

UNIVERSITY OF BERGEN

MASTER THESIS

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**Confidence in oneself, confidence in others:  
Design implications for the design of  
gameful CSCW systems**

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“A Thesis is Never Done. But it can be done *enough*.”

An unnamed mentor.

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## *Abstract*

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Disentangling the intricacies of digitally supporting collaboration remains a challenge. It's a challenge which the field of Computer Supported Collaborative Work have been tackling for decades and where they've argued that collaboration might be supported without socio-economic or psychological considerations (Schmidt, 2011). In contrast, the rise of massively multiplayer online role playing games represent collaborative platforms where their collaborative dynamics are largely driven by players' emotions. Adding to that we find that the concepts of gamification or the less loaded term gameful design are increasingly being hailed as the magic bullet for getting people to act in some desired way (Kumar and Herger, 2013). McGonigal (2011a) however, argue that we need to think beyond the bells and whistles of points and badges to how gameful design may enrich interaction by empowering users. This thesis presents qualitative design research in creating a gameful CSCW system inspired by the free-flowing collaborative play seen in games like World of Warcraft (Nardi and Harris, 2006). A conceptual framework was developed and implemented as a high-fidelity prototype called Looking for Group (LFG). Focus groups were recruited from two Communities of Practice to give feedback on the LFG prototype. Three hours worth of focus group interviews were transcribed, analyzed and discussed in order to develop both theoretical implications and design implications regarding the design of gameful CSCW systems. Ultimately, we argue that confidence might be an important prerequisite to collaboration, and that gameful design might be an effective tool for creating an environment in which confidence may thrive.

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# Abbreviations

<b>CoP</b>	<b>C</b> ommunities of <b>P</b> ractice
<b>CSCW</b>	<b>C</b> omputer <b>S</b> upported <b>C</b> ollaborative <b>W</b> ork
<b>DR</b>	<b>D</b> esign <b>R</b> esearch
<b>GS</b>	<b>G</b> ame <b>S</b> tudies
<b>HCI</b>	<b>H</b> uman <b>C</b> omputer <b>I</b> nteraction
<b>IxD</b>	<b>I</b> nteraction <b>D</b> esign
<b>IS</b>	<b>I</b> nformation <b>S</b> cience
<b>LFG</b>	<b>L</b> ooking for <b>G</b> roup
<b>P&amp;P</b>	<b>P</b> ils and <b>P</b> rogrammering
<b>MMORPG</b>	<b>M</b> assively <b>M</b> ultiplayer <b>O</b> nline <b>R</b> ole <b>P</b> laying <b>G</b> ame
<b>SL</b>	<b>S</b> pillmakerlauget
<b>WoW</b>	<b>W</b> orld of <b>W</b> arcraft

# Chapter 1

## Introduction

The collaboration occurring in World of Warcraft is interesting, it's interesting due to both its magnitude and fleeting nature. Even after ten years of existence, millions of players still log into WoW on a monthly basis to play, interact and collaborate (WarcraftRealms.com, 2013). Logging into WoW means to log into a highly engaging collaborative work platform (McGonigal, 2010), where opportunities frequently present themselves for engaging in light-weight collaboration (Nardi and Harris, 2006). From moment to moment players readily band and disband to meet whatever challenges WoW would throw at them. Moreover, the players feel great while doing so. Thus, a question springs to mind: What may collaborative systems implementors learn from this?

This thesis presents design research into building a collaborative application inspired by WoW's collaborative play. The design was evaluated through focus groups with the goal of deriving implications for both theory and the design of similar collaborative systems. Figure 1.1 provides a high-level overview of how this research was structured.

In this chapter we introduce the research question along with sub-questions and argue why they could be worth asking. Chapter two presents relevant theory and defines WoW's collaborative dynamics before proposing a set of CSCW characteristics in light of relevant research. Chapter three presents how both design methods and research methods were used to create and evaluate the design. Chapter four presents the final prototype covering design decisions, main functionality and technical overview. Chapter five presents survey and focus group findings. Chapter six discusses the findings and

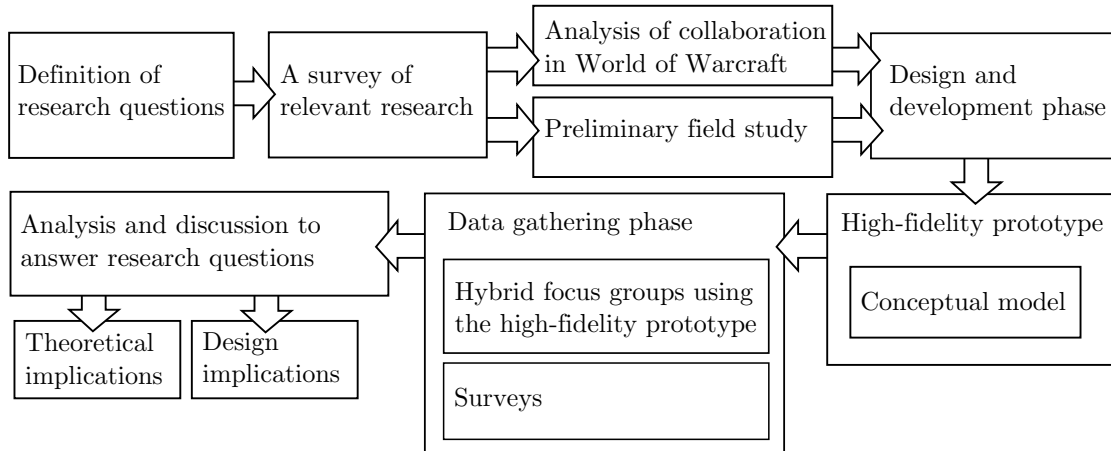


FIGURE 1.1: The overall structure of this design research effort.

develop implications for both theory and design. Chapter seven presents the conclusion of this thesis.

## 1.1 Research question

This section introduces our main research question, argues its relevance and present sub-questions to help focus the research and determine what research methods to use. The main research question underpinning our research is as follows:

*How can we recreate the collaborative dynamics found in Massively Multiplayer Online Roleplaying Games within a Computer Supported Collaborative Work system?*

In order to answer this question this thesis will be focusing on the game World of Warcraft (Blizzard Entertainment, 2013). Admittedly, WoW is but one of many MMORPGs which could have been the subject of this study. A cursory look online reveal over hundred alternatives to WoW (WhatMMORPG.com, 2014). Nevertheless, the reason for looking to WoW is that it's been a sizable contender in the MMORPG landscape for a relatively long time (Blizzard Entertainment, 2012), and that there exists a rich volume of research regarding its collaborative nature (Nardi and Harris, 2006)(Bardzell et al., 2008)(Bennerstedt and Linderoth, 2009). Thus we argue that WoW is reasonably representative for other MMORPGs.

While World of Warcraft is pure entertainment, we believe its social organization comprised of communities, knots, and pairwise collaborations with friends has implications for other domains (Nardi and Harris, 2006, p. 157).

In WoW we find a dynamic collaborative environment fueled by users' emotions (McGonigal, 2011b). Moreover, McGonigal argues that WoW's ability to provide users with work that *feels* meaningful to them has been key to its success. Researchers have already for some time been looking into how game elements might be integrated within other systems as instances of gameful design (Deterding et al., 2011). In contrast, turning to the field of Computer Supported Collaborative Work which have traditionally tasked itself with researching collaboration we find arguments for not considering emotions when analyzing collaboration (Schmidt, 2011). Schmidt argues that CSCW as a whole should pursue a research agenda which seeks to understand and support collaboration without including socio-economic nor emotional considerations in its object of analysis.

By comparing Schmidt's theoretical model and proposed research agenda for CSCW against research into collaboration in games such as Nardi and Harris (2006) and research into gameful design such as Deterding et al. (2011) one might begin to question the decision to remove users' emotions from the unit of analysis. On one hand we have this proposed CSCW research agenda which argues that emotions should be abstracted to lessen complexity, while on the other hand we have research which argues that WoW's success hinges on its ability to make users feel empowered and motivated to collaborate. Though Schmidt's model may accurately describe the mechanics of collaboration, it might be missing out on important factors underlying collaboration.

We argue that WoW present collaborative dynamics worth exploring from a CSCW perspective. By exploring this research question one might expand CSCW theory and possibly lay further groundwork towards CSCW systems that not only enable collaboration but also empower and motivate users to collaborate.

### **Sub-questions**

This section expands our main research question into more directed sub-questions which help guide our efforts. Thereafter we explain where in the thesis these questions are specifically addressed.

1. *What is the nature of WoW's collaborative dynamics from a CSCW perspective?*
2. *How could one recreate WoW's collaborative dynamics within a CSCW system?*
3. *How would such a gameful a CSCW system be received by a community of potential collaborators, and how can it fit into their existing collaborative work practices?*
4. *What theoretical implications might be distilled from our data regarding gameful CSCW systems?*
5. *What design implications might be distilled from our data for designing gameful CSCW systems?*

The first sub-question is to be addressed in the next chapter where we dive into relevant research regarding WoW and collaboration in general. The second sub-question is addressed in the prototype chapter which presents our efforts at realizing a CSCW system inspired by WoW. The third sub-question is addressed in the findings chapter which presents findings gathered through surveys and hybrid focus group interviews. The fourth and fifth sub-question is answered in the analysis and discussion chapter where this thesis's findings are discussed in light of relevant research.

In the course of this chapter a brief overview of this research work has been given. We introduced the main research question and argued its relevance in light of theory. Our main research question was then broken down into sub-questions. The answers to the sub-questions will build upon each other and together help answer our main research question.

## Chapter 2

# Collaboration: Relevant research

This chapter presents relevant research including both theory and studies with the goal of situating and supporting our design research efforts.

The relevant research to be elaborated in the following sections are Design Research (DR), Computer Supported Collaborative Work (CSCW), Human Computer Interaction (HCI), Game Studies (GS) and Community of Practice (CoP). Together, these fields provide theory and studies to help structure our research, drive the design and development and analyze our findings.

Towards the end of this chapter we analyze and define the collaboration found in World of Warcraft in light of CSCW theory. This is done to tackle the first of this thesis's sub-questions: *What is the nature of WoW's collaborative dynamics from a CSCW perspective?* Finally, this chapter concludes by presenting some technological and cultural tendencies towards more and better collaboration.

### **Selection criteria for research**

When exploring the fields of DR, HCI, CSCW, GS and CoP the focus has been on providing an introduction to the fields and central concepts. Central, more established research was consulted in order to convey some of the more influential arguments found within the fields. We also did a survey of relevant conference proceedings from the last two to three years.

To gather relevant theory and studies from no less than five fields of research pose a certain challenge when it comes to the inclusion of relevant work. We therefore contend that this chapter might have left out certain studies which could have been worth including.

## 2.1 Design science: Achieving knowledge through design

This section begins by defining design itself. Design research is then elaborated from the perspectives of HCI and Information Science. Finally, we present a design science framework by Hevner et al. (2004).

*A clarification of terms:* Design research go by various names within and without various research fields. However, within the confines of this thesis design research will be used to refer to the research approach in general. Research through design will refer to HCI design research as defined by Zimmerman et al. (2010), while design science in this thesis will be referring to Information System design research as defined by Hevner et al. (2004).

### 2.1.1 Defining design

The word design itself can refer to either a product (a design) or a process (to design) (Hevner et al., 2004). From thereon the understanding of what it means begin to differ between fields of research and between researchers belonging to the same field. In some fields even, design's ambiguous nature seem to make researchers shy away from writing about how they did their design altogether.

The design process tends to remain implicit as researchers are embarrassed by not being able to show evidence of the same kind of control, structure, predictability, and rigorousness in doing design as they are able to show in other parts of their research (Fallman, 2003, p. 230).

Dissatisfied with researchers' reluctance to write about their processes Fallman (2003) set out to disentangle the concept of design. Drawing from theory Fallman (2003) argue that there exist three main understandings of design: The conservative, the romantic and the pragmatic.



The conservative account has its philosophical roots in rationalism leading to a view of design as a problem-solving activity. A focus on process is central to the conservative account, where methodology and structure is viewed as key to understanding and practicing design. The designer disappears into the background in favor of a transparent, rational process consisting of structured methods and guidelines. In sum, the designer becomes an impersonal ‘glass box’ consisting of methods and guidelines who first breaks down a problem into smaller sub-problems before synthesizing a solution as prescribed by theory.

In contrast to the notion of the ‘glass box’ we have the ‘black box’, which is the romantic account of design as an irrational act led by emotion. It is within this account where we find the idea of the designer as a “creative genius.” The romantic idea of design suggest that the act of designing carry a certain mystical element, unexplainable by the designer. Methodology and guidelines step into the background leaving the designer with his or her values and taste basking in the foreground. In the view of the designer as a ‘black box’ the design process becomes opaque resulting in a focus on the designer and the product.

Somewhere in the spectrum between the ‘glass box’ and the ‘black box’ we find the pragmatic account of design. Central to the pragmatic account is the idea of the designer as situated in the world. Being situated means the designer always acts within some context crammed with compounding factors consisting of people, practices and artifacts. The changing nature of these compounding factors forces the designer to iteratively interpret the effects of the design on the world. Going beyond methodologies and guidelines pragmatic designers employ a certain ‘reflection-in-action’ in order to deal with uncertainty, instability, uniqueness and value conflict. The pragmatic account boils down to accepting the complexity of context. While the designer might use methodologies and guidelines to create a design its effects on context cannot be calculated on beforehand. Instead when designing designers must rely on informed guesses grounded in both methodologies and past experience, aiming for a design that fits its intended context while accepting the need for iteration due to complex contextual factors.

These three accounts all describe the nature of design. However, Fallman (2003) warns against abandoning or emphasizing one account over the others. But what *is* design? Reconciling the three accounts of design Fallman (2003) suggest that design should be

viewed as a tradition of pro-activity, a tradition guiding action and thought towards taking an active stance in the world. In practice, design becomes an iterative act of breaking down a problem and synthesizing a solution by aiming to unfold a coherent whole. The designer enters a dialogue with the resources at hand, where both the problem and the solution are developed in pair until no inconsistencies remain (Fallman, 2003). Implicit in this close coupling is also the notion whereby the designed solution leads to a deeper understanding of the problem.

### **2.1.2 Human Computer Interaction: Research through Design**

Having come to an understanding of what design is we'll now turn to elaborating design research. This section will be dealing with design research mostly from an HCI perspective, surfacing an ongoing discussion of what design research is and should be.

While [Research through Design] has become a somewhat common approach in the design research community and is becoming more recognized in the HCI community, details of what constitute this approach have not been well discussed by either community (Zimmerman et al., 2010, p. 311).

In an effort to unpack the concept of design research Zimmerman et al. (2010) argue that it's used mainly for three purposes: Firstly, there's Research about Design with the purpose of understanding the human practice of design. Secondly there's Research for Design with the goal of improving design practice by developing tools such as concepts, methods and frameworks. Thirdly, there's the purpose of investigating potential futures which Zimmerman et al. (2010) term Research through Design (RtD).

Because RtD sets out to explore potential futures Zimmerman et al. argue that it may effectively tackle wicked problems. The concept of wicked problems was first coined by Rittel and Webber (1973) referring to a certain breed of problems that feature numerous compounding variables sometimes due to interdependent social components. What's more, Rittel and Webber argue that design is capable of affecting desirable change where engineering and science alone cannot. Beyond tackling wicked problems RtD may also generate useful theory though Zimmerman et al. note that theory creation often occur as an afterthought and is seldom an explicit goal of design research.

To further develop RtD within HCI Zimmerman et al. present four key points to be heeded by design researchers in order to establish RtD as an approach capable of building both relevant and rigorous theory: (1) The development of methodology, (2) evaluation criteria, (3) research examples and (4) proper critique of theory.

On the topic of methodology Zimmerman et al. argue that RtD projects should have their progress and evolution rigorously documented. Ideally, RtD should detail the problem framing as well as the ideal state. Special attention should be paid in presenting how theories from various fields of research were integrated in the design process. Furthermore, researchers should reflect on the resulting artifact with the goal of refining or challenging existing theory. Also, researchers must better argue their choice of RtD over other forms of inquiry and avoid using RtD out of mere convenience.

Concerning the development of evaluation criteria for RtD Zimmerman et al. call for design researchers to seriously consider how RtD should be evaluated and potential theoretical contributions critiqued and valued. The authors argue that achieving well described and critically examined RtD examples would allow researchers to critically examine each other's research. On the same note, the authors admit that RtD projects by their nature cannot be perfectly replicated. Instead the authors argue that RtD need to approach the classical research qualities of reliability, repeatability and validity on its own terms for the sake of not hampering the design process.

Indeed, a design research alternative called *Design Methodology* was developed with the intention of being a rigorous and thus more scientific approach. However, Design Methodology's structured and formalized approach proved detrimental as it failed to gain a wider adoption (Jones, 1970 cited in Fallman, 2003, p. 229). Fallman note that the 'second-generation' attempts which followed in the wake of Design Methodology avoided excessive formalism aiming instead to assist collaboration and creativity.

In light of Fallman's concept of design it may seem that Zimmerman et al. call for a dynamic formalism of design research, a science performed on design's own terms, which could enable theory generation without compromising the design process itself. Moreover, their call for action urges design researchers to engage in earnest and serious critique of each other's work.

The [HCI] field is still dominated by a sense of “being first” and that creating something “new” is more valuable, recognized and sought after than in-depth analysis and critique of existing theoretical proposals (Zimmerman et al., 2010, p. 317).

If RtD is to result in theory design researchers need to consider, try to replicate and challenge the RtD projects of others. Doing so will help form more mature theories out of promising ‘nascent’ (emerging) theories proposed in singular RtD projects.

This nascent theory is different and more designerly than the nascent theory produced by qualitative fieldwork in that it focuses on uncovering important relationships between phenomena in the near and speculative future and not in the present (Zimmerman et al., 2010, p. 317).

In relation to nascent theory we find the concept of wild theory coined by Rogers (2011). Rogers argues that there’s an emerging trend where more and more HCI researchers have started prototyping and evaluating ‘in the wild,’ referring to research conducted in the field. “Researchers are decamping from their usability labs and moving into the wild [...]” Rogers (2011, p. 58). In other words wild theory trade experimental design’s controllable variables for an increased real-world relevance.

Wild theory take issue with lab-developed theories and resultant high-level guidelines such as implications and principles. It argues that while this knowledge may often be easily applied to a design it’s hard to map aspects of its relative impact back to any of the theories used. By re-conceptualizing existing theory “in the wild” Rogers (2011) call for a shift in theory from being predictive and explanatory, to instead sensitize designers to the interdependent nature of interaction in unfolding in context.

With RtD Zimmerman et al. (2010) argue for a HCI design research where researchers document more of their design process, place less emphasis on “being first” and start constructively critiquing the works of each others. A prerequisite for more constructive design research critique are better documented design processes. With this, researchers will be able to develop more mature theories out of insular research efforts.

### 2.1.3 Information Science: Design Science

This section presents IS design science in light of HCI's RtD, before introducing an IS design research framework by Hevner et al. (2004) to help structure our research.

At the outset one might notice that while HCI researchers have cautioned against a "science of design", IS clearly term their design research efforts design science. However, IS design science seem to avoid the pitfalls of Design Methodology by trying to structure the design research on design's own terms.

That is the essence of design science. Contribution arises from utility. If existing artifacts are adequate, then design-science research that creates a new artifact is unnecessary (*it is irrelevant*). If the new artifact does not map adequately to the real world (*rigor*), it cannot provide utility. If the artifact does not solve the problem (*search, implementability*), it has no utility. If utility is not demonstrated (*evaluation*), then there is no basis upon which to accept the claims that it provides any contribution (*contribution*). Furthermore, if the problem, the artifact, and its utility are not presented in a manner such that the implications for research and practice are clear, then publication in the IS literature is not appropriate (*communication*) (Hevner et al., 2004, p. 91, emphasis added).

Each of the emphasized portions of text refer to the framework guidelines which will be elaborated shortly. While much of the design research presented so far has come from the field of HCI this framework was developed within the field of IS, which reveals some differences in culture.

IS research's broad goal is to develop knowledge of how organizations can increase their efficiency and effectiveness by developing and implementing various information systems (Hevner et al., 2004). And to reach that goal IS research has been mainly done in the form of behavioral research and design science research. On one hand, behavioral research works to contribute theories that help explain and predict the interdependencies between people, technology and organizations. While on the other hand, design science research is essentially a problem-solving paradigm which aims to contribute innovative artifacts to aid in the analysis, design, development and implementation of information systems.

IS research acknowledge that design research must often venture into domains for which sufficient theory is nonexistent prompting the researchers to invent their approach as they go along. “Theories regarding their [IT artifacts] application and impact will follow their development and use” (Hevner et al., 2004, p. 76). Thus, products of IS design research often end up becoming the focus of subsequent behavioral research, which in turn might inform future design research.

In general HCI and IS tend to pursue design research for different reasons. While HCI design research has been done for the purpose of exploring the relationship and possibilities between humans and computers, IS design research has focused their efforts on mainly targeting business needs. “Framing research activities to address business needs assures research relevance” (Hevner et al., 2004, p. 79).

Furthermore, the narrow research focus of IS which targets business needs might have allowed them to mature their design research approach faster than their HCI counterparts. While HCI design researchers call for a fragmented field of design research to unite behind common criteria for reporting and critiquing design research (Zimmerman et al., 2010), IS design researcher seem to have already managed to agree upon some clear ‘rules of engagement’ as presented by Hevner et al. (2004).

Nevertheless the IS design researchers are not immune to some of the concerns voiced by HCI researchers. The difficulty of successfully mapping theory to designed implementations and back again are also valid here. And the IS framework by Hevner et al. (2004) try to meet such theoretical concerns by stating that artifacts must be implementable and possible to evaluate.

As mentioned earlier in the chapter, HCI researchers’ regard wild theory and nascent theory as possible theoretical outcomes of design research. Hevner et al. (2004) argue a different approach where IS design research result in IT artifacts and IS behavioral research result in theories. Moreover, Hevner et al. (2004) argue that IT artifacts should chiefly show that they work and that the matter of why they work is of lesser importance and left to be figured out at a later stage. In other words, IT artifacts are mainly valued for their utility and relative impact and not so much their explanatory power.

Considering this, one might argue that design science has achieved a design research on design’s own terms as argued by Zimmerman et al. (2010). And that design science

has answered the call for wild theory by Rogers (2011) in the concept of IT-artifacts (sensitizing concepts) which help realize information systems at the intersection of people, organizations and technology (distributions of change). However, design science subject of interest is not researching the everydayness as mentioned in wild theory. The narrow research focus founded upon business needs have allowed design science to mature within IS into a framework such as the one by Hevner et al. (2004).

#### **2.1.4 An Information Science framework for design research**

This section introduces an Information Science framework for design research developed by Hevner et al. (2004). This framework was selected for its maturity and clear guidelines on how to perform design research. Each of the framework's guidelines will be introduced below in turn.

*1. Design as an artifact.* Design-science in the context of Information Science is the creation of an IT artifact built to address an important problem of organizational nature. Hevner et al. (2004) argue that the types of IT artifacts may range between instantiations, models, methods and constructs applied in the development and subsequent use of the information system. Hence, working prototypes or implemented systems termed instantiations is but one of the possible contributions offered by design research. Still, all designed artifacts must be implementable (usable) in building working prototypes. Types of design artifacts include:

- Methods are the processes or 'best practices' that help explore the range of possible solutions where examples include the process of iterative prototyping or the process of conceptualizing the problem space.
- Constructs signify vocabulary, concepts and symbols, the benefit of constructs is that once defined this additional vocabulary sensitizes us to and allows us to more easily speak of potentially complex concepts and phenomena.
- Models are abstractions and representations, often represented as a framework of interrelated constructs that help people wrap their mind around a complex problem or a system by providing an abstracted overview.

2. *Problem relevance.* “Formally, a problem can be defined as the differences between a goal state and the current state of a system” (Hevner et al., 2004, p. 85). Speaking from the standpoint of IS research, the framework urge researchers to address problems found at the intersection of people, organizations and information technology.

3. *Design evaluation.* Proper evaluation of the design artifact is key to exploring and ensuring its usefulness and effectiveness. The design artifact is evaluated against requirements derived from its intended environment (Hevner et al., 2004). Also worth evaluating is the process by which the prototype was constructed so that design processes may be improved. Evaluation that is well executed and well documented give weight to the research contribution.

4. *Research contributions.* To be effective, design research must provide clear and verifiable contributions. Hevner et al. (2004) explain that design research offer mainly three types of research contributions:

- Quite often it is *the design artifact* itself that becomes the main research contribution as a product existing knowledge applied in new and innovative ways, solving a relevant and previously unsolved problem.
- Contributions may also be of more *foundational* nature where new and useful constructs, models, methods or instantiations are offered which extend the existing knowledge base of design research. An innovative construct for instance may provide a shift in thinking that unlocks a range of possible research avenues.
- The third type of design research contribution is that of *methodologies* such as the creative use of development methods, evaluation methods and possibly the addition of new evaluation metrics.

The criteria made to assess contribution should focus on representational fidelity and implementability (Hevner et al., 2004). Representational fidelity pertains to how well the artifact fits with its intended environment. Furthermore the IT - artifact must be ‘implementable’, meaning it must be possible to make use of this contribution in developing an information system.

5. *Research rigor.* Design-science research relies upon the use of rigorous methods when constructing and evaluating the designed artifact. In other words, rigor is the use of



appropriate techniques to create theory or artifact and the skillful selection of means to justify that theory or evaluate the artifact. Broadly speaking rigor comes from the effective use of existing knowledge.

In other fields of research this rigor may come from strictly adhering to proper data collection and analysis techniques. However Hevner et al. (2004) caution against pursuing rigor to such an extent that it diminishes relevance, arguing that the artifact's intended environments may defy excessive formalism. One must avoid 'assuming away' factors of these environments or important parts of the problem, thus removing real-world relevance for the sake of rigor. Assessing rigor, especially rigor in the development phase, needs to be done with respect to the artifact's applicability and generalizability. The methods employed in the design-science research, how they were used and how strictly they were followed, determine how generalizable the results are and how well they may be put to use. Furthermore when assessing an artifact one must also make a conscious choice as to which metrics to measure. Finally, Hevner et al. (2004) argue that design-science is less interested in why an artifact works relegating such questions to behavioral research and instead argue that design-research should emphasize exploring how well an artifact works.

*6. Design as a search process.* A fruitful way to view the design-research process is that of a journey where the starting point is a relevant problem from which a search towards a solution begins. When performing this journey available means are used to reach the desired goal all of which must obey certain conditions provided by the environment. Considering the iterative nature of many development processes it's perhaps even more fitting to call it a search process.

Aspects of the goal state constrained by conditions inherent to the environment together lead to a certain range of possible solutions. However as argued by Hevner et al. (2004, p. 85), "[e]ven when it is possible to do so, the sheer size and complexity of the solution space will often render the problem computationally infeasible." In other words, one cannot explore all alternative approaches, determine all their pros and cons, and outline all the conditions that constrain the solutions. Therefore Hevner et al. (2004) argue that design research should focus on establishing that an artifact *does work* and uncovering characteristics of the environments in which it works. This emphasis enables design

science contributions to be more quickly put to use. By readily putting working artifacts to use the contexts of their use may provide valuable starting points into further research.

