

Examining expectations about user involvement in
software development and factors that influence high
quality user involvement

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Abstract

In contemporary software development, frequent user engagement throughout the development process is commonly viewed as good practice, leading to increased development productivity and user satisfaction with the product. Contemporary Agile software development methodologies, as adopted by many practitioners, promote such frequent and timely involvement of users. The quality of this user involvement may be variable in its contribution to the software project, however. While there are many factors that may influence the quality of the user involvement, in this thesis it is posited that the degree of alignment or misalignment of *expectation* of user involvement among the development and user groups is an important factor in the quality of user involvement. There is little documented research in this alignment of expectations of user involvement, and an investigation of this in practice is the basis of this thesis. Furthermore there is no consistent meaning to the notion of “quality of user involvement” in related literature and so another aim of the thesis is to get a deeper understanding of the meaning of “quality” in user involvement.

The scope of the investigation presented in this thesis is to develop an instrument for comparing expectations and use this to identify patterns of alignment in expectations by role. The linking of alignment of expectations to project success is beyond the scope of this investigation. A framework for conceptualising “quality” in the context of user involvement, as well as characterising significant barriers and enablers to high quality user involvement, are also goals of this research.

The approach to the investigation is based on a systematic, role-by-role comparison of user involvement expectations using Repertory Grid techniques. The standardised grids of constructs and elements related to user involvement were constructed from a synthesis of relevant current literature. Three grids were used for comparison of expectations by role: the nature of the involvement, the modes of communication associated with the involvement, and the characteristics of the user that influenced user involvement. In addition to the Repertory Grid data, interview data were gathered from participants through a series of semi-structured interviews. Thematic analysis of the interviews was used to develop conceptual frameworks related to the notion of “high

quality user involvement” as well as to identify the significant enablers and barriers to high quality user involvement.

Two Agile software development organizations based in New Zealand, were the case organizations for this study. A total of nineteen interviews were conducted with technical roles including Developer, Project Manager, Business Analyst, Tester and user roles such as the Product Owner and Subject Matter Expert.

The results show no strong misalignment of expectations of user involvement across both the user roles and development roles for the case organizations studied, and some interesting patterns were uncovered. Some significant barriers and enablers of high quality user involvement are also identified, providing some useful insights to guide the design of future techniques and tools to support high quality user involvement.

Attestation of Authorship

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgement), nor any material which to a substantial extent has been submitted for award of any other degree or diploma of a university or other institution of higher learning.

Signed:

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Table of Contents

1	Introduction	10
1.1	Motivation and Research Problem	10
1.2	Research Approach and Design	12
1.2.1	Literature Review	12
1.2.2	Case Study Approach	13
1.2.3	Data Collection	14
1.2.4	Analysis of Interviews and Repertory Grids	15
1.3	Main Contributions	16
1.4	Structure of the Thesis	16
2	Literature Review	18
2.1	Introduction	18
2.2	Meaning of User “Involvement”	19
2.3	Benefits and Importance of User Involvement	21
2.4	Description of User Roles	23
2.4.1	End Users	24
2.4.2	User Representatives	24
2.4.3	Subject Matter Expert (SME)	25
2.4.4	Product Owner	25
2.4.5	Client Management User	26
2.4.6	User Proxy	26
2.5	How are users involved?	27
2.5.1	User classification driven involvement	27
2.5.2	Agile methodology influenced User Involvement	28
2.5.3	User Involvement and Agile Principles	30
2.5.4	Recent Example of User Involvement in an Agile environment	31
2.6	Enablers to User Involvement	31
2.6.1	Motivated Stakeholders:	33
2.6.2	Representative cross section of users:	34
2.6.3	A champion for the cause of User involvement:	34
2.6.4	Active Management:	34
2.6.5	Follow through User involvement to the end	35
2.6.6	Flexibility:	35
2.6.7	Educate users about the whole process:	35
2.6.8	Establishing responsibilities for each role in user involvement	36
2.7	Barriers to User Involvement	38
2.7.1	Developers lacking empathy towards technically challenged users	38
2.7.2	Difficulty in obtaining End User input	38
2.7.1	Undermotivated users	39
2.7.2	Diverse range of user requirements	39
2.7.3	User involvement limited to specific stages only	40
2.7.4	Value and implementation of user input	41
2.7.5	Lack of developer knowledge about user context	41
2.7.6	Little to no involvement of End Users	42
2.8	Measuring User Involvement	43

2.9 Factors contributing to “quality” User Involvement.....	45
2.10 Current practices of User Involvement.....	48
2.11 “Expectations” as an influencing factor?.....	52
3 Research Design & Methodology	56
3.1 Research Approach	56
3.1.1 Case Study Method	58
3.1.2 Unit of Analysis	62
3.2 Literature Review of Research on User Involvement	62
3.3 Data Collection and Analysis.....	65
3.3.1 Semi-Structured Interviews.....	65
3.3.2 Repertory Grid Technique.....	69
3.4 Ethical Considerations	74
3.5 Implementation of Methodology	75
3.5.1 Literature Review of User Involvement.....	75
3.5.2 Organizations for Case Study.....	75
3.5.3 Data Collection and Analysis.....	77
4 Findings and Discussion.....	86
4.1 Case Study Context of Organization A.....	86
4.2 Case Study Context of Organization B.....	87
4.3 Comparison of Expectations across roles within an Organization	89
4.3.1 Comparison of Expectations in Organization A.....	91
4.3.2 Comparison of Expectations in Organization B.....	140
4.3.3 Comparison of expectations of Organization A with Organization B	149
4.4 High Quality User Involvement	161
4.4.1 Conceptualization of High Quality Involvement	163
4.4.2 Barriers to Good Quality User Involvement	166
4.4.3 Enablers for Good Quality User Involvement.....	169
4.5 The Implications of the Findings.....	173
5 Conclusion	175
5.1 Limitations	177
5.2 Further Research.....	178
6 Appendices	179
Appendix 1: Questionnaire for Interviews.....	179
Appendix 2: Thematic Analysis of Interview Data	182
Appendix 3: Repertory Grids.....	209
Appendix 4: Participant Information Sheet.....	233
Participant Information Sheet	233
<input type="checkbox"/> Date Information Sheet Produced: 1 May 2012	233
<input type="checkbox"/> Project Title: Examining whether expectations about user involvement influence the quality of user involvement, in software projects	233
<input type="checkbox"/> An Invitation	233
<input type="checkbox"/> How was I identified and why am I being invited to participate in this research?	234

<input type="checkbox"/> What is the purpose of this research?	234
<input type="checkbox"/> What will happen in this research?	234
<input type="checkbox"/> What are the benefits?	234
<input type="checkbox"/> How will my privacy be protected?	235
<input type="checkbox"/> What opportunity do I have to consider this invitation?	235
<input type="checkbox"/> How do I agree to participate in this research?	235
<input type="checkbox"/> Will I receive feedback on the results of this research?	235
<input type="checkbox"/> What are the discomforts and risks?	236
<input type="checkbox"/> How will these discomforts and risks be alleviated?	236
<input type="checkbox"/> What are the costs of participating in this research?	236
<input type="checkbox"/> What do I do if I have concerns about this research?	236
<input type="checkbox"/> Whom do I contact for further information about this research?	237
Appendix 5: Consent to Participate	238
Consent to Participate in Research (Interview)	238
References	240

Tables and Figures

LIST OF TABLES

Table 1 Mapping of types of Case Study strategies with research question.....	62
Table 2 Project, Process and User related factors affecting user involvement...	72
Table 3 Mapping of Interview Questions to Research Question.....	77
Table 4 Frequency Distribution table for C1E1	81
Table 5 Frequency Distribution table for C2E1	82
Table 6 Frequency Distribution table for C3E1	82
Table 7 Aggregated Grid for Developers expectations about the nature of involvement of users.....	83
Table 8 Inter-role Comparison Matrix.....	84
Table 9 Comparison of Case Organizations.....	87
Table 10 Formula for Repertory Grid aggregation for each role.....	89
Table 11 Comparison of Expectations about user involvement, belonging to roles interviewed at Organization A.....	90
Table 12 Comparison of Expectations about user involvement, belonging to roles interviewed at Organization B.....	137
Table 13 Comparison of expectations of developer roles in Organization A and Organization B	145

LIST OF FIGURES

Figure 1 Framework of Research Area.....	5"2
Figure 2 Research design process diagram.....	63
Figure 3 High Quality User Involvement Model.....	158
Figure 4 Barriers to High Quality User Involvement.....	163
Figure 5 Enablers to High Quality User Involvement.....	167

1 Introduction

This introductory chapter introduces the problem being researched, a motivation and background to the problem, as well the overall approach to investigating the problem. An overview of the main contributions of the thesis and a roadmap of the rest of the thesis are presented at the end of this chapter.

1.1 Motivation and Research Problem

In contemporary software development, frequent user engagement throughout the development process is commonly viewed as good practice, leading to increased development productivity and user satisfaction with the product (He & King, 2008; Hsu, Lin, Zheng, & Hung, 2011). Typically users' involvement relate to participation in activities related to specifying, elaborating, prioritising, reviewing and verifying the requirements as well as testing and verifying developed features (Iivari, 2009). The users involved may include end-users, product owners, project sponsors, subject matter experts, or business analysts (Ives & Olson, 1984). A number of recent studies have provided empirical evidence to support the benefits from such involvement. For example, in 2008, He & King synthesised the findings from 82 empirical studies on user participation in information systems development and concluded that the effects of user participation positively influenced the system development efficiency by providing developers with the domain knowledge they needed. In addition they show that the attitudes of the developers and users are positively influenced by frequent user participation. Several studies for example Hsu et al. (2011) and (Procaccino & Verner, 2009) support the positive influence of user involvement on productivity. Similarly, a number of studies exemplified by (McKeen, Guimaraes, & Wetherbe, 1994; Thalen & van der Voort, 2012) support the positive relationship between user involvement and high client satisfaction.

However, obtaining user participation in the development process is often difficult to achieve in large-scale software design and implementation projects. A study by Wagner

& Piccoli (2007) focussed on this challenge and showed that this was attributed to the users' motivation to engage, influenced by causes such as user resistance or outright rejection of the software being introduced. Their research also shows that users are often busy with their own work and consumed by immediate responsibilities resulting in a lower inclination towards analysing and evaluating new systems. These problems have been identified in early research by Grudin (1991a) and Doll & Torkzadeh (1991) where it was shown that user involvement is viewed as expensive and the cause of delays when more people with different point of views are involved. Wagner & Piccoli (2007) have addressed these issues and proposed changes to user participation activities that align with human behaviour to promote user "buy-in" and commitment to the development of a new system. In coherence with the objective of this thesis, they suggested system development processes should connect with users at opportune moments, work towards understanding what they are trying to say and adjust expectations about when a system is being completed. They purport that in order for the project to be successful it is important for the implementation of user participation to be successful. This highlights the notion of "high quality" user involvement, prompting the focus of the research in this thesis to relate to the user stakeholders involved and when and how they can be involved. The thesis aims to study the expectations around user involvement, in system development process, as a factor influencing high quality user involvement leading to project success.

One of the objective of this research is to define the characteristics of high quality user involvement. This has been categorised into three broad areas of charactersitics: what comprises characteristics of high quality users for involvement in the development process, activities to be involved in for different user roles, and the modes of communication that are used for user involvement. It has been shown in previous studies (eg: Seffah et al., 2005; Bak et al., 2008; R.A. Majid et al., 2009), that often the development team's expectations about user involvement are contrasting to those of the user group, leading to or preventing the involvement from being productive. It was the complexity of this dynamic between expectations of users and the development team that has motivated this thesis to deepen the understanding of this phenomenon, with a view to influencing new approaches to make this partnership successful for project success. By revealing what comprises high quality user involvement, this research aims at helping practitioners improve their user involvement practices to result in satisfied

clients, thereby boosting the reputation of software organizations. To be able to contribute towards the body of knowledge for enhanced user involvement practices is the main motivation of this research thesis.

This research aims to answer the following research questions, in an Agile software development context:

1. What is the degree of alignment of expectations of user involvement for different roles involved in the development of a software project?
2. What comprises high quality user involvement in practice?
3. What are the barriers and enablers of high quality user involvement in practice?

The relationship between these and the nature of the user and developer groups is known to influence user involvement (Procaccino & Verner, 2009) and developers' perspectives have been recorded in several studies to identify the pros and cons about involving users in software development (Bak et al., 2008). While most other studies have focussed on the fact that user and developer interactions definitely promote quality software development, there is a distinct lack of research surrounding the expectations of both these parties about user involvement itself. Users and developers can have markedly different perspectives of the level of involvement that is required to present a fully functional and high quality product to the market (Lettl, 2007). My research is particularly focussed on examining the expectations around user involvement in practiced and understanding how aligned the user and developer expectations around high quality involvement are. In addition, it is the intent of this thesis is to study what is understood by Hhigh quality user involvement and what can be done to promote it.

1.2 Research Approach and Design

1.2.1 Literature Review

To carry out this research, the research question has been broken down into its main components – the users, the developer group and the meaning of user involvement. A literature review of research in the area of user involvement was conducted to

understand what is understood by user involvement, how it is being implemented, who the main stakeholders are and what their expectations around its implementation are. This gave a detailed overview of activities surrounding user involvement and related factors influencing the project. A framework of activities comprising user involvement and user characteristics facilitating it was created and tested in the form of Repertory Grids. The aim of the research is to provide a holistic view of expectations as well as the relationship between expectations about user involvement and the quality of the user involvement. As there are various roles within the user and developer groups, it is desirable to obtain the expectations and perspectives of as many roles as possible for this research to meet its aim. The intention of obtaining a complete set of expectations is to be able to compare expectations across roles to look for patterns of expectation and evaluate levels of alignment or misalignment across these roles. In addition it is desirable to survey all the different roles on the meaning of quality in user involvement to get as complete a view as possible as well as see how well these matched. The research endeavours to reveal the alignment or misalignment of expectations about user involvement and what is meant by high quality of user involvement.

Previous studies have shown that lack of user motivation or desire to participate (Doll & Torkzadeh, 1991), inability to participate due to workload and time constraints (Bak, Nguyen, Risgaard, & Stage, 2008) and lack of technical knowledge (R.A. Majid, Noor, Adnan, & Mansor, 2009) are some of the major factors that developers feel influence the effectiveness of user involvement, negatively. Users on the other hand have been found to be unsure of whether their input is taken seriously and actually implemented in the project. Factors such as these motivated me to probe into the state of user involvement in software development. It is the aim of the thesis to not only better understand what is meant by good quality (i.e. effective or beneficial) user involvement but also to explore what practices are being implemented as well as expected by experts in the field of software development in order to achieve this.

1.2.2 Case Study Approach

To understand the complexity of the phenomenon of user involvement in its usual industrial software development environment, it was important to obtain the perceptions and expectations of practitioners and users in the realistic setting of a software development company that involves user involvement practices. The reason this

research was carried out in a realistic setting and not, for example, with a group of students at university was because the implications around developing quality software are different in a business versus in a project for a course. Although it is important for both students and a software company for the project to execute successfully, the users and evaluators of software developed by students for a project and a company for a client, differ greatly. In a business, someone is financially responsible for the software being developed and therefore, it is imperative that the software solution meets the users' expectations as closely as possible. To obtain a deeper understanding of the aspects of the development process users are being involved in, where they would be expected to be involved and what the expectations around a good user are, a multiple case study analysis of two software organizations was executed. Organizations that practice Agile software development methods were selected for this purpose since this is a common contemporary approach and Agile methods promote the engagement of users throughout the software development process (Beck et al., 2001). Several local organizations claiming to use Agile software development methods were contacted, of which two organizations agreed to participate in this research.

1.2.3 Data Collection

For the purpose of this investigation, data collection involved personal interviews in which interviewees responded to semi-structured questions. At the same interviews the interviewees provided a further representation of their expectations in the form of fixed Repertory Grids based on George Kelly's Personal Construct Psychology (PCP) (Edwards, McDonald, & Michelle Young, 2009). As the aim of the case study was to obtain expectations of practitioners of Agile techniques in an commercial project, interviews were chosen as the data collection instrument rather online surveys and questionnaires because the data captured is richer and greater depth of understanding of the phenomenon in the practical sense can be achieved (Englander, 2012). The interaction of face-to-face interviews provided more than just answers to questions and included implied meaning to answers via inflections of voice and body language for richer data for qualitative analysis (Black, 2006). The questions for the interviews were semi-structured to enable the respondents to relate the question to their own experience and elaborate around all areas that they felt would answer the question sufficiently well.

The interviewees were then asked to complete three fixed Repertory Grids that represented a framework of factors comprising user involvement. The elements for all the grids are different user types. The set of constructs for each grid were different and relate to (1) the nature of the development activities, (2) characteristics of the users, and (3) modes of communication concerning user involvement. The elements and constructs were obtained from the literature review conducted prior to field work for this research. Developers, Testers, Business Analysts and Project Managers were roles that were interviewed from the developer group while an SME and a Product Owner were roles interviewed belonging to the user group. Different roles were available in different organisations. The use of fixed grids, rather than having the constructs and/or elements elicited from the respondents, allows for consistent and systematic comparison of respondents' perceptions (Edwards et al., 2009). In this case it allowed aggregation of perceptions of expectation of user involvement by role, as well as comparison by role, to explore the degree of alignment or misalignment of expectations.

1.2.4 Analysis of Interviews and Repertory Grids

The raw data from the interviews were first coded thematically (Boyatzis, 1998) to obtain an understanding of interviewees' expectations around user involvement, and subsequently the associated expectations of roles within the technical teams as well as user roles. These findings were later compared with the results obtained from the analysis of the Repertory Grids to gain further insights. The Repertory Grids were analysed by comparing an aggregation of grids for each role with aggregations of grids with every other role. The main results that formed the focus of this research are from the comparison of technical and user roles. It was found that the alignment of expectations can lead to higher quality user involvement as both groups are able to work effectively towards achieving project goals. This can be achieved by understanding expectations of different roles and creating a process around making these more visible and accommodating (sometimes compromising) expectations to achieve common ground towards the goal of obtaining high quality involvement. The misalignment of expectations did not adversely affect the quality of the end product but did lead to impediments in obtaining the benefits of user involvement affecting budget and time to delivery. By describing the expectation of roles around user involvement, the thesis throws light on factors that each role places emphasis upon for the purpose of achieving high quality involvement. By understanding the constructs of each role's interpretation

of high quality user involvement, guidelines have been suggested for incorporation in Agile practices to achieve benefit of user involvement.

1.3 Main Contributions

The findings from this thesis contribute to the body of empirically-based knowledge related to Agile software development practices. This thesis deepens the understanding of factors related to alignment of expectation of user involvement, provides empirical evidence for the strength of the alignment of those expectations in practice across project roles. In addition the study in this thesis contributes to a clear and consistent conceptualisation of the meaning of “quality user involvement” and some barriers and enablers to achieving high quality involvement. Practitioners will benefit from a deeper understanding and awareness of the differences and similarities of expectations of various development roles and user roles with respect to user involvement. This knowledge should encourage a sensitivity to differences and a encourage discussion and effort to align expectations. A clear and detailed conceptualisation of the meaning of “high quality” user involvement provides consistent terminology to discuss the issues related to high quality involvement and what can be expected in what areas. This is useful to both practitioners and researchers interested in exploring this area. It clarifies the meaning of the goal of high quality user involvement and could provide the basis for a future quality metric.

The deeper understanding of factors related to alignment and misalignment of expectations and their influence on the quality of user involvement, as well as clarity in the goal and barriers to achieving that goal, can also provide guidance in the design of future techniques and tools to support the alignment of expectations high quality user involvement.

1.4 Structure of the Thesis

After the introductory chapter, Chapter Two presents the research context for this thesis based on a survey of current literature in the area of user involvement in software development. A synthesis of this research literature provides a framework to conceptualise the factors related to expectations of user involvement. This is used to

design the Repertory Grids as well as structure the interview questions. The philosophy of the research approach used in this thesis is discussed in Chapter three, together with the design of the data collection and analysis methods. The justification and implementation of this design is also detailed in this chapter. The main contribution of the thesis is presented in Chapter Four, where the findings of both the Repertory Grid analysis and interview data analysis are presented and discussed. The final chapter of the thesis, Chapter Five, summarises the main results, answering the research questions explicitly, notes some limitations of the research, and suggests some avenues of future related research.

2 Literature Review

2.1 Introduction

It is imperative for any software product to meet the needs of its users for it to be deemed successful (Chappell, 2012). User involvement has emerged as a popular practice in software development and has been acknowledged as an important factor contributing to project success (Terry & Standing, 2004). According to the Agile Manifesto (2001), Agile software development encourages the involvement of users for fast, better and cheaper software development by placing importance on individuals and interactions over processes and tools, customer collaboration over contract negotiation and responding to change over following a plan. Williams & Cockburn (2003), state that agile development is about feedback and change, which is what forms the basis of user involvement in software development. There has been extensive research that emphasises the importance, approaches, benefits and obstacles to user involvement which has generated a great deal of interest in the field motivating further research (Rogayah A Majid, Noor, Adnan, & Mansor, 2010). Szajna & Scamell (1993) investigated the effects of user expectations on their performance and perceptions in a laboratory experiment involving 159 undergraduate business students. They suggested that the systems development process can benefit from an awareness of user expectations by enabling them to diagnose and deal with problem areas before they become ingrained in a system. They also recommended looking at high and low expectations in organizations in order to introduce measures of system success related to user expectations. The paucity of research in determining the influence of expectations on quality user involvement has motivated me to examine users' and the technical team's expectations on user involvement as an influencing factor in Agile software development. This research aims to study expectations with the intention of identifying the expectations around user involvement and what the factors for effective user involvement in software development are.

2.2 Meaning of User “Involvement”

Over the years, there has been a change in the perceptions about user involvement. For example, Kristensson, Matthing & Johansson, (2008) describe the change as end users being regarded as the “inferior” party, with limited to no technical knowledge and the denial of the opportunity to become fully involved in development project activities, to being regarded as “active collaborator” with involvement in software development from inception to the end. User involvement has, been defined by Ives & Olson (1984) as the participation in the system development process by representatives of the target user group. However, nowadays there is the participation of a much wider client stakeholder group comprising the Business Owner/sponsor, Subject Matter Experts, Business Analysts and end users. My research covers the perspectives of all these roles that are active within a project, with the aim of obtaining a range of point of views around the practice of user involvement, examining how well they match and how aligned they are around the concept of effective user involvement.

In research by Cavaye (1995), the meaning of user participation in development has been explained by breaking it down and defining its main components – the user, participation and development. The term “user” refers to the entity that would be using the software directly or indirectly. The user’s role can range from decision makers, who are responsible for the profitability of an organisation, managers who are affected by the system to end users who would be interacting directly with the software as part of their core activities. These are the people who would contribute to defining the problem, identifying requirements, validating the design and testing out the software prototype. User involvement has evolved from being informative and consultative, involving the elicitation of requirements and to provide guidance in the design phase, to participative (Damodaran, 1996), wherein they actively contribute to project scoping and prioritisation of requirements; responding and providing inputs to product prototypes created by development teams; and participating in design meetings and to provide inputs on product features as well as design aspects that are important to user groups (Subramanyam, Weisstein, & Krishnan, 2010).

User participation in the development of software comprises an array of activities undertaken by the user and has been characterised by using attributes such as the type

of participation, degree of participation, content of participation, extent of participation, formality of participation and influence of participation. In their research, Barki & Hartwick (1994) have claimed that the concepts of user participation and user involvement are distinctly different. They have suggested using the term user participation to refer to activities, assignments and behaviours that users and their representatives perform during development processes and user involvement to “a subjective psychological state reflecting the importance and personal relevance that a user attaches to a given system”. Later, they classified user involvement into situational and intrinsic involvement where the former is the extent of participation in various project development activities and the latter is the amount of personal relevance, psychological significance and significant consequences pertaining to an object for the individual. In essence, previous studies by Szajna & Scamell (1993) have provided an insight into how user involvement is positively related to perceived usefulness because people have contributed to the development of the information system and therefore the system holds a certain personal significance to them. Since then, there have been various manifestations of the user’s role as co-creators, collaborators and participants which now fall under the broader umbrella of user involvement (Bogers, Afuah, & Bastian, 2010). Users are usually considered the best experts when it comes to evaluating a system that they are going to use. Software development activities such as mutual alignment of IT artefacts and the social and organizational context in which the artefact will be used, identification and specification of the needs of the people who will be using the software, implementation of that software in the organizational context and evaluation of the components of this system and its changes demand user involvement in order to achieve end user satisfaction (J. Iivari, Isomäki, & Pekkola, 2010).

In my research, one of the objectives has been to understand what the practices to user involvement in Agile Development in industry are, today. Despite being a popular methodology, one cannot ignore the fact that it is still challenging for Agile organizations to find a mutually agreeable work around with clients, many of whom are used to the traditional way of developing software. By examining expectations of clients and developers around user involvement, the thesis aims to uncover the meaning of high quality user involvement and factors influencing practices in achieving it.

One of the key principles of Agile software development is the active and continuous participation of clients, throughout the lifecycle of a project. The philosophy is to incorporate client feedback into the development process by making them responsible for the providing information and making business decisions during a project (Agile Manifesto, 2001). This includes the prioritization of requirements according to the client's value for their business allowing the developers to smoothly create software applications in the direction intended by clients, without having to put in extra time and resources (Bakalova & Daneva, 2011). I chose to study Agile organizations that have active user participation in their projects to find out what works for them and what doesn't, and what the determining factors are in ensuring that the software development process effectively implements Agile principles.

2.3 Benefits and Importance of User Involvement

The software industry has recognised the benefits of the Agile methodology and a lot of companies have made a volitional choice to use it as much as they can, in delivering software solutions. Practitioners claim that it leads to building a product exactly the way the client wants it, thus leading to higher client satisfaction (Thalen & van der Voort, 2012).

There are various advantages to user involvement and effective user involvement in system design can lead to improved quality of system design arising from accurate user requirements, greater understanding and acceptance of system and consequently, effective use of the system (Damodaran, 1996). Improved levels of acceptance of a system are more likely with effective user involvement when users have a better understanding of the design and development process of a system. Increased awareness of their influence on system design leads to an increase in personal relevance about the system. According to Barki & Hartwick (1994), users who participate in the development process are likely to believe that a new system is good, important and personally relevant. It was further purported that if users are given the responsibility to influence the design of a system, they will develop feelings of ownership, which would in turn enable them to get a better understanding of the new system and how it could help them better in their job. It was thus shown that the way users perceive a system is largely dependent on their level of participation in its development process and the

system is likely to hold personal relevance and importance to the users if they are given more responsibility in various stages of the development cycle. Users who participate in the development system are also able to effectively use the system as a result of greater understanding of system functionality which is a by-product of effective user participation. This has been taken further in my research where an investigation will be conducted on how users' attitude towards being given that responsibility and undertaking ownership, could influence their participation in developmental activities and by extension, the value of the involvement.

User satisfaction is considered an important determinant of product quality and user involvement has been touted as a means to improve user satisfaction about the software developed (Davis, 1993). The effects of user-developer communication on the relationship between user participation and user satisfaction has been explained in a study by McKeen, Guimaraes, & Wetherbe (1994) where they argue that user influence or user-developer communication was positively related to user satisfaction regardless of the level of participation. Users that communicate frequently with developers are able to exert greater influence, through their involvement in a project, and are more likely to feel like they own the system. It improves their knowledge of different aspects of the system to a greater detail, leading to greater user satisfaction and effective use of system. The relationship between users and developers directly influences the sharing of common knowledge in software development. Shared common knowledge is necessary for achieving mutual understanding and trust, improving users' knowledge of information technology and business knowledge of developers, thus having a very strong impact on the effectiveness of user-IS knowledge co-production. Common knowledge, if effectively shared, between user and developers can lead to better elicitation of requirements, which in turn influence project performance. This impact of common knowledge on requirement determination was linked to the quality of the relationship between users and developers in a study by Hsu et al. (2011) and it was suggested that users can have an impact on the process by participating in various activities in different stages of design and development. The developer's perspective of involving users in design and development stages has been examined to explore conditions necessary for users to act as co-producers. Users' perspectives on their involvement in design and development have not been considered and can provide

valuable insight on their preferred form of involvement and how their preference impacts the user-developer knowledge sharing process, relationship and thus, the effectiveness of the involvement.

Procaccino & Verner (2009) interviewed members of the developer group to compare what they think their end-users consider important in the development process and final outcome, with literature reports of what end-users consider important. They found that user participation was considered important to the development process and final outcome, facilitated by effective communication between users and developers. Effective communication, through user participation, ensures that users' business needs are met and the completed system meets user requirements, minimises system maintenance necessary to meet those requirements and a positive relationship is fostered between developers and users. They were also able to link extra costs and time associated with remedial work, for final systems that do not meet users' requirements, to denying the users the opportunity to participate in the development process. Further studies to this research suggested systematically examining developers' perspective regarding end-users and to obtain end-users' perspective on their influence on the system. My investigation aims at examining the developers' perspective and expectations about involving users at different stages of the development process as well as the users' perspective and expectations about the involvement to understand how the difference and similarities in these two sets of perceptions affects the effectiveness of the user involvement. I have also compared the opinions of different roles within the development team to look for pattern in expectations about enablers and barriers to high quality user involvement.

2.4 Description of User Roles

The first thing to consider is the different ways in which users are categorised. This is dependent on the roles they play in their day-to-day professional lives and what functions essentially comprise their nature of work.

The roles undertaken by users are just as varied as their backgrounds. There are different stakeholders from the user group whose influence on the quality of user involvement, directly or indirectly, is crucial for effectiveness. Each user type has a different level of influence on the project depending on their level of authority in an

organisation, their knowledge, expertise and experience. Based on this variation, a user can be classified end user, user representative, Subject Matter Expert, Product Owner, client management or decision maker or very often, proxy to client (Terry & Standing, 2004). To gain a better understanding of each type, the users have been described in greater detail in the next few sections.

2.4.1 End Users

End Users are those who form the organisation and will be affected by the IT development. They are the ones who will eventually use the system. It is their work that the system is expected to improve and problems in their tasks that system aims to resolve. It is important for end users to take ownership of the system and be aware that their knowledge and experiences are required to contribute to its development. End users can be involved for different purposes at different stages of the development process. They are required to provide a detailed description of their roles, tasks and responsibilities for the IT group to develop a system that will serve their needs effectively. User representatives need to understand fully users and their work regardless of the position they occupy, as users are the experts in their work and would be able to differentiate between formal and informal processes, constraints, attitudes. End users will ultimately use the developed system and are involved to ensure that the IT system meets their needs. In user participation, they can be consulted to provide information on demand, provide feedback on proposals and evaluate products for relevance.

