or not (Cullen & Taylor 2009). This lack of voluntariness makes usage a more complicated measurement: it is hardly a measure of success that the system is being used if the users have no say in the matter — it is just a measure of use. The users might also have other needs than in b2c, such as the need for shared workspaces and information flows (Chen et al. 2013). In b2b, the success of an IS might depend on how the users can interact with each others via the system. Strengthening and facilitating the relationship between the parties is one of the goals of b2b e-commerce (Cullen & Taylor 2009). It follows that there are other factors to be considered when measuring the success of such as system than present in the D&M IS Success Model. For these reasons, Chen et al. (2013) propose an addition of (7) process

quality, how the service is actually executed and delivered, and the steps that have been taken to facilitate interactions between the trading partners; and (8) collaboration quality, as in facilitating decision making and information exchange as well as the sharing of resources.

Cullen & Taylor (2009) explored the supply chain for the National Health Services in UK to see what critical factors influenced the success of b2b e-commerce systems. They found five significantly different factors: (1) system quality, the same as in D&M IS Success Model; (2) information quality, the same as in D&M IS Success Model; (3) management and use, meaning requirement for management support; (4) assurance and empathy, encapsulating the importance of information to support trust such as legislation and relations to other trusted companies; and (5) trust, by which is meant trusting the system and information by means of security, as well as having a relationship with the transaction partners. Taken together, these five factors show the importance of a b2b e-commerce not only being a transactional space, but also a space for building lasting relationships between the parties.

Milanova et al. (2012) writes: 'For a long time emotions have been neglected as being irrational and having no place in the world of science and engineering. Nowadays this is slowly changing.' The authors continue by saying that insights of our cognitive functions should be applied when improving interaction and customer satisfaction in b2b. This emotional aspect has been shown to be important when promoting online transactions (Yang et al. 2009). It is clear that emotions are important when it comes to the success of a b2b e-commerce: it depends on trust and the building of relationships between parties.

Can we design for trust? There are many attempts to explore the occurrence of trust in e-commerce from an interaction design perspective. Egger (2001) distinguishes two different types of trust: the first initial trust that a customer infers from surface cues from the vendor, and the second trust based on actual experience affecting the long-term relationship between the parties. His article then explores the first type of trust. For all e-commerce sites, the first type is important as it gives the customer confidence to actual commit to a purchase. For b2b, the second type specifically would be very important, as the long-term relationship is one of the goals for many b2b e-commerce services.

So, what is trust? McKnight & Chervany (2001) did a meta-analysis of different concepts of trust used in several research domains, such as psychology and management. They found that trust was seldom defined in the same way, the perspective shifting according to research domain. In some research, trust was not defined at all, leaving the reader in darkness. Instead of this hotchpotch, McKnight & Chervany (2001) propose a dividing of the term into four separate constructs: disposition to trust, meaning the intrapersonal inclinations to trust as such; institution-based trust, meaning the trust experienced for the structure in which one operates (such as the web); trusting beliefs held by the person; and trusting intentions, by which is meant the intent a person has of acting with regards to trust.

Establishing trust depends on several variables, including user psychology (predisposition, cultural differences etc), the pre-purchase knowledge of the brand and

transference, by which is meant experiences of others that have in some way come to the attention of the user (Egger 2001). Egger continues by posing several guidelines for designing e-commerce for trust, focusing on how the selling company brands itself in the service and usability. To facilitate a trusting relationship, a service should give the impression of being professional, reliable and up to date. Egger (2000) posits the MoTEC, a Model of Trust for E-Commerce System Design, that has three components: informational content, interface properties and prepurchase knowledge (Figure 5). This can be used as a descriptive model to facilitate the design for trust. The prepurchase knowledge can be connected to the trusting beliefs supported by McKnight & Chervany (2001), as it considers the vendor's reputation as well as information about the vendor from other sources that the consumer has knowledge of. The interface properties deal with the use factors of the site, such as how the customer experiences its usability and design. It is thus connected to designing for emotion. The informational content refers to the content provided by the vendor regarding risks and privacy.
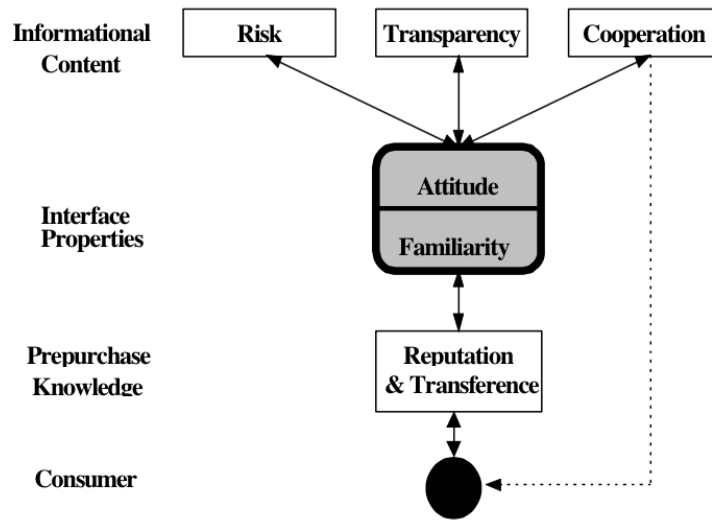

Figure 5. MoTEC (Egger, 2001).

Why is it that relationships between parties come up in discussion about b2b e-commerce so much more than in b2c e-commerce? For sure, customer loyalty is important in b2c too (Srinivasan et al. 2002). In b2b, large amounts of money is spent by a single customer, making this relationship ever more important (Rauyruen & Miller 2007). There is also often a greater need for customization of products and pricing. Loyalty is therefore important for both parties, making the building of relationship a critical success factor in b2b e-commerce (Rauyruen & Miller 2007).

It thus stands clear that there are some critical factors specific to b2b e-commerce: usage may not be voluntary; a need for shared workspaces and information flows; building longterm relationships between purchaser and vendor; designing for trust (longterm and shortterm); key accounts; customization. These factors make the designing of these services apart from other e-commerce services, and of course also from a more general interaction design. It is reasonable to assume that this calls for specific considerations in the design process towards such services. We have not found any research on specific design tools to support the designing of b2b e-commerce, which means that there is a possible need for such a tool.

3.4 Learning from projects

The purpose of our thesis work is to support interaction designer in project-based work. A project, according to Project Management Institute (2015), is "a temporary endeavor undertaken to create a unique product, service or result." This is the definition for projects we use throughout this report.

One way of making sure projects go smoothly is to gain knowledge from one projects that can carry through to the next. Handling knowledge from one project into the next is of essence for a learning organisation, but many organisations fail in this respect (Argyris 1991; Maylor 2010). Maylor (2010) discusses how an organisation with clearly mapped processes more easily can continue to improve and gain learning between projects. Argyris (1991) published a much cited study of management consultants and learning in projects, and concluded that although nearly all claimed that they valued learning, most showed tendencies that were in contrast to a learning disposition. Argyris' explanation is that as specialized professionals, these people come from an environment unused to failures. When such failures appear, the responsibility for them tend to be projected onto the outside world; the client, the boss, or other circumstances. This method of projection is self-perpetuating, as colleagues look to each other for codes of conduct. But without claiming responsibility for failure, chances for learning are slim.

Interaction designers also belong to the ranks of specialized professionals. At Maverick, the work done by interaction designers is done in teams in more or less short term projects. Learning from one project to another is essential to ensure improving performance of an organisation (Maylor 2010). A learning organization would then look on the interaction designer, as well as the organization as a whole, and focus on what could be done to raise the competence and skill of the designer from one project until the next. Any support for interaction designers working in project-form would then do well to accommodate for learning and knowledge gaining.

How do we learn from projects? Crossan et al (1999) point to the importance of not only innovating new ideas, but interpreting them to oneself and the group as a way to reach a deeper understanding. An idea must be seen in the light of its consequences. The authors highlight the significance of language as a learning tool, and that explaining something to others might turn a sensation or hunch into an explicit, verified idea. In a research review, Malakouti et al (2014) confirms this idea when they state that one of the biggest obstacles to organizational learning today is deficiency in communication, and the difficulty of turning tacit knowledge into explicit.

Sole & Wilson (2002) reviewed the research done on storytelling as a learning tool in organisations, and found that it can facilitate the sharing of tacit knowledge between colleagues. It is also well suited to subsidize change. Storytelling is defined as the "sharing of knowledge and experiences through narrative and anecdotes in order to communicate lessons, complex ideas, concepts, and casual connections." (Sole & Wilson 2002). Another method to share tacit knowledge that they propose is simulations, such as recreating actions in a case-study.

In a word of warning, Williams (2008) state that "any learning accumulated will dissipate at the end of the project unless attention is paid to collecting, storing, and

disseminating it." Williams too, highlights the narrative as an important and productive way to share knowledge within and between projects, and specifically in catching the tacit knowledge that so easily eludes us. The author emphasises that reviewing the project historically with team members, by means such as storytelling and mapping, holds high potential for learning. By mapping is meant the building of a network or graph of the parts of which the project consisted, showing connections and consequences (Williams et al. 2005). In sum, visualizing the project can help stimulate learning, as the visualization also becomes an anchor from which to narrate the history of the project.

4. Methodology

In this section, we will introduce the methodology used in the work of this thesis, present our design process, and describe the methods used in each step of the process.

4.1 Research approach

Doing research means building upon the research of others in order to create some new value which others can use. It means being a part of the bigger picture, a task asking for humility and creativity. Blessing & Chakrabarti (2009) pose that there is no common view on this bigger picture, and that design research instead is a plurality of voices on what should be investigated and how, and to what end. They describe how this difference of opinions is embodied in what they call 'referencing islands' (Blessing & Chakrabarti 2009, p.6), groups of researchers referencing foremost other researchers in the same group. This leads to separate strands of research, the divides hard enough to oversee from a researcher's perspective but even more so from a master student's.

However, there are themes to be discerned. Blessing & Chakrabarti (2009) divide the research into two main strands: developing understanding and developing support. Taken together, these two strands aim at making design more effective as well as efficient, thus creating more successful products. Developing an understanding is done by exploring how we think about design; what do we think about how designers work, how do we value a design, what is it that makes us say that this or that process is more effective. To develop support, we use the models created on the basis of our understanding in order to improve the practice of design.

The problems with design research, as Blessing & Chakrabarti (2009) mention, are that the scientific rigour is often lacking, there is no easy overview over existing research, and the results from research are seldom used in design practice. An attempt to rectify the first of these problem, is the design research methodology, DRM, developed by Blessing & Chakrabarti (2009). They propose this as a strategy of making the research more stringent and structured, thus improving the rigour and openness of the researcher as to what methods were used and why, and what results were obtained and why. Openness in research can be very important as it is a way to create a basis for reliability testing of the methods used. If we know the steps a researcher has taken in order to obtain certain results, these can be replicable and thereby tested again and again. Results can then be aggregated on a higher level, in order to build more statistically valid theories.

In short, DRM tells us to work through different stages in a research, sometimes going back and forth, in order to structure the work (Blessing & Chakrabarti 2009). These stages involve research clarification, exploring and understanding the problem, prescribing or creating the support needed, and finally an evaluation of that support. The aim of a design research methodology is thus to produce better design research, which in turn aims (at least partly) to produce better design. Improving something means that we have to have a theory of the existing situation, as well as a theory of what the intended — improved — situation might look like. We also have to have a tool to turn the first into the second, to change the situation at hand into the situation that we want. Creating these tools is one of the goals of design research. It thus becomes clear that

much of design research has to do with design work. Developing a support for design is in fact often designing in itself.

Saikaly (2003) conducted a study on ten different doctoral theses within the design area, among others interaction design. The results showed that different methodologies were used: scientific approach and/or reflexive and interpretive approach. While the scientific approach focused on collecting empirical, mostly qualitative, data and analyzing it, the reflexive and interpretive approach based the research on design practice. Within this field, two different models were adopted: practice-oriented and practice-centered. Practice-centered research focuses on the actual designing of the researcher, whereas practice-oriented most often used action research as the method of choice. Action research within design means using the designing of an artefact as a methodology (Seago & Dunne 1999). This is close to what Zimmerman et al. (2007) means when they describe their research through design model. They propose a strand of research built upon designing as a method to explore ways to change the existing situation into a desired one, much like proposed by Blessing & Chakrabarti (2009). This research through design can then be evaluated against four criteria: how rigorous the process is, that the invention produces must be somehow significant, that it must also be relevant to the field of research, and that it must be extensible, enabling other researchers to build further on the outcome (Zimmerman et al. 2007). In a later article, Zimmerman et al (2010) themselves draw likeness between their method and action research.

4.2 Exploratory methods
In order to understand a problem, it needs to be explored. As Rittel & Webber (1973) propose, in defining a problem we also define its solution. Therefore, it is important as a researcher to be transparent as to which methods are used. The methods used for exploring our research area are listed below.

4.2.1 Literature review
Wolfswinkel et al. (2013) have described a method for conducting a literature review, made to increase the transparency about choices made in the research process and based on grounded theory. It divides the review in five stages; define, search, select, analyze and present. By offering this structure to the review, it can be easier to see the choices made and to, if so wanted, reproduce the result.

The first step of the literature review is setting up criteria for choosing articles to review. These criteria guide the researchers to find relevant and interesting articles. When the criterias have been set, a list of search terms is produced. Listing the search terms increases the transparency of the review, and thereby lending the review an increasing scientific rigour. These search terms are then used in certain outlets and databases, specified by the researchers.

As search results are often many and diverse, a screening process will then begin to choose which articles are relevant. The criteria set up in the beginning help with this. By reading the abstracts of the articles found, the researchers will have an idea of which to choose, but sometimes the entire articles will have to be read in order to find out whether they are relevant. At this stage, it is helpful to formulate specific questions that should be answered by the article in order for it to be chosen.

The advantage to this method is that it is created to increase the scientific rigour, by offering organisational structure to the literature review. However, as Szymaszek (2014) points out, there can be difficulties adhering to such a firm structure. Among other things, searching through databases can require more flexibility with the search terms than is proposed by Wolfswinkel et al. (2013).

4.2.2 Ethnographic methods

In design, ethnographic research is sometimes recommended (eg. Blomberg et al. 1993). In ethnography, observations and interviews are the methods most widely used.

The main point for doing observations is that there is often a difference between what people say that they do, and what they actually do (Blomberg et al. 1993). There is often tacit knowledge involved that might not be readily available for the participants to explain. Observing ongoing activities by being at the location of the situation you are interested in, is therefore a good way of getting to know a situation and the actions performed. But it is also a resource-demanding task: if the problem to be researched is expanded in time, then longitudinal observations might be ordered (Blomberg et al. 1993). There can also be situations of some delicacy, that it is difficult to be allowed access to as an outsider.

Interviews are a well used tool in interaction design, the main purpose of which often is to understand the user and the user's needs (Griffin & Hauser 1993). As our design concept is to support the process of interaction designers, interaction designers themselves are our primary users. The purchasers of b2b e-commerce services are users only per association: they are part of the design space in which our users design.

One-on-one interviews can be differentiated from focus groups, where several people related to the concept are interviewed as a group. There is an ongoing debate as to which setting is better (Wallgren 2014). One-on-one interviews are generally proposed as providing more in depth discussions, and thereby allowing the interviewees to more thoroughly explain their points. Focus groups are instead generally believed to be more time-efficient and to produce a greater variety of purchasers' needs. There is however some research indicating that this is not the case, and that the expected benefits are not met by reality (Shirr 2012).

There is also a distinction to be made between contextualized and decontextualized interviews, alluding to the real context in which the interview is being conducted (Crabtree et al. 2012). A contextualized interview is one conducted in the actual flow of work of the interviewee. This permits the interviewer to not only hear the interviewee describe the work, but also to observe it first hand. In this setting, a structured interview can be of great help, allowing the researcher to progress through predetermined questions one at a time. In a decontextualized interview, an unstructured approach can be of help. The unstructured approach allows greater freedom in following up on loose ends and sudden insights, as the questions are not set in advance to the same degree as a structured interview.

4.2.3 UCD and participatory design

Interaction design mostly focuses on designing interactions between humans and computer-based systems (Hallnäs & Redström 2007). User-centered design (UCD)

focuses more intently on the user (Abras et al. 2004). In UCD, it is of essence to let the end-users influence design through the design process. This can be done by interviewing, observing, testing, or by use of other methods.

Participatory design recommends involving stakeholders early in the project, to let them participate in the designing itself (Spinuzzi 2005). This is a design approach trying to involve all stakeholders in order to understand target audience needs & desires, what they value, prioritise and think about the problem. The limitations of participatory design are that it might, because of the heavy involvement of those closely affected by the design, focus too narrowly on the artefacts to be improved, rather than taking the whole situation into consideration and thus enabling an entire new solution (Spinuzzi 2005). However, some degree of participatory design is supported by law in Sweden, as stated in the 1st paragrah, 2nd chapter of Arbetsmiljölagen: 'The worker shall be given opportunity to take part of the formation of his/her own work situation as well as in the change and development concerning his [sic] own work.' (2015, our translation). Participatory design typically involves workshops (Spinuzzi 2005).

Within a workshop, there are a multitude of methods that can be used. Card sorting is a method used by IDEO (2015) to expose the participants' mental models of a design. Observing how the participants sort cards naming design attributes can give insights into the expectations on this design. It is a rather simple method to use, but it demands a well thought through card set.

Instant card technique is a similar method, where the cards serve as triggers to create ideas in the creation of a design concepts (Beck et al. 2008). The technique can be used to create different scenarios in a participatory design setting. It is designed to help participants through the idea generation process, thus creating new service ideas and concepts (Beck et al. 2008). The downside of this technique is that it requires the researchers to be well conversant within the method.

Interaction relabelling encourages participants to think outside of the box by igniting their imagination. An existing product is presented, and the participants are asked to consider it as if it is the product to be produced, and to describe how it works (Djajadiningrat et al. 2000). The method is good for instigating creativity, but a risk with using this kind of method is that the ideas can be either unrealistic or difficult to implement. Still, at the beginning of a project the type of solutions thought of by the participants can give a hint as to their expectations.

4.2.4 Other exploratory methods

Brainwriting 6-3-5 is a method for ideation, and is originally performed by 6 persons, who are to write or draw 3 ideas each in 5 minutes (Sivaloganathan & King 1999). The ideas are then passed to the person on the right, who iterates the task. After 6 iterations, the exercise is complete and the ideas can be evaluated. One advantage of the method is that it simple in concept and thus easy to learn. It is also a fast way to create many ideas. But on the other hand, evaluating these ideas can be a time consuming job.

User surveys is a method to use when questions can be answered on the format of true/false, or as a choice of fixed answers (Esaiasson et al. 2003). It is an easy way to collect quantitative data but be aware of that the quality of the survey depends on

factors such as who and how many people participating. Also, using surveys makes it hard to explore issues in depth. It can be administered in different ways, eg. by hand or via webb.

According to Fullerton & Swain (2008), playtesting should be done in all stages of development of games. It is a way of understanding how the underlying mechanisms create the experience of playing the game. As such, playtesting games by using them and evaluating the experience, can help designers find out how to design for certain experiences. Although we are not designing a game, the experience of using a tool can be similar to that of using a game, such as cooperation, strategy, playfulness. This is a time consuming activity, as it requires playing not only one game, but several in order to compare and draw conclusions.

4.2.5 Structuring information
The information gathered in early stages of design can easily become overwhelming. One method that can be used to order and evaluate findings is KJ (Scupin 1997). It proposes to write things you know on post-its, silently arrange them as you see them fit and then discuss the categorisation of the post-its within the group. Essentially, this method can be used to structure data under accumulating labels, thus ordering them into a common web of interdependencies (Scupin 1997). The strengths of this method is that it is relatively rapid, applicable in various stages of the process and useful when analyzing qualitative data. It does however only deliver results that are as good as the researchers using the method; it is the researchers who decide the accumulated labels.

Another method that can be used for structuring information is the Kano method (Sauerwein et al. 1996). Kano helps structure information gathered into basic, performance or delight attributes, based on customer satisfaction and investment. The attributes are illustrated in a coordinate system and the model is used to prioritize what should be developed. The advantage to the method is that it allows the designers to see what attributes would be most beneficial to develop.

4.3 Prototyping methods
There are many different kinds of prototypes, from simple pen sketches to full-size renderings looking and feeling like the real thing. Early sketches have the advantage that they can be made effortlessly, at a very low cost, and be used to explore ideas as well as to communicate them (Buxton 2007). The further the work has gone, the more elaborate the prototypes will be.

Working with paper prototypes is a basic method to visualize solution to design problems (Buxton 2007). It is mainly used to explore different ideas, and can be of more or less complex nature. Buxton (2007) further describes how for interaction designers, sketching is the main activity of paper prototyping. The sketches can be general or detailed, depending on where in the design process they are created. As paper prototypes can be rather difficult to understand for an outsider, a facilitator might be necessary to explain them. However, this drawback is less evident when working together in a team. The explaining itself, can be seen as a way to deepen the understanding of the prototype, and explore its possbilities (Crossan et al. 1999).

Further along an interaction design project, more hi-fi prototypes are often called for (Benyon 2010). These prototypes are typically developed in a computer application, and more closely resembles the finished product. As they require more time to produce, they are perhaps best used when a concept is set. With the higher fidelity comes a good opportunity to do user testing.

Another prototyping tool that could be used is video prototyping. It is best used for exploration and idea generation, and can be powerful in catching the experience of using a design (Benyon 2010). This can be quite efficient in eliciting user reactions, as the video can be used to show users the benefits of the design. However, it requires some time and skill to create a video prototype.

4.4 Evaluative methods

Evaluations can be of summative or formative character (Copper 2007). Summative evaluations are performed on completed products, and can be used in comparison to other products. Formative evaluations are instead performed before the finish line, attempting to refine the design.

Physical activity not only increases positive mood, but also helps to spur creativity (Steinberg et al. 1997). By taking daily walks, called walk-and-talks, this time can be used to discuss present problems and find creative solutions. The main difficulty with the method is to document the solutions arrived at, as it is conducted on foot without much possibility for documentation.

Subjective evaluation takes place whenever the designer takes a step back and evaluated the design according to his or her own knowledge and experience. It is perhaps the cheapest and fastest way to evaluate a design, as it takes none other than the designer to perform. It is of a quick and dirty type, but performed without users.

"Quick and dirty evaluation" is of an informal character, and performed by the designer with the help of users or consultants. It is quick, thus its name, and very cheap as it requires a minimum amount of time. The disadvantage is that the results are not structured or documented in any extensive fashion, making them less transparent. It is therefore better used as indication rather than evidence.

Heuristic evaluation can be done by experts, to see how well the design conforms to the heuristics of the field (Benyon 2010). Guidelines that can be considered could in our case be flexibility, as in how the tool can be used in different projects; consistency, so that the tool is considered a whole; navigation, so that it is easy to recognize how to use the different parts of the tool, etc. The participatory heuristic evaluation involves work-domain experts to evaluate the product, thus complementing the usability experts' perhaps more abstract knowledge (Muller et al. 1998).

One specific instance of heuristic evaluation is accessibility test. Many users have some kind of disability, which means that addressing the accessibility of your design could potentially increase the customer base (Brinck et al. 2002). Newell et al. (2009) discuss how designing for people with disabilities can help also those who find themselves under particular circumstances at some period in life, eg. with impaired vision on account of age. Conducting accessibility tests requires using relevant guidelines, so to

make sure that the design is accessible in that respect. We will use WCAG 2.0 (Web Content Accessibility Guidelines) as a guideline for our design, making sure that the design is inclusive of people with impaired vision.

General for heuristic evaluations is that they are cost effective, as the number of testers can be kept to a minimum. They are therefore good to use in early stages of development, as the design can still easily be revised. One disadvantage is that this type of evaluation does not involve actual users of the system, and it may stay blindsighted to problems that would occur in actual usage.

Co-discovery asks participants to explore the design in groups (Benyon 2010). Specific tasks can be provided to make it easier for the participants to approach the design. By using co-discovery, one can see how a design is received by the intended users, and evaluate how the different parts of it are used and perceived. One advantage of co-discovery is that it can open up for a natural flow of comments, and that participants may feel free to be more adventurous when exploring the design than they would have been if alone (Benyon 2010). It might however be less effective is the people working together do not know each other in advance. Also, the designers have to be careful not to steer the discovery by asking too specific questions.

Controlled experiments can be a powerful method to explore whether a design has the impact it is intended to (Benyon 2010). This allows the designer to compare different designs to each other, to see which is better in specific regards. The advantage is that the results can be statistically analysed. However, performing controlled experiments takes a lot of planning, and is thus very costly.

Scenarios could be used when either presenting a walkthrough, when explaining how your design is going to be used or as an introduction for a test just to put the participant into the right context or to trigger them to interact with something. The scenario itself could either be a short statement or a presented as a storyline (Usability Body of Knowledge, 2015).

5. Planning

In this section, we present the design process which we have used as a basis for our project plan, as well as the plan itself.