In the search for knowledge design science is willing to accept decomposing a problem into simpler sub-problems and simplifying factors related to means, goal state and environmental conditions. Simplification may help provide initial insights which may then be iteratively refined to become more realistic and solve a greater problem. Hence, the search process may be modest in its ambitions and realism yet provide an important starting point for more rigorous research. These refined insights may then lead to a greater understanding into *why* an artifact works.

*7. Communication of research.* This guideline argues that the research must be written with both management-oriented and technology-oriented audiences in mind (Hevner et al., 2004). Management requires enough information to decide whether or not to dedicate resources into constructing the artifact while technical staff require enough information to be able to construct the artifact. In other words, the design research must be effectively communicated to the decision makers within a community or organization so that they may decide whether or not to invest time and effort to integrate that artifact into the daily affairs. And of equal importance is communicating enough information so that developers may effectively construct and/or extend the artifact.

Together these guidelines form a framework that will help guide the research conducted within this thesis and in discussing our findings.

## 2.2 HCI and Interaction Design

This section introduces the field of Human Computer Interaction (HCI) and the closely related field of Interaction Design (IxD). We'll present the history behind HCI and IxD together with some central concepts. Both HCI and IxD contain research worth considering when embarking on a design research journey. While this section might be comparatively short, we rely on HCI and IxD theory in much this research perhaps especially in the design process.

HCI is a field of research which emerged in early 1980s with the research goal of making computers usable (Carroll, 2013). As personal computers started to make their way into

households a need emerged for adapting these computers for use by a wider public. To this end, HCI developed a central term of *usability*.

This concept [usability] was originally articulated somewhat naively in the slogan “easy to learn, easy to use”. The blunt simplicity of this conceptualization gave HCI an edgy and prominent identity in computing (Carroll, 2013).

Presently, HCI has become a field burgeoning with research. “HCI is the name for a community of communities” (Carroll, 2013). The concept of usability served to keep the field of HCI together over the decades, evolving to keep up with technology and society. As the interplay between technology and society develops over time novel technologies step into our cultural background. An example would be how the desktop metaphor represented a radical change from previous command line input, a change which at the time seemed threatening to office workers and their practices. The desktop metaphor has since become a part of our culture to the extent that it tends to be readily grasped by children. In that respect, Carroll (2013) propose that HCI is more similar to world history than physics. Over time, the artifacts within our society shape our tasks which in turn form the basis and inspiration for new artifacts.

This perspective of the co-evolution of society and technology, this perspective of task-artifact cycles, is central to HCI. It sensitizes researchers to the possibilities in present tasks for novel artifacts. Additionally, it reminds researchers to consider how their designs may shape people’s tasks to form new ground for novel designs. However, Carroll (2013) note that though this perspective help researchers picture trajectories of technological development the future quickly becomes unpredictable. And in trying to guide technology along such trajectories towards usability may lead to unforeseen consequences which may persist over decades.

For example, many people struggle every day with operating systems and core productivity applications whose designs were evolutionary reactions to misanalyses from two or more decades ago (Carroll, 2013).

Beyond faulty software HCI also tie into broader environmental issues. Kaptelinin and Nardi (2006) argue that designers and researchers should also be mindful of the currently

inadequate means to handle the waste and toxins produced by the billions of electronic devices being made.

If a historical developmental perspective frames our view, we cannot merely hope for the adoption of the technologies we intentionally design; we must consider wider impacts (Kaptelinin and Nardi, 2006, p. 12).

To mitigate such consequential misanalyses HCI has ingrained in itself a culture of exploring alternatives. This means exploring alternative approaches within a single research endeavor. And on a deeper more profound level, to consider alternative perspectives on humans' relation to technology. To that end, a number of grand theories co-exist within HCI each of which aspire to provide a deep and fruitful understanding of the task-artifact relationship (Rogers, 2004). For the purpose of answering our research question such extensive theories have been deemed outside of the scope of this thesis. While employing grand theories might greatly enrich the design and subsequent discussion they often require a non-trivial amount of effort to be used. So, for the purpose of this thesis that effort has been put into exploring a synthesis of theory where HCI theory is but one of five fields consulted in this chapter. Ruling out using grand theories still leaves a wealth of other HCI theories, owing to the eclectic nature of this community of communities.

“One of the most significant achievements of HCI is its evolving model of the integration of research and practice” (Carroll, 2013). Originally, this model constituted a symbiosis between cognitive science and cognitive engineering. Over time, as HCI appropriated theories from other fields of research and developed theories, and even sub-fields of its own, HCI also managed to develop this relationship between research and practice. This relationship is often constructively critiqued such as with Research through Design and Wild Theory which we covered earlier in the section on design research. Conceptions of how theory may inform design and how design research may contribute theory is often contested.

Having introduced HCI in very broad terms, we now turn to presenting promising concepts found within HCI and Interaction Design to be applied in the design and subsequent discussion.

### 2.2.1 Interaction Design

In addition to HCI theory, the work undertaken by this thesis will also be leaning on methods and techniques found in the design field of interaction design. The goal of this section is to briefly present interaction design, its relation to HCI and some key ideas central to this design discipline.

“Interaction design is about shaping digital things for people’s use” (Lowgren, 2013). Compared to HCI Interaction Design is more practice oriented, aiming to uncover how to best design user experiences. The concept of user experience may seem easily grasped at first but once explored more in depth reveal a complex set of inner workings (Hassenzahl, 2013). In this thesis we define user experience as the sum of a user’s impression and feelings regarding the product, determined by the design of the product interacting with the nature of the user (Rogers et al., 2011). From this definition it follows that a user experience cannot be completely designed since it is only the nature of the product that can be adjusted. Instead it is more fruitful to view the designer as designing *for* a certain user experience by making design choices in the product while mindful of its intended users and the targeted user experience. In other words, the choices made in the design process simply aim for an intended user experience.

As mentioned, the concept of *usability* helped focus the field of HCI as it grew ensuring that their mission was to make digital devices more usable. Within interaction design, the concept of usability was joined by the concept of user experience prompting designers to design devices which purposely elicit certain feelings.

There is not a clear-cut difference between usability and user experience, work put into designing to improve usability will affect the user experience and vice versa (Rogers et al., 2011, p. 18). Simply put, usability relates to designing devices that are easy to learn and effective to use while user experience is related to purposely designing for feelings. When designing, the interaction designer defines and works towards hitting goals related to both usability and user experience.

When HCI welcomed designers into its fold they helped shape it as design discipline. Eventually this resulted in the creation of several design disciplines and the uncovering of important issues relevant to HCI. Interaction design later became one of the first exports from HCI into the design world (Carroll, 2013). Having originated from within

HCI, Interaction Design seem to have inherited its tendency towards pluralism, similarly becoming an eclectic field yet more focused on the practice of design rather than the creation of theory. Interaction design's multi-faceted nature can be seen in how interaction designers readily combine, re-combine and develop methods, techniques and frameworks to achieve their designs.

HCI and IxD have grown to be eclectic fields of research brimming with research offering useful perspectives, instructive examples, methods and concepts worth considering when embarking on design research.

## **2.3 CSCW: Disentangling collaborative work**

Computer Supported Collaborative Work (CSCW), is a field that researches collaboration in order to uncover the nature of collaboration and how to best support collaboration through digital means. This section will present the field of CSCW together with some key concepts to help understand collaboration and how it can best be supported.

CSCW is commonly introduced as a field which came about in the mid-eighties. The acronym 'CSCW' first appeared with a workshop held in 1984, in its wake followed two conferences in both the USA and Europe, before the research efforts eventually led to the emergence of the CSCW Journal in 1992 (Schmidt and Bannon, 2013). Since then, the heterogeneous field of CSCW has undergone several evolutions sparked by discussions regarding its scope and focus to the point where Schmidt and Bannon (2013) argue that its continued existence is a feat in itself.

Important turning points include the rise of ethnographic workplace studies, and the employment of those studies as basis for more general analytical frameworks (Schmidt and Bannon, 2013). Arguably, this has helped CSCW theory remain sensitive towards the convoluted nature of collaboration within and across collaborative systems and organizations.

### **2.3.1 A vocabulary for collaboration**

Talking about collaboration might seem easy enough, as in 'I know it when I see it' type of easy. However, capturing the changing nature of collaboration in a definition may prove

surprisingly challenging. Humans cooperate on levels ranging from groups to global societies, and cooperate with a comprehensiveness ranging from merely trying not to get in someone's way (Møller and Dourish, 2010), to more tightly knit collaborations. So, to enable us to unambiguously discuss collaboration in all its forms we need to establish a vocabulary grounded in a consistent conceptual framework.

In a book by Schmidt (2011) he presents a conceptual framework which has been developed over two decades of research into collaboration. Developing a conceptual framework for collaboration has not been unproblematic as Schmidt admits in his book. Nevertheless, by encountering and having to resolve the various conceptual inconsistencies Schmidt argues that the framework has matured to be far more suited than certain alternatives which he contends 'seem to cut no ice.'

Throughout his article Schmidt (2011) provide a rationale for his framework in which he makes a number of 'strategic distinctions' to lessen complexity and avoid becoming lost in a jungle of ambiguous definitions. One very notable distinction is that Schmidt argues that CSCW is fully able to understand and support collaboration without socio-economic nor emotional consideration in its subject of analysis.

Cooperative work has been identified as a phenomenon we can study systematically, as a category of work practice, distinct from its organizational and socio-economic form, and irrespective of what mutual feelings of companionship actors may or may not have. That is, cooperative work practices have been made a researchable phenomenon (Schmidt, 2011, p. 26).

Schmidt's strategic program for CSCW propose a number of concepts to help conceptualize collaboration. The following paragraphs will explain each of them in turn.

1. *Cooperative work arrangements.* Faced with the multifaceted, all-encompassing nature of collaboration Schmidt argues that CSCW should focus its attention upon cooperative work arrangements. To explain this and related concepts Schmidt draw up a scenario where two persons decide to move some chairs and a table. "There is the unfolding pattern of cooperative interdependencies and interactions, as the two men engage in the task and perform their work [...]" (Schmidt, 2011, p. 10). This unfolding pattern which emerges between these two actors to complete the work to be done, that is what Schmidt terms a cooperative work arrangement.

2. *Work organization.* In contrast to the dynamically enacted cooperative work arrangements, we have work organization which refers to a relatively stable configuration of actors. An example of a work organization could be a team of firemen who have been trained to respond as a unit to some predefined event. The key difference is that work organizations are a mobilization of resources, a configuration of actors, prior to the work and the arrangement typically persists after the work is completed awaiting a similar task to appear.
3. *Interdependence in work.* When two or more actors decide to collaborate in completing a set of tasks, chances are that the tasks will vary in the interdependence required to complete them. On one hand some tasks may be completed by an actor working alone like moving small furniture around in a living room, collaborating to complete such tasks is primarily done to speed up the process. On the other hand we have tasks that require at least two or more people acting together in order to complete, like moving a big, heavy piece of furniture for instance. Schmidt argues that being interdependent in work represents an important distinction from simply being interdependent due to the sharing of some scarce resource; sharing a budget; being equally dependent on the bus being on time or being employed by the same organization. “Different rules apply and hence different practices are involved. Without the distinction, the term ‘interdependence’ is analytically useless” (Schmidt, 2011, p. 12).
4. *Difference in coupling.* Closely related to the previous post, in addition to being interdependent the actors’ actions may also be tightly or loosely coupled. Within Schmidt’s aforementioned scenario he explains that when two actors start carrying a table together they’ll be tightly coupled to each other by virtue of the table being solid. Any movements by one of the actors will be instantly communicated to the other through the table. When navigating the solid table through a stairway the high degree of coupling will provide the actors with the means to instantly communicate problems and possibilities. In contrast, one may also have a task which also require an interdependent effort of two actors yet feature a loose coupling, such as two people carrying a large carpet. If two actors were to carry a large carpet through a doorway the task itself might be easier to accomplish because the carpet is more flexible than a solid table. However the large carpet’s flexibility



also represents a loose coupling in which any difficulties experienced by any of the actors won't be as quickly communicated to the other.

5. *Articulation work.* Articulation work represent the secondary actions required to coordinate and integrate the actors' efforts in a cooperative work arrangement. In other words, *in addition to the work itself* articulation work is the coordinative and integrative effort that is required for the smooth completion of that work.
6. *Granularity and scope.* When observing collaboration the scope and granularity may vary greatly. One might consider individual actions in themselves like the singular movements of individual pieces of furniture, or one might consider all the actions together as a set and instead consider moving furniture as a consolidated set of actions. In sum, collaboration might be researched at many varying levels ranging from societal, to group to individual actors. Furthermore, collaboration might also be researched at the level of actions grouped together over time or at the level of an individual concerted action happening at a distinct moment in time.

### **2.3.2 Towards complementing natural protocols**

In addition to the concepts and important distinctions which are outlined above Schmidt (2011) also introduced the concepts of coordinative mechanisms and ordering systems. After spending a lot of time doing ethnographic research on collaboration occurring at factory floors, within businesses and the like Schmidt became aware of a vast, multi-faceted collection of coordinative practices.

Faced with an increasingly complicated workplace workers often invent various coordinative practices to simplify their lives (Schmidt, 2011). Examples of such coordinative practices include routine morning meetings, pair programming, established norms for performing articulation work etc. Additionally, the workers might also employ a number of coordinative artifacts such as calendars, post-its, computer systems etc. to assist their coordinative practices. Grouped together these artifacts and practices form coordination mechanisms like for instance a project management board (artifact) which is coupled with certain agreed upon ways of using it (practice).

The concept of coordination mechanisms was developed in opposition to the then prevailing opinion in CSCW according to which IT systems cannot or should not regulate interaction (Schmidt, 2011, p. 1994).

Coordination mechanisms were made in response to a decisive critique raised by Suchman (2007), which argued that systems which imposed strict rules of execution upon its users were doomed to fail due to the unpredictable nature of context. While plans often provide step-by-step procedures for action, Suchman argues that in practice they become resources for actions because they almost always require adjustments to fit the concrete context of use. Thus according to the theory of situated action systems including collaborative systems should solely present themselves as potential resources for the users.

Schmidt found this criticism unduly pessimistic and he retorted with the proposition that collaborative systems should expose their underlying plans as resources to be manipulated by its users. In other words, while a collaborative system may suggest step-by-step plans for collaboration its users should be able to manipulate those plans and control their concrete execution. Schmidt accepts Suchman's argument that plans are resources for situated action, and uses it to argue that a malleable coordination mechanism would in fact be a resource for situated action.

Using the concept of coordination mechanisms Schmidt was better able to reason about the various collaborative practices and specialized artifacts. Nevertheless, despite its immediate utility the coordination mechanism concept revealed some serious shortcomings.

As this work progressed and matured, Ina Wagner and I, in our effort to be able to embrace the multifarious nature of coordinative practices in contemporary workplaces as exemplified in the work of architects, developed an approach in which coordinative artifacts and protocols in their infinite variety are taken as the point of departure, without any presumption that they bond or have to bond in specific ways (Schmidt, 2011, p. 23).

Schmidt and Wagner had to reconcile the realities of collaboration which they encountered in their research with their theoretical models. Instead of arguing that coordinative protocols (*practices*) and coordinative artifacts always needed coupling, they instead

made the concepts wider stating that they *might* be coupled in various ways. Additionally, Schmidt and Wagner introduced the concept of ordering systems which represent more or less tightly coupled clusters of coordinative protocols and coordinative artifacts.

In sum, Schmidt has through his research developed a conceptual framework meant to describe and understand the complex reality of collaboration. And he argues that the field of CSCW need to pursue technologies that augment users' natural protocols with artificial protocols, helping them express malleable coordination protocols and coordination artifacts.

## 2.4 Game Studies: Play as a collaboration enabler

In this section we explore the interdisciplinary field of Game Studies for knowledge to build upon in our research. The societal impact and prominence of video games have grown exponentially over the years, a growth which have garnered interest within both industry and academia.

We begin with a brief introduction to the field in general before defining exactly what we mean by the concepts of play and games, we then dive into a selection of game study research focused on collaboration.

### 2.4.1 Introducing Game Studies

The significance of video games (and thus Game Studies) is often argued through sales figures and usage numbers. While this does establish a certain importance from an economical standpoint the societal impact of having an increasing number of people spending time immersed in video games may be even more profound than that (Fromme and Unger, 2012).

While video games had been the subject of some research during the eighties and nineties it was first at the turn of the millennium that Game Studies established itself as an emerging field of research. Key to this development was the establishment of an international journal called Game Studies and an international association for digital games research called DiGRA. It was also around this time that studies into games started shifting from research asking whether or not games induce violence over to research asking what

are the capabilities and the significance inherent to this new medium. However, as the researchers Fromme and Unger (2012) note the public and other fields of research still hold significant skepticism towards games. This can be seen in the volume of “do-games-*induce*” type of research that focus on explaining how parents may protect their children against gaming addiction for instance. While this research is important in its own right, Fromme and Unger (2012) note that such critical skepticism often follow in the wake of new mediums as was the case when books, films and television were fledgling mediums.

Though a large body of game studies concerns itself with gamer culture and exploring how technology and culture co-evolve, there are also other more applied strains of research focused on employing the knowledge of games and gamers to improve society. We’ll look into that shortly but for now it would be fitting to define what a game is.

### **2.4.2 Defining play and games**

There have been several attempts at defining what games are and what it means to play. In their book Salen and Zimmerman (2004) compare a total of eight definitions made by people including game scholars, game historians and game designers. Having compared the definitions they attempted to piece together their own ninth definition.

A game is a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome (Salen and Zimmerman, 2004, p. 80).

We’ll be relying on this definition when we talk of games in this research. Salen and Zimmerman (2004) admit that the application of their definition may become fuzzy at times. Nonetheless, they argue that the definition is wide enough to capture the broad nature of games without becoming too watered out.

Similarly, McGonigal (2011b) also note the challenges in defining what games are or what it means to play. Approaching this definitional task from a pragmatic point of view McGonigal argues that the philosopher Bernard Suits has made the single best definition of a game: “Playing a game is the voluntary attempt to overcome unnecessary obstacles” (Suits, 2005 cited in McGonigal, 2011b, p. 22).

Suit's definition elegantly captures the elusive yet ever-present nature of play. Completing a work related task can feel like playing a game. While completing a game may feel like a chore. With Suit's definition we define what it means *to play a game* and with the definition of Salen and Zimmerman (2004) we capture *what games are*. McGonigal (2011b) differ in her definition of games in that she argues that games should include feedback systems and be voluntary, while Salen and Zimmerman (2004) argue that games need not be voluntary and that games need only have a quantifiable outcome. On a more fundamental point these researchers differ in that Salen and Zimmerman (2004) set out to understand and design better games while the mission of McGonigal (2011b) is to explore how games may improve everyday life.

Having defined play and games we'll now look at why games are able to be so engaging. "Playing World of Warcraft is such a satisfying job, gamers have collectively spent 5.93 million years doing it" (McGonigal, 2011b, p. 50). Tellingly, McGonigal note that when Age of Conan a competitor to World of Warcraft was launched many players complained about the game being too easy in other words that the game didn't provide enough work. Tough, hard work is something gamers seek out in games. If a task is too easy it becomes boring, reversely if it's too hard it becomes off-putting. However, if the task proves perfectly challenging the person doing the work he or she may end up in a state of flow, a state of being fully immersed in a task (Csíkszentmihályi, 1975 cited in McGonigal, 2011b, p. 35). According to Csíkszentmihályi, flow represents the greatest form of happiness achievable by humans. And flow may be achieved by doing many different tasks. However, Csíkszentmihályi argues that games are especially suited to facilitate flow in that they often include tailored obstacles, self-chosen goals and continuous feedback.

Closely related to flow we find the concept of *fiero*, which refers to the neurochemical high felt after conquering some adversity (McGonigal, 2011b). By adversity, one may refer to any sort of life challenge including the tailored challenges found in games. Moreover, the larger the adversity overcome the greater the resulting *fiero*.

Beyond the emotional rewards achievable by games McGonigal (2010) argue that games cultivate four gamer qualities which are urgent optimism, social fabric, blissful productivity and epic meaning.

- Urgent optimism: In the face of seemingly daunting challenges gamers are always able to muster urgent optimism believing that victory is always attainable.
- Social fabric: Games cultivate trust in that players trust each other to stick with the game for the duration of the game and abide by the rules.
- Blissful productivity: Given the right type of work a gamer will devote significant effort to complete simply because it feels fulfilling.
- Epic meaning: Gamers enjoy being part of something larger, something meaningful, attaching their individual efforts to a larger purpose.

Together, these qualities make for highly-motivated, courageous, sociable gamers who believe that they're individually capable of changing the world. "And the only problem is that they believe that they are capable of changing virtual worlds and not the real world" (McGonigal, 2010).

As argued thus far the dynamics of games and play have readily made their appearance both academically, economically and in society in general. Inspired by this prowess various people have tried to make use of games in creating instances of gamification and alternate reality games for the sake of changing the real world, a topic to be explored in the next section.

### **2.4.3 Gameful systems and serious games**

This section will introduce the concepts of gamification and alternate reality games together with some illustrative examples with the goal of distilling some key takeaways to be used in our research.

Gamification is the integration of game principles or game mechanics into non-game environments according to Kumar and Herger (2013). The term gamification came into fashion around 2008 and has since established itself as something of a buzzword regarding how games may can be used to create more engaging systems. On a broader level, some researchers have argued that society at large may be experiencing a rise of 'ludification.'

Technologies, tropes, references and metaphors, mindsets and practices flowing from games increasingly suffuse society and everyday life, most notably playful identities and playful media practices (Deterding et al., 2011, p. 10).

As it has risen into popularity gamification has also become a heavily contested term carrying disparate definitions and interpretations.

I realize that gamification is the easy answer for deploying a perversion of games as a mod marketing miracle. I realize that using games earnestly would mean changing the very operation of most businesses (Bogost, 2011).

Gamification has been criticized by both game researchers and game designers. Kumar and Herger (2013) warn against using gamification to ‘chocolate cover broccoli.’ Echoing this sentiment McGonigal (2011a) argue that gamification should be used to enrich interaction not to make users addicted. Moreover, researcher Evgeny Morozov argue that it’s at best naive to discuss gamification without also taking a hard look at the teachings and implications of behaviorism (Poole, 2013). Kumar and Herger (2013) emphasize that there are ethical and legal considerations to heed when gamifying a system.

Gamification’s mixed-bag of connotations resulted in that researchers would invent their own terms thus possibly adding to the confusion of game terminology. To address the convoluted nature of the term gamification Deterding et al. (2011) suggest that the term might be recast as *gameful design* so as to have a term with less baggage and bewildering connotations. And in recognition of preexisting research they situate the term gameful design alongside other game related terms. Their delineation can be seen in figure 2.1.

Deterding et al. argue that gameful design is a useful complement to that of playful design, which has already established itself as a term within HCI. Gameful design represent a more specialized design practice residing within the broader design space of playful design.

“Where ‘playfulness’ broadly denotes the experiential and behavioral qualities of playing (*paidia*), ‘gamefulness’ denotes the qualities of gaming (*ludus*)” (Deterding et al., 2011, p. 11).

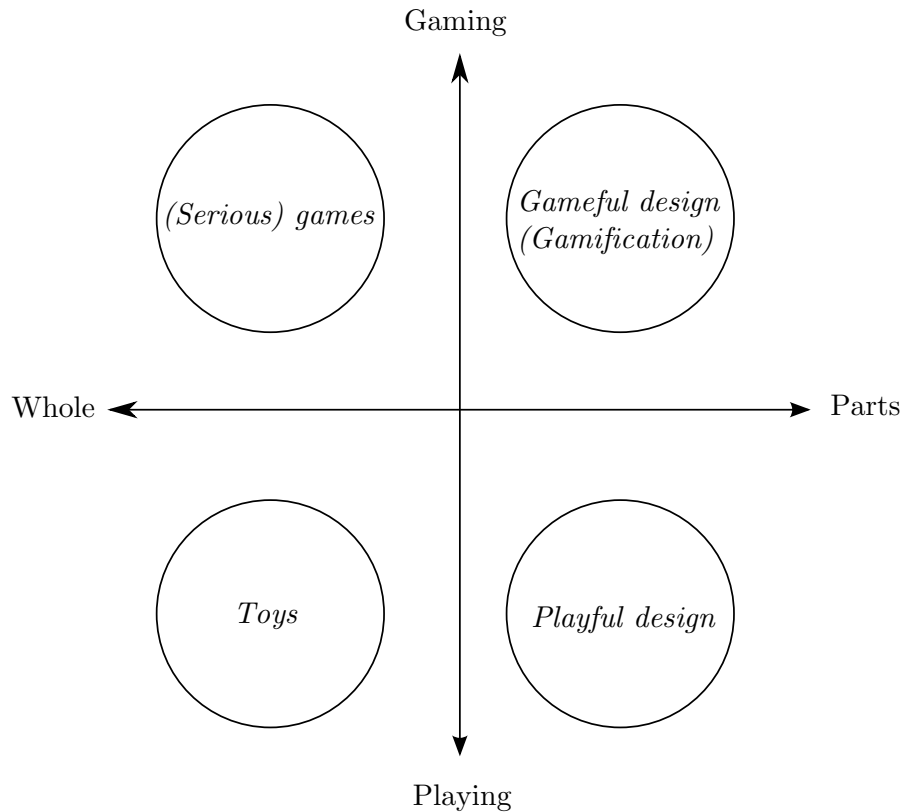


FIGURE 2.1: Overview of gamification related terms (Deterding et al., 2011, p. 13).

To clarify, the authors explain the dichotomy of play and gaming as such: Designing for playfulness means designing for open, exploratory, free-form play. In contrast, designing for gamefulness means to design for rule-bound, goal-oriented play. Having considered the flora of related terminologies and the multi-meanings inherent in gamification Deterding et al. (2011) suggest this clarification of gamification.

To summarize: ‘Gamification’ refers to

- *the use* (rather than the extension) *of*
- *design* (rather than game-based technology or other gamerelated practices)
- *elements* (rather than full-fledged games)
- *characteristic for games* (rather than play or playfulness)
- *in non-game contexts* (regardless of specific usage intentions, contexts, or media of implementation) (original emphasis, Deterding et al., 2011, p. 13).



*Clarification of terms used:* This definition is the one we refer to when speaking of gamification and gameful design. The terms are used interchangeably in this thesis.

There are a number of game design elements one may employ in order to achieve gameful interaction. While Deterding et al. (2011) suggest a hierarchical typography of game design elements, Kumar and Herger (2013) provide a curated selection of game mechanics which includes elements ranging from more simple touches such as points and badges to implementations potentially more extensive such as adding an overall narrative where the application usage is narrated from a standpoint of the user being on an epic journey.