2.4.2 User Representatives

User representatives are those people who work closely with end users or are one among them. These are often managers of a team of end users but can also be the person who is actually paying for the software. They are usually well-versed with user activities, tasks and are able to relate to user tasks at a very basic level. User representatives behave as the liaison between users and the IT team by consulting or interacting with users to extract their ideas, needs and problems and liaise with the IT team to come up with a solution that can help users perform better at work or assist them with certain tasks. This is a rather difficult undertaking, considering it involves

having some knowledge of technology as well as strong understanding of the user side of things. They form the connecting bridge between users, who may not be technically skilled, and the IT group, which is not always sympathetic towards the users' lack of technical expertise. This difference in thought processes, backgrounds and areas of expertise puts the user representative through many a difficult situation requiring perseverance and a sense of direction, especially in event of conflict. Damodaran (1996) summarised the functions of user representatives to comprise of a thorough understanding of significance of their role for the whole organisation, ability to operate independently even in times of conflict, good interpersonal skills to be able to consult widely and liaise with members from the technical and not technical side. User representatives are characterised by the willingness and ability to draw ideas from other experts and are able to seek support and authorisation when necessary. There isn't always a clear distinction between the different user types. The line between user representatives, product owners and Subject Matter Experts often blurs and one person can undertake more than one of these roles. Many IT organisations have a dedicated Subject Matter Expert (SME) and/or a Product Owner (PO) who act as user representatives liaising with the IT team to provide information on the business process and objectives of software functionalities.

2.4.3 Subject Matter Expert (SME)

An SME is often someone who knows the business process well and understands what the needs of the end user are. They could also be knowledgeable about technology and are able to present the end user's requirements as well as be able to understand the development team's proposed solution. They understand what will work best, what won't, what the scope of a particular feature can be, what the limitations are and are able to map this knowledge to user specifications. Their job is to liaise with the technical team and the end users to ensure that the most relevant software solution is created.

2.4.4 Product Owner

This user type is usually responsible for reviewing and signing off requirements. They are involved in the budget allocation for a project, the time-frame and in some cases,

could also be a contributor to the requirements. They may not necessarily be the ones who will use or directly interact with the software solution being created, but are certainly affected by it in some higher form.

2.4.5 Client Management User

These are often people belonging to the management of the client organisation and are also the product sponsors of the software being created. They are aware of the software being created but may not directly contribute to the creation of the software. They form the highest level of decision makers on the project and their engagement is usually limited to authorising the project.

2.4.6. User Proxy

This user type is someone acting and thinking on behalf of the user. They are usability specialists, Business Analysts and technical consultants who understand technology, software development and have deep insight of what users want. They do consult with end users, but are usually considered part of the development team as their job is to listen to users and draw out requirements in the form comprehensible for the technical team. The development team relies heavily on the specifications drawn out by the Business Analyst and therefore it is important for this role to not only understand user requirements well, but also to convey those requirements accurately to the technical team.

The expectations of the technical roles around the involvement of various roles, assumed by the user are the focus of this research and therefore the “role” was chosen as the unit of analysis for this research. Researching the different user types enabled me to structure my research design and methodology around dynamics between various roles within the technical team and users. These user types have been used in defining the elements for the fixed Repertory Grid analysis technique that has been implemented for this research, to obtain a comparison of perspectives across roles, projects and organizations practicing Agile. The elements thus selected from this section are:

- End User
- User Representative/Product Owner

- Subject Matter Expert (SME)
- Client Management User (member of the management of client organization)
- Proxy to Client (Usually the Business Analyst or Technical Consultant)

This would provide detailed insight into expectations of the different user types involved in the project in terms of activities for project engagement, facilitating characteristics to be exhibited by different user roles and preferred mode of communication with each user type, for effective user involvement. A more detailed explanation of the use of “roles” as the unit of analysis has been provided later in Chapter 3 (Research Design & Methodology).

2.5 How are users involved?

The user side can be a combination of all or some of the users described above and the kind of engagement varies with each user type. Some users may have more interaction with the development team as compared to others and some could be involved only at specific stages of the development cycle.

2.5.1 User classification driven involvement

In their study in the Open Source Software (OSS) development context, (N. Iivari, 2009) showed that user participation can be both direct and indirect. “Novice”, “Non-technical” and “Technical” are b manifestations of user roles where they form a discussion forum and have acquired a consultative role where they are able to engage in the development process by commenting on existing solutions. User participation was categorised based on these three types and all three forms of user roles can represent themselves or be represented by others who claim to have knowledge about them in a consultative role. Novice and Technical users, of the OSS in question, may read and write code but non-technical users, though technically illiterate, are also consulted in relation to the OSS. HCI Specialists are invited by developers to represent users in the project, are essentially user surrogates, have access to the arena and may read and write code. Further investigation was suggested to examine whether direct participation of the end user should be supported and expected, in OSS development, or whether user representatives are able to add more value to user participation. Another

recommendation is to understand the extent of participation of technical and non-technical users, the amount of decision power that can be given to them and usability specialists and how cooperation between different levels of technically literate and illiterate people can be achieved. Although the discussed study focuses on the area of OSS development, the investigation will be taken further in my study on expectations about user involvement, to find out how beneficial cooperation can be achieved between users with varying technical literacy and the development team. This will be examined in the analysis of the Repertory Grids on “Nature of Involvement” obtained from the interviews in understanding the development teams’ preferences in involving which type of users, for which type of software development activities and why.

2.5.2 Agile methodology influenced User Involvement

Agile has many different forms such as SCRUM, Extreme Programming (XP), Kanban, Lean, BDD and Feature Injection to name a few. However, there need not be a lock down on any one type for successful implementation of Agile. There are many interpretations of Agile and the way it is practised, today. Different organisations follow different process to achieve the benefits of Agile. Although core principles remain the same, the approaches to Agile are different and the means undertaken to achieve its goals are tailored specific to the culture of the organisation. One of the endeavours of my research is to understand the current practices to Agile software development, the barriers they face in user engagement and the measures undertaken to achieve its benefits. Approaches to user involvement in software development have evolved since the time it was first conceptualised and several software development communities have adopted its various forms. It is considered as the democratic empowerment of the skilled worker and has paved way for popular practices such as User Centred Design, Usability Testing, User stories, Putting Usability First (PUF), Usability Engineering (UE) and Participatory Design (PD). The difference between all approaches to user involvement lies in the degree to which users are able to influence system design (Damodaran, 1996). A study by Kaulio (1998) provides an overview of a number of methods for customer involvement in product development, presenting us with Quality For Deployment (QFD) and Beta Testing as popular methods for user involvement in Software Engineering. QFD is a methodology that is described as a development process wherein the product design and production is driven essentially by customer needs. In this, user

involvement is restricted to the initial phase of product design where engineers are the leading actors and users are objects from which general requirements are elicited. Customer requirements thus derived are subject to deductive analysis to obtain product characteristics and subsequently, performance measures for the development process. In contrast to QFD, Beta testing is an approach that is applied in the latter phases of product design process with the aim to determine whether the product does what it is designed to do in the customer environment. It involves presenting product prototypes to customers for feedback and continuously refining the product until customer satisfaction is achieved. QFD is implemented in “design for” customers, where the product design is based on data about users, general theories and customer behavioural models. The goal of Beta Testing is to “design with” customers, where the focus is on the users and data obtained is based on user preferences. In Beta Testing, the needs and requirements are utilised to present users with different solutions to react to and choose from. The stages of the development cycle were specification, concept development, detailed design, prototyping and final product. It was observed that QFD is implemented in requirements and specification phase and is the only time users interact or communicate with designers. It is an approach that supports representation and structuring of user requirements that form the basis of product features. Beta Testing is usually applied in the prototyping phase and offers an easy way to extend the designing process. User-based Evaluation is a Usability Evaluation Technique where user involvement in the design of information systems entails the study of representative target users’ preferences by directly exploring users’ interaction with the interface. Freiberg & Baumeister (2008) provided an extensive, categorised overview of usability evaluation techniques and described various forms of User-based Evaluation which included controlled experiments, focus groups, physiological monitoring, post-task walkthrough, query techniques, remote usability testing and user study. In my research on understanding current practices to user involvement, interviews with industry practitioners will shed light on their preferred techniques of implementing Agile and how user involvement is incorporated in these techniques, based on the social and organizational context of the software being developed.

2.5.3 User Involvement and Agile Principles

According to the Agile Manifesto (2001), a core principle of Agile development is to provide the customer with software that is valuable, on an early and continuous basis. User-centred Design (UCD) has been integrated with Agile methods to ensure that an application is usable and effectively fits in with the needs of the user. The user representative's requests are captured on index cards in the form of descriptive stories to form a very high level definition of requirements for developers to estimate the amount of time and effort required to generate the solution. These user stories are created at the start of every iteration and then prioritised to ensure they are completed within the time allocated for that iteration. The result of the finished iteration is then displayed to the customer for feedback and approval. Final iterations involve bug fixes where users conduct usability testing to find problems before any actual development is underway. Usability involves observing users perform tasks, while Agile methods involve continuous customer feedback but both methodologies aim at creating software that the customers want. Fox, Sillito, & Maurer (2008) have explored how usability affects development over the long term and the similarities and difference in Agile and UCD methodologies and found that the main difference lies in who executes which tasks and performs which roles in the process. They suggest examining different roles and the perceptions on which usability approach is considered most effective and why. By interviewing various roles from the technical fraternity, my investigation attempts to further the aforementioned research in uncovering the perceptions of different roles on different approaches to user involvement and using the Repertory Grid technique to compare perceptions across varied roles, projects and organizations.

The purpose of researching the various approaches to user involvement was to gain an understanding of how these are applied and what the expectations around the applied method of involving users are. This subject forms the core of my thesis and to gain a deeper insight, perspectives of different roles within a development team have been recorded and compared. A further comparison between different organizations has been performed to find out the how expectations and perceptions differ between development teams that apply Agile techniques differently, and what is perceived as high quality user involvement in their respective settings.

2.5.4 Recent Example of User Involvement in an Agile environment

A recent study by Nakki, Koskela, & Pikkarainen (2011), conducted a case study with 33 end users and four software developers implementing the Scrum technique of Agile development. The study demonstrates ways in which the development team communicates with customers and showed that face-to-face meetings with customers being physically present for consultation, telephones, videoconferencing and email are popular for customer participation in distributed contexts. The study reflects upon how Open Source Software (OSS) contexts have been using online tools to involve users in the development process. The “Open It” approach combines user participation in design with the community driven approach of OSS. The designs are showcased to the crowds by means of online tools such as YouTube, Flickr, Twitter and blogs. Each of these modes of communication is effective when applied to the right context. According to the Agile manifesto (2001), “the most efficient and effective method of conveying information to and within a development team is face-to-face conversation”. However, in distributed settings it is hard to involve customers in such direct engagement as they are spread out in geographically separate locations. In this context, the use of online tools and social media are effective in involving users. Agile also endorses maximum involvement of end users where possible. However, in practice it can be hard to contact and involve end users and it is often user representatives who are involved in the project. This adaptability of forms of communication for user involvement based on the context, motivated the consideration of the third aspect of User Involvement – Mode of Communication. A collation of popular modes of communication was used to create constructs for the Repertory Grid on preferred “Modes of Communication”. The aim was to examine, the point of view of user and technical roles to obtain their preference of the most effective forms of communication within the context of their respective projects. Effective means of communication with user contributes to effective involvement.

2.6 Enablers to User Involvement

Favourable conditions are necessary to reap the benefits of user participation in an Agile development environment. A great deal of research (for example, Dean, Lee, Pendergast, Hickey, & Nunamaker Jr, 1997; Netta Iivari, 2004; Kujala 1, 2008) has been conducted to unveil the factors that contribute to effective beneficial user

engagement and understanding of user needs facilitated by good communication between the users and the technical team was found to be a major factor for successful User Centred Development. In order for the development team to establish a relationship with users, conducive for user participation, it is necessary to foster a positive attitude towards user involvement. This works two ways; while a lot has been said about reservations on the developer side towards involving users in design and development, it is also important to promote a positive attitude towards IT among users, even if that means providing support to facilitate the successful interplay between the two groups. An in-depth study on users by Damodaran (1996) has stressed on the role of top management in developing a clear vision about what needs to be done to inculcate this positive attitude and how it should be gone about. This involves developing a thorough understanding of human and organisational implications and an all-round awareness of the repercussions. Accepting this argument, Iivari (2004) performed an analysis of how user involvement is encultured in organisations and suggested that there are different interpretations to user involvement and that cultural context is an influential factor affecting the amount of emphasis placed upon different aspects of user involvement. Sensitivity to cultural issues is important in facilitating user involvement. The study showed that some cultures supported the ‘quality and control oriented engineering approach’ to facilitate user involvement by controlling, measuring and monitoring, “normal project work”. Others allowed users to either independently explore usability at their own will or user involvement should be planned and incorporated in the process schedules for software development, even though tight schedules may inhibit user involvement.

Various studies in the past have explored other factors that influence the decision to implement user involvement in practice. Grudin (1991a) studied the extent of user participation in different development contexts – contract development, product development and in-house development to identify influencing factors in the development of interactive systems. Size of an organisation was found to be a major influencing factor where it was purported that start-up or small product development companies were more flexible towards accommodating user involvement. Fewer resources, less division of labour and a smaller customer base, therefore lesser customer satisfaction related concerns were factors that were attributed to provide greater scope for innovation and experimentation. In-house development often faces the difficulty of

catering to users of varying backgrounds and numbers. Users who pay for their own customised systems become involved voluntarily, as opposed to users for whom a system has been acquired, because the system holds personal importance to them and they have an economic stake in it. As the type of companies that were studied for this thesis had in-house and external projects, it gave me as the researcher, reason to consider Grudin's (1991a) study in questioning whether expectations about user involvement were influenced by the nature of their projects. The expectations recorded from the interviews have been inspected taking into consideration whether they belonged to roles that were part of an in-house project or an external project.

User involvement is seen as a practice that improves the quality of work in software development and does a lot for the image of an organisation (Chappell, 2012). The aim of user involvement is to gain more knowledge about users and their context of use of systems to be able to effectively develop user satisfactory systems (Kujala 1, 2008). Attitude and motivation of users are crucial factors influencing their involvement in the software development. Highly motivated users are usually preferred for involvement because it is believed that more can be drawn from them in terms of value to the project (Barki & Hartwick, 1994). They also mentioned another measure to further facilitate user involvement is to make users feel at ease during meetings and to assure them that their opinions are valued. This can be done by ensuring that they are not judged based on their knowledge of, or lack thereof, technology. Wilson, Bekker, Johnson, & Johnson, (1997) personified facilitators to user involvement which included motivated stakeholders, representative cross section of users, a champion for the cause of user involvement. They also added effectively organised meetings, active management support, flexibility in accommodating different perspectives and approaches, facilitating later involvement through earlier user involvement, educating users through the whole process of design (and development) and individual and group meetings with users to this list of enablers to user involvement. The personas of the facilitators described in their study are now explained.

2.6.1 Motivated Stakeholders:

All stakeholders- managers, developers, product owners, the management, have to be amiable to the idea of user involvement. The more motivated they are to involve

users, the more likely they would be to encourage users to participate and provide support for user involvement. Users who are interested in contributing to a project and exhibit a desire to participate are likely to take their involvement seriously. Most developers believe that a motivated user will look into every aspect of their involvement so as to provide optimum benefit to the project.

2.6.2 Representative cross section of users:

Users from varying levels of seniority, expertise and technical and non-technical backgrounds should be selected for the involvement. This would provide a range of perspectives on the organisational context giving the development team a more wholesome view of business needs and objectives (Lilien, Morrison, Searls, Sonnack, & Von Hippel, 2002).

2.6.3 A champion for the cause of User involvement:

It is essential for the organisation to have at least one member who advocates user involvement and is able to organise activities and processes to support it. Meetings should be organised effectively with clear mention of the purpose and time requirements so that users are aware of the context of the meeting and the amount of time they are required to invest in it. This role is usually essayed by the Business Analyst who dons the cap of a mediator and essentially communicates user need to developers while keeping the user group informed of technological activities (Grudin, 1991a).

2.6.4 Active Management:

Top Management authorities should not only agree to user involvement but also promote its importance, ensure that users are kept abreast of what is going on at every stage and support them in taking time out of their normal work to participate in development or design activities (Butler & Fitzgerald, 2002). User involvement can be facilitated by drawing up an agreement, limited to the system to be developed, that specifies techniques to involve users such as prototyping or scheduled reviews or aspects of the development process that should have user influence (Grudin, 1991a). It should be known that users are experts in their own fields and different expertise should be valued. Users may not have the skills

necessary for the design and development of systems but can provide information about their work and organisation to facilitate the developers' understanding of requirements.

2.6.5 Follow through User involvement to the end

There is a tendency for user involvement to lose momentum somewhere during the course of the project until the end. Care needs to be taken that user contributions have been noted, where appropriate, and users made aware that they have influenced the project in either the design stage or concerned development stages. User participation throughout the development process has been studied by Shim, Sheu, Chen, Jiang & Klein (2010) in their research on "Coproductioin". 128 users who participated in the development process of various software products were surveyed and it was found that for successful coproduction, it is necessary for developers and users to foster a relationship wherein the client can be forthcoming about sharing information rather than simply being a source of information. This would entail both users and developers taking each other's expertise into consideration and maintaining a level of involvement through all phases of development (Bettencourt, Ostrom, Brown, & Roundtree, 2005).

2.6.6 Flexibility:

There should be enough flexibility to accommodate different perspectives and choices to techniques in design techniques. Although, this has been recommended in the paper by (Grudin, 1991a) it is highly likely that accommodating individual preferences would be a tedious affair and achieving common ground would be a more pragmatic approach in optimally utilising perspectives. Often, user groups are made for the purpose of involvement where they are involved in requirements elicitation and verification to ensure the system developed meets requirements of all users, as closely as possible (Butler & Fitzgerald, 2002).

2.6.7 Educate users about the whole process:

This would involve educating users about what is happening throughout the process, which decisions are made when and the consequences of these decisions. Individual meetings should be organised to enable users to voice their opinions freely but

difference in opinions can be resolved through group discussions. User training and support and educating users about their role in a project will improve their motivation to participate in project related activities, create a feeling of ownership towards a project which could directly influence their commitment towards their involvement in a project (Thalen & van der Voort, 2012).

2.6.8 Establishing responsibilities for each role in user involvement

Optimum benefit from user involvement can be achieved if roles and decision point are more clearly defined in a formalised process for user involvement. This would include formal involvement of managers where support in the form of a step by step process that guides users as to what is expected of them through their involvement at different development stages. This could be further supported by equipping users with access to usability expertise (Følstad, Jørgensen, & Krogstie, 2004). N.Iivari (2006) addressed the assumption that “organizational culture has some effects on usability work; the cultural context might reinforce and advocate certain aspects of usability work while deeming other aspects less important. On the other hand, usability works, when introduced and implemented into the cultural context, might also be capable of modifying the context.” This also implies that the culture in an organisation can influence user involvement as well as be influenced by it. Different organizations have different cultures which influence their reasons behind practicing user participation and their approaches to user participation. User involvement is driven by the goal to save the organization’s time and money and in order to attain those goals the management may give their users a free hand in the way they contribute to a project where initiative, individuality and innovativeness are encouraged or may incorporate user involvement activities in software development processes for quality and control. Therefore, it is inferred that culture does influence different interpretations of user involvement and which aspects of user involvement are emphasized upon. By conducting a case study on different organisations, my investigation can further this research in studying the individual styles of Agile organizations in practicing user involvement. There could be cultural influences to user involvement practices in different organisations and semi-structured interviews with the members of participating Agile organizations will provide me with rich data on the commonalities and differences in expectations of different Agile

practitioners and the expectations of roles hailing from different organizational cultures about high quality of user involvement.

Some of the enablers discussed in this section are situational, that is they are dependent on the implementation certain processes and measures to carry out user involvement, while some are based on the characteristics of the users themselves. As the quality of user involvement is hinged upon the contribution of different users involved in the project, I have chosen to focus on the characteristics of users. They have been used in creating constructs for the second Repertory Grid in the expectations around “User Characteristics” to obtain expectations of different technical roles on facilitating characteristics users should have in order for their involvement to be useful. The constructs thus obtained are:

- Expectation of time invested (by user) per week
- Expectation of ability to articulate
- Expectation of desire to participate
- Expectation of availability
- Expectation of authority/level of influence on project
- Expectation of experience with project engagement
- Expectation of technical knowledge
- Expectation of knowledge of business process (context of software being developed)

My research will examine these enablers to user involvement, obtained from past research and literature against the expectations of practitioners’ to show the current state of user involvement, what is being done to facilitate it and how their expectations and efforts affect user involvement as it is practiced in their projects. It aims at uncovering expectations of users and technical members, what challenges are faced in meeting expectations of both groups in industry today and how the similarity or differences in expectations are managed to result in high quality of user involvement.

2.7 Barriers to User Involvement

Having focussed on the facilitators to user involvement, one cannot ignore the inhibitors that created the need for facilitators in the first place. Wilson et al (1997) defined an obstacle as a factor that prevents the user from making an effective contribution to design, which in the context of current practices to user involvement can be extended to stages of development as well.

2.7.1 Developers lacking empathy towards technically challenged users
Grudin (1991b) explored obstacles faced by developers in achieving and benefitting from user involvement. It was observed that even though developers may agree to involving users in the development process, they tend to lack empathy users for who are inexperienced or from non-technical backgrounds. Factors such as difficulty in communicating effectively, contrasting work situations and attitudes along with the slowness and imprecision that comes with user involvement have been identified as barriers to involving users during development, from the developer's perspective. Additionally, if the product to be developed is for a wider market, identifying the right users or user group could be challenging. Choosing one may eliminate other possibilities and selecting the right user or user representative is the deciding factor as to whether the user involvement will be beneficial or harmful to the development of the product.

2.7.2 Difficulty in obtaining End User input

Access to users is another issue faced by the development team who may not be able to interact with end-users directly and have to liaise with managers, information specialists or subject matter experts. Often developers and users are isolated as it is not feasible, financially or time wise, for developers to spend time with each user to cater to their individual needs. Barriers, such as this, prevent effective communication between users and developers, also affecting the relationship between both parties (Grudin, 1991b). Alternatively, it is possible that the users may be too pressed for time to be able to directly communicate with the relevant members of the development team, may not be regular with attending meetings or a simply prevented from interacting with the developers by senior management.

2.7.1 Undermotivated users

Bak, Nguyen, Risgaard & Stage (2008) conducted a study on 39 software development organizations to determine whether they were evaluating the usability of their software with the aim of revealing what the obstacles in doing so were. It was found that often, it was difficult to convince users of the importance of usability evaluation and getting them to participate actively in the project. This was attributed to the users' lack of knowledge about the benefits of usability evaluations and restrictions on how much they are allowed to disclose about what they do. Users who are not driven by the right motivation are considered a major hindrance in benefitting from user involvement. It is difficult to get users to spend time on a particular project and get them to give understandable feedback (Doll & Torkzadeh, 1991). User involvement, in IS development, is often viewed as expensive and cause of delays because reaching consensus becomes difficult when more people, with different viewpoints are involved. This is seen as very time consuming, especially when there is a time constraint on the development resulting in little or no user participation. These are inhibitions about involving users from the development team's perspective.

2.7.2 Diverse range of user requirements

In another of his previous efforts, (Grudin, 1991a) also addressed the inability to identify future users in the context of product development, especially when it concerns a wide customer base where potential users are numerous and their preferences are diverse. It was found that it is difficult to cater to individual customer requests and it is often time consuming for developers to respond to their individual needs. The study covers some cases where the products were modified by the customer's in-house development team before it reached the actual users, leaving no scope for user involvement in the development process. They mentioned that this practice is common in the case of customers located in different organisations or perhaps, different countries. Another obstacle identified in the same study was the pressure to produce new releases of existing products where smaller upgrades are favoured over significant innovations providing lesser time for developers and users to interact and educate one another. In-house development, despite offering greater prospects for collaboration between users and developers, also faces the challenge of greater bureaucracy influencing a project rather than the end-users themselves due to conflict in interests. Selection of user representatives is also challenging as the management may want an

active role in participation or wish to control the participation. Potential users may not have the time or the inclination to participate in the development process or may be more knowledgeable about technology and interested but not given the opportunity to represent. Involving users is also seen as an area where user expectations of the project may be unrealistically raised, resulting in the possibility of disappointment. Although this is a rather old study, the findings from their research are useful for consideration in this thesis about expectations about user involvement. It provides foresight in the kind of expectations developers and users can have, which will be investigated further during interviews with the participants in my research to check if there is a similar pattern of expectations across roles and how they contribute to or keep the practice of user involvement from being useful.

2.7.3 User involvement limited to specific stages only

It is common practice to involve users in the requirement analysis stage, but there is a strong diffidence towards involving them in the design and development stages. Exemplifying this point, a study by R.A. Majid et al. (2009) throws light on importance on HCI considerations, from a practitioner's perspective. The study was able to identify the state of user involvement in Software Development Life Cycle while examining the extent to which HCI elements have been addressed in SLDC. It was found that practitioners are more likely involve users in the requirements analysis stage rather than during the development stage and this was largely attributed to users' lack of technical knowledge. Their study revealed that while this is the mind-set that is common among many development teams, higher degree of user participation and influence has been found to result in effective user involvement and therefore higher levels of user satisfaction. Further investigation in the users' awareness on the importance of user involvement in software development was suggested and this could involve studying user perspectives on what is expected of them and what they expect in terms of support from the development team, for effective involvement. Elaborating on developer mind set, Bak et al. (2008) found that developers found it hard to think like users and usability tests are often mistaken for functionality tests. This was presumed to be related to the disagreement of developers with users' opinions. Developers tend to prioritise bug fixes over usability tests and beautifully written code is more important than ensuring easy to learn, use and interactive software. The mind sets thus discussed in the aforementioned

research efforts, point to the expectations technical members can have about users and their involvement. In this thesis, these will be compared with user involvement practitioners' expectations today to verify if the findings from these studies still hold true and whether users have the same perception about their involvement.

2.7.4 Value and implementation of user input

The other aspect to user involvement is the amount of importance placed upon user contribution. There is a possibility that although feedback is collected from users, at whichever stage, it may not be recorded properly or, all or some of it may not reach the developers (Wallach & Scholz, 2012). Mediators, generally members of the sales and marketing department, management, customer support and usability specialists act as the link between developers and users and have greater influence on a project than the end users. They serve as surrogate users conveying information about user environment and needs but may not be able to cover the whole picture as well as an end user can. This communication channel has been seen to be less effective when meetings are attended by customer management or decision makers rather than users and by marketing executives rather than the developers (Grudin, 1991a). This obstacle will be investigated in this research about expectations to confirm the extent of influence that is users belonging to different levels within the hierarchy have and what they are expected to have for good user involvement. The opinions of both groups, users and technical members, will be recorded for comparison to investigate whether they align or digress and if they affect the effectiveness of user involvement.

2.7.5 Lack of developer knowledge about user context

Developers' lack of knowledge of users and user context prevents the establishment of a mutually benefiting relationship between developers and users, affecting the communication and subsequently reducing the value of the expected contribution from user involvement. In this context, Seffah et al. (2005) refer to the "people gap" which suggests that the two groups do not share the same culture, the same perspective and the respective constraints under which each group operates. They observed that views and suggestions from members of the user group, who also have strong technical knowledge and skills, are much better accepted by software engineers and are often incorporated in

the development process. Conversely, it was noted that usability specialists often do not understand why and how technical choices and constraints affect the design and development of the product. The expectations of technical members and users around the aforementioned “people gap” in user involvement will be further investigated for this thesis to check whether the user and developer groups’ expectations coincide or not and in either case, whether it affects the quality of user involvement. More recently, a study by Heiskari & Lehtola (2009) identified a set of challenges associated with the lack of user information available. By user information, they referred to anything that describes user needs, problems they encounter or the context they operate in. They conducted a case study to gain an overall understanding of the state of user involvement in the organization and 6 semi-structure interviews were conducted along with follow up interviews. It was found that, while feedback obtained from users helps in tracing back to where the problems may have originated, they cannot help prevent them from occurring. The research for this thesis covers how user information is obtained in practice and whether there is consistency between user and developer groups’ expectations around the same. To investigate the expectations around gathering user information for high quality user involvement is one of the aims of this research

2.7.6 Little to no involvement of End Users

Involving end users in product development does not happen in all software companies and Iivari (2004) points out that it entails more difficulties particularly in obtaining end user feedback since customers (management and decision makers) are given precedence over end users. They go on to add that in product development, the developers are isolated from end users and requirements are usually conveyed through the marketing team. In my research, the state of end user involvement in the development phase will be investigated along with the expectations around end user involvement.

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Although, the above discussed barriers go a long way back, a lot of these are still experienced in current practice today. They manifest themselves in the small crevices of a project and if not alleviated early on, can grow into much bigger issues in the later phases of the project. By providing an overview of all the problems elicited in literature,

it is easier to understand and probe further into the problems faced by current practitioners of Agile and user involvement. They will be compared against the findings of my research to highlight issues that can and cannot be avoided or dealt with easily, and possibly provide some pointers towards achieving a higher level of effectiveness in user involvement.

2.8 Measuring User Involvement

There have been many attempts to measure user participation in system development. Robey, Farrow, & Franz (1989) measured participation using a three-item scale where users were asked to assess the amount of time they spent preparing for, the extent to which they were consulted during and the number of questions they asked during project meetings. The scale was found to be extremely reliable. Barki & Hartwick (1994) reviewed that there was no general measure to user participation and proposed a measure that would include participative activities that are both formal and informal, direct and indirect, active and passive, performed alone or in a group and that occur overall as well as at specific stages of the development process. They studied users' expected participation in the pre-development stage and actual participation in developmental activities to develop a measure of user involvement, in terms of importance and personal relevance. User IS relationship, responsibility and hands-on activities emerged as factors for measurement, from analysis of pre-development activities. While my research does not attempt to measure the extent of user participation, it does endeavour to understand what which user roles are preferred for participation in which activities of the project and the areas of the development cycle where their participation is expected to be high.

The motivation to participate is a pre-requisite for successful participation. Depending on how and why participants are selected, their desire to participate varies. In their research, Doll & Torkzadeh (1991) discuss an individual's desire to get involved as congruence construct on the measure of involvement. The involvement congruence was defined in terms of the degree to which users' desire for involvement in system activities such as requirements elicitation, software design etc matches their perceived level of involvement. When users' are involved as much as they want, the involvement

congruence is high and as the gap between perceived and desired involvement widens, degree of involvement congruence decreases. The reliability of this construct has been assessed and it was found that the desire to be involved is a better predictor than perceived involvement in the measure of involvement. The three “frames of reference” with reference to user involvement have been discussed: equilibrium and moderate deprivation; saturation; and high deprivation. Very rarely is the first frame of reference found where the users’ desire to be involved in software development perfectly matches their perceptions of the actual involvement. There could be situations where they were coerced into participating and had to get more involved than they would’ve wanted to or, conversely they were not involved in the project as much as they would have wanted to. The study suggested that the efficacy of user involvement can be facilitated if the development team is made aware of the users’ desire for participation. User types differ in their levels of desire to participate in software development and it has been shown that congruence between involvement opportunities and expectations are just as important as the actual degree of user involvement. This research aims at investigating whether there is a match of developers’ and users’ expectations about the expected degree of participation with actual degree of participation and what is expected to achieve high quality of participation.