5.1 Our design process

Our thesis' design process consists of three parts, worked on in a cyclical form: Learn, Do and Test. Each iteration concerned all three, although the emphasis shifted as the work progresses. Comparing it to Bruce Archer's Basic design procedure (Dubberly 2005), the analytical phase much likens our learn phase, while the creative phase likens our do phase. The test phase is implied by the arrows in Archer's procedure, as the creative phase constantly assesses and corrects itself. However, during interviewing we found that testing had a more prominent place in interaction design. Comparing our process to Jones (1992), we find that our learn phase consists of divergence and enters into transformation, while do encompasses transformation and convergence. The testing and verifying is for Jones considered to as the other phases progress. Finally, compared to Pugh's Design funnel (Buxton 2007), there are great likenesses as they are both built around the iterative formula of going back and forth between the broadening and learning, and the tapering refining of the product. Our process will allow for more iterations, and shorter ones, as they are not bound by external goals.
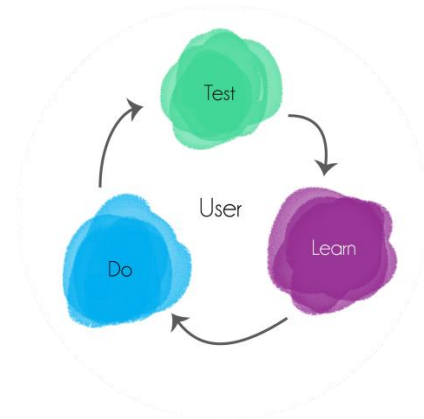
As interaction designers, it is also important to keep the *User* in focus all through the process, which can be seen in our visualization. By doing our thesis work in Maverick by Sigma, we work close to the intended future users of our design tool, thus enabling us to do regular informal assertions of how our work is progressing. We also use more specific methods to incorporate users and their evaluations into our work, as can be seen below.

In the *Learn* phase, we focus our time to determine the design space in order to understand b2b e-commerce from many different angles, more specifically interaction design, economics and management. We use this knowledge to set up criteria by which we evaluate our later designs. In the *Do* phase, main focus is on producing ideas and creating a design tool prototype based on knowledge gained in the *Learn* phase, in order to then try the prototype out in the *Test* phase. Here our design tool prototypes are tested against criteria set up in the *Learn* phase.

5.2 Planning

Our thesis project spanned 20 weeks, and was divided into iterations of the three phases of our design process, Learn, Do and Test, with the addition of writing on the thesis. The plan can be seen in Figure 6. It was of an iterative nature, to make use of the advantages of early deliveries and continuous testing.
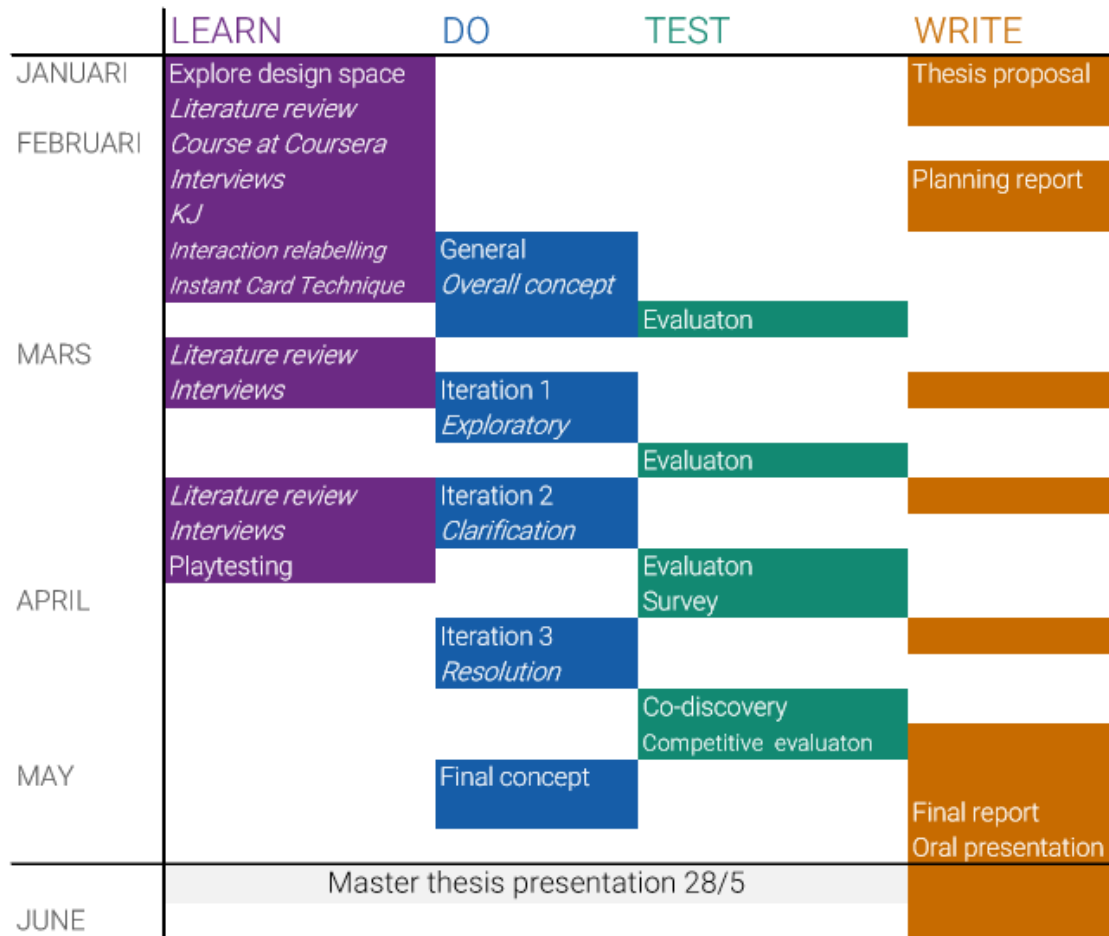
	LEARN	DO	TEST	WRITE
JANUARI	Explore design space / Literature review			Thesis proposal
FEBRUARI	Course at Coursera / Interviews / KJ / Interaction relabelling / Instant Card Technique	General / Overall concept	Evaluaton	Planning report
MARS	Literature review / Interviews	Iteration 1 / Exploratory	Evaluaton	
	Literature review / Interviews / Playtesting	Iteration 2 / Clarification	Evaluaton / Survey	
APRIL		Iteration 3 / Resolution		
MAY		Final concept	Co-discovery / Competitive evaluaton	Final report / Oral presentation
	Master thesis presentation 28/5			
JUNE				

Figure 6. Time plan.

5.2.1 General concept

The first month was devoted to General concept, and of an exploratory nature. It consisted of the execution of a literature review as well as starting doing interviews. This period also involved ideation to determine the overall concept of our tool. A workshop with interaction designers were carried out with the goal of exploring more solutions. In the workshop, we used the methods interaction relabelling (Djajadiningrat et al. 2000) and instant card technique (Beck et al. 2008). To collect our many ideas from the workshop a customized version of the method 6-3-5 was being used. Deliverables were a literature review of b2b e-commerce and interaction design, as well as a reference model as proposed by Blessing & Chakrabarti (2009).

5.2.2 Iteration 1

Iteration 1 focused on doing interviews with interaction designers, and further reading literature upon subjects that came up in interviews. Several low fidelity prototypes were constructed in order to explore different solutions to the problem as it emerged followed. Deliverables from this iteration was prototype 1 shaped like a map.

5.2.3 Iteration 2

Next iteration focused on clarifying the solutions so far, and included interviews with most of our purchaser informants. The goal was to make sure we took notice of all

24

important aspects that had come up during our work and were able to make our prototype work with them, thus reducing the available solutions to the one we saw as most promising towards the end. To fill the need of research on learning in projects, a small literature review was conducted. To gain inspiration about how to create an inspiring and fun experience when using our design tool, six boardgames were played. To evaluate the shape of the cards, we used paper prototyping to test the hexagons and tripods. To find a way to sort the cards an icon survey was sent out to designers, and to see which colour should be used on the cards an accessibility test was made. A deliverable was prototype 2, a paper prototype consisting of method cards shaped as hexagons and concept card shaped as tripods. Another deliverable was seven b2b cards with formulations based on findings from the interviews and literature review.

5.2.4 Iteration 3

Our final iteration was mostly about refining the concept and testing it with subjects, i.e. interaction designers. It involved one last interview with a knowledge manager, some changes of icons, naming of the tool, specifying of concepts and methods. We also did hi-fi prototypes of the cards using digital applications. During testing through co-discovery, several small changes were made in response to the reactions and suggestions of the testing participants. Deliverables was the final version of the design tool Trip, consisting of 99 cards in total; 38 concept cards, and 62 method cards.

6. Concept development

In this section we will present the development process of our design tool.

In Pugh's design process (1990), each iteration consists of an elaboration part where ideas are generated and a reduction part where ideas are reduced. This is why it is called a design funnel, since the prototype is more and more refined as each iteration passes, making it more developed as time goes. The iterations are as follows: General (Overall concept); Iteration 1 (Exploratory); Iteration 2 (Clarification); and Iteration 3 (Resolution). This section is chronologically divided into these four parts.

Exploring a new design area in order to build a support for interaction designers, fits well into what Blessing & Chakrabarti (2009) would term research of type 3, Development of support. It focuses on a review-based research clarification as well as descriptive study 1, and includes a more comprehensive prescriptive study. The descriptive study 2 will only be initial. The focus of our work is on understanding how interaction designers can work in building b2b e-commerce, and constructing a prototype for a support for the design process. The evaluation of our prototype is only preliminary.

Another way to attack this problem would be to put a larger emphasis on the design tool itself, commencing the prototyping of it earlier in the process and aiming to create a finished support. This would however be difficult, as at the beginning of our thesis project, our understanding of the problem and of the problem area is that of a novice's. If the initial understanding is insufficient, there will not be enough basis for starting building a support.

One method was used throughout our master's project: walk-and-talk. When we found ourselves in frustration and in need to evaluate present dilemmas, we took the habit of discussing the issue during a walk. We found that this helped us clear our minds and focus on the problem.

6.1 General concept

Our starting point was to do something touching upon the subject of b2b e-commerce. As we knew nothing substantial about the field, neither as such nor from an interaction design point of view, we decided that we would have to do thorough research before we could extract a workable problem definition and thus solution. We found the area interesting, but also wanted to focus on the interaction designer. We also attended an online course at Coursera. Coursera is an educational platform that offers courses online from top universities and organizations worldwide for free (Coursera 2015). At this site, the course Foundations of e-commerce, provided by Nanyang Technological University (Sethi 2015), aims to give important concepts and issues regarding e-commerce today. It provides an overview of up-to-date theory of e-commerce, however it does not focus specifically on b2b.

We discussed conducting observations, but agreed that for the scope of this project it would not be beneficial in relation to the time it takes. The purpose of our tool is to support the entire scope of a design project, which would be too time consuming to

observe. We did conduct our thesis at Maverick, which gave us some insights as to how the interaction designers there worked.

6.1.1 Literature review

The literature review was initially performed according to the model set up by Wolfswinkel et al. (2013). They divide it in five sequential steps: Define, Search, Select, Analyze, Present. This division gave us a structure to follow and made our selection less haphazardous, but it also proved difficult as it was very rigid. We believe that perhaps our being so new to the subject may have been to our disadvantage, as we often had to go back to revise earlier steps. However, it is our belief that a method has to be lenient to this going back and forth, as new discoveries will inevitably change the way you look at a problem, as Rittel & Webber (1973) also proposes.

Define

We set up criteria for choosing articles to be included as follows: We will only use articles from academic sources, found in the channels ACM Digital Library or Google Scholar. We will also use citation tracking. The language of the articles has to be either English or Swedish, as the review will be dependent on our full understanding, which is restricted to these languages. The articles should also be of relatively recent date, as these areas are in a state of change and development. E-commerce is in great expansion and change, and articles specifically about this should be from 2005 or later. Our interest in interaction design is more of a methodological than technological matter, and we can therefore be more lenient as to this criteria with articles focusing solely on interaction design. As our thesis will be about b2b, articles concerning this takes precedence over b2c. As we found that research on b2b is yet slim, we have however covered both. We have also chosen to focus on the construction process rather than the evaluation process of interaction design, as our work is of an exploratory kind.

We based the search upon carefully selected keywords; b2b, e-commerce, interaction design, design space, emotional design, design tool(s), user experience, methodology, usability, trust. Defining search terms proved to be rather difficult, as the field is still young from an interaction design perspective. We set up search terms that used together gave us a plentiful list of results. Mostly we used the search terms in pairs from the different areas, such as *b2b + interaction design*. We omitted term couples that would obviously result in too huge a result list, such as *interaction design + usability*. In defining these keywords and using them in combinations to make sure that we got results mentioning both terms from e-commerce and interaction design, we narrowed the search to include only such research that would answer our questions.

This definition of search terms was done iteratively: it proved impossible to know beforehand which terms would be most interesting and yield the best results. At first we had set up more specific search terms, but the results were slim. We widened the search to the search terms listed above to be able to find more relevant articles. The addition of "trust" was also done later, as we found that this was a highly discussed term even in articles not specifically about emotional design. It stood to reason that trust would be an important factor in any commerce, and it was thus included on its own.

Search

The search was done iteratively and proved rather difficult. A lot of the articles found were not relevant for our topic. This could be a symptom that our search terms were of bad quality, yet we tried many more with worse result. Our stance is that although the search terms could probably be more refined, there was also a problem of b2b e-commerce from an interaction design perspective is a young field, and not many have published research that deal with it explicitly. Instead, we had to widen the search to b2c, which is more researched, and information systems in general.

Select

An initial selection was made from the titles of the articles, and a large number was marked as interesting. Our next step was to read the abstracts of the articles found and then decide if they answered any of five inclusion questions that we set up as central to our research:

1. Does the work address e-commerce?
2. Does the work address b2b?
3. Does the work address emotional design?
4. Does the work contain guidelines or recommendations for design?
5. Does the work have other implications for design?

These inclusion questions together allowed us to create a table of the articles to make sure that we in our selection covered all sections. The questions proved an invaluable tool to make sure the selection was relevant and covering all important aspects. The selected articles can be found in Appendix I, along with title, year of publication, authors, reasons for inclusion and checking marks for the inclusion questions.

Analyze

The analysis was then performed as suggested in Wolfswinkel et al. (2013). The articles were read and important passages and ideas highlighted and annotated. We then searched for abstract terms, not necessarily included in the specific paper, to describe the main concepts found. We did a simple inter-coder validity check of one paper to see if we would find the same concepts, and a result of 70% was far from the 90% wished for by Wolfswinkel. This problem was tackled by further discussing what we were looking for in the articles and agreeing on terms for what we found.

Present

The final result of the analysis is presented in Appendix II. Apart from this table, we used a KJ analysis to group the concepts in meaningful ways, in order to find relevant higher order concepts and dimensions (Figure 7). Themes and concepts were written down on post-it notes and put up on a whiteboard. In silence, we individually ordered them as we saw connections between them, resulting in some notes being cast away as they were deemed to mean the same thing, and some to be revised to clarify difference between them. The notes were ordered spatially in a meaningful relation to each other. When we were both satisfied with the order, we began to discuss this order among ourselves, which in turn brought further clarity and more rearranging. Areas were then discerned and explicated, and the notes were rearranged again so that the areas could be better fitted next to each other. We ended up with three main areas: Brand equity, Trust and Emotion. It can be argued that trust is an emotion, but as found in McKnight &

Chervany (2001), trust is conceptualized in different ways depending on research area. Thus, trust can in some instances be an emotion, but in other instances be a behaviour. For this reason, and for the reason that among emotions mentioned, the impact of trust in the articles was unparalleled, we chose to use it separately.

Figure 7. KJ analysis and KJ analysis sorted.

We found that three areas all had overlapping qualities. Therefore, we arranged them in a triad of circles, enabling us to use the overlapping areas meaningfully. Also, on the image to the right, each post-it is colour coded to create some sort of connections between different sources, as well as to see where our own research fitted into a larger image.

The result of the KJ was later arranged in a Kano analysis. This, however, was not fruitful for our purposes. The method was used but was difficult to apply as many of the attributes we found for b2b e-commerce were intangible. It was thus difficult to apply the second scale of the Kano method (investment) to the attributes, as we lacked the knowledge to properly estimate it.

6.1.2 Reference model

Parallel with our literature review, we constructed a reference model. A reference model, according to Blessing & Chakrabarti (2009), is a model of the presumed present state. This model will later be used to benchmark the proposed solution against, thus referencing the solution to the present state. Our reference model is build as Blessing & Chakrabarti suggests, with nodes representing influencing factors connected in a graphical visualization. The factors are formulated as attributes of elements, so that each can be perceived as measures or assessed as either increasing or decreasing. Thus, "product" cannot be a factor, but should instead be specified as "quality of product" for example. Our work here was made easy by using the reference model exemplified in Blessing & Chakrabarti (2009) as a prototype. This model proved to have many similarities to the model we created, as they were both about creating a product that had as a goal to support the sales in a e-commerce. Our reference model can be seen in (Figure 8). It should be read as such that the arrows are directions of influences, so that one factor that points to another is described as influencing the other. Plus or minus-signs at the ends of the arrow specify the influence. Thus in our reference model, an increase in Effective design is decreasing the Time for a purchase. Beside the arrows are annotations to sources, such as author's names, or (A) for assumption. As this reference model was done early in our project, a lot of our influences were assumptions.

Our key factor, the factor that we are proposing to change, is the effective design process. We assume is that a more effective design process will increase the effectively of the design, which in turn will decrease the time for a purchase. The faster purchase will increase user satisfaction, which has a mutual positive influence with brand equity. Brand equity means the value accompanied with a brand's name, and can be calculated by how much more a product of that brand can cost than a generic product. Both brand equity and user satisfaction will increase the amount of profit.

An effective design process is also presumed to decrease the percentage of design time spent on modifications. Less time spent on modifications means a shorter delivery time, which lowers the cost of production and thus increases the amount of profit.
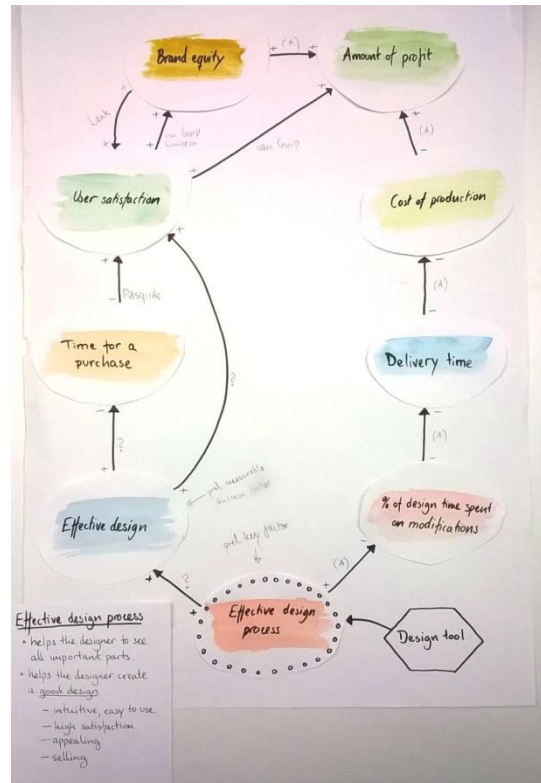

Figure 8. Reference model.

Blessing & Chakrabarti (2009) also recommends creating an Impact model, which is similar to the reference model but instead is supposed to show the impact of the coming solution. We decided that the models would be so much alike that they could be merged, and thus our reference model is also our impact model. The main difference is that we added the Design tool at the bottom right, as our proposed solution. Our assumption is that using the design tool will increase the effectiveness of the design process, and thus by association increase the profit.

We found the reference model a powerful tool to visualize our assumptions. It served as a basis from which to search for literature, although we found that many of our assumptions were of a logical type and could therefore be readily accepted. For example, it is a logical derivative that shorter production time leads to lower production costs.

6.1.3 Interviews
As our purpose is to create a support for interaction designers working with b2b e-commerce, we started conducting interviews with interaction designers early on, as recommended by UCD and participatory design. We wanted to gain insights into how professional interaction designers worked in projects. We also needed to understand the interaction designers' end-users: b2b purchasers. The questions for the different interviews can be seen in Appendix III. For our thesis it proved difficult to get both designers and purchasers together at the same time, and for scheduling purposes we opted for one-on-one interviews. It is reasonable to suppose that our findings might have differed if we had used focus groups instead, but in what ways we cannot say. This would allow us better understanding of the interaction designer's tasks and goals. Our

first interviews were therefore conducted with one purchaser and thus user of b2b e-commerce systems, and with two interaction designers working with e-commerce, one of which had experience with b2b. The interviewees were at this point mostly selected by convenience; they were personal contacts of our, except for one of the interaction designers, who worked at Maverick. We planned interviewing all interaction designers at Maverick, as these are intended end-users of our support. All interviews were conducted in quiet cafés during fornoons, and took about one hour each. Every interview were conducted with one interviewer and one transcriber, working simultaneously. For the discretion of the purchaser and one of the designers (A), those interviews were not recorded. The interview with the second designer (B) was recorded, and the recording was then transcribed and the transcript anonymized. We have used our interviews to understand primarily how interaction designers work in projects, and as such a contextualized interview was out of the question. Our designers and their teams were very busy, and we scheduled our interviews in quiet rooms in order to get their full attention.

Purchaser A
The purchaser worked in one of the major retailers in Sweden, using several different purchasing systems for different types of goods. Our goal with this interview was to gain insights of how it was to be a purchaser in such systems.

One main finding was that the purchasers in these systems were expert users. They used the systems often, and in a specialized manner. The learning curve of some of the systems was relatively high and that a purchaser often had to either call a special support within the own company or ask a colleague for help. The inputs demanded by the system were often order numbers or other abstract data, and there was limited browsing possibilities. This was however often a problem for the purchaser, as some items were difficult to find. Visually, the systems were perceived as grey and text-based. The purchaser stated that sometimes she had to look away from the screen in order not to be dizzy from the monotonous tables.

In specific instances, orders were made automatically by the system and were customized afterwards by the purchaser. This was perceived as a great help by the purchaser, and a way to save time. For many items, algorithms helped the purchaser deciding amounts and delivery times although they always had to be checked by hand.

Our take-away from this interview was that b2b e-commerce might deal with huge quantities of products, thus making visual search and browsing more difficult. The systems can demand a high learning curve and expertise from its users, but this is accepted, at least as this purchaser perceived it. As the systems are complex, there needs to be a support system in place, to answer questions and provide guidance and help.

Interaction designer A
This designer has been involved in building several e-commerce sites, some of which were b2b. Our goal with this interview was to find out whether there were special things to consider when building these sites, as compared to other sites. We asked about designing for emotion, and how the user's experience of the site was thought of. Also, we wanted to see how the design process could look, both from a general perspective

but also specifically in one case. Lastly, we were interested in how interaction design was appreciated by and communicated to clients, and within teams.

This designer involved clients early on in the process, and tried to work close to the client during the development of the site. The client was seen as the expert on its customers, and no further studies were made on actual future users of the site than what the client could readily provide. Testing involved client and developers and none other. The designer's firm were in the middle of building a standardized design process themselves, and early sketching and testing were two parts that this designer often felt were left out of the actual process. It was his opinion that clients were often hard to convince of the prospects of interaction design, and sometimes his firm would add unbilled time to a project just for the interaction design, as the firm saw great advantages when this was done early on and found that its reputation could gain from it. They felt that the client knew too little about interaction design to see its worth.

The emotional experience of the user was taken into account when designing, mostly by branding options, but also by designing for trust. This was accomplished among other things by discussing how personal information was to be taken care of and shown, but also by showing off important labels such as "Trygg e-handel", a Swedish organization for safe e-commerce. Specifically for b2b, trust for this designer could mean not making too large changes in layout and design, so as to strengthen the user's sense of recognition.

When we asked this designer what he felt was missing from their design processes, he mentioned one thing that we yet had not thought of: he asked for help to document the process itself, in order to give the sales people hands-on information about what interaction design was and what happened during the design phase, so that the next client could have a better understanding and appreciation for it. He also said that there was a lack of time during projects, and that this part was often bypassed.

Interaction designer B
Our next interviewee had designed e-commerce sites to be launched in Nigeria. Our goal was yet again to see the overall process, what steps there were, and how interaction design was appreciated by and communicated to the client and other team members. We further asked about the emotional responses of the user and what role trust played for their design.

The case we discussed the most was somewhat special. As the designer himself put it: "We did every mistake possible." From start to finish, the project was accompanied by mishappenings, miscommunication, unfortunate planning and missed deadlines. The designer stated that his clients did not know what interaction design was, and saw no need for it. As this was his first project, he went against his own better judgement and decided to accept the client's point of view and design the site as they pictured it. No users were consulted. The developers started coding the project right at the start, and very little time went into wireframing. All in all, this project came to us as an indication that at least one of our assumptions in our reference model was valid: a more effective design process would lead to less time spent on modifications, and the delivery time would thus be shortened. The project described by designer B had the opposite course of events.

Our biggest take away from this interview is how important it is to have a working process, and how learning from past mistakes is what makes a designer successful or failed. When we asked designer B if he had systematized learning since this project, he answered: "Even though I know that I should have [automated processes for learning], I don't."

6.1.4 Building a general concept

We organized a workshop for six interaction designers, where the goal was to reach a deeper understanding of how interaction designers conceived of design tools, and the possible use of such in their design processes. The participants were interaction design students from the same class, which meant that they knew each other and were accustomed to working together. They were selected by the simple fact that they were the only ones who could meet at the same time, and this time was the one at which most interaction designers could meet. This workshop was completely exploratory in nature, and we had no expectations of gaining explicit ideas on which to build our tool. Rather, we wanted to see how other designers thought about their processes. To obtain this goal, we used two different methods successively: interaction relabelling, and the instant card technique. We considered card sorting, but this method requires finished concepts. As we at this point still wanted to explore concepts, we opted against this method.The two methods took around 45min each, and with a short break in the middle, the workshop lasted for 2h.