When considering what game design elements to include it's worth acknowledging that including mechanics such as points and badges does not automatically make a gameful, engaging experience (Deterding et al., 2011). Similarly, the addition or removal of a single game mechanic may create or disrupt a gameful experience. Deterding et al. also note the difficulty of judging whether or not system have accomplished gamefulness. Equally challenging is judging at what point a gameful system becomes a full-fledged game. Only by reviewing the original design intentions and the felt experience of its users may we properly separate gameful systems from 'proper' games.

Let's contrast a couple of gamified systems with more full-fledged serious games and reflect on their differences. Sites like Reddit (Reddit Inc, 2013) and Stackoverflow (Stack Exchange Inc, 2013) feature elements of gamification. Stackoverflow.com, is a site for asking and answering questions that has devised an intricate points system where asking good questions and giving good answers is awarded with points or badges. As a user earns points within Stackoverflow.com additional functionality is unlocked. This approach have proved so effective that the creators purposely capped the amount of points achievable on a daily basis to avoid users spending all their time solely asking and answering questions (Attwood et al., 2009).

Likewise, on Reddit.com user behavior of sharing and voting on links result in "karma" points. "[Karma] reflects how much good the user has done for the reddit community (Reddit Inc, 2013)." Through intense effort by its users Reddit has become a forum of forums where users compete to create the most top-voted posts and comments. Being first with the latest and introducing user-found information not found elsewhere on the internet has lead Reddit to pride itself of being "the frontpage of the internet." Incidentally, both Stackoverflow and Reddit contain sub-forums where users fervently discuss

the points systems, which to some extent signifies how important it is for the users that the points are dealt out in a fair manner and that no one is able to cheat their way into prominence. Reddit and Stackoverflow are examples of gamified systems which have managed to spark strong gameful experiences by continuously iterating their gamification efforts.

Opposite from gameful design on the whole-parts axis in figure 2.1 we find games. This category titled (*serious*) *games* include a flora of interrelated terms including serious games, pervasive games, alternate reality games as well as other games. We defined games earlier in the text. The term serious games are games built to convey a certain learning material (Deterding et al., 2011). In continuing the authors define pervasive games as a type of games where the *circle of play* is extended spatially, temporally or socially. The circle of play refers to where the game takes place highlighting the space where special meanings and rules accrue (Salen and Zimmerman, 2004). Examples of pervasive games include location-based games and Alternate Reality Games (ARGs). McGonigal (2011b) define ARGs as essentially *antiescapist* games, where the game is played to get more out of real-life as opposed to escaping it.

Chore Wars is a browser-based ARG where players play the game by completing real world chores (Davis, 2013). A household who wants to start playing Chore Wars would first create avatars for themselves and then start defining various adventures (chores) where they also include bounties. The bounties may be in the form of in-game gold and experience points. Gaining experience points result in your online character looking more powerful and impressive. Furthermore in-game gold collected may be traded in for various perks defined by the household such as being the one who gets to decide which channel to watch one evening for instance. In her analysis McGonigal (2011b) highlight several aspects of Chore Wars as critical to its ability to create an engaging experience. Firstly, by listing all the chores as adventures from which players may pick and choose Chore Wars introduces choice with regards to household chores. The result is that players may choose to complete a few arduous high-reward chores or many low-intensity, low-reward type of chores. As mentioned in the section on defining games, one way to look at games is as the voluntary engagement with unnecessary obstacles. Secondly, Chore Wars' adventures may be made more 'unnecessary' by defining certain completion criteria which may lead to higher reward for the same quest. Examples of extra-credit completion criteria may include that a player must be dressed out as an animal while taking out

the trash or singing a song while a cleaning out the bath room. Thirdly, McGonigal argues that Chore Wars succeeds at creating a tight feedback loop between completing quests and seeing one's avatar growing more and more powerful. Even more so, while a mowed lawn will eventually need mowing again one's avatar will remain a lasting sign of past accomplishments. Fourthly, playing Chore Wars with your significant others would likely add significantly to the game experience. Knowing that your avatar's progress can be viewed by the others in the household may act as a competitive motivator. Taken together, these aspects help establish Chore Wars as a full-fledged game.

The best ARGs are the ones that, like the best traditional computer and video games, help us create more satisfying work for ourselves, cultivate better hopes of success, strengthen our social bonds and activate our social networks, and give us the chance to contribute to something bigger than ourselves (McGonigal, 2011b, p. 127).

Another perhaps more grand example of an alternate reality game is World Without Oil (WorldWithoutOil.Org, 2013), a game which was played between April 30, 2007 until June 1, 2007. During those 33 days over 1900 players were challenged to imagine themselves living in a world without oil and blogging about it the result of which was over 1500 in-game stories created by the players. Throughout the game was accessed through a web portal which provided various multimedia content to help players immerse themselves in the setting. Studies done afterwards found that the game had left a lasting impression on many of the players to the point where many had changed their lifestyles to be more sustainable (McGonigal, 2011b).

Comparing ARGs with gameful systems (gamification) we find that both approaches are instances of gameful design used to affect real-world contexts. The difference between these approaches is the degree to which they are full-fledged games and thus how well they're able to tap into the aforementioned gamer qualities.

To conclude this section which explores game studies I'd argue that new gameful design projects provide an opportunity for implementing full-fledged games which fully cultivate the favorable gamer qualities within real-world contexts. And in light of our research question I'd argue that cultivating the qualities of blissful productivity and social fabric seem worth attempting.

## 2.5 Community of Practice: United by concern and passion

This section will define the concept of CoP and introduce related concepts before moving on to explore recent research into CoP's all with the goal of tackling our research question. Let's begin by defining CoPs.

Communities of practice are groups of people who share a concern or a passion for something they do and learn to do it better as they interact regularly (Wenger, 2011, p. 1).

A CoP may be a group of artists who regularly meet to explore new art styles, a group of web designers who mostly interact online yet spend time to share various tricks of the trade or a group of students who've teamed up in a colloquium to divide the study work and teach each other. Wenger (2011) explains that there are three essential factors to CoPs:

1. The domain: More than a club or merely a network of connections a CoP unites members through both a shared identity and a shared competence within the domain of interest. If one studies birds as a domain of interest one might identify oneself as a bird watcher and thus identify with other bird watchers.
2. The community: Members of a CoP have discussions and partake in activities together, provide advice and help each other. Returning to our bird watching example, forming a community of bird watchers require that you and one or more bird watchers interact.
3. The practice: In the course of their interactions members of a CoP develop a shared set of stories and cases that form a resource for their shared practice. To exemplify, through sustained communal interaction your group of bird watchers develop a shared set of bird watching stories which in turn reveal the 'tricks of the trade' related to your CoP.

In addition to creating the concept of CoP Jean Lave and Etienne Wenger also created two concepts related to learning (Van De Vanter and Squires, 2013): *situated learning*

argues that learning is always done in some context. While, *legitimate peripheral participation (LPP)* conceptualizes the initial role of apprenticeship assumed by new CoP members.

Over the years researchers have problematized and tried to develop the concept of LPP further (Handley et al., 2006). Initially, LPP was conceptualized as the process by which new members start out with a minimal membership and then ‘learn’ their way into a CoP by progressively learning the CoP’s practice thus eventually becoming full members. A central issue here is that research has shown that not all members strive to become anything more than just peripheral members, and other times they might be denied full membership by existing members. Furthermore, the concepts of practice and participation are arguably ambiguous as they sometimes seem to overlap (Handley et al., 2006). To resolve this Handley et al. argue that practice should be limited to *observable* activity, while participation encompasses *meaningful* activity where meaning is developed through shared identities and relationships.

Towards the end of the twentieth century many industries found themselves more and more reliant upon knowledge workers. This led businesses to be concerned as to how they would educate and sustain their knowledge-intensive labor. When it came to addressing this challenge the concept of CoP found fertile soil within both business and education (Van De Vanter and Squires, 2013). In education CoP theory was adopted as a theory for situated learning, while in business it became known as a knowledge management approach. Over time, the term CoP has become increasingly popular within both the education sector and the business sector.

In response to the at times unbounded optimism regarding CoPs researchers have argued for the need to limit the usage of the term to avoid it becoming merely a buzzword that doesn’t refer to the intended phenomenon (Duguid, 2005). Echoing that sentiment, Schwen and Hara (2003) also note that there exists an enthusiasm regarding CoPs that is beyond empirical evidence and inconsistent with theory regarding how to nurture CoPs. Moreover, Schwen and Hara argue that using CoP theory as basis for online communities face five key challenges:

1. Though the central CoP theory built by Wenger provide a useful description of a productive organizational form that are CoPs, it doesn’t prescribe steps on how to

create a CoP. In other words, while a CoP can be recognized and encouraged it isn't something that is easily designed into existence.

2. Schwen and Hara (2003) argue that it's hard to judge whether or not the development of young CoPs is progressing well since early stages of CoP development are not well understood. Due to the lack of theory on CoP's early stages it is hard to judge whether key decisions were right or wrong and whether the results represent alternative developmental paths towards a full-fledged CoP.
3. To support their practice CoP members discuss work issues and share stories together forming a dynamic competence of knowing. Schwen and Hara contrasts that knowing with declarative knowledge typically taught at schools arguing an incompatibility between support for knowing (participatory) and support for knowledge (classroom).
4. Echoing the previous point, Schwen and Hara (2003) note several failed attempts at underpinning online communities with combined, aggregated theories. A micro-level theory for learning does not necessarily aggregate into a predictable theory for collective learning, combining it further with a mid-level social theory like CoP theory does not equate a good foundation for online CoP.
5. CoPs may succumb to an unhealthy culture exemplified by new member hazing rituals, recurring collective passive aggression and the like. Furthermore, the intentionality underlying CoP membership may be sabotaged or hijacked. Schwen and Hara exemplify with financial support given to teacher CoPs which was explained as due to teachers' inadequacy thus undermining their professional intentions.

What Schwen and Hara (2003) *do* recommend is that CoP designers describe existing patterns of community learning and co-designing suitable interventions and evaluations together with the CoP members. They admit, engaging CoP members to co-designing a solution is easier said than done though vital nonetheless.

In analyzing existing CoPs Schwen and Hara suggest looking for social patterns for learning and identity formation. Moreover, they suggest looking for untapped possibilities for achieving the goals of the population. Despite the CoP theory's sophisticated descriptive

qualities the analysis will necessarily be, “[...]a speculative process of seeking hypotheses for causal links [...]” (Schwen and Hara, 2003, p. 266). Thus it becomes key to empirically test the suggested theoretical insights.

When designing for the development of a CoP Schwen and Hara advice that the design intervention should be a jointly owned endeavor between the designers and CoP members. The design should be minimalist thus allowing room for the CoP to naturally blossom due to well-nurtured conditions. Furthermore, Schwen and Hara echo Wenger’s emphasis on the importance of identity formation in CoPs noting that it cannot be directly designed for only indirectly by shaping favorable conditions. According to Handley et al. CoPs house a perpetual conflict between identity-regulation (community) and identity-work (person). While the larger community will try to retain a shared identity through identity-regulation, the individual members will each try to negotiate the imposed shared identity through identity-work. Complicating the process of establishing a shared identity is the fact that people may be members of several CoPs carrying different identities, and when members try to reconcile these identities tensions may arise within both the individual and the community (Handley et al., 2006).

Finally, the intended and unintended consequences of the design need to be considered. “We [Social Designers] have just barely become sophisticated enough to do harm” (Schwen and Hara, 2003, p. 266). By designing the CoP *with the members* and not merely to the members the designers can help them understand both the state of their CoP and the implications of the design intervention thus helping to resolve any ethical issues.

## 2.6 Defining the collaboration in World of Warcraft

Thus far this chapter will hopefully been able to show that there are a number of fields that become relevant when one seeks to do design research on collaboration. This section will tackle the first of our sub-questions underlying our main research question:

*What is the nature of WoW’s collaborative dynamics from a CSCW perspective?*

We begin by introducing WoW and exploring existing research before developing a working definition to characterize the collaboration in WoW. Furthermore, we contextualize

that definition within CSCW to further establish what it would mean to have a CSCW system inspired by WoW.

Since its 2004 launch the game World of Warcraft continue to be a platform where millions of players collaborate (Blizzard Entertainment, 2013). A community driven census estimate the number of monthly players to be 2.9 million at the time of writing (WarcraftRealms.com, 2013).

McGonigal (2011b) argues that WoW's ability to provide more meaningful work has been one of the keys to its success. The work in WoW comes in the form of quests which are tasks that contain clear, actionable goals ensuring that the player always knows what to do. Moreover, this work becomes meaningful because the experience points rewarded for accomplishing quests so immediately and visibly improves the player's hero. This notion of meaningful work, work that always feels productive, helps explain WoW's ability to drive so many people to contribute their free time playing this game.

The chief characteristic of collaboration in World of Warcraft is perhaps the degree to which WoW as a platform incentivise and facilitate collaboration. According to Nardi and Harris (2006) WoW give players ample opportunities to "try out" collaborators by inviting people to try and solve various small tasks together. If successful, players might decide to band up for larger tasks like doing "instances" which are larger scripted events like clearing out a dungeon as a five person group (Bardzell et al., 2008). Bardzell et al. argue that WoW in general provide highly stable challenges. The players are the unstable element who must work to coordinate themselves efficiently and gain experience both in the game and out of the game. In actuality, the odds are stacked in the players' favor as *eventually and undoubtedly* they'll be able train themselves and their characters to beat any challenge.

Instance runs come in 5, 10 or 25-person formats and 25-person format tend to require a lot of training in the form of team coordination (Bennerstedt and Linderoth, 2009). It is no small matter to gather 25 well-equipped players who "know the drill" of a particular instance thus players often organize themselves in more stable communities termed guilds.

Guilds vary greatly in their approach to playing WoW, some simply aim for an including and supportive community (Nardi and Harris, 2006), while others place the conquering of very hard instances the highest (Bennerstedt and Linderoth, 2009). In the case of the



latter, often called “raid guilds” the social pressures to always be online and participate in hour-long raids can grow very high.

In sum, one might argue that WoW as a platform for collaboration has created a well balanced trajectory from trying out collaborators, to eventually joining or creating a guild, to potentially undertaking larger quests like 25-person raids (instances). This trajectory is founded on not only a stable and predictable game world but also social pressures sparked by the need for a well-coordinated team. Though it’s possible to play much of WoW without collaborating, it’s been made very easy to fall onto this trajectory. To try and condense these reflection I suggest defining WoW’s collaborative dynamics as this:

*Beyond providing clear, actionable goals and immediate, visible progress feedback, as a collaborative platform World of Warcraft provides ample opportunities for light-weight collaboration with trajectories towards more strongly committed, large-scale collaborations.*

Equipped with this definition we may now consider how this definition would relate to CSCW theory. Here we conceptualize WoW’s collaborative dynamics as a CSCW system and present a set of key characteristics which propose that such a system should:

1. Heavily utilize gameful design and playful metaphors in order to incentivise collaboration, lower barriers to participation and otherwise enrich interaction.
2. Provide a user experience more like a multiplayer game rather than a collaborative work platform with gamification tacked on.
3. Focus on surfacing what skills users possess, and surfacing what tasks they’re currently undertaking. Users would be able to quickly understand the capabilities of fellow users, and also quickly understand the requirements of a given task before deciding whether or not to collaborate.
4. Provide opportunities for enacting light-weight cooperative work arrangements with trajectories towards more strongly committed, large-scale collaborations.

On the face of it, such a WoW-inspired CSCW system might not be so distinguishable from other light-weight platforms for collaboration with emphasis on providing awareness. Nevertheless, a distinguishing trait would be that its user experience is closer to that of

a proper game, rather than a collaborative system with gamification included. There is an intention here to make a system which is more like a game so as to possibly tap even more into the possible positive benefits of gameful design.

## 2.7 Tendencies towards more and better collaboration

This section contextualizes our research effort with research of similar nature. This section is by no means meant to present an exhaustive overview of similar research, only meant to try and uncover some interesting developments regarding collaboration.

In a study by Ducheneaut (2005), the researcher elaborate the inner workings of a community of open source developers. Using a mixed methods study the researcher explore how new members approach an open-source community dedicated to developing the Python programming language. Ducheneaut present how new members must go through a certain socialization process which includes certain “rites of passage” all the while gradually earning the privilege to contribute to the community’s project. Ducheneaut (2005) argue the socialization process could benefit from software that would help make the socio-technical nature of open-source projects more “readable” so that newcomers could faster figure out the intricacies of a given project’s code and organizational nature.

Ducheneaut’s call for readability seem to have been answered in part in the social coding site GitHub Inc. (2014b), which was launched in 2008 before becoming hugely popular. In contrast to other code sharing sites such as Google Code (Google, 2014) and Sourceforge (Dice, 2014), Github has placed a solid emphasis on transparency and socializing. In a study by Dabbish et al. (2012) they uncover how Github users utilize its functionality for drawing inferences regarding project developers’ intentions and commitment level, project popularity and whether or not one should step in and help guide a project’s growth.

In addition to including social network features Github itself has also become more gamified over the years. While this move may have increased user engagement overall some fear that Github’s gamification efforts threaten to wear out open source developers in the long run (@Fat, 2013).

Another interesting collaborative tendency is the rise of DIY communities (Kuznetsov and Paulos, 2010), these communities very much exemplify thriving communities of practice. DIY may be defined as any modification, repair or modification of objects without the help of a paid professional. For a long time hobbyists have had a long standing tradition for creating and appropriating artifacts for personal use. However, helped by an emerging body of tools people are able to share and collaboratively critique their work on global scale. Kuznetsov and Paulos argue that one of the distinguishing features of these communities is the manner in which knowledge is shared, which is through *talking with* the audience through personal project blogs, video blogs, project forums and the like. This stands in contrast to sharing knowledge by *talking at* the audience which Kuznetsov and Paulos argue is more the tendency of the academic way of disseminating knowledge. This difference in knowledge transfer seem to exemplify the difference between dynamic competence of knowing common to CoPs vs. declarative knowledge common to academic institutions. Kuznetsov and Paulos argue that DIY communities warrant greater research interest.

In the case of Github technology with an emphasis on supporting transparency and socialization seem to have greatly lowered barrier to collaborate. And with the rise of DIY communities one might argue that we're seeing an evolution of not only technology but also culture. As mentioned earlier in elaborating the HCI field of research, as new technologies gets introduced to society some of it will eventually seep into the cultural fabric of society laying fertile grounds for sparking new technologies in turn.

## 2.8 Summary of relevant research chapter

This chapter has covered a lot of ground in terms of presenting relevant theory and studies. The fields from which this research has been drawn have been Design Research (DR), Computer Supported Collaborative Work (CSCW), Human Computer Interaction (HCI), Game Studies (GS) and Community of Practice (CoP). Here we'll try to provide a summary of each of the fields.

*Design research (DR)* is a tradition of creating artifacts for the purpose of generating knowledge through effecting change in the world (Zimmerman et al., 2010). We began by defining design itself before subsequently exploring design research perspectives

within HCI and Information Science. After comparing some of this research this chapter proceeded to present a design science framework by Hevner et al. (2004). This framework argues that DR is in fact capable of contributing research insights in the form of the design artifacts themselves, foundational concepts which sensitize designers and methodologies which might aid the development and evaluation.

*Human Computer Interaction (HCI) and Interaction Design IxD* both represent large, pluralistic fields of research which focus on ensuring that technology is developed with human use in mind (Carroll, 2013). Several concepts provided by HCI and IxD will play fundamental role in the design and development of the LFG prototype. This chapter have focused on giving an overview of HCI and IxD, leaving specific concepts to be introduced in the method chapter and prototype chapter.

*Computer Supported Collaborative Work (CSCW)* is similar to HCI in that the field of CSCW is also very pluralistic. CSCW aims to understand the nature of collaboration so that it may be successfully supported by digital solutions (Schmidt, 2011). This chapter has presented some central CSCW arguments and concepts to situate this research within existing research on collaboration.

*Game Studies (GS)* is the study of video games as a medium (Fromme and Unger, 2012). GS studies the *mediality* of games meaning its intrinsic qualities, potential and impact. Increasingly, business and academia are looking to games for lessons on how to engage users in general. When presenting GS an emphasis was placed on defining play, games and gameful design. Gameful design instead of gamification will be used throughout the remainder of this thesis to signify the use of game-elements in non-game contexts.

*Community of Practice (CoP)* is a concept used to describe communities united by a common concern or passion for something they do. Moreover, CoP members often share what they know and interact frequently (Wenger, 2011). Healthy CoPs facilitate learning amongst its members hence their popularity within education and business, and some CoPs even tend to facilitate collaboration amongst its members (Muller and Chua, 2012). The concept of CoP are useful in understanding the potential users of our prototype and its potential impact on them.

In the course of this chapter we've covered research which we've found relevant for this research into collaboration. Furthermore, we also dedicated a section to analyzing and

defining the collaborative nature of World of Warcraft. Equipped with that definition we proposed a set of key characteristics a CSCW system inspired by WoW could have. And thus we answered the first of the sub-research questions. Finally, we introduced some tendencies regarding the cultural and technological development towards better collaboration.

# Chapter 3

## Method

This chapter elaborates how our research was structured in order to answer our research questions. A high-level overview of our research was provided in the introduction with the figure 1.1. With figure 3.1 we provide a closer look into the design and development phase and the data gathering phase, both of which will be elaborated in this chapter.

At this point it's worth reiterating the second and third of our sub-questions which tie directly into to the two phases depicted in figure 3.1.

2. *How could one recreate WoW's collaborative dynamics within a CSCW system?* This question ties into the design and development phase.

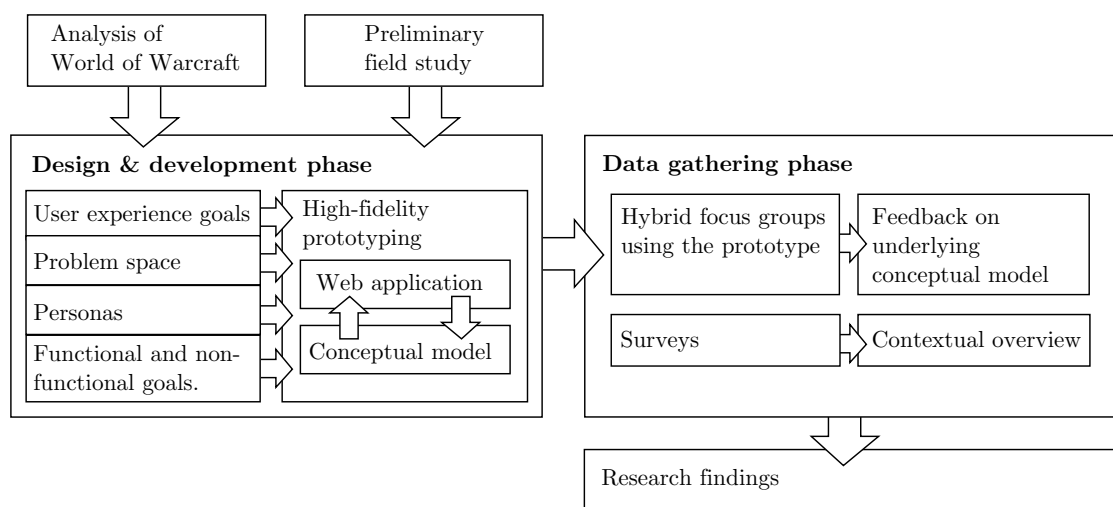


FIGURE 3.1: Overview of design and development phase and data gathering phase.

3. *How would such a gameful a CSCW system be received by a community of potential collaborators, and how can it fit into their existing collaborative work practices?* This question ties into the data gathering phase.

This chapter will focus on explaining how these phases were structured in order to answer these sub-questions and ultimately our main research question. Chapter four and five provide the answer to sub-question two and three respectively.

When undertaking a research project one commonly face having to choose between a quantitative approach, a qualitative approach or a mixture of both (Bryman, 2008). In the case of pursuing a quantitative approach one's focus become the quantification of data, essentially a focus on the counting of various facts, in both the data gathering and subsequent analysis. In contrast, when pursuing a qualitative approach one's focus become words over quantifiable numbers, which means an emphasis on gathering rich, descriptive data and from that performing an interpretative analysis. Increasingly, researchers also combine quantitative and qualitative methods into what is commonly referred to as mixed methods studies.

The quantitative approach is commonly a deductive science approach which emphasizes the testing of hypotheses derived from theory. And reversely the qualitative approach has commonly been tied to an inductive science approach that emphasizes the generation of new theories. Nevertheless, Bryman notes that this deductive/inductive delineation isn't clear cut, as quantitative and qualitative research are to some extent both deductive and inductive. Furthermore, it's possible to employ quantitative methods with the goal of generating theory and employing qualitative methods in order to test existing theory.

This research is of mainly qualitative, inductive nature. This is argued on the basis of the significant amount of qualitative data gathered in the hybrid focus groups, and the research goal of generating theoretical implications and design implications. Though, one might argue that this research is also somewhat deductive in that the research puts existing theories to the test in both the design and development and the analysis of findings.

In addition to being qualitative research, this research is also a design research endeavor. And to state this in the terminology of design science: A *model* was developed representing a *framework of interrelated constructs*, which was then *instantiated* as the LFG

prototype and (*design*) *evaluated* through hybrid focus groups. Additionally, surveys were used to give more contextual information by which to view the focus group findings. Finally, by analyzing the findings in light of relevant research we develop a research contribution in the form of more foundational sensitizing constructs (implications for theory and design) in addition to the designed artifact itself (the prototype) (Hevner et al., 2004).

### 3.1 Design and development phase

This section describes how a user-centered design approach was used in order to develop the prototype called Looking for Group (LFG). Moreover, this section cover how various HCI concepts were used in the design process.

Rogers et al. (2011) describe the user-centered design approach as consisting of three principles. Firstly, the approach emphasize an early focus on users and their tasks. Secondly, an emphasis is also placed on empirical measurement throughout the design process by which users are exposed to design aspects. Thirdly, the design is developed in an iterative fashion.

As a consequence, a well-designed system will make the most of human skill and judgment, will be directly relevant to the activity in hand, and will support rather than constrain the user. This is less of a technique and more of a philosophy (Rogers et al., 2011, p. 327).

A number of HCI concepts were employed in order to support this user-centered design approach. These concepts included user experience goals, design principles, problem space, personas, functional and non-functional requirements and finally the act of creating high-fidelity prototypes. While these concepts could rightfully have been presented together with the prototype in the next chapter we chose to include them here to give a better overview of the design and development process. By documenting the design process in this manner this thesis tries to answer the call made by Zimmerman et al. (2010), presented in chapter two, for more clearly described design processes.

Figure 3.1, which was presented a few pages back, give an overview of how the design and development phase was structured. In the figure we see that the design process was



based on both the analysis of World of Warcraft as well as a field study (Appendix A, p. 125).

That initial field study was performed in a community called Pils & Programming, one of the communities that would later test the prototype. In section 3.2.2 we elaborate on the relationship between this research and the test communities of Pils & Programming and Spillmakerlauget. Both communities helped provide informal feedback throughout the development process in addition to the field study and data gathering phase.