McKeen et al.(1994) define task complexity, system complexity, user influence and user-developer communication as contingency factors that can determine if, when and how much user participation is appropriate. Task complexity was shown to be the level of users’ understanding of the task and system complexity relates to the developer’s understanding of development project. The research concluded that in the development of information systems, in participation of appropriate users at appropriate stages is required and in a manner that enables meaningful contribution. The study revealed that in well-structured tasks, where uncertainty and ambiguity are low, minimal user participation would be needed and their participation may have little to no effect on user satisfaction. Unstructured and ambiguous tasks require active user participation which will lead to user satisfaction. Additionally, it was proved that increased complexity in a system and/or tasks is likely to lead to changes in the original specifications, as the development cycle unfolds. These changes are paramount to the final product and therefore call for increased user participation and input into decisions pertaining to

changes. Interestingly, the study showed user-developer communication to be a poor measure in the relationship between user participation and user satisfaction. One of the suggestions from this research was to have users assess their degree of participation over the stages of development. In my research, it was endeavoured to compare the expected degree of user participation with actual degree of participation; from both users' and development team's perspective to determine what the two sets of expectations are around influences to achieving high user satisfaction and the expectations around high quality of user involvement.

2.9 Factors contributing to “quality” User Involvement

Although there have been many studies to show the relationship between user involvement and project success, there hasn't been much research concerning conditional variables, predictors or qualifiers to effective user involvement. Effective user involvement means that the users should be able to influence the design and not just 'rubber stamp' it (Wallach & Scholz, 2012). The influence should result in improved system design, decrease in cost overheads, higher levels of acceptance, greater understanding and effective use of the system. This was confirmed by Damodaran (1996) to show that quality and experience of the involvement are crucial determinants of the overall performance in software development. It was found that for user involvement to be successful from the users' perspective it is necessary to educate users about both the process and its outcomes. Users should be involved in the decision making of the design process to a greater degree to be able to effectively influence a system.

Effective involvement can be achieved if the context of development is correctly assessed for the need for user involvement. This means that degree of user involvement is directly related to the need for user involvement in particular development context. McKeen & Guimaraes (1997) have described development context in terms of task complexity and system complexity which are determinants of the need for user involvement. The focus of the study was to identify specific participative behaviours used in system development projects and to identify how different users participate under different contexts. Depending on how difficult tasks are and how complex the

system to be built is the need for user participation can vary and its effectiveness will be greater where the need is met appropriately. When task and system complexity are low, users should participate in the cost justification of project and to involve themselves in the selection of technology for the project. The projects development and management should be left to a member of the technical team because there is no need for heavy user involvement in this case. However, when task and system complexity are high, users should not only be part of the project development team but should also be responsible for defining and testing of the project. Additionally, they should assume leadership of the development team and approve project management schedules. It is necessary to obtain an overall indication for the need for participation to establish specific activities the users should be involved in. This “recognizes and maximises the contributions users can make to the development process” which would ultimately lead to effective user involvement.

Doll & Torkzadeh (1991) have elicited that the motivation to participate is necessary for successful user participation. They presented a discrepancy model that contends user’s motivation to participate as a factor that influences the relationship between the success of the involvement and end-user satisfaction. Effectiveness of user involvement is also affected by user-analyst relationship. It has been argued that user participation can only be effective if they are able to exert influence during the development process. It is possible that even though user participation may be there, user inputs may be ignored, therefore affecting the degree of participation. It has also been shown that users in influential position are able to exert influence to a much greater extent, sometimes having a detrimental effect on the project. Effective user involvement is affected by the relative position of users and specialists in the organisation, the extent to which both party’s involvement is mandatory and the semantic gap between users and specialists (Cavaye, 1995). In his study, Lettl (2007) has shown that the intensity of user involvement varies at different stages of the development process. A trend that has been observed was that involvement of users is more intense during the initial phases of idea generation and screening and the later stages, such as design, test marketing and commercialization because the users placed heavy weightage on the beginning and end of a process. The study also emphasises the importance of involving users at appropriate stages where their inputs will count effectively to obtain best results.

The relationship between the user group and IT group influences effective communication, which in turn affects the quality of the involvement. The level of dependency of a user on the IT department determines their expectations from the IT group in terms of development or support which is rooted in the users' technical knowledge and skills. The type of relationship depends on the users' knowledge and skills apropos the technology to develop a product or application that can facilitate their work. Users with higher levels of technical knowledge and experience with utilising their technical skills were found to develop their own applications that would facilitate their work, either completely or to a great extent, turning to the IT group only for finishing or support of the developed product. On the other hand, there are users who know what they want to get out of a system but don't know how to go about developing a system to meet their requirements due to lack of technical knowledge. This type of users turns to the technical team to develop and implement a system for them. The lack of users' technical knowledge is compensated entirely by the IT group which designs and develops the product from start to finish, offering post development maintenance and support. Leonard (2002) established that relationship types are based on the "degree of independence with which users are able to make use of essential technologies" to develop and maintain a system. The study defined relationships as hard relationships and soft relationships. Hard relationships are those that showed high frequency of communication between users and the IT group, over an extended period of time, owing to the end users' inability or lack of knowledge to do something themselves. The maturity level of user involvement in these relationships is deemed as low maturity level as the IT group does not expect users to be equipped with special technical knowledge and skills for the project or service in question. Soft relationships are those that extend over a short period of time, with relatively lower frequency of communication between users and the IT group, because of the end users' ability to help themselves. The maturity level of user involvement for soft relationships is referred to as high level maturity level which implies that the users are expected to have a high level of technical knowledge for the given project or service.

A better understanding of the users and their background can help gauge a user's attitude and aptitude towards contributing effectively in the project development

process. User information can be drawn from users' real life experiences by studying their situations to look for needs that are apparent. Users become aware of their own needs while they engage in various activities and these needs then stimulate ideas that stem directly from real life experiences. Users can be asked to describe their needs in terms of user stories, where users are put through actual situations and asked to navigate their way to a solution, diagrammatically, by connecting users to functions in different contexts and roles. Kristensson et al. (2008) suggest that many new solutions to user problems are latent in nature because users may not understand exactly what technology can do for them in the future and that users can be made more aware of their latent needs by asking them to derive solutions while simultaneously experiencing needs.

These factors, collated from literature and past research efforts, provide the base of my research to showcase a set of guidelines that would help current practitioners reap the benefits of effective user involvement. By comparing factors already identified in literature with those elicited during interviews for my research, my thesis will address underlying problems that are still faced by current practitioners and they measure they have undertaken to alleviate the same.

2.10 Current practices of User Involvement

An earlier study by Alam (2002) aims at exploring the current practices in user involvement in the development of new services. Although this research is not specifically in the context of software services, the principles and results should be transferrable. The research is focused on understanding why users are involved in the new service development process, the stages at which they are involved, how the intensity of their involvement varies across these different stages and what are the means or methods employed to obtain input and information from users. Managers and users were interviewed for the purpose of this research. The findings showed that overall, users were involved in 10 stages of new service development – namely strategic planning, idea generation, idea screening, business analysis, formation of cross-functional team, service and process design, personnel training, service testing, pilot run, test marketing and commercialization. Idea generation, service/process design and service testing/pilot run were found to be more significant than other stages. It was

observed that investigating customers in great depth gave a better understanding of “market mechanics” which helped shape ideas that could then be taken further to obtain a more accurate description of the users’ wish list. Final modifications are made at the service testing/pilot run stage after watching actual customer reaction to and interaction with the new service. The intensity of user involvement was found to be very high in representation, which involved inviting users to be part of a new service development team and consultation with users involving detailed interviews, focus group research and focus group discussions. Other stages of involvement were passive acquisition of input where users volunteered information about a new service to the service producer and information and feedback on specific issues where users are approached by service producers to obtain feedback on specific issues at various stages of the development process. The intensity of involvement was found to be extremely low in passive acquisition and relatively higher in information and feedback stages. The most preferred levels of involvement were extensive consultation and information and feedback which are less expensive, less time-consuming and easier to manage. The least preferred levels were representation and passive acquisition of input. The modes of involvement found to be most popularly used for obtaining user input at various stages of the development process were found to be face to face interviews, user visits and meetings, brainstorming sessions, users’ observation and feedback, communication channels such as phones, faxes and emails and focus group discussions. The most effective forms of involving users were found to be in-depth interviews and user visits to development sites, including team meetings, because they are easier to organize and inexpensive modes of obtaining user input. Focus group discussions were the least favored mode of involvement as they were considered both expensive and time consuming. Brainstorming sessions were conducted only at the incipient stage of idea generation while user observation and feedback were considered useful at personnel training and commercialization stages. Phones, emails and faxes were used only at strategic planning and business analysis stage, therefore aren’t considered as favorable modes of involvement. Users were shown to effectively contribute in activities involving team work as they were able to learn more about the product and were able to provide useful input into the development process. While this study was centered on the development of a new service in general and not software service or product in particular, my research draws some of its inspiration to explore user involvement around application development by focusing on the importance placed on different user roles by

development teams. My thesis attempts to reveal current practitioners' preference of stages for the involvement of users in the development process, the ways in which they are involved and what their expectations surrounding user involvement to improve the quality of user input are. By interviewing practitioners of the Agile development methodology, my research will get a thorough understanding of perspectives of users as well as developers to be able to find influences to good/effective user involvement.

Actual user involvement is often conducted according to terms defined by industrial democracy and users are essentially involved in the early phases of the development process. Følstad et al. (2004) confirmed that the most frequently used means of user involvement is the inclusion of "user representatives" or subject matter experts in the project team. Core users are also observed to participate in user involvement activities. An interesting trend that has been observed is that domain experts are not only using software but increasingly getting involved in developing it to meet their constantly evolving needs. The line differentiating users and developers is blurred and user participation has undergone an evolution where users participate in various development activities to shape or re-shape software systems through collaboration. This means that if a system does not satisfy the needs of a user, the user is able to modify the system without the assistance of a developer. A co-adaptive process between users and the software has been established deeming users as co-developers (Fischer & Giaccardi, 2006). This was the rationale for developing a meta-design framework comprising "objectives, techniques and processes for creating computational tools" that can be used by domain experts to act as designers. Fischer, Nakakoji & Ye (2009) developed the concept of the Seeding, Evolutionary growth and Reseeding (SER) model to design evolvable systems that can adjust to fluctuations and conflicts in requirements. Seeding refers to small contributions of many people to frame an initial understanding of a problem, supplemented by the knowledge of domain experts and evolves over time through constant changes in the environment. In the next phase of Evolutionary growth, domain experts use and extend this seed to explore new problems and perform development. It provides a pool of solutions or work resources and uses them to obtain specific solutions for problem in the project while simultaneously extending the seed. Since, these solutions may not necessarily integrate with the rest of the solution of the seed, the Reseeding phase involves the organization, formalization and generalization of

the solutions so that they can be easily found, reused and extended. While the Seeding phase is predominantly owned by software developers who perform major system and solution-space modifications, user participation is crucial for making decisions on what solutions will work for the users and how they can be structured to serve users' work practices.

The nature of user involvement is largely consultative or informative in nature. User information is gathered using interviews, focus group discussions and through user representatives. Interviews are conducted with users to understand their roles, tasks and responsibilities, needs, problems encountered to be able to reach a solution that would be easy for them to apply in their day to day routine. The information thus obtained is useful in the development of a new product or to modify an existing one. Focus group discussions are generally conducted for existing products, where users are asked for their opinion on a certain component and functionality of a product, known to provide important insights into how the users perceive the software and its usability. Heiskari & Lehtola (2009) also add that introspection is a form of user involvement where testers are encouraged to "step in the users' shoes" when conducting beta testing, focusing more on the users than on themselves. These forms of user involvement have been studied to be able to gain a better understanding of their influence on the development process and the challenges faced in user-centered practices. It leaves an opening for my research to be able to study other forms of user involvement practiced in software development these days, which could also extend to being participative and how the preference of these various forms of involvement could vary for different projects and different roles.

Based on the knowledge from the research discussed in this section and section 2.5, I was able to draw out what formed the constructs of the third fixed Repertory Grid about expectations around the "Nature of Involvement" of the users in different project development activities. The constructs that have been selected and used for the analysis of the data are:

- Decision making about the product, its aesthetic features and the software development process
- Requirements elicitation (security, portability, scalability, scope)
- Creation of user stories
- Clarification of requirements (confirmation of documented specifications)
- Verification of requirement (User Acceptance Tests and Functionality testing)
- Co-development (users as developers)
- Cost negotiation
- Decisions around the time frame
- Choice of technology (Underlying platform, programming language, hardware and networking etc)

This would enable me to examine the expectations of the roles (users and technical) around the different user roles' level of involvement in different activities, whether high or low. This will show which roles prefer which users to have high involvement in which activities. A comparison of the preferences within the technical team will show how aligned expectations within the team are and a comparison of technical roles with the users will show how aligned the users' expectations are with different roles of the technical side. As much of the onus is upon the expectation of "roles", it affirms the selection of "role" as a suitable unit of analysis for this research.

2.11 "Expectations" as an influencing factor?

Software is developed for users from nearly every field, with varying levels of technical knowledge and expertise. Involving users in software development has been argued to be helpful as well as hindering in the development of software. There are two types of perceptions to consider for the involvement; those of the users and those of the development team. The need for developers of interactive systems to understand the eventual users has led to an emphasis on direct user contact during the development process (Grudin, 1991b).

Reviews about different perspectives of user involvement have been conducted in a study by N.Iivari (2006), where differences in the motivation behind involving users

and methods of involving users were studied. Empowerment of the users is analysed and it was shown that it can be related to either democratic empowerment or functional empowerment. In democratic empowerment, users are encouraged to participate in the decision-making for projects where as functional empowerment is described as enabling users to work efficiently and effectively. Participative involvement is seen as democratic empowerment of users as users are actively involved at different stages of development and their feedback is valued enough to affect the course of the software project.

The research seeks to study what is understood by user involvement in software development, what the user and the development team's expectations are about user involvement and how the alignment or misalignment of these expectations influences the quality of user involvement in software development. By combining findings from various studies in the literature review above, a framework that defines user involvement pertaining to practitioners today has been created. This has been represented in the form of Repertory Grids that depict the activities surrounding user involvement, the forms of involving users through media of communication and the characteristics of users that lead to high quality user involvement. This concept of user involvement has been tested against the expectations of various roles in a project to obtain their expectations for high quality user involvement. It will give an insight into the current practices to user involvement as to how different it is from theory and what measures are being taken to ensure optimum benefit of the involvement. By studying expectations associated with user involvement as a practice the research will aide in providing proof to support practices that promote effective user involvement and/or make recommendations to achieve efficiency in user involvement for software development.

The framework of user involvement depicted in Figure 1 shows a synthesis of the ideas from the literature review. This framework is the basis for the data collection and analysis for the research undertaken in this thesis. The three main characteristics of user involvement shown map to the three Repertory Grids used, and the detailed aspects of these shown are used as the constructs of each of the grids. The structure of this framework is also reflected in the structure of the interview questions.

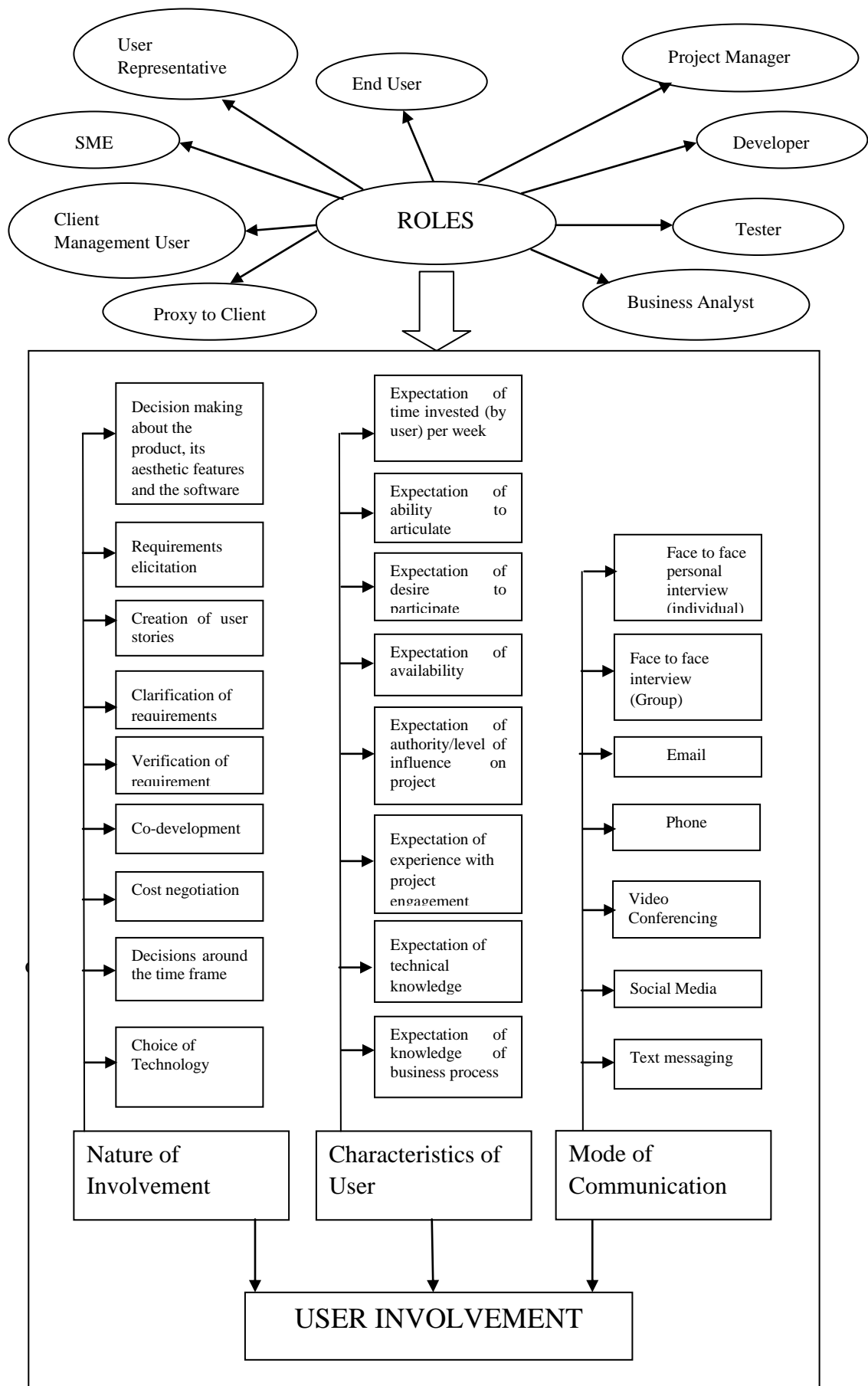
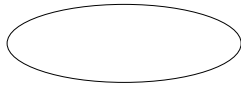


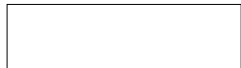
Figure 1 Framework of Research Focus

Legend for Figure 1:

Technical team and user roles are represented by elliptical shape as shown below:



Constructs that form the concept of User Involvement and its influences are represented by a rectangular box as shown below:



The research spans expectations of different technical roles about an array of user roles that have been identified from literature and through the interviews conducted during the course of this research, thus making the “role” in a project the most relevant unit of analysis for this thesis effort.

The survey of literature leads me to investigate the following research questions (in a commercial software development context) :

RQ1: What is the degree of alignment of expectations of user involvement for different roles involved in the development of a software project?

RQ2: What comprises high quality user involvement in practice?

RQ3: What are the barriers and enablers of high quality user involvement in practice?

3 Research Design & Methodology

In this chapter, the research methods used to answer the research questions have been described and justified. This includes the unit of analysis, the data collection and data analyses techniques as well as an overall research approach and philosophy. This is followed by a description of how the research design has been implemented systematically in practice.

3.1 Research Approach

The aim of this thesis is to explore the area of user involvement in the context of software development and investigate the expectations of various stakeholders, technical team members and users, around user involvement. The intended outcome of this investigation is to understand what is meant by quality user involvement and the influence of expectations of technical and user roles on the conceptualization of high quality involvement. I empirically investigate the research question about the expectations of different roles about user involvement by breaking it down into its main component parts – the nature of user involvement, the characteristics of the roles, and their expectations around user involvement. I have adopted a multi-method research design for this purpose. As the purpose of this research is to contribute to the in-depth knowledge of user involvement in practice, a case study approach has been used along with qualitative data collection strategies with cognitive modelling based on George Kelly's Personal Construct Psychology (Edward et al., 2009). As this research entails understanding the complexity of the phenomenon of user involvement, in the environment that it is practiced in, the research aim for this thesis relates to the in-depth investigation of expectations of user involvement and the notion of its high quality. To obtain an in-depth understanding of this user involvement, it is important to understand the constructs associated with its main component, the user. The case study method enables this research to cover contextual conditions related to user involvement. In this thesis about expectations, the intended study of the contrast between “the daily realities”

of user involvement and the interpretations of those daily realities made by those who participate in them (the “actors”) aides in the development of new theory and hypotheses (Cassell & Symon, 2004). The research will be case study based that will encompass a comparison of practices, expectations and views about involvement, barriers and factors that influence the quality of user involvement. This research strategy will be used owing to the fact that this research is exploratory in nature. (Runeson & Höst, 2009) have argued that a positivist case study searches evidence for formal propositions, measured variables, tests hypotheses and draws inferences from a sample to a stated population. An interpretive case study, on the other hand, attempts to study phenomena through participants’ interpretation of their context. The case study for this research leans towards an interpretivist perspective as it involves exploratory studies. By definition, case studies are conducted in real world settings and have a high degree of realism, even though there is the compromise of the level of control.

From the data collected, I intend to inductively obtain the meaning of user involvement and factors influencing its quality. This will be done using the interpretivist approach. “Interpretivism” appeals to “subjective meaning and concepts such as empathy and interpretation. The power of this research paradigm is known to present rich, powerful data that can provide insight, where hidden and important meaning is buried within situational details. The interpretivist approach is well suited for the analysis of data that is collected in the form of interviews, where meaning is buried within seemingly inconsequential inflections of voice and body language (Black, 2006).

User involvement is an area that has been researched since as early as the 1980s and the literature review conducted prior to this research was used to design the data collection and analysis strategies employed for this research. The application of qualitative data collection techniques of semi-structured interviews and Repertory Grid technique along with thematic analysis of data will allow for methodological triangulation. This will be effective in obtaining and examining expectations about user involvement and their influence on the quality of user involvement by performing a comparison across a spectrum of roles. The use of multiple methods will result in a more robust set of findings by taking into consideration any variance that may have otherwise been

neglected by a single method. The combination of methodologies in research improves the possibilities to draw conclusions, thereby providing improved external validity (Shah & Corley, 2006).

3.1.1 Case Study Method

In order to understand the concept and influences to user involvement, my research begins with an open, exploratory approach of case analysis. Case study has been described by Yin (2003) as an all-encompassing method that covers the logic of design, data collection techniques and approaches to data analysis. He states that the case study approach is particularly useful in explaining the casual links in real-life interventions that are that are too complex for the survey or experimental strategies. As the context of the research question relates to the complexity of user involvement in software development, it was important that the perspectives and expectations to be analysed belonged to software professionals who are practitioners of user involvement and are directly vested in its implications.

Runeson & Höst (2009) have shown how triangulation can be used to increase the precision of empirical research. This research relies primarily on qualitative data obtained through interviews and by using triangulation of different stakeholders, different angles towards the studied phenomenon can be taken, to provide a broader picture. A case study is expected to meet the following objectives, which will be used as a checklist for this investigation:

- Has research questions set out from the beginning of the study
- Data is collected in planned and consistent manner
- Inferences are made from the data to answer the research question
- Explores a phenomenon or causal analysis of it
- Threats to validity are expressed systematically

There are two variants to the case study approach; single and multiple-case studies. Case studies can be a mix of quantitative and qualitative evidence. Single case studies are often used in testing well-formulated theory to confirm, challenge or extend this theory. Such studies help to review and refocus investigations in an entire field. Multiple case studies are employed to predict similar results or contrasting results for predictable reasons. They involve the replication of procedures to develop a rich theoretical framework that states the conditions that do and do not influence the occurrence of a phenomenon. This framework is applied to multiple cases to check for patterns or contrasting results (Yin, 2003). For the purpose of this research, a multiple case study approach has been chosen as it allows the comparison of cases to investigate the phenomenon of user involvement. The framework of user involvement obtained from the literature review can be applied to examine and compare expectations surrounding user involvement and the notion of high quality user involvement, as it is practiced in Agile software development organizations. The following table summarizes the logic and purpose underlying the different case study designs, adopted from a study by Yin (2003) and maps them to the intent of this research representing the rationale that supports the implementation of multiple case study approach for this research.

Case Study Type	Purpose	This Research
Multiple Case Study	Predict similar (literal replication) or contrasting results (theoretical replication)	Comparison of expectations: <ul style="list-style-type: none"> • Technical roles with technical roles • Technical roles with user roles • Inter organizational comparison
	Prevalence or frequency of particular phenomenon	Frequency of factors elicited by various roles as contributors and barriers to high quality user involvement
	Enabling comparison of conditions	Comparison of Agile practices and user involvement approaches in case organizations
	Every case should serve specific purpose within its overall scope of enquiry	<ul style="list-style-type: none"> • Agile software development methodology • Active projects • User participation in project development

Table 1 Mapping of types of Case Study strategies with research question

The principles of Agile software development approach align with user involvement and this thesis is focussed upon companies that actively practice Agile development techniques. According to the Agile Manifesto (2001), Agile software development stresses upon frequent interaction between the clients and the developers, where customers commit to actively take part in and take joint responsibility for, the software project. It emphasises constant learning and is characterised by constant change, re-evaluation and intense collaboration between developers and customers (Jyothi & Rao, 2011). The aim of this research was not just to collect a data set of the expectations of developers and users and compare their expectations in general, but to focus on the expectations of developers and users working towards the same unified goal of usable software, within the same context. The interactions between these two groups and their understanding and expectations about the same phenomenon form the core of this research and therefore it was important to narrow down the focus of this research to development teams that belonged to the same organization and/or the same project. As mentioned in the literature review, there are different techniques to Agile and the purpose of this research is to conduct an in-depth investigation of how Agile techniques being implemented, the nature of the projects, the type of customers and the expectations of the development teams about the involvement of customers in the development of software. A case analysis focuses upon description and analysis within

a single, bounded context. Hence, to ensure events and behaviour are not merely the result of an idiosyncratic setting, a multiple case study approach has been chosen for this study to obtain a systematic comparison of the understanding of the meaning of user involvement, expectations around user involvement as a phenomenon across roles, projects and organizations within the Agile spectrum. This will enable the comparison of perceptions and expectations about user involvement across different organisational settings, projects and various roles in the development of user satisfying software. A multiple case study approach allows the researcher to conduct detailed examinations with high contextual realism. The comparative case study allows for in-depth investigations and understanding of causality, but may lack generalizability of findings and reliability (McClintock, Brannon & Maynard-Moody, 1979). To obtain analytic generalization in the case studies a comparison across organizations will be performed to look for patterns and the empirical results obtained will be tested against theory obtained from literature for improved external validity. The evidence from multiple cases is considered as more compelling and therefore, the overall study is regarded more robust (Yin, 2003). For the purpose of case selection, two main criteria were identified. The first criterion was that the organizations should be practitioners of Agile development, which meant they follow Agile principals in their approach to developing software. The second criterion was that the interviewees should belong to the same project to maintain coherence and relevance of context. The case study will be executed by carrying out the following steps:

- Formulate Open ended questions for in-depth interviews
- Carry out interviews with members of the development teams of two Agile software companies where each interview completes a set of three Repertory Grids
- Thematic Analysis of interview data
- Analysis of Repertory Grids
- Develop themes from interview data and use to support the findings from Repertory Grid analysis
- Test empirical results against theory from literature
- Write-up findings

3.1.2 Unit of Analysis

As this study involves the perceptions and expectations of people whose functions fall under roles of either the user or technical team category, the unit of analysis is assumed to be the “role” of the interviewee. Based on the analysis of data obtained from the interviews of different roles, a model of expectations about facilitators to good quality user involvement is obtained whilst comparing how aligned expectations are between roles and the influence of this alignment on the overall quality of user involvement. I argue that this alignment or misalignment of expectations between roles, especially user and technical roles influences the quality of user involvement. Furthermore, based on the themes identified by Butler & Fitzgerald (2002), this inter-role comparison will provide insight into the type of emphasis on enablers and hindrances (to user involvement), given by each role and why.

3.2 Literature Review of Research on User Involvement

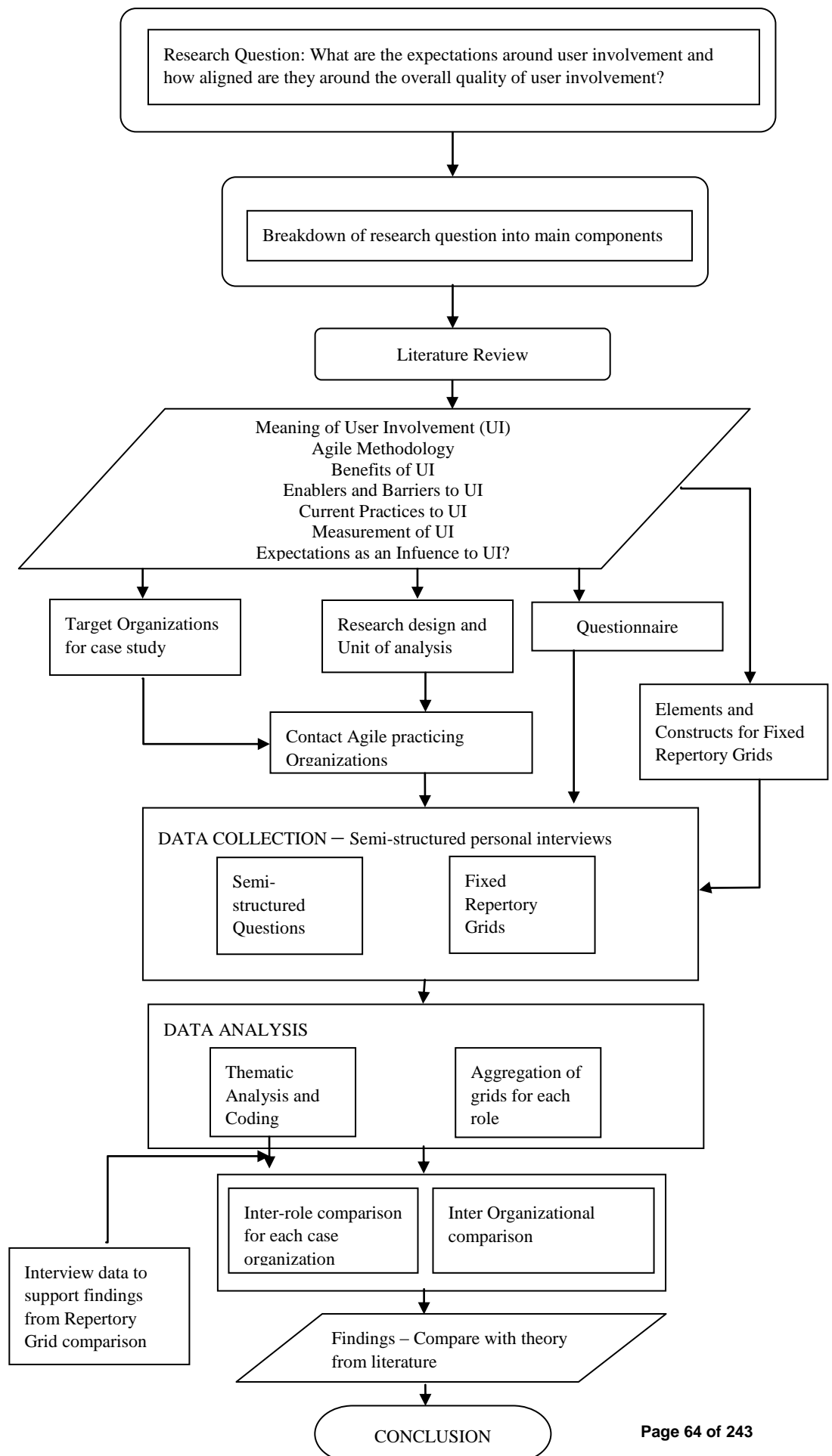
The first stage of the research is the literature review that involved thorough reading and analysis of underlying theory about User involvement and the Agile methodology of software development. This enabled me to identify what is meant by user involvement, the activities that comprise user involvement, user types, the benefits of engaging users in software development, the barriers and facilitators to user involvement and the perspectives that development teams have towards users and their involvement thereof. The primary aim of this review was to provide a theoretical foundation for the research and to develop a model of factors that affect user involvement. The findings from these studies have been incorporated to formulate open-ended questions for interviews and to define the elements and constructs for the Repertory Grids, which form the main forms of data collection for this thesis. The research on past work in the field of user involvement and related areas brought forth the meaning and importance of user involvement in software development, the barriers and facilitators to user involvement and the expectations of members of development teams about characteristics that users should possess in order to be able to participate effectively. In various research endeavours (Damodaran, 1996; McKeen & Guimaraes, 1997; Leonard, 2002;

Kristensson et al., 2008), the characteristics of users have been deemed as factors contributing to good quality user involvement and have helped create a framework of factors influencing user involvement and a set of expectations around users and their role in project development. These factors have been classified under themes identified in a study by (Butler & Fitzgerald, 2002), which will also be applied to my research: Project related factors; Process related factors and User related factors.