Interaction relabelling

In first part of the workshop, the participants were informed before starting that they, as interaction designers, had been hired to create an e-commerce site for a company that sells pens to offices. On this subject, they were now given different items and 10 minutes per item, to ideate and motivate how this item could be useful. They were encouraged to see the item not for what it was, but as a new strange object with boundless possibilities. The items were: a children's toy cube, a hair dryer, and a bicycle pump.

As items, they were all different, and the participant seemed to enjoy the creativity rendered by the task. The children's toy cube reminded the participants of a die, and randomizing elements were frequent in the list of ideas. Perhaps the fact that it was a toy with many moving parts made the ideation easier. The hair dryer was perhaps the most difficult of the three, as the ideas all kept referring to the item as something that blew air: it seemed that this was a tricky item to see as something else than what it was. The bicycle pump proved the most rewarding, but not for any obvious reason. Some minutes into this third part of the interaction relabelling, the participants noticed a piece of string that had held the pump together. This string then took up the rest of the task's time, and elicited many interesting ideas.

When we read about interaction relabelling in Djajadiningrat et al. (2000), they proposed that the item used should have many moving parts, which we tried to account for with our items. The string, however, was better at eliciting many ideas, and by our judgement also elicited the best ideas. Why was this? It is our take that this is because it was easy for the participants to see the string as not a string, but as a tool — we are used to using strings for multiple purposes, and perhaps this lack of proper, or "right", way to interact with the item made it more powerful for this exercise.

Finally, this exercise awarded us with the concepts of showing were in a process a team is at, and to be able to see what has happened before and what is the next step. Also, the idea of communicating with the client and other team members came up as important.

Instant Card Technique

In the second part of the workshop, after break, the participants were handed cards with images from four different categories. The categories were relating to users, tools, methods and goals. The participants were instructed in how to use the cards and recommended a working process (Figure 9).

For this workshop and these participants, the instant card technique did not work well. It seemed as though the cards were more in the way, as if they were stifling and holding back creativity. The cards were hesitatingly used at the beginning, and later hardly at all. The exercise did amount to certain results though: the parti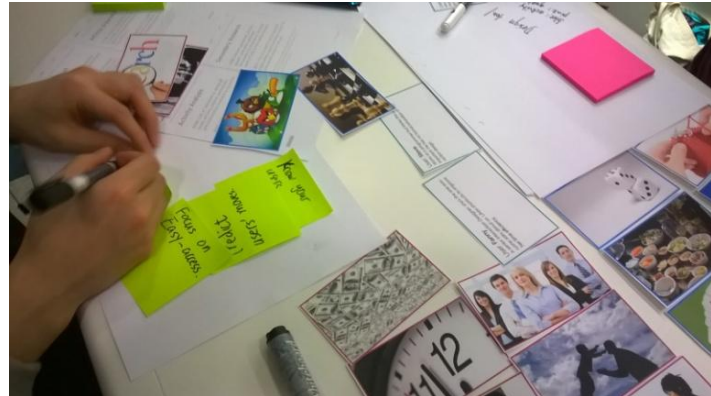cipants rather quickly decided that a good design tool would help the designer handle design methods, and choose the right one. They also thought that it would be good if the design tool could help them with knowledge management, so that it would bolster the learning and knowledge transference from one project to another. In sum, the tool would help the designers be more effective.

Figure 9. Participants using the instant card technique.

Why did the participants not use the cards? We do not have the answer to this question, but we believe that there might be several reasons. For one, the instructions might have been unclear: perhaps they were too complicated so that the purpose of the cards was not evident. The number of participants might also have influenced, six persons might be too many for such an exercise and in hindsight we think that we should have divided them into two groups of three. Before using this method, we had our doubts as we thought that it would demand a lot of the participants and that its success would depend on how experienced the participants were as designers. We still wanted to use it as a way of pushing ourselves into unexplored territory, but we should have come better prepared.

6.1.5 Summing up the general concept

As a way of collecting our many ideas after this exploratory round, we used a customized 6-3-5 method, and draw three solutions each during five minutes, then exchanged ideas and continued building on each other's and exploring new solutions. This resulted in an extensive list of 30 possible solutions, and after reviewing them we realised that some of them could be combined. We then voted on our favourites and ended up with three main concepts: a structure for collecting the most important questions a designer should consider, a documentation assistance, and a map of the design process illustrating where the team is and what the process looks like. We agreed that all three held a promise for further evaluation.

6.2 Iteration 1 - Exploratory

In the second iteration we again started out from the learn phase, but this time we could base our learning on what the previous iteration had resulted in. This time our goal was to build a prototype focusing on the functionality — a design tool that could support an interaction designer in building a b2b e-commerce service. We now needed to know more about how interaction designers worked in projects, and in this iteration we did the main interviews with such designers. We will present the findings from the interviews in sum.

6.2.1 Interviews with interaction designers C, D & E.

At this point in our project, we interviewed the remaining interaction designers employed by Maverick. Our goal with these interviews was to see how interaction designers wanted to work in projects versus how they actually worked in projects, and we therefore inquired both to their ideal processes and a process from an actual case. We also wanted to know how b2b was different from other projects. As trust emerged as important in the literature review, we inquired on how the designers used emotional design and specifically designing for trust. In the general concept learning from projects was shown to be an important and often overlooked part, and we also wanted to focus on this by asking about how they structured learning. As our previous interviewees had told us that their clients did not know about interaction design and therefore did not see the use of it, we also wanted to verify this and see if and how interaction designers tried to rectify this by communicating with the clients. The interviews were conducted at Maverick by Sigma's office, in quiet rooms, and lasted for approximately 1-1,5h each.

Outline

Three interaction designers working at Maverick by Sigma were interviewed individually. Two of the three had illustrated their own design processes, one of which can be seen in Figure 10, and were keen on showing and discussing them. They all agreed that there was an ideal process, but that this was never fully realised in actual projects: one of the reasons for this was that the client did not want to pay for it. All three agreed that clients usually did not know what interaction design was, but they also thought that this was starting to change, as interaction design became more popular.

There was one interesting difference between the two illustrations: the word "magic" appeared in one of them relating it to the black box design tradition, while the other was more scientific and explanatory. Both were general and would fit most projects, and were used by the designers to explain interaction design to others; colleagues and clients.
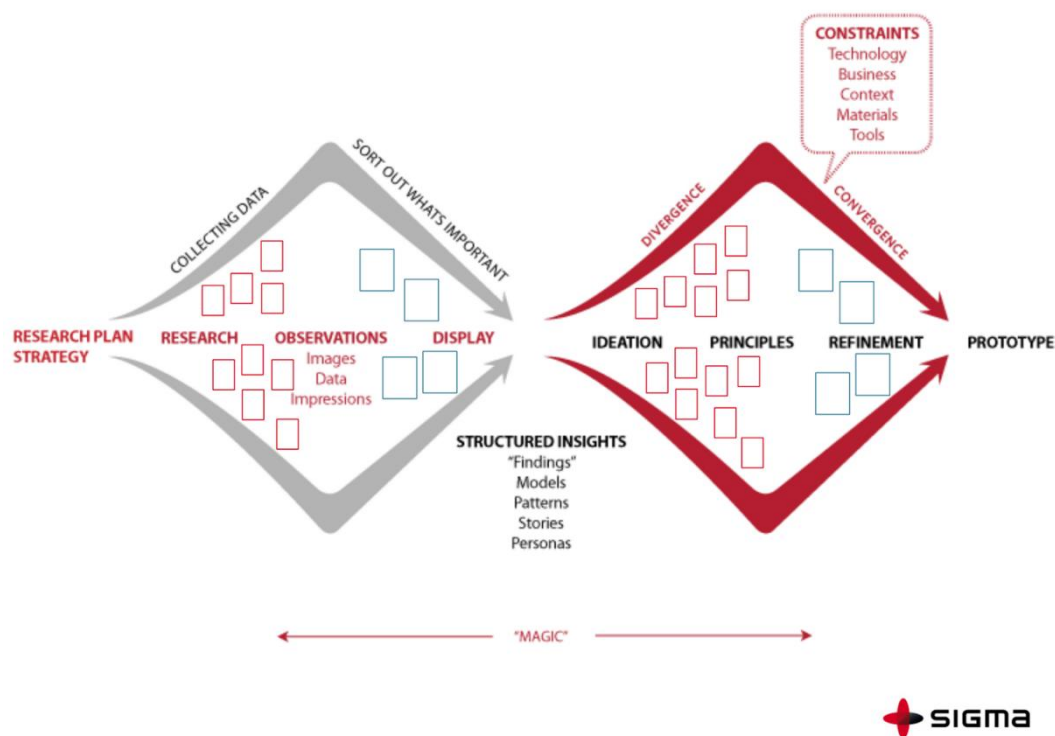
Figure 10. One of the interviewees design processes.

As for b2b, it was noted that b2b users are not as sensitive as other users when it comes to graphical design, and that they are more lenient towards mistakes. One possible reason for this is that changing a supplier is more difficult and takes time and money, so there is a buffer zone of resilience. However, a b2b user is more of an expert user and puts higher demand on things like efficiency and customizations. It puts a higher demand on usability and the elimination of disturbing elements. One of the designers highlighted, that often when designing for b2b he had not been allowed to contact end users. On the reasons for this, he could only speculate: perhaps the business was too sensitive to risk important information coming out. Perhaps it was clients' lack of knowledge about interaction design that was the problem.

When discussing designing for emotions and trust, none of them had any specific methods for this, although they all agreed this was important. It seemed as though they relied heavily on previous experience and their own subjective views.

We asked all three designers about if and how they structured learning from projects, and all three agreed that there was no structured way, but that learning definitely occurred: "You learn things, for sure, but it is unstructured." The general view was that learning was something that happened implicitly, and that by doing projects you get a feel for what is a good method or technique, and what is not. There was no explicit sharing of this knowledge.

When asked about failed projects, two of the interviewees answered that they had no failed projects to tell of. The third put forth the recent discontinuation of one project as a failed example, and withheld that they had had no discussion about the reasons for this discontinuation within the team.

The interviews were recorded and transcribed, and were then compared by noting and correlating the frequency of important concepts. From this correlation, a requirement specification was elicited concerning the main fields generated: the purpose of the tool, specifics related to b2b, specifics related to the client, specifics related to the team, and specifics related to learning. The most important part of this was specifying the purpose: the tool should support the interaction designer by clarifying important steps in the process and facilitate documentation. It should also aid communication within the team and with the client, to explain what interaction design is and what is being done. Finally, we wanted it to support an iterative process.

6.2.2 Prototype 1
At this point, the three general concepts were combined into a design tool that would function as a visualization of the design process. Our first attempt at this was a map with a start and a goal, and we tried to fit in the necessary steps discerned from the interviews and literature. We wanted the map to allow for iterations to fit the way interaction designers worked in projects, as was evident from our interviews.

The result was a map, (Figure 11) based on questions and concepts connected to different phases. At the beginning of our master thesis, we had visualized our own process as an iteration between the phases learn, do and test, and after careful consideration we found that this could be applicable to our tool as well. In each phase, questions and concepts were listed as nodes and connected. They were supplemented by goals and outcomes, useful advice and methods.

Figure 11. Prototype 1.
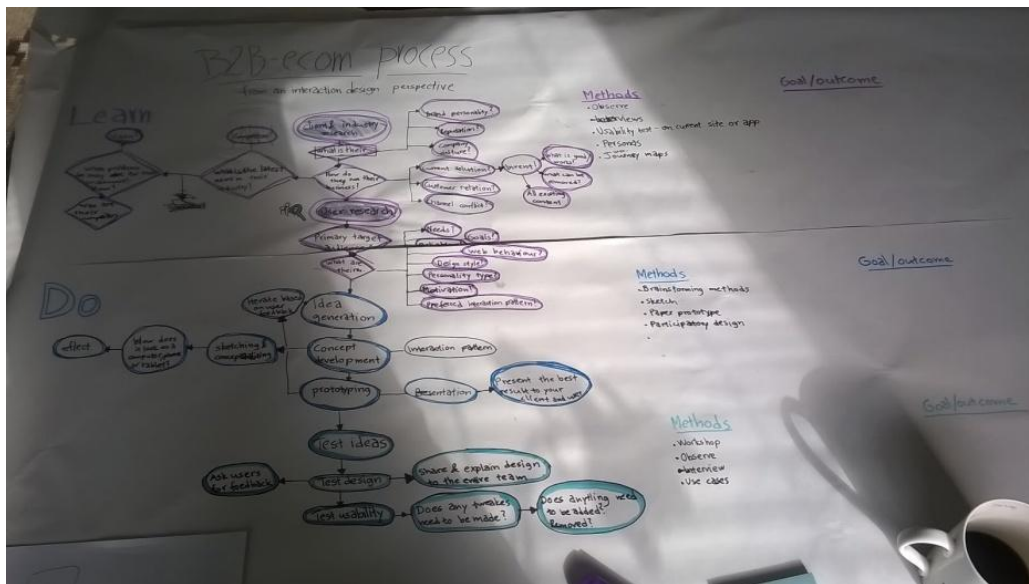
6.2.3 Evaluation of prototype 1
The evaluation of this prototype was strictly subjective. We both agreed that it held promise, but was too messy and wide, and that further categorization was needed. As it had appeared in the interviews, shortcuts were part of the everyday world of interaction designers, and we wanted our tool to be used not as an ideal, but as a realistic plan for

actual design processes. We had thus chosen a path: we would not build a design process, but rather a tool to be used in projects to plan a realistic one. This meant that our tool would have to be able to cater to shortcuts and ad hoc solutions. We were also unsure of if we had really caught the essence of b2b e-commerce, and decided to explore this thread further. A third objection was that we wanted the tool to support iterations, and as it looked now, the tool was built upon a waterfall principle.

A discussion of the right medium for our tool was also imminent, and we decided that this was worth further consideration: for documentation purposes, perhaps a digitalization was the best choice? At this point, we did not have an answer to this question.

6.3 Iteration 2 - Clarification

The goal of this iteration was to clarify the solution and its purpose. We interviewed purchasers in b2b e-commerce from different areas, did some further research into learning from projects, and playtested board games to see if we could adopt some concepts thereof to make our tool more interesting to use. A shorter literature search was done to meet the need for research on learning through projects. The shape of the tool was reworked to better suit the work of an interaction designer.

6.3.1 Interviews with purchasers B, C & D

Our goal with these interviews was to further explore b2b e-commerce, from the purchaser's perspective. We wanted to find out important concepts that needed to be taken into consideration when designing such services, in order to highlight them in our design tool. This would be important in order to facilitate shortcuts to be taken by designers, as they might not always have opportunity to talk to users themselves. The interview questions are to be found in Appendix III.

Outline

We met with three purchasers individually, from three different backgrounds. One worked as a purchaser for Volvo, one was a purchaser at Chalmers, and one was a department head of Maverick by Sigma. The three interviews were rather different, and especially the one with the purchaser from Volvo stood out. This was less subjective, and she would only agree to introduce us to the general purchasing procedure of Volvo. We were not allowed to observe her using the system, but were instead referred to Volvo's own homepage for suppliers (www.volvogroup.com/suppliers). She held a presentation where she explained the details that can be found on that page.

It was evident that Volvo is very fastidious when choosing suppliers. There is a lengthy process with multiple evaluations before a supplier is approved. Many of these evaluations were in place to make sure that the relationship with Volvo could be of a longterm character. Volvo also wanted to make sure that they would be a valued client to the supplier, and that they would be able to customize the goods as Volvo had the need. The purchaser herself had no saying in from which companies items were bought, as these decisions were made at a higher level. This means that she was not a voluntary user of their b2b systems. It was also clear that she was what interaction designers call an expert user. The systems were complex, and the need for verification from different levels in the organization was typical.

The interview itself was a bit off from the goal we had, and perhaps it was we who had been unclear when communicating our purpose with Volvo. When at the interview, it was not possible to correct this, as the purchaser needed to get clearance from her superiors for every bit of information she gave us. We now wonder if this was not the same problem as the interaction designers we interviewed earlier had: she did not know what interaction design was, and thought that we were interested in their purchasing regulations. We never learned how she actually used the system.

As for the purchaser from Chalmers, the voluntariness of use depended upon the type of goods and the cost. For some goods, the supplier is decided by a framework agreement, and for others, the regulations were more lenient. For a larger amount, a framework agreement is always needed. Purchasing items in Chalmers, like in Volvo, is to follow a specific chain of command: purchasing within this specific department is supposed to go through this purchaser. He confirmed that some colleagues thought this was practical — they only send him an email with what they wanted bought, and then he takes care of it. Not everyone conform to the rules, however, and the purchaser explained that other colleagues prefer to do their own shopping. He then gets invoices that he has to attest.

For certain objects, he and some colleagues had managed to create an account where they all knew the login information, so that his colleagues could add items to the shopping basket, let him know, and he would then go in to do the actual purchase. The purchaser thought this was a good solution.

Our third interviewee, from Maverick by Sigma, had yet another story. In Maverick by Sigma, everyone is responsible for their own purchasing, to some degree. There are specific limits to the amount that anyone can buy for, and items over that amount have to be attested by a superior. This continues hierarchically. For many items, there are framework agreements in place, for example for computers. The framework agreements mostly mean that the items are negotiated to a better price, and it is still up to the personnel to use the company or not. Some companies who had framework agreements have built in their stores in Maverick by Sigma's intranet, making it easy for Maverick by Sigma's personnel to buy from the stores.

When asked what differentiates the purchasing he does at Maverick by Sigma from his own private purchasing, he answered that at home he is quicker to change supplier, and that he is not as thorough at doing background checks. Purchasing for Maverick by Sigma, it is important not to buy from any competitors, and he has to think about Corporate Responsibility. Also, when a purchase becomes regular, Maverick by Sigma tries to generalize the process to speed it up and make it more cost efficient.

General conclusions
The interviews together gave us a rather wide view of what b2b commerce could be about. We wanted to draw general conclusions from this to be used in our design tool. We found some things specifically interesting:

- *Expert users* - the users are very used to the systems, and with this comes specific needs. Specifically, efficiency and speed are important.
- *Multi-user* - there is a chain of command in place, with several people at the customer's side involved in any single buy.

- *Need for customization* - the items are not always purchased as they are, but are instead in need of customization to fit the customer's needs.
- *Longterm relationships* - framework agreements and other solutions are well used to make the relationship more lucrative and safer for both parties.
- *Negotiations* - there might be negotiations both about time and deliveries, in order to fit into the customer's processes.
- *Taxonomies* - the complexity of products can be huge.
- *Key accounts* - a large enough customer can mean very much for a supplier, meaning that the supplier will want to go to extra measures to adapt to the customer.

6.3.2 Playtesting

We had from the start been interested in ways to make our tool interesting and fun to use. The idea to use game elements had been with us early on. To gain inspiration about how the experience of using our design tool could be amplified, six boardgames were played. We had several questions that we wanted answered: one was concerning the shape and feel of our design tool — what would make for a pleasant and inspiring experience? Also, we wished for our tool to be simple to use, as reading instructions at a length or making mistakes would fail to meet the criteria of making the design process more effective.

The selection of games depended on at least one of us being familiar with it already, partly in order to be more time-efficient, and partly on the fact that we had spent some time thinking about the game mechanics before and found them interesting. Also, we tried to pick games that were as different from each other as possible, in regards to complexity, visual expression and shape. Also, for practical reasons one requirement was that the games could be played with only two people.

The games that we tested were Tsuro (McMurchie 2004), Ricochet robots (Randolph 1999), Dominion (Vaccarino 2008), Settlers of Catan (Teuber 1995), 7 wonders (Bauza 2010) and Hanabi (Bauza 2010). Downbelow each game has its own evaluation.

Tsuro

In Tsuro (Figure 12), the goal was to stay on the board building a path longer than your opponent. Simple, few rules and hard to do wrong, also it elegant designed. We found the cardboard thickness to be pleasant to work with, and graphic balance in each card further embellished the game. It was very quick to play and the cognitive load was light, we could start playing almost immediately. The reasons for this as we saw it, was that the cards themselves held all the information you needed about the possible moves, and there were no

Figure 12. Image by Matěj Baťha.

other influences in the game than what card the players played, one per turn and player.

The fact that the game was built upon chance but still gave the players some choice was effective in keeping us present in the game. The boardgame surface was shared, and the

players had icons to show where they are in relation to each other. It was interesting in that you would sometimes change the game not only for yourself, but also for the other player. This resulted in a higher perceived competitiveness.

Apart from the visual and kinetic appeal of this game, that inspired us, we also thought that the element of chance might be a good way to keep users involved. First and foremost, our take-away from this game was that making the game as obvious as possible by way of graphical cues, does not necessarily take away excitement. Instead, it can be of great use to focus on the problem at hand instead of being bewildered by rules.

Ricochet robots

In Ricochet robots (Figure 13), the players use their quick wits to find the shortest route from where the robots are presently at to specific places on the board. It is rather demanding for the short-term memory of the players and any distraction will be met with frustration. This is highly a game of skill, for which some seem more apt than others. The reason for this is probably the load on short-term memory, but also thinking logically under pressure. There is a keep remember several chunks of information in mind at the same time, but also a matter of training to know what is likely to be a shortest route.

Figure 13. Ricochet robots. Own footage.

From this game we learned that as this ours is to be a planning tool, there would be need for optional remakes and improvements. This meant that we should stay away from short-term memory load, and be clear on the consequences of taking a step.

Dominion

The game (Figure 14) is heavily based upon text, although the texts are short. Each card is explained on itself, making it rather easy to play without rulebook. The game can be played at two different levels: by playing each hand as is, or by building the deck into a powerful combination. The latter of these is often the winning strategy. This means combining the cards, but also having a feel for probability of having specific cards on your hand.

Figure 14. Dominion. Own footage.

A general lesson from playing this game was that games tend bring out unmasked selves of the players, and creates an atmosphere where everyone is supposed to be good loser and winner. This is not always the case though, as many of us have experienced. Still, we experienced a special type of social nakedness that came with the game setting, that might be influential and teambuilding.

Another important note from this game was that the colour coding made it easy to see the difference between cards, eg. yellow for treasure cards and green for victory cards.

Settlers of Catan

In Settlers of Catan (Figure 15), each player is to build settling and roads to connect them, and by this way scoring points. The board is built up for every game by linking hexagonal cardboard cards, and it can thus change appearance for every new game. Not only does this prolong the enjoyment of something novel, but it also makes it scalable since players can add or take away cards to suit their needs. The hexagonal shape helps with making the board look less strict and more organic, and it can be made to look finished no matter how many cards are used.

Figure 15. Settlers of Catan. Own footage.

Adding the three dimensional wooden pieces for houses and roads makes it easy to spot the different players. In this game too, colour is used as a code for type of card: the different raw materials have one colour each.

We were impressed by the hexagonal shape and its modularity, how it could be built in different shapes without ever seeming unpleasant. The thought of modularity appealed to us as it would solve the problem of creating shortcuts, but also of diving deeper into specific areas of interest for certain projects.

7 Wonders

One of the most intriguing things we found about 7 Wonders (Figure 16) was that the players' turns are done simultaneously. This means that players do not have to wait for each other. Each player builds a civilisation, and different points score differently depending on type and combinations. There are many different strategies to use, and which one is best depends on which civilisation you are playing, and the chance of procuring the right cards.

Figure 16. 7 Wonders. Own footage.

In 7 wonders, as in many other games, expansion packs are used to further explore the game and give more novelty by adding specific themes. As we had spent our thesis project thinking about what makes b2b special from a design process point of view, we knew that b2b had a lot of things in common with a more general design process, although other things stood out. The thought of having b2b as an expansion to a more generalized design process tool seemed for us to be a rational way of adding these specificities. It would also mean that we could in the future widen the scope and research other areas with specific interests, and perhaps create expansions for those areas too. The idea intrigued us, and we found that it was worth further investigating.

Hanabi deluxe

Unlike the other games in our selection, Hanabi is a cooperation game (Figure 17). The players can be seen as a team, who either win or lose together. Each player has a set of bricks of certain values, and these bricks are to be laid out on the table in order. However, a player can only see other players' bricks, and the game turns into one of resources that are used to provide hints to other players regarding their bricks.

Figure 17. Hanabi deluxe. Own footage.

We found the information distribution among the players to be interesting: the only thing a player knows for certain, are the things he or she cannot make decisions about. Relying on others in this way, having to take heed to what they are saying about your competencies, would probably make for a good teambuilding exercise. We had difficulty applying this to our tool however. Although information is often already asymmetrically distributed in a team, it is not likely to be of help to but up rules as to how it can be spread. However, the game also make the players think about the phrasing and the timing of hints, because how a hint is received depends not only on what is said, but also when and how, and what is not said. The clarity and disambiguation were two values that we needed to take into consideration.

6.3.3 Literature review

A short literature review was performed to fill the need of research on learning in projects, that had risen from our interviews. The ACM Digital Library as well as Google Scholar were used, and also citation tracking. We searched specifically for articles of an academic nature, published in peer reviewed magazines, that contained the subjects of organisational learning, and learning in projects. The results were screened as to discern their fit into our field of interest by reading titles and abstracts, and a total of six articles were chosen. Some explicitly concerned learning in projects, others were more contextual and discussed how organisations and professionals learn. Also, the articles gave us meaningful and important methods that can be used to foster learning: storytelling and simulations.