Furthermore, figure 3.1 shows how the HCI concepts supported the design development of not only a high-fidelity prototype but also a conceptual model. The arrows going between the prototype and the conceptual model denote that they very much influenced each other throughout the process of finalizing the high-fidelity prototype.

### 3.1.1 User experience goals and design principles

To help guide the design choices a set of user experience goals (UX) and a couple of design principles were chosen, which are presented in table 3.1 together with a short explanation of how they were intended to influence the prototype.

<i>User experience goals</i>	
Effortlessness	Using the application for accomplishing collaboration should feel effortless, an important factor.
Safe	Users should feel safe when sharing information about themselves, their skills and tasks they would want done.
Inspirational	The application should inspire users to take on tasks potentially larger than themselves and also inspire them to learn and display new skills.
Freshness and progress	When using the application it should convey feelings of freshness (that the community is in flux) and progress (users learning and tasks being accomplished).
<i>Design principles</i>	
Visibility	The mindful selection of what to show and not show the users so that the user has a clear overview of the application's functionality without overwhelming the user.
Feedback	The application clearly and immediately communicates back to the user the result of his or her actions.

TABLE 3.1: Overview of LFG's user experience goals

User experience goals are aspects to be desired in the resulting user experience while design principles serve as a collection of general rule of thumbs that sensitize the designer to certain design aspects. Also worth mentioning is the concept of usability goals, which are closely related to user experience goals. Usability goals are a set of commonly used design criteria made to ensure that the product is usable. UX goals and usability goals both affect the product design and the resulting user experience. While usability goals help ensure that a design is usable, UX goals help the designer target a more expressive set of emotions with the design.

### 3.1.2 Conceptualizing the problem space

This section introduces the concept of problem space which can be used when creating a conceptual model. The resulting conceptual model is introduced in the next chapter together with the final prototype. The goal here is explain *how* we conceptualized the problem space.

Rogers et al. (2011) use the term problem space to emphasize that the problem exists in a context meaning that an attempted solution could inadvertently cause additional problems or end up treating symptoms instead of the real problem. To aid in this process Rogers et al. (2011) advice that one should try spell out one's assumptions and claims as it is central to understanding the problem space.

Informed by the initial field study we were able to design with a certain set of users in mind, the community of Pils & Programmering (P&P), a heterogeneous group of people with differing skill sets whom share knowledge and sometimes collaborate on projects. Even though designing with this community in mind could've endangered the design of becoming to specialized it helped spell out some assumptions on how this design might help communities of this kind.

1. We assume that the P&P community carry an unrealized potential for more project collaboration.
2. We assume that members of the P&P community carry competencies which are unknown to the other members.

3. We assume that point 1. and 2. hold true despite P&P's access and use of various collaborative software.
4. We assume that both point 1. and 2. could be unlocked through a WoW-inspired CSCW system as proposed in chapter two.

Having a well formed, well communicated conceptual model help users tremendously when they're trying to reason about the interactive application and figure out what to expect and not expect from the application. To exemplify, one might look to Dropbox's success as a cloud storage facility for syncing files between computers which might be attributable to their clever use of the analogy, "it's just like a folder on your desktop" (Dropbox.com, 2013). This simple analogy help explain the concept of Dropbox to new users by likening it to something they were already familiar and comfortable with.

### 3.1.3 Personas: Lenses through which to view the design

Personas were also created in order to guide the design process (Appendix B, p. 129). This section starts by explaining what personas are before explaining how this research made use of them.

"Personas are rich descriptions of typical users of the product under development that designers can focus on and design the product for" (Rogers et al., 2011, p. 360). When creating personas one shouldn't aim for idealism but rather realism in their descriptions. Rogers et al. (2011) even suggest adding photos to represent these fictitious users. Personas are especially useful when developing for users that are quite different from the designer and thus harder to assume the perspectives of.

Lillian is a timid, yet hard worker. [...] When asked what she knows she hesitates, because she doesn't feel that she is good enough at anything to say that she *knows* the skill. Lillian does know a thing or two about programming, and would appreciate a system that would let her talk about her skills in a more differentiated fashion (Appendix B, p. 130).

A total of six personas were created inspired by the two communities in which the design would be tested in, three personas based on P&P and three personas based on

Spillmakerlauget. The P&P personas were based on the field study findings and my ongoing involvement with the community. The Spillmakerlauget personas were based on me participating in their events and talking with SL members who frequented P&P gatherings.

### 3.1.4 Functional and non-functional requirements

This section presents functional and non-functional requirements which were informed by the personas, field study, UX goals and design principles.

Coming from the area of developing systems, requirements have traditionally been divided into two categories (Rogers et al., 2011): 1. Functional requirements stating what the system should do. 2. Non-functional requirements stating what constraints exist on the system and its development.

#### Functional goals

1. The system should be able to be used by several communities each isolated from each other.
2. The system should be able to tell whether or not collaboration is currently happening.
3. Users should be able to create, accept, change and destroy tasks and personal profiles.
4. Users should be able to join forces with other users on a task, and let other users join them on a task they're on.

#### Non-functional goals

1. *Environmental-social*. Considering the social environment of the P&P community, a lot of communication happens through already established channels. Thus, the prototype should try to blend with these and not try and replace them.
2. *Environmental-organizational*. The application should accommodate a loosely structured community in which there is no clear chain of command and members come and go.

3. *Environmental-physical.* The application will possibly be used in cafés and similar settings meaning users might want to use the application with their smartphones in addition to via a computer.

These requirements were made with a minimal feature set in mind, aimed at solving the research question and avoid adding unnecessary features. Spending time getting the requirements right early on saves a lot of time and effort from being spent adjusting and fixing an application.

### 3.1.5 High-fidelity prototyping

This section covers the pros and cons of high-fidelity prototyping, which is to iteratively develop something which looks like the finished product using technologies which might well be found in the finished product.

When attempting high-fidelity prototyping one needs to be mindful of certain potential pitfalls (Rogers et al., 2011). These pitfalls include that such high-fidelity prototypes often require quite a lot of time and effort to create, users may think it's finished and get high expectations, changing the prototype significantly may become discouraging and finally minor bugs might derail the user experience completely. Despite these potential pitfalls LFG was built as a high-fidelity prototype due to these reasons:

1. *Exploring technical feasibility.* By diving into a development process that made use of technologies that might well have been used in the finished product it was possible to explore the feasibility of the design.
2. *Making the prototype independent.* The application is less dependent on the designer being there to explain everything. The situations in which the designer has to step in to explain are instructive of how well users understand the design.
3. *Collecting data through the prototype.* Building LFG as a high-fidelity prototype enabled functionality for gathering statistical user data over time.
4. *A believable conceptual model.* By making the prototype look much like a real-world product users were able to better imagine the prototype used in their environment and thus better able to uncover fuzzy or problematic aspects of the design.

The finished high-fidelity prototype is presented in the next chapter.

## 3.2 Data gathering phase

Equipped with the final prototype we were able to pursue user feedback on not only the prototype itself, but also on its underlying ideas and concepts. The following sections explain how data was gathered through surveys and hybrid focus groups. Also covered is the method by which users were recruited.

### 3.2.1 Theoretical sampling

This section provides a small overview over different sampling methods and elaborates this thesis's chosen method of theoretical sampling.

The act of sampling means to take samples or data from a larger population of possible samples. In quantitative research one often strives to achieve representative data by using probability sampling in which the researchers tries to get random sample from a population (Bryman, 2008). However due to constraints of ongoing fieldwork it can be challenging to map the population and get a random sample of informants according to Bryman (2008). Without a random sample one cannot argue that the findings are representative for the whole population. Nevertheless, there exist alternatives that accept the loss of generalization which are purposive sampling and theoretical sampling.

Purposive sampling is the intent of collecting participants in a strategic fashion with the goal of answering the research questions. Related but not the same, we find the method of convenience sampling which is merely rounding up any participants available at hand. The research in this thesis purposely sampled from P&P and Spillmakerlauget using theoretical sampling which is a form of purposive sampling.

[T]heoretical sampling is a 'defining property of grounded theory' and is concerned with the refinement of ideas, rather than boosting sample size (Charmaz, 2000 cited in Bryman, 2008, p. 415).

In theoretical sampling the data collection is controlled by the emerging theory (Bryman, 2008). And the emerging theory in this case is the prototype LFG and its underlying

conceptual model. Deciding who to ask, who to sample, becomes a question of how the ideas and concepts can be best refined rather than ensuring a generalizable sample.

### **3.2.2 Background: Pils & Programming and Spillmakerlauget**

This section provides a bit of background to the two communities around which the LFG prototype was developed. In fact, these communities played a rather influential part throughout the development process.

Pils & Programming is a community of student programmers that engage in weekly coffee-shop meetings, where people converse about IT (Kompiler, 2014). Over the course of its two year existence the community has seen as steady attendance of 10-15 people, a growing Facebook group of over eighty people (Kompiler, 2012), and a Facebook page with over two hundred likes (Kompiler, 2011). Last year the community also founded an organization titled Kompiler that would formally host the various community gatherings. What's more, this concept has also sparked other communities such as Pils & Programming Grenland (2014), and Beer & Programming in Denmark (Laustsen, 2013).

It's important to note that I co-founded the P&P community. My involvement in P&P's founding and my attendance in over seventy Friday gatherings is something I thoroughly acknowledge as posing a risk of research bias which is an issue I've worked to mitigate in the choice of research methods. Arguably, my involvement helped sensitize me to the inner workings of P&P, it's development over time and potential for more collaboration. Furthermore, this connection provided me with informal feedback throughout, and in the end participants for the hybrid focus groups.

In addition to the P&P community this research was also able to get access to a community called Spillmakerlauget (SL) (Spillmakerlauget, 2014). SL is a game developers guild that strives to create a sustainable game industry in Norway. This community features various small game development firms who meet over weekly "developer beers", and also help host other game developer events. Informal user feedback was also elicited from SL members during a game developer festival called Konsoll 2012 when a very early design was showcased alongside early game prototypes (Spillmakerlauget, 2013). Still, there was a much looser connection between this research and SL which posed some challenge when recruiting focus group participants.

In sum, the SL community and especially the P&P community proved to be favorable contexts aiding the design, development and testing of the LFG prototype. And in light of the CoP theory introduced in the previous chapter we argue that both communities qualify as examples of communities of practice.

### 3.2.3 Survey method

Because the application was to be introduced into the communities P&P and Spillmakerlauget it seemed prudent to do a minor survey using an online questionnaire in order to gain some overview regarding their collaborative nature and the motivations of their members. “Questionnaires are a well-established technique for collecting demographic data and user’s opinion” (Rogers et al., 2011, p. 238). The resulting overview could help serve an explanatory role when analyzing the focus group findings.

The data gathering method of administering a questionnaire was chosen over other data gathering techniques like interviewing to reduce potential bias since members from P&P knew me very well and some even knew of my research very well. Hence, using an online survey was thought to be a smart choice since it would allow P&P members in particular to more honestly express critical opinions. Additionally the use of a survey was thought to be beneficial for approaching Spillmakerlauget since it would allow me to elicit data without moving in and influencing the community too much in the process.

Admittedly, I might have overestimated my chances of somehow altering Spillmakerlauget. By approaching it with a survey and effectively “remaining on the outside” it was thought to serve as a contrast to my very much invested membership of P&P. At the same time, by choosing not to try and emerge myself in the Spillmakerlauget community I risked overlooking important contextual info that would’ve aided the focus group analysis. Adding to that risk is also the risk of getting too few survey replies because I’m presenting the survey to a community without being a part of that community thus members could be less compelled to answer. Additionally the sample of responses might not be representative for the community.

The nature of the questions in the finished questionnaire aimed to explore collaboration in the context of Pils & Programming and Spillmakerlauget. Respondents were first asked simple background questions before moving into questions on their experience with



collaborating with other people in general and in P&P and Spillmakerlaugset specifically. Additionally respondents were asked if they could provide a list of the tools they employ when collaborating in order to get an overview of the communities' product ecologies.

Creating a questionnaire can be challenging since the interviewer won't be there to clarify any confusing or ambiguous questions (Rogers et al., 2011). Thus, before distributing the online questionnaire it was tested on potential respondents on beforehand.

### **3.2.4 Hybrid focus group method**

This section will present the manner in which a "hybrid" focus group method was used to gather rich in-depth responses from members of P&P and SL communities. It was termed hybrid focus groups because it combines the focus group method with the progressive scenarios method proposed by Huh et al. (2010).

"A major reason for conducting focus group research is the fact that it is possible to study the processes whereby meaning is collectively constructed" (Bryman, 2008, p. 476). Additionally, focus groups are beneficial in that they allow for participants to wrestle some control from the interviewer and stray off the agenda and potentially reveal new issues important to them. Thus the interview guide was developed with the goal of anchoring the focus group discussions around LFG while also allowing for users to delve into issues important to them, this resulted in a set of broad topics and open questions related to the prototype (Appendix D and E).

There are many ways in which to structure the focus group sessions. "The best advice is to err on the side of minimal intervention" (Bryman, 2008, p. 481). Bryman argues that the researcher should only intervene if the group starts struggling in their discussion or if someone in the group makes an interesting point that is overlooked by the rest of the group.

In their paper, (Huh et al., 2010) outline a research method called Progressive Scenarios, an attempt at creating a rapid prototyping method, aimed at exploring what interpretations, invisible assumptions and social norms a given technology would encounter. The PS method consists of group interviews conducted using scenarios that do not necessarily specify goals or tasks. Interviewees are first introduced to a scenario before asked to provide their their thoughts and interpretations. Based on their responses the researcher

may then ask follow-up questions which are unstructured and open-ended in order to further probe their responses. When the participants seem to have come to an agreement or the conversations come to a halt the researcher proceeds to the next scenario which might provide a bit more information about the system in question. According to the authors, this approach help uncover how interpretations of a technology might change over time as users learn more about it.

By deliberately hiding information about how the system works initially and gradually unfolding information about the system, we were able to replicate the processes by which users' assumptions, implicit rules, and interpretations would come into play when the system is deployed in natural settings (Huh et al., 2010, p. 3).

Inspired by the Progressive Scenarios method, the focus group participants did not receive an elaborate introduction at the beginning of the group interview. Instead participants were asked to try out the system, create a hero, create a quest and possibly complete a quest just to see that functionality in action. After a period of time participants were then asked to provide their opinions of the system and its central concepts, their thoughts on LFG in the context of their community and how they would imagine the system used in practice by their community. Eventual questions, comments, issues and possibilities that would crop up underway would consequently be explored using unstructured, open-ended questions.

This resulted in participants providing their intuitive opinions and understandings of the LFG prototype. Furthermore they also suggested alternative approaches to various aspects of LFG's functionality all driven by their intuitive notions. After having probed the participants to elaborate on their responses I would expose them to the response of another group and / or provide my full intent for including that functionality in that way. This enabled these focus groups to be a space in which to explore potential user interpretations and expectations of LFG.

### 3.2.5 Thematic analysis of transcribed focus group audio

Conducting the three focus groups led to roughly three hours worth of audio recordings which was subsequently transcribed resulting in a data material consisting of approximately 30 000 words.

Having this type of data material on hand allows us to do a qualitative analysis. Ideally one might opt for using a theoretical framework like grounded theory for the analysis to possibly mine richer insights. However, due to time constraints and the magnitude of the data material the choice fell on using a more general approach of thematic analysis.

One of the most common approaches to qualitative data analysis entails what is often referred to as thematic analysis. However, unlike strategies like grounded theory or critical discourse analysis, this is not an approach to analysis that has an identifiable heritage or that has been outlined in terms of a distinctive cluster of techniques. (Bryman, 2008, p. 554).

The thematic analysis described in this thesis was conducted by first iteratively poring over the transcribed data highlighting and marking sections with labels that tried to capture underlying themes. Further iterations were then made using the identified themes to explore which of the themes might be developed into stronger overarching themes. The themes were compared across focus groups, between participants and over the course of the focus group interview itself.

Broadly speaking, data gathering and analysis in interaction design is carried out for one of two purposes: to derive requirements for an interactive product, or to evaluate an interactive product under development (Rogers et al., 2011, p. 311).

Considering the above quote this analysis serves both purposes mentioned: Firstly, by presenting LFG to the intended user base one might learn more of what works and doesn't work for communities like P&P and Spillmakerlauget. Secondly, by having users interact with LFG they might provide useful feedback on the further development of the interactive prototype and its underlying conceptual model. Both of these purposes served as useful perspectives when moving into analyzing the data gathered.

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There are objections to be made against this approach of data analysis. One objection is that a theme might be created based on solely one or more statements from one or more of the focus groups or merely one of the participants. And that in turn might wrongfully inform further design development. However in the case where a statement would be made by only one of the focus group participants and uncontested by the others this thesis would argue that the statement is representative for the whole group because the act of forming a consensus is a common characteristic to focus groups (Bryman, 2008). Another perhaps more significant objection can be made regarding how representative the focus groups ultimately are for the communities from which they were recruited. That issue of potentially lack of representativeness is hard to safeguard against at this point beyond being mindful of it when analyzing and discussing the findings.

Chapter five named findings present the results of this thematic analysis in which the themes are explained and illustrated through instructive quotes.

## Chapter 4

# High-fidelity Prototype

In this chapter we present the prototype Looking for Group (LFG), a CSCW system which builds upon the analysis of World of Warcraft done in chapter two. The goal of LFG is to explore the potential in gameful design to support and facilitate collaboration. LFG sports functionality for surfacing what skills people have, uncovering what tasks people need done and giving awareness to what collaborations are currently happening. Furthermore, the LFG prototype is an answer to the second sub-question which was posed in the beginning of this thesis:

*How could one recreate WoW's collaborative dynamics within a CSCW system?*

The LFG prototype constitutes one possible answer to this question. As noted in chapter two, when undertaking design research it quickly becomes infeasible to explore all design alternatives and fully evaluating all their pros and cons. Nevertheless, we'll argue that this answer to the second sub-question is both well-argued and well-documented in both this chapter and the previous chapter.

### 4.1 Design choices

This section will cover some central design choices and assumptions in the LFG prototype development. Driving the design decisions were considerations regarding the potential of gameful design, facilitating user adoption and supporting existing collaborative practices.

Already systems such as Stack Exchange Inc (2013) and Reddit Inc (2013) show the potential for harnessing gameful design (gamification) towards increased user engagement. LFG's design contains an assumption in that an effort to push the design *even more* towards the realm of games might unlock more of games' inherent benefits.

The final conceptual model ended up featuring the core concepts often heroes, skills, quests and awesomepoints. It came about through reflecting on the experience given by World of Warcraft, and asking what that experience boiled down to. Rather than trying to include specialized World of Warcraft concepts I took a step back and picked out some of its more basal concepts. The concepts of heroes, skills, quests and awesomepoints were selected because they all spark strong gameful connotations. "The best conceptual models are those that appear obvious; the operations they support being intuitive to use" (Rogers et al., 2011, p. 41). However, how effective these concepts are in the end need to be determined by exposing them to potential users and gathering their feedback.

To drive user adoption LFG was made to be a minimal solution. Rather than trying to give a full suite of collaborative functionality, LFG focuses on providing a gameful design layer on top of existing collaborative practices and technology. Reflecting on our initial test communities, we saw that both Pils & Programming and Spillmakerlauguet already utilized a set of collaborative software which worked well for them. To collaborate P&P used a Facebook group, Github and a Facebook page. Spillmakerlauguet on the other hand relied mainly on using Skype for communication and collaboration. It was understood that for LFG to be implementable in existing communities, it would have to heed their existing product ecologies (Forlizzi, 2008). The theoretical design framework of product ecology builds upon social ecology in that they both argue that human behavior represents an adaptive fit to an external environment, an environment made up of dynamically interconnected factors. Thus in an effort to only enhance, not disrupt, communities LFG tries to not displace existing tools and practices. Drawing upon the theory of product ecologies we term this approach *ecology-centric*.

In addition to having a minimal feature set, LFG was also designed for unmoderated flexibility. Dix (2007) argues that to design for appropriation means creating a design which may be adapted and appropriated for uses unintended by the designer. In the case of this design, LFG's users are able to freely create any number of skills in whatever category. Similarly, quests can be made to encompass any task. Furthermore, LFG

does not feature any built-in moderation functionality. The reasoning was that built-in moderation functionality might risk restraining the communities from realizing certain collaborative practices, since LFG was designed for smaller communities it intentionally assumes that they would handle moderation more effectively through cultural norms instead.

Discussing and arguing the design choices underlying aspects such as button placement was deemed outside of this thesis. This design approach has been a pragmatic one where many design choices were founded on theory while others boil down to more intuitive decisions. Bootstrap aided greatly in the visual design process, which is a CSS library that provides a set of well designed UI elements to build upon (Bootstrap, 2014).

## 4.2 Key concepts

*Realm: A realm is the home page for a community.* When users log in they're immediately forwarded to the realm page which displays heroes and quests connected to the realm.

*Hero: A hero represents the user within the realm.* Users registered within a realm may create a hero to represent themselves. This hero may then display any number of skills, showcase the user's projects, create quests and take other heroes' quests all of which is displayed on the hero.

*Skill: A skill is a user named proficiency combined with a user reported level of competence.* The level of competence called skill level may range from one to five and are titled in rising order novice, journeyman, mentor, master and grandmaster. What skills and levels heroes display may depend a lot on the community behind the realm. Certain skills will be more relevant like displaying programming skills within a community of programmers. Nevertheless, skills that are more rarely found might be even more valuable for that community like knowledge of video editing or graphic design within a community of programmers.

To help members of Spillmakerlauget and P&P select skills and skill levels the front page presented the alternative skill levels together with some short, playful explanations (Haukaas, 2012). These explanations are enumerated below wherein the quoted text was also presented in the prototype.

1. Novice. “Hello World.” Select this if you still feel you are a beginner at this skill.
2. Journeyman. “My first program.” From being a beginner it should be a short way to the level of journeyman. Beginner tutorials bore you at this point and you have started building one or more programs in the language.
3. Mentor. “My first usable program, using best practices.” “I can teach you.” You have some programs created with this language under your belt and you now see how you “should have done it,” you have a better grasp of best practices. Furthermore you feel that you are at a point where you feel you could write tutorials or give guidance to other people learning the language.
4. Master. “Multiple pull requests accepted on Github.” “I could create most programs using this language.” “I’m fully fluent at this language.” You consider yourself a serious user of the language, though still learning.
5. Grandmaster. “I know kung fu.” This level was thought to be something of a mythical top level in which the hero had fully mastered the skill and perhaps even more so.

*Quest:* A quest represents a task within the system. Heroes can create quests and undertake quests both their own and others. By creating quests a user can display the work he or she would like to get done.

*Awesome points:* Awesome points function as a favor currency. When a user creates a hero it automatically receives a hundred points which can be spent when creating quests as a bounty. Thus, points become a currency for creating and completing tasks in the form of quests. Heroes that have a lot of points may choose to use a lot of points as bounty on a few quests to make completing these quests seem extra motivating.

### 4.3 User interface: An overview

This section provides an overview of the main application screens, highlighting a few design considerations before

The login screen can be seen in figure 4.1. in which the user can input login data at the top of the page. The other elements on the page include a list of links to active realms,



a form for registering a new user, a video that elaborates LFG in the context of this research, a prominent button for giving feedback and further down the page a textual guide to the application.

Ahoy hero! Please login to start adventuring.    Remember me

## Lookingforgroup

It is about **heroes**, with heroic **skills** of various levels solving **quests** together and gaining magnificent amounts of **awesomepoints**.

### Realms

Dear adventurer. We currently have two realms.

- [Plis & Programming](#)
- [Spillmakarlauguet](#)

### LFG wants you

Fill out the form and apply to join the beta.

Name

Email

Realm to join

**Feedback**

Lookingforgroup på 5min :)

FIGURE 4.1: Login page.

After logging in a user is treated to a view of the realm page as seen in figure 4.2. When a user logs in a cookie is placed in the user's browser that identifies the user within the server. The browser cookie in turn enables the user greeting at the top of figure 4.2 which helps clarify who's account the user is currently logged into.

Continuing along the top we find a button for viewing messages, a button for going to another page to review one's user account and a button for logging out. Below, we find name of the application followed by a sentence highlighting the application's concepts.

The main part of the page displays heroes to the left and quests to the right. To support viewing the application on smaller screens the right column of quests gets automatically shifted below the column of heroes whenever the view application is reduced past a certain point. Additionally, hidden from the user are four dialog boxes that get called when the user would for instance choose to view a quest in more detail.

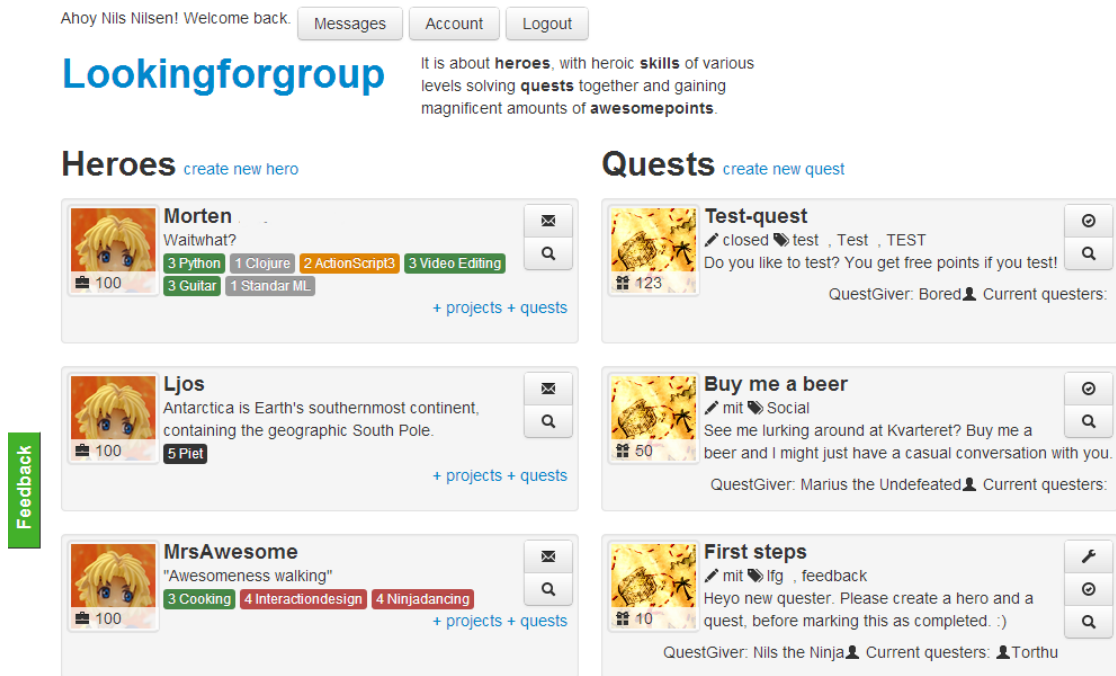


FIGURE 4.2: Realm page, after the user has logged in.

## 4.4 Main functionality

In this section we present a tour of the main functionality in the LFG prototype. Central use cases will be covered of how a user will be (1) creating a hero for themselves, (2) find potential collaborators, (3) create quests for others, (4) undertake quests and (5) proceed to accomplish quests.