This framework thus obtained from literature will be tested against the responses obtained from the interviews to gain insight into the current scenario of user involvement – how is it being practiced, expectations around practising it and how these expectations affect it being practised effectively. My research will also attempt to understand practitioners' definition of quality user involvement as well as barriers and facilitators to the same. A comparison of expectations around user involvement will reveal how aligned expectations are between user and technical roles and technical roles within the development team as well. It endeavours to extract from current practitioners of Agile their understanding of the “good quality” or “quality” user involvement and a set of guidelines to help achieve beneficial user involvement.

The research design is shown in Figure 2 describing the process to be followed for data collection and analysis.

Figure 2 Research Design and Methodology Process Diagram



3.3 Data Collection and Analysis

This section describes the data collection strategies employed for the purpose of this research. The rationale behind the use of semi-structured interviews and the Repertory Grid technique has been elaborated upon.

3.3.1 Semi-Structured Interviews

Taking into consideration that this study of expectations around user involvement is about understanding the complexity of a phenomenon as it occurs in the real world, it is necessary to understand it from the “point of view of the lived experience” of different stakeholder roles, to be able to uncover its meaning in the practical sense (Englander, 2012). The research aims at understanding current practitioners’ interpretation of the term user involvement in the context of Agile Software Development. A development team essentially consists of developers, testers, a project manager and Business Analyst. The user side is generally composed of a Subject Matter Expert (SME), Product Owner and End-users. Each of these entities has a specific role in a project and each stakeholder has a unique meaning associated with the term user involvement. Depending on their level of experience with the Agile development methodology, members of the development team can have varying expectations and perceptions about engaging with users and develop a strategy they deem most effective in order to obtain the best understanding of the users’ business process, to produce software that will meet users’ needs. Users may have their own reservations and interpretation of what is expected of them from this involvement. Semi-structured interviews emerged as the most effective method of gathering data for this research based on expectations. This style of interviewing is more “fluid, probing and qualitative” (Hart, 1989) facilitating greater depth of understanding and richness in the data captured around the experiences of current practitioners of user involvement in the Agile context. “With the spoken word, information is found far beyond the mere words uttered and is conveyed via inflections, volume, tone, verbal mannerism and even pauses” (Black, 2006).

The purpose of my research is to study user involvement as a phenomenon in the environment that it is practiced in and the various cognitive constructs that surround it. It seeks to extract, from the participant’s account of their experience and expectations, a better understanding of “quality, meaning and significance” of user involvement for

each individual, whether it is a member of the user or developer group. The researcher is present to the research participant as someone who will report the participant's experience and exposure to the phenomenon under investigation, which is user participation in software development. Although the overall research area is user involvement, I am not seeking to understand individual's need based perceptions, rather more of an industry standard expectation from the *role* under consideration. Thus, in this investigation, the goal is to encounter the phenomenon of user involvement via the person's description, making the "role" essayed by the person the primary unit of analysis. In a nutshell, during the interview, I as the researcher will not only have to be present to the phenomenon of user involvement but also to the relation between the research participant and user involvement.

The data will be approached with an open mind while bracketing my own assumptions as the researcher. Due importance will be placed on the issue of inter-subjectivity, that is assumptions will not be disregarded but will be investigated in a manner where their effects can be recognised and verified, whilst being able to hold them with flexibility. As my research focuses on the type of experiences, rather than the people describing them, emphasis is placed upon *how* user involvement as a practice is experienced. It deconstructs expectations about the involvement, how "quality user involvement" is interpreted by current practitioners and how different interpretations of the same phenomenon can influence the quality of user involvement. *Why* individuals personally experience something in a particular way while practicing User Involvement is, therefore, not relevant to this study. As the type of data suitable for analysis of a phenomenon needs to provide the researcher with information about "nature, quality and texture" of research participants' experiences, interviews are the preferred method of data collection, as recommended by Smith, Osborn & Smith (2003). Interviews provide rich detailed accounts of the participant's experiences and in the case of my research, their expectations about the nature and quality of user involvement as well.

Interviews are frequently used as a method of qualitative data collection and are a common technique in the area of empirical software engineering research. Considering that this research explores the expectations about user involvement with a strong focus

on human behaviour, face-to-face interviews have been used to capture data that cannot be otherwise obtained quantitatively (Heinbokel, Sonnentag, Frese, Stolte, & Brodbeck, 1996). As the research aims for an in-depth investigation of user involvement practices in industry today, face-to-face interviews were the preferred means of data collection rather than a written or recorded account of the research participants' experience. Although the interviews are longer, they provide data enriched with flavours of many nuances which will aid the researcher to reach a depth of understanding of the phenomenon, which is the meaning of user involvement, expectations associated with it and the relation between these expectations on the quality of the involvement. This will further help the researcher transition to the first step of data analysis by focussing on the participant/interviewee's cognition of user involvement. Fitzgerald, Hartnett & Conboy, (2006) found this method of data collection to be highly valuable in their case study research on Agile development and described interviews as a window to people's world, opinions, thoughts and feelings . Interviews would enable the interviewees to relate experiences and expectations around user involvement relevant to the research problem (Walker, 1985). It is possible that sensitive information such as criticizing work place or an individual is likely to come up during interviews. However, interviews provide an in-depth explanation of already mentioned issues, and also new and sensitive issues.

The research, being case study based, will encompass a comparison of practices and expectations about involvement along with factors that influence the quality of user involvement, both negatively and positively. Interviews will be initiated by using open ended questions that allow the research participant to provide a description of situations they have encountered in their experience with user participation. The actual situation for different participants will be different, but the description will help during the data analysis stage, to discover the meaning of user participation in the context of the current project under consideration and the relation between their expectations and the outcome of the involvement. However, this does not come without a pre-established understanding that every situation provides a context and the meanings derived are dependent upon the context.

Members from the partnering organisations will be approached and interviews will be scheduled with consenting participants from the user and development team side. Hour long interviews will be scheduled with each of the participants at the beginning, middle and end of iteration to observe changes undergone by expectations and an idea of how well reality aligned with expectations and recorded on a recording device. Each interview will then be summarised for further analysis. Interviewees will be encouraged to talk freely about their experience in the interaction with users (in case of members from the development team) and about their experience in participating in a project (in the case of users). The interview questions are a combination of specific questions as well as open ended questions which form a semi-structured format of interviewing. The semi-structured interviews for this research included general questions in the beginning which give an insight into the background of the interviewee, gradually narrowing down to behaviour and experience questions about how interviewees work and reflexive questions around their opinions and values, as well as specific questions to bring forth foreseen information.

3.3.1.1.1 Analysis of Interview data

Thematic Analysis in the form of template analysis will be applied to the data collected from interviews. As the approach has a basis in cognitive complexity, it allows the research to measure how ideas are manipulated by individuals, based on “linguistic output” (Suedfeld & Coren, 1992). Template analysis enables the development of conceptual themes that fall into bordering groups, eventually enabling the identification of “master themes” and their subsidiary “constituent themes”. Individual cases will be analysed in depth before integrating the results. As this research focuses on the expectations of different groups, technical and user, about user involvement, template analysis is particularly suited to compare expectations of these groups within the specific context of high quality user involvement. Recordings will not be transcribed, but will be referred to in conjunction with the extensive field notes to identify themes. As described in reference work by Boyatzis (1998), the interview notes will be segmented into small thematic units and then coded under a specific label identifying that theme. Codes are essentially descriptive requiring little or no analysis by the researcher. The codes will then be organized hierarchically, within groups of similar codes. This approach allows the researcher to communicate findings and interpretations

to those using different methods. It would help help identify understanding the concept of user involvement and the factors that influence high quality user involvement. Thematic codes give a good general overview of the area of study and what the research is trying to achieve (Cassell & Symon, 2004). This would also provide a useful insight to experts within the field of user involvement, in their review of “what is known” to guide their strategy.

3.3.2 Repertory Grid Technique

The secondary element to the data collection method employed for this research is the use of the Repertory Grid technique. Repertory Grids were first introduced by George Kelly (1955), the author of Personal Construct Psychology (PCP), as a tool designed to give some clues about how a people understands the world around them. The Repertory Grid technique is a form of cognitive modelling that will be used in this research to represent commonality of construing among members of a homogenous group of subjects and in this case, users and the development team. Based on Kelly’s perception of individuals, research participants in this research will be regarded as “scientists” and based upon their past experience, would devise a personal construct system to deal with current and anticipated situations encountered during user engagement for software development (Marsden & Littler, 2000). Latta, G. F., & Swigger, K. (1999) described the Repertory Grid technique as “a structured technique for eliciting both conceptual content embodied in an individual’s mental model and the relationships which exist among these concepts”. They emphasize the advantage it has over other methods of knowledge representation is the relative ease with which subjective models can be derived and represented.

The basic components of a Repertory Grid are elements (columns) and constructs (rows) which form the grid. The elements are the objects that are the focus of the study and the constructs are the ideas that the participant or interview holds about the elements. There are three types of Repertory Grids, namely the full Repertory Grid, partial Repertory Grid and fixed grid. The full Repertory Grid involves the identification of both, elements and constructs, by the individual being interviewed. The partial Repertory Grid involves the individual being supplied with elements and the

constructs being identified by the individual. For the fixed Repertory Grid, the elements and constructs are supplied to the individual. Due to the complexity of the phenomenon of user involvement, a fixed Repertory Grid has been used for this research. The elements and constructs were pre-defined using findings from prior research to represent a framework that encompasses the various aspects of user involvement. This approach works well for making comparisons among individuals, in this case roles, and facilitates ease of statistical analysis. The constructs are usually present in the grid as bipolar distinctions where the fundamental difference in elements can be identified by their likeness or difference towards terms (Edwards et al., 2009). However, while the basic construction of the grid for this research remains the same, the constructs have not been presented as bipolar distinctions. This is mainly because of the three contexts of implementation for the grid. The first grid is about the nature of involvement of users, wherein the constructs supplied are aspects of software development in which users are involved. It was impossible to accurately identify the polar opposite for activities such as requirements elicitation, verification of requirement, budget and timeframe of the project. Similarly, for the User Characteristics and Mode of Communication grids, it was difficult to determine the opposites for constructs such as time dedicated to project per week for the former and face-to-face meetings (personal and group), phone, email, videoconferencing, social media and text messaging, in case of the latter. In order to maintain consistency, the difference in elements' expectations would be identified using a Likert scale of 1-7, where 1 represented very low involvement (or importance in case of User Characteristic and Mode of Communication grids) and 7 represented very high involvement (or importance). 4 was the midpoint on the scale. Longer scales are seen to provide interviewees with greater scope to express themselves and therefore a 7 point scale was considered appropriate for rating purposes. The interviewees were asked to evaluate the construct for preferred level of involvement and level of importance, against this scale.

The elements and constructs for the Repertory Grids devised for this research have been obtained from literature review conducted prior to my work. From literature, further investigation into the different client stakeholder roles pointed me to, what comprised my target user group for the interviews and elements for the Repertory Grids (Section 2.4). The effort was to include as many user types in my research as have been stated in

past and recent literature. Studies (eg: Damodaran, 1996; Freiberg & Baumeister, 2008; Iivari, 2009; Procaccino & Verner, 2009) showed that end user, user representatives, product owners, sponsors and members of management, Subject Matter Experts and Proxy to clients, often essayed by Business Analysts were the most commonly involved participants for project engagement. As this research focusses on the perspectives around the involvement of different user roles, the user roles were defined as Elements for the Repertory Grids and were fixed for all three grids – Nature of Involvement, User Characteristics and Modes of Communication. Subsequently, research on the various activities, barriers and facilitators to user involvement provided me with the constructs for the grids mentioned above.

The different activities in user involvement were then investigated so that we could focus on the development teams' preferred level of involvement in each activity, for each user role. These activities researched were defined as constructs for the “Nature of Involvement” Repertory Grid to enable comparison between the perspectives of different roles interviewed on their preferences for user involvement activity. The constructs for each of these grids have been obtained from the literature review conducted prior to my work.

This technique will help describe how stakeholders from the user and developer groups employ internally constructed models of User Involvement to efficiently interpret and predict events in their project with the scope of the Agile development methodology. As indicated previously in Chapter 2 (Literature Review), the timely and regular feedback from those who will ultimately use the software benefits the development team by providing greater clarity about user requirements, thus enabling them to produce software with high user satisfaction. User engagement in software development has evolved over generations and is applied today within the context of different Agile techniques such as SCRUM, XP, Feature Driven Development, Kanban etc. Kelly proposed that individuals constantly revise their models on the basis of feedback from their environment concerning the effectiveness of their actions. In alignment with this theory, the research aims to examine the iterative refinement of current practices to user involvement and what is being done for it to be effective in its implementation today.

The Repertory Grid technique will help capture the expectations, of the development teams as well as users of different projects, about the emphasis they place upon different aspects of user involvement and the factors they deem most important for good quality user involvement. This will facilitate the comparison of cognitive models of expectations across different roles within a project as well as between projects and organizations. The use of the Repertory Grid technique provides a methodology for me, as the researcher, to develop a strategy to elicit the parameters that shape good and effective user involvement practices. Analysis of the grid could then result in obtaining a view of the alignment and misalignment of expectations about the practice and quality of user involvement across different projects and the roles in a project.

3.3.2.1 Analysis of Repertory Grids

For the analysis of fixed grids, the use of conventional quantitative approaches is suggested since a “closed question” approach has been taken (Edwards et al., 2009). The grids were then aggregated, for each project, based on type of role using Frequency Distribution. As there would be a total of 3 grids collected from each interviewee, frequency distribution was evaluated to be a very convenient way to gather multiple ratings and capsule them to provide an aggregation for each grid, across roles. It groups data together into classes providing a way for us to see how frequent each class is (Valiela, 2001). The levels of user involvement in software development activities (Nature of Involvement) and the importance of characteristics and mode of communication (User Characteristics and Mode of Communication grids) – Very Low, Low, Moderate, High and Very High – were computed based on the frequency of responses, for a particular value in the grid, on the Likert Scale of 1 to 7. A frequency counting of the occurrences of the rating given for each intersection on the grid will be performed.

The aggregated grids for each role (eg: Project Managers, Testers, Developers, Business Analysts, Users) will then be cross compared to find patterns of similarities or differences of expectations which will point to an alignment or misalignment of expectations among roles. The analysis of these grids will provide answers to the research question around preferred activities, characteristics and mode of communication for particular user types (elements), for enhanced quality of user

involvement. The results will be themed using categorization schemes identified in research by (Butler & Fitzgerald, 2002). The themes described are project, process and user related factors that shape and influence product quality and product acceptance. The use of these themes has been extended in my research to categorize the findings from the Repertory Grids into project, process and user related factors influencing and shaping the quality or effectiveness of user involvement. They have been described in Table 2.

Project Related Factors	Process Related Factors	User Related Factors
Initiator of Project	User/technical team relationships	Participation vs, Involvement
Top Management Commitment	Influence on project	User perception of technical team
Type of Project	Communication	Willingness to Participate
Time for Development		Ability to Participate
Financial resources available		User characteristics and attitudes
		User commitment to development and related change

Table 2: Project, Process and User related factors affecting user involvement

The findings from the analysis of the grids will also be supported by the themes identified from the thematic coding and analysis of raw interview data. The findings from this research will also be tested against theory from past research identified in the literature review section ensure that the analysis is robust and air tight.

3.4 Ethical Considerations

For this project, AUT Ethics Committee (AUTEC) clearance was obtained for the interviews with employees of the software solutions company involved in the study and user/requirement providers with regards to recording the interviewing session and the data that would be required of interviewees. Ethics approval was obtained from the Auckland University of Technology Ethics Committee on 31/5/2012 AUTEC Reference number 12/113. All participants were provided with a participant information form (Participant information form attached – Appendix 4) and invited to email the researcher with any questions prior to the research. Consent forms were signed by each interviewee, permitting the use of the information elicited during the interviews for this research. The interviewees were assured that they may withdraw from the research at any time prior to completion of data collection, without being disadvantaged in any way. Two copies of the consent form were signed by each interviewee, of which one was to be retained by the interviewee.

3.5 Implementation of Methodology

3.5.1 Literature Review of User Involvement

Based on the literature review conducted prior to my research, I was able to gain a thorough understanding of user involvement, its benefits and how it has evolved over the years (Ives & Olson, 1984; Barki & Hartwick, 1994; Cavaye, 1995; Damodaran, 1996). This gave me an overview of its incipient forms that formed the foundation for what it is today. Additionally, by specifically looking for barriers (eg: Grudin, 1991b; Wilson et al., 1997; Seffah, Gulliksen, & Desmarais, 2005; Majid, Noor, Adnan, & Mansor, 2009; Bak et al., 2008; Heiskari & Lehtola, 2009) and enablers to user involvement, I was able to obtain a set of barriers that past researchers have come across to compare against the barriers that I was expecting to be elicited during the interviews with the case study organizations participating in this research. A great deal of the research on barriers also provided facilitators for effective user involvement enabling me to have a set of facilitators to compare against and add to the findings of my research.

3.5.2 Organizations for Case Study

The second stage of this research was in-depth semi-structured interviews with organisations that are practitioners of the Agile methodology and had on-going projects with active user engagement. Agile organizations within the Auckland region were researched and invited via email and phone to participate in this research. Many of them showed interest but were unable to engage in the research either due of time constraints or distributed setting of the development teams and clients. After many attempts of trying to engage small and large software companies for the research, two organizations agreed to schedule personal interviews. The first one has been in business for 12 years. They have established themselves as an Agile organization continually delivering customised software solutions to its clients with constant engagement from start to finish. The clients for this company are external, meaning they contract the technical talent of this company to create customised solutions for them. The second company has also been in business for roughly a decade and is a provider of insurance products and

services to New Zealanders and identifies itself as an Agile driven organization. The development teams interviewed for this company are for in-house projects, meaning the technical team and the users are employees of the same organization. The companies are not competitors. Their services are very different from one another, serving entirely different markets. For the purpose of confidentiality, I have named them Organization A (the first company with in-house projects) and Organization B (the second company with external projects). The interviews were conducted over a period of 3 months. All interviews were carried out one-to-one with no one else present and most times, without interruptions. The interviews were electronically recorded. Interviews typically lasted between 30-45 minutes. At the beginning of the interviews, participants were reminded of the purpose of the research. They were provided with a Participant Information Sheet and were made to sign consent forms. In accordance with the AUT Ethical Committee's guidelines for ethical research practice, they were informed of their right to withdraw from the research at any point, including their right to withdraw, retrospectively, their consent to allow me to use their data. They were assured that their names and other identifying details would not appear in any reports of the study (Willig, 2012).

3.5.2.1 Organization A

There were a total of 11 interviews from Organization A. These included 4 Developers, 2 Project Managers (PM), 2 Business Analysts (BA), 1 Tester and 2 members of the user group, a Product Owner (PO) and a Subject Matter Expert (SME). There were two on-going projects that were studied at Organization A. The roles interviewed on the first project team were 2 Developers, 1 Tester, 1 BA, 1 PM, a Product Owner and an SME. This was the ideal range of interviewees for this research. The second project had 2 Developers, 1 BA and 1 PM.

3.5.2.2 Organization B

A total of 8 interviews were obtained from Organization B. These comprised 7 developers and 1 Business Analyst. 4 out of 7 developers were working on the same project, while the other 3 belonged to 3 other projects.

3.5.3 Data Collection and Analysis

3.5.3.1 Semi Structured Personal Interviews and Repertory Grid Technique

Although the initial aim of this research was to interview technical members and users at the beginning, middle and end of an iteration, due to delay in establishing research partnership and scheduling interviews, obtaining even the first interview with each organization was difficult. Eventually, I was able to obtain only one interview with each person and the aim of the research had to be altered to examining expectations about user involvement as opposed to expectations at different stages of a project or iteration.

Participants' accounts of their expectations and experience around the Agile approach in software development, particularly their interaction with users, were produced in response to the interview questions in Appendix 1.

Table 3 shows how the interview questions relate to the research questions.

Research Questions	Interview Questions
What are the expectations around user involvement?	<ol style="list-style-type: none">1. Who do you consider are the main client stakeholders that need to be involved in this project?2. How will you go about selecting users for participation in project related activities?3. How do you think the interaction with the users will contribute to this project? What are you hoping to get out of the interaction with users?4. In what ways do you think users of the software should be involved in the project and how will you go about getting them to contribute to the project?
What are the barriers and enablers of high quality user involvement in practice?	<ol style="list-style-type: none">5. What are the barriers expected when involving users in project activities and how would you go about alleviating them?

What comprises high quality user involvement in practice?	<ol style="list-style-type: none"> 6. what are your expectations about their knowledge and skills? 7. What characteristics, according to you, make a good candidate for participation in project related activities? 8. In your experience, how aligned were the users' expectations of their role in the project with yours? In what way does this alignment or misalignment affect the success of the involvement and by extension, the project? 9. How would you judge the effectiveness of users' participation in/contribution to the project? 10. How do you distinguish between useful user contribution and poor user contribution? 11. If the involvement does yield the desired results, what will you do to get optimal benefit from the participation of users?
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Table 3: Mapping of Interview Questions to Research Question

The questionnaire used in the interviews is available in Appendix (6.1). The interviews were then analysed using a thematic template and coded according to the themes that were identified. The three steps to the Thematic Analysis of raw interview data is shown in detail in Appendix 2. This precedes the Repertory Grid technique of recording data to enable the comparison of perspectives and expectations across organisations, projects and a spectrum of roles.

The style of interviewing was intended to allow participants to be able to describe in detail their experiences and expectations. At the beginning of the interview research participants were asked to talk about their experience in working within the Agile software development space, particularly user involvement. The discussion allowed the participants to elaborate on their roles and responsibilities within a project, their understanding and expectations of user involvement and focus their thoughts on the factors that affect the quality of user involvement. Each research participant was then

asked to complete three grids – Nature of involvement, Quality of involvement and Mode of Communication. The grid technique combines aspects of both idiographic assessment, which strives to reveal unique dimensions of a given respondent's outlook, and nomothetic research, which seeks general patterns across people. This format enabled me as the researcher to perform comparisons across organizations, projects and different user groups and roles within the technical team. This blend of projective and objective testing is useful to understand how different roles organize their view of users and their involvement in software development (Craighead & Nemeroff, 2004).

The respondent was prompted to rate or rank each of the elements on the elicited construct dimensions. While the set of elements remained constant for all three grids, different sets of constructs were defined for each grid and were arranged in rows on a sheet of paper. The elements were arranged in columns going across the sheet, representing where each figure would fall on a 7-point scale anchored by the poles of each construct. The intersection of construct rows and element columns forms the grid. Each respondent had to complete grids with matrix of x and y specific ratings that are amenable to a wide range of analyses. To be able to find patterns of preferences within the grids, each number on the scale was allocated a colour. Numbers from 1 to 3 were allocated shades of blue, indicating low importance or involvement and numbers 5 to 7 were allocated shades of green, indicating high importance or involvement. This enabled me to perform an initial analysis of all grids wherein I was able to spot noticeable preferences of activities for involvement and desired characteristics, for particular user roles.

Analysis of Repertory Grids

The grids were then aggregated using the Frequency Distribution technique according to Organizations, Projects, Roles (Developers, BAs, PMs etc) and compared for better validity of what was stated in interviews and literature. As the constructs used for this techniques were pre-determined, a limited amount of quantitative analysis in the form of frequency of counting of the occurrences of ratings given for constructs was performed. This method was successfully used in the analysis of Repertory Grids in a study by Moynihan (1996) to identify prevalent risks in software development projects which are

undertaken for third parties. He claimed that frequency counting worked well for a study that was exploratory in nature and was free of researcher bias. In order to obtain each role's expectations about every construct in each grid, the data from each grid for all roles was aggregated using Frequency Distribution. The following example shows how the "Nature of Involvement" grids obtained from developers belonging to the Organizations were aggregated to obtain one "Nature of Involvement" grid for all developers in that organization. The value for each intersection of rows and columns on each grid, was first represented using a histogram depicting how frequent a particular item was given a particular rating on the Likert scale. The frequency (F) was calculated using the formula:

$$F = \sum (\text{number of responses (n)} * \text{standard deviation from mean value (d)}) / \sum n * 3$$

The rating value in each intersection was grouped into classes and then the number of items in each class was plotted.

Aggregation and analysis of Repertory Grids for each user role is demonstrated in the example below consisting of grids obtained for the 11 respondents interviewed.

Analysis of Organization A (Project 1)

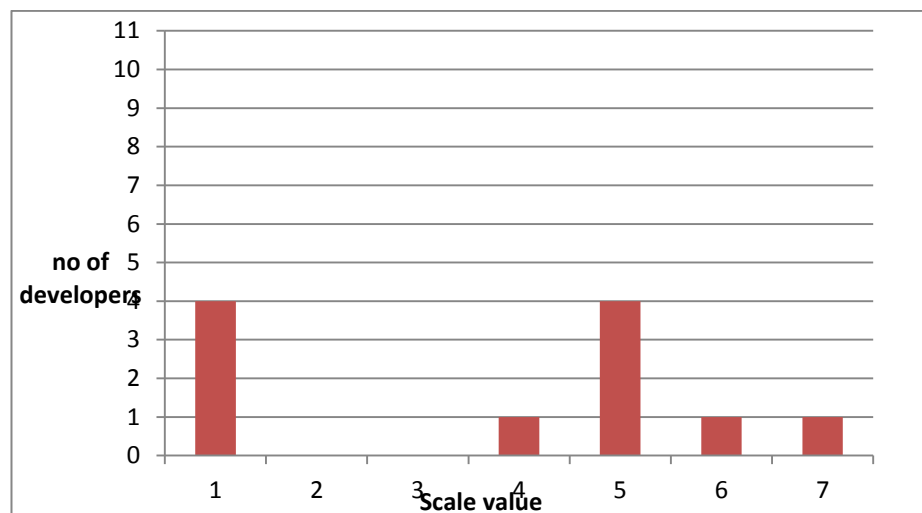
Grid: Nature of Involvement

Role: End User

1. C1E1 - Aggregation for all developer ratings for Construct 1 Element 1

Scale	Number of responses (n)	Standard Deviation(d)
1	4	-3
2	0	-2
3	0	-1
4	1	0
5	4	1
6	1	2
7	1	3
		$\Sigma(n)*3=33$
		$\Sigma(nd)/33=-0.1$
		L

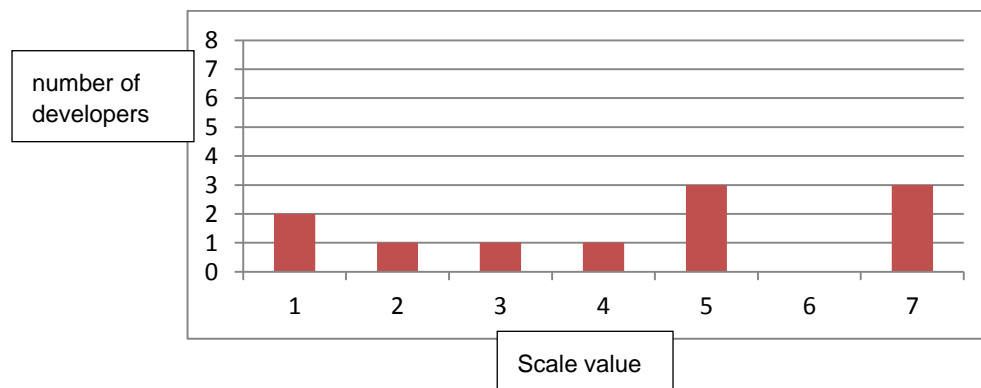
Table 4 Frequency Distribution table for C1E1



C2E1- Aggregation for all developer ratings for Construct 2 Element 1

Scale	Number of responses (n)	Standard Deviation(d)
1	2	-3
2	1	-2
3	1	-1
4	1	0
5	3	1
6	0	2
7	3	3
		$\Sigma(n)*3=33$
		$\Sigma(nd) / 33 =$ 0.1
		H

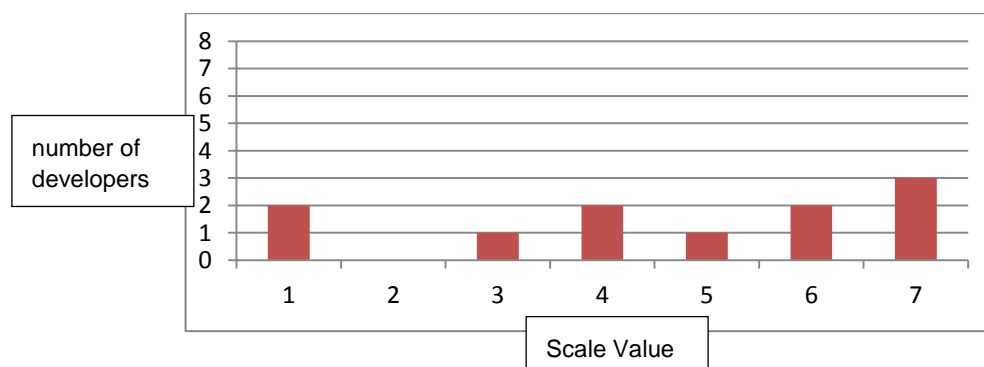
Table 5 Frequency Distribution table for C2E1



C3E1 - Aggregation for all developer ratings for Construct 3 Element 1

Scale	Number of responses (n)	Standard Deviation(d)
1	2	-3
2		-2
3	1	-1
4	2	0
5	1	1
6	2	2
7	3	3
		$\Sigma(n)*3=33$
		$\Sigma(nd) / 33 =$ 0.2
		H

Table 6 Frequency Distribution table for C3E1



If $F < -0.7$, then aggregated value for corresponding intersection is Very Low (VL)

If $-0.7 < F < 0$, then aggregated value for corresponding intersection is Low (L)

If $0 < F < 0.7$, then aggregated value for corresponding intersection is High (H)

If $F > 0.7$, then aggregated value for corresponding intersection is Very High (VH)

If $F = 0$, then aggregated value for corresponding intersection is Neutral (N)

This was done for all elements (user roles E1 to E5) for each grid (nature of involvement, user characteristics and mode of communication). The aggregated grid for all nature of involvement for all developers belonging to organization B is shown below:

Constructs Elements	E1	E2	E3	E4	E5
C1	L	H	VH	H	VH
C2	L	H	VH	H	VH
C3	L	H	VH	L	VH
C4	L	VH	VH	L	VH
C5	H	VH	VH	L	H
C6	VL	VL	L	VL	L
C7	VL	L	L	VH	L
C8	L	H	N	VH	H
C9	VL	L	L	H	H

Table 7 Aggregated Grid for Developers expectations about the nature of involvement of users

This exercise was performed for all technical roles, that is, testers, developers, project managers, business analysts and users for both organizations. A comparison of the expectations around Nature of Involvement, User Characteristics and Mode of Communication was performed. The comparisons performed are represented in Table 8.