6.3.4 Prototype 2

As mentioned earlier, our tool has to cover various design processes, differing in scope, effort, access to end users, if it is to be a redesign or realignment etc. Therefore, iteration 2 ended up in a prototype (Figure 17) for a modular design process tool. The tool is based on two types of cards:

Concept cards, which creates a leading path when putting them together. This is a development of the questions and concepts we used in iteration 1, along with the addition of concepts we learned during this iteration.

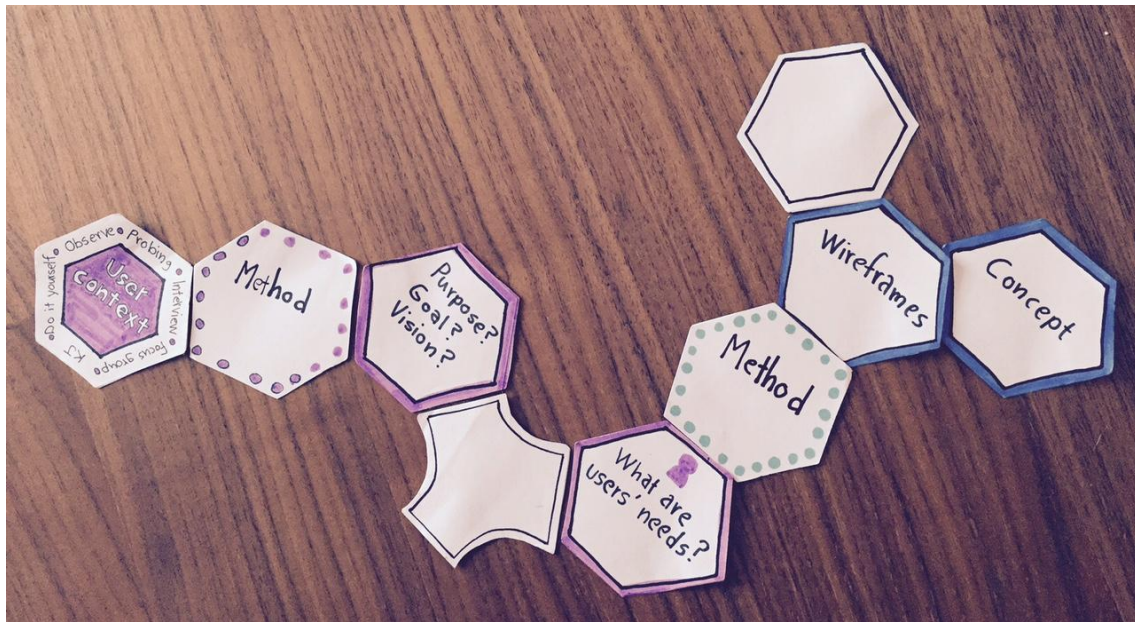*Method cards,* which easily can be connected to the concepts.

Figure 18. Prototype 2.

We started out with hexagonal shapes, by inspiration from Settlers of Catan, but realised that we needed different types of cards to accommodate the needs of the tool. We did not want the tool to be simply a collection of methods, and as it is mostly the concepts that we saw as important for b2b, we built our tool around them. When just having concepts though, the tool would not be able to communicate to the team and client what an interaction designer actually did. Therefore, a combination of methods and concepts was chosen. The cards specific for b2b were decided to be of an expansion type, so that we could now focus on the shape and practical functionality of the tool.

The cards were colour coded in purple (Learn), blue (Do) and green (Test), in order to provide a context and some assistance in where in a process to use them. This was supposed to make it easier for a user to screen through them and find the ones that were valid for certain tasks.

At this point we wanted representations for the members of the team, as in a 3D figure or a card to put on top of the other cards. We decided to wait with this feature until we knew more about how the tool could work. Other ideas that we put on hold were using blank cards, in order to further increase modularity by allowing users to write their own cards, and start and finish cards to each iteration so that it would be easier to follow.

6.3.5 Testing iteration 2
We needed to test the shapes of the cards in order to see that they would fit our purpose. We also needed to test how we could manage sorting all the cards, making the concepts and methods easy to find, as the number was expected to be large. First we printed large papers with hexagonal pattern, where we could sketch our cards simply by pen. As our ideas progressed, we cut out rough cards in paper in order to be able to move them around.

Shapes

We decided that as we already used colour to code the context of the cards, shapes could be a good way of separating the concept cards from the methods cards. As with colour, shape is processed early in the visual cognitive system (Ware 2012). It is thus easy to spot different shapes. As we chose the hexagonal shape because of its modular capacities, it could be expanded or contracted in number of cards without affecting the visual appeal and consistency, we wanted a shape that could be accommodated into hexagonal spaces. The tripod and the star were easy to do this with, and we decided against the star since it had so many other connotations: winning, fame etc.

We then had to decide which type of card should have which shape, and this was done by testing our tool ourselves. The results were that the concept cards were assigned the tripod shape, as the path through the project would then be easier to spot and follow (Figure 19). It was simple to see which cards the tripod connected with, as it only had three edges to connect instead of six. We came to the conclusion that if one edge was used for entering, one could be used for exiting and the third for structuring methods.
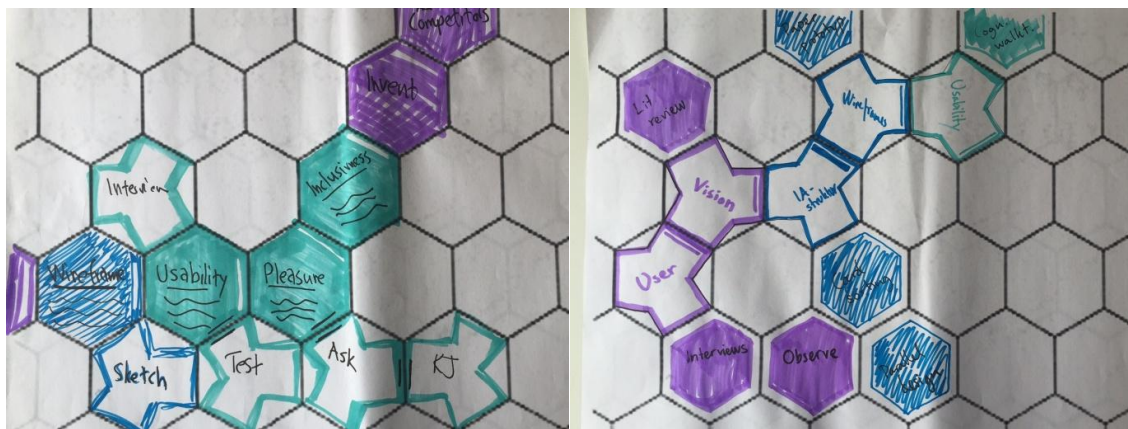
Figure 19. (t.l) test version 1. (t.r) test version 2.

As we tried out our tool, we found certain limitations: first and foremost, using the enter/exit dynamic we would embrace a rather linear planning. This seemed to go against the iterative way that many projects were supporting. Upon thinking, we decided that this might not be true: the linearity would refer to time alone, and iterations could be supported by going back and forth through the different phases coded by colour: Learn, Do and Test.

Sorting

As the number of concepts and methods could be large, we needed more ways to sort them. After screening other design tools for sorting options, such as the IDEO method cards (2015), and relating these to the interviews with designers we had performed, we realised that what would be most interesting was how much time or resources a method took, how many users the method would require, and how difficult it would be to conduct.

We decided to use icons for these measurements, in order to save space on the cards. Different icons for time/resources, number of users, and if the method was difficult or not, were created, and we put together a web survey (Appendix IV) with these icons in

order to see which would best fit our purposes. We also had other icons included in case we would want to add them to the design tool later on. The web survey was hosted by Google, and the link and plea for participation posted on Facebook. Since our target group for the design tool is interaction designers, we inquired interaction design students to answer the survey, and to forward the link to other interaction designers they might know. The answering itself was kept anonymous. The respondents are all, to the best of our knowledge, interaction designers and interaction design students. In total, we got 23 respondents. Here follows a summation of the results.
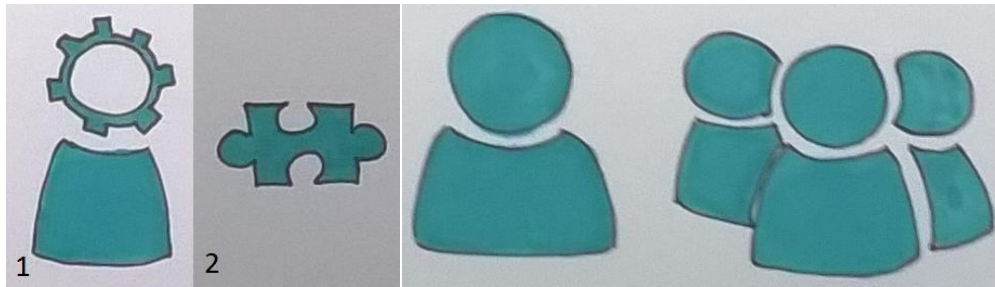
Figure 20. (t.l) Illustrating 'tricky'. (t.r) Illustrating single person vs. a group.

For illustrating the difficulty, a choice of two icons was presented (Figure 20). When asked about which icon that was most suitable to illustrate 'tricky' 20 participants voted for the 'puzzle piece' and 3 people for the 'user with a gear as head'.

To investigate whether an icon illustrating a single person vs. a group of people is a good way to say that a method requires a one or a number of people, we asked the users an open-ended question about what they associated the icon combination (see figure 21) with. To this question 20 people replied something along the lines of 'users, single or a group', 'one, team' or 'number of people', which we counted as in support of our icons.
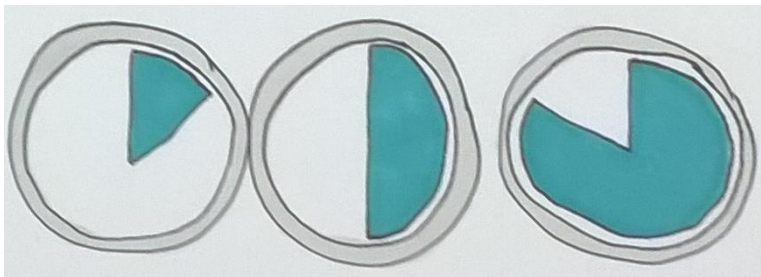
Figure 21. Illustrating 'time'.

When testing if the user associates tree pie time chart (Figure 21) with different amount of time span, we again asked them open-endedly what they associated the icon combination with. This time, all 23 participants said that they associated the icons with either 'time', 'amount of time', 'time span' or 'progress'. Again, we had support in choosing this type of icon.
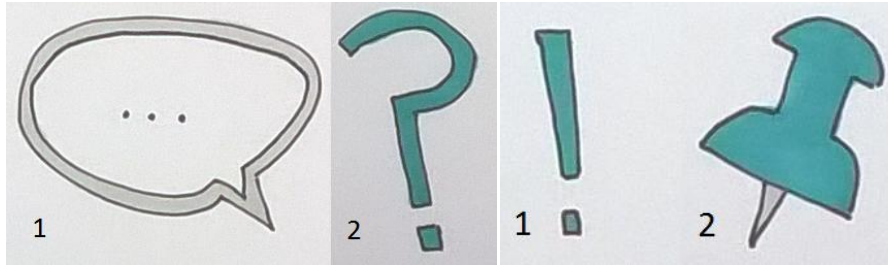
Figure 22. (t.l) illustrating 'explain'. (t.r) illustrating 'important'.

In a similar way, icons could be used on the concept cards to give the user a hint of what type of information could be found there, whether it could be categorized as either 'explain' or 'important' (Figure 22). Here, 15 of 23 thought that a speech bubble was most suitable to illustrate 'explain'; 21 participants thought that an exclamation mark is most suitable to illustrate 'important'; to illustrate 'communicate' (Figure 23) an icon having two people communicating through speech bubbles was the winner.
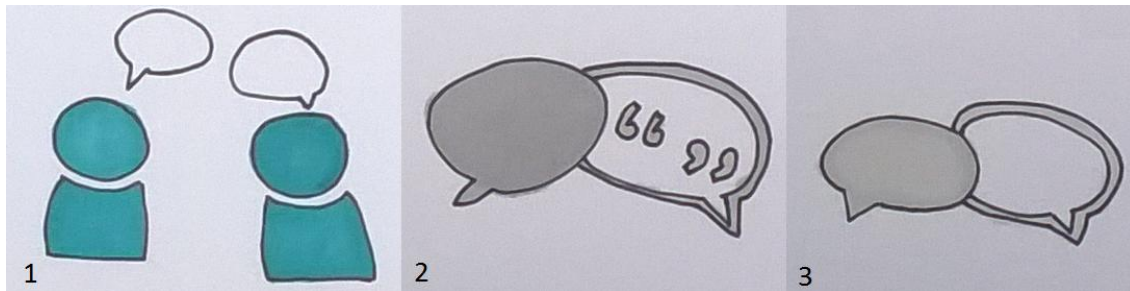
*Figure 23. Illustrating 'communicate'.*

Accessibility

A final test was performed during this iteration as to see which colour should be used on the cards. This test was done by checking the text/background contrast ratio using WebAIM's online tool (found on http://webaim.org/resources/contrastchecker/). We strived for as high contrast between the colours and white text/background as possible without losing the individual look of the colours we used. After testing the colour, we realised they were all too bright. We tuned them somewhat, and ended up with colours scoring 9.12:1 for the purple 6.63:1 for the blue colour, and 4.51:1 for the green colour. WCAG 2.0 requires 3.0:1 for large text, and 4:5:1 for normal text, which means that all our colours pass the requirement. This test of course is meant for web accessibility, while our tool is to be a physical artifact. We do believe that it can be used as an indication, but as the physical version will be dependant on printer, ink and paper quality, no test on that version will be made.

6.4 Iteration 3 - Final version

In our final iteration, we devoted most of our time on finishing the prototype and testing it with groups of interaction designers (see section 6.4.4). But before that, we still wanted to know more about learning in projects, as so far we did not know how to accommodate that need.

6.4.1 Interview with knowledge manager

In order to find out how learning can be accomplished in projects, we contacted a specialist in business intelligence and knowledge management for a short interview. Our goal was to find out exactly how she worked with retaining knowledge in an organization and how people working in projects could incorporate this. As a background we used our literature search on the subject, and based our questions on this (Appendix III). Specifically, we discussed storytelling and how to build a knowledge bridge between projects, transferring the lessons learned in one project to explicit knowledge in the next one.

She confirmed that storytelling was a well used method in knowledge management today, and thought that a visual aid for this could be supportive in the process of retelling a project. Most importantly, she pointed to the critical impact that meetings between project team and client could have, and recommended not only a start-up meeting, but also a rap-up meeting to sum up the achievements of a project from the client's perspective. Apart from this, she meant that some of the most productive meetings from a knowledge perspective were the one held 3-6 months after the completion of a project. In this meeting, both team and client could view the project in perspective of turn-out, and could thus evaluate the efforts more reasonably. As she often had a difficult time getting the project team into these types of meetings, she stressed that they should not be seen as a final meeting, but rather as a meeting leading into the next project.

We found this meeting structure very interesting, and decided to incorporate it into our tool as a way of facilitating knowledge gathering.

6.4.2 Specifying concepts and methods

The concept cards were now specified, as results from literature and interviews were combined. As for the method cards, we had decided to not put our main effort into this as many before us had created method libraries for interaction designers. Instead, we surveyed existing libraries and tools to get a collection of methods that could enhance the tool and be used explore each concept. Our selection here was based on personal experience, methods mentioned by interaction designers interviewed, and finally the need to make sure that every concept card could be explored by appropriate methods.

Our sources were IDEO Method Cards, a card deck developed by the design firm IDEO in 2002 (IDEO 2015), along with several internet libraries: "Generic Work Process" (2015); "Usability Net" (2015); and "Usability Body of Knowledge" (2015). This was accompanied by other resources deemed interesting.

Change of icons

At this point, we made a high fidelity version of our tool, working in Illustrator and Sketch. All the concepts and methods we had decided upon were made as individual cards, and the graphical design became important. We chose to shift background/text colours on concepts and methods in order to make them more different. We added explanatory texts to both types of cards, and here the space on the cards was a heavy influencer as to how much information we could give. This forced us to think carefully of phrasings of the sentences, and to prioritize which information was most important.

When trying to fit in our icons, we were at a loss. Taking a step back, we tried to simplify. We asked ourselves: "What reasons would one have to sort some methods out?" Besides for personal liking, the most important reasons we found was shortage of time or resources, and that one had no access to end users. Both of these had heavily influenced processes of our interviewees. We therefore chose to change the iconography to two simple icons: a fast forward arrow (for quick method), and a crossed-over user (for no end users needed), as can be seen at the lower part of the card (Figure 24).

Figure 24. Method card with icons.

6.4.3 Naming the tool

We had an ongoing discussion about what to name our tool for a long time. We wanted a short name that could stand on its own, yet bear some meaning related to the game. We finally decided upon Trip, as the tools will visually describe the journey through a project. Our inspiration for the name however, came mainly from the word tripod, the shape that we use for our concept cards.

6.4.4 Test through co-discovery

Our final test regarded the usability of our tool. A delimitation of this thesis has been that of time, and for the short period of the project the testing of the tool during a real design project was out of the question. We chose to test our tool formatively, which allowed us to focus on feedback that could help us see benefits and problems with our tool and thus form a basis for future work. A summative evaluation would require a more finished prototype (Cooper 2007). Our goal with this master's project was not to provide a finished product, but rather to explore the problem situation, as Blessing & Chakrabarti (2009) describes the research type Development of support.

Outline

We enlisted 12 interaction designers. We attempted to attract professional interaction designers, from Maverick, but they were too busy by this time. Instead, we used interaction design students. Most (9 out of 12) were about to have their degree, and 3 out of 12 were 4th year students. As students, they had no real-life experience from designing b2b e-commerce. This can have influenced the results: for one thing, the b2b e-commerce concepts used in Trip might have been unfamiliar to them. For another, they might not be used to planning projects.

The participants were divided in pairs, and had them cooperatively use either our design tool or IDEO method cards to set up a project plan for designing a b2b e-commerce service. The tool was randomly selected, although as we wanted a formative study rather than a summative, we opted for 4 cases with our own tool, and 2 cases with IDEO as reference. The goal with comparing the results from our tool and those from IDEO Method Cards, was to see whether our tool could accomplish anything else than being a deck of method cards. Specifically, as we built our tool for planning, communicating and learning, we wanted to focus on these aspects. Learning would be difficult to test

49

other than on a subjective level, so this was left out of testing for the scope of the master project.

In total, six test sessions was conducted, each session was conducted in pairs and lasted for about 1,5 hours. Our goal was to investigate how each tool was used, how it affected the communication between the two team members as well as how they presented their project to the presumed client, and not least the outcome as perceived by the participants themselves. To make it easier for the participants to approach the tool they were given a specific case called 'Plan your project', where they were informed that a client had approached them wanting them to design a site for a company selling hobby materials to schools.

For the test (Figure 25), a more finished version of our tool had been completed, printed on regular paper, and cut out in respective shapes.

Figure 25. Co-discovery of Trip done in pairs of two.

Results
Confirming our impression that every designer has a process, the six couples all had different ways of attacking the problem. But here were some general observations to be made.

The IDEO Method Cards include a division referring to process: all cards belong to one of four categories: Look, Learn, Ask and Try. As one participant noted, they are all focused on the earlier stages of a project and it is somewhat difficult to see the use of them throughout. How were they used to support the design processes? One group experienced them more as a hindrance at the beginning, and decided to put them aside for future use, once they had drawn the general outline of their project. The other group using the IDEO cards picked the methods they wanted to use first, and then arranged them by when they wanted to use them. They both individually assessed the time that each method would take, and agreed on a rough estimate. None of the groups discussed much about the cards, other than of the type: "Should we do this?"

In evaluating the IDEO cards, both groups agreed that the cards could provide a basis for presenting the methodology of an interaction designer to the client, although some methods were deemed too "donald duck" (sic) to be presentable to un uninitiated, by one participant. None of the groups stated that the cards supported their process, rather they seemed to feel that they were accompanying the process.

The four groups that tested our tool each had their own way of building design processes with it. One group methodically spread out all concept cards from one phase

(Learn, Do or Test) on the table, read all texts, and chose a few. They added new concepts and methods successively. Another group started with the methods, added concepts and built independant islands of cards that they then put together. While we were enthusiastic about the different ways our tool could be used, we were also surprised over how many usages we had not thought about. The cards were related to each other not only by attaching, but also by piling and hiding them beneath and on top of each other. It was obvious that the placement of the cards was more complicated than we had thought.

One reason for this might be that the instructions we gave were vague. This was done purposefully so as to encourage creative use, but as we realized, there is a fine line here. In hindsight, we should have provided better instructions. As of now, all groups experienced some frustration over how to build with the tool.

The need for a clear start and finish came up in several groups. This is something that we had planned for in an earlier iteration, but had chosen not to realise due to time restraints and, primarily, other focus. One group were especially creative when it came to expanding our tool, and created start and finish tiles along with context areas to put around groups of cards, and own cards. We had provided empty cards so as to facilitate any ideas for development, and some of these stacks were emptied.

Another request from several groups was that we should provide arrows, as the groups wanted to be able to build iterative loops. We had only provided one card for each concept and method, which made reusing the same method impossible without looping. Yet looping could, as the cards were hexagonal, best be made by connecting six cards in a circle — creating an unnecessary restriction. Two groups mentioned arrows as an addition that they would appreciate.

In the first tests, we noticed that the participants were not using the concept cards that were specifically for b2b. They expressed an unfamiliarity with the concepts, and sometimes needed further explanation to what they meant. Besides from this difficulty to understand, we wondered whether these cards would be used more often if it was clear that they were meant to provide support for b2b. In the last test, we marked them out and provided the participants with the information that these cards are specific for b2b. The use of these cards rose significantly. One test is of course too little to draw any conclusion, however we do believe that this indicates that using b2b as an expansion might be a good idea for highlighting these cards.

As for communication, several participant experienced that the tool helped them to find the right words for the things they needed to do. They all used the tool to communicate the plan to the client, and it seemed to function as a support for explaining the work ahead.

Regarding the communication within the groups, it is perhaps not entirely surprising did the groups that knew each other from before seemed to have an easier time communicating during the test. Would an ice-breaker activity for the groups who did not know each other before the test have helped them to communicate more easily? We believe this is likely, but how much that would have affected their performance, we can not tell.

Finally, we got a very good response to the visual expression of our tool. Several of the participants said that they felt it was nice and inviting, and that it felt fun to work with. For this project, however interesting it would have been, the time scope was not sufficient to conduct controlled experiments. Controlled experiments would perhaps have enabled us to see clearer if the b2b concepts covered were used to a significant extent , as well as to draw some conclusions on the support for learning that we hoped to provide.

6.5 The result: Trip - a design tool

Trip is a design tool, explicitly developed for building design processes along with your team. It has a b2b e-commerce focus, but can also be used generally. It helps the team to see what aspects of the design space that need to be considered, what methods could be used and also attempts to improve the understanding of an interaction designer's daily work. For instance, the tool tries to be inclusive in terms of explaining the design specific terms so that everyone in the team or the client, understands what is being discussed regardless of background. Further, our tool can be used as a visual support for storytelling and simulation of previous projects, or after the end of a current project in order to encourage learning and make implicit experiences explicit. Thus, experiences can be gained by the entire team instead of just implicitly by individuals.

Figure 26. Trip, our design tool.

Trip, is the name of the design tool developed. Because, in our opinion 'take a trip' in context of travelling is a good metaphor for illustrating our design tool. Even though you keep travelling to the same place over and over again there will always be new things to experience or rediscover — our design tool tries to inspire to such use. A fun

twist is also that the syllable "trip" can also be found in the geometrical shape being used in the concept cards: tripod. In our logo (Figure 27), the 'p' in Trip is shaped like an eye. The reason for this is that we got inspired by the phrase 'get your eye in', which refers to becoming really good at something, or as in our case, the eye tries to spot the concepts that are important for the specific project, and lets the designer as well as the client and team members 'get their eye in' the design process.

Figure 27. Logo of Trip.

6.5.1 B2b expansion

Concept and methods related to the b2b field are provided as an expansion card pack of Trip. On the front those cards looks just the same as all the other cards. The difference is at the back side, where you will find a text saying 'b2b' added to the logo. Hopefully, this will differentiate the b2b specific cards from the rest, and thus will make it easier to pay attention to those cards. Also, this build on the idea of modularity, that could possibly make Trip easy to expand into other design areas.

Participants testing our tool have thought of Trip is 'a game without a winner'. Of course, a real project can succeed or fail, but as the tool is to be used in the planning phase we see no point of designate a victory or failure conditions. Inspiration for the tool has however come from several games, see section 4.3.2 Playtesting for more on this.

6.5.2 Cards

Trip consists of two kinds of cards: concept cards and method cards. Each card is categorized into one of three different phases in design work: Learn, Do and Test. But of course, the user should feel free to use each card as they see fit. To make it easily to distinguish the design phases, the cards are colour coded into purple (learn), blue (do) and green (test).