### Creating, changing and destroying a hero

*“After logging in for the first time Mary is treated to the realm screen upon which she may create a hero to represent herself.”*

After having joined a realm and logged in for the first time a natural first step for a user is to create a hero to represent themselves within that realm. A user may be a member of several realms and control max one hero within each of those realms.

Clicking on the button named “create new hero” at the top of the realm screen reveals a dialog box, seen in figure 4.3, for the user to create a hero. The hero creation dialog box includes fields for inputting a title, catchphrase, skills and projects.

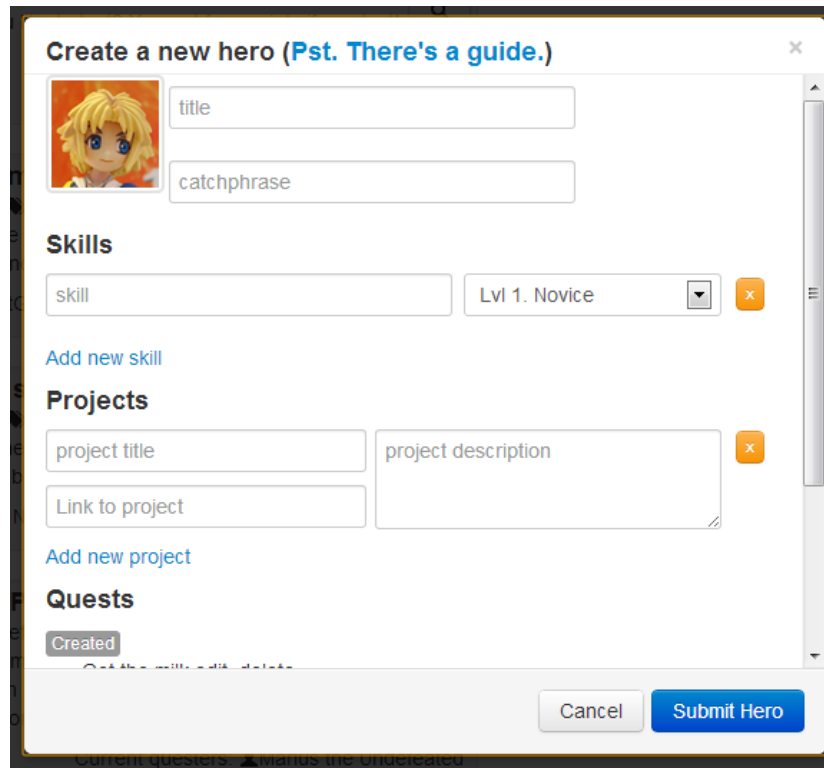
The image shows a web form titled "Create a new hero (Pst. There's a guide.)". At the top left is a profile picture of a blonde anime-style character. Below it are two text input fields labeled "title" and "catchphrase". The "Skills" section has a "skill" input field and a dropdown menu showing "Lvl 1. Novice" with a yellow "x" button to its right. Below the skills is a link "Add new skill". The "Projects" section has a "project title" input, a "project description" text area with a yellow "x" button, and a "Link to project" input. Below the projects is a link "Add new project". The "Quests" section has a "Created" button. At the bottom right are "Cancel" and "Submit Hero" buttons.

FIGURE 4.3: Creating a hero.

The title and catchphrase allows the user to tailor his or her representation within the realm, shaping the hero that will go roam around in the realm solving and creating quests with or without fellow questers. This free form personalization functionality was meant to be balanced by a profile image of the user so that it would be possible to create a truly heroic and playful hero without sacrificing the ability to determine which user owns which hero.

At the outset there is only room for inputting one skill and one project. Pressing add new skill or project appends another set of fields for inputting a skill or project. Each set of fields feature a corresponding check box in yellow that when clicked removes that set. Towards the bottom there's a final label called quests meant to simply allude that the created hero will be able to display its created, accepted and finished quests.

### Finding someone to collaborate with

*“Nathalie had always viewed Michelle as an illustrator and was surprised to learn that she also knew how to program in Ruby.”*

When created, the hero is represented through a compact UI element called a hero-card as seen in figure 4.4. The hero card display title, catchphrase, user submitted image, list of skills, current amount of awesome points, number of projects and number of currently undertaken quests. To the right are three buttons where the envelope button sends email to the user and the looking glass button shows detailed hero info. The third button, the wrench button, enables the user to edit the hero and is only visible when the user owns the hero-card in question.

The awesome points are a form of currency that the hero spends setting up a bounty when creating quests. When the hero is created it receives 100 awesome points and when deleted the system first removes the hero and its points before removing points from the realm in general until a total of 100 points have been removed from the realm. This is a feature made to avoid inflation of points, heroes trading points and a need for someone to moderate the amount of points within a realm.

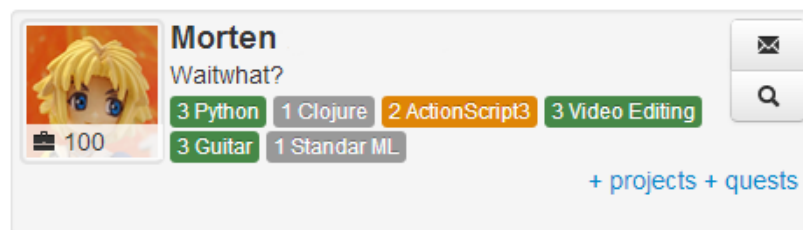


FIGURE 4.4: A sample hero-card

### Create, change and destroy a quest

*“Greg isn’t sure who to ask for help on his task so he creates a quest carrying a bounty of awesome points.”*

Clicking on the create quest link reveals a dialog box for creating quests, seen in Figure 4.5. The dialog box asks the user to provide a title, an image, an awesome point bounty, explanatory tags, a description and a choice of license.

The choice of license is often a central topic when programmers decide to collaborate (GitHub Inc., 2014a). Hence, dedicated licensing functionality was added offering quests a number of licensing options including closed source, MIT license and various forms of Creative Commons licenses.

When creating a quest the hero must spend some awesome points setting up a quest bounty. Quests cannot be created unless awesome points are spent by the hero creating it. This is done to prevent heroes from only creating quests. Heroes that run out of awesome points must either complete quests or cancel any active quests they own in order to regain awesome points.

**Create a new quest (Pst. There's a guide.)** ×

Upload new

What's the title of the quest?

Set a reward Max: 123

add a tag

Write a quest description

**License**

MIT  Closed source  CC By  CC BY-ND  
 CC BY-SA  CC BY-NC  CC BY-NC-ND  
 CC BY-NC-SA

**Quest giver**  
Your name here...

**Quest taker(s)**  
Quest haven't been created yet

Cancel Create quest Complete Quest

FIGURE 4.5: Create quest dialog

## Taking on a quest

*“Bored one evening Nathalie would like to solve a quest.”*

Quests are represented on the realm page in the form of quest-cards, as seen in figure 4.6. Quest-cards feature quest title, quest image, quest tags, quest description, awesome point bounty, name of questgiver and names of questers. Furthermore, the quest-card also has a set of three buttons where the check mark button enables a hero to undertake

a quest and the looking glass icon brings forth a view quest dialog box [Appendix C, Figure C.1]. The wrench icon is displayed if the hero owns the quest-card in question, and when clicked it surfaces a dialog for editing the quest [Appendix C, Figure C.6].

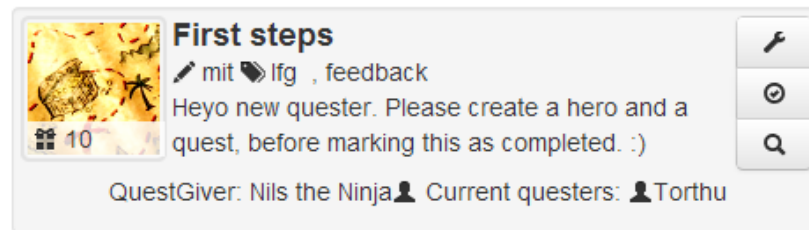


FIGURE 4.6: A sample quest card

The quest-cards have been designed with the goal of quickly conveying what tasks are currently available within the community, who are the heroes in need of help and what quests are the other heroes currently undertaking. The quests have been designed to allow the creator of the quest, the questgiver, to undertake their own quest. Also, any number of heroes may freely join any number of quests regardless of whether the quest has questers. The intention was to enable questgivers to undertake a task themselves and try to get other heroes to aid them. In other words, this allows for showing what one is currently working on and invite others to collaborate. By freely allowing for and streamlining the act of joining a quest the aim is to further boost the level of collaboration. Nevertheless, this streamlined functionality for joining quests will necessitate coordination efforts of the current questers to help guide would-be collaborators on how exactly they may contribute to the project. This design place freedom on the questgiver and / or the community to themselves stipulate a cultural code of conduct on how collaboration should be done within their community.

### **Messaging: Completing quests**

*“Ding! Mark just received a notification that a quest of his just got completed.”*

To complete a quest one of the persons taking the quest must click the looking glass button on the quest-card to bring up a detailed view of the quest where a button named “complete quest” can be found [Appendix C, Figure C.1]. Because the system does not have functionality for automatically determining when a quest is done it is up to the questers undertaking a quest to notify the questgiver that the quest has been completed.

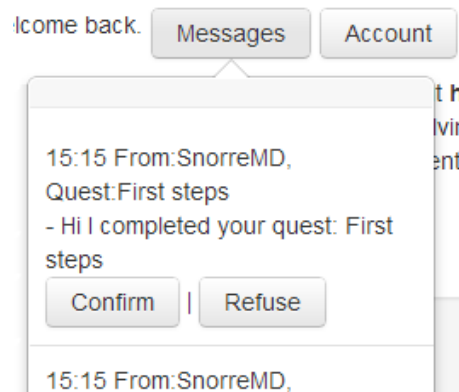


FIGURE 4.7: Reviewing quest completion request

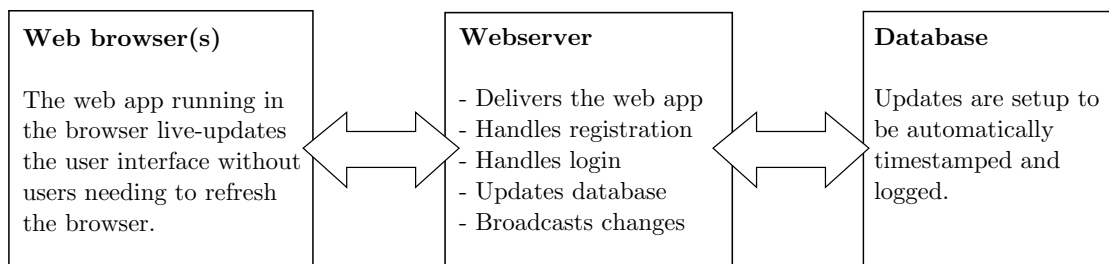


FIGURE 4.8: Overview of final prototype functionality.

Clicking on the messages button towards the top of the realm page reveals any pending quest completion messages as seen in figure 4.7. Past messages are also shown albeit in a grayed out form below any new messages. Typically, having received a quest completion request the questgiver would first check if the work had indeed been completed after which the questgiver may either refuse or confirm the request to have the quest be marked as completed and awesome points distributed.

## 4.5 Technological overview

This section provides a brief technical overview together with some notes regarding the development effort.

The Looking for Group prototype was built as a web application. A web application or “web app” is an application running in the browser that seeks to provide a desktop-like experience (Ocupop Lab, 2012). Figure 4.8 provides an overview of the functionality which was achieved in the final prototype. And table 4.1 provide an overview of the specific technologies used, wherein the web server technology Node.js played a central part (Joyent Inc., 2013).

The prototype was built over the course of a 4-5 month period. The user interface was quickly iterated thanks to an automatic build system and a library of user interface elements. What proved to require some time however, was properly integrating and testing the data storage, implementing login functionality, passing messages in real-time between logged-in users and essentially implementing a desktop-like experience that required a lot of HTML element manipulation. Nonetheless, the final application afforded a desktop application experience in which users could make their changes, changes which would immediately be stored on the server and broadcast to the other connected users.

The original intention was to develop a system which could have been used over a longer period of time, hence considerable effort was put into implementing a system which would log the actions of the users for later analysis. Though time only permitted the prototype to be qualitatively tested in focus groups in this research study, for future research it would be possible to use this prototype to gather quantitative data from a larger population.

Modules & Libraries		
Express.js (A framework built on top of Node.js)	MongoDB (Document-oriented database)	Connect-flash (handles messaging)
Passport (streamlines the process of user logins)	Mongoose (acts as a bridge towards MongoDB)	GruntJS (is an automatic build tool)
Mocha (enables testing)	ShouldJS (makes tests more expressive)	jQuery (enables DOM manipulation)
Socket.io (handles message passing between client and server)	Bootstrap (provided user interface elements to build upon)	

TABLE 4.1: Overview of key modules & libraries used (Z. Schlueter, 2013)



## Chapter 5

# Findings

This chapter will start off with a section presenting the results from the questionnaire which was administered to Pils & Programming and Spillmakerlauget to learn more of the state of collaboration within the individual environments. Thereafter comes the main part of this chapter which presents findings gathered from the focus groups. As a whole, these findings present an answer to our third sub-question that is:

*How would such a gameful a CSCW system be received by a community of potential collaborators, and how can it fit into their existing collaborative work practices?*

This question builds upon the previous sub-questions. And answering it enables us to tackle the remaining sub-questions underlying our main research question.

### 5.1 Survey findings

A total of thirteen responses were gathered whereas ten of them were from P&P, two from Spillmakerlauget and one responding for both. Hence there's simply not enough data to discuss Spillmakerlauget. This section will try and draw some cautious findings from the P&P community.

The respondents from the P&P community were ten males and one female, seven of them in their mid- to late twenties (24-29). In terms of education seven respondents had either started or finished taking a masters program indicating that quite a few of P&P's members are at the graduate level despite the effort to recruit broadly.

One of the questions explained what a community of practice was before asking the respondents to list out any CoPs in which they were members. Most of the respondents simply answered that they were members of P&P. Some however, also mentioned being part of Bergen Coding Dojo, xda-developers, StackOverflow and Reddit. It's worth noting that Reddit, in addition to pure entertainment, also contains sub-forums where for instance web developers share knowledge and discuss their craft with their peers.

Competencies	No. of responses
Web design	7
3d, -modeling, -animation and -design	0
Video editing	2
Programming	11
Graphic design	1
Game Design	1
<i>Other:</i>	
Semantic Web	1
Operating system and Network	1

TABLE 5.1: P&P respondents' reported skill sets

Table 5.1 show the respondents' self-reported reported competencies. The skills Semantic Web and Operating Systems and Network were reported in addition to the provided alternatives. Though not so surprising, all the respondents reported proficiency in programming.

Primary motivation	No. of responses
Collaborating on projects	0
Sharing knowledge	7
Socializing	4
Other	0

TABLE 5.2: P&P respondents primary motivation their membership

One point of particular interest were the respondents' *main* motivation for partaking in a community such as P&P. Table 5.2 shows the distribution of replies where the act of sharing knowledge revealed itself as the most important motivational factor closely

followed by socializing as a community. None of the respondents selected project collaboration as a main motivating factor, though it's clearly not the main motivation it might still be part of the motivation.

Collaboration technologies	No. of responses
Github or Git	9
Email	5
Dropbox	3
Irc	2
Facebook chat	2
Assembla, Visio, Eclipse, "various instant messaging solutions", pair programming, Google Calendar, Google Drive, Trello, Study space work group, P&P gathering, Team Foundation Server	These were mentioned only once.

TABLE 5.3: P&P: Tools used for collaboration

Another topic of interest that the questionnaire sought to shed light on was the ecology of collaborative products used by P&P members. Table 5.3 provides an overview of the responses. Perhaps unsurprisingly Github and Git were frequently reported as they are the go-to tools for many programmers. Because Github is a social network for coders built upon the git version control technology they were aggregated as one. What to note here besides git's dominance is that the eleven respondents reported a total of seventeen collaborative tools.

Challenges	No. of responses
Sharing updated information	6
Coordinating work	6
Knowledge sharing	4
Time management	2
Planning	3
Choice of developer tools	1
Keeping up motivation	1

TABLE 5.4: Challenges P&P members face when collaborating

Table 5.4 present the responses on the question of challenges often faced when wanting to collaborate. The question was formatted as an open question where respondents

Project collaboration rating	Number of replies	Percentage
Very good	3	27%
Somewhat good	2	18%
Totally ok	2	18%
Somewhat bad	2	18%
Very bad	1	9%
No reply	0	0%
Not shown	1	9%

TABLE 5.5: Respondents rating of project collaboration within P&amp;P

could type in any issues they would often face when collaborating. The table presents some notable and some recurring themes in their responses. In reviewing the results the primary challenges faced by P&P members are sharing updated information and the coordination of who does what. Effort was made in extracting distinct themes from the responses though it might still be argued that the themes intertwine to some extent.

Respondents were also asked how they would rate their community in terms of project collaboration, knowledge sharing and overall sense of community cohesiveness and the results are presented in tables 5.5, 5.6 and 5.7. Respondents seemed quite content with the level of knowledge sharing and especially happy with the sense of group cohesiveness. However it is important to be mindful that it might well be the case that P&P members who would rate P&P low on those factors would have been less inclined to answer the questionnaire altogether. Nevertheless, even though the respondents rated level of knowledge sharing and group cohesiveness quite high their response regarding project collaboration differed. Project collaboration was rated noticeably lower than the other factors possibly indicating some discontent.

## 5.2 Focus group findings

This section presents the results from analyzing three hours worth of transcribed audio with the goal of uncovering central themes and recurring patterns. Six main themes were identified under which several sub-themes have been organized.

Knowledge sharing rating	Number of replies	Percentage
Very good	5	45%
Somewhat good	2	18%
Totally ok	3	27%
Somewhat bad	0	0%
Very bad	0	0%
No reply	0	0%
Not shown	1	9%

TABLE 5.6: Respondents rating of knowledge sharing within P&amp;P

Sense of community rating	Number of replies	Percentage
Very good	5	45%
Somewhat good	5	45%
Totally ok	0	0%
Somewhat bad	0	0%
Very bad	0	0%
No reply	0	0%
Not shown	1	9%

TABLE 5.7: Respondents rating of the sense of community cohesiveness within P&amp;P

Table 5.8 provides an overview of the groups interviewed. The results were made anonymous so that no real names were included in the following findings. Adding to that, the transcribed data was originally in Norwegian and have subsequently been translated to English wherein a balance was struck between legibility and staying true to the sometimes convoluted nature of natural speech. Additional explanations were therefore included in the themes.

Focus groups	Number of participants
P&P focus group 1	Four participants
P&P focus group 2	Five participants
Spillmakerlauget focus group	Six participants

TABLE 5.8: Overview of hybrid focus groups

The interview guides used can be found in appendix D and E, containing some general

notes and open-ended questions. The first interview guide was used to interview the first two focus groups recruited from the P&P community both of which were interviewed on the same day. That initial interview guide was then iterated into the second interview guide before conducting the third focus group interview. The revision was mainly done to include helpful lessons learned from the first two focus groups to try and prevent the participants from focusing on reporting bugs. The revision also included some new questions and opinions sparked by the open-ended discussions in the previous focus groups.

Despite the revised interview guides, the focus groups were essentially conducted in this manner: After welcoming the focus group participants and informing them of the nature of the study they were asked to log into the application, create a hero for themselves inputting skills at various levels and finally creating quests and completing others' quests just to test that functionality. The login info had been sent out some days on beforehand which enabled the participants to familiarize themselves with the system before the focus group session. Having tried the prototype's functionality the participants were then asked to discuss on various aspects of the prototype's underlying design.

As outlined in the method chapter the goal of these hybrid focus groups were to try and uncover the participants intuitive reflections regarding the gameful metaphors of heroes, skills, quests and awesomepoints as well as figuring out how this system could actually work within the context of their community.

### **5.2.1 Initial issues and impressions**

This theme covers some initial issues and impressions regarding the prototype, where two of the sub-themes provide findings regarding the hybrid focus group process itself.

#### **The value or danger of making things more playful**

When users reported their impression of the system's nature they were quick to comment on its playfulness. Furthermore, they reported that the playfulness seemed to indicate that the tasks found in this system would be fun. Arguably, the playfulness seemed to take the edge off, thus lowering the barrier to entry. However, some users questioned the possibility of using the system in a very corporate environments.

Morten: [...] If you picture a senior project leader or like someone searching for people I think maybe it isn't the first thing you do to go searching for heroes maybe. (P&P focus group 1).

Ola: But I do think that it's indeed quite okay because it does show in a way a bit of the mentality to this. You aren't supposed to be creating serious programs here. It's not supposed to be used for creating large enterprise systems. There is supposed to be made [programs such as] MicroBrewit and it is to be made small funny toy things, right? (P&P focus group 1).

In the above quotes Morten voiced concern over senior team members possibly not taking LFG seriously as a tool for facilitating collaboration. Ola reacts to Morten's statement by explaining his own view on the concepts that they do not seem to suggest the construction of enterprise software but instead hint towards the constructions of smaller more fun programs like a project of theirs called MicroBrewit. Later on, one of the users suggest changing some of the system's wording.

Ragnhild: You might use this at a consultancy firm. So, can they then say "instead of heroes there's consultants"? Ola: Mhm. Ragnhild: Instead of realms there's perhaps teams, I don't know. Morten: Then it becomes very serious again (P&P focus group 1).

### **Process: Many started by reporting bugs instead of discussing design**

The initial reactions of several groups was to start reporting bugs with the system. In reaction to that, the purpose of the focus group was reemphasized as discussing LFG's conceptual model and this system's potential for supporting groups like Pils & Programmering and Spillmakerlauget.

Andreas: Yes, it's not possible to edit quests after you have created [them]. You get the buttons. Interviewer: Okay. Andreas: Accept quest or finish quest. Those buttons aren't supposed to be there when you're editing. Eh, it happened to me not long ago. Tried to refresh and everything. Interviewer: Yes, eh let me see. Andreas: That was the fourth bug [...] (P&P focus group 2).

Per: They are much too small those [input] fields of yours. Interviewer: Oh yes. Yes, that is true. Per: Just like (illustrates issue). [...]. Then I'm going to create a hero. Interviewer: Yes. And in a way, the goal of this whole exercise isn't to point out bugs because I know there's a lot (P&P focus group 2).

Gjermund: Yes, okay. Is this supposed to be made more clear? Interviewer: Yes, it should really. The box should really disappear so that the user knows that something has happened (SL focus group).

### **Process: Participants both balanced and challenged each other**

When conducting the focus group interviews the dynamic of being in a group proved beneficial. If a user expressed something unclearly other users would jump in asking for clarification. Similarly, when a user became somewhat disruptive other users would help get them back on the agenda. In sum, this allowed the interviewer to stay more in the background and put more control into the hands of the interviewees.

Interviewer: I think I understood it. What do you guys think of that? (refers to the rest of the group). Ragnhild: Did you all understand what I meant now? Erik: Not sure if I did no. Ragnhild: Well, you actually have under groups then. You have "pilsprog" and then you have the sub-group of "graphical design", the sub-group "programmers", the sub-group "database" which then become clusters in a way in the graph that is the whole of "pilsprog." Erik: Okay. Like that yes. Morten: Like a tree then. Ragnhild: Yes, like a graph really. Actually just like a graph, hehe (P&P focus group 1).

Morten: Eh, your skills? You're tall. Ragnhild: Laughing. Morten: You are probably very good at reaching things at tall places. Shelfpicker. Ola: Don't think those are the skills we're after here (P&P focus group 1).



### 5.2.2 Skills: Issues and possibilities

Once finished with their heroes participants were asked to reflect on why they chose to present themselves as they did and their reasoning behind their skill selection. Participants had been reminded along the way to create their heroes as if LFG was to be used within their community. The first focus group noted difficulty in deciding what level to select for their skills.

#### **It's hard to tell how good you are**

When selecting which skills to display on their hero users expressed difficulty in deciding what proficiency level they were on. Though they had been briefed on the proficiency attached to each level users said it was hard to decide, some fearing that it could create the wrong expectations. One participant reported that he purposely down rated himself in order to not disappoint any potential collaborators. Some users also questioned the connotations associated with some of the skill level titles. As a potential solution, one user suggested having clearly defined skill criteria to make deciding skill levels easier.

Ragnhild: I think it's hard to by yourself estimate one's real [skill] level, without-. Morten: I think so too. Ragnhild: [...] a further description of what you really mean by those different levels. Interviewer: Mhm. Erik: I've selected [level] one for most these [skills] now because eh. It's really supposed to. Like I don't know if it eh. Morten: Like what do they expect? What do they expect of, say if you pick [skill level] number three. What do they expect then? Yeah, I also think this is a little difficult (P&P focus 1).

Erik: When I was about to setup skills I thought like, "yes... Do I have such a good skill there then? Yes, maybe safest to step it down a notch." Because it is better to maybe create a positive surprise about how good one is at a skill than to in a way claim that one is very good at a skill but not that good anyway (P&P focus group 1).

Ola: I think it jumped too fast. You have novice, journeyman, mentor. I think mentor seems suddenly so very high because now you're suddenly supposed to be able to teach others. And then you have master and grandmaster

in a way. You get three levels that are actually quite high. Erik: Yes. Ola: And I think that already at mentor you're quite complete in your knowledge. When you're a master you're in a way one that teaches others and then you're grandmaster [...]. Grandmaster is theoretically speaking really supposed to be an unachievable goal which only very few reach (P&P focus 1).

Ragnhild: [...] maybe you should have had something better that the realm could present like info about what the deal is? And then also what is meant by the different levels in skills. You could then get rid off that impostor phenomenon. Because then you're saying that: "Okay to become journeyman in CSS [styling language] then you'll have to know this and this and this" (P&P focus group 1).

### **How general should a skill should be defined?**

Skill specificity arose as a potential challenge in the focus group interviews. For instance, a user could write programming as a skill, or be more specific by dividing it up into various programming language skills. Users also suggested a new skill type somewhat like 'aggregated skills', where for instance a programming language skill could be made up of various sub skills. Too many skills however, might make the system seem overwhelming. One interviewee referenced the business networking site LinkedIn (2014) as having a potentially bewildering skill system.

Interviewer: [...] How should one do this? Ragnhild: Well, if you *would* provide some objective measures you would still be able to differentiate between people who are damn good at [programming in] Java. Grandmasters in Java. Like one that clearly knows programming but who's still a novice in [programming] PHP. Alternatively, you might let the groups [realms] specify what the different levels are. But then it'll be hard to collaborate between various groups [realms]. Erik: Maybe. Ola: Or for instance, one should specify skills even further. If one is to differentiate internally inside the group. If everyone is crazy good at Java. Then well, Java is very big. So, maybe differentiate it as Java Spring then. Or Java JDBC. Or well, database. It has to in some way, well, be more specific skill-wise. Erik: So, like for instance.