	Developers	Tester	Project Managers	Business Analysts	Users
Developers		D vs T	D vs PM	D vs BA	D vs U
Tester			T vs PM	T vs BA	T vs U
Project Managers				PM vs BA	PM vs U
Business Analysts					BA vs U

Table 8 Inter-role Comparison Matrix

Cross Comparison of Aggregated grids of:

- Business Analyst, Developers, Project Managers, Testers and Clients (Organization A)
- Business Analyst and Developer roles in Organization B
- Developers of Organization A and Developers of Organization B

This comparison matrix was followed for Organization A as I was able to obtain user interviews only with this organization and not with Organization A. The interviewees from Organization B were developers and a BA and therefore the aggregated grids obtained were only those of the developers. The aggregated developer grids from Organization A were compared with aggregated developer grids of Organization B look for patterns in perspectives of the Developer role and find out how similar or different the themes of expectations were and the influences to them. The Repertory Grids of the Business Analysts across both organizations have not been compared as they were very similar and showed the same trend in expectations.

The results from the analysis of the grids was then compared with the analysis of the data from interviews and then compared against what was found in literature. The findings from this research are presented in the next chapter describing the alignment and misalignment of expectations of various technical roles about User Involvement. They provide detailed insight into the expectations of different roles about what they expect out of involving users in project development and what comprises high quality user involvement.

4 Findings and Discussion

The purpose of this chapter is to present the findings of the research to answer the following research questions:

1. What is the degree of alignment of expectations of user involvement for different roles involved in the development of a software project?
2. What comprises high quality user involvement in practice?
3. What are the barriers and enablers of high quality user involvement in practice?

To be able to answer these research questions, case analysis was conducted on two software organizations based in Auckland, New Zealand. These have been briefly described in Chapter 3 (Research Design & Methodology) and are referred to as Organization A and Organization B to maintain anonymity of identity. Both Organizations consider themselves to be practitioners of Agile software development but have distinctly different styles to implementing Agile techniques. Based on the information from interviews with members of these Organizations, the development process followed by each Organization has been described below.

4.1 Case Study Context of Organization A

The projects studied at Organization B were in-house, meaning the development team and the user groups were employees of the same organization. They were creating a solution from a legacy system that was already being used by end users at different branches with the intent of retaining functionality that was necessary and adding more functionality to simplify and improve their business process. On both projects, the Product Sponsor was a highly involved member and frequently consulted for most decisions. An SME was selected from their pool of end users to be engaged in the project full time and was considered an integral part of the development team. The SME was new to this role and was being brought up to speed on the objective of his involvement and the tasks he was expected to perform. The SME was consulted most frequently for requirements elicitation and clarification and queries around business process. The SME also had access to End Users in case he was in doubt in making a well-informed contribution to information. Stand up meetings are conducted daily where all members of the development team and involved users are updated about the

on-goings of the project, sprint planning and a forecast of imminent deliverables. Sprint planning is for the duration of the coming fortnight and a showcase is conducted at the branches every 4 weeks. During the showcases, the Business Analysts conduct a presentation of what has been done in the current sprint and what the users can expect to achieve out of the module that has been developed. End Users are invited to interact with the software hands on and provide feedback. The feedback is recorded by Business Analysts on a story board and then on a spread sheet which is conveyed to the product owners and development team. The Product Owners make the final decisions around functionality after discussion with the Business Analysts and Project Managers. The Product Owners had explicitly made themselves available for consultation at any time for project related queries and prioritization of the project was a pre-established procedure. There was a dedicated tester for the project who performed test cases before each showcase. The project was ongoing and was in the middle of the overall delivery cycle.

4.2 Case Study Context of Organization B

The projects of Organization A are all external. The development process followed by the projects studied for Organization A involves users throughout the development process. The user stakeholders are extensively consulted at the beginning of the project for elicitation of requirements, technology, budget, timeframe and scope of the project. There is no selection process as to which users should be involved in the project and the user points of contact are usually appointed by the client. The most frequently involved users are Product Sponsors, User representatives and in some cases, the end user. The former two roles are essayed by managers and/or a member of the client management. These roles interact with the Business Analysts for clarification and confirmation of specification until project kick off. Business Analysts are extensively involved in understanding user requirements, documentation of specifications and liaising with the developers on the technology to be implemented for the proposed solution. Detailed specification documents are created for the developers to understand requirements and create solution. These contain high level requirements as well as a step by step break down of how the requirements are to be met using relevant technology. After project kick off, the developers interact directly with the clients for queries and feedback. This

interaction takes place over meetings or more frequently, over phone, email and shared desktop. Developers contact users as and when information is needed and only proceed after a response has been received wherein there is a clear understanding of what needs to be done. Developers create and test code and perform some analysis on their end as well. Users are consulted throughout the project and are involved in workshops for functionality acceptance testing at the end of each release cycle. Business Analysts are responsible for conducting these workshops and providing training to the users about how to navigate through the software solution. Feedback is collected by the Business Analysts and conveyed to the developers. After project go-live, support is offered to the client until all issues have been resolved and client requirements have been fully met. Clients are given a fixed period, after go-live, up to which they can raise issues in case of faults or issues or requirements have not fully been met. It is only after clients sign off the acceptance of solution that the development team deems the project to be complete. Most projects studied at Organization A were ongoing in the middle of the delivery cycle.

The nature of the projects studied at the two organizations are compared in table 9.

	Organization A	Organization B
Project Type	In-House	External
Agile practice	Typical	Unconventional
Roles Interviewed	Developer, Project Manager, Tester, Business Analyst, Product Owner and SME	Developer, Business Analyst
Total Interviews	11	8

Table 9: Comparison of Case Organizations

4.3 Comparison of Expectations across roles within an Organization

The first objective of this research was to obtain the expectations of different roles, technical and user, to understand their cognition of user involvement. A review of literature showed that user involvement is centred upon the different phases of the development process and related activities, characteristics of users and efficient forms of communicating with them. These factors have been incorporated and applied to this research to develop a framework that describes user involvement and in the framing of open ended questions for personal interviews as well as the Repertory Grids, to test this framework for current practitioners' understanding of user involvement.

The raw data obtained from interviews with both organizations has been summarized and coded to present the interviewees' expectations around user involvement and their understanding of good quality user involvement. This information has then been used to support or argue the results obtained from the analysis of the Repertory Grids. The Repertory Grids filled in by interviewees of varied roles have been compared across different roles within the development team as well as each developer role and user roles with the intention of providing a comprehensible way of answering the research questions. The three aspects of user involvement under consideration are – Nature of Involvement, User Characteristics and Mode Communication. While the constructs for each grid vary, the elements remain the same throughout. As mentioned in chapter 3, the Elements are as follows:

E1 – End User

E2 – Product Owner/User Representative

E3 – Subject Matter Expert

E4 – Member of the Management committee on client side/Project Sponsor

E5 – Proxy to Client (Such as the Business Analyst)

All grids analysed are aggregated grids for Developers, Business Analysts, Testers and Users that were part of the various projects studied. The aggregation of grids for each role type was done using a general frequency mapping formula to map the frequency of responses on the specified scale of 1 to 7, for every role. An upper threshold of 0.7 was selected and a lower threshold of -0.7 with 1 being the midpoint on the scale. Table 10 describes the how the formula was applied to values high, very high, very low and low.

Formula result	Corresponding value on aggregated grid
$-0.7 > F$	Very Low (VL) involvement/importance
$-0.7 < F < 0$	Low (L) involvement/importance
$0 < F < 0.7$	High (H) involvement/importance
$F > 0.7$	Very High (VH) involvement/importance
0	Neutral (N)

Table 10 Formula for Repertory Grid aggregation for each role

The results of these comparisons show how expectations between different roles have matched or differed, giving a more detailed insight into expectations about factors influencing the quality of user involvement. They indicate areas where expectations around involvement were very high, high, very low or low. Practitioners can use these results to understand how well aligned the expectations of different roles are and relate these to the conceptualization of high quality user involvement. The results give direction to forming processes around effective user involvement in the development cycle in way that accommodates expectations of user and technical roles, promoting user-developer relationship.

4.3.1 Comparison of Expectations in Organization A

The grids under analysis for this section are those obtained from the interviews with Organization A, as I was able to interview a range of members in technical roles as well as their main user/client stakeholders. A total of 11 members have been interviewed from Organization A. The results from the comparison of grids among the different roles reveal the alignment and misalignment of expectations as summarized in Table 11.

Roles	Developers	PM			Tester			Business Analyst			User		
		No I	UC	Mo C	No I	U C	Mo C	No I	U C	Mo C	No I	U C	Mo C
Developers		✓	✓	✓	✓	✓	✓	✗	✓	✓	✓	✓	✓
PM					No I	U C	Mo C	No I	U C	Mo C	No I	U C	Mo C
					✓	✓	✗	✗	✓	✓	✓	✓	✓
Tester								No I	U C	Mo C	No I	U C	Mo C
								✗	✓	✗	✓	✓	✓
Business Analyst											No I	U C	Mo C
											✗	✓	✓
User													

Table 11 Comparison of Expectations about user involvement, belonging to roles interviewed at Organization A

LEGEND:

NoI – Aggregated Repertory Grid for Nature of Involvement

UC – Aggregated Repertory Grid for User Characteristics

MoC - Aggregated Repertory Grid for Mode of Communication

✓ - The expectations were well aligned

✗ - The expectations were misaligned

The details behind these summary results and a discussion of their meanings and implications is presented in the next sections. The results are presented in a structure that follows the three Repertory Grids. A comparison of expectations of roles is presented first for the nature of user involvement (4.3.1.1), then for characteristics of

high quality users (4.3.1.2) and expected mode of communication for high quality user involvement (4.3.1.3).

4.3.1.1 Comparison of Expectations of Nature of User Involvement

Nature of involvement refers to the activities that users are generally engaged in, during the software development cycle. The grids below provide a comparison of expectations around the involvement of different user types in different activities.

4.3.1.1.1 Developer & Business Analyst

Constructs Elements	E1	E2	E3	E4	E5
C1	L	H	VH	H	VH
C2	L	H	VH	H	VH
C3	L	H	VH	L	VH
C4	L	VH	VH	L	VH
C5	H	VH	VH	L	H
C6	VL	VL	L	VL	L
C7	VL	L	L	VH	L
C8	L	H	N	VH	H
C9	VL	L	L	H	H

Constructs Elements	E1	E2	E3	E4	E5
C1	VL	N	L	N	H
C2	L	H	L	N	H
C3	VL	VL	L	VL	H
C4	VL	L	H	N	H
C5	H	L	H	VL	H
C6	N	VL	VL	VL	VL
C7	VL	N	VL	N	L
C8	VL	L	L	H	L
C9	VL	VL	L	VL	N

Developers

Business Analysts

LEGEND:

C1	DECISIONS ABOUT PRODUCT FEATURES
C2	Requirements Elicitation
C3	User Story creation
C4	Clarification of requirement
C5	Verification of functionality
C6	Co-development of software
C7	Project budget/cost negotiation
C8	Timeframe/Schedule of Project
C9	Choice of Technology

E1	END USER
E2	Product Owner (PO)/ User Representative
E3	Subject Matter Expert (SME)
E4	Member of the Management of Client Organization/Product Sponsor
E5	Proxy to Client (eg: Business Analyst)

The comparison of the developer grid with that of the Business Analyst grid depicts a marked difference in expectations around the activities in which different user roles should be involved in.

The developers expect very high involvement of the Subject Matter Expert (SME) and Business Analyst (BA) in activities around decision making about the software solution, requirements elicitation, User stories, Clarification of requirements and User Acceptance Testing (C1 to C5). High involvement of the user representative/Product Owner is expected for the elicitation of requirements and User stories and is expected to play a very important role in the clarification of requirements and Verification of functionality. The expectation of End users and the Client management user's involvement was low owing to the fact that the SME on this project was previously an end user and knew the business process well. This was also evidenced in the interview with one of the developers who described user contribution in the following words - *"From requirements perspective, BA gathers requirements by talking to the SME, not so much to the branch staff"*.

The client management user is expected to partake only in decisions around budget and timeframe of project with some involvement in the choice of technology (C7 to C9). As a proxy to client, the Business Analyst is also expected to have high involvement in these activities.

Therefore, the theme identified for developer expectations of client management user are for very high involvement in Project Related Factors. The SME and BAs are expected for high involvement in development activities C1 to C5.

Business Analysts, on the other hand, expected themselves to be greatly involved in activities C1 to C5 should be high. The areas for high involvement of the user representative and SME were the elicitation and clarification of requirements and verification of functionality, apart from which the general expectation of user involvement was either neutral or low. The Business Analyst was required to make a lot of decisions in consultation with the SME. This was exemplified in the Business Analysts statement describing their role in the project as proxy to users

I do not interact with the end users apart from in the showcases. There are sometimes decisions we need to make that could affect branch users.

(Business Analyst)

The client management user was expected to have high involvement in deciding what the timeframe of the project should be.

The BA's expect to be mainly involved in development activities C1 to C5 working together with the SME on these activities.

Both roles expected little to no involvement of users in the actual development of the software.

4.3.1.1.2 Developer & Tester

Constructs \ Elements	E1	E2	E3	E4	E5
C1	L	H	VH	H	VH
C2	L	H	VH	H	VH
C3	L	H	VH	L	VH
C4	L	VH	VH	L	VH
C5	H	VH	VH	L	H
C6	VL	VL	L	VL	L
C7	VL	L	L	VH	L
C8	L	H	N	VH	H
C9	VL	L	L	H	H

Developers

Constructs \ Elements	E1	E2	E3	E4	E5
C1	L	VH	H		H
C2	L	VH	H		H
C3	VL	N	H		VH
C4	VL	H	VH		VH
C5	VH	VH	VH		VH
C6	VL	VL	VL		VL
C7	VL	VH	N		N
C8	L	H	N		N
C9	VL	L	L		H

Tester

LEGEND:

C1	DECISIONS ABOUT PRODUCT FEATURES
C2	Requirements Elicitation
C3	User Story creation
C4	Clarification of requirement
C5	Verification of functionality
C6	Co-development of software
C7	Project budget/cost negotiation
C8	Timeframe/Schedule of Project
C9	Choice of Technology

E1	END USER
E2	Product Owner (PO)/ User Representative
E3	Subject Matter Expert (SME)
E4	Member of the Management of Client Organization/Product Sponsor
E5	Proxy to Client (eg: Business Analyst)

The developers and the tester had similar expectations around the involvement of the SME and the Business Analyst. Developers felt the BA and SME's involvement in activities C1 to C5 should be very high, whereas the tester felt they needed to have higher involvement in activities C3 to C5 as compared to C1 and C2. Both roles expected low involvement of end users, attributed to the fact that there was a dedicated SME on the team who knew the business process well and was well connected with all the end users. A developer was quoted as saying

A co-located user, currently played by our SME is perfect. He knows the business process inside-out. (Developer)

They did, however, feel that end user participation in User Acceptance Testing should be very high.

The Product Owner on this project was also a member of the client management was consulted frequently on the project and was the main decision maker on prioritization of tasks. The general expectation for this user type between both roles was high to very high on activities C1 to C5 and in timeframe decision (C8) evident in the developer and testers following quotes.

Even though the Product Owner was not expected to participate directly at story level he was kept abreast of what is going on and how things progress. (Developer)

Product Owners are consulted when I have any questions regarding the Tests to be developed. SME and Product Owners are very helpful and always available when required. (Tester)

The tester combined the PO and client management user and therefore did not rate the latter's involvement in project activities separately. The developers felt that the client management should have very high involvement in decisions around timeframe and budget for project and high involvement for requirements elicitation and choice of

technology. The expectation of involvement of all other users in decisions around timeframe and budget of project was low.

Both roles expected high involvement of the BA in Project related activities relating to timeframe and choice of technology and activities C1 to C4.

4.3.1.1.3 Developer & User

Constructs \ Elements	E1	E2	E3	E4	E5	Constructs \ Elements	E1	E2	E3	E4	E5
C1	L	H	VH	H	VH	C1		VH	N		
C2	L	H	VH	H	VH	C2		H	N		
C3	L	H	VH	L	VH	C3		H	L		
C4	L	VH	VH	L	VH	C4		H	N		
C5	H	VH	VH	L	H	C5		VL	N		
C6	VL	VL	L	VL	L	C6		VL	VL		
C7	VL	L	L	VH	L	C7		N	VL		
C8	L	H	N	VH	H	C8		H	N		
C9	VL	L	L	H	H	C9		L	L		

Developers

All Users

LEGEND:

C1	DECISIONS ABOUT PRODUCT FEATURES	E1	END USER
C2	Requirements Elicitation	E2	Product Owner (PO)/ User Representative
C3	User Story creation	E3	Subject Matter Expert (SME)
C4	Clarification of requirement	E4	Member of the Management of Client Organization/Product Sponsor
C5	Verification of functionality	E5	Proxy to Client (eg: Business Analyst)
C6	Co-development of software		
C7	Project budget/cost negotiation		
C8	Timeframe/Schedule of Project		
C9	Choice of Technology		

For this comparison, the developers' expectations on the involvement of SMEs (E3) and Product Owner (E2) will be compared with that of the Users' expectation of their own

involvement. The users did not know what to expect of other user roles and therefore did not opt to rate their expectations of their involvement.

The grids show an alignment in the developers' expectations of the Product Owner's Involvement with that of the Product owner's expectations, but a major misalignment in developer expectations of the SME's involvement versus the SME's expectation of his own involvement.

The developers expected high to very high involvement of the Product Owner in development activities C1, C2, C3, C4, C5 and C8 and low involvement in everything else. The Product Owner expected the same except for user acceptance testing (C5) where he felt he did not have much to contribute.

Although the developers expected very high involvement of the SME in activities C1 to C5, the SME's expectations of his own involvement in those same activities was neutral to low. From the interview with the SME, I was able to gather that the SME felt that as he was new to this role and was in a constant process of learning, he would be open to trying out new things but was not necessarily aware of the level of importance of his role in any particular activity.

4.3.1.1.4 Business Analysts & Tester

Construct s\Element s	E1	E2	E3	E4	E5
C1	VL	N	L	N	H
C2	L	H	L	N	H
C3	VL	VL	L	VL	H
C4	VL	L	H	N	H
C5	H	L	H	VL	H
C6	N	VL	VL	VL	VL
C7	VL	N	VL	N	L
C8	VL	L	L	H	L
C9	VL	VL	L	VL	N

Constructs\ Elements	E1	E2	E3	E4	E5
C1	L	VH	H		H
C2	L	VH	H		H
C3	VL	N	H		VH
C4	VL	H	VH		VH
C5	VH	VH	VH		VH
C6	VL	VL	VL		VL
C7	VL	VH	N		N
C8	L	H	N		N
C9	VL	L	L		H

Business Analysts

Tester

LEGEND:

C1	decisions about product features
C2	Requirements Elicitation
C3	User Story creation
C4	Clarification of requirement
C5	Verification of functionality
C6	Co-development of software
C7	Project budget/cost negotiation
C8	Timeframe/Schedule of Project
C9	Choice of Technology

E1	end user
E2	Product Owner (PO)/ User Representative
E3	Subject Matter Expert (SME)
E4	Member of the Management of Client Organization/Product Sponsor
E5	Proxy to Client (eg: Business Analyst)

The grids show that the Business Analysts have given high importance to their involvement in activities C1 to C5, which is nearly in agreement with the tester's view of very high for the BA's involvement (in C3 to C5) and high for choice of technology (C9). However, the tester also expects high to very high involvement of the Product Owner and SME in activities C1 to C5. The tester expectations of involvement are very high for end users in acceptance testing and product owner in decisions around budget of the project. While the tester does not have any expectations from the SME and BA around activities C7 and C8, the developers generally have expectations of low to very

low involvement of users in activities C6 to C9 (Co-development, Budget and timeframe, choice of technology).

4.3.1.1.5 Business Analyst & User

Construct s\Element s	E1	E2	E3	E4	E5
C1	VL	N	L	N	H
C2	L	H	L	N	H
C3	VL	VL	L	VL	H
C4	VL	L	H	N	H
C5	H	L	H	VL	H
C6	N	VL	VL	VL	VL
C7	VL	N	VL	N	L
C8	VL	L	L	H	L
C9	VL	VL	L	VL	N

Business Analysts

Constructs \Elements	E1	E2	E3	E4	E5
C1		VH	N		
C2		H	N		
C3		H	L		
C4		H	N		
C5		VL	N		
C6		VL	VL		
C7		N	VL		
C8		H	N		
C9		L	L		

Users

LEGEND:

C1	DECISIONS ABOUT PRODUCT FEATURES
C2	Requirements Elicitation
C3	User Story creation
C4	Clarification of requirement
C5	Verification of functionality
C6	Co-development of software
C7	Project budget/cost negotiation
C8	Timeframe/Schedule of Project
C9	Choice of Technology

E1	END USER
E2	Product Owner (PO)/ User Representative
E3	Subject Matter Expert (SME)
E4	Member of the Management of Client Organization/Product Sponsor
E5	Proxy to Client (eg: Business Analyst)

The comparison of BA and user expectations show that the BA's generally have expectations of low to very low involvement of the Product Owner and the SME. The only exceptions are around the involvement of Product Owner in requirements elicitation and SME in clarification of requirements and verification of functionality,

where involvement was expected to be high. The BAs expected themselves to fill in for the gap between end users and the development team.

The BA's expectations barely align with those of the Product Owner or the SME. This can partly be attributed to the fact that the SME was not sure about the importance of his involvement in most activities where members of other roles expected high involvement of the SME.

4.3.1.1.6 Tester & User

Construct s\Element s	E1	E2	E3	E4	E5
C1	L	VH	H		H
C2	L	VH	H		H
C3	VL	N	H		VH
C4	VL	H	VH		VH
C5	VH	VH	VH		VH
C6	VL	VL	VL		VL
C7	VL	VH	N		N
C8	L	H	N		N
C9	VL	L	L		H

Construct s\Elements	E1	E2	E3	E4	E5
C1		VH	N		
C2		H	N		
C3		H	L		
C4		H	N		
C5		VL	N		
C6		VL	VL		
C7		N	VL		
C8		H	N		
C9		L	L		

Tester

Users

LEGEND:

C1	DECISIONS ABOUT PRODUCT FEATURES
C2	Requirements Elicitation
C3	User Story creation
C4	Clarification of requirement
C5	Verification of functionality
C6	Co-development of software
C7	Project budget/cost negotiation
C8	Timeframe/Schedule of Project
C9	Choice of Technology

E1	END USER
E2	Product Owner (PO)/ User Representative
E3	Subject Matter Expert (SME)
E4	Member of the Management of Client Organization/Product Sponsor
E5	Proxy to Client (eg: Business Analyst)

The tester generally had expectations of high to very high involvement from both the SME and the Product Owner in most activities except for co-development of software (C6) and Choice of technology (C9). While these expectations aligned slightly with those of the Product Owner, they did not show any alignment or misalignment with those of the SME. This was mainly because the SME was did not know how involved he was expected to be.

4.3.1.1.7 Developer & Project Manager

Constructs\Elements	E1	E2	E3	E4	E5
C1	H	VH	VH	VH	VH
C2	L	VH	VH	H	VH
C3	N	VH	N	N	VH
C4	VH	VH	VH	H	VH
C5	H	VH	L	H	VH
C6	L	N	VL	VL	VH
C7	VL	N	VL	VH	H
C8	VL	H	VL	VH	VH
C9	VL	VL	VL	VL	VL

Developers

Constructs\Elements	E1	E2	E3	E4	E5
C1	L	H	VH	H	VH
C2	L	H	VH	H	VH
C3	L	H	VH	L	VH
C4	L	VH	VH	L	VH
C5	H	VH	VH	L	H
C6	VL	VL	L	VL	L
C7	VL	L	L	VH	L
C8	L	H	N	VH	H
C9	VL	L	L	H	H

Project Managers

LEGEND:

C1	DECISIONS ABOUT PRODUCT FEATURES
C2	Requirements Elicitation
C3	User Story creation
C4	Clarification of requirement
C5	Verification of functionality
C6	Co-development of software
C7	Project budget/cost negotiation
C8	Timeframe/Schedule of Project
C9	Choice of Technology

E1	END USER
E2	Product Owner (PO)/ User Representative
E3	Subject Matter Expert (SME)
E4	Member of the Management of Client Organization/Product Sponsor
E5	Proxy to Client (eg: Business Analyst)

The comparison of the two grids shows that the project manager and developer roles' expectations about all users align well, except for the Client Management User, BA and End User, where they differ slightly. While Project Managers expect high involvement of end users and client management in activities C1 to C5, the developers expected low involvement of end users in activities C1 to C5 and low involvement of client management user in activities C3 to C5.

Low involvement was expected of most users in co-development, budget and timeframe decisions and choice of technology (C6 to C8) except for the Client Management User

and BA who were expected to have very high involvement in decisions around time frame. The PMs expected high involvement of the BA in cost negotiation of project (C7), whereas developers had low expectations of BAs for the same. PMs expected very low involvement of the client management user and BA in choice of technology but developers had high expectations for the same.

4.3.1.1.8 Project Manager & Business Analyst

Constructs\Elements	E1	E2	E3	E4	E5
C1	H	VH	VH	VH	VH
C2	L	VH	VH	H	VH
C3	N	VH	N	N	VH
C4	VH	VH	VH	H	VH
C5	H	VH	L	H	VH
C6	L	N	VL	VL	VH
C7	VL	N	VL	VH	H
C8	VL	H	VL	VH	VH
C9	VL	VL	VL	VL	VL

Constructs\Elements	E1	E2	E3	E4	E5
C1	VL	N	L	N	H
C2	L	H	L	N	H
C3	VL	VL	L	VL	H
C4	VL	L	H	N	H
C5	H	L	H	VL	H
C6	N	VL	VL	VL	VL
C7	VL	N	VL	N	L
C8	VL	L	L	H	L
C9	VL	VL	L	VL	N

Project Managers

Business Analysts

LEGEND:

C1	DECISIONS ABOUT PRODUCT FEATURES
C2	Requirements Elicitation
C3	User Story creation
C4	Clarification of requirement
C5	Verification of functionality
C6	Co-development of software
C7	Project budget/cost negotiation
C8	Timeframe/Schedule of Project
C9	Choice of Technology

E1	END USER
E2	Product Owner (PO)/ User Representative
E3	Subject Matter Expert (SME)
E4	Member of the Management of Client Organization/Product Sponsor
E5	Proxy to Client (eg: Business Analyst)

The expectations of PMS and BAs are similar for activities C6 to C9 but differ widely for activities C1 to C5. The grids clearly show that the PMs expected very high involvement of the user representative, SME, BA and in some aspects the end user and client management user. The BAs grids have indicated very low expectations of the involvement of these users in most activities, except for their own role where they felt they needed to have high involvement (C1 to C5). For activities C1 to C3 the BAs felt the SME should have low involvement but the PMs felt it should be very high.

The PMs had expectations of high involvement from end users in activities C1 to C5 but the BAs felt it should be low except for verification of functionality (C5), where they expected high involvement from them.

4.3.1.1.9 Project Manager & Tester

Constructs\Elements	E1	E2	E3	E4	E5	Constructs\Elements	E1	E2	E3	E4	E5
C1	H	VH	VH	VH	VH	C1	L	VH	H		H
C2	L	VH	VH	H	VH	C2	L	VH	H		H
C3	N	VH	N	N	VH	C3	VL	N	H		VH
C4	VH	VH	VH	H	VH	C4	VL	H	VH		VH
C5	H	VH	L	H	VH	C5	VH	VH	VH		VH
C6	L	N	VL	VL	VH	C6	VL	VL	VL		VL
C7	VL	N	VL	VH	H	C7	VL	VH	N		N
C8	VL	H	VL	VH	VH	C8	L	H	N		N
C9	VL	VL	VL	VL	VL	C9	VL	L	L		H

Project Managers

Testers

LEGEND:

C1	DECISIONS ABOUT PRODUCT FEATURES
C2	Requirements Elicitation
C3	User Story creation
C4	Clarification of requirement
C5	Verification of functionality
C6	Co-development of software
C7	Project budget/cost negotiation
C8	Timeframe/Schedule of Project
C9	Choice of Technology

E1	END USER
E2	Product Owner (PO)/ User Representative
E3	Subject Matter Expert (SME)
E4	Member of the Management of Client Organization/Product Sponsor
E5	Proxy to Client (eg: Business Analyst)

The Tester's expectations aligned well with those of the PMs, except for the expectations around end user involvement for activities C1 to C5. The Project Managers expected high involvement in all activities, but requirements elicitation, The Tester

expected low to very low involvement in all activities except for verification of functionality (C5).

Also, we can see that the PMs expect very high involvement of the BA and client management user in activities C7 and C8. The tester has combined user representative and client management role and expects very high to high involvement of the product owner/ user representative/client management but is neutral about the BA's involvement in these activities.

Also, where the PMs expect very high involvement of the BA in co-development, the tester expects very low involvement.