6.5.3 Concept cards

Trip contains of 36 tripod shaped concept cards, divided into 14 Learn concepts, 17 Do concepts, and 5 Test concepts. Out of these 10 concepts are specific for b2b. The concept card (Figure 28) contains an assertion (1) followed by a informational text (2) either explaining the concept further, asking a related question, or giving an advice or a hint. At the top right edge, there is a line (3) that provides a visual cue for the path illustrating the design process. Next card in turn should be attached to this path line to provide the direction of the project. The background is
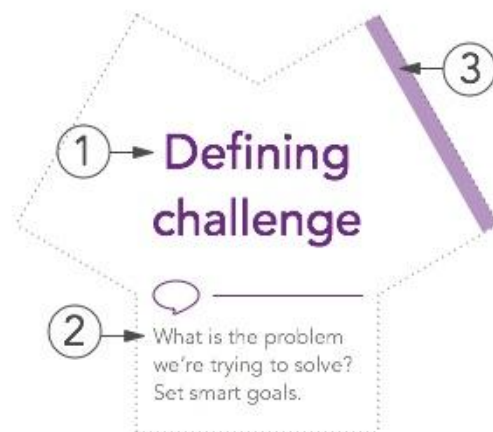

Figure 28. Concept card.

white, with purple/blue/green text illustrating which part of the design process the card belongs to. These are the concept cards (also found in Appendix V) in Trip:

Learn
a.1. Competitors - *How do others tackle the problem? What does market research tell us?*
a.2. Context of use - *Where will it be used? In what ways?*
a.3. Defining challenge - *What is the problem we're trying to solve?*
a.4. Follow-up meeting - *Meet the client to review the project. Ask for feedback. What happens next?*
a.5. Lessons learned - *What have we done before, that we can use now?*
a.6. Present solution - *What do they have now? Redesign or realign?*
a.7. Rap-up meeting - *Meet the client and discuss achievements and shortcomings.*
a.8. Start-up meeting - *Meet the client to agree on goals and limits.*
a.9. User - *Who are the intended users? What other users might there be? Prioritize.*
a.10. User's goal - *What needs and desires does the user have?*
a.11. Vision - *Where does the client want to be in three years?*
Learn: b2b
a.12. Key accounts - *Your client is your boss, some more than others.*
d.13. Multi-user - *How many from your client's side are involved in one buy?*
d.14 Network effects - *Explore how network effects could enhance your position.*

Do
b.1. Ideate *- Time to create possible solutions, based on facts of the problem.*
b.2. Experience design - *Think about the total experience you want to achieve.*
b.3. Information architecture - *Structure the information to in meaningful ways.*
b.4. Measurements - *How will you know if it's good? Be specific and realistic.*
b.5. Mockups - *Create specific visualizations that closely resembles the finished product.*
b.6. Navigation - *How should the user navigate through the content?*
b.7. Prototype - *Refine for each iteration.*
b.8. Requirements - *Specify the requirements that should be met.*
b.9. Style guide - *Standardize how the information should be presented.*
b.10. Wireframes - *Create a visual guide, showing clearly what goes where and how it works.*

Do: b2b
b.11. Customization - *Special orders are not so special.*
b.12. Expert users - *Efficiency & speed. Design for learning.*
b.13. Lifelong relationship - *Design for old friends as well as new acquaintances.*
b.14. Negotiations - *Design for variations in prices and deliveries*
b.15. Omnichannel - *Aim for the same experience through all channels.*
b.16. Taxonomies - *The complexity of products might be huge. Work on how to visualize this.*
b.17. Trust - *Design for safety, recognizability and professionalism*
Test
c.1. Accessibility - *Can everyone use this?*
c.2. Experience - *People might spend a lot of time on this. Respect their experience.*

c.3. Lessons learned - Your most unhappy customers are your greatest source of learning.
c.4. Pleasure - People might spend a lot of time with this. Respect their feelings.
c.5. Usability - It should be easy to do right, and hard to do wrong.

6.5.4 Method cards

The method card (Figure 29) is recognized by its hexagonal shape and higher saturation. In total there are 62 method cards, divided into 26 Learn methods, 21 Do methods, and 15 Test methods. Each method card contains the name of a design method (1) followed by a short explanation (2). To indicate if no user(s) are needed an icon with a crossed user is used (3). To indicate if a method is relatively fast the fast forward icon is used (4). Compared to the

concept cards, the colour scheme has been inverted, which means that the background is

Figure 29. Method card.

purple/green/blue and the text white. To use them, just connect the method with a concept, at any edge. The method cards formulated in text (also found in Appendix V) are presented below, with the added abbreviations NU for No User, and F for Fast:

Learn
d.1. 5 why's - Keep asking "why" until you get to the underlying reason.
d.2. Card sorting - Have users arrange cards with concepts in groups and structures.
d.3. Competitive product survey - Evaluate competitor's' product. (NU, F)
d.4. Cultural probes - Have user capture their context with tools such as cameras, paper
d.5. Diary study - Ask participants to record their experiences on a daily basis.
d.6. Do it yourself - Try existing solutions yourself. (NU, F)
d.7. Draw the experience - Have users show an experience through drawings.
d.8. Effect mapping - Identify business goal, stakeholders and their needs, and the features that can fulfill goals and needs.
d.9. Expert interview - Find experts in the field and interview them. (NU)
d.10. Focus group - Set up a group discussion with stakeholders, with a facilitator.
d.11. Hit the books - What does the writers and thinkers say about it? (NU)
d.12. Impact mapping - Identify assumptions and test them, in order to reach business objectives.
d.13. Interview - Ask what you don't know. Don't interrupt. Ask one question at a time.
d.14. Kano analysis - Differentiate between basic, performance and excitement needs. (NU)
d.15. KJ - Write what you know on post-its, and arrange in meaningful ways. (NU)
d.16. Narration - Have users describe what they do as they do it.
d.17. Observe - Stay unobtrusive but curious. Note what happens, but also what doesn't happen.
d.18. Rapid ethnography - Spend as much time as possible with users. Observe their behavior in their natural habitat.
d.19. Still-photo survey - Do a planned photo excursion documenting specific activities.

d.20. User surveys *- Well suited for short, true/false questions. (F)*

Learn: b2b
d.21. Be your customer *- Have your client describe the typical customer's experience. (NU)*
d.22. Extreme user interview *- What aspect do you want to explore? Find users who are extreme in this aspect.*
d.23. Historical analysis *- Compare features through different stages of development, to see where they're heading. (NU)*
d.24. Long range forecast *- Explore the future. How will technological and social trends influence us? (NU)*
d.25. Predict next years headlines *- Have clients identify where their company will be in the future. (NU)*
d.26. Social network mapping *- Map the interactions within and between user groups.*

Do
e.1. 6-3-5 Brainwriting *- 6 people write 3 ideas in 5 min. Pass around and repeat 6 times. (NU, F)*
e.2. 6 thinking hats *- Give team members different focus: Process, Facts, Feelings, Creativity, Benefits & Cautions. (NU)*
e.3. Bags of stuff *- Give a group of users a bag full of craft material to prototype with.*
e.4. Bodystorm *- Develop ideas physically, enacting users interacting with your design. (NU)*
e.5. Brainstorm *- Let a group come up with as many ideas as possible in 1h. Don't criticize, build on each other's ideas. (NU)*
e.6. Experience prototyping *- Prototype the experience of your design. (NU)*
e.7. Extreme characters *- Find an extreme character to design for, such as Santa or Bill Gates. (NU)*
e.8. Flow analysis *- Represent the flow of information, in order to find bottlenecks. (NU)*
e.9. Focus prototyping *- Prototype a specific aspect of the design. (NU)*
e.10. Moodboard *- Communicate the design concept through a collage of pictures and texts. (NU)*
e.11. Paper prototyping *- Fail early and cheap. (NU, F)*
e.12. Parallel design *- Compare several possible designs with each other. (NU)*
e.13. Personas *- Create characters representing the targeted demographics. Base on real data.*
e.14. Roleplaying *- Assume different stakeholder's identities to make sure their voices are heard. (NU)*
e.15. Scenarios *- Describe scenarios in which your design is being used. (NU)*
e.16. Sitemap *- Structure the content of the site in a map. (NU)*
e.17. Sketching *- Explore and/or evaluate. (NU, F)*
e.18. Storyboard *- Do a comics depicting a user's session with your design. (NU)*
e.19. Use cases *- Describe short cases in which your design is being used. (NU, F)*
e.20. User journey *- Demonstrate users' interaction with your design, either future or present.*
e.21. Wizard of Oz *- Let a team member simulate the response of the system towards a user.*

Test

f.1. A/B test - Release two versions at the same time, and observe the different outcomes.

f.2. Accessibility test - Does it live up to accessibility guidelines? (NU)

f.3. Cognitive walkthrough - Have a tester think aloud while using the design.

f.4. Competitive usability test - How is the usability compared to that of competitors'?

f.5. Empathy tools - Use tools to assume different user's disabilities. (NU)

f.6. Error analysis - What could go wrong? Find the causes. (NU)

f.7. Guerilla testing - If you don't find users, use what you can find. (NU)

f.8. Heuristic analysis - How does the design live up to standards? (NU)

f.9. Informal test - Ask your friends and family for help. (NU, F)

f.10. Metrics analysis - Analyse how the design is being used, using aggregated data.

f.11. Scenario testing - Have users react to different scenarios.

f.12. Simplify - What can you take away? (NU, F)

f.13. Subjective evaluation - Try it out yourself. (NU, F)

f.14. Usability test - Is the design easy to use and consistent? How hard is it to do wrong?

f.15. Usage patterns - How do users interact with it? Follow mouse movements etc.

6.5.5 Blank cards

As our research into b2b e-commerce as well as interaction design processes is exploratory and not exhaustive, we provide blank cards of both concept and method type. This allows users to fill in their own cards, as they find a concept or method that could be used, but is missing from the original set-up. This feature also might prolong the life of the tool, as it can grow according to trends and new research in the field, as well as to the personal growth of the designer.

6.5.6 Using Trip

Trip is a tool to be used at the start of a project for planning, during a project for referral or change, and after a project as a guide for storytelling or simulations. It is designed to work as a communication tool, and is at an advantage when used in discussion and cooperation. The divisions of card into concepts and methods, as well as into the phases Learn, Do and Test, should be seen as guidelines and not rules: each card is to be used as the designer sees fit, without restrictions.

Use Trip to plan your design project by:

1. Connect concept cards with each other.
2. Aggregate methods to your concepts.
3. Discuss along with your team, add, remove and improve.
4. Remember: the blank cards are there to be used.

6.6 Scenarios

To show how it could be used we will illustrate this with possible scenarios. We will show you three project plans, but every designer should feel free to use the tool as they think is best. The scenarios should be seen as examples and not ideals. Our scenarios emanate from the fictitious case of redesigning the navigation of a b2b e-commerce site.

Scenario 1

In this scenario (Figure 30), 4 concept cards ('Defining challenge', 'Experience design', 'Accessibility' and 'Lessons learned') and 3 methods cards ('Interview', 'Experience prototyping' and 'Cognitive walkthrough') are being used. All together they are illustrating a small project with one iteration. The interaction designer will being by doing interviews in order to define the challenge. Then comes an interval with experience design, striving for a design that takes all the experiences of the user into consideration. This concept will be explored by experience prototyping, focusing on what the user sees, hears and feels while using the site. Testing accessibility, extreme users (in this case perhaps, visually impaired) will be enlisted. After this comes an evaluation with lessons learned, where the most unhappy responses to the site will be noted and evaluated.

Figure 30. Scenario 1.

Scenario 2

In this scenario (Figure 31) there is still only one iteration of design work, but it has been somewhat changed in order to see how the tool can be used to cater the need of different design processes. Here, the designer starts with investigating the context of use, by having users draw the experience of using the site. After this, interviews form the basis when defining the challenge. Again, experience prototyping is used to explore experience design. Then trust is given specific attention by creating a moodboard to communicate the design concept. Accessibility is again tested by a cognitive walkthrough with extreme users. Lessons learned is finally used as a ground for simplifying the navigation.

Figure 31. Scenario 2.

Scenario 3

This solution (Figure 32) holds the same cards as scenario 2, but rearranges them into two iterations. This solution is provided to show that although the cards can work in a linear set-up, they are also usable in a more iterative fashion. Here the design process starts with interviewing users to explore the context of use, continuing with creating a moodboard for trust and then simplifying the concept by taking into consideration what lessons can be learned from unhappy users. Now, users will be enlisted to draw the experience of the site, and from this the designer will define the challenge. After designing the experience through experience prototyping, a final cognitive walkthrough with extreme users will test the accessibility of the site.

Figure 32. Scenario 3.

7. Final result

As a result to our master's project, we propose three needs in which interaction designers can be supported. We also propose an example of how these needs can be addressed, in the form of a prototype.

7.1 What to support

How can interaction designers best be supported when planning and conducting b2b e-commerce design projects? To understand the problem, we reviewed literature in this area and conducted interviews. Four interviews were made with b2b purchasers, to understand the pain points and success factors involved in this type of design. We also interviewed five interaction designers used to project-based work. These interviews supported the findings from our literature review. All designers had experience from e-commerce, and most from b2b. Finally, we interviewed a specialist in knowledge management, to understand how knowledge could be transferred from one project to another.

Our research resulted in the following needs: to know what concepts to consider when designing for b2b e-commerce, to communicate what interaction design can contribute to the project to team members and clients, and to better structure and ensure learning in projects. Trip therefore intends to help interaction designers in three ways: (1) to know what concepts to consider when designing for b2b e-commerce, (2) to communicate what interaction design can contribute to the project to team members and clients, and (3) to better structure and ensure learning in projects.

7.1.1 Providing concepts

There are some specificities of b2b e-commerce, that makes it distinctive from other interaction design areas: usage of the system may not be voluntary, but determined by the purchaser's company (Cullen & Taylor 2009); the purchasers have a need for shared workspaces and information flows, due to the decision levels of the purchasing company (Chen et al. 2013); it aims to build longterm relationships between purchaser and vendor (Cullen & Taylor 2009); one focus should be designing for trust (longterm and shortterm) (Cullen & Taylor 2009; (Rauyruen & Miller 2007); some purchasers are of incomparable importance to the vendor, often referred to as key accounts (Rauyruen & Miller 2007); purchasers often require some sort of customization of products (Rauyruen & Miller 2007), and as the purchasers we interviewed mentioned, also of prices and deliveries . In addition to this, from our interviews with interaction designers and purchasers we concluded that b2b e-commerce should support expert users, meaning among other things that there is a high demand on efficiency (Benyon 2010).

Although most interaction designers had an understanding of some of the specificities of b2b e-commerce, none mentioned all these factors. This may of course not mean that they did not know of them, but we concluded that it is important to provide the interaction designers with the central concepts relating to the design area of b2b e-commerce. Providing the concepts readily would facilitate taking use of them in the design process.

Trip provides concepts specifically for b2b e-commerce, described below, but also more general concepts to be used in the design process. When the concepts of specific importance to b2b2 e-commerce were highlighted in the evaluation trial, participants took more use of these cards. This indicates that by providing b2b e-commerce concepts into the design process, interaction designers can more readily utilise them.

7.1.2 Communication

One thing all interaction designers interviewed agreed upon: clients do not understand the need for interaction design. One consultant firm sometimes provided interaction design without billing the client for the hours — they knew that the reputation they would gain for designing good services would be worth it, although the clients did not ask for it. Sometimes, interaction designers also had difficulty explaining to the team and project managers what their role would be, and what they could bring to the table.

There are many visualizations of design processes to be found, from simple to more complex (eg. see Dubberly 2005). Generally, many have tried to describe the process by discussing the input data and mechanisms, the process of analyzing this data, and synthesising the analysis into possible solutions (eg. Archer's Basic design procedure (Dubberly 2005); Pugh's Design Funnel (Buxton 2007)). However, as Treder and his colleagues (2013) noticed when investigating the matter, few interaction designers follow these processes strictly. Instead, they take shortcuts, staying flexible to the specific project and circumstances. One reason for this is shortage of resources, such as time and money (Treder 2013). As the interaction designers we interviewed confirmed, it might also be difficult to find access to actual users, which further restrains the traditional design methods.

One way of supporting interaction designers would thus be to facilitate communication between the interaction designer and the team and client, in order to bring understanding to what interaction design is. However, any attempt to communicate design processes should stay flexible to accommodate the specific project's limitations, specifically when it comes to resources and access to users.

The concept cards in Trip are to be used to build the path of a design project. As such, each project planned with Trip will entail a design process specific for that project. The exploration of each concept can then be specified by adding method cards. The users of Trip can themselves choose which parts to include and which not, according to the needs and limitations of the project and its participants. Every method card is equipped with icons to tell if it requires less resources, or if it can be accomplished without access to users, thus providing the designer an easy and quick way to find the methods best suited to their project.

Attention has been payed to the short explanations that are stated on each card, so that the language used is readily understood by those without training in the interaction design field. Trip will thus visualize the design process intended for the specific project, and work as a visual guide in communicating with team and client. When evaluating Trip, participants claimed that having the methods and terms on cards, lended an authority to the discussion. At the trial session, they all found Trip to be of help when explaining the intended design process to the presumed client, as well as facilitating the communication between the team members.

7.1.3 Learning

The interaction designers we interviewed brought our attention to the importance of being able to learn from projects, and carrying that knowledge through into the next project. It became clear that they had no routines for this, and the design processes they described to us had no structure for discussing the projects from this perspective. Yet, clearly mapped processes enable organisations to gain knowledge between projects, which is essential for improving performances in an organisation (Maylor 2010). Without paying attention to the knowledge gained in a project, it will dissipate (Williams 2008). Malakouti et al. (2014) agree and state that the difficulty of turning implicit knowledge into explicit is one of the biggest obstacles to organizational learning today, together with deficiency in communication.

One way to gain a deeper understanding of problems and solutions is to interpret them in the light of their consequences, to oneself or in a group (Crossan et al. 1999). By explaining something to others, we use language as a learning tool, turning implicit knowledge into explicit. Storytelling is one method to share tacit knowledge between colleagues (Sole & Wilson 2002). By sharing narratives of our experiences, we can also share lessons, connections and knowledge. In this line of reasoning, by visualizing a project we can provide a basis for the project participants to discuss and share learnings.

The specialist in knowledge management that we interviewed, gave us an outline of her preferred work process with learning. She described how meeting with the team and client could subsidise discussions on the consequences of choices made in the project, and thereby lead to deeper understanding and knowledge made explicit. Such a meeting, held after the project is completed, can help retain knowledge in an organisation. This in turn i likely to lead to improved performance in coming projects.

Trip mainly addresses learning by acting as a visual documentation of what aspects were considered during a design process. As such, it can be used after a project's completion in order to instigate storytelling. It also incorporates concept cards with meetings with clients not only during a project, but also directly after completion as well as up to six months after. These are included to encourage taking the opportunity to learn.

7.2 Support composition

This section will describe the Trip cards, and reference the findings on which these cards were based. General for the concept is that the cards are divided into three phases: Learn, Do and Test. These phases are derived from the interviews with interaction designers as well as other design processes reviewed, where we found these phases emerging, although under varying names. The phases are provided in order to split the 98 cards of Trip into smaller sets and make the tool more searchable and quicker to use.

7.2.1 Concept cards

The 36 concept cards, are divided into 14 Learn (purple) concepts, 17 Do (blue) concepts, and 5 Test (green) concepts. Out of these 10 concepts are specific for b2b. The concept card is tripod-shaped (Figure 33) and contains an assertion (1) followed by a informational text (2) either explaining the concept further, asking a related question, or giving an advice or a hint. At the top right edge, there is a line (3) that provides a visual cue for the path illustrating the design process. Next card in turn should be

attached to this path line to provide the direction of the project. The background is white, with purple/blue/green text illustrating which part of the design process the card belongs to. Below are the concept cards in Trip. The titles are in bold text, and the informational texts are in italics. These are accompanied by descriptions and references, and ordered alphabetically by title.
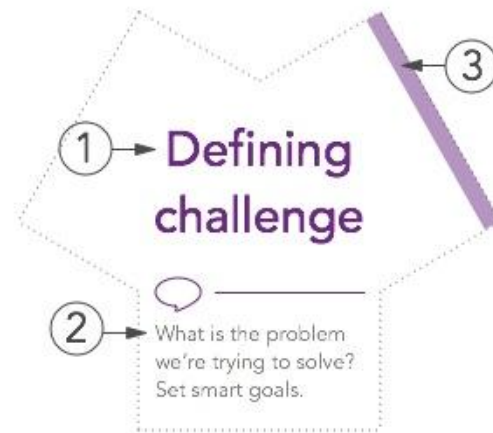

Figure 33. Concept card.

Learn

a.1. Competitors - *How do others tackle the problem? What does market research tell us?*
Looking at competitors and how they propose to solve the problem can be beneficial. One way of handling competition is to be aware of disruptions in the market, thus being able to handle them and use them to one's advantage (Sethi, 2015).

a.2. Context of use - *Where will it be used? In what ways?*
Understanding the context of use is important because different contexts requires different solutions. This is supported by our interviews with interaction designers. For example, if the purchaser in a b2b e-commerce works on the factory floor, the service might require a different solution than if the purchaser works in an office.

a.3. Defining challenge - *What is the problem we're trying to solve?*
According to Rittel & Webber (1973), the definition of a problem holds the solution to that same problem.

a.4. Follow-up meeting - *Meet the client to review the project. Ask for feedback. What happens next?*
The follow-up meeting is to be conducted with the client three to six months after the project is completed, and was recommended by the specialist in knowledge management that we interviewed. The purpose of this meeting is to follow up on the consequences and effects of the service, and to find out if the contributions had the expected effects. It is also an excellent opportunity to get feedback on how the client experienced the collaboration. Not only will it enable the team to gain knowledge about the results, but it can also be the start of a new project, since new opportunities might be uncovered.

a.5. Lessons learned - *What have we done before, that we can use now?*
This is especially good to use when similar projects have been conducted. Retelling the stories of earlier projects further deepens the knowledge of them (Crossan et al., 1999).

a.6. Present solution - *What do they have now? Redesign or realign?*
Listening to the interaction designers we interviewed, we have concluded that for many b2b e-commerce services it is important to attend to the present solutions. Bigger changes might result in the purchaser experiencing lower trust towards the vendor.

a.7. Rap-up meeting *- Meet the client and discuss achievements and shortcomings.*
The rap-up meeting is to be conducted with the client directly after the project is completed, and was recommended by the specialist in knowledge management that we interviewed. The purpose is to gain insights into how the client experienced the collaboration and results. Trip can be used to facilitate discussion.

a.8. Start-up meeting *- Meet the client to agree on goals and limits.*
The start-up meeting is to be conducted with the client at the start of a project, and was recommended by the specialist in knowledge management that we interviewed. This meeting should be used to structure the collaboration and establish the design process. Trip can be used to communicate the process.

a.9. User *- Who are the intended users? What other users might there be? Prioritize.*
An interaction designer must always keep the user in mind (Cooper, 2007). There might be different types of users, and they should be considered according to their importance for the service's success.

a.10. User's goal *- What needs and desires does the user have?*
The user needs to be satisfied with the service in order to define it as a success, meaning it has to help the user reach their goals (Cooper, 2007).

a.11. Vision *- Where does the client want to be in three years?*
Defining the vision of the client is important in order to making sure the solution is in line with this vision. According to the interaction designers we interviewed, sometimes the client's wishes are not the best solution to the problem. As Rittel & Webber (1973) discussed, design problems are wicked problems. Understanding the client's vision might change the problem and thus the solution.

Learn: b2b
a.12. Key accounts *- Your client is your boss, some more than others.*
Some purchasers are of incomparable importance to the vendor, often referred to as key accounts (Rauyruen & Miller, 2007). They stand for a substantial part of the revenues, or perhaps they might do this in the future. This means that their needs might be more important when designing the service, than lesser accounts. Perhaps these key accounts would prefer to access the service from their intranet, as one of the purchasers we interviewed described.

d.13. Multi-user *- How many from your client's side are involved in one buy?*
As described by most of the purchasers we interviewed, one purchase might go through a chain of decision-makers in order to be submitted. This means that the service needs to cater to shared workspaces and information flows (Chen et al., 2013).

d.14. Network effects *- Explore how network effects could enhance your position.*
For e-commerce today, network effects can be what separates a success from a failure (Sethi, 2015). Utilise the added value a network can bring to the service by making sure that connecting via the service brings value to the users. This way, it will be more difficult for competitors to disrupt the business.

Do

b.1. Ideate - *Time to create possible solutions, based on facts of the problem.*
The interaction designers we interviewed all used methods, often some variant of brainstorming, to create several solutions. The purpose is to create options that can be evaluated, so as to decide on which solution to pursue.

b.2. Experience design - *Think about the total experience you want to achieve.*
How the user experiences the service influences how they react to it (Cullen & Taylor, 2009; Egger, 2001). Designing with emotions in mind, and thus the experience a user is having while using a service, can create a more successful service (Desmet et al. 2007; Lindegaard et al., 2011). In truth, a user is likely to have emotional responses to a service whether the designer designed for them or not (van Gorp & Adams, 2012).

b.3. Information architecture - *Structure the information to in meaningful ways.*
The interaction designers we interviewed pointed to the importance of a good information architecture. One even explained that he say this, the logical ordering of information needed, as a big part of the interaction design.

b.4. Measurements - *How will you know if it's good? Be specific and realistic.*
Proper measurements will ensure that the project can be evaluated later on (Maylor, 2010). Setting these measurements early on will work as a test for whether the project can live up to the expectations (Adzic, 2012).

b.5. Mockups - *Create specific visualizations that closely resembles the finished product.*
Creating digital mockups enables the designer to explore issues that might arise, such as interaction inconsistencies (Brinck et al., 2002).

b.6. Navigation - *How should the user navigate through the content?*
Deciding how the navigation should be conducted in a site is of great importance for its usability and the experience it gives (Brinck et al., 2002; Cooper, 2007).

b.7. Prototype - *Refine for each iteration.*
Prototyping is one of the standard tasks for interaction designers (Buxton, 2007). It can be done with paper, or with digital tools, or with another medium that suits the task.

b.8. Requirements - *Specify the requirements that should be met. Prioritize.*
The interaction designers we interviewed all saw requirements gathering as an important part of creating a design. If the list is long, there might be need to prioritize.

b.9. Style guide - *Standardize how the information should be presented.*
A company often has already decided how their brand is to be communicated to the user (Cooper, 2007). Exploring how this should be translated to the look-and-feel of a website can be a substantial work.

b.10. Wireframes - *Create a visual guide, showing clearly what goes where and how it works.*
Creating wireframes can be useful to see how users interact with the elements of a website (Brinck et al., 2002).