Alright Java, or you could write programming. But what in the world does that mean because you have functional programming, object-oriented and so on? Ragnhild: You should perhaps also have had, skill as, well multi-level [skills] in a sense. [...] Under Java you have, JDBC and so on. Skills under Java. So, could perhaps have Java [overarching skill] calculated from what you have said about the other things [sub-skills]. Interviewer: Mhm. Ragnhild: I picture it'll be terribly long lists if you go into detail. On. Eh. Different languages. Ola: It becomes a bit like LinkedIn in a way as in the end you have so many skills. Morten: That it just becomes just one long. Ola: Yes, but then. So, then people don't view them because. Interviewer: Mhm. Ola: It's so. Just so much. It becomes so insignificant, right (P&P focus group 1)?

### **Skills may be used to show off personality**

When writing skills on their heroes one participant inputted some skills with the intention of communicating his personality. The focus group interview further revealed that another participant had taken this as an invite to also share a guitar playing skill, which might be argued to be out of place in a programming focused community such as P&P. Moreover, P&P participants in the prior focus group interview cautioned against this tendency calling for some moderating functionality.

Andreas: [...] I've entered piano which isn't relevant at all but it's part of my identity so I think it's very interesting in that setting. But in a more formal situation then maybe I wouldn't have done it (P&P focus group 2).

Andreas: Our setting is Pils and Programming. And that is actually a very social happening, so I think that there are more that have entered guitar. [...]. Frode: That's why I did it. Andreas: Yes. Frode: Because you created that [skill] [...] (P&P focus group 2).

Ola: But another thing, as well, that goes a bit back to the irritation of LinkedIn is indeed that. Skills should indeed be, a bit like, domain specific so that you shouldn't be able to input guitar and such. [...]. If this [system]

is meant for Pils & Programming then one ought to restrain oneself. There should be some form of moderated cleanup (P&P focus group 1).

### **The debatable value of skill discovery**

Participants questioned the usefulness of the skills functionality. One P&P member argued that the skills functionality wouldn't be that useful in a tight knit community such as P&P where members already know each others skills. Similarly, the Spillmakerlauget focus group also doubted the argued value of the skills functionality arguing that it wasn't hard to know who to turn in their community when in need of some assistance. However, the SL focus group added that this system could be useful for new members who wouldn't know who to turn to due to being new to the community. While one P&P participant agreed that the skills functionality could prove useful in discovering hidden skills in other members, another member remarked that one would at least learn what fellow members thought of themselves.

Henning: Well well. [...]. Since everyone knows each other then it's not so important to really input skills then. Because people do know approximately what the other ones' know (P&P focus group 2).

Gjermund: [...] I think it would work better on a larger scale because when you deal with such small communities like for example take Spillmakerlauget in Bergen then everyone talks with each other anyway and then that doesn't-. Then people know who they ought to ask if they need anyone to do special tasks (SL focus group).

Gjermund: But I can picture it being very relevant to take for example students who are looking for someone to do project-. Well, people who aren't-. You have those who are more established and they would often know where they could find the people they need but then you maybe have students who have projects that they would like to start but they don't have the money [...]. (SL focus group).

Interviewer: Do you think that it would be possible to find, eh, skills within others that you didn't know about? With this one-. This tool here? Andreas:

I would say yes. Frode: Can at least learn what they think of themselves then. Even if they not necessarily have those traits (P&P focus group 2).

### **Alternative skill implementations**

Alternative implementations of the skills functionality was suggested by two of the focus groups. Common to these two suggestions was the inclusion of experience points, and the idea that instead of simply telling how good you are you would earn a high skill level by doing good work.

The Spillmakerlauget focus group came with some very different ideas as to how LFG could implement its skills system suggesting a system of primary and secondary skills in combination with a skill level system based on calculated experience points (XP). In this alternative implementation users would earn XP by completing quests, points which would in turn “level up” (increase) their skill levels. Augmenting the LFG with XP was also suggested by the second P&P focus group, albeit in a less radical alternative. While keeping the original skills system intact it was suggested that hero-cards would also display experience points, a points value increased by completing quests which would either replace or complement the existing awesomepoints (points used to create quests). Participants quickly noted that there would be a need for an additional concept of sub-experience, like if a hero had a very large amount of XP it would be useful to see through which skills or quests the points were earned.

Lisa: [...] Rather than you writing in a series of skills and selecting levels you write in one and then so and so many skills on ‘primary’ that is in a way your main things [skills] and then you have-. Gjermund: -this you’re confident in, this you know, this-. Lisa: -yes, and then you have ‘secondary’ that is in a way those [skills] you have some grasp of but they’re not necessarily your main skills. And then you get XP [experience points] on each of them based on the collaborations you do with other people (SL focus group).

Lisa: So, then you have in a way all the skills you choose, those are things you think you know and want to continue with and want to collaborate with people on and then you start with [skill level] 1 in each of them. And then

through collaborating with people you'll-. Gjermund: Mhm. Lisa: -show that you have experience and know it. Gjermund: Yes, yes. Interviewer: Ah, like so. Gjermund: I actually think that would be a much better way to do it. That you basically work your way up in. Yes. Interviewer: Mhm. Lisa: And then-. Gjermund: At the same time. Lisa: That was the first impression of the system when I saw it. Gjermund: -and at the same time you have the option to show off your projects so that people wants to use you, when you're still on, when you're on [skill] level 1 (SL focus group).

Ragnhild: It is perhaps better with pure experience [points] then. Erik: Yes. Ragnhild: That you see, okay that person has done a tremendous amount and has a lot of experience. Maybe even differentiate experience into sub-experience and so on, "yes he has crazy amounts of experience but that is only in Java." Morten: Mhm. Ragnhild: Maybe that could've been used to level up too or something. Morten: It may be better because then you see in a way what areas they've worked in and instead of just having points (P&P focus group 1).

### 5.2.3 **Quests: Reconceptualizing work**

One of the goals of the focus group interviews was to explore how the participants interpret and reason about the notion of quests. And some interesting contrasts surfaced between the focus groups and especially between P&P and Spillmakerlauget.

#### **Quests, challenging work made less scary**

Quests create connotations of both safety (safe to fail) and challenge (epic undertakings). When asked to reflect on the notion of quests in this system participants said that they pictured quests as something a group of people could undertake together, it's okay to attempt a quest that's beyond one's capabilities and even risk failure.

What's more, one Spillmakerlauget participant challenged the other participants on notion of why not have quests that would require a year to complete. That remark should be seen in context of Spillmakerlauget being a community of many small firms who have

decided to go their own way and create games embarking on long-term projects where the eventual success might or might not lie at the end. In a sense, Gjermund and his group have embarked on an epic quest that is a project which will take a long time and much work to reach fruition. In fact, the evening when I conducted the interview the group was working late performing contract work for other firms in order to generate funding for their own project.

Ola: I think the quest metaphor is quite alright in a way. Kinda like. Morten: Indeed, it is a more fun concept than a lot out there. Ola: Yes. But it is indeed quite descriptive in the way that a quest, in my mind, is indeed a group of people overcoming some kind of obstacle together, right? Ragnhild: Mhm. Ola: So, in that case it is a good metaphor then. I don't know if this was everyone's impression though. Ragnhild: I think it makes it less scary. You might be well acquainted in that you already have played some online games and then you're indeed used to jumping into some kind of quest that you don't necessarily have the skills to accomplish that original quest but that isn't something dangerous. It's ok to fail (P&P focus group 1).

Per: Epic quest. Legendary quest. Interviewer: Yes yes yes, "will take you a year." Per: Yes yes yes! Interviewer: Hehe. Gjermund: (somber tone) But why, why not if one first is willing to attempt something like this? (SL focus group.)

### **Extending quests with quests-chains**

Spillmakerlauget participants suggested that quests could include sub-goals or sub-quests. This would help make quest progress more visible and engaging overall. Furthermore, by breaking down quests into smaller tasks it helps people figure out what concrete tasks need to be done.

On a similar note, one of the P&P focus groups suggested quest-chains as something to complement the existing quest functionality. To get people contributing to a project (a code repository) quests would need to be small enough so that it's not too hard to complete it and thus get a sense of progression. And because having many small quests

could become confusing there would be a need for some functionality to string quests together in something like quest-chains.

Trond: It is a very great advantage to see that a quest is moving forward.  
Gjermund: Yes. But it could've been included as an independent like in a way eh progress window or that it doesn't necessarily-. Interviewer: A [news] feed perhaps? Gjermund: Yes, something, some form of eh yes. Trond: Or that there exist sub-quests. That you have sub-goals, I was about to say, like when you've done that sub-goal then there's something that shows that it like has progressed a step further? (The group voice agreement) So, that it is much easier to concretely see what needs to be done and that you see that it's moving forward (SL focus group).

Ragnhild: It might be quest chains then maybe. Mhm. That you have it a bit like (???). You have the chain and then you have lots of sub-quests that are just different small things like. [...] We always create another [code project] repo[sitory] collectively, and then there's no one that really does anything with that repo. So, then you must have quests to get something to happen in the repo of yours. But then indeed the quests have to be almost small enough so that you actually manage to accomplish something a bit fast so that you get some points. Get a little like, progression. [...] And then it quickly becomes difficult to have the coherence in all that is to be done in the project (P&P focus group 1).

### **Estimation of quest size might be useful though boring**

One participant reasoned that quests should perhaps contain estimations of how long it would take to complete them. Though a useful feature, that same participant also argued estimation work was a boring task whereupon the rest of the group agreed.

Ragnhild: Perhaps a bit more estimation on quests then, I don't know. Well, okay. "This takes ca ten minutes to accomplish." "This takes a day to accomplish." And then there's added [bounty] points. [...] (pauses). But then on



the other side you might not want that much estimation. Boring (collective agreement) (P&P focus group 1).

### **Creating quests for oneself and for others to join**

In contrast to solely creating quests for others participants also voiced a desire to create quests where they would participate themselves. One of the P&P focus group participants Ola explained that he would like to create a quest for himself and for others to join. Moreover, Ola present scenario where he would like to create a quest as a rallying call for others to join him in exploring a certain technology. Building upon Ola's suggestion Ragnhild adds that in this case one might creating a quest to explore a programming language that one literally haven't looked at before.

Ola: I think that it is more important, not skills, but more what do I want to play with? Erik: Yes. Ola: If you're in a group of people that you know is good at doing stuff. Because most of the people who attend Pils and Prog are good at doing something using computers. And involving themselves, so then it's more interesting maybe to know like "I've recently discovered something awesome, who else is interested in this?" Like, or, who else is interested in creating something in like [the] Clojure [programming language] like you talked about right? Want to make a project in Clojure but that is a little too big to undertake alone. Like just, "who else?" That one may go in and see who else. Ragnhild: In such a case you might not even be a novice. You haven't even looked at the language (P&P focus group 1).

### **Moderating questers and quests**

At the outset, LFG aimed to have as little built-in moderation as possible and instead rely on social norms instead. Throughout the interviews however, participants argued the need for some in-system moderation. Participants argued that quest moderation was needed to avoid duplication of effort and otherwise ensure that collaborative projects had some supervision. Furthermore, the Spillmakerlauget participants argued that quest-givers should be able to decide which questers get to undertake their quest as a means to also avoid duplicated efforts.

Ragnhild: Yes, well the case is if you're sitting then and sitting and watching TV on a Friday and then [realizing] "damn, we should've had a search bar up to the right." So, then you add that to the [Looking for Group] system and then you don't get to discuss it before next Friday again and then you might've well forgotten what. What the reason was. And then you didn't get to discuss with others on beforehand what that reason was. What. What the deal was. So, then people will surely be confused. Especially if you then give a quest and then there's someone who have completed the quest before you've discussed it (collective agreement). (P&P focus group 1).

Gjermund: So, then [...] you can in a way accept quests and then you must wait for approval, that the one who's put up the quest must say that "I want that or that and those three to do [the quest]." Interviewer: Ah, exactly. That people apply for quests? Gjermund: Yes. Trond: Yes, you must apply to a quest. If not, you might suddenly end up receiving fifty of the same illustration right? Gjermund: Yes and then it suddenly becomes like. And I actually think this is a little important. Because suddenly it takes off and then you have a million users and then there's like people sitting and sending accepting quests over the whole world (SL focus group).

#### **5.2.4 The points system was eagerly discussed**

##### **Points are hard to estimate and kill creativity**

Participants reflected on the process of setting a bounty on a quest. When asked to reflect on this one participant bluntly stated users shouldn't have to deal with points estimation as it kills creativity. He didn't get to elaborate, before another participant proposed that quests should have a fixed bounty to simplify the whole process of selecting a fitting bounty. This suggestion was countered by another participant who argued that people in need of help might not be able to accurately judge the size nor the value of the quest (task) they're creating.

Interviewer: How should one really have calculated those points: Ola: Shouldn't calculate points really. Kills creativity. (Participants interrupting each other).

Erik: One might say that. That if putting a fixed amount per quest or. That it doesn't make that big of a difference how big the quest is (??). Ragnhild: I think so. It's just that it's quite difficult because then you don't entirely know. If you actually give a quest because you can't complete it yourself then you don't know how much points you need or how much points that person who completes it deserves in relation to difficulty and such (P&P focus group 1).

### **Creative quest-creators versus points-raking doers**

One participant made an interesting remark that while some might be really good at creating quests others might be better at completing them. In other words, some heroes might end up spending all their points creating quests while other users find themselves solving quests but not necessarily creating new one's.

Ola: But then you may have some people who are just incredibly creative and comes up with crazy good ideas right but they're not that good at solving these things right? Interviewer: Mhm. Ola: Should they then be troubled because they're not that good at solving so many problems? Like if someone that is extremely good at coding just sits there solving problem after problem (P&P focus group 1)?

### **Inactive, uncreative users equals lost points?**

What happens if someone only solves quests? In an effort to stress test LFG's conceptual model one participant proposed a scenario where one participant would only solve quests thus amassing a large portion of points which would never return to the system, essentially removing points that could be used in creating new quests. Another participant suggested that such a problem might be solved by introducing inflation.

Henning: The only thing is that if there's a person who never. If a person helps out a lot but never needs help-. Andreas: Then he becomes rich. Henning: Yes, but then points disappear from the [LFG] system. [...]. Andreas: I don't think that will happen. But I do think there will be some people who

might get a lot. But then again I think one might have a system of inflation where one pours [points] in just like in the economy. Give a little something for attendance or something like that (P&P focus group 2).

### **Points as encouragement or coercion?**

A talking point which emerged was whether the intention of the points would be encouragement or coercion. When asked to reflect on the points system, one participant questioned whether or not the system's intent is to coerce users into collaboration and doing things they don't want to. Participants in the second focus group proved more positive towards the points, though they ended up discussing them the longest of the groups. Also, they recognized that in small communities people could give informal reminders to members with a lot of points to get them to create quests.

Interviewer: What if there was an option that like you may have like three quests eh broadcasted simultaneously [...] then you have to eh either eh. Let time pass or solve quests for others to return to three quests. Ragnhild: It depends a bit on what the point is then. Well, are you going to force people to collaborate? Do stuff they're not necessarily that interested in (P&P focus group 1)?

Andreas: Well, a privilege you get for having points is the ability to create quests. For example, now I'm all out of points and can't create more quests. And that is a good thing. Maybe I'll have to make more quests then. [...]. If no one is interested in my quests then I'll have to remove those quests to create new quests instead. Henning: That means you'll have to prioritize (P&P focus group 2).

Henning: One has to think about this as a small group where everyone knows each other really. Or know who people are at least. So, in that setting it might actually work. The rest of the group might go and say "now you'll have to. (Chuckles). Get more points into the system and not just sit there hoarding points." (P&P focus group 2).

### **Where there are points, there might be cheating**

When critiquing the idea of points participants easily conjured up an example of how the system could be exploited by creating a lot of users and funneling those points into one hero. Afterwards participants noted that they believed such behavior would be less likely in a smaller community like P&P.

Henning: [...] then you have someone then, who wants to help them get a higher points score or (???) right? Yes, cheat. So, then they create new heroes just to- Andreas: Gather some [points] into one- [hero] Henning: - gather, yes. Andreas: Maybe you're only, only allowed one hero (P&P focus group 2)?

### **5.2.5 Cultural differences: Professional vs. hobbyist CoP**

#### **Concerns on ensuring proficiency**

The question of how to ensure proficiency emerged in the focus groups. In the second focus group participants suggested implementing endorsements as in LinkedIn as a means to put more trust behind the skills of a hero. When prompted for their opinion on skill endorsements one of the participants succinctly stated that a problem of ambiguity and complexity might surface when a skill could be endorsed at various levels. The Spillmakerlaugset focus group was also asked to reflect on the idea of skill endorsements.

Similarly, the Spillmakerlaugset focus group agree that endorsements might pose a problem where people get endorsed for skills they're not good at. Per referred to LinkedIn and stated that many people endorse him for skills that he doesn't even know if he knows anything about. Gjermund suggests that a middle-ground of combining self-reported skills and endorsements might be the way to go.

Henning: Seeing that it is built for a group setting. Eh. Then it might be good enough that you yourself describe what [skill] level you think you're on. But maybe it could be a bit like [...]. Like that when LinkedIn got that where you may give eh. Interviewer: Endorsements. Henning: Endorsements to the different skills. So, then you say that "this I know on such and such level."

And then the others may say that “yes we think that this- [is valid].” Andreas: This is a very good idea. [I] would like to support it. [...] Interviewer: [...] what do you think Finn? Finn: I just started thinking whether it should be relative to what rank that person has entered or if it should be more general. Just how many thumbs-up you have (P&P focus group 2).

What is the proof right? Some kind of endorsement-type system is some kind of evidence but even then there are problems because people may give endorsements to people who’s not necessarily that good at those things. Per: No, people give endorsements on a lot of stuff-, (Many in the group state their agreement), -and I have no clue if I know anything about eh this or that. And that is in a way a weakness with-. Gjermund: But a combination there, I think would be the best (SL focus group).

### **Paid work vs. favor work**

Another theme that emerged from the transcribed data was the line drawn between paid work and work based on exchanging favors. Spillmakerlauget saw LFG as a means to support a barter economy where services are exchanged and expressed both the value and proliferation of it within the Spillmakerlauget community.

While Spillmakerlauget at various occasions discussed LFG’s stance on paid vs. unpaid work the P&P focus groups hardly mentioned it. The P&P focus groups hardly considered this topic but when the topic came up some of the participants reacted with a sense of bewilderment to the thought of LFG dealing with paid work. At one point, participants Morten and Ola were quick to note that taking on client work would mean commercializing LFG making it into something entirely different. That remark is interesting because there were never any strict instructions regarding on whether or not the system would include money, the participants instead voiced their intuitions.

Per: [...] there’s a lot of like bartering [of favors] going on to be fair. Gjermund: Yes. Interviewer: But then it’s really valuable trading as well. Per: Yes, indeed. Gjermund: Yes, it is just as valuable as the money (SL focus group).

Morten: So, maybe a photographer or seamstresses [...] would go in here and say, “hey I need a web site.” So, I’m thinking maybe they would not take it as seriously when it like says, “hey I’m looking for a hero who can.” Something like that. Ola: But then you’re suddenly reaching a different market. Morten: That’s true. Ola: Then it suddenly becomes a commercialization where you’ll have to charge and such and. Morten: Yes, that’s right (P&P focus group 1).

Andreas: [...] for example I have tried to- [...]. Eh, give eh give beer or some other extra reward. And the possibility for then to maybe add to this [quest] like a bit of bold text, “extra rewards are given”, or something. Henning: You could just write it in the text itself to-. Andreas: You could do that. But that becomes a bit too discreet. Could off course just do, capslock, “gives beer” (P&P focus group 2).

### **5.2.6 Information management**

#### **A proper search functionality is vital**

Due to lack of time search functionality did not get implemented. The lack of searching capability did not go unnoticed by especially the Spillmakerlauget focus group who quickly noted that a well-formed search functionality would be vital to the utility of LFG.

Gjermund: But I’m picturing that to be able to search within such a program would be very, very important. (Strong agreement from the group).

Gjermund: It isn’t something one really can avoid because it really is a place for finding people with particular skills (SL focus group).

#### **The lack of chat functionality**

Focus group participants noted the lack of chat functionality, upon which it was explained that the LFG system doesn’t try to recreate functionality which other programs do well.

Though puzzling at first, many seemed to recognize the reasoning behind keeping LFG minimal and flexible and combine it with other collaborative software.

Anna: So then, coordination happens through other channels outside? Interviewer: Yes, that was the idea. But that is an open question. Because it is indeed like, if it becomes too much to juggle or if it becomes so that if one tries to gather everything in LFG then one risks having a worse-. Frode: There is something called Assembla, that I considered using in a project. It has all the same, there you may have a git repo and a good amount there, and you may have user stories and that. I kinda gave it up because it was too much in one place, frankly speaking. So, sometimes it is better to divide it if there are solutions that are better because Github was better than the solution they had (P&P focus group 2).

### **Information need to be centralized and up to date**

Participants especially in the second focus group questioned how information would be distributed and how immediate it would be. Without immediate, updated information LFG would work more like an initial planning tool. If so, users believed LFG would be used for a bit in the start and quickly abandoned.

In a worst case scenario according to one interviewee, users would enter LFG just to see that they would have to go elsewhere to get more updated information. Adding to the tediousness, when having completed a quest users would have to return to the system to manually insert information on the quest's progress, failure or completion.

To remain useful throughout a collaboration LFG would need to be able to dynamically integrate communication and work happening in other systems. Changes to a project should be immediate and global across multiple systems.

Ragnhild: Yes, but the thing is that the quest should import the communication that's happening other places. Because if I would have been bothered to use this [system] then this must have been a central place to get information. Wouldn't have bothered to go in here and say "ah yes there is someone who's working with something" and then go somewhere else [into another system]



and then return [to LFG] and say “ok now I’m done with this [quest].” (P&P focus group 1).

Ragnhild: So, people would perhaps use this [system] for some days and then they would just forget about it. Ola: Yes, or then they would use it like “yes, we’ll now have to take action and plan a bit.” Then they would maybe plan in this program (???) this here okay. Ragnhild: Yes, done. . . Never. Never going back [into that program] again. Ola: Then it becomes more of a planning tool just to give tasks (P&P focus group 1).

Ragnhild: [. . .] then if you create a comment thread on Facebook, within a group or event, you could then tell Looking for Group that “ok here, here’s a discussion happening.” It [LFG] could then retrieve the discussion and maybe have a commenting form here [on the quest] that sends information back [to Facebook] thus it would in a way use Facebook as a storage. That is then the database for the communication thread for this quest (P&P focus group 1).

### 5.3 Summary of findings chapter

This chapter has presented data gathered from both surveys and hybrid focus groups. A summary of the main findings is presented in table 5.9. While the surveys were only able to provide some cursory findings the hybrid focus groups were able to generate a number of relevant themes to analyze and discuss in the next chapter.

<b>Survey findings</b>	Due to a low number of respondents the data from Spillmakerlauget was disregarded. Instead some cursory findings regarding the P&P community were presented: Knowledge sharing seems to be a main motivation for participation and members seem familiar with a wide range of collaborative programs. Many members know programming and some report discontent with the level collaboration in the community.
<b>Focus group findings</b>	
Initial issues and impressions	As common with high-fidelity prototyping participants initially tended to want to report bugs. The prototype's playful nature was well received overall though some wondered how well it would fit within larger corporations.
Skills: Issues and possibilities	Participants reported difficulties with selecting skill levels, and deciding how specific to be when inputting their skills. Some viewed skills as a means to showcase their personality. Some questioned the value of discovering their peers' skills. Alternative implementations of the skill functionality were suggested.
Quests: Reconceptualizing work	The concept of quests resonated well with the participants who reported that it gave connotations of safety and challenge. Participants also suggested functionality for chaining quests, and moderating quests. Moreover, they also reported that they would like to create quests for themselves and others to join.
The points system was eagerly discussed	Participants readily discussed LFG's points functionality. Some argued that it would be hard to estimate how much points to set as a quest bounty and that it might even kill creativity. Other issues such as the risk of cheating were also discussed.
Cultural differences: Professional vs. hobbyist CoP	While the Spillmakerlauget members readily discussed the notion of paid work vs. favor work, the P&P community seemed to not believe that LFG would be used for paid work. Furthermore, SL members seemed more concerned with ensuring that displayed competencies were true.
Information management	If the prototype seeks to successfully integrate with existing tools and practices then users should not have to wonder where to find updated information nor have to update the same information in several systems.

TABLE 5.9: Summary of main findings

## Chapter 6

# Analysis and Discussion

In this chapter we discuss our findings in light of the research discussed in chapter 2. The goal of this chapter is to develop theoretical implications and design implications for designing gameful CSCW systems. And we start off by reiterating the sub-research questions and also note where some of them have already been answered.

1. *What is the nature of WoW's collaborative dynamics from a CSCW perspective?* In chapter two we defined the collaboration in World of Warcraft and outlined a set of characteristics which we argued that a CSCW system inspired by WoW ought to have.
2. *How could one recreate WoW's collaborative dynamics within a CSCW system?* Chapter four provide an answer to this question in the form of the Looking for Group prototype.
3. *How would such a gameful a CSCW system be received by a community of potential collaborators, and how can it fit into their existing collaborative work practices?* By introducing the LFG prototype to the Pils & Programming community and the Spillmakerlaugget community we were able to gather findings to try and answer this question.
4. *What theoretical implications might be distilled from our data regarding gameful CSCW systems?*
5. *What design implications might be distilled from our data for designing gameful CSCW systems?*

As we near the end of this thesis it's time to tackle the fourth and fifth subquestion. And by answering all the sub-questions we help answer this thesis's main research question:

*How can we recreate the collaborative dynamics found in Massively Multiplayer Online Roleplaying Games within a Computer Supported Collaborative Work system?*

As noted in chapter three, the implications for theory and design together with the LFG prototype constitute our core research contribution. Furthermore, these contributions represent the answer to our main research question.

## **6.1 Theoretical implications**

This section discusses the theoretical implications of our findings. Through our findings we argue that our prototype Looking for Group (LFG) support the nature of CoPs. Furthermore, we argue that our findings indicate that the notion of confidence seem to underpin many of the themes uncovered in our research findings.

### **6.1.1 The concept of Community of Practice meets gamefulness**

LFG was tested in two Communities of Practice. This section discuss our findings in light of CoP theory. We argue that the findings revealed showed characteristics commonly found in CoPs, and that LFG seem to enhance not disrupt these characteristics.

Theoretically speaking, LFG should align itself well with CoP theory due to how the prototype handles identity formation and skills. Through participation in a CoP individuals develop their identities and practices (Handley et al., 2006).

In our findings we found tendencies of interviewees appropriating the skills system for establishing their identity in the group. Specifically, one interviewee decided to input an instrument skill which consequently inspired another to do the same. Some interviewees questioned the lack of moderation functionality partly because they saw a need for moderating what skills people would choose to showcase. Altogether, this seem to capture the duality of identity-regulation and identity-work introduced in chapter two: These findings capture a tension between the community and the individuals where the

community tries to regulate its members by instilling a shared identity, while the members try to reconcile their individual identities. In other words, while some interviewees wanted to add instrument skills in order to show more of their identity, other members called for built-in functionality that would help them regulate the identities. Handley et al. (2006) argue that such identity tensions will be an ongoing process and never fully resolved.