4.3.1.1.10 Project Manager & User

Constructs \ Elements	E1	E2	E3	E4	E5
C1	H	VH	VH	VH	VH
C2	L	VH	VH	H	VH
C3	N	VH	N	N	VH
C4	VH	VH	VH	H	VH
C5	H	VH	L	H	VH
C6	L	N	VL	VL	VH
C7	VL	N	VL	VH	H
C8	VL	H	VL	VH	VH
C9	VL	VL	VL	VL	VL

Project Manager

Construct \ Elements	E1	E2	E3	E4	E5
C1		VH	N		
C2		H	N		
C3		H	L		
C4		H	N		
C5		VL	N		
C6		VL	VL		
C7		N	VL		
C8		H	N		
C9		L	L		

Users

LEGEND:

C1	DECISIONS ABOUT PRODUCT FEATURES
C2	Requirements Elicitation
C3	User Story creation
C4	Clarification of requirement
C5	Verification of functionality
C6	Co-development of software
C7	Project budget/cost negotiation
C8	Timeframe/Schedule of Project
C9	Choice of Technology

E1	END USER
E2	Product Owner (PO)/ User Representative
E3	Subject Matter Expert (SME)
E4	Member of the Management of Client Organization/Product Sponsor
E5	Proxy to Client (eg: Business Analyst)

The Project Managers expect very high involvement of the SME and Product Owner in activities C1 to C5. These align well with the expectations of the Product Owner, but not so much with those of the SME. Apart from activities involving verification of functionality, The PMs expectation of SME involvement is very high for C1 to C5. For activities C6 to C9, the expectations aligned well with those of the SME and Product Owner and the general expectation of involvement in these activities in low.

4.3.1.2 Discussion of Comparison of Expectations of Organization A for Nature of Involvement

The expectations of Developers were misaligned with those of the BAs. This was mainly around activities concerning decisions about the product, requirements elicitation and clarification, creation of user stories and verification of functionality (C1 to C5). The Developers expected greater involvement of the user representative, SME and Project Sponsor, while the BAs felt that the same set of users should have low involvement in those activities as compared to the BA.

The Developers and the Tester had similar expectations. Both roles felt that the BA and SME have an important role to play in activities C1 to C5, while the client management user and product owner should have more involvement around Project Related decisions (Butler & Fitzgerald, 2002) about timeframe and budget of the project. They agreed that end user involvement in User Acceptance Tests (Verification of functionality) should be high.

A comparison of the Developers' expectations about the users' involvement indicated an alignment with the Product Owner's expectations, but not so much with those of the SME. Developers expected more involvement of the SME in C1 to C5, while the SME was not sure about how involved he needed to be in those activities.

The Tester and Business Analysts' expectations were misaligned in terms of the involvement of the Product Owner and SME. The testers were inclined towards higher involvement of these users, overall.

The Business Analysts expectations barely align with those of the users. This result was skewed because the SME was unsure of how involved he needed to be for good involvement.

The Tester's expectations aligned well with those of the Product Owner.

The expectations of Project Managers and Developers aligned well. Both placed great emphasis on the high involvement of all users in activities C1 to C5 and for the BA and client management user, on Cost negotiation (C7) and timeframe (C8) as well.

The expectations of Project Managers and Business Analysts are not very well aligned in terms of other user roles' (E1 to E4) involvement in project activities. Project Managers felt that end users, user representatives, SMEs and the client management should have high involvement in development activities C1 to C5. However, the BAs expected involvement of on the SME for these activities and of the Client management user, who in this project was also the product owner, for project related decisions and consultation on requirements.

The expectations of Project Managers and the tester aligned well. Both roles placed emphasis on the high involvement of the BA and client management user in decisions about timeframe and budget for project.

The expectations of Project Managers align well with those of the Product Owner. In general, the SME was not sure about his involvement and was neutral about his participation in most activities.

The expectations thus depicted in the grids above are consistent with the theory on the actual involvement of users. The developers, project managers and the testers believe that end users, SMEs, user representatives should be heavily involved in activities around the elicitation and clarification of requirements, creation of user stories and verification of functionality. These results aligned well with research by Heiskari & Lehtola (2009) where user involvement in design and pilot run were found to be significant stages of the development process for user involvement. Having a dedicated SME on one of the projects at Organization A was yielding good results as the product had higher user acceptance levels. This was attributed mainly to the fact that he used to be an end user of the legacy system that was being developed. This collaboration has been described in a study by Følstad et al.(2004) where it observed that domain experts

are increasingly becoming co-developers of the software by collaborating with the development team.

In my research, one of the constructs is co-development, where users are co-developers of the software. This was adopted from a study by Fischer & Giaccardi (2006) who found that users are increasingly becoming tech-savvy and choose to develop custom solutions that suit their specific needs. For this, they are even willing to learn about new technology and give development a go themselves. They would develop part or all of the software and only consult the development team when they were unable to do a particular task. However, none of the interviewees were able to identify with this form of user involvement. No one had even come across such users and therefore the concept of “users as co-developers” was not a construct they could evaluate.

4.3.1.3 Comparison of Expectations about Characteristics of Users for High Quality Involvement

The following comparisons are about the characteristics expected of good users, by the various technical roles. The expectations are compared across different roles within the technical team as well as with the users. These are consistent with the User Related factors in research by Butler & Fitzgerald (2002) research. The comparison of grids across roles will show which roles emphasize on which factors and what are the factors from other two themes (Project Related Factors and Process Related Factors) associated with them. The purpose of this comparison is to check whether the expectations of different technical roles around “high quality user characteristics” are aligned among themselves and with the expectations of the user group. It will provide insight into the type of characteristics different user types should possess in order to contribute effectively to the project.

4.3.1.3.1 Developer & Business Analyst

Construct s/Element s	E1	E2	E3	E4	E5
C1	L	H	VH	H	H
C2	L	VH	VH	VH	VH
C3	L	VH	VH	H	VH
C4	L	H	VH	H	VH
C5	L	VH	H	H	H
C6	L	H	H	H	VH
C7	VL	L	L	L	H
C8	L	H	VH	H	H

Constructs /Elements	E1	E2	E3	E4	E5
C1	VL	N	VH	L	VH
C2	H	H	VH	L	VH
C3	H	H	VH	H	VH
C4	H	N	VH	L	VH
C5	VL	VH	H	VH	N
C6	VL	H	H	N	VH
C7	L	L	H	L	H
C8	H	H	VH	N	H

Developers

Business Analysts

LEGEND:

CONSTRUCTS	MEANING
C1	Expectation of time invested (by user) per week
C2	Expectation of ability to articulate
C3	Expectation of desire to participate
C4	Expectation of availability
C5	Expectation of authority/level of influence on project
C6	Expectation of experience with project engagement
C7	Expectation of technical knowledge
C8	Expectation of knowledge of business process (context of software being developed)

ELEMENT	MEANING
E1	End User
E2	Product Owner (PO)/ User Representative
E3	Subject Matter Expert (SME)
E4	Member of the Management of Client Organization/Product Sponsor
E5	Proxy to Client (eg: Business Analyst)

Developers placed high to very high importance on all characteristics for all users, except for technical knowledge, which they felt was not necessary for effective participation. They had little expectations of the end users to possess any of these traits as their interaction with end users was limited to the showcases that were held after every sprint. They did, however, mention in interviews that end user involvement is beneficial and they should be consulted for the prioritization of tasks:

End users are at a low level, but it would be helpful if they decided budget and functionality because it is they who use the application regularly. If they feel that certain functionality should be given more importance, we can work on developing it immediately and probably delay release by a week.

(Developer)

The Business Analysts had similar expectations as the developers with the exception of the client management user, who was not expected to allocate time, be available for participation and have the desire to participate (C1, C2 and C4). Also, the BAs did have high expectations of end users to have the desire to participate, be available and be able to articulate feedback well. There was also an expectation of the end user to know the business process well.

Both roles did not have high expectations of technical knowledge from anyone except the Business Analysts.

4.3.1.3.2 Developer & User

Constructs /Elements	E1	E2	E3	E4	E5
C1	L	H	VH	H	H
C2	L	VH	VH	VH	VH
C3	L	VH	VH	H	VH
C4	L	H	VH	H	VH
C5	L	VH	H	H	H
C6	L	H	H	H	VH
C7	VL	L	L	L	H
C8	L	H	VH	H	H

Developers

Constructs /Elements	E1	E2	E3	E4	E5
C1		VH	VH		
C2		VH	VH		
C3		VH	H		
C4		VH	H		
C5		VH	H		
C6		L	N		
C7		L	H		
C8		VH	VH		

Users

LEGEND:

CONSTRUCTS	MEANING
C1	Expectation of time invested (by user) per week
C2	Expectation of ability to articulate
C3	Expectation of desire to participate
C4	Expectation of availability
C5	Expectation of authority/level of influence on project
C6	Expectation of experience with project engagement
C7	Expectation of technical knowledge
C8	Expectation of knowledge of business process (context of software being developed)

ELEMENT	MEANING
E1	End User
E2	Product Owner (PO)/ User Representative
E3	Subject Matter Expert (SME)
E4	Member of the Management of Client Organization/Product Sponsor
E5	Proxy to Client (eg: Business Analyst)

As shown in the grids above, the expectations of the developers and those of the client stakeholders aligned quite closely, with the only exception being the low expectation of the product owner around his experience with project engagement. The developers felt it would be beneficial for a product owner to have had experience in participating in software development. Their expectations were summed up by the following quote about users' knowledge of business process:

They must know the whole business process. It is helpful to obtain inputs from users who belong to the core business as well as exceptional cases that

are different from mainstream but know minor details about the business and/or application to be developed. (Developer)

4.3.1.3.3 Developer & Tester

Construct s/Element s	E1	E2	E3	E4	E5
C1	L	H	VH	H	H
C2	L	VH	VH	VH	VH
C3	L	VH	VH	H	VH
C4	L	H	VH	H	VH
C5	L	VH	H	H	H
C6	L	H	H	H	VH
C7	VL	L	L	L	H
C8	L	H	VH	H	H

Developers

Construct s/Element s	E1	E2	E3	E4	E5
C1	VL	VH	VH		VH
C2	N	VH	VH		VH
C3	H	VH	VH		VH
C4	L	H	H		VH
C5	L	VH	H		H
C6	L	H	H		VH
C7	L	L	L		H
C8	VH	VH	VH		VH

Tester

LEGEND:

CONSTRUCTS	MEANING
C1	Expectation of time invested (by user) per week
C2	Expectation of ability to articulate
C3	Expectation of desire to participate
C4	Expectation of availability
C5	Expectation of authority/level of influence on project
C6	Expectation of experience with project engagement
C7	Expectation of technical knowledge
C8	Expectation of knowledge of business process (context of software being developed)

ELEMENT	MEANING
E1	End User
E2	Product Owner (PO)/ User Representative
E3	Subject Matter Expert (SME)
E4	Member of the Management of Client Organization/Product Sponsor
E5	Proxy to Client (eg: Business Analyst)

The grids above show that the expectations of the developers aligned closely with those of the tester. The expectation around the product owner, SME, client management member and BA was high to very high for all characteristics except for choice of technology. Both roles had high expectations of the BA to possess good technical knowledge.

While both, the developers and the tester, had low expectations of the end users to possess any of the characteristics listed C1 to C8, the tester did differ slightly in expecting the end user to have a desire to engage in project development and knowing the business process as well as the back of their hand.

The Developers and the tester, overall, had very low expectations of the end users possessing any of these traits as their interaction with end users on this project was minimal. However, in their interviews, the developers did endorse that

End users are at a low level, but it would be helpful if they decided budget and functionality because it is they who use the application regularly. If they feel that a certain functionality should be given more importance, we can work on developing it immediately and probably delay release by a week. End users need to have greater influence on a project, even though at the moment it is low. (Developer)

This was repeated by a tester who said that “*end users must have a strong power to decide*”.

4.3.1.3.4 Business Analyst & User

Constructs /Elements	E1	E2	E3	E4	E5
C1	VL	N	VH	L	VH
C2	H	H	VH	L	VH
C3	H	H	VH	H	VH
C4	H	N	VH	L	VH
C5	VL	VH	H	VH	N
C6	VL	H	H	N	VH
C7	L	L	H	L	H
C8	H	H	VH	N	H

Constructs /Elements	E1	E2	E3	E4	E5
C1		VH	VH		
C2		VH	VH		
C3		VH	H		
C4		VH	H		
C5		VH	H		
C6		L	N		
C7		L	H		
C8		VH	VH		

Business Analysts

Users

LEGEND:

CONSTRUCTS	MEANING
C1	Expectation of time invested (by user) per week
C2	Expectation of ability to articulate
C3	Expectation of desire to participate
C4	Expectation of availability
C5	Expectation of authority/level of influence on project
C6	Expectation of experience with project engagement
C7	Expectation of technical knowledge
C8	Expectation of knowledge of business process (context of software being developed)

ELEMENT	MEANING
E1	End User
E2	Product Owner (PO)/ User Representative
E3	Subject Matter Expert (SME)
E4	Member of the Management of Client Organization/Product Sponsor
E5	Proxy to Client (eg: Business Analyst)

The comparison of the grids shows that the developers had higher expectations of the SME in terms of time allocated per week, the desire to participate, be able to articulate requirements well, be available all the time and know the business process well (C1 to C5 and C8). Developer expectations around all characteristics from C1 to C9 for the SME and Product Owner were generally high. While the developers did not expect the product owner to have technical knowledge, they did feel that it would be advantageous for the SME to possess some knowledge of technology. The Business Analyst stressed upon the fact that:

the user should be comfortable using the system and know it well. The user should be able to bring to light information early on in the development process. A user who thinks about the bigger picture and is happy to offer information outside of the current topic is considered a good user.

(Business Analyst)

The expectations of the BAs aligned reasonably closely with those of the user group.

4.3.1.3.5 Business Analyst & Tester

Constructs /Elements	E1	E2	E3	E4	E5
C1	VL	N	VH	L	VH
C2	H	H	VH	L	VH
C3	H	H	VH	H	VH
C4	H	N	VH	L	VH
C5	VL	VH	H	VH	N
C6	VL	H	H	N	VH
C7	L	L	H	L	H
C8	H	H	VH	N	H

Construct s/Element s	E1	E2	E3	E4	E5
C1	VL	VH	VH		VH
C2	N	VH	VH		VH
C3	H	VH	VH		VH
C4	L	H	H		VH
C5	L	VH	H		H
C6	L	H	H		VH
C7	L	L	L		H
C8	VH	VH	VH		VH

Business Analysts

Tester

LEGEND:

CONSTRUCTS	MEANING
C1	Expectation of time invested (by user) per week
C2	Expectation of ability to articulate
C3	Expectation of desire to participate
C4	Expectation of availability
C5	Expectation of authority/level of influence on project
C6	Expectation of experience with project engagement
C7	Expectation of technical knowledge
C8	Expectation of knowledge of business process (context of software being developed)

ELEMENT	MEANING
E1	End User
E2	Product Owner (PO)/ User Representative
E3	Subject Matter Expert (SME)
E4	Member of the Management of Client Organization/Product Sponsor
E5	Proxy to Client (eg: Business Analyst)

As seen in the grids above the BAs expectations around the characteristics of the Product Owner (E2), SME (E3) and BA's (E5) involvement aligned quite closely with those of the Tester. However, their expectations of the end users (E1) vary slightly. While the tester had low expectations of all other characteristics in end users, she felt that it was important for end users to *want* to participate (C3) in the project and very important for them to know the process well (C8). The Business Analysts, however, expected that in addition to those two characteristics it is important for the end users

to be able to articulate well and be available for consultation or participation whenever required by the development team.

Both roles felt that the Business Analyst should have good technical knowledge. The Business Analysts did also feel that it would be helpful if the SME had some knowledge of technology.

4.3.1.3.6 Tester & User

Construct s/Element s	E1	E2	E3	E4	E5
C1	VL	VH	VH		VH
C2	N	VH	VH		VH
C3	H	VH	VH		VH
C4	L	H	H		VH
C5	L	VH	H		H
C6	L	H	H		VH
C7	L	L	L		H
C8	VH	VH	VH		VH

Construct s/Element s	E1	E2	E3	E4	E5
C1		VH	VH		
C2		VH	VH		
C3		VH	H		
C4		VH	H		
C5		VH	H		
C6		L	N		
C7		L	H		
C8		VH	VH		

Tester

Users

LEGEND:

CONSTRUCTS	MEANING
C1	Expectation of time invested (by user) per week
C2	Expectation of ability to articulate
C3	Expectation of desire to participate
C4	Expectation of availability
C5	Expectation of authority/level of influence on project
C6	Expectation of experience with project engagement
C7	Expectation of technical knowledge
C8	Expectation of knowledge of business process (context of software being developed)

ELEMENT	MEANING
E1	End User
E2	Product Owner (PO)/ User Representative
E3	Subject Matter Expert (SME)
E4	Member of the Management of Client Organization/Product Sponsor
E5	Proxy to Client (eg: Business Analyst)

The tester and user expectations aligned closely around the characteristics. The only mild variation in expectations was that the tester expected the Product Owner to have

some past experience with project engagement. However, the Product Owner did not consider the same to be a factor that adversely affects the engagement.

Interestingly, while the tester had low expectations of the SME's technical knowledge, the SME expected that he was expected to be aware of the current trends in technology in order to contribute effectively to the team.

4.3.1.3.7 Project Manager & Business Analyst

Constructs/Elements	E1	E2	E3	E4	E5
C1	N	VH	VH	H	VH
C2	H	VH	VH	VH	VH
C3	VH	VH	VH	VH	VH
C4	VH	VH	VH	VH	VH
C5	H	VH	VH	VH	VH
C6	VL	L	L	N	VH
C7	VL	L	L	L	VH
C8	N	VH	VH	H	VH

Constructs/Elements	E1	E2	E3	E4	E5
C1	VL	N	VH	L	VH
C2	H	H	VH	L	VH
C3	H	H	VH	H	VH
C4	H	N	VH	L	VH
C5	VL	VH	H	VH	N
C6	VL	H	H	N	VH
C7	L	L	H	L	H
C8	H	H	VH	N	H

Project Managers

Business Analysts

LEGEND:

CONSTRUCTS	MEANING
C1	Expectation of time invested (by user) per week
C2	Expectation of ability to articulate
C3	Expectation of desire to participate
C4	Expectation of availability
C5	Expectation of authority/level of influence on project
C6	Expectation of experience with project engagement
C7	Expectation of technical knowledge
C8	Expectation of knowledge of business process (context of software being developed)

ELEMENT	MEANING
E1	End User
E2	Product Owner (PO)/ User Representative
E3	Subject Matter Expert (SME)
E4	Member of the Management of Client Organization/Product Sponsor
E5	Proxy to Client (eg: Business Analyst)

The Project Managers and BAs expectations around characteristics important for good involvement were quite similar for the end user, user representative/product owner,

SME and BA. It was considered very important for these roles to be able to dedicate time to the project, articulate issues, be interested in the project and want to contribute effectively and be available to answer the development team's queries when needed. The SME on this project fulfilled all these criteria and was therefore considered a good user for involvement. The Business Analyst advocated the presence of a designated SME for the project and was quoted as saying

We have a designated SME in the team and therefore the number of issues is significantly low. (Business Analyst)

The project manager on this project added to this statement about the SME's contribution.

Our SME has used the software before and he knows the challenges that users face. The SME guides us on the processes followed in the branches, that is how they process insurance from day to day. (Project Manager)

Although, PMs considered the client management user to be an important contributing user as well. They expected the Product Sponsor to be able to allocate time for involvement per week, articulate well, be interested in project engagement, be available/easily accessible and have high level of influence in the decisions that are made on the project. The Project Manager on Project 1 exemplified this by describing

one of the key stakeholders (who) is a Segment Manager; he knows strategy and direction. He tells us what needs to be done from an underwriting perspective to enable us to make quick decisions and lets us know if we have missed anyone in the process.

The PMs expected the BA to have good knowledge of technology and the business process and have experience with project engagement. The expectations of all other users to have technical knowledge and experience with project participation are low. The BAs had the same expectations of end users and client management member for

these characteristics. However, they did expect the user representative and SME to have some experience with involvement in project related activities and for the SME to have good knowledge of technology.

Both roles expected all users to have good knowledge of the business process well enough to be able to describe it to the developers. The Business Analyst described such a user as “*someone who has industry knowledge and has been across different policy types and is able to give voice to different scenarios*”. An additional facilitator that was mentioned during the interviews was the user’s ability to source information from other users. The Project Manager on Project 1 mentioned that the SME qualified as an ideal user because

he has best interest of the project at heart as he has used the existing application and he knows the business insurance process well enough. He is enthusiastic and committed to the project and always puts his hand up when a new task comes along. If there was something he didn’t know, he sends an email to a member of the branch staff and they provide him with the necessary information. He knows what happens at the branch and his knowledge can be used to bring people up to speed quickly. He is aware of all outstanding issues and where they are sitting currently.

4.3.1.3.8 Project Manager & Developer

Construct/ Elements	E1	E2	E3	E4	E5
C1	N	VH	VH	H	VH
C2	H	VH	VH	VH	VH
C3	VH	VH	VH	VH	VH
C4	VH	VH	VH	VH	VH
C5	H	VH	VH	VH	VH
C6	VL	L	L	N	VH
C7	VL	L	L	L	VH
C8	N	VH	VH	H	VH

Constructs /Elements	E1	E2	E3	E4	E5
C1	L	H	VH	H	H
C2	L	VH	VH	VH	VH
C3	L	VH	VH	H	VH
C4	L	H	VH	H	VH
C5	L	VH	H	H	H
C6	L	H	H	H	VH
C7	VL	L	L	L	H
C8	L	H	VH	H	H

Project Managers

Developers

LEGEND:

CONSTRUCTS	MEANING
C1	Expectation of time invested (by user) per week
C2	Expectation of ability to articulate
C3	Expectation of desire to participate
C4	Expectation of availability
C5	Expectation of authority/level of influence on project
C6	Expectation of experience with project engagement
C7	Expectation of technical knowledge
C8	Expectation of knowledge of business process (context of software being developed)

ELEMENT	MEANING
E1	End User
E2	Product Owner (PO)/ User Representative
E3	Subject Matter Expert (SME)
E4	Member of the Management of Client Organization/Product Sponsor
E5	Proxy to Client (eg: Business Analyst)

The PMs and Developers placed very high to high importance on all characteristics C1 to C8 for all users, with the exception being around the expectations of technical knowledge (C7). No one, other than the BA was expected to have good technical knowledge for good user involvement. The PMs also felt that no one other than the BA should have previous experience with project participation for good user involvement stating that *“they (Business Analysts) need to have good communication skills and have good knowledge of what end users need. They need to be communicative with end users”*.

The Developers also felt that end users “*must have a strong power to decide. Users need to understand risk, cost and consequence of change. It is important for users to fully understand the proposed solution so that they can approve of what they see when it is done*”.

4.3.1.3.9 Project Manager & Tester

Constructs/Elements	E1	E2	E3	E4	E5
C1	N	VH	VH	H	VH
C2	H	VH	VH	VH	VH
C3	VH	VH	VH	VH	VH
C4	VH	VH	VH	VH	VH
C5	H	VH	VH	VH	VH
C6	VL	L	L	N	VH
C7	VL	L	L	L	VH
C8	N	VH	VH	H	VH

Project Managers

Constructs/Elements	E1	E2	E3	E4	E5
C1	VL	VH	VH		VH
C2	N	VH	VH		VH
C3	H	VH	VH		VH
C4	L	H	H		VH
C5	L	VH	H		H
C6	L	H	H		VH
C7	L	L	L		H
C8	VH	VH	VH		VH

Tester

LEGEND:

CONSTRUCTS	MEANING
C1	Expectation of time invested (by user) per week
C2	Expectation of ability to articulate
C3	Expectation of desire to participate
C4	Expectation of availability
C5	Expectation of authority/level of influence on project
C6	Expectation of experience with project engagement
C7	Expectation of technical knowledge
C8	Expectation of knowledge of business process (context of software being developed)

ELEMENT	MEANING
E1	End User
E2	Product Owner (PO)/ User Representative
E3	Subject Matter Expert (SME)
E4	Member of the Management of Client Organization/Product Sponsor
E5	Proxy to Client (eg: Business Analyst)

Once again, the overall expectations of the PMs and tester aligned well with the exception being around past experience with project engagement. The PMs indicated that it was sufficient for only the BA to be experienced with a project involving user

involvement for the involvement to yield good results, whereas the Tester felt the Product Owner (E2) and SME (E3) should be experienced as well.

The Project Managers indicated that all user roles (E1,E2,E3,E4 and E5) should characteristics C1-C5. These mentioned several times as the most important characteristics for users to have in order for their involvement to yield good results. The Tester's grid indicates that their expectation in this regard of end users was low, and this was mainly because on both projects interaction with end users was limited or minimal. The Testers expectations of the end users (E1) are contrasting to the expectations of the PMs. Although, the development team interacted with end users only during showcases, the PM felt that they can add value simply by being interested and proactive during showcases. The Project Manager describes their interaction with End Users in the following quote:

We invite people from the branches for the showcases. These include the sales support staff, branch staff and the sponsor. We have a quick half an hour presentation and then get them to play with the system. The purpose of the feedback from the branches is, to the greatest extent possible, reuse what is currently in production to make it look the same so it is intuitive and there are no surprises.

The tester felt having an SME works well as he is *available to answer queries whenever needed* and that since interaction with end users was low, the expectation around them exhibiting facilitating traits is low. The only area where the tester's expectations were high, for end users, was the ability to articulate feedback and issues and be able to describe business process in detail. Referring to expectations around knowing the business process well (C8), the Tester stressed on the fact that *"it is important for users to fully understand the proposed solution so that they can approve of what they see when it is done"*.

4.3.1.3.10 Project Manager & User

Constructs/Elements	E1	E2	E3	E4	E5
C1	N	VH	VH	H	VH
C2	H	VH	VH	VH	VH
C3	VH	VH	VH	VH	VH
C4	VH	VH	VH	VH	VH
C5	H	VH	VH	VH	VH
C6	VL	L	L	N	VH
C7	VL	L	L	L	VH
C8	N	VH	VH	H	VH

Constructs/Elements	E1	E2	E3	E4	E5
C1		VH	VH		
C2		VH	VH		
C3		VH	H		
C4		VH	H		
C5		VH	H		
C6		L	N		
C7		L	H		
C8		VH	VH		

Project Managers

Users

LEGEND:

CONSTRUCTS	MEANING
C1	Expectation of time invested (by user) per week
C2	Expectation of ability to articulate
C3	Expectation of desire to participate
C4	Expectation of availability
C5	Expectation of authority/level of influence on project
C6	Expectation of experience with project engagement
C7	Expectation of technical knowledge
C8	Expectation of knowledge of business process (context of software being developed)

ELEMENT	MEANING
E1	End User
E2	Product Owner (PO)/ User Representative
E3	Subject Matter Expert (SME)
E4	Member of the Management of Client Organization/Product Sponsor
E5	Proxy to Client (eg: Business Analyst)

The grids of the PMs and users show that their expectations aligned well. Both sides felt that previous experience with project engagement and technical knowledge (C6 and C7) were not that important as compared to the other characteristics. It was mainly important that feedback can be obtained in time from all users and for this they should be able to dedicate some time to the project. The Project Manager (Project 1) indicated in through the following quote that the Product Owner chose to be part of the project, and this interest in the project greatly affects the quality of involvement.

The Segment Manager (Product Owner) has the best interests of the project at heart and by regularly attending stand-up meetings; he is able to make quick decision. (Project Manager)

The Project Manager on Project 1 also indicated that the SME brings awareness around targets and helps identify priorities around them. He usually accompanies the BA in all activities. The PM described the SME as someone who *“has best interest of the project at heart as he has used the existing application and he knows the business insurance process well enough. He is enthusiastic and committed to the project and always puts his hand up when a new task comes along. He knows what happens at the branch and his knowledge can be used to bring people up to speed quickly. He is aware of all outstanding issues and where they are sitting currently”*.

Point to note, however is that, although the PMs did not feel that it was mandatory for SMEs to have technical knowledge, the SME did feel that it would be important for him to know a little about and be skilled in technology. The SME was quoted as saying that *“sometimes the lack of technical knowledge can prevent you from understanding a few things around project modules”* and the fact that he was learning as he went along with his role of SME, helped him understand the software solution better, thereby enabling him to bring to light issues earlier on in the iteration.

4.3.1.4 Discussion of Comparison of Expectations of Organization A on User Characteristics

The Business Analysts, Developers, Testers, Project Managers and User expectations aligned well about the user characteristics to facilitate good user involvement.

All technical roles stressed upon users' ability to articulate requirements and feedback well, strong desire to participate. Explaining the meaning of good articulation, the following quote by a developer interviewed shows that detailed feedback helps the developers understand user needs better:

Users need not have technical knowledge, but an eye for when things feel wrong. They should pay attention to what they're trying to achieve, pay attention to finer aspects. (Developer)

As end user involvement was limited in both projects, the developers' did not have any expectations from the end users on these projects. However, in terms of facilitators to user involvement, they did express the need for greater end user involvement and feedback, exemplified in the following quote:

We aren't able to interact with end users. There are certain areas where we feel it would have been beneficial to obtain feedback from the end users, but because our interaction was limited to the CIO and his offside we never really got to know about difficulties end users could have been facing.
(Developer)

End users and SMEs need to have greater influence over the decisions made on the project and know the business process well. Technical knowledge was not expected of the average user but Business Analysts are expected to be able to fill that technical gap and to have experience with project engagement, for effective involvement.

The grids showed that there was great emphasis on the users' ability to dedicate a certain amount of their time per week for project related activities and be easily accessible for participation or consultation. In the interviews, quite a few of the roles mentioned barriers associated with the users' inability to make time to participate in workshops, showcases and other opportunities where they would get a chance to actually interact with the software and provide feedback.

The User Experience team, although greatly involved, do not always make themselves available. They tend to think long and hard and do not reply quickly, whereas we want a response immediately. The users have a job to do and are expected to meet their goals. Project involvement is outside their defined role and even though they may want to be more involved, they are either not allowed to or cannot find the time. The ability of users to be

involved and accessible would be highly appreciated. They should be able to dedicate their time. (Developer)

Main issues are around availability. As long as users and stakeholders come to stand up meetings and it has a productive outcome, they will be able to see the progress of the project.(Business Analyst)

While all these expectations were consistent with theory, that User Related Factors (Butler & Fitzgerald, 2002) play a significant role in determining the acceptance of the product, the empirical results obtained from the grids reveal that these factors also influence the quality of involvement. Developers, Testers, BAs, PMs have stressed upon the importance of user willingness to participate (Wilson et al., 1997), ability to participate, users characteristics and attitude and commitment towards the project and related change as very crucial factors influencing the quality of user involvement. Although research in this area also shows the necessity to support users by providing them with access to usability expertise and training will improve user motivation to participate (Følstad et al., 2004) and their commitment towards involvement in the project (Thalen & van der Voort, 2012), these have not been mentioned as much in the interviews with Organization A. However, they did mention the lack of end user involvement reduces the quality of user input to work with and that there should be more than one user type involved in project related activities so that different perspectives can be taken into account. User inability to participate in project related activities due to time constraints was mentioned as a major barrier by developers, testers and business analysts of Organization A. Bak et al. (2008) suggested that this can be facilitated by the management who should create processes around the involvement by end users so that their individual workload is adjusted to allow them to invest time in project related activities. Referring to users' lack of technical knowledge, the development team did mention that it was not that major a factor in influencing user involvement, even though it would have been helpful. This was a different attitude compared to that discussed in a study by Seffah et al. (2005) where they refer to the "people gap" which suggests that users and the developers lack of knowledge of each other's domain of expertise influence the relationship shared between the two groups. As it was observed in the projects of Organization A, lack of technical knowledge did

not affect the relationship between the development teams and the user stakeholder group. They worked seamlessly well, despite the slight knowledge gap.