Do: b2b

b.11. Customization - *Special orders are not so special.*
Purchasers in b2b e-commerce often require some sort of customization, be it of products, prices or deliveries (Rauyruen & Miller, 2007).

b.12. Expert users - *Efficiency & speed. Design for learning.*
It became apparent during our interviews with both purchasers and interaction designers, that the user in b2b e-commerce is often an expert in the system. Experts require shortcuts and powerful features (Cooper, 2007). Since the users of the system might use it a lot, there is an opening for designing more complex features to accommodate the experts.

b.13. Lifelong relationship - *Design for old friends as well as new acquaintances.*
One of the aims of b2b e-commerce is to build longterm relationships between purchaser and vendor (Cullen & Taylor, 2009). While this is of utmost importance, there might be opportunities to gaining new customers as well.

b.14. Negotiations - *Design for variations in prices and deliveries.*
As the purchasers we interviewed informed us, due to key accounts and the need for customization, it can be relevant to design for customer-specific variations in prices and deliveries.

b.15. Omnichannel - *Aim for the same experience through all channels.*
Many vendors use different channels to sell and communicate to their customers (Sethi, 2015). It is important to provide a similar experience in all channels, in order to communicate the brand efficiently.

b.16. Taxonomies - *The complexity of products might be huge. Work on how to visualize this.*
From interviews with some of the purchasers and interaction designers, we concluded that some b2b e-commerce products come at great complexities. The work needed to render the products searchable (and findable) can be substantial.

b.17. Trust - *Design for safety, recognizability and professionalism.*
In order for a user to experience trust when visiting a website, special consideration should be taken to design for an experience of safety, recognition and professionalism (Egger, 2001).

Test

c.1. Accessibility - *Can everyone use this?*
Many users have some kind of disability, which means that addressing the accessibility of your design could potentially increase the customer base (Brinck et al., 2002). Newell et al. (2009) discuss how designing for people with disabilities can help also those who find themselves under particular circumstances at some period in life, eg. impaired vision on account of age.

c.2. Experience - *People might spend a lot of time on this. Respect their experience.*
The experience of the user might very well decide how successful the service is (Desmet et al., 2007; Lindegaard et al., 2011).

c.3. Lessons learned - Your most unhappy customers are your greatest source of learning.
Interviewing the interaction designers, we noticed how the ones who reflected upon their failures seemed to gain knowledge that they used in later projects.

c.4. Pleasure - People might spend a lot of time with this. Respect their feelings.
Many of the interaction designers we interviewed stressed the importance of the look-and-feel of the design. Not only would this be important for the first impressions of the user, but also for selling it to the client.

c.5. Usability - It should be easy to do right, and hard to do wrong.
Eliminate excise (Cooper, 2007). A user should be able to easily know what to do, and how to do it.

7.2.2 Method cards

The 62 method cards are divided into 26 Learn methods, 21 Do methods, and 15 Test methods. Out of these, 6 methods were added as specifically suited to explore b2b e-commerce. Each method card (Figure 34) contains the name of a design method (1) followed by a short explanation (2). To indicate if a method is relatively fast, the fast forward icon is used (3). To indicate if no user(s) are needed an icon with a crossed user is used (4). Compared to the concept cards, the colour scheme has been inverted, which means that the background is purple/green/blue and the text white. To use

Figure 34. Method card.

them, just connect the method with a concept at any edge. The method cards are presented below with the added abbreviations NU for No User, and F for Fast. Titles are in bold text, explanations in italics. As exploring the methods have not been the purpose of this thesis, the explanations are kept short. The references to the methods can be used to see further descriptions of them.

Learn
d.1. 5 why's - Keep asking "why" until you get to the underlying reason.
Asking "why", is a great way to find out the underlying reason for what caused a certain problem. Only when you know that, you can prevent it from happening again (IDEO, 2015).

d.2. Card sorting - Have users arrange cards with concepts in groups and structures.
Asking users for help to group and structure is a good start when designing navigations, workflows and information architecture (IDEO, 2015).

d.3. Competitive product survey - Evaluate competitors' products. (NU, F)
Collecting information about competitors' products, comparing and evaluating it is a good way to learn about possible solutions and pitfalls (IDEO, 2015).

d.4. Cultural probes *- Have user capture their context with tools such as cameras, paper etc.*
Having users to capture any sorts of artifacts helps designer to understand users lives, thoughts and values better (IDEO, 2015).

d.5. Diary study *- Ask participants to record their experiences on a daily basis.*
A diary study requires participants (users or observers of users) to record their experiences for a particular period of time (IDEO, 2015).

d.6. Do it yourself *- Try existing solutions yourself. (NU, F)*
Doing it yourself will help you to truly understand how it works (IDEO, 2015).

d.7. Draw the experience *- Have users show an experience through drawings.*
Asking users to describe their experience through drawings is a good way to understand and organise their experiences (Ottersten, I., 2010).

d.8. Effect mapping *- Identify business goal, stakeholders and their needs, and the features that can fulfill goals and needs.*
To identify business goal, stakeholders and their needs, draw a mindmap that answers the following questions: 'why?' 'who?' 'how?' and 'what?' (Ottersten & Balic, 2010).

d.9. Expert interview *- Find experts of the field and interview them. (NU)*
Interviewing experts can be a way of finding out the newest research without spending as much time as on a literature review. It should be kept in mind, however, that the results of the expert interview will only be as good as the expert.

d.10. Focus group *- Set up a group discussion with stakeholders, with a facilitator.*
Focus groups can be used to identify needs in a short time (Griffin & Hauser, 1993).

d.11. Hit the books *- What does the writers and thinkers say about it? (NU)*
Articles, blogs, books and research papers are golden, and extensive, sources of knowledge.

d.12. Impact mapping *- Identify assumptions and test them, in order to reach business objectives.*
Impact mapping aims at creating more efficient plans that are easily adapted to changes (Adzic, G., 2012).

d.13. Interview *- Ask what you don't know. Don't interrupt. Ask one question at a time.*
Interviews are a well used method to get to know users and see the problem from their points of view (Blomberg et al., 1993; Crabtree et al., 2012).

d.14. Kano analysis *- Differentiate between basic, performance and excitement needs. (NU)*
Use this as a help to prioritise what should be developed (Sauerwein et al., 1996).

d.15. KJ *- Write what you know on post-its, and arrange in meaningful ways. (NU)*
This method is especially useful when arranging and evaluate findings (Scupin, 1997).

d.16. Narration *- Have users describe what they do as they do it.*

Ask users to describe their actions and goals as they use the design (IDEO, 2015).

d.17. Observe - *Stay unobtrusive but curious. Note what happens, but also what doesn't happen.*
Conduct observations in the users' environment over an extended period of time, in order to gain insight in implicit knowledge (Blomberg et al., 1993).

d.18. Rapid ethnography - *Spend as much time as possible with users. Observe their behavior in their natural habitat.*
Spending time with users helps understanding their natural habits (IDEO, 2015).

d.19. Still-photo survey - *Do a planned photo excursion documenting specific activities.*
Use these photos to decode behavioural patterns along with your team (IDEO, 2015).

d.20. User surveys - *Well suited for short, true/false questions. (F)*
This is an easy way to collect quantitative data. (Esaiasson et al., 2003)

Learn: b2b
d.21. Be your customer - *Have your client describe the typical customer's experience. (NU)*
Your client possesses a lot of information regarding their own customers, utilize that knowledge (IDEO, 2015). Remember to design for *trust*.

d.22. Extreme user interview - *What aspect do you want to explore? Find users who are extreme in this aspect.*
Users that are extreme in one sense are often good at finding issues and possible improvements of a design (IDEO, 2015). Can be useful to explore *expert users*.

d.23. Historical analysis - *Compare features through different stages of development, to see where they're heading. (NU)*
This compartment can for instance be made between different industries, market segments or organisations (IDEO, 2015). This can help to create an experience of continuous development, to strengthen *lifelong relationships* and *trust*.

d.24. Long range forecast - *Explore the future. How will technological and social trends influence us? (NU)*
Imagine how technological and social trends could affect our behaviour. Write prose scenarios about it (IDEO, 2015). Consider *network effects* and *lifelong relationships*.

d.25. Predict next years headlines - *Have clients identify where their company will be in the future. (NU)*
Invite client and talk about where they want to be and also, how to maintain relations with customers and how to improve that relation (IDEO, 2015). Special focus can be on *key accounts*.

d.26. Social network mapping - *Map the interactions within and between user groups.*
Doing a map over the social network is a good way to understand the underlying social structure within a team (IDEO, 2015). It can be used to explore the concept *multi-user*.

Do

e.1. 6-3-5 Brainwriting *- 6 people write 3 ideas in 5 min. Pass around and repeat 6 times. (NU, F)*
This is a method for ideation, and is originally performed by 6 persons, who are to write or draw 3 ideas each in 5 minutes (Sivaloganathan & King, 1999). The ideas are then passed to the person on the right, who iterates the task. After 6 iterations, the exercise is complete and the ideas can be evaluated.

e.2. 6 thinking hats *- Give team members different focus: Process, Facts, Feelings, Creativity, Benefits & Cautions. (NU)*
In this method, different team members get the task to symbolise different ways of thinking. Each member discusses from a given perspective (de Bono, 1989).

e.3. Bags of stuff *- Give a group of users a bag full of craft material to prototype with.*
A low-tech prototyping technique well suited in a participatory design setting.

e.4. Bodystorm *- Develop ideas physically, enacting users interacting with your design. (NU)*
Use it when testing an idea or a concept, to experience the consequences (IDEO, 2015).

e.5. Brainstorm *- Let a group come up with as many ideas as possible in 1h. Don't criticize, build on each other's ideas. (NU)*
Focus on quantity and creativity (Kelly 2000).

e.6. Experience prototyping *- Prototype the experience of your design. (NU)*
Use this method to find unexpected gaps or needs when evaluating ideas (IDEO, 2015).

e.7. Extreme characters *- Find an extreme character to design for, such as Santa or Bill Gates. (NU)*
Designing for characters with exaggerated emotional attitudes (Djajadiningrat et al., 2000).

e.8. Flow analysis *- Represent the flow of information, in order to find bottlenecks. (NU)*
By seeing the information flow through all of the process, it is easier to spot where troubles accumulate (IDEO, 2015).

e.9. Focus prototyping *- Prototype a specific aspect of the design. (NU)*
Sometimes, certain aspects can benefit from being more thoroughly explored.

e.10. Moodboard *- Communicate the design concept through a collage of pictures and texts. (NU)*
Using a moodboard is a good way to explain a design's intended feeling or style.

e.11. Paper prototyping *- Fail early and cheap. (NU, F)*
Sketches on paper, is a rapid way to design a concept, it's usability and evaluate it (Buxton, 2007).

e.12. Parallel design *- Compare several possible designs with each other. (NU)*

By exploring promising designs further, the evaluations of them can benefit from each other.

e.13. Personas - Create characters representing the targeted demographics. Base on real data.
You could have one persona for each target group, but avoid stereotypes (Pruitt & Grudin, 2003).

e.14. Roleplaying - Assume different stakeholder's identities to make sure their voices are heard. (NU)
Specify relevant problems and perform them in a real or an imagined context (IDEO, 2015).

e.15. Scenarios - Describe scenarios in which your design is being used. (NU)
Do it as if you were asked to tell a story line (IDEO, 2015).

e.16. Sitemap - Structure the content of the site in a map. (NU)
By structuring the content of a website, it becomes clear what goes where, and what might be missing.

e.17. Sketching - Explore and/or evaluate. (NU, F)
A sketch is fast to be made and easy to redo (Buxton, 2007).

e.18. Storyboard - Do a comics depicting a user's session with your design. (NU)
This is a good way to illustrate and organize ideas ideas in order to get feedback (Usability Net, 2015).

e.19. Use cases - Describe short cases in which your design is being used. (NU, F)
Use cases are short descriptions of user needs, often in one sentence.

e.20. User journey - Demonstrate users' interaction with your design, either future or present.
User journeys capture not only the usage of the design, but encompasses the total experience and can thus show potential areas to improve.

e.21. Wizard of Oz - Let a team member simulate the response of the system towards a user.
Fake what has not yet been implemented (Usability Net, 2015). Useful for trying out features without having to build them first.

Test
f.1. A/B test - Release two versions at the same time, and observe the different outcomes.
Find out which one performs best and analyse why (Tolentino, J. 2013).

f.2. Accessibility test - Does it live up to accessibility guidelines? (NU)
Most users have some disability at least once during their lives (Brinck et al., 2002). By including these in your design, the design can prove better for both those, and others (Newell et al., 2009).

f.3. Cognitive walkthrough *- Have a tester think aloud while using the design.*
Use this method for testing the usability (Usability Body of Knowledge, 2015).

f.4. Competitive usability test *- How is the usability compared to that of competitors'?*
Comparing your usability to that of others can give you a competitive edge.

f.5. Empathy tools *- Use tools to assume different user's disabilities. (NU)*
Experience yourself having different kinds of disabilities to understand what it could be like (IDEO, 2015).

f.6. Error analysis *- What could go wrong? Find the causes. (NU)*
Create a list of everything that could go wrong with the product or service (IDEO, 2015). What are the causes?

f.7. Guerilla testing *- If you don't find users, use what you can find. (NU)*
Go out on the street and start asking people to try out your prototype. It can be done quickly and is cheap (Tolentino, J., 2013).

f.8. Heuristic analysis *- How does the design live up to standards? (NU*
Evaluate your design based on guidelines and best practices (Benyon, 2010).

f.9. Informal test *- Ask your friends and family for help. (NU, F)*
Asking friends and family can be an easy way, but be careful so they are not just saying what they think you want to hear.

f.10. Metrics analysis *- Analyse how the design is being used, using aggregated data.*
 For instance, use Google Analytics for this work (Tolentino, J., 2013).

f.11. Scenario testing *- Have users react to different scenarios.*
Explore their reactions to see that your design creates the intended experiences.

f.12. Simplify *- What can you take away? (NU, F)*
Less is more. Avoid excise (Cooper, 2007).

f.13. Subjective evaluation *- Try it out yourself. (NU, F)*
Test your product spending a minimal amount of cost, but mind that you are not the user.

f.14. Usability test *- Is the design easy to use and consistent? How hard is it to do wrong?*
The user is never wrong. Be polite and clear (Cooper, 2007).

f.15. Usage patterns *- How do users interact with it? Follow mouse movements etc.*
There are several tools available to keep an eye on how users behave and interact with interfaces (Tolentino, J., 2013).

7.2.3 Blank cards

As our research into b2b e-commerce as well as interaction design processes is exploratory and not exhaustive, we provide blank cards of both concept and method type. Therefore, each category of card has been equipped with extra blank cards. This

allows users to fill in their own cards, as they find a concept or method that could be used, but is missing from the original set-up. The blank method cards have a white background and a purple, blue or green border according to category (Figure 35). This is because it is easier to write and read handwritten text on a white background. If the blank cards would run out, more can be printed. Having this feature will prolong the life of the tool, as it can grow according to trends and new research in the field, as well as to the personal growth of the designer.
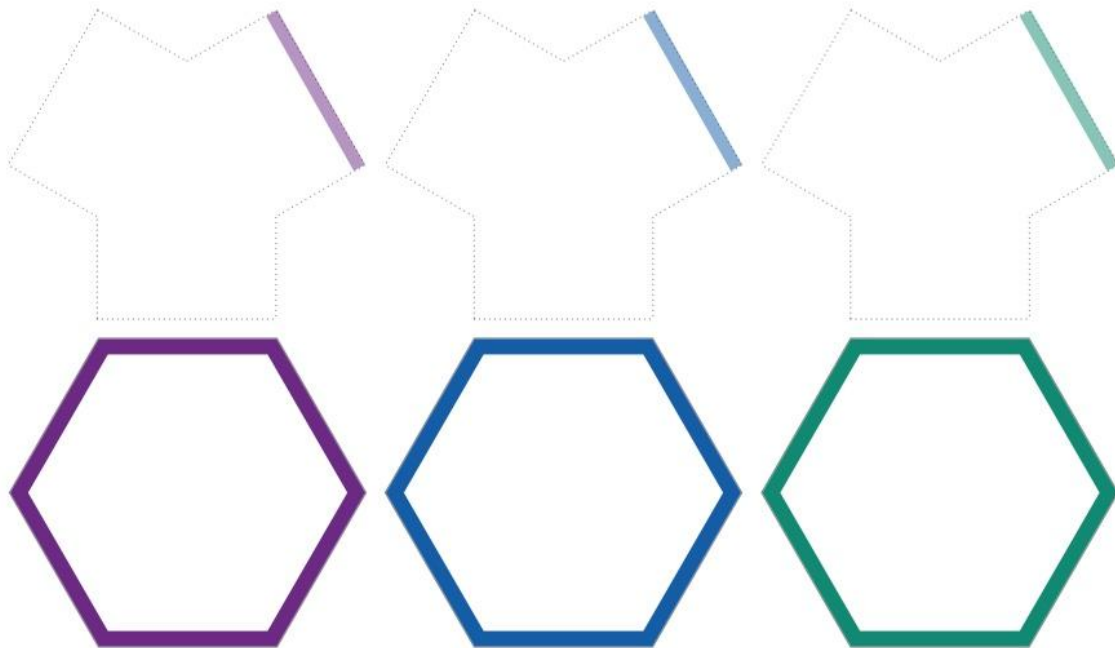
Figure 35. Blank cards.

7.2.4 Using Trip

Trip is built to support interaction designers with three things: providing b2b e-commerce concepts, working as a communication tool with team and client, and to facilitate learning. Here, we will explain how to use Trip for these purposes. First, we focus on the communication purpose, as it was shown to be central in our interviews with interaction designers.

Trip can be used at the start of a project for planning, during a project for referral or change, and after a project as a guide for storytelling or simulations. It is designed to work as a communication tool, and is at an advantage when used in discussion and cooperation. The divisions of card into concepts and methods, as well as into the phases Learn, Do and Test, should be seen as guidelines and not rules: each card is to be used as the designer sees fit, without restrictions.

Use Trip to communicate your design process by planning your project with it. First choose which concepts cards to use, then connect them to each other from left to right in a chronological way. Then, choose methods to use to explore the concept cards. Build on the remaining edge. Discuss the plan with your team; add, remove, improve. Remember that there are no rules, just guidelines, and that the blank cards are there to

be used. The finished plan can be used as a basis for presentation for clients, where the cards will provide correct terms and show the planned progression.

To support learning, Trip provides specific concepts with this purpose: meetings with clients, and reflection moments for lessons learned. It can also be used at the end of a project. Here, Trip will function as a documentation of what steps were taken in the project. It will work as visual anchors from which to discuss what happens, and to trace back action to find the causes for certain results. Thus, it facilitates telling the stories of how the project progressed and turned out.

Finally, it can be used as a simple deck of cards, to look through when starting a project to get inspiration on which concepts and methods can be used. Specifically, it might be interesting for b2b e-commerce projects, as it contains cards referring to research on success factors in such services.

8. Discussion

In this chapter we will discuss the findings of our research, evaluate our tool from the standpoints of our expectations as well as our research findings, and finally discuss the possible future development of our tool.

8.1 Process

When we started researching for this thesis, our focus was on b2b e-commerce. As it happened, we noticed that our focus slipped somewhat during our work, into becoming more and more into the design process of interaction designers. B2b e-commerce was still our entrance into this field, and it has stayed with us as a presence that we should constantly anchor our findings in, and start our excursions from. However, if we had done it all over again, we would probably focus earlier and more heavily on design processes. Trip as a tool is based on building design processes, and as such, it would have been a resource to have a more thorough understanding of such visualizations beforehand. As Rittel & Webber (1973) stated, the definition of the problem and that of the solution go hand in hand. If we had started out this project with b2b e-commerce as peripheral and design processes as central to our question, our tool might have looked different.

Another miscalculation with our process, and perhaps connected to the one above, was that it was difficult to find interviewees with substantial experience from designing b2b e-commerce. Everyone that we interviewed had designed e-commerce sites, and almost all had at least once designed for b2b, but none of them were specialized in this field. We attempted to interview more specialized interaction designers, but these were unwilling to be interviewed. We suspect that the reason might be that b2b is a line of business with high stakes and historically low transparency, leading to secrecy and protectiveness. Perhaps a more experienced researcher would have better luck.

The specific attributes of b2b e-commerce used in our tool were instead foremost those found in literature. Our findings are by no means claimed to be exhaustive in this respect, and further research is needed. We have attempted to follow the rigorous literature review process proposed by Wolfswinkel et al. (2013). However, the problem pointed out by Blessing & Chakrabarti (2009) that interaction design research has resulted in "referencing islands" (p.6), might make this review skewed.

An effect of these problems with our process is that the resulting tool is a tool for interaction design processes, with b2b e-commerce aspects added. We have not been able to thoroughly investigate if and how the design process itself changes when designing b2b e-commerce. Instead, we have lifted concepts that research has shown is of importance.

8.2 Findings

When we started this project, we wanted to find out how a design tool for building b2b e-commerce services could be constructed. We then set out investigating the design space of b2b e-commerce, and especially explored how interaction designers actually worked with this type of design in particular, as well as interaction design in general. The idea was that if we looked at the design process, we could perhaps see a way to

strengthen it, or make it more efficient. What we found was that interaction designers did not seem to find the specificities of b2b as difficult as the act of communicating the purpose of interaction design in general. The main difficulty that we found interaction designers experiencing, was to be allowed to do a good job. We thus built a tool for planning the design process in a communicative way, in order to explain to team members as well as clients what the use would be of having an interaction designer on board. Other tools, such as the IDEO method cards (2015) include examples of how methods can be used in real life settings. We chose not to include such examples, partly because including them would clutter the cards, and partly because our goal was not to explain certain methods to interaction designers, but rather to give interaction designers an opportunity to discuss concepts and methods with others. We decided to leave the question of finding out how the method could be conducted up to the interaction designers, as there are ever more to read about the methods on the internet.

On top of this, designers were found to devote time to visualize their own design processes. There are any number of these visualizations to be found, one more complex than the other (see Dubberly 2005). Despite all good intentions with these processes, it is very difficult to follow one in all projects (Treder 2013). Designers need to be able to take pragmatic shortcuts, which interested us as we wanted to build a support for real life projects. This is the reason why we chose a modular approach, so that the process could shrink and expand to fit the project as well as the designer.

The specificities of b2b e-commerce we found mostly concerned the distinctive context of the user: as a part of a bigger company, the user in b2b often acts only as a part of a whole, and the legal and social aspects seem to be of bigger importance than in b2c. This was supported not only by the research into purchaser collaboration in b2b done by Chen et al. (2013), but also by our own interviews with purchasers. In b2b, purchasers often need to communicate their purchasing with colleagues, other departments and managers. It can be a source of frustration if this is difficult, and we see a potential for giving the user a positive experience by supporting this communication.

Another thing that came up in both literature and interviews was the robustness of the b2b relationship. As Cullen & Taylor (2009) concluded, the relationship itself is often a goal in b2b e-commerce. The longevity of relations showed to be pivotal for many of the purchasers we interviewed, as this meant that they could trust in support and service for a long time forward. The other side of this could be what some of the interaction designers we interviewed pointed to, that the purchasers in b2b e-commerce were less picky about appearances and problems. A longterm relationship can stand a few issues.

This, and the expectations to be rational and correct had made some of the interaction designers think less about the emotive responses of the user. However, designing for emotions does not equal designing pretty looking interfaces. It involves designing for trust, impressing the user with the social experience of long-lasting relationships and assurances. Trust is one of the main concepts that the literature we studied revolved around (eg. Chen et al. 2013; Cule & Taylor 2009; Egger 2001). As van Gorp & Adams (2012) explained, a design always invokes emotions. The difference is whether you as designer take responsibility for them.

Our most interesting finding, as we see it, was not specific for designing for b2b e-commerce. Instead it touched upon the need for addressing learning in projects. The need became clear as we realised that our question for structured learning was infallibly answered with incomprehension or laughter of recognition that this is something that should be, but is not. In combination with many of the respondents acknowledging that user testing is often neglected because of financial savings, this raised a flag for us. The designers all pointed out that they gained knowledge through projects implicitly, and that an experienced designer carried a knowledge of "best practice" that could be substantial. They also described how they could search the expertise of their colleagues when in need of assistance. But we could still not help but wonder if there would not be a more optimal way of spreading learning in the organisation, and thus making the organisation less dependant on the individual designer, instead retaining the knowledge irrespective of the specific team members.