Quests seemed to favorably conceptualize the work found in the members' CoPs. Interviewees reported that quests conceptualized the tasks as something to stretch one's skills towards accomplishing, while being reassured that failure would be tolerated. Though some interviewees questioned the value of being able to discover competencies in others they saw a benefit for newcomers in how they could orient themselves in the community. And figure out how to establish themselves as recognized members or in other words "collaborate their way into" the community. From our findings, one might argue that LFG help streamline CoP participation by providing awareness of possibilities for interacting with other members.

Completed quests and projects point to past accomplishments, and thus towards the CoP's shared set of stories. LFG was not tested over the long term and thus did not capture any shared stories of the CoPs. However, we would argue that LFG's functionality would be able to support this important element regarding CoPs. Moreover, it would be interesting to see if or how a resulting set of shared stories would be affected by gameful concepts such as heroes and quests considering their larger-than-life connotations.

In sum, our findings revealed dynamics typically found within Communities of Practice. And moreover, LFG did not seem to get in the way of these dynamics. Though it would have to be proven over the long-term, based on our findings one might argue that the LFG prototype seem to fit well with CoPs as it provides awareness without disrupting the CoP's inner dynamics. And these inner dynamics refer to processes such as the ongoing negotiation of identity and the development of a shared set of stories, all of which might benefit from the gameful narrative provided by the conceptual model.

### 6.1.2 Confidence as foundation for collaboration

Moving into this research we asked our main research question of how WoW's collaborative dynamics might be realized in a CSCW system. True to the nature of design research, the solution *as well as the* problem gets developed throughout the process. This section explores an undercurrent in this research that gradually became more apparent throughout our efforts: CSCW should explore the extent to which collaboration correlates with confidence.

As we've drawn inspiration for our research from both Game Studies and CSCW theory we've seen a marked difference regarding the inclusion of emotions in the subject of study. Both GS and CSCW discuss collaborative platforms, and while the former considers psychological concepts such as flow (McGonigal, 2011b), the latter has chosen to largely abstract away emotional considerations to try and lower complexity (Schmidt, 2011). Admittedly, the relevance of this argument hinges on the degree to which the proposed CSCW research agenda by Schmidt (2011) can be said to be instructive for the broader, ever-pluralistic field of CSCW.

Indeed, it's worth noting that there is *some* CSCW research into games and gameful design. For example, by removing an existing points-based incentive system from an Enterprise Social Network System researchers showed a decreased user participation and thus argued its importance (Thom et al., 2012). Another example is this research into the competitive multiplayer game Halo Reach which reveal that in-team friendships significantly impact team-performance in a positive manner (Mason and Clauset, 2013).

Going into the design process it was assumed that using playful concepts such as heroes, skills and quests would help lower the barrier-to-entry. Furthermore, by introducing skills and levels we assumed that the barrier would become even lower as users who only knew a little bit about certain skill would be able to broadcast that skill for others to know and with less fear of judgment. Throughout the design process there were a number of assumptions and intuitive design decisions, which were elaborated in introducing the prototype (p. 59).

An undertone of confidence gradually became apparent in our findings. The findings show that even though we tried to make the skills system as accessible as possible interviewees still struggled with inputting skills. Some interviewees even reported that they

purposely lowered their skill levels in order to avoid disappointing potential collaborators. Two of the focus groups suggested the addition of the concept of experience points something that would relegate skill calculation responsibility to the system thus removing the pressure on the users to continuously self-evaluate. Interviewees responded better to the quest concept, reporting that they viewed quests as obstacles that people banded up to conquer together without fear of failure. If one looks past the issues of achieving a good information-flow or whether or not to include awesomepoints, the LFG revealed basic issues of trust and fear, uncertainties which interviewees tried to mitigate directly or indirectly by requesting moderation functionality and experience points. From this one might argue that CSCW platforms that try to affect collaboration need to be mindful about helping users feel confident enough to show off their skills and confident enough to apply for quests which might prove too challenging.

Game Studies might also help explore this potential undertone of confidence. In chapter 2 when we elaborated the field of Game Studies we argued that games offer people four benefits: urgent optimism, social fabric, blissful productivity and finally epic meaning. Particularly relevant here is the concept of urgent optimism which argues that games help people get good at mustering optimism towards any task. Through games players are taught to never doubt that the game can in fact be bested. Off course, in our case LFG could house truly impossible quests. Moreover, the principle of social fabric argues that people cultivate trust in each other through games because it takes a lot of trust to sit down and play a game with someone and trust that they'll stick to the rules and stick around for the duration of the game. In chapter two, when we developed an understanding of World of Warcraft we saw that aspects related to social fabric seemed to be big part of what made WoW a very engaging experience, to the point where some WoW players would feel socially pressurized to play the game.

By making our prototype seem more like a game, we have tried to unlock more of the positive qualities regarding games, such as urgent optimism and social fabric. Indeed, Kumar and Herger (2013) note that gamification can be made to play on both intrinsic motivations such as autonomy, mastery and meaning as well as extrinsic motivations such as badges, gold stars and money. Considering this intrinsic/extrinsic delineation we argue that confidence fall in the realm of intrinsic motivation underpinning both autonomy and mastery. Furthermore, Kumar and Herger argue that when pursuing gameful design of complex problem-solving tasks one should rather rely on intrinsic

motivations, as extrinsic motivations might prove downright detrimental. While the prototype did include points in the form of the concept of awesomepoints, it mainly attempted to enrich the collaborative interaction rather than strictly incentivise it.

Concerning the notion of designing for confidence one should also consider the wealth of research on designing for emotions contained within HCI (Rogers et al., 2011). Within HCI's established set of usability goals we find the usability goal of *safety* which states that a system should protect users from performing dangerous or undesirable actions. Arguably, that usability goal influence whether or not the users end up feeling confident when using the system. Furthermore, beyond usability goals there is the concept of user experience goals which are free to target any feeling including confidence. Moreover, as we've argued earlier usability goals and user experience goals do affect each other. A device which targets confidence as a user experience goal will need to be mindful of how usability will affect and be affected by this.

At this point one might ask where to place this concept of confidence considering the realm of gameful intrinsic motivation and the realm of interaction design's user experience goals. What this research would like to suggest is that one should consider confidence as a user experience goal, all the while being mindful of games as being interactive experiences. Rather than viewing gameful design as solely a project of incentivisation, one should broaden the scope to consider gameful design as capable of enriching interaction by tapping into users' intuitions regarding games. Considering this, the inclusion of heroes, skills, quests and awesomepoints might be viewed as a project of enriching a prototype which was essentially a CSCW system for competency-awareness and task-allocation with users' intuitive understandings of how games work. Indeed, the findings reveal these game intuitions to be significant.

As covered in chapter two, to design is to develop both the solution and the problem until no inconsistencies remain. In our case, through developing a design solution that affected the dynamic of collaboration we might have learned something about the nature of the underlying design problem, to which confidence might be an important factor. Also, it was argued that one should consider confidence as a user experience goal and consider gameful design as capable of enriching interaction rather than solely incentivising it. Finally, we argue that CSCW should look to GS and HCI for theory to build upon in order to support confidence as a prerequisite for collaboration.



## 6.2 Design implications

Having discussed our findings in light of theory we now turn to consider what design implications they might have on gameful design for the design of similar CSCW systems. Sparked by the themes in our findings we discuss the usefulness of points and badges, the challenge of surfacing competencies, how quests might favorably conceptualize work and the importance of real-time information. Following those discussions we present an overview of the design implications developed.

### 6.2.1 An argument against points and badges

Points and badges should be employed in gameful design with caution and perhaps outright avoided. The reasoning is that points and badges may easily become the users' main focus and prevent them from caring about the system's main purpose.

In our focus groups participants tended to enthusiastically discuss the points from various perspectives, all of which were elaborated in the previous chapter. Before trying to develop a design implication, we'll here briefly recap the themes found regarding points:

1. Points are hard to estimate and kill creativity (p. 88).
2. A problematic scenario could arise where some users would solely create quests, and others solely solve quests (p. 89).
3. Inactive users would effectively prevent points from being circulated in the system (p. 89).
4. While points might serve as encouragement, they may also be perceived as coercion (p. 90).
5. Interviewees questioned how easy it could be to cheat the system (p. 91).

In our findings we see that the points system was readily questioned by the interviewees. And even though each of the issues uncovered might be resolved through further design iterations it might sidetrack both the system designers and the users from the true purpose of the system which in LFG's case was to affect collaboration.

Exploring our findings we find that interviewees readily discuss to and fro regarding the points system. As noted in chapter two, in our elaboration of Game Studies various points debates seems to be a recurring tendency in gamified systems such as that of Reddit Inc (2013) and Stack Exchange Inc (2013). Users tend to get caught up discussing the points functionality. Sometimes it might even devolve into a cat and mouse game where the system designer tries to balance the system towards driving a certain behavior while users simply wants to amass points through any means possible (Attwood et al., 2009). Points and badges might thus be argued to be a double-edged sword where the reward of implementing it successfully leads to a very engaging user experience, while failing to do so threaten to overwhelm the system designers with points debate and balancing work. In other words, gathering points threaten to become the gamified system users' sole goal.

One might speculate that calling them awesomepoints was a mistake as it functions more like a currency that is exchanged through the creation and completion of quests. By naming them awesomepoints users might have received the wrong connotations, because in games points are traditionally hoarded in order to achieve a certain high score. Nonetheless, our findings show that interviewees recognize the monetary nature of the awesomepoints.

An alternative approach in the case of the LFG system, might be to completely avoid the costly avenue of points and badges. Instead the LFG system would rely on the existing functionality of hero-cards displaying completed quests and projects. While users might try to cheat by creating false users to create and complete a lot of false quests or simply input a lot of false projects, presumably it would be harder to fake quests and projects due to their textural, qualitative nature, and even more so in smaller communities. Authentic completed quests and projects might serve better as tokens of pride and experience. However, this alternative approach would have to be tested in future research in order to be truly advisable.

Based on our findings and in light of theory, we offer a design implication which argues that points and badges should be employed in CSCW systems with caution or outright avoided. While it may be a potent means to drive user behavior adding points functionality to a CSCW system necessitate continuous balance work and may sidetrack users

into simply debating and chasing points instead of consciously aligning themselves with the system's purpose.

### **6.2.2 Displaying proficiency: An argument for experience points**

CSCW systems that include functionality for users displaying their competencies face certain issues that need to be negotiated. Our focus group findings regarding skills reveal issues which include skill specificity and determining skill levels. To try and resolve those issues this section will argue the potential in leveraging the concept of experience points.

At the outset, this section seem to contradict the previous section. Nevertheless, this thesis argues both design implications because a decision to implement experience points in this system would have to heed the dangers spelled out in the previous section.

In order to try and overcome the issues uncovered regarding skills it seems that it might necessary to implement functionality for having experience points, all the while being mindful of the costs it'll incur in the form of balancing work and cheat-proofing. Let us recap the findings regarding skills:

1. Interviewees reported that after selecting a skill to input into the system it proved challenging to select a proficiency level (p. 79).
2. Deciding the level of specificity by which to define a skill was also experienced as challenging (p. 80).
3. Some users used the skills functionality as a means to express their personality by displaying for example guitar skill in a programming-focused community (p. 81).
4. Though useful for newcomers, interviewees challenged the utility of listing out their peers' competencies as they argued that they already knew their peers' capabilities (p. 82).
5. Two of the focus groups suggested independent alternatives, both in which a common factor was the introduction of the concept of experience points (p. 83).

Some of the issues above may be attributed to the way LFG was designed to be flexible. LFG was designed to be both minimal and flexible so that it would be tailored to the

community not the other way around. This resulted in functionality for creating an infinite amount of skills, freely set at a level from one to five. This expressiveness may have in turn resulted in some insecurity with the users where they wondered what would be the right skill and the right level to display in the context of their community.

Interestingly, when interviewees were reporting issues with LFG some used LinkedIn (2014) as an example of a poorly implemented skill system. LinkedIn (2014) is a website for professional networking which also includes functionality for displaying skills. “It just becomes so insignificant,” said one interviewee referring to LinkedIn’s long lists of sometimes irrelevant skills (page 81). LinkedIn prompts users to suggest skills for each other and themselves upon which others may endorse (confirm) those skills (Gupta, 2012). LinkedIn employee Gupta suggests, “if you think your connection is being too humble for their own good, suggest a skill they may not have listed yet on their profile.” This is a telling quote as it hints at the issues uncovered in our data, that users may struggle with deciding what skills to showcase. LinkedIn has tried to mitigate this issue by relying on users suggesting skills for each others, and by endorsing they also instill an element of trust.

To meet the feedback by the interviewees we might introduce absolute skill criteria to help improve skill levels. In practice, the individual communities or realms would strive to define clear skill level criteria for a selection of skills. For instance, in the case of a programming language they might define level one “novice” as being able to write a simple “hello world” program, while level four “mentor” as having taught at least one workshop in that language. In other words, clearly spell out more objective skill level criteria. This implementation would hinge on the community’s ability to come together and agree on clear skill criteria for a selection of skills relevant to their community. Agreeing on skill criteria in this manner would hopefully lower the classification work required by the individual who would in this case have more clear criteria to go by. Furthermore, when defining these criteria communities could also be allowed to freely define how many skill levels to differentiate a skill by as it might be hard to define five distinct levels when dealing with a relatively easy skill.

Two of the focus groups proposed that LFG should include some form of experience points. Though they were slightly different from each other both implementations proposed that completed quests should be reflected in experience points displayed on the

hero-cards. One group suggested that all skills would start at level one and only through completing quests would the relevant skills eventually increase in level. While the other one simply suggested that there would be an aggregated experience points number that could be explored to discover what quests were completed to earn those points. Adding experience points relegates the responsibility to the system for deciding how experienced users are in a certain skill. The success of this functionality would hinge on its ability to calculate experience points in a way that would reflect the user becoming more experienced in a skill. If successful, LFG would not only help decide how skilled people are but also add an additional element of trust in that the experience points would be *earned* through completing tasks. As an added bonus users would be freed from having to update their skill levels over time.

The issues uncovered in the focus groups would have to be resolved if skills are to fully support the discovery of peer competencies in a fashion where the skills displayed may be trusted. In the case of LFG we suggest working out absolute skill criteria and exploring the notion of experience points.

On a more general basis, what design implications might be drawn from our findings for the gameful design of CSCW systems? One key finding was how our interviewees struggled with the challenge of figuring out what skills and corresponding skill levels to display. Possible solutions might be something along the lines of LinkedIn's skill endorsement system, introducing absolute skill criteria and implementing experience points. However, adding dynamically calculated experience points might be the best as it would leverage users' familiarity with game metaphors and alleviate both users and the community from continuously having to make judgments about skill levels.

### **6.2.3 Quests suggest that it's safe to challenge oneself**

This section explores our findings regarding the quests functionality. From our findings we discuss how quests might represent an advantage in terms of cultivating a culture in which it's safe to fail. Before exploring that design implication we briefly recap relevant themes in our findings:

1. Quests seem to yield favorable connotations (page 84).

2. Functionality for defining quest-chains and sub-goals was requested by interviewees (page 85).
3. Though useful, quest (work) estimation may quickly become boring (page 86).
4. Interestingly, interviewees reported that they would also like to create quests to work on themselves together with other questers (page 87).
5. Interviewees also argued the need for including functionality for moderating quests and questers (page 87).

Overall, the concept of quests seem to have been well received by the interviewees. They understood quests as work that could be of epic proportions as in possibly taking a year to complete and possibly very challenging, and yet safe to fail.

Interviewees took issue with the possibility for very large quests which could potentially exhaust would-be questers. However, quest-chains and quest sub-goals would help break down larger quests into smaller tasks which in their completion would help create a faster, more continuous sense of progress.

To make use of the quest concept in collaborations with money on the line would require some adjustments, as failure would not be as easy to accept. However, though failure would be harder to accept in this case the benefits are still very desirable in that workers would challenge themselves with tasks that could help them grow regardless of the outcome.

Our findings indicate that the concept of quests spark connotations that urge users to undertake tasks that might be too big for them and that failure should be tolerated as it is tolerated in games. A tolerance for failure might lead users to take greater risks such as collaborating with someone they don't know so well or undertaking a project where they'll be pushing their skills to their limit and thus potentially grow from that.

#### **6.2.4 Realtime information-flow is a prerequisite for ecology-centric CSCW systems**

In this section we discuss our design choice to aim for a prototype which was ecology-centric, which meant an emphasis for it to work with existing collaborative tools. Here

we explore the findings regarding this design decision and discuss the importance of real-time information flow.

In designing LFG a design choice was made to try and make it very minimal where it would rather co-exist alongside and not replace existing technologies and practices. LFG drew upon theory of appropriation (Dix, 2007), product ecologies (Forlizzi, 2008) and finally the concept of supporting natural protocols through artificial protocols (Schmidt, 2011). Together these theories argued a flexible system that would co-exist with existing systems and augment existing practices rather than try and replace them.

Thus the envisioned scenario was one where depending on the project the questers would simply pick the best tools for the job, for instance using GitHub Inc. (2014b) for code collaboration, and have the quest-card mostly reflect the ongoing state of the task unfolding on GitHub adding only a gamification layer. Due to lack of time this functionality did not end up in the finished prototype. However, the interviewees were informed of this intended functionality which helped them provide comments nonetheless.

What we found in our findings was that implementing functionality for the real-time flow of information and the moderation of quests and questers would be vital to LFG's utility. Interviewees argued that some in-program measures would have to exist in order to prevent duplication of work or simply unwanted work. Interviewees also argued that if LFG were to be used over time, quests would need to be able to display up to date information regarding their status, being forced to search various sites in order to learn the status of a given quest would be unacceptable.

Thus even though LFG did not prove it's utility over time, this prototype helped elicit feedback that confirms the importance of proper information-flow and built-in moderation within minimal CSCW systems of this kind. One might contest the relevance of this design implication on the basis of not being gameful. Nevertheless, this design implication is relevant for gameful CSCW systems that would try to integrate with existing tools and practices.

Design implication	Benefit	Limitation
Points and badges	Successfully implementing points and badges functionality may effectively drive desired user behavior.	Gamifying an application through points and badges will require an ongoing balancing effort by the designers. Furthermore, it might blind users of the real goal of the system.
Skills and levels	The concepts of skills and levels help surface competencies in a community, by enabling users to display a proficiency while simultaneously signaling the level of proficiency.	It's challenging for users to judge their own competencies for fear of disappointing others. Thus we propose moving the responsibility of calculating skill levels to the system.
Quests	Quests provide a favorable conceptualization of work, in that we see that users understand quests as both more approachable and forgiving.	System implementations should provide functionality for moderating both quests and questers and chaining quests to prevent duplicating efforts and creating daunting tasks.
Ecology-centric	Through plugability and minimalism ecology-centric CSCW systems lower the barrier to adopt and enable communities to piece together a collaborative ecology which fits their needs.	Proper, real-time information flow is instrumental to achieving minimal CSCW systems that operate in concert with other systems. Users should not have to wonder where to find the latest project information nor should they have to update project information several places.

TABLE 6.1: Overview of design implications

### 6.3 Overview of design implications

### 6.4 Research limitations and the potential for future research

This section covers the limitations of this design research, and potential avenues for future research.



A chief limitation to this research was that the users did not get to experience the prototype over a longer period of time and attempt collaborating on actual projects. This challenge in evaluating multi-user systems was a concern which Grudin (1988) argued already back in the eighties.

Though some of the data gathered by this research was quantitative, most of it was qualitative such that one might question to what extent the findings and implications are generalizable. Even though the findings were rich and provided a lot of design input, one could still question the degree to which the focus group participants were representative of their communities, and how representative those communities would be for other communities in turn. And, though the design implications are argued to be relevant for the design of gameful CSCW systems such as the LFG prototype it remains to be proven.

Potential avenues for future research include testing the LFG prototype over the long-term, with a focus on gathering quantitative data from several communities in order to determine whether or not collaboration is helped by the application. Though, before long-term testing one would have to resolve the issues uncovered in the findings meaning that one would need to implement the suggestions provided by the design implications such as considering removing the concept of awesomepoints altogether.

Furthermore in undertaking a large-scale study, for some of the communities one might replace the concepts of heroes, skills, quest and awesomepoints with concepts such as users, competencies, tasks and tokens in an effort to test the removal of the “game-layer” to evaluate its impact. This would resemble the study by Thom et al. (2012) in which gamification was removed from an enterprise social network system.

Thus one might take this research further by resolving the issues uncovered in the LFG prototype and implementing the suggestions given by the design implications. Afterwards both the revised gameful prototype and a “plain version” of the prototype could then be administered to different communities to be tested for an extended period of time in order to gather quantitative log data, to measure how gameful concepts might affect collaboration.

On a smaller note, a further research avenue would be to try and test the design implications individually in smaller design research projects.

## 6.5 Chapter summary

Throughout this chapter we've tried to develop a set of theoretical implications and design implications based on our findings.

Despite the issues encountered interviewees responded favorably to LFG's gameful nature and the quest concept in particular. This chapter identified steps that might be taken to iron out the issues our interviewees found with the LFG prototype. To support the gameful design of future CSCW systems we distilled some design implications based on our findings presented in table 6.1.

On a wider level our findings seem to indicate that collaboration correlates with confidence, and also that gameful design might efficiently boost confidence. One potentially fruitful avenue of research would be to research the extent to which confidence correlates with collaboration, to ultimately figure out the degree to which emotional aspects such as confidence should be considered in the design of CSCW systems.

## Chapter 7

# Conclusion

This chapter concludes this thesis's voyage. Inspired by a Massively Multiplayer Online Roleplaying Game called World of Warcraft we set out to explore its potential for other collaborative systems. And the main research question guiding this effort has been:

*How can we recreate the collaborative dynamics found in Massively Multiplayer Online Roleplaying Games within a Computer Supported Collaborative Work system?*

To answer this research question we drew upon research from the fields of Design Research, Human Computer Interaction, Computer Supported Collaborative Work, Game Studies, Community of Practice. In light of relevant research we defined WoW's collaborative nature:

*Beyond providing clear, actionable goals and immediate, visible progress feedback, as a collaborative platform World of Warcraft provides ample opportunities for light-weight collaboration with trajectories towards more strongly committed, large-scale collaborations.*

This definition was then conceptualized as a WoW-inspired CSCW system highlighting several key aspects. And through an interaction design process that employed techniques such as personas and user experience goals we developed a functioning web application, a high-fidelity prototype called Looking for Group (LFG). At the core of LFG's design

were the gameful concepts of heroes, skills, quests and awesomepoints. By creating a gameful system which was even more like a game, we hoped to unlock even more of games' beneficial properties.

LFG was tested in three hybrid focus groups with members drawn from two communities of practice named Pils & Programming and Spillmakerlauget. The former was a community of student programmers while the latter was a community of professional game developers. In the hybrid focus groups interviewees were introduced to LFG and asked to reason about the underlying conceptual model and discuss how the system could or would work within their community. These focus group interviews resulted in a total of three hours worth of audio recordings which were subsequently transcribed and analyzed for themes.

Through the analysis of our findings we uncovered instructive issues and opportunities regarding our gameful prototype, which we used to inform the development of more general design implications for the design of gameful CSCW systems. In light of theory and our findings we developed four design implications:

1. Gamification through points and badges should not be undertaken lightly, as it necessitates continuous balance-work to prevent cheating and ensure desired user behavior. Regardless, rather than caring about the purpose of the system users may become solely concerned about amassing points and badges.
2. LFG's skills and levels system uncovered instructive issues regarding self-doubt and self-censoring which led us to suggest three design possibilities: (1) The inclusion of functionality for users suggesting skills for each other, (2) the community defining clear skill criteria and (3) moving skill calculation work over to the system in the form of experience points. We argue that despite the balance-work needed (as per point 1), a system that would dynamically calculate experience points would help dispel users' fear of showing their competencies.
3. The concept of quests represents an advantageous conceptualization of tasks. On the basis of our interview findings conceptualizing tasks as quests seem to lower the barrier for undertaking tasks, even tasks which one would have to stretch oneself considerably to accomplish. In addition, quests also seem to lower the fear of failure. In sum, conceptualizing tasks as quests might help unlock users' potential.

4. Through plugability and minimalism ecology-centric CSCW systems lower the barrier to adopt and enable communities to piece together a collaborative ecology which fits their needs. Interviewees noted that for the LFG prototype to succeed as a gameful addition to existing tooling and practices it would have to include proper, real-time flow of information in a manner so that users would not have to wonder where to find updated information nor have to update the same information several times over.

Concerning broader theoretical implications we argue that our findings contribute useful insights to CoP theory and particularly CSCW theory.

The LFG prototype seem capable of supporting some of CoP's core characteristics, namely the duality of identity work and the development a shared set of stories. When creating heroes some users opted to share aspects of their broader identities (identity-work), while other users called for built-in functionality for moderating what skills the system would accept (identity-regulation). The duality of identity work is an ongoing, unresolvable process foundational to CoPs (Handley et al., 2006). In our findings we saw that LFG can be a vehicle for negotiating this duality of identity. Additionally, LFG also seem capable of supporting another important characteristic of CoPs that is the development of a shared set of stories. LFG lists completed quests and projects on users which in turn may become talking points and points of remembrance as they remind the community of past accomplishments.

Chief of our findings is the notion of confidence. Emerging in many of the themes in our focus group findings we see that interviewees tried to mitigate uncertainty regarding collaboration. To be an entrusted collaborator, to showcase one's skills for others to rely on, to try and initiate a collaboration, common to these aspects is a notion of confidence. Using theory found in HCI and GS in particular, we argue that confidence might be strengthened and thus the capacity for collaboration bolstered. Moreover, we emphasize that gameful design should be used as a means to enrich interaction, rather than solely incentivise desired behavior.

In our research we've touched upon a theoretical dichotomy between CSCW and Game Studies. On one hand CSCW provide fruitful yet arguably mechanistic conceptualizations of collaboration. While on the other hand GS investigate games and collaboration

in games from a standpoint of emotions. Though the notion of confidence as foundational to collaboration might be considered from a GS standpoint, it's largely assumed away from a CSCW perspective to lessen complexity. Through our findings we argue for CSCW to also consider the emotional nature of collaboration and specifically how confidence might play a foundational part in collaboration.

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## Appendix A

### P&P. Observasjonsnotat. Tid: 24.

### Februar 2012

Observasjonsnotat av Pils & Programmering. Tid: 24. Februar 2012, kl 16 – 22.30.  
Stad: Det Akademiske Kvarter.

Observasjon. Det er fredagsettermiddag på Kvarteret, og det er ein del folk i Stjernesalen (kafeen oppe). Innledande oppmøte er på ca 10 stk, der to er i frå studentgruppen Code Phun i frå HiB, sju er studentar ved informasjonsvitskap ved UiB og ein er ein nyutdanna indie-spelutviklar i arbeid.