4.3.1.5 Comparison of Expectations about Modes of Communication for High Quality User Involvement

Communication is one of the key aspects of user involvement and it is important to know which mode of communication facilitates user involvement the most. The following grids show alignment of expectations around the preferred mode of communication by different technical roles with different user roles.

The purpose of this exercise is to conduct comparison across different roles to find their preferred modes of involvement and whether these preferences align with each other. As all grids showed a similar pattern in results, the comparison between roles has not been discussed for all grids unless there is a marked difference between expectations. A discussion of this expected mode of communication for high quality user involvement has been discussed at the end of this section (4.3.1.6)

4.3.1.5.1 Developer & Business Analyst

Construct Elements	E1	E2	E3	E4	E5	Construct Elements	E1	E2	E3	E4	E5
C1	L	H	VH	H	VH	C1	VH	VH	VH	VH	VH
C2	H	H	VH	H	VH	C2	VH	VH	VH	VH	VH
C3	L	H	H	H	H	C3	N	H	H	H	H
C4	L	H	H	H	VH	C4	N	H	N	H	H
C5	L	L	H	L	H	C5	VL	VL	VL	VL	VL
C6	VL	VL	VL	VL	VL	C6	VL	VL	VL	VL	VL
C7	VL	VL	VL	VL	VL	C7	VL	VL	VL	VL	VL

Developers

Business Analysts

LEGEND:

CONSTRUCTS	MEANING
C1	Face to Face (Group Discussion)
C2	Face to Face (Individual Meeting)
C3	Phone
C4	Email
C5	Video Conference
C6	Social Media
C7	Text Message

ELEMENT	MEANING
E1	End User
E2	Product Owner (PO)/ User Representative
E3	Subject Matter Expert (SME)
E4	Member of the Management of Client Organization/Product Sponsor
E5	Proxy to Client (eg: Business Analyst)

The developers have not considered communication with the end users as they barely interacted with end users on the project. Their main point of contact is the SME and the BA and therefore face-to-face communication with this user was rated very high on importance. Phone and email were also highly used and more frequently with the BAs, when they were out of office. Video conferencing, SMS and social media were never used and therefore rated very low.

The Business Analysts rated face to face communication very highly for all users, including end users. Phone and email are also popular modes of communication. Social media, text messaging and video conferencing are never used.

One can say the developers' and BAs' expectations aligned well.

4.3.1.5.2 Developer & Tester

Construct s\Element s	E1	E2	E3	E4	E5	Constructs\ Elements	E1	E2	E3	E4	E5
C1	L	H	VH	H	VH	C1	VH	VH	VH		VH
C2	H	H	VH	H	VH	C2	N	H	VH		VH
C3	L	H	H	H	H	C3	L	L	L		L
C4	L	H	H	H	VH	C4	L	N	N		VH
C5	L	L	H	L	H	C5	0	0	0		0
C6	VL	VL	VL	VL	VL	C6	0	0	0		0
C7	VL	VL	VL	VL	VL	C7	0	0	0		0

Developers

Tester

LEGEND:

CONSTRUCTS	MEANING
C1	Face to Face (Group Discussion)
C2	Face to Face (Individual Meeting)
C3	Phone
C4	Email
C5	Video Conference
C6	Social Media
C7	Text Message

ELEMENT	MEANING
E1	End User
E2	Product Owner (PO)/ User Representative
E3	Subject Matter Expert (SME)
E4	Member of the Management of Client Organization/Product Sponsor
E5	Proxy to Client (eg: Business Analyst)

While the tester preferred face to face communication with all users, phone was the least popular mode of communication with the tester. But this could be a personal preference and I would not consider it as a representation of most testers. The Tester preferred email with the BA, in case he/she was not available to meet.

4.3.1.5.3 Developer & User

Constructs Elements	E1	E2	E3	E4	E5
C1	L	H	VH	H	VH
C2	H	H	VH	H	VH
C3	L	H	H	H	H
C4	L	H	H	H	VH
C5	L	L	H	L	H
C6	VL	VL	VL	VL	VL
C7	VL	VL	VL	VL	VL

Developers

Construct s\Element s	E1	E2	E3	E4	E5
C1		VH	H		
C2		VH	N		
C3		N	L		
C4		H	N		
C5		L	H		
C6		L	VL		
C7		VL	VL		

Users

LEGEND:

CONSTRUCTS	MEANING
C1	Face to Face (Group Discussion)
C2	Face to Face (Individual Meeting)
C3	Phone
C4	Email
C5	Video Conference
C6	Social Media
C7	Text Message

ELEMENT	MEANING
E1	End User
E2	Product Owner (PO)/ User Representative
E3	Subject Matter Expert (SME)
E4	Member of the Management of Client Organization/Product Sponsor
E5	Proxy to Client (eg: Business Analyst)

4.3.1.5.4 Business Analyst & Tester

Constructs Elements	E1	E2	E3	E4	E5
C1	VH	VH	VH	VH	VH
C2	VH	VH	VH	VH	VH
C3	N	H	H	H	H
C4	N	H	N	H	H
C5	VL	VL	VL	VL	VL
C6	VL	VL	VL	VL	VL
C7	VL	VL	VL	VL	VL

Business Analysts

Constructs\ Elements	E1	E2	E3	E4	E5
C1	VH	VH	VH		VH
C2	N	H	VH		VH
C3	L	L	L		L
C4	L	N	N		VH
C5	0	0	0		0
C6	0	0	0		0
C7	0	0	0		0

Tester

4.3.1.5.5 Business Analyst & User

Constructs Elements	E1	E2	E3	E4	E5
C1	VH	VH	VH	VH	VH
C2	VH	VH	VH	VH	VH
C3	N	H	H	H	H
C4	N	H	N	H	H
C5	VL	VL	VL	VL	VL
C6	VL	VL	VL	VL	VL
C7	VL	VL	VL	VL	VL

Construct Elements	E1	E2	E3	E4	E5
C1		VH	H		
C2		VH	N		
C3		N	L		
C4		H	N		
C5		L	H		
C6		L	VL		
C7		VL	VL		

Business Analysts

Users

LEGEND:

CONSTRUCTS	MEANING
C1	Face to Face (Group Discussion)
C2	Face to Face (Individual Meeting)
C3	Phone
C4	Email
C5	Video Conference
C6	Social Media
C7	Text Message

ELEMENT	MEANING
E1	End User
E2	Product Owner (PO)/ User Representative
E3	Subject Matter Expert (SME)
E4	Member of the Management of Client Organization/Product Sponsor
E5	Proxy to Client (eg: Business Analyst)

4.3.1.5.6 Tester & User

Constructs Elements	E1	E2	E3	E4	E5
C1	VH	VH	VH		VH
C2	N	H	VH		VH
C3	L	L	L		L
C4	L	N	N		VH
C5	0	0	0		0
C6	0	0	0		0
C7	0	0	0		0

Constructs Elements	E1	E2	E3	E4	E5
C1		VH	H		
C2		VH	N		
C3		N	L		
C4		H	N		
C5		L	H		
C6		L	VL		
C7		VL	VL		

Tester

All Users

4.3.1.5.7 Project Manager & Business Analyst

Constructs\ Elements	E1	E2	E3	E4	E5
C1	H	VH	VH	H	VH
C2	H	VH	VH	VH	VH
C3	VH	VH	VH	H	VH
C4	VH	VH	VH	H	VH
C5	L	N	L	L	N
C6	VL	VL	VL	VL	VL
C7	VL	VL	VL	VL	VL

Project Managers

Constructs\ Elements	E1	E2	E3	E4	E5
C1	VH	VH	VH	VH	VH
C2	VH	VH	VH	VH	VH
C3	N	H	H	H	H
C4	N	H	N	H	H
C5	VL	VL	VL	VL	VL
C6	VL	VL	VL	VL	VL
C7	VL	VL	VL	VL	VL

Business Analysts

LEGEND:

CONSTRUCTS	MEANING
C1	Face to Face (Group Discussion)
C2	Face to Face (Individual Meeting)
C3	Phone
C4	Email
C5	Video Conference
C6	Social Media
C7	Text Message

ELEMENT	MEANING
E1	End User
E2	Product Owner (PO)/ User Representative
E3	Subject Matter Expert (SME)
E4	Member of the Management of Client Organization/Product Sponsor
E5	Proxy to Client (eg: Business Analyst)

4.3.1.5.8 Project Manager & Developer

Constructs\ Elements	E1	E2	E3	E4	E5
C1	H	VH	VH	H	VH
C2	H	VH	VH	VH	VH
C3	VH	VH	VH	H	VH
C4	VH	VH	VH	H	VH
C5	L	N	L	L	N
C6	VL	VL	VL	VL	VL
C7	VL	VL	VL	VL	VL

Constructs\ Elements	E1	E2	E3	E4	E5
C1	L	H	VH	H	VH
C2	H	H	VH	H	VH
C3	L	H	H	H	H
C4	L	H	H	H	VH
C5	L	L	H	L	H
C6	VL	VL	VL	VL	VL
C7	VL	VL	VL	VL	VL

Project Managers

Developers

LEGEND:

CONSTRUCTS	MEANING
C1	Face to Face (Group Discussion)
C2	Face to Face (Individual Meeting)
C3	Phone
C4	Email
C5	Video Conference
C6	Social Media
C7	Text Message

ELEMENT	MEANING
E1	End User
E2	Product Owner (PO)/ User Representative
E3	Subject Matter Expert (SME)
E4	Member of the Management of Client Organization/Product Sponsor
E5	Proxy to Client (eg: Business Analyst)

4.3.1.5.9 Project Manager & Tester

Constructs\ Elements	E1	E2	E3	E4	E5
C1	H	VH	VH	H	VH
C2	H	VH	VH	VH	VH
C3	VH	VH	VH	H	VH
C4	VH	VH	VH	H	VH
C5	L	N	L	L	N
C6	VL	VL	VL	VL	VL
C7	VL	VL	VL	VL	VL

Constructs\ Elements	E1	E2	E3	E4	E5
C1	VH	VH	VH		VH
C2	N	H	VH		VH
C3	L	L	L		L
C4	L	N	N		VH
C5	0	0	0		0
C6	0	0	0		0
C7	0	0	0		0

Project Managers

Tester

4.3.1.5.10 Project Manager & User

Constructs Elements	E1	E2	E3	E4	E5	Constructs Elements	E1	E2	E3	E4	E5
C1	H	VH	VH	H	VH	C1		VH	H		
C2	H	VH	VH	VH	VH	C2		VH	N		
C3	VH	VH	VH	H	VH	C3		N	L		
C4	VH	VH	VH	H	VH	C4		H	N		
C5	L	N	L	L	N	C5		L	H		
C6	VL	VL	VL	VL	VL	C6		L	VL		
C7	VL	VL	VL	VL	VL	C7		VL	VL		

Project Managers

All Users

LEGEND:

CONSTRUCTS	MEANING
C1	Face to Face (Group Discussion)
C2	Face to Face (Individual Meeting)
C3	Phone
C4	Email
C5	Video Conference
C6	Social Media
C7	Text Message

ELEMENT	MEANING
E1	End User
E2	Product Owner (PO)/ User Representative
E3	Subject Matter Expert (SME)
E4	Member of the Management of Client Organization/Product Sponsor
E5	Proxy to Client (eg: Business Analyst)

4.3.1.6 Discussion of Results of Comparison of expectations about Mode of Communication for High Quality User Involvement

An analysis of all the grids below shows the same trend that the most expected modes of involvement are face-to-face individual and group meeting followed by email.

Phone and email are secondarily preferred followed by video conferencing, in rare cases. Text messaging and social media are almost never used. This is consistent with theory from research (Nakki et al., 2011) where it was found that face-to-face interviews, user visits and meetings, brainstorming sessions, users' observation and feedback were most effective forms of communication with users. Communication channels such phones, faxes, emails were secondary to focus group discussions and meetings. In-depth interviews and user visits to development sites are easier to organize and relatively inexpensive means of obtaining user input.

4.3.2 Comparison of Expectations in Organization B

In organization B, 8 people were interviewed across different projects. The roles interviewed were developers and a Business Analyst. This section shows the comparison of expectations about user involvement between different roles. The purpose of this exercise is to show whether expectations of different roles within the same organization align and if so, then how well aligned these expectations are around good quality user involvement. Developer and Business Analyst roles were interviewed at Organization B and the alignment of their expectations has been shown in table 12.

Roles	Business Analyst		
	NoI	UC	MoC
Developers	✓	✓	✓

Table 12 Comparison of expectations about user involvement belonging to roles interviewed at Organization B

LEGEND:

NoI – Aggregated Repertory Grid for Nature of Involvement

UC – Aggregated Repertory Grid for User Characteristics

MoC - Aggregated Repertory Grid for Mode of Communication

✓ - The expectations were well aligned

✗ - The expectations were misaligned

The details behind these summary results and a discussion of their meanings and implications is presented in the next sections. The results are presented in a structure that follows the three Repertory Grids. A comparison of expectations of roles is presented first for the nature of user involvement (4.3.2.1), then for Characteristics of high quality users (4.3.2.2) and expected mode of communication for high quality user involvement (4.3.2.3).

4.3.2.1 Comparison of Expectations about Nature of Involvement

Constructs/ Elements	E1	E2	E3	E4	E5
C1	N	H	H	H	N
C2	H	H	H	N	H
C3	H	H	H	L	L
C4	H	H	H	N	N
C5	H	H	H	N	N
C6	L	L	L	L	L
C7	VL	VL	VL	VH	VH
C8	L	L	L	H	H
C9	L	L	L	L	N

Construct s\Elemen ts	E1	E2	E3	E4	E5
C1	VH	H	VH	N	VH
C2	VH	H	VH	H	VH
C3	VH	H	VH	L	VH
C4	VH	H	VH	L	VH
C5	VH	H	H	L	H
C6	N	L	L	VL	H
C7	N	N	VL	VH	N
C8	N	N	VL	H	VH
C9	L	L	VL	L	N

Developers

Business Analyst

LEGEND:

C1	DECISIONS ABOUT PRODUCT FEATURES
C2	Requirements Elicitation
C3	User Story creation
C4	Clarification of requirement
C5	Verification of functionality
C6	Co-development of software
C7	Project budget/cost negotiation
C8	Timeframe/Schedule of Project
C9	Choice of Technology

E1	END USER
E2	Product Owner (PO)/ User Representative
E3	Subject Matter Expert (SME)
E4	Member of the Management of Client Organization/Product Sponsor
E5	Proxy to Client (eg: Business Analyst)

The grids show that for activities C1 to C5, the developers expect high involvement of the End User, Product Owner and Subject Matter Expert. For the same set of activities, the Business Analyst expects very high involvement of End User, Subject Matter Expert and the Business Analyst along with high involvement of the Product Owner. Both roles were relatively neutral or expected low involvement of the Client Management User type for these activities except for C1 and C2 where they felt he should have high level of participation. Their expectations align reasonably well about the involvement of all user types for activities C1 to C5.

Both sets of roles expected high involvement of the Business Analyst and Client Management User type in the aspects of project budget and timeframe/schedule (C7 and C8). Apart from the involvement of these two user types in these activities, for activities C6 to C9, both technical roles expected low involvement or considered the involvement of all user types in these activities to be less important for high quality involvement.

4.3.2.2 Comparison of Expectations of Characteristics of Users for High Quality Involvement

Constructs/ Elements	E1	E2	E3	E4	E5
C1	L	L	N	H	H
C2	H	H	VH	H	H
C3	H	H	H	H	H
C4	H	H	H	H	H
C5	L	H	H	H	H
C6	L	N	H	H	H
C7	VL	L	N	L	N
C8	H	H	H	H	H

Constructs/Elements	E1	E2	E3	E4	E5
C1	VH	VH	H	L	VH
C2	H	H	H	L	VH
C3	VH	VH	VH	VH	VH
C4	H	VH	H	L	VH
C5	L	L	L	VH	H
C6	H	H	N	L	VH
C7	L	L	L	VL	VH
C8	N	H	N	L	VH

Developers

Business Analyst

LEGEND:

CONSTRUCTS	MEANING
C1	Expectation of time invested (by user) per week
C2	Expectation of ability to articulate
C3	Expectation of desire to participate
C4	Expectation of availability
C5	Expectation of authority/level of influence on project
C6	Expectation of experience with project engagement
C7	Expectation of technical knowledge
C8	Expectation of knowledge of business process (context of software being developed)

ELEMENT	MEANING
E1	End User
E2	Product Owner (PO)/ User Representative
E3	Subject Matter Expert (SME)
E4	Member of the Management of Client Organization/Product Sponsor
E5	Proxy to Client (eg: Business Analyst)

In comparing the expectations of developers and the Business Analyst about user characteristics for high quality involvement, the grids revealed that the Business Analyst strongly emphasized a strong a desire to participate in all user types as a necessary quality for high quality user involvement. The Business Analyst also expected the End User, Product Owner and the proxy to client/Business Analyst to compulsorily allocate time for project participation per week. This role indicated that it was very important for the proxy to client user or the BA to possess all characteristics C1 to C8 for high quality involvement. High importance was placed on End User, Product Owner and SME user

types possessing characteristics C1 to C4 for high quality involvement. The BA expected the client management user and BA to have a great level of influence on the project and the End User and Product Owner user types to possess some experience with project engagement in order for the involvement to be of high quality. The BA also felt that although it would be good to interact with End Users for information about the business process, it was usually the Product Owner that the development team interacted with and therefore the PO should have good knowledge of the business process. Characteristics C5, C7 and C8 were given low importance for End User, PO and SME user types and were not considered necessary by the BA, for high quality involvement. The Business Analysts expectations are expressed in the following quote.

How much they care about what the solution does for them is important. They need to believe and feel passionate about the project. They should care about the outcome enough to actively participate. More engagement leads to natural progression to comprehend other cases. (Business Analyst)

The Developers had low expectations of time invested by End User and Product Owner user types per week and high expectations of the client management user type and BA for the same. Their overall expectations for characteristics C2 to C6 was high for all user types, except for End User whom they felt in practice had low level of influence on a project and should, in fact, have more authority in making decisions about the features of a product. A Developer mentioned the importance of users “*having a bit of a voice*”.

Sometimes having only one go-to person can be quite challenging. You may not get everything from the End Users as he could be filtering it. (Developer)

Developers also felt that the End User needn't have previous experience with project engagement for their involvement to be of high quality. The developers also felt that the users having good knowledge of technology was not a requirement for high quality user involvement. However, high emphasis was placed on all user types knowing the business process well enough to be able to explain it to the developers.

Users need not have technical knowledge, but an eye for when things feel wrong. (Developer)

The Developers' expectations aligned moderately well with those of the Business Analyst with the only difference between expectations being high and very high importance placed by the two roles on the various characteristics discussed.

4.3.2.3 Comparison of Expectations about Modes of Communication for High Quality User Involvement

Construct \ Elements	E1	E2	E3	E4	E5
C1	H	H	H	L	H
C2	N	N	H	L	H
C3	L	L	H	L	H
C4	L	L	H	N	H
C5	N	H	H	L	H
C6	VL	VL	VL	VL	VL
C7	VL	VL	VL	VL	VL

Developers

Constructs \ Elements	E1	E2	E3	E4	E5
C1	H	H	H	H	H
C2	VH	VH	H	VH	VH
C3	H	H	H	L	H
C4	H	H	H	H	VH
C5	H	H	H	H	H
C6	L	L	L	VL	N
C7	N	N	N	L	H

Business Analyst

LEGEND:

CONSTRUCTS	MEANING
C1	Face to Face (Group Discussion)
C2	Face to Face (Individual Meeting)
C3	Phone
C4	Email
C5	Video Conference
C6	Social Media
C7	Text Message

ELEMENT	MEANING
E1	End User
E2	Product Owner (PO)/ User Representative
E3	Subject Matter Expert (SME)
E4	Member of the Management of Client Organization/Product Sponsor
E5	Proxy to Client (eg: Business Analyst)

In comparing expectations of developers and the BA, about the most preferred forms of user involvement for high quality or effective involvement, it was found that the BA considered modes C1 to C5 to be effective for all user types, with face-to-face one on one meetings being extremely effective with End User, Product Owner, Client Management and proxy to client user types. The BA did not consider C6 and C7 to be effective forms of communication at all, with the exception of text messaging (C8) as a means of contacting the BA in case the other forms of communication were not possible.

The Developers considered C1 to C5 to be high effective for communication with SMEs and the BA, but not that effective for communication with the Client Management User. Face to face meetings with the End User, Product Owner and SME user types was

considered to be a highly effective form of communication for user involvement followed by video conferencing which was stated as a good form of communication when the users were not available to meet in person. As they expected most involvement from End User and Product Owner user types for high quality involvement, phone and email were not considered effective enough for communicating with them as opposed to personal meetings, video conferencing and sharing desktops.

The expectations of the Developers and BA aligned well for modes C7 and C8 where both roles felt they were the least effective forms of communication. Overall, the expectations aligned well for preferred modes of communication for high quality involvement with slight variation in expectation about communication with End User and Client Management user types.

4.3.2.4 Discussion of Comparison of Expectations of Roles within Organization B for Nature of Involvement, Characteristics of Users and Mode of Communication for High Quality User Involvement

The expectations of the developers aligned well with those of the Business Analyst. Both roles expected high involvement of End User, Product Owner and SME (E1, E2 and E3) in activities C1 to C5. The Business Analyst or proxy to client user was also required to participate in these activities either for exchange of information or for the purposes of training. The developers and Business Analyst expected low involvement of user types E1, E2 and E3 in activities C6 to C9 and high involvement of users E4 (Client Management user type/Product Sponsor) and E5 (Business Analyst/Proxy to Client) in the same.

The developers and Business Analyst agreed on the importance of user characteristics C1 to C4 for all user types, except for the client management user (E4) whom the Business Analyst did not expect to exhibit those characteristics. Both technical roles did not expect users to have previous experience with project development or technical knowledge for their involvement to be of high quality, although they felt it would be helpful.

The developers and the Business Analyst agreed that the best forms of communication with users were personal meetings, either individual or in groups followed by phone and

email in case the personal meetings were difficult to arrange. They also advocated the use of video conferencing and shared desktop for effective user participation and considered them essential to obtain high quality user involvement.

4.3.3 Comparison of expectations of Organization A with Organization B

In this section we will perform a comparison between the aggregated Repertory Grids of technical roles of Organization A versus those of Organization B. As I was only able to acquire interviews with developers and a BA from Organization B, who belonged to different projects, the purpose of this comparison is only to find patterns between the two organizations. The results from the comparison of expectations of developers from both organizations align well as summarized in the table 13, revealing coherence in overall expectations of the developer role across organizations and Agile practices.

Roles	Developers of Org B		
	NoI	UC	MoC
Developers of Org A	✓	✓	✓

Table 13 Comparison of expectations of developer roles in Organization A and Organization B

The details behind these summary results and a discussion of their meanings and implications is presented in the next sections. The results are presented in a structure that follows the three Repertory Grids. A comparison of expectations of roles is presented first for the nature of user involvement (4.3.3.1), then for Characteristics of high quality users (4.3.3.2) and expected mode of communication for high quality user involvement (4.3.3.3).

4.3.3.1 Comparison of Expectations of Nature of User Involvement

Constructs/Elements	E1	E2	E3	E4	E5
C1	N	H	H	H	N
C2	H	H	H	N	H
C3	H	H	H	L	L
C4	H	H	H	N	N
C5	H	H	H	N	N
C6	L	L	L	L	L
C7	VL	VL	VL	VH	VH
C8	L	L	L	H	H
C9	L	L	L	L	N

Constructs\ Elements	E1	E2	E3	E4	E5
C1	L	H	VH	H	VH
C2	L	H	VH	H	VH
C3	L	H	VH	L	VH
C4	L	VH	VH	L	VH
C5	H	VH	VH	L	H
C6	VL	VL	L	VL	L
C7	VL	L	L	VH	L
C8	L	H	N	VH	H
C9	VL	L	L	H	H

Developers of Organization B

Developers of Organization A

LEGEND:

C1	DECISIONS ABOUT PRODUCT FEATURES
C2	Requirements Elicitation
C3	User Story creation
C4	Clarification of requirement
C5	Verification of functionality
C6	Co-development of software
C7	Project budget/cost negotiation
C8	Timeframe/Schedule of Project
C9	Choice of Technology

E1	END USER
E2	Product Owner (PO)/ User Representative
E3	Subject Matter Expert (SME)
E4	Member of the Management of Client Organization/Product Sponsor
E5	Proxy to Client (eg: Business Analyst)

4.3.3.2 Discussion of comparison between the two Organizations' expectations about the Nature of User Involvement

The comparison of developer grids of Organizations A and B show that the expectations of both sets of developers are very similar. The only difference being their expectations of end user involvement and decisions about the choice of technology. As the end users were not involved as much in projects of Organization A their expectations of end users

involvement was low. Developers of Organization B, on the other hand, indicated a preference of high involvement of end users in activities C1 to C5. Developer 2 of Organization B supported the result, exemplified by the following quote:

It is very useful to talk to end users. They tend to understand better than people conveying specifications, about what they want the product to do. They are the ideal Subject Matter Experts when it comes to the testing phase. (Developer; Organization B)

Developers of Organization B expected moderate involvement of the BA in activities C1 to C5, while in Organization A the developers felt the BA's involvement in those activities should be high.

Both sets of developers expected low involvement of users, except for client management user in Project Related activities (C6 to C9) around budget, timeframe, choice of technology and co-development. None of the developers were able to relate to the concept of "users as co-developers" except for a few developers in Organization B whose primary user stakeholder was the CTO of the Client organization.

As a client, the CIO is involved the whole way through which has driven the success of the project so far. He is available and quite an investigator. He likes to understand what is going on and how things work; that makes him very a knowledgeable person and that's how he can talk with know-how about the subject. We share screens with the CIO and get feedback that way. We shared application on a Microsoft link and that allows him to use it as he fancies. He is very good with SQL, so he will write something and get us to have a look at it. (Developer; Organization B)

4.3.3.3 Comparison of Expectations of Characteristics of Users for High Quality Involvement

Constructs/ Elements	E1	E2	E3	E4	E5
C1	L	L	N	H	H
C2	H	H	VH	H	H
C3	H	H	H	H	H
C4	H	H	H	H	H
C5	L	H	H	H	H
C6	L	N	H	H	H
C7	VL	L	N	L	N
C8	H	H	H	H	H

Constructs/ Elements	E1	E2	E3	E4	E5
C1	L	H	VH	H	H
C2	L	VH	VH	VH	VH
C3	L	VH	VH	H	VH
C4	L	H	VH	H	VH
C5	L	VH	H	H	H
C6	L	H	H	H	VH
C7	VL	L	L	L	H
C8	L	H	VH	H	H

Developers of Organization B

Developers of Organization A

LEGEND:

CONSTRUCTS	MEANING
C1	Expectation of time invested (by user) per week
C2	Expectation of ability to articulate
C3	Expectation of desire to participate
C4	Expectation of availability
C5	Expectation of authority/level of influence on project
C6	Expectation of experience with project engagement
C7	Expectation of technical knowledge
C8	Expectation of knowledge of business process (context of software being developed)

ELEMENT	MEANING
E1	End User
E2	Product Owner (PO)/ User Representative
E3	Subject Matter Expert (SME)
E4	Member of the Management of Client Organization/Product Sponsor
E5	Proxy to Client (eg: Business Analyst)

4.3.3.4 Discussion of comparison between the two Organizations' expectations about User Characteristics for High Quality User Involvement

The developers of Organization B placed equal and high importance on all user characteristics except for technical knowledge where the expectation was low. They felt that end users and user representatives were not expected to dedicate time to the project every week, if the SME and BA were involved. This was in agreement with the expectations of developers of Organization A, whose expectations were very high for the SME and BA. This is mainly due to the fact that developers of Organization A

consulted these two user groups the most on their projects and therefore had very high expectations of their characteristics.

Enablers to user involvement mentioned by Developers of Organization B were –

Often clients really want the project done but want no involvement whatsoever, which is a very frequent occurrence. Users who are active in wanting to get project done, understand parts that need to be finished, understand what to expect of us and basically have the knowledge to answer developers' questions is helpful to us. Prompt response from the user really helps. Keeping things open and flowing. Everyone should know what is going on and should be responsive to queries. It makes it easier when channels of communication are clear and we are aware of who and how to get in touch with for information. (Developer; Organization B)

Constant involvement with instant feedback is always appreciated. (Developer; Organization B)

Referring to influence on project the developers felt that users should not be very demanding, should be good listeners and have realistic expectations of the project.

User should be Open minded and having a bit of a voice. (Developer; Organization B)

Contrary to the developers of Organization A, end user feedback was greatly stressed upon by all the developers and the BA of Organization B exemplified in the following quote:

End user feedback would be nice as it would give a better idea of what is useful and what should be discarded. (Business Analyst; Organization B)

The basic expectations of developers were summed up by one of the developers at Organization B:

Client should be reachable at all times. Ideally, he should be sitting with the development team. (Our client is in Dunedin so he is reachable at all times).Users should have good communication skills .Users that are not tech savvy tend to misunderstand why we can or cannot use something. They should have an overall understanding of software. They should be proactive about what they want and not change requirements. They need to be well aware of the business process to be able to tell us exactly what they need. The clients should not micromanage and should trust the development team on the project.
(Developer; Organiaztion B)

4.3.3.5 Comparison of Expectations of Modes of Communication for High Quality User Involvement

Constructs\ Elements	E1	E2	E3	E4	E5
C1	H	H	H	L	H
C2	N	N	H	L	H
C3	L	L	H	L	H
C4	L	L	H	N	H
C5	N	H	H	L	H
C6	VL	VL	VL	VL	VL
C7	VL	VL	VL	VL	VL

Constructs\ Elements	E1	E2	E3	E4	E5
C1	L	H	VH	H	VH
C2	H	H	VH	H	VH
C3	L	H	H	H	H
C4	L	H	H	H	VH
C5	L	L	H	L	H
C6	VL	VL	VL	VL	VL
C7	VL	VL	VL	VL	VL

Developers Organization B

Developers Organization A

LEGEND:

CONSTRUCTS	MEANING
C1	Face to Face (Group Discussion)
C2	Face to Face (Individual Meeting)
C3	Phone
C4	Email
C5	Video Conference
C6	Social Media
C7	Text Message

ELEMENT	MEANING
E1	End User
E2	Product Owner (PO)/ User Representative
E3	Subject Matter Expert (SME)
E4	Member of the Management of Client Organization/Product Sponsor
E5	Proxy to Client (eg: Business Analyst)

4.3.3.6 Discussion of comparison between the two Organizations' expectations about Mode of Communication for High Quality User Involvement

The most preferred forms of communication for both sets of developers is face-to-face personal meetings, however the developers of Organization B tended to use phone email and videoconferencing frequently and felt that they were effective means of communication.