Especially when reading Argyris (2002) after our interviews with interaction designers, the fact that many of our interviewees did not seem to acknowledge, or at least did not attend to, failed projects caught our attention. Is it true that they have never been part of failed projects, or is this a symptom of how they review projects? In that case, how come they are not prioritizing gaining knowledge? In light of our interviews, for projects time is always short. The designers we interviewed were already cutting back on user studies and testing, and this is if they ever got any hours at all — many of them had experienced clients only wanting to add interaction design ad hoc, as a way to put a nice finish to already done projects. Is it any wonder then that there is no time for learning from past mistakes at the end of projects?

However, learning is central for the positive development of an organisation (Maylor 2010). One of the greatest hindrances for learning today, stated by Malakouti et al (2014), is deficiency in communication and the difficulty of turning tacit knowledge into explicit. These two problems are related, as Crossan et al (1999) found that discussing and explaining innovations within groups facilitates the turning of knowledge from implicit to explicit. It is interesting that we found in our interviews with interaction designers, that not only learning from projects, but also communication about interaction design needed support. Our findings do not indicate a relationship between the two, but it would be fascinating to explore.

8.3 Evaluation

The design tool Trip is an attempt at taking on these different aspects of how interaction designers can be supported. The look-and-feel of Trip was appreciated by the participants in our final evaluation. However, we noticed that the icons we used for demarking fast methods, and methods that does not require access to end users, were almost never used. One reason might be that we gave the participants a rather generous time frame. We also noticed that these deductions were made by the participants themselves, irrespective of the icons. Perhaps this means that interaction designer do not need the icons? We suggest further testing to evaluate this.

When it comes to the shape of the Trip cards, participants responded with pleasing, but we noticed that while building the plan the cards themselves were sometimes in the way of shaping it to fit the participant's wishes. This was one reason for the creative

placement of cards; on top of each other, semi-obscuring each other etc. We would like to explore if this is a hindrance or an incentive for creativity.

Can Trip communicate the importance of interaction design in a b2b e-commerce project, and can it inspire interaction designers to leave time for learning? It is a disappointing fact that we can answer none of these questions. We can only say that as far as theory goes, there are indications that a tool such as Trip might facilitate learning processes, as it incorporates support for storytelling, simulations and mapping. The evaluative tests performed at the end of our project also leave us hoping that Trip can work as a communication tool, as the participants found it easy to use in support to their presentation in front of presumed clients, as well as a basis for discussion among themselves.

If we were to fit our results into the history of design thinking, we would connect our final design to design science, as exemplified in this thesis by Bruce Archer (in Dubberly 2005). Looking back at our process, we have tried to departmentalize the specific instances of design into our concepts, and thus tried to capture the essence of design, without the magic. All in order to describe to the public what we actually do: to make it seem less magic, and more worth spending your money on. Of course, this is itself a pragmatic approach: as it was a goal for us to communicate what interaction design is, we wanted to pin it down to understandable concepts. But can design be explained? We do not presume to make a contribution in this debate, and will leave the question unanswered.

8.4 For the future

There are many questions that gather at the end of a project such as this. Would anyone use it? Is it enough support to warrant use? Would it be seen as a contribution or a bother? The answers to all these questions lie in further testing and research. The strengths with Trip as we see them are that it is a tool that invites playfulness, perhaps making it useful in the start of a project to explore possible routes. It visualizes the design process to others, while still acknowledging each designer's, and project's, own specificities. It facilitates learning, both by presenting the project in parts, working as a supportive structure to storytelling, and by incorporating concepts such as "lessons learned" and "sum-up meeting". However, further work needs to be done to thoroughly evaluate the concepts and methods included, to distinguish the two types from each other, and to test possible additions, of for example arrows. We have not attempted to be exhaustive of the design space in b2b e-commerce, and therefore there might still be concepts and methods that should be included.

For the future, we also see the possibility of expanding into other design areas. One such area could be tangibles, where Trip could be augmented with a Tangible Tool Kit, comprising of concepts such as "Internet of Things". We see a great potential in this, and would like to explore the possibility further.

There is also a discussion needing to be had about the medium of our tool. As of now, it is of paper only, but it would be interesting to digitalize it. Making it digital could enable us to save records of the projects without this being a hassle for the project manager. We could perhaps augment the records with stories, so to make the learning from the project readily available to other working for the same company. If digital,

deeper information about concepts and methods could also be made accessible, so that a method could be explained, exemplified and perhaps entail links to other projects in which it was used, and the evaluations of it. We encourage inclined designers to participate in further developing our tool.

The findings of our project also point to learning as a field to explore: how can interaction design facilitate learning in projects? How do interaction designers learn from projects? We would propose interaction design researchers to look further in this field, to see how the findings of knowledge management can be used in the design process. We believe that there is a want for support for this in the professional lives of interaction designers, and that the problem is often neglected as of today. The subjects of storytelling, simulations and mapping would all be of interest from an interaction design perspective, and could be augmented in many different ways. One of the main difficulties in providing support for these activities is that interaction designers are already pressed for time in projects. Adding chores to the list is not immediately well received. One way of facilitating learning would be to make it easy, fun and "on the run". We believe that making our tool digital and augmenting it with evaluation possibilities could perhaps accommodate this.

A more comprehensive literature review, or meta-analysis, of the important factors of b2b e-commerce from an interaction design perspective, would also be recommended. B2b e-commerce is a growing field today, and finding the best ways to facilitate the establishment and continuance of these longterm relationships between companies, could perhaps bring ease and efficiency to many people, thus saving time, money and agony.

9. Conclusion

In this section, we will present the conclusions of our work and answer our research questions.

This thesis is the result of exploring the question: *How can interaction designers be supported in projects, when designing b2b e-commerce services?* To answer this question, we also had to consider specific attributes of b2b e-commerce, and different aspects of an interaction designer's project-based work.

Our research resulted in the three prominent needs of interaction designers working in projects to design b2b e-commerce: to know what concepts to consider when designing for b2b e-commerce, to communicate what interaction design can contribute to the project to team members and clients, and to better structure and ensure learning in projects. These needs were found by interviewing interaction designers about their work processes, and their experience from working with b2b e-commerce.

We also interviewed purchasers in b2b e-commerce, to discern what aspects were important for the success of such services. In addition to this, a literature review on this subject was conducted. The results showed that the purchasing decision in b2b e-commerce can involve many different individuals, and that the design should support the communication between them. Further, one goal of b2b e-commerce is to build longterm relationships, why it is important to consider the user's experience while using the service in order to ensure that a trusting, loyal foundation is supported. Special consideration can be needed to accommodate for the often very complex and specific product taxonomies. As users in b2b e-commerce are often experts in the application, this also requires attention.

Trip is an example of a design tool for building b2b e-commerce services. It attempts to support interaction designers by providing a visualization of how the design process is planned, so that this can be communicated to team members and clients, but also be used as a basis for discussion and reflection, to facilitate learning. In addition, it presents interaction designers with important concepts to consider when designing for b2b e-commerce. Evaluating the tool, participants found it useful for communicating ideas and plans. Research in knowledge management indicate that storytelling is a fruitful method for reaching a deeper understanding, and as visual guide to the history of a project, Trip can assist interaction designers in telling the story of their project.

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Appendix I: Papers included in the literature review

Nr	Year	Author(s)	Title	Reason(s) for selection	E-commerce	B2B	Emotional design	Guidelines	Other implications for design
1	2009	Cullen & Taylor	Critical success factors for B2B e-commerce use within the UK	Success factors for b2b e-commerce	x	x		x	
2	2003	deLone & McLean	The DeLone and McLean Model of Information Systems Success: A Ten-Year Update	Includes specific guidelines for creating e-commerce services, success factors that must be recognized.	x			x	
3	2015	Coursera	Foundation of e-commerce						
4	1990	Bitner et al.	The Service Encounter: Diagnosing Favorable and Unfavorable Incidents.						
5	2002	McKnight & Chervany	What Trust Means in E-Commerce Customer Relationships: An Interdisciplinary Conceptual Typology	A study on how trust can be conceptualized.			x		x
6	2012	van Gorp, T. & Adams, E.	Design for Emotion.				x		
7	2008	Schaffer	Beyond usability designing for persuasion, emotion, and trust	Includes PET design			x		
	2000	Egger	"Trust Me, I'm an Online Vendor": Towards a Model of Trust for E-Commerce System Design	Models how trust can be thought of when building e-commerce services.	x		x		
8	2001	Egger	Affective Design of E-Commerce User Interfaces: How to Maximise Perceived Trustworthiness	Includes guidelines for building trust in e-commerce.	x		x	x	
9	2012	van Gorp, T. & Adams, E.	How Do We Design for Emotion?	Emotional design, ACT			x	x	x
10	2013	IDEO	Methods Cards	Exemplifies how interaction designers could work.				x	x
11	2013	Pasquale et. al	The future of e-Commerce Experience: Marcopoloshop Platform	The 10 most painful points during the customer experience	x				

Nr	Year	Author(s)	Title	Reason(s) for selection	E-commerce	B2B	Emotional design	Guidelines	Other implications for design
12	2014	chen. et al	Process quality and collaboration quality on B2B e-commerce	Adds process quality and collaboration quality as important aspect os b2b e-com	x	x		x	x
13	2012	Leake et al.	Complete b2b online marketing	Online marketing, brand	x	x	x	x	
14	2010	Lin et al.	B2B E-Commerce Adoption and Implementation Constraints and Critical Success Factors in the Healthcare Organizations	More about the wider picture, what to think about when trying to implement e-commerce in a b2b structure.	x	x		x	x
15	2009	Tran et al.	Design Guidelines for B2C E-Commerce in Virtual Worlds	Gives direct guidelines that are somewhat relevant. Some can be used, perhaps if modified to b2b e-commerce.	x	x		x	
16	2009	Yang et al.	B2B E-commerce Website Customer Satisfaction: a Formula and Scale		x	x		x	
17	2012	Banerjee et al.	Routinisation of B2B E-commerce by small firms: A process perspective		x	x			
18	2011	Lindegaard	An Exploration of Relations Between Visual Appeal, Trustworthiness and Perceived Usability of Homepages	Visual appeal, trustworthiness and usability. Says that people who are using an appealing e-commerce are more likely to complete an online transacton	x		x		
19	2003	deLone & McLean	The DeLone and McLean Model of Information Systems Success: A Ten-Year Update	Includes specific guidelines for creating e-commerce services, success factors that must be recognized.	x			x	
20	2004	deLone & McLean	Measuring e-Commerce Success: Applying the DeLone & McLean Information Systems Success Model	Specific guidelines for creating e-commerce services: success factors that should be considered.	x			x	

Nr	Year	Author(s)	Title	Reason(s) for selection	E-commerce	B2B	Emotional design	Guidelines	Other implications for design
21	2007	Desmet et al.	Emotional Design; Application of a Research-Based Design Approach	Uses emotional design. Describes how emotional design can be used to design a specific product.			x		x
22	2010	Jascanu et al.	Toward Emotional E-Commerce	Discusses network effects and how people respond emotionally to different stimuli.	x		x		
23	2008	Jascanu et al. 2	Toward Emotional E-Commerce: The Customer Agent						
24	2013	Nørgaard et al.	Exploring the Design Space of Shape-Changing Objects: Imagined Physics						
25	2012	Milanova et al.	Design for Emotion. A Case Study				x		
26	2002	Singh & Kotzé	Towards a Framework for E-Commerce	Discusses the cultural differences in	x			x	x
27	2013	Baghdadi	From E-commerce to Social Commerce: A Framework to Guide Enabling Cloud Computing	Discusses how social media can be used to further e-commerce.	x	x			x
28	2010	Dalsgaard	Research In and Through Design						
29	2013	Wolfswinkle et al.	Using grounded theory as a method for rigorously reviewing literature	Explaining how to use grounded theory in literature reviews.					
30	2014	Szymaszek	Between challenge and solution	design tool				x	x
31	2003	Saikaly	Design re-thinking, Some issues about doctoral programmes in design						
32	2005	Saikaly	The factors shaping design research and its relationship with industry						

Nr	Year	Author(s)	Title	Reason(s) for selection	E-com merce	B2B	Emotional design	Guide- lines	Other implic- ations for design
33	2007	Zimmerman et al.	Research Trough Design as a Method for Interaction Design Research in HCI						
34	2010	Zimmerman et al.	An Analysis and Critique of Research through Design: towards a formalization of a research approach						
35	1999	Seago & Dunne	New methodologies in art and design research: the object as discourse						
36	2009	Blessing & Chakrabarti	DRM, a design research methodology						
37	2005	de Villiers	Three approaches as pillars for interpretive Information Systems research: development research, action research and grounded theory						
38	2012	Rasmussen et al.	Shape-Changing Interfaces: A Review of the Design Space and Open Research Questions						

Appendix II: KJ analysis

		References								
		1	2	3	4	5	6	7	8	9
Brand equity	A.1. pre purchase				X					
	A.2. analyze the brand's equity								X	
	A.3. examine attitudes towards industry								X	
	A.4. graphical standards									X
	A.5. pre purchase knowledge								X	
	A.6. relationship	X								
	A.7. interactive brand experience								X	
	A.8. post purchase				X					
	A.9. collaboration quality.		X							
Brand equity & emotions	B.1. appealing						X			
	B.2 service quality		X							
	B.3 benevolence					X				
	B.4 usage		X							
	B.5 attract						X			
Emotions	C.1. emotion							X		
	C.2. customer centric (expectations)								X	
	C.3. predictability					X				
	C.4. process quality		X							
	C.5. desirable						X			
	C.6. converse						X			
Emotions & trust	D.1. transact						X			
	D.2. customizable		X							

1	Cullen & Taylor
2	DeLone & McLean
3	Coursera
4	Bitner et al.
5	McKnight & Chervany
6	van Gorp & Adams
7	Schaffer
8	Egger
9	Ovn research

		References								
		1	2	3	4	5	6	7	8	9
Trust	E.1. competence					X				
	E.2. informational content								X	
	E.3. information quality		X							
	E.4. interface properties								X	
	E.5. trust					X				
	E.6. reliability		X							
	E.7. integrity		X			X				
	E.8. trusting beliefs					X				
	E.9. trusting intentions					X				
	E.10. professional								X	
	E.11. person in front of the screen									X
	E.12. disposition to trust					X				
	E.13. purchasing department									X
Trust & brand equity	F.1. user satisfaction		X							
	F.2. reputation					X				
	F.3. institution based trust					X				
E-commerce	G.1. persuasion							X		
	G.2. purchase				X					

1	Cullen & Taylor
2	DeLone & McLean
3	Coursera
4	Bitner et al.
5	McKnight & Chervany
6	van Gorp & Adams
7	Schaffer
8	Egger
9	Ovn research

Appendix III: Interviews questions

The interviews with purchasers all followed the same semi-structured script. This means that the script was kept as a loose guide as to allow us to follow the interviewee's train of thought. These are the general questions we sought to have answered, but individual deviations happened. The interviews were all in Swedish, and the questions are therefore provided both in Swedish, and below in English.

> Hur ser din roll som inköpsansvarig ut?
> Många system?
> Hur skulle du beskriva inköpssystemens inlärningskurva?
> Vad köper du in?
> Hur vet du vad du ska köpa in?
> Hur hittar du rätt vara?
> Hur ser er inköpsprocess ut?
> Hur kändes det att vara ny, att sätta sig in i inköpsprocessen?
> Vilka kanaler använder du för inköp?
> Hur ofta handlar du från samma företag?
> Hur väljer ni varifrån ni köper in?
> Har du personligen något inflytande över vem ni handlar från?
> Har du jobbat med inköp på något annat företag?
> Är det någonting mer kring inköp som vi inte pratat om?

In English:
1. What is your role as a purchaser?
2. Are there many systems?
   > How would you describe the learning curve of your purchasing systems?
   > What is it that you purchase?
   > How do you know what to purchase?
   > How do you find the right item?
   > What does your process for purchasing look like?
   > How did it feel to be new at the job, to acquaint yourself with the
purchasing process?
   > What channels do you use for purchasing?
   > How often do you purchase from the same company?
   > How do you chose from which company to purchase?
   > Do you have any personal influence over from whom you purchase?
   > Have you worked in purchasing in another company?
   > Is there anything else concerning purchasing that we haven't discussed?

Interview with knowledge manager
This interview was unstructured, and revolved around an open dialogue about how organisations handle, and can handle, knowledge. Besides from methods for this, we also discussed the possible gain of handling knowledge.

Appendix IV: Icon survey

1. Which icon is most suitable to illustrate 'explain'?
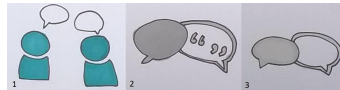1. 15 votes
2. 7 votes

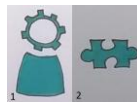## 2. Which icon is most suitable to illustrate 'important'?
1. 21 votes
2. 2 votes

3. Which icon is most suitable to illustrate 'communicate'?
1. 12 votes
2. 3 votes
3. 8 votes

4.Which icon is most suitable to illustrate 'tricky'?
1. 3 votes
2. 20 votes

5. What do you associate the following icon combinations with?
time x 7
different amount of time
time duration
15,30, 45 min
time, or measures
time or amount
time elapsed
how much has already been used/done
time span, time is passing
percentage
parts of a whole, three independent fractions
time. either a timer or a notification of time needed.
progress x 2
time, pie charts
time, pizza, fractions
count down or progress

6. What do you associate the following icon combinations with?
user and group x 10
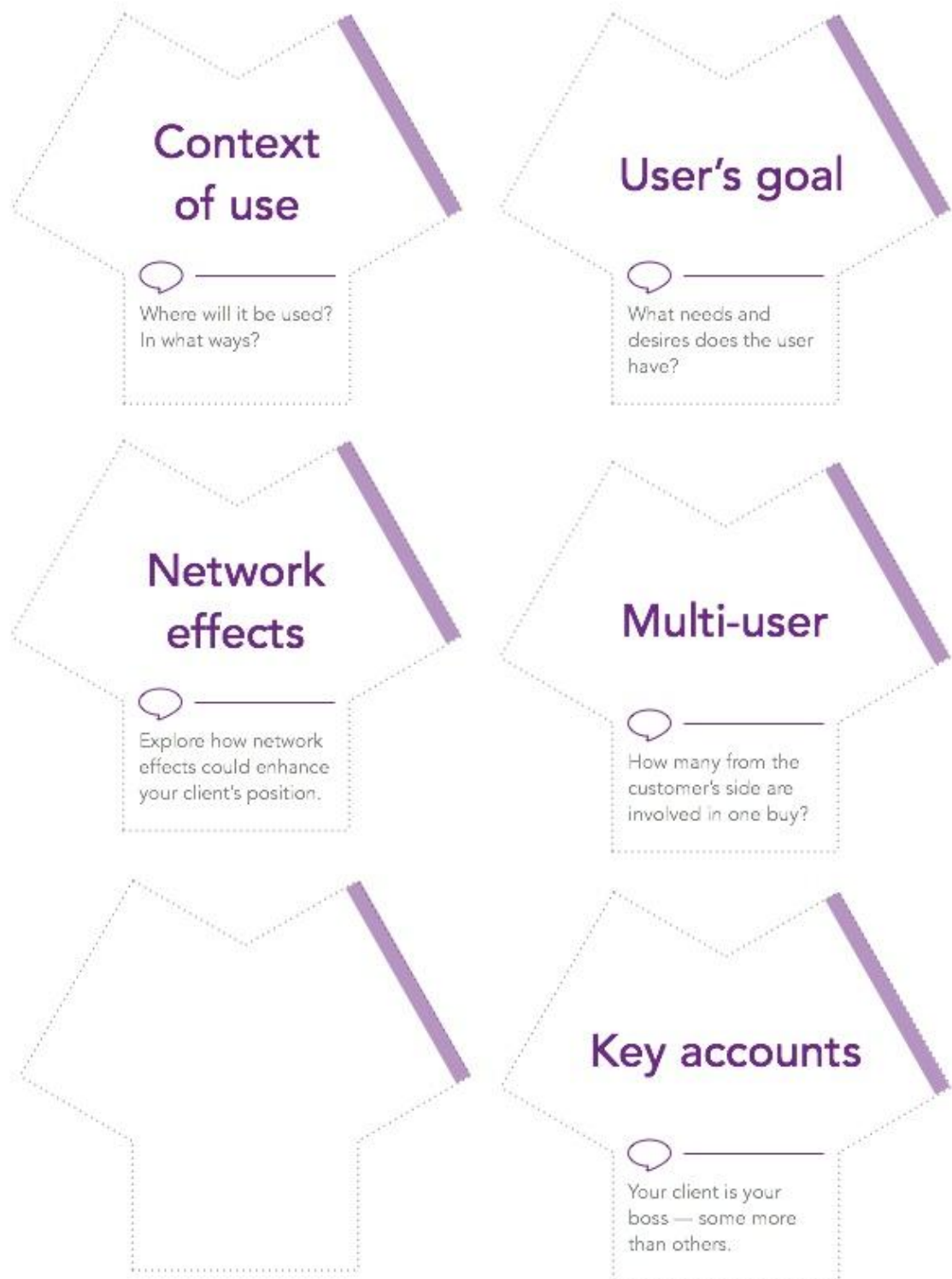*single or multiple users. (if they are two separate, otherwise a bit fuzzy)*
one person and a group, difficult to say how the relation between the two parts are.
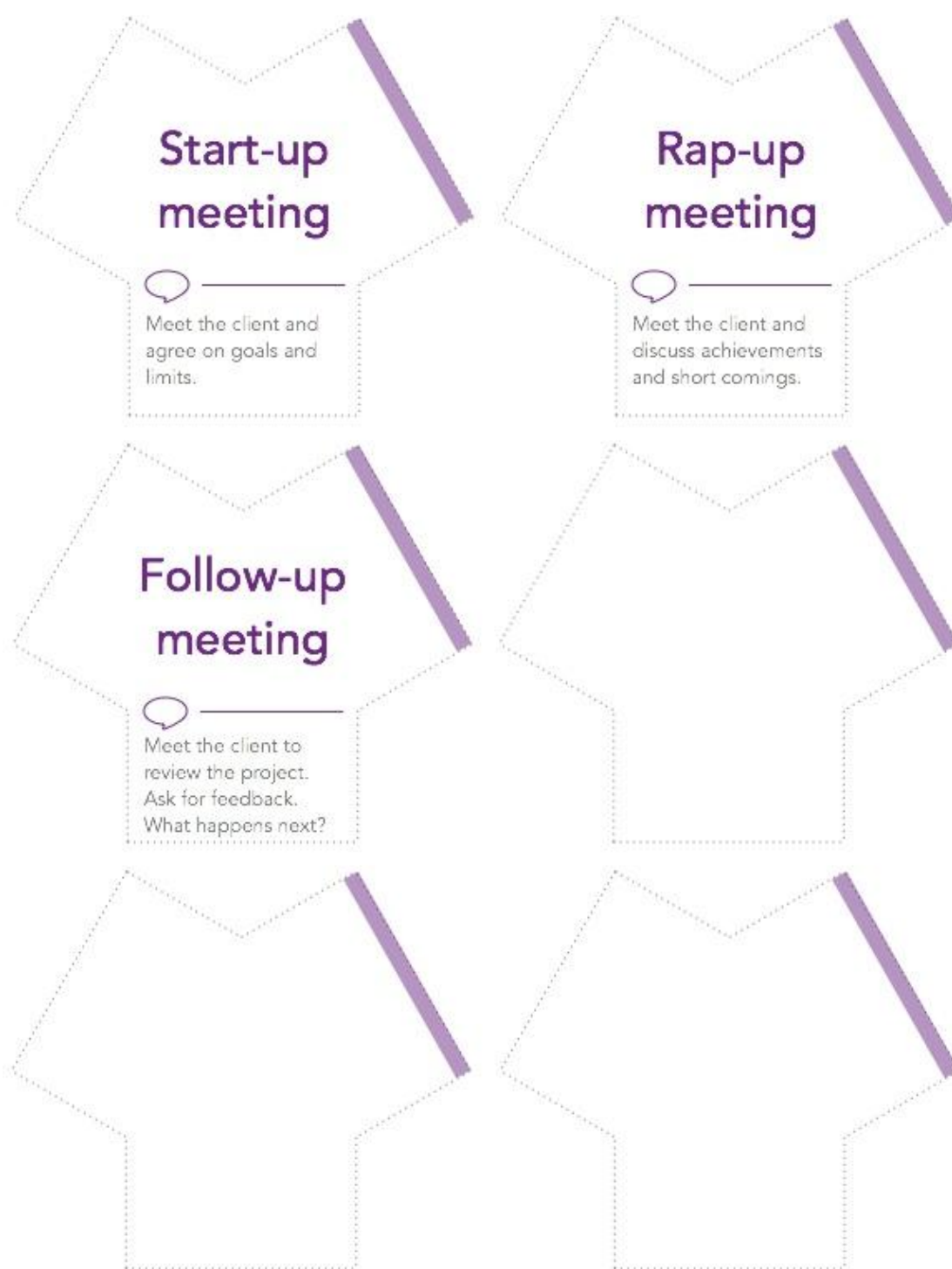*maybe he's the expert,*

users x 2
teacher
teacher, presenter etc.
boss
colleagues, group of people?
number of people
Team
get together
online forum
add new to group
joining a group/discussion

Appendix V: Trip

Context of use

💬 —————

Where will it be used? In what ways?

User's goal

💬 —————

What needs and desires does the user have?

Network effects

💬 —————

Explore how network effects could enhance your client's position.

Multi-user

💬 —————

How many from the customer's side are involved in one buy?

Key accounts

💬 —————

Your client is your boss — some more than others.

Present solution

💬 ————————

What do they have now? Redesign or realign?