Gruppa ser seg om etter ein plass å sitte, fortrinnsvis ein plass med rom for å utvidast dersom det skulle kome fleire og i tillegg ein plass med stikkontaktar. Ingen har tatt med seg ekstra straumpadde i dag, så gruppa posisjonerar seg som best er og i tillegg konstaterar dei oppmøtte kor mykje batteri dei har å gå på og omtrent alle seier at dei er villige til å byte på straumkontaktanes.

Dei fleste har med seg laptopar, men to stk har ikkje med seg laptop og er heller med berre for å slappe av og diskutera IT.

Etter at folk har fått satt seg ned og fått opp laptop'ane sine, så gjer ein løs og lett stemning seg gjeldande. Ein UiB student løftar laptopen sin og snur den rundt for å visa den siste versjonen av nettstaden hans. Og han fortset med fortelje ei historie om korleis han nettopp hadde blitt headhunta og fått ein henvending i frå eit lite firma som hadde

leita fram nettstaden hans. Gruppa tykkjer det høyrest bra ut. UiB studenten hinter mot at firmaet verkar for lite, men er dog glad for hendvendinga.

Eit par i gruppa bestemmer seg for å kjøpe mat borte ved disken, og begge kjem tilbake med øl i hand. Det blir konstaterert at no er Pils og Programmering i gong, etterfulgt av litt lettbeint erting av ein av dei oppmøtte som sitter med ein cola for hånden som i sin tur flirer muntert av det.

Dei to som ikkje hadde med seg laptop sit i sofaen blant andre som knottar på sine laptopar. Temaet estetikk i forhold til nettsider kjem opp, truleg grunna framvisningen av den nettstaden på laptop'en. Han eine av dei laptopplause gjer eit poeng av å konstatere at dersom han skal lage noko, så skal det sjå ut som om det har vore laga av ein ingeniør (greit mao.). Som i ein munter overgang, så plukker den andre laptopplause sidemannen opp tråden, og vil gjerne konstatere at dette med å spesialisere seg på front-end (webdesign look n' feel) bunnar i ein "touchy-feely" kunnskap. Forslaget om å definere front-end som eit touchy-feely yrke møter smil og humring i frå gruppa, også i frå UiB-studenten som viste fram nettsida si. Og han går faktisk vidare til å spele på dette, og seier at det er ofte slik han jobber, ut i frå ei kjensle om kva slags forbetringar sida treng.

HiB-studentane i frå Code Phun, byrjar å diskutere seg i mellom den neste iterasjonen av deira interne programmeringskonkurranse. Her er det ingen premie, foruten mestringsfølelsen av å ha lært seg å til dømes lavnivå-kode websockets (forrige utfordring dei hadde laga). Medan folk jobbar på eigne småprosjekt tiltek brainstormingen mellom HiB studentane, og spelutviklaren blir dratt med i idemyldringa ikring "neste level," som dei kallar det, av programmeringsleiken. Iveren er synleg, og dei kjem til slutt fram til at dei gjerne vil lage ein labyrinth, med ein robot inni og til slutt eit programmeringsgrensesnitt for å kunne gje kommandoar til roboten. Sluttmålet er å hjelpe roboten å finne vegen ut. Dei er klar over at det finst enkle strategiar for å kome seg ut av labyrinthar, men vil gjerne implementere labyrinthen slik at det blir sperringar for desse.

Begge to av dei UiB studentane som ikkje tok med laptop har sin hovedkompetanse på AI, og etter at dei høyrer at neste oppgåve er ein labyrinth oppgåve konstaterer dei at det ville vere ein kjempelett oppgåve, for det vil berre vere å implementere ein generell stifinningsalgoritme ved navn Eight-Star. HiB-studentane stiller seg spørrande, og den eine UiB studenten tek det på seg å forklare korleis denne algoritmen er fantastisk god til å finne fram til den aller mest ideelle vegen ut av alle labyrinthar. HiB-studentane



forsøker å ta til motmæle og foreslår ulike grep for å kunne motvirke effektiviteten til Eight-Star, utan at UiB-studenten lar seg affisera av det. Det blir i tillegg hevda at det kan sjå ut til at problemet har blitt løyst før utfordringa var påbegynnt i det heile. Til tross for dette fortset HiB-studentane med å tenkje, diskutere og forsøkje å implementere denne programmerings-utfordringa. Sjølv om dei har blitt presentert ein tilsynelatande universell og moglegvis sær effektiv stiffiningsalgoritme verkar det som om dei likevel har lyst til å lage ein labyrint som kan utfordre UiB-studentane med A.I. bakgrunn. Vidare kan det sjå ut til at dei tek ein glede i berre det å konstruere utfordringa, og jobbar like ivrigt vidare med hjelp i frå spelutviklaren. Vidare går diskusjonen over i tankar ikring ein server som skal kunne køyre opplasta programmeringsløyningar, uavhengig av programmeringsspråk og utan fare for å bli hacka.

Det går litt tid der folk berre jobbar med sitt og småpratar, før nokon spør om korleis det går med spelutviklaren og firmaet hans. Spelutviklaren pakka ned laptop'en tidleg, og har siden hjulpet HiB-studentane med det planleggingsmessige rundt labyrintoppgåva. Han trekk litt på det, men spelutviklaren forklarar at det har vore ein god del jobbing i det siste og at no ser det ut til dei nærmar seg pengar inn i firmaet omsider. Vidare fortel spelutviklaren at mykje kode har blitt refaktorert, og blitt gjort skikkeleg, men som igjen har betydd at dei ikkje har hatt så mykje faktisk framskritt foruten det å gjere spelet meir solid. Spelutviklaren føler at han har programmert nok for i dag, nevner at han har stått på hardt heile veka. Den eine laptop-lause UiB-studenten har flytta seg bort til bordet der bla. spelutviklaren sit og han uttrykker at han gjerne skulle visst kor mykje spelutviklaren tener. Ein merker at stemninga rundt bordet endrar seg nærast umerkeleg til å vere lyttande. Etter litt dveling røper spelutviklaren at pengemessig er det eit lavt beløp, men at han også får betalt i oppsjonar i spelfirmaet.

UiB-studenten seier at ein treng ikkje snakke særleg høgt om dette, men han vil likevel at spelutviklaren skal forstå at han kunne enkelt fått ein jobb der han hadde tent mykje meir enn det han gjer no. Spelutviklaren seier seg enig, men uttrykker samtidig ein glede og ein forsiktig stoltheit over å vere ein plass der han jobber både for seg sjølv og draumen om å lage spel. UiB-studenten svarer med å sei at det er eit fullgodt val han har tatt, og fortel om ein liknande situasjon holdt på å hamne i då han fekk tilbod om jobb men takka nei fordi det var både underbetalt og verka som programmeringsarbeid som verka lite givande. Og svaret som UiB-studenten gav bedriften var at han faktisk kunne tatt

på seg arbeid som var lønna under snitt, men då måtte det ha vore noko underhaldande programmeringsarbeid som programmering av kunstig intelligens eller maskinlæring.

Det blir eit avbrekk diskusjon ikring IT, og i staden går praten over til å utveksle historiar om kvinnelege eskapader og fyllekuler.

I 19-tida byrjer fleire av dei oppmøtte å tenkje på å kome seg vidare, bla fordi fleire av dei skal vere me på festlege tilstelningar og må handle drikke i forkant. På veg ut fortel UiB-studenten som hadde gjort litt narr av front-end utviklarar, at han eigentleg har den styrste respekt for den kunsten det er å laga gode nettsider. Og vidare seier han at det er berre interesseforskjell mellom front-end og han sitt foretrukne fokusområde kunstig intelligens. Det nikkes og smiles.

Kvelden dreg sidan ut. Me er to stk totalt som sit å kodar fram til kl 22, og sjølv om det kodes på vidt forskjellige prosjekt så viser det seg å vere ein veldig hjelp i å ha eit par friske auger til å ta ein titt på prosjektet. Det er gøy, men arbeidet rundes av i 22-tiden. Ein av dei som forlot P&P tidlegare på kvelden kjem tilbake etter å ha vore på vorspiel. Praten går over til å diskutera framtida for Pils & Programmering. Og omsider går folk vidare.

Diskusjon. Det skal seiast at eg er ein av grunnleggjarane av Pils & Programmering, og er rett nok påverka av det. Til tross for det, eller moglegvis i kraft av det, så vil eg hevde at det latar til å liggje eit uforløst potensiale i den uformelle samankomsten som Pils & Programmering er. I møtet beskrevet ovanfor kan det sjå ut til at dette var eit kulturelt møte mellom bachelor og master, HiB, UiB og ekstern utviklingspraksis. Nett no, kan ein sjå ein uformell kunnskapsutveksling, der dei oppmøtte diskuterar tema som opptek dei. Det herskar ein stemning av lave skuldre, men samstundes ein gryande vilje til å starte eigne prosjekt i alle fall snakke om eigne prosjekt. Kommenterar på kvarandre sitt arbeid sit laust. Sikkerhet, nettverk og lavnivå-koding verkar som fokusområde som HiB-studentar har betre grep på enn UiB-studentar. UiB-studentane som hadde bakgrunn kun innafor Informasjonsvitskap, verkar som dei hadde eit meir høgnivå syn på sakane. Eit viktig poeng er at kunnskap blir delt, men det verkar som om det framleis er sperringar for skikkeleg samarbeid mellom dei oppmøtte, alternativt så saknar ein eit fundament som kan støtte uformelt samarbeid.

# Appendix B

## Personas

### B.1 Pils & Programming personas

About the setting. Pils & Programming is an informal community of mostly programmers, but also some designers and working professionals. For almost a year the community has been seeing a steady attendance, and knowledge sharing. When founded the aim was to foster great projects. This has not happened quite yet, and may be caused by participants having a difficulty seeing each other over the weeks.

#### B.1.1 Mary. 22 year old student

Catchphrase: "Let's make something!"

Description: A starry eyed student who is still in school, but would like to find other students and enjoy a community of programmers. Furthermore, inspired by the talent in the P&P community Mary would also like to create a business with some of the talent from that group. Mary has been working on a couple of closed-source projects and is currently seeking others that would join her cause.

Background	Motivations	Frustrations
22 year female. Entrepreneur. Novice programmer.	Business. Community.	That fellow students don't recognize their inherent potential.

### B.1.2 Morten, 25 year old student

Catchphrase: “Hey, check out this thing”

Morten is a real it-whiz kid, who have always done quite well in school. In his pasttime Morten have been steadily creating a few open-source projects that hold hold a potential to grow into something great. Morten is very willing to share his knowledge.

Collaboration is not his strongest card. He has started to accumulate a few projects, and they are a bit of a hazzle to maintain. Moreover he is a backend coder and not a designer. All the projects could use a makeover. Since he feels its challenging to find people to help expand his projects Morten would appreciate a way for him to display the work that needs to get done to other people.

Background	Motivations	Frustrations
25 year male. Student. Mentor material. Tinkerer	Create great projects. Mastery / learning. Community	Wish he could more easily get help with his various projects.

### B.1.3 Lillian, 21 year old student

Catchphrase: “Wish I could program.”

Lillian is a timid, yet hard worker. And she appreciates being able to learn more about programming which indeed fascinates her. When it comes to programming she has taken a couple of classes, and would like to find people to discuss with and perhaps even collaborate with. When asked what she knows she hesitates, because she doesn't feel that she is good enough at anything to say that she *knows* the skill. Lillian does know a thing or two about programming, and would appreciate a system that would let her talk about her skills in a more differentiated fashion.

Background	Motivations	Frustrations
21 year, female. Student. Shy, smart hard worker. Fascinated by technology	Would like to become a better programmer. And be part of a cool community.	Being scared of taking on projects.

## B.2 Spillmakerlauget personas

### B.2.1 Greg, age 27, 3d artist

Catchphrase: “No nonsense, please pay me as per the contract.”

Partly disillusioned. Greg has spent quite a while as a striving freelancer without making a great break. Recently, Greg joined a community of freelancer and now hopes to find collaborators to work with. Still hellbent on becoming a successful freelancer, he would welcome a solution built to enhance collaborations but at the same time he would be apprehensive about how well the application actually performs. Important that this application surfaces results, and doesn't waste his time. On a positive note, he has accumulated quite a bit of freelancing experience and would be able to teach young entrepreneurs how to attack the market.

Background	Motivations	Frustrations
27 year, male. Have been working as a freelancer for a while. Has come to be quite realistic and business savvy.	Network: Find good collaborators. Make great projects. Earn money.	The difficulties in finding collaborators for important projects. Making a living.

### B.2.2 Adelaide, age 23, idealistic, hard-working programmer

Catchphrase: “I'd rather not talk about how much I'm getting paid. I'm doing this because I would like to make a living doing it.”

Adelaide moved to another city in order to follow her dream of working on a computer game. For a while now Adelaide has been working for almost no pay, all in the hopes that the game will earn money once it's released.

Well into the project Adelaide finds herself in the need for something to motivate her. Perhaps doing some minor projects for her friends on the side of her job would feel right?

### B.2.3 Bob, age 25, would-be company manager

Catchphrase: “The game is going to be great.”

Background	Motivations	Frustrations
23 year, female. Programmer. Always wanted to make games.	Network: Find good collaborators. A community besides work to be able to vent her frustrations.	Being stuck in an office working for low pay.

Bob has been bootstrapping for some time now, but not unsuccessfully. The company is steadily tinkering away at that which will become their first game. It is not without perils, many of his crew know that they could be getting a higher salary doing more conventional jobs. However through motivating speeches Bob has been able to keep a hold of talented individuals, as well as inspire others to join his cause. Bob does not have a great budget to employ talent, but he would be open to hire freelancers for smaller sub-projects connected to the game.

Though he might not be the strongest coder, Bob still holds an unique leadership skillset which would be valuable to the community. Moreover, the community might benefit from seeing his unique skillset, and also realizing that it is quite unique.

Background	Motivations	Frustrations
25 year, male. Inspirator. Talker.	Create a great game. Make money. Find talent.	Constantly having to motivate his fellows. Finding talent.

## Appendix C

### Lookingforgroup screen shots



FIGURE C.1: View created quest

Ahoy Nils Nilsen! Welcome back.

Messages

Account

Logout

# Lookingforgroup

It is about **heroes**, with heroic **skills** of various levels solving **quests** together and gaining magnificent amounts of **awesomepoints**.

## Heroes [create new hero](#)

**Morten** . . .  
Waitwhat?  
3 Python 1 Clojure 2 ActionScript3 3 Video Editing  
3 Guitar 1 Standar ML  
100

**Ljos**  
Antarctica is Earth's southernmost continent, containing the geographic South Pole.  
5 Piet  
100

**MrsAwesome**  
"Awesomeness walking"  
3 Cooking 4 Interactiondesign 4 Ninjabancing  
100

+ projects + quests

+ projects + quests

+ projects + quests

## Quests [create new quest](#)

**Test-quest**  
closed test , Test , TEST  
Do you like to test? You get free points if you test!  
123  
QuestGiver: Bored

**Buy me a beer**  
mit Social  
See me lurking around at Kvarteret? Buy me a beer and I might just have a casual conversation with you.  
50  
QuestGiver: Marius the Undefeated

**First steps**  
mit ifg , feedback  
Heyo new quester. Please create a hero and a quest, before marking this as completed. :)  
10  
QuestGiver: Nils the Ninja

Feedback

FIGURE C.2: Realm page: large view



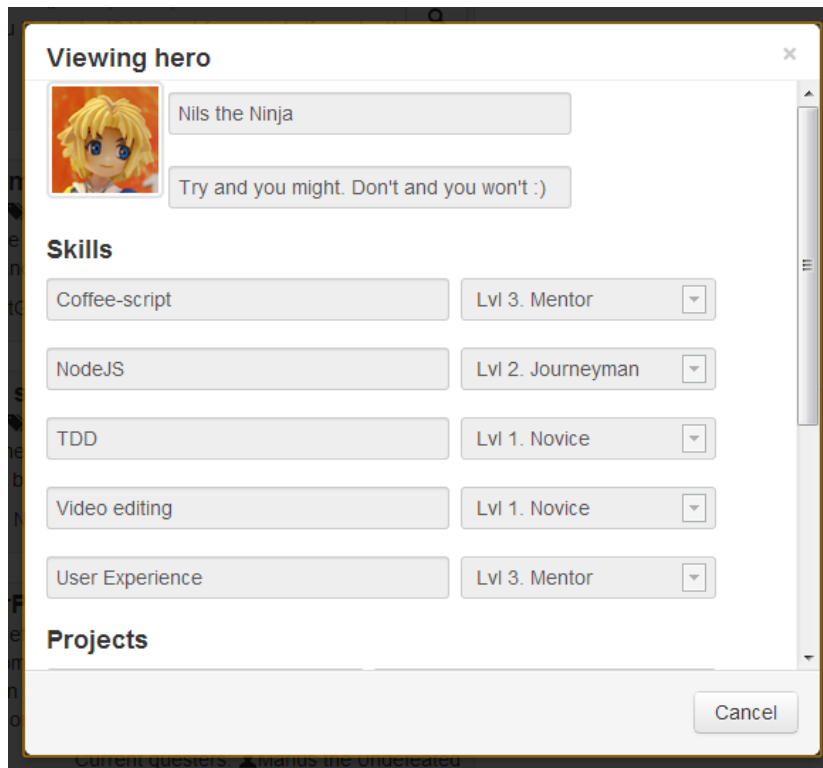


FIGURE C.3: View created quest

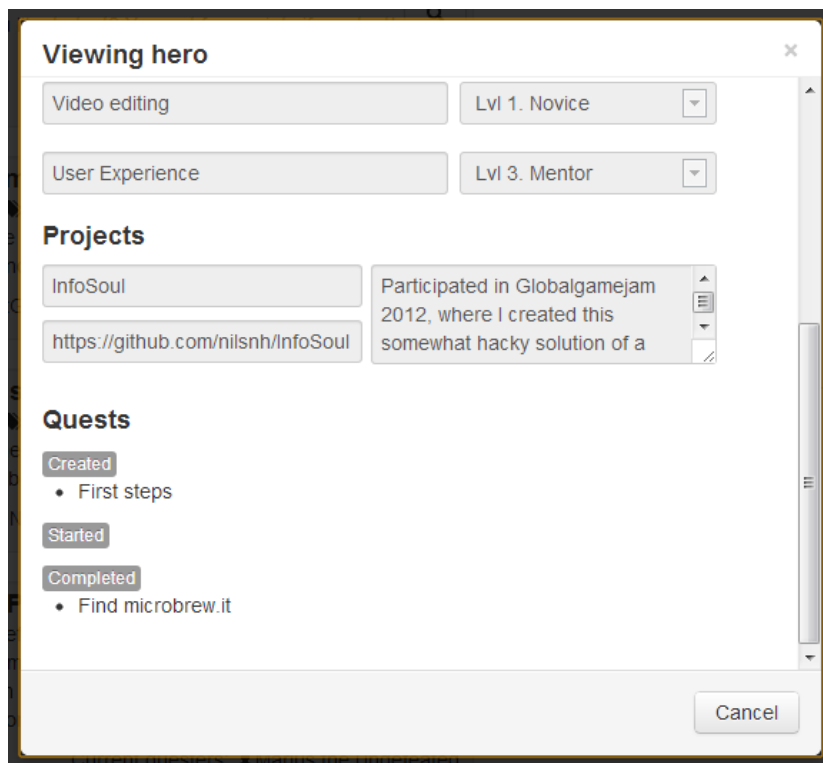


FIGURE C.4: Viewing hero: Lower part of dialog box

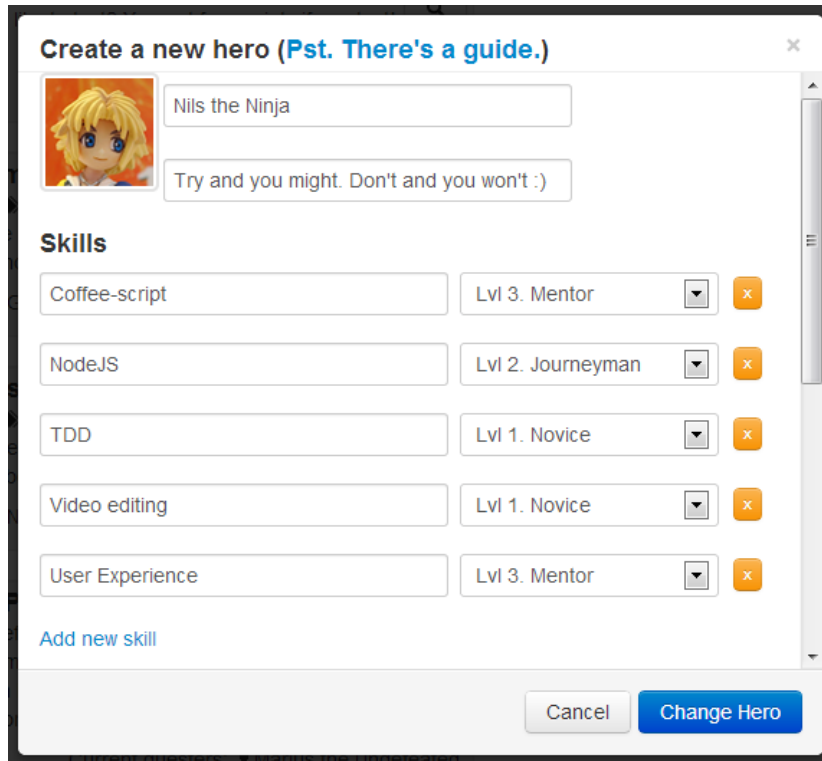


FIGURE C.5: Dialog box for editing hero

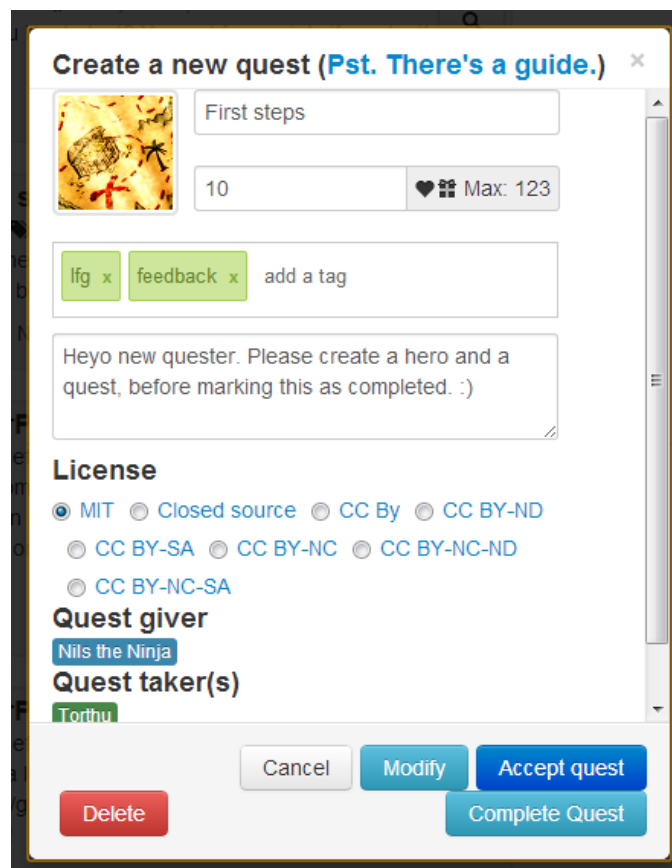


FIGURE C.6: Dialog box for editing quest

# Appendix D

## Focus group interview guide 1

Focus group guide

*Armed with a functioning prototype we are better able to elicit useful feedback*

Broad topics

Possibilities for emergent collaboration. Lowering the need for communication. How could this application fit into a community such as Pils & Programming.

A couple of scenarios will be explored

1. Creating a hero and fleshing it out with skills, levels and projects.
2. Creating a quest and selecting someone else's quest to complete.

What thoughts arise as you are completing this as a group?

If the group gets off track concrete concepts can be discussed

- What are your thoughts on the use of metaphors such as heroes, skills and quests?
- Lowering the barrier for participation or merely digressions?
- So, how would you imagine you could use this application.
- Did you learn something about the other participants' skills that you didn't know from before.

- What potential contact points for collaboration can we spot here? What projects could this group be able to take on.
- What about the user interface?
- What other programs would you combine this program with? Would it replace some programs?
- Features missed?
- What does not work so well?

Thank people for joining. Assure privacy of information gathered. Explain the proceedings. Let people speak. Don't impose views. Encourage diversity of opinion. Try to have one person speak at a time.

## Appendix E

# Focus group interview guide 2

Introduksjon.

App'en har bugs det er ikkje det ein er her for å beslutte. Det er eit ganske begrensa sett med features, ein kan lage og komplettere quests i tillegg til heroes. Eg kan jo ikkje bevise at denne appen skaper samarbeid. Men eg vil gjerne sei noko meir enn berre det at denne appen er nice eller den ikkje er nice. Eg har tatt ein del tanker, forskningshunches, og konsepter og satt dei inn i ein app. Settingen er Spillmakerlauget og Pils og programmering. Og eg vil ha mest mogleg synspunkter det er det det handler om. Tanker og idear i forhold til programmet og det det forsøker på. Så, kan ein sei at eg ikkje hadde treng å lage dette programmet for å innspel. Men med utgangspunkt i dette programmet så håpe eg å få betre, meir rikare innspel. Så, ein prøve å skape samarbeid. Men eg kan ikkje bevise det. Rike data vil vere mitt innspel. Appen er eit forsøk på å synleggjere moglegheiter for samarbeid på kryss og tvers av medlem.

Altså, me lager oss nokon helter og kanskje noken quests og berre snakker om moglegheiter og slikt. Eg har nokre diskusjonstema som eg vil innom. Scenario: Alle lagar seg heroes som dei fyller ut med skill med tanke på korleis dei ynskjer å vise seg fram til gruppa.

Eg kjem til å ta opp lyd no, men resultatet vil vere anonymt.

- If the group gets off track concrete concepts can be discussed Skills. What do you think of them. What skills should be displayed? Should there be more of a system to this besides just writing in? Absolute criteria to establish what level is what or

have more floating indications? The realm is a group. Spontaneous collaborations should emerge within.

- What are your thoughts on the use of metaphors such as heroes, skills and quests? Lowering the barrier for participation or merely digressions?
- Thoughts on learning about skills that you didn't know colleagues had? Would you bake administration inside the system? Or could you just take it around.
- What potential contact points for collaboration can we spot here? What projects could this group be able to take on.
- Points, I tried using gamification to create incentives for collaborations. But what are your thoughts on this? Consider the alternative of having a set number of quests you can complete.
- I have tried to aim for a certain, less communication more collaboration. What do you think about this approach to this program? My philosophy was that a group will already have a set means of cooperating.
- What other programs would you combine this program with? Would it replace some programs? For programming for editing, for testing.
- Integration against other programs. How would you imagine this program in use? Describe scenarios. Thoughts on coordination?
- Features missed?

To be able to signal what types of quests you want to work with? Are points a good thing to include?

Thank people for joining. Assure privacy of information gathered. Explain the proceedings. Let people speak. Don't impose views. Encourage diversity of opinion. Try to have one person speak at a time.