Both sets of developers did not regard social media and texting as forms of communication effective enough for communication for project related queries.

It is better to be able to pick up the phone and ask for what you need as that provided more scope for discussion as opposed to email. We usually talk on the

phone or share screens. At one point, when he was overseas, communication was quite email driven and we had to make sure we gave him options in the form of screen shots. (Developer; Organization B)

OCS and phone are not as good as talking in person. Communication over email is time consuming. (Developer; Organization B)

4.3.3.7 Overall comparison between the Two Organizations' Expectations around practicing User Involvement and conceptualization of High Quality User Involvement

One of the objectives of the research question is to examine the expectations of the different roles involved in project development and how these expectations align with each other. The study of both organizations A and B revealed that even though expectations may not align initially, an endeavour on the part of each side – technical and user, to meet expectations would lead to good quality involvement, which in turn would benefit the project to a great extent. A case-wise breakdown of expectations for each component of user involvement has been given below:

4.3.3.7.1 User Involvement in Development activities

The study of Organization A revealed that of the technical roles interviewed, Developers, Testers and Project Managers expected higher involvement of end users, SMEs and User representatives in activities around the elicitation and clarification of requirements, creation of user stories and verification of functionality. Having a dedicated SME who was picked due to his background of being an End User proved to be advantageous for this project. As most members in technical roles greatly vouched for end user input and involvement in project activities, the End User emerged as the most valuable contributor of all user roles and therefore high involvement of this user type is emphasized. The SME and BA were secondary user roles expected to have high involvement followed by moderate involvement of the Product Owner or Product Sponsor. On the projects in Organization A, the expectations of the Developers, Testers and Project Managers aligned well with those of the Product Owner, Proxy to Client (BA) and to some extent, the SME around the involvement of these specific roles. It was indicated during their interviews that the technical teams engaged seamlessly with the users impacting the development process and the project positively. The technical team interviewed at Organization B showed similar indications. They stressed the importance of End User involvement and even referred to them as the “ideal Subject Matter Expert” for the Testing phase. They supported the theory which states that end user involvement is as crucial in the requirement elicitation and clarification phases as it is in the verification of functionality, Testing phase.

4.3.3.7.2 Essential user characteristics for the involvement to be effective and beneficial

Highly motivated users who knew the business process well were most preferred for involvement by both Organizations. The expectation of both sets of technical teams was that users who are interested in participation and genuinely have the best interests of the project at heart should be selected for involvement in the development process. The explanation was that motivated and keen users have an eye for detail and are therefore able to provide better quality feedback, thus enhancing the quality of involvement. The technical team at Organization A felt that the key users on their projects, the SME and the PO, were “switched on” and wanted to influence the project positively. The fact that they were easily accessible also helped the cause. The technical team at Organization B communicated frequently with their clients over the phone and/or email, if not personally over meetings and found that frequent communication was essential for project success. They too, emphasized upon client accessibility as a major factor in improving the quality of user involvement. Both sets of technical teams mentioned that although technical knowledge would be helpful, it was not a compulsive requirement for successful user involvement. User availability and ability to participate were two major concerns expressed by both sets of technical teams. Inability for users to participate and provide detailed feedback was reported as a hindrance in achieving effective user involvement. In Organization A, the expectations of the users were initially unclear about the extent of their involvement and how much time they would be required to dedicate to project related activities. However, due to the fact that the SME and PO on this project volunteered to participate shows that they were highly motivated to participate and therefore were willing to meet the development team’s expectations of time commitment to fulfill the project’s needs. Thus, it is suggested that if the expectations of technical members and users can be understood, common ground can be found to accommodate each other’s requirements which would lead to a successful symbiotic user-developer relationship.

4.3.3.7.3 Preferred forms of communicating with user for consultation

For Organization A, the study showed that the most preferred forms of communication were face to face meetings. Phone and email were the secondary forms of communication. The users in Organization A were co-located with the development team as this was an in-house project. Therefore, access to End User feedback was relatively easier. The SME was physically present with the technical team and the Product Owner attended most stand-up meetings besides making himself available for remote consultation as well. The expectations of both groups, the users and the technical members, aligned well and the users made every effort to meet the technical team's requirements at every step.

A study of the technical team at Organization B revealed that for external projects, personal meetings and group discussions were practically possible during the early stages and at the end of a delivery phase. Even though physical presence of the users on-site was preferred; phone, email and Open Communication Services were the most frequently used. As long as the users agreed to respond well over any of these modes of communication as and when required by the development team, communication was effective. Thus, it was stated that in order for any of these modes of communication to provide beneficial outcomes, it is necessary for the user to be available to communicate as and when needed by the development team, with minimum response time to queries.

The second objective of this investigation was to examine the influence of expectations on the quality of user involvement. As interviews with users and technical members on the same project were only obtained for Organization A, the inference is based on the comparison of data from interviews and Repertory Grids for both roles. It was revealed that the SME's expectations around his involvement did not entirely match with those of the technical roles. This was attributed to the fact that he did not have previous experience of engaging in a project and being new to the role, was unsure of the level of importance his participation played in project activities. The SME was open to trying out new things and was willing to meet the technical team's expectations of his role in the development process. The Product Owner, who was the second user on the same project as the SME, was more aware of his role in the development process. He was vested in the project and although his expectations were a good match to those of the

technical team members', was willing to cooperate to meet their expectations of his role in the development process. This Organization's technical members found it highly beneficial that the users were accommodating and able to participate in the way that they expected them to. Although we were unable to obtain interviews with any of the clients of Organization B, from their interviews it was inferred that if users could not only understand the technical team's expectation of their intended participation in the project, but also try and meet them it would help the quality of involvement immensely. Team Organization B's expectations mainly revolved around the clients availability to participate and trusting the development team with their judgment of what is best for the project. Timely user input was stressed upon by the developers of Organization B and raising issues earlier on in the development process. They suggested briefing the users about what their participation would entail, before commencing the project. There is always the possibility of user expectations not meeting those of the developers but if users could endeavour to meet developer expectations to the greatest extent possible, it would improve the quality of involvement greatly.

4.4 High Quality User Involvement

The objective of this research was to examine expectations around user involvement and to understand what current practitioners consider as high quality, effective and/or beneficial user involvement. The results from the two cases show that the research design is robust and an effective way of recording and analysing expectations of various roles involved in user engagement for project development. The various issues and considerations related to user involvement were brought to light and a cognitive model of the concept of high quality user involvement was developed. During the course of this research, the constituents of effective or high quality involvement were revealed as a result of the analysis of data from the interviews and Repertory Grids. Additionally, the barriers that are frequently encountered in achieving high quality involvement have been identified and facilitators to alleviate these barriers in order to achieve high quality user involvement have been suggested. The expectations of different roles, technical and user, have been analysed and presented so that they can be better understood and taken into consideration when developing processes and procedures to achieve good quality user involvement. It was found that the most important influences to good quality user involvement are the characteristics of the users that are involved in the project. If they exhibit characteristics that are favourable for engagement then the quality of involvement is high, if they exhibit contrasting characteristics to what the development team expects, then the quality of user involvement is hampered. The findings from this research have been presented in the diagram below explaining the current scenario of what comprises good quality user involvement and the barriers and enablers affecting the same.

Figure 3 represents the constituents of high quality involvement, as derived from the interviews and Repertory Grid analysis, and factors influencing each of them. This chapter provides an explanation to how this model of high quality user involvement was conceptualized, followed by the barriers and enablers, to high quality user involvement, that were highlighted during this research.

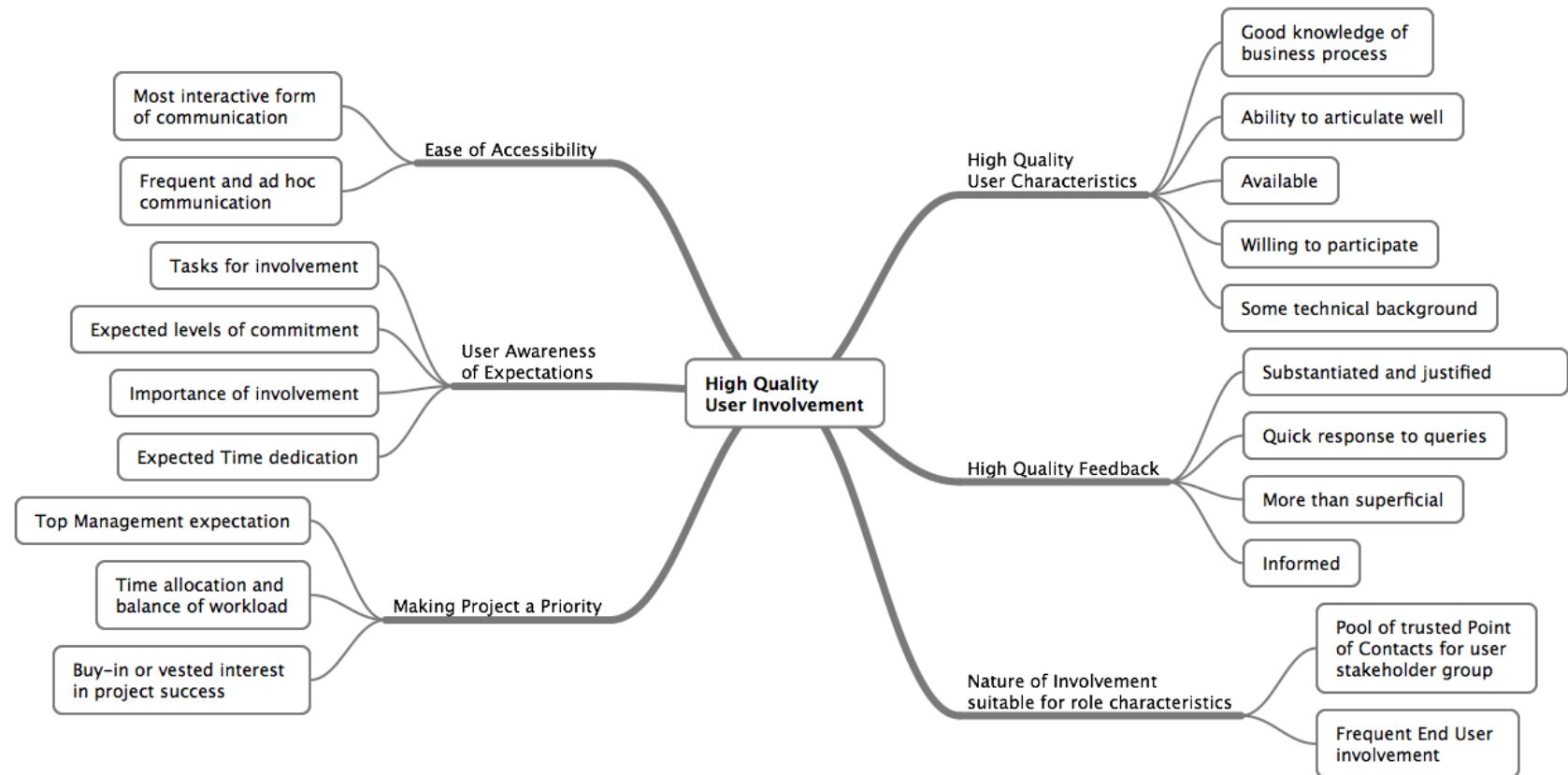


Figure 3 High Quality User Involvement Model

4.4.1 Conceptualization of High Quality Involvement

4.4.1.1 Involvement Suits the Role

The different user roles should have distinct responsibilities where certain user types should be more concentrated on certain user engagement tasks as compared to the others. End User input is considered paramount to good user involvement and therefore this user type is expected to have high involvement in activities relating to requirements elicitation, clarification and testing phases. It was perceived that End Users and SMEs know the business process well and would be able to point out what features help them achieve their task related goals in the best possible way. End User knowledge should be supplemented by the Business Analyst's expertise, especially in areas where end user knowledge of technology is lacking. A good understanding of end user needs is considered to be very important for the project to meet its intended goal of maximum user acceptance and end user satisfaction for project success. Therefore, for enhanced user involvement it was suggested that Business Analysts should represent the needs of the end user as closely as possible for enhanced quality of user involvement. The Product Owners, Sponsors and members of the client management should be aware of the on-goings in a project and while they can play a role in contributing towards the project, their inputs should not be given precedence over end users as far as decisions pertaining to the features and functionality of the software are concerned. Their influence should be greater for decisions surrounding the budget and time frame for project, while end users and SMEs should have greater influence regarding the features and functionality. Project Managers stressed upon the importance of Product Owners making quick decisions for effective user involvement. A developer was quoted as saying that

End users are at a low level, but it would be helpful if they decided budget and functionality because it is they who use the application regularly. If they feel that certain functionality should be given more importance, we can work on developing it immediately and probably delay release by a week. (Developer)

4.4.1.2 High Quality Feedback

An important element of effective user involvement was found to be the quality of input or feedback received from the users, regarding the project/product. The development team expected users to provide prompt response to queries, preferably earlier in the development process. A prompt response from the users enables the development team to address issues there and then, preventing a delay in deliverables and also avoiding a great deal of re-work. Users paying attention to the finer aspects of the projects and scrutinizing functionality of the software during the testing phase was described as proactive and good user involvement. This would result in improved quality of user feedback and it is also expected that feedback or suggestions accompanied by supporting reason would further substantiate the intent of user involvement, thereby resulting in high quality user involvement. A Project Manager mentioned that as a decision maker, a *“Product Owner should be able to make quick decisions”*. The Business Analyst also added that *“the user should be able to bring to light information early on in the development process”*. Another Business Analyst added that *“the user should know the business domain and area within it well. He should have a good understanding of the wider areas and be able to communicate, listen, explain and comprehend”*.

4.4.1.3 High Quality Users

A main concern that was expressed by the development teams, around user involvement, was the ability of users to participate. It was recommended that the client business should prioritize user participation and should create processes to facilitate user engagement. This can be done by emphasizing the importance of user input and ensuring that the users' workload is balanced in a way to enable them to devote sufficient time to project related activities. Also, in selecting users for participation in the project, it was suggested that users who express a keen interest to contribute and are generally more inclined towards engaging in the project should be considered for involvement. They should be encouraged and facilitated to participate by including participation in their regular tasks and making it a priority. This was exemplified in a quote by a developer.

Users who are active in wanting to get project done, understand parts that need to be finished, understand what to expect of us and basically have the knowledge to answer developers' questions is helpful to us. Prompt response from the user really helps. (Developer)

Addressing the inability of users to make time to participate a developer suggested that “workload and schedules for users should be managed in such a way that everyone gets to have their say in time”. A Business Analyst stressed on this factor as well saying that users “should care about the outcome enough to actively participate. More engagement leads to natural progression to comprehend other cases”.

4.4.1.4 Ease of Accessibility

Communication between the two groups – users and developers is extremely crucial to gain the most out of user involvement and should be as frequent as required. This is connected to the previous condition, wherein users should ensure they are available for communication by all viable means if not in person whenever there is a need for information. Users need to be open to being contacted by developers on a need basis and this would be helped by ensuring that communicating information to the developers is a priority. Developers find that being able to contact a user at any time is imperative for high quality involvement.

It is better to be able to pick up the phone and ask for what you need as that provided more scope for discussion as opposed to email. We usually talk on the phone or share screens. At one point, when he was overseas, communication was quite email driven and we had to make sure we gave him options in the form of screen shots. (Developer)

They found that being able to communicate with the user frequently was very beneficial to project success.

4.4.1.5 User Education

While a lot has been said about the importance of understanding user needs, it is necessary for users to understand what their involvement entails and what the expectation is around their involvement. Users should be educated about the importance of their involvement, the activities they could be potentially involved in and kind of knowledge that is expected of them. This will enable users to develop a sense of responsibility towards the project, enabling them to have a better understanding of what is expected of them. This was exemplified in a quote by a project manager who said that

the SME needed to be educated a little about his role, although originally we assumed he would know what was expected of him. (Project Manager)

Describing the process of educating a user about what they can expect and what they need to do as part of the involvement a developer stated

A good user is one who understands the balance that has to take place – business and technology. Also, users need to be stricter during the User Acceptance test. (Developer)

4.4.2 Barriers to Good Quality User Involvement

4.4.2.1 Overbearing and mistrustful users

Clients who lack trust in the development team and tend to micromanage are considered the most undesirable candidates for user involvement. Developers emphasized that “*having to give an explanation for every step is infuriating and a major setback to the development process*”. They also stated that clients who “*do not listen to you and just cut you off and tell you what they want*” do not help the development.

4.4.2.2 Technologically challenged

While users are not expected to have a technical knowledge and expertise at the same level as the development team, they are required to have some experience with working with software at some stage. Users who do not understand the limitations of technology

will not understand its capabilities either. An ideal candidate for user involvement is someone who is fairly knowledgeable about the way software works and has realistic expectations about what the solution can and cannot do. This was exemplified in a quote by a developer who stated that

sometimes it was difficult talking to someone without IT background. (I) would have liked to talk to the system user. (Developer)

Another developer added that,

some things are technical and business people cannot understand why they cannot have certain things. (Developer)

4.4.2.3 Availability

The inability to get all user stakeholders to attend meetings and workshops is a major impediment in achieving the benefits of user involvement. Users who are unable to commit to participation due to their own demanding workload or schedules will lead to poor quality user involvement. Users who do not understand the importance of their involvement and do not prioritize the project are least beneficial to a project.

Sometimes, the manager doesn't know everything about the system, but the actual user does and therefore, their opinion is more useful. (Developer)

4.4.2.4 Poor understanding of the importance of Involvement

In some cases, it is difficult to explain to businesses the importance of their constant involvement throughout the development process. The process of obtaining approval for developers to contact and interact with users is often tedious and can be a major setback to the project.

People (on client side) take more interest when they are made aware of the commercial value of a project and are willing to step in when there are bigger commercial issues.(Developer)

The barriers are generally around the characteristics of participating users and are often interconnected. A representation of barriers to high quality user involvement is shown in Figure 4 below:

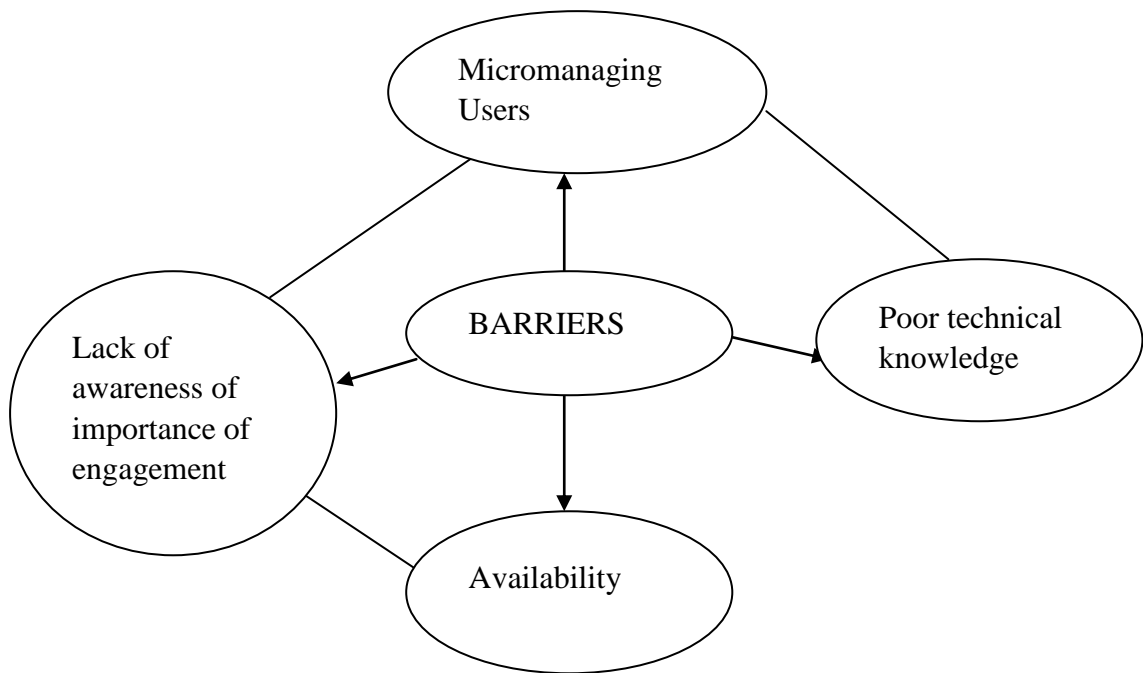


Figure 4 Barriers to High Quality User Involvement

4.4.3 Enablers for Good Quality User Involvement

In combining the constituents to high quality user involvement and addressing the barriers discussed a set of enablers to high quality user involvement has been drawn below.

4.4.3.1 Motivated Users

Clients who are motivated by a genuine want for the project to succeed are most desirable candidates for user involvement. These users are said to have the best interests of project at heart with a genuine desire to learn alongside contributing to the project, and therefore are more likely to provide information that is of high quality. Good user involvement should result in high quality information that is useful to the development team and high quality information is what characterizes good user involvement. This was something that was highly emphasized by Project Managers and Developers.

How much they care about what the solution does for them is important. They need to believe and feel passionate about the project. they should care about the outcome enough to actively participate. More engagement leads to natural progression to comprehend other cases. (Business Analyst; Organization B)

4.4.3.2 Good Communication Skills

Users who not only understand the business process well and the objective the software solution needs to meet, but can also articulate their needs effectively are considered good candidates for involvement. Requirements and feedback that is communicated to the developers effectively results in less ambiguity and more effective development. It is important for users to be able to supplement the users with information representing their exact needs in the most comprehensible form.

Having clearly defined and detailed requirements is very helpful.
(Developer; Organization B)

Open and proactive lines of communication. The user should know the business domain and area within it well. He should have a good understanding of the wider areas and be able to communicate, listen, explain and comprehend. (Business Analyst; Organization B)

Keeping things open and flowing. Everyone should know what is going on and should be responsive to queries. It makes it easier when channels of communication are clear and we are aware of who and how to get in touch with for information. (Developer; Organization B)

4.4.3.3 Availability

Users should prioritize project and ensure that they are available to engage in project activities in a timely manner and in the most interactive way possible. Besides attending meetings and workshops, it is also crucial for users to participate actively and provide feedback whenever possible. If the situation does not demand a personal meeting, users should be prepared to be available on other media of communication such as phone, email, open communication services and video conferencing and be able to invest enough time to be able to reflect and provide quality feedback.

As long as users and stakeholders come to stand up meetings and it has a productive outcome, they will be able to see the progress of the project.
(Business Analyst; Organization A)

The user should be available, readily accessible and responsive to questions.
(Business Analyst; Organization B)

Available whenever we need information. Available for face to face meetings
(Developer; Organization B)

4.4.3.4 Pre-defining User stakeholder group

While it is not practically possible to consult all users of the proposed solution, it is helpful to consult with users from each of the studied user types. It was suggested that a group comprising at least one End User, an SME and Product Owner is ideal for good

user involvement. It is highly helpful for the development team to know exactly whom to go to for what information. Pre-establishing point of contacts in the user group at the start of a project is a practice that will lead to wholesome user input resulting in high quality user involvement.

A decision maker should be reasonably involved in the project considering they are the ones who are paying for the features they want on a project.

(Developer; Organization A)

Someone who has industry knowledge and has been across different policy types and is able to give voice to different scenarios.

(Business Analyst; Organization A)

They must know the whole business process. It is helpful to obtain inputs from users who belong to the core business as well as exceptional cases that are different from mainstream but know minor details about the business and/or application to be developed.

(Developer; Organization A)

There is only one SME on the project, which limits it to one perspective.

(Developer; Organization A)

4.4.3.5 End User involvement

End User is the main recipient of the software solution to be developed and therefore should be involved the most in project development. They know the business process well and are able to point out what features or functionality need to be made priority and what are the main objectives the proposed solution needs to meet. Developers stressed upon the involvement of End Users and attributed high quality user involvement to the involvement of End Users. This was exemplified in the following quote:

Would have liked to talk to the system user. Sometimes, the manager doesn't know everything about the system, but the actual user does and therefore, their opinion is more useful.

(Developer; Organization B)

4.4.3.6 Prioritizing project

Businesses should not make a halfhearted commitment to engaging in the project but instead, make project participation a priority. Processes should be created around the facilitation of user involvement to make it easy and fruitful for members of the user stakeholder group to dedicate themselves to the cause of project success.

Workload and schedules for users should be managed in such a way that everyone gets to have their say in time. (Business Analyst; Organization A)

Some of the enablers to high quality user involvement are often related to each other. A diagrammatic representation of the enablers to high quality user involvement is shown in Figure 5.

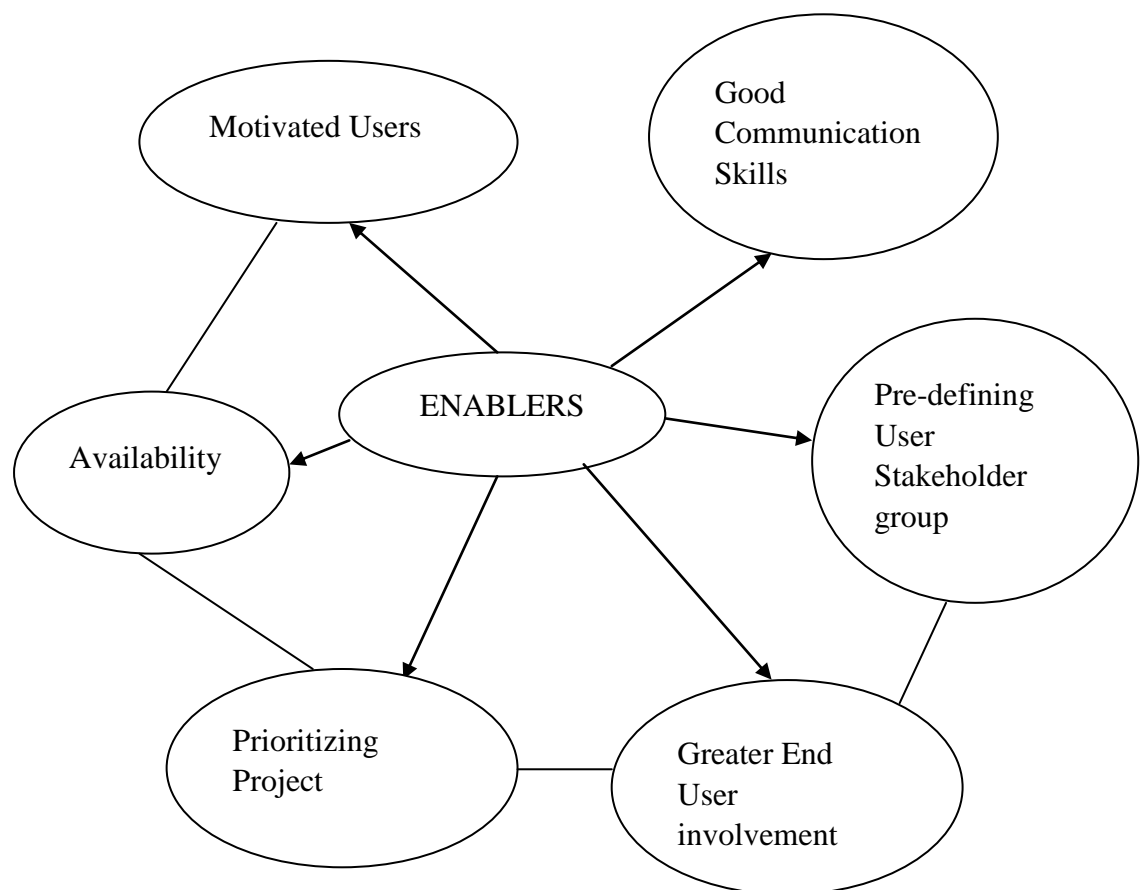


Figure 5 Enablers to High Quality User Involvement

4.5 The Implications of the Findings

The expectations around user involvement have been the centre of focus for this research with the aim of obtaining an understanding of what comprises high quality user involvement. The expectations of different technical and user roles have been presented for Agile practitioners to gain insight into the perspectives of various roles within a team about user involvement and what they perceive as high quality or beneficial user involvement. This would facilitate the creation of improved processes around implementing user involvement and what is expected out of the involvement of users for each role to perform better in project development. Technical members now have a better idea of the expectations of the user group about user involvement and can use the findings of this research to enable them to contribute in a more effective way. The interaction with users can be made more useful by taking into consideration the expectations of various stakeholders and can be prevented from being a mere, substandard procedure of obtaining user input. A better understanding of the expectations of all stakeholders involved will greatly facilitate the development process providing a boost in the direction of project success.

The findings of this research contribute to the vast body of knowledge about user involvement with a specific focus on expectations and how expectations influence the conceptualization of high quality user involvement. This thesis will also be useful to businesses liaising with software development companies implementing Agile techniques, as customers of a software company. It provides clear visibility of what is expected of customers from their involvement in project development, the importance of their input, which roles within the user group contribute most effectively in which areas of the development process and how they can ensure that their involvement enables the development team to deliver better results in creating a more satisfying product.

The High Quality User Involvement model conceptualized as a result of this research endeavour can be used by both Agile practitioners and their customers to understand the various issues faced in involving users in project development, how these can be alleviated and important considerations for achieving beneficial or high quality user involvement. Practitioners can use this model as a reference when creating processes

around User Involvement for software development in the Agile space, to ensure that standards of quality user involvement are met throughout the development cycle. Taking into consideration the aspects comprising high quality user involvement described in the model would lead to effective utilization of time and resources and high customer satisfaction not only about the software solution but also about their involvement in the project. It is a known fact that the success of a project is relative to the customer's satisfaction with the product and this research goes to show that by understanding expectations of customers about their involvement, it would also lead to customer satisfaction with regards to their involvement in project development. The overall objective of this research to contribute to improved processes to user involvement for better results and project success supports the creators of software in achieving their objective of delivering a product of maximum customer satisfaction.

5 Conclusion

The research aims for this thesis were to understand the expectations around user involvement and what comprises high quality user involvement. This research has met its objective of obtaining expectations of various roles around user involvement in software development and around the conceptualization of high quality user involvement. The research aim has a clear and focussed rationale in relation to obtaining an in-depth understanding of what the current state of user involvement is in practice, the expectations of technical and user groups surrounding its implementation and factors that influence its quality or effectiveness.

The expectations of various technical roles were compared with user roles as well as within their respective groups using a Repertory Grid technique. It has been found that the expectations of roles within the development team aligned well and while they aligned well with certain user types, there could be more clarity on what is expected of each user type for involvement in different stages of project development. While in Organization A, it was seen that the expectations of the Business Analyst aligned poorly with those of other team members, in Organization B the expectations of developers and the Business Analyst aligned well. The interviews and Repertory Grids of technical members from both organizations revealed that it is important to educate the user group about the importance of their contribution in project development, what they are expected to do and areas of focus for specific user roles.

The comparison of expectations of the technical roles with those of user roles revealed that there was a slight gap in knowledge about user involvement in terms of what was expected of the users. The interviews were used to support or argue the findings from the comparison of the Repertory Grids. Even though the grids revealed a certain pattern of expectations about the involvement of a particular user type, the interviews sometimes evidenced contradictory expectations suggesting that the real expectations were actually what were reflected in the interviews and not in the grids. The idea of looking at