Lessons learned

💬 ————————

What have we done before, that we can use now?

Defining challenge

💬 ————————

What is the problem we're trying to solve? Set smart goals.

Competitiors

💬 ————————

How do others tackle the problem? What does market research tell us?

Vision

💬 ————————

Where does the client want to be in three years?

User

💬 ————————

Who are the intended users? What other users might there be? Prioritize.

Start-up meeting

Meet the client and agree on goals and limits.

Rap-up meeting

Meet the client and discuss achievements and short comings.

Follow-up meeting

Meet the client to review the project. Ask for feedback. What happens next?

User survey

Extra well suited for short, true/false questions.

▶▶

Interview

Ask what you don't know. Don't interrupt. Ask one question at a time.

Expert interview

Find experts in the field and interview them.

Hit the books

What do the writers and thinkers say about it?

Observe

Stay unobtrusive but curious. Note what happens, but also what doesn't happen.

5 why's

Keep asking "why" until you get to the underlying reasons.

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Focus group

Set up a group discussion with stakeholders, with a facilitator.

KJ

Write what you know on post-its, and arrange in meaningful ways.

Diary study

Ask your participants to record their experiences on a daily basis.

Cultural probes

Have users capture their context with tolls such as cameras, paper etc.

Kano analysis

Differentiate between basic, performance & excitement needs.

Card sorting

Have users arrange cards with concepts in groups and structures.

Still photo survey

Do a planned photo excursion, documenting specific activities.

Draw the experience

Have users show an experience with drawings.

Extreme user interview

What aspect do you want to explore? Find users who are extreme in this aspect.

Long range forecast

Explore the future. How will technological and social trends influence us?

Social net-work mapping

Map the interactions within and between user groups.

Predict next year's headlines

Have clients identify where their company will be in the future.

Do it yourself

Try existing solutions yourself.

Effect mapping

Identify business goals, stakeholders and their needs, and the features that can fulfill goals and needs.

Impact mapping

Identify assumptions and test them, in order to reach business objectives.

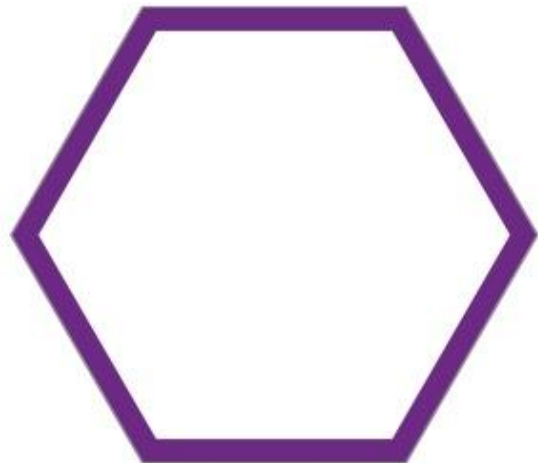## Competitive product survey
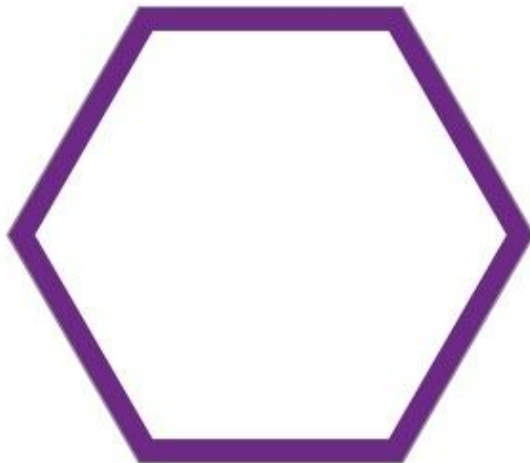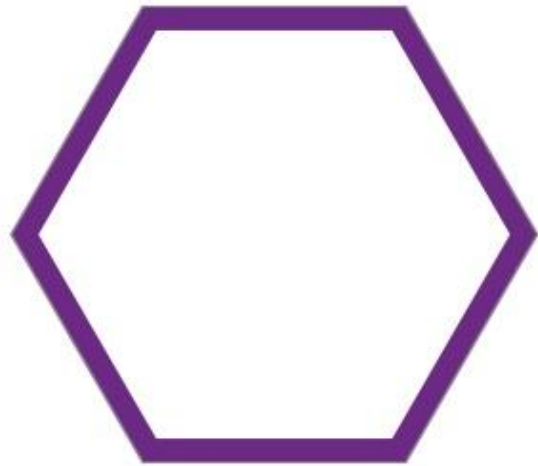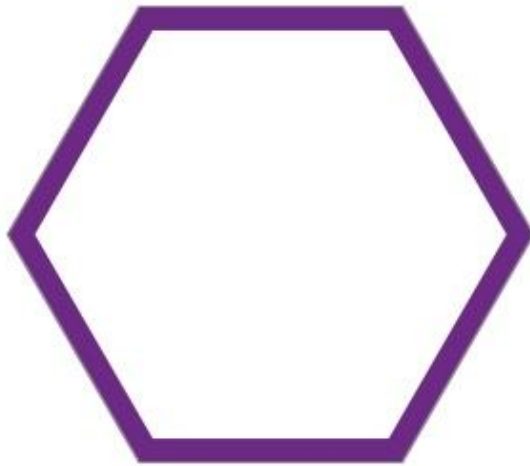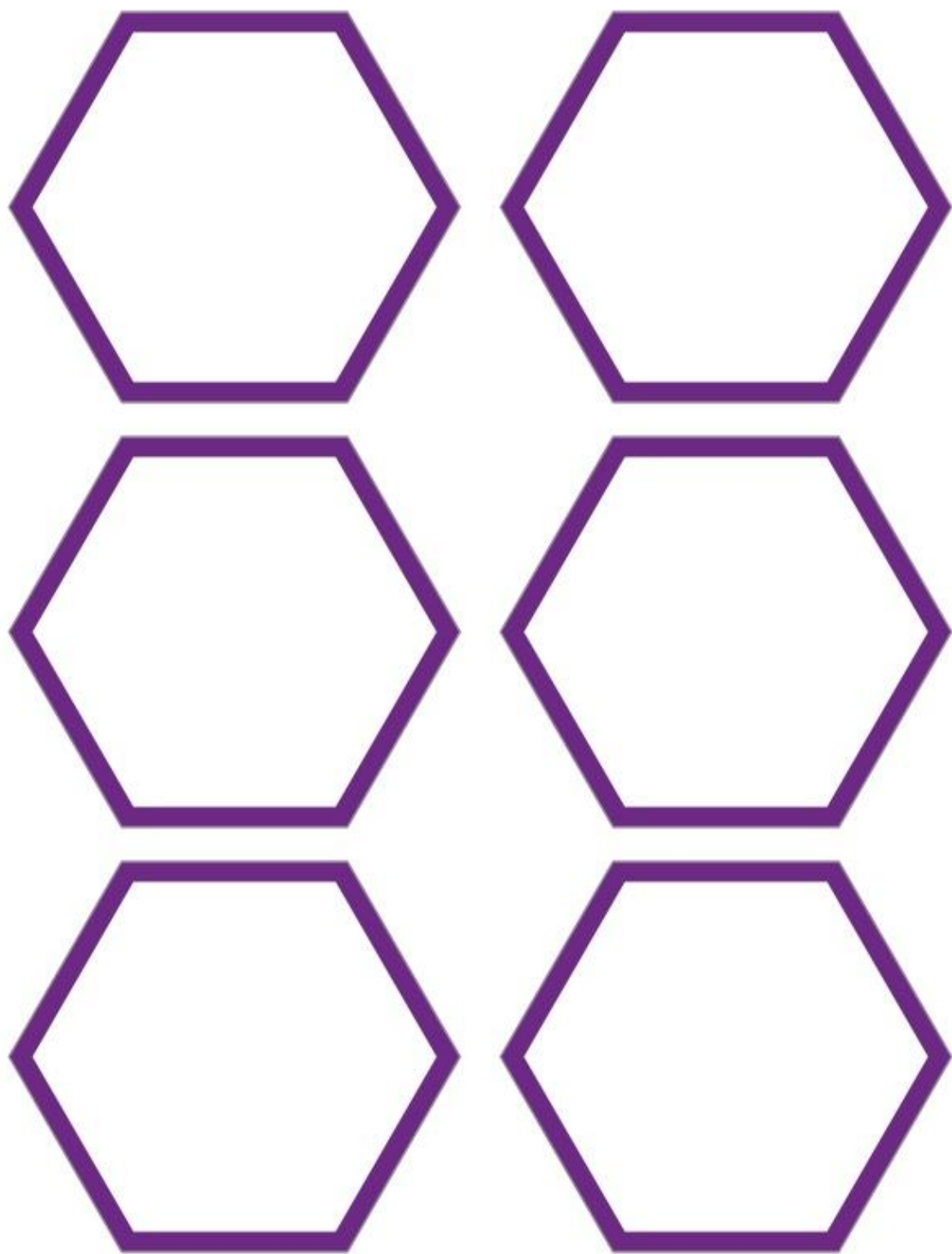
Evaluate competitors' product.

Rapid ethnography

Spend as much time as possible with users. Observe their behaviour in their natural habitat.

Narration

Have users describe what they do as they do it.

Historical analysis

Compare features through different stages of development, to see where they're heading.

Be your customer

Have your client describe the typical customer's experience.

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Wireframes

Create a visual guide, showing clearly what goes where and how it works.

Style guide

Standardize how the information should be presented.

Measurements

How will you know if it's good? Be specific and realistic.

Mockups

Create specific visualizations that closely resembles the finished product.

Lifelong relationship

Design for old friends as well as new acquientances.

Customization

Special orders are not so special.

Expert users

Efficiency & speed.
Design for learning.

Taxonomies

The complexity of
products might be
huge. Work on how to
visualize this.

Trust

Design for safety,
recognizability and
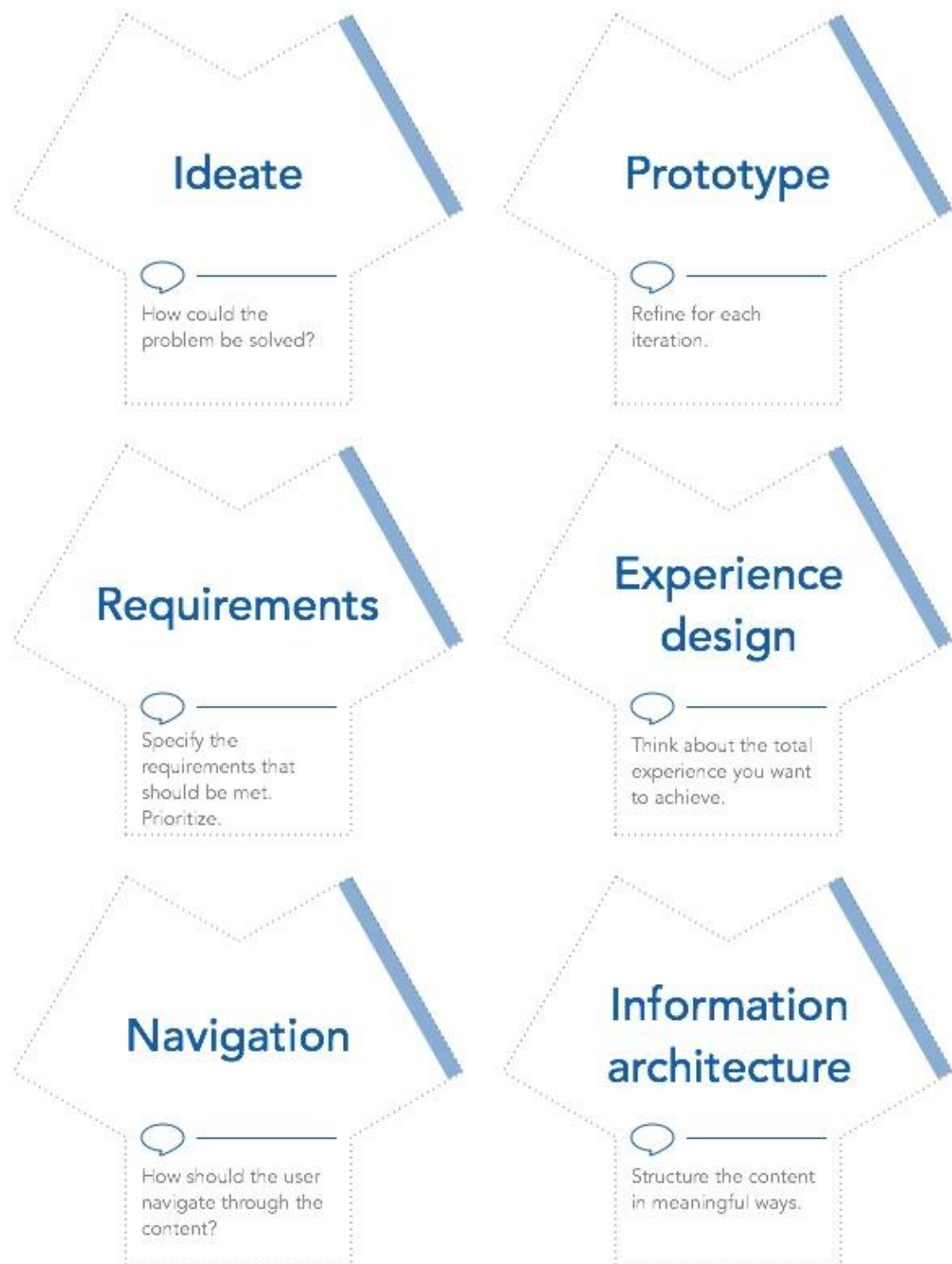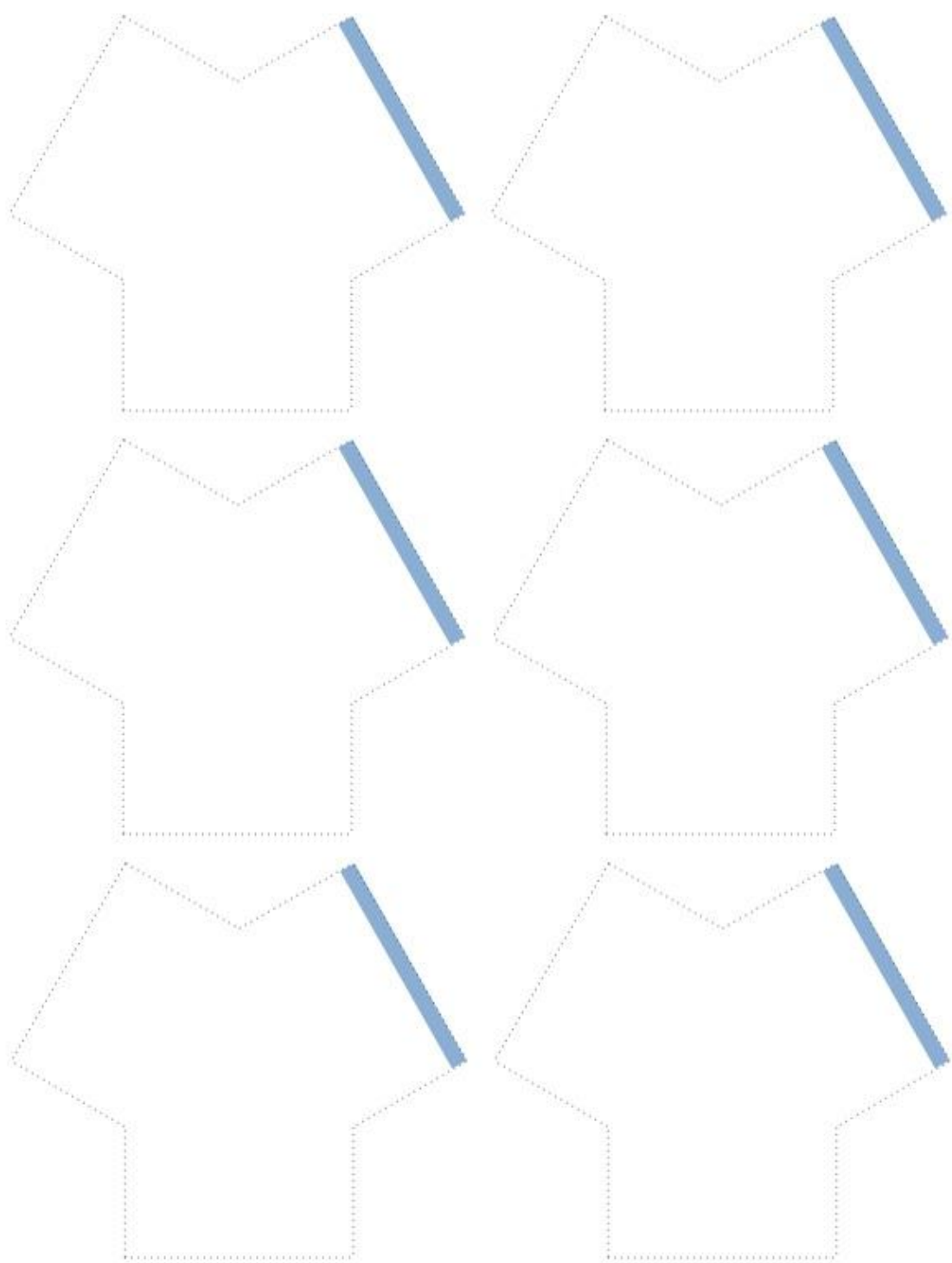professionalism.

Negotiations

Design for variations
in prices and
deliveries.

Omnichannel

Aim for the same
experience through all
channels.

Ideate

How could the problem be solved?

Prototype

Refine for each iteration.

Requirements

Specify the requirements that should be met. Prioritize.

Experience design

Think about the total experience you want to achieve.

Navigation

How should the user navigate through the content?

Information architecture

Structure the content in meaningful ways.

Brainstorm

Let a group come up with as many ideas as possible in 1h. Don't criticize, build on each other's ideas.

Focus prototyping

Prototype a specific aspect of the design.

Bodystorm

Develop ideas physically, enacting users interacting with your design.

Flow analysis

Represent the flow of information, in order to find bottlenecks.

Roleplaying

Assume different stakeholder's identities to make sure their voices are heard.

Parallel design

Compare several possible designs with each other.

6 thinking hats

Give team members different focus: Process, Facts, Feelings, Creativity, Benefits & Cautions.

Moodboard

Communicate the design concept through a collage of pictures and texts.

Sketching

Explore and/or evaluate.

Sitemap

Structure the content of the site in a map.

Storyboard

Do a comics depicting a user's session with your design.

User journey

Demonstrate a user's interaction with your design, either future or present.

Experience prototyping

Prototype the experience of using your design.

Scenarios

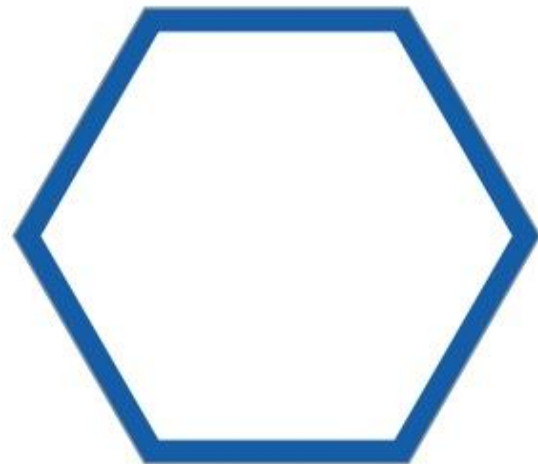Describe scenarios in which your design is being used.
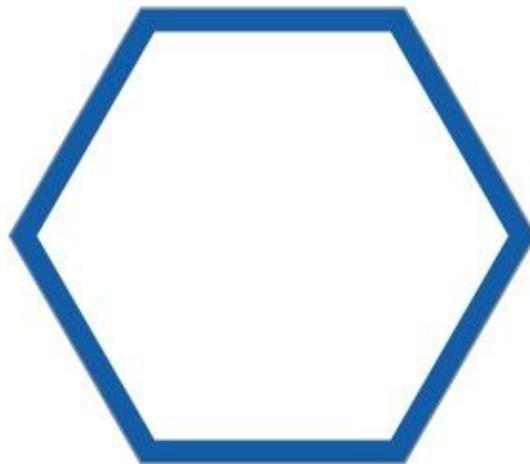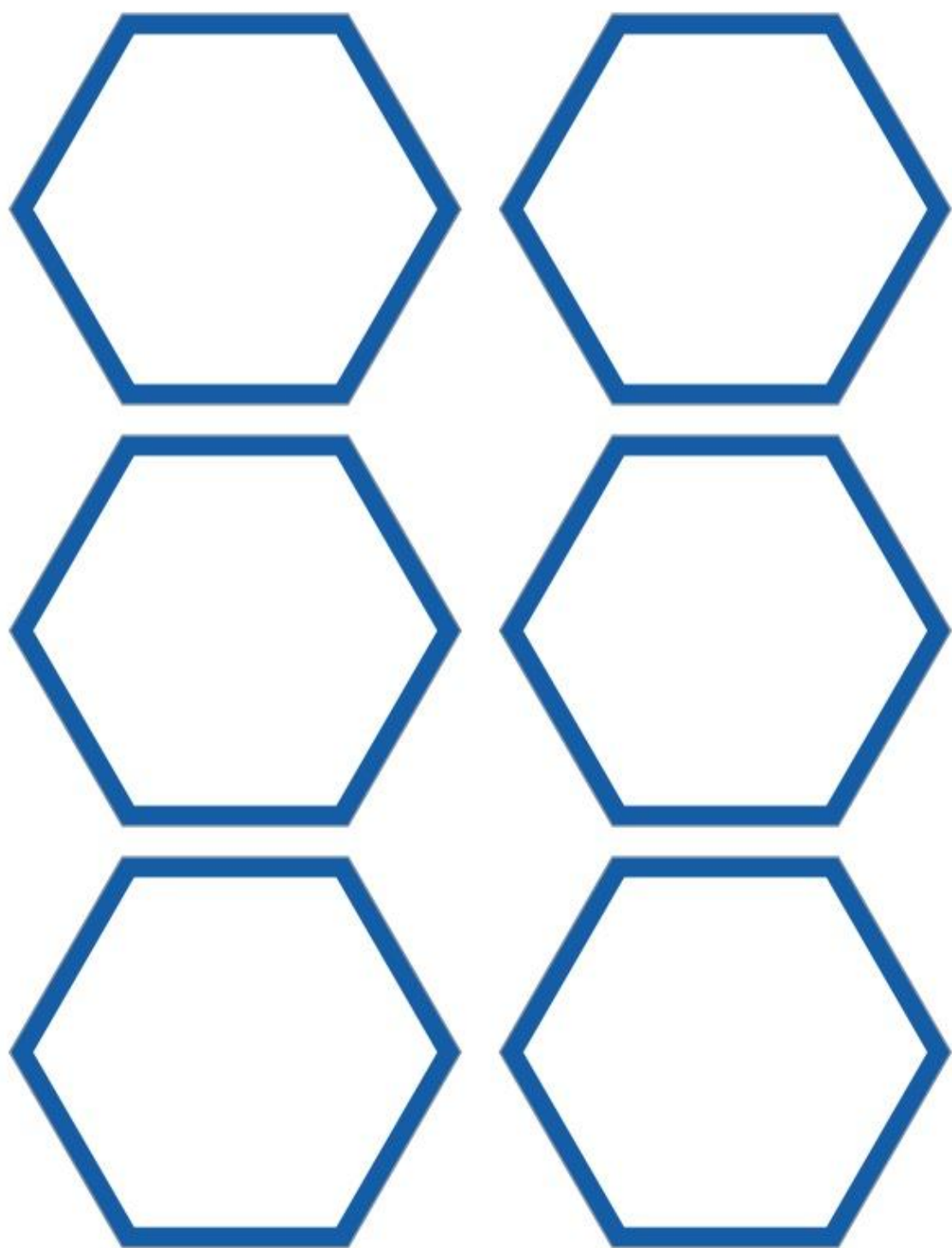
Use cases

Describe short cases in which your design is being used.

Bags of stuff

Give a group of users a bag full of craft material to prototype with.

Personas

Create characters representing the targets demographics. Base on real data.

Paper prototyping

Fail early and cheap.

Extreme characters

Find an extreme character to design for, such as Santa or Bill Gates.

6-3-5 brainwriting

6 people write 3 ideas in 5 min. Pass around and repeat 6 times.

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Usability

It should be easy to do right, and hard to do wrong.

Experience

People might spend a lot of time on this. Respect their experience.

Accessibility

Can everyone use this?

Lessons learned

Your most unhappy customers are your greatest source of learning.

A/B test

Release two versions at the same time, and observe the different outcomes.

Heuristic analysis

How does the design live up to standards?

Usability test

Is the design easy to use and consistent? How hard is it to do wrong?

Cognitive walkthrough

Have a tester think aloud while using the design.

Simplify

What can you take away?

Competitive usability test

How is the usability compared to that of competitors?

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Subjective evaluation

Try it out yourself.

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Accessibility test

Does it live up to accessibility guidelines?

Guerilla testing

If you can't find users, use what you can find.

Usage patterns

How do users interact with it? Follow mouse movements etc.

Error analysis

What could go wrong? Find the causes.

Scenario testing

Have users react to different scenarios.

Empathy tools

Use tools to assume different users' disabilities.

Metrics analysis

Analyse how the design is being used, using aggregated data.

Informal test

Ask your friends and family for help.

Wizard of Oz

Let a team member simulate the response of the system towards a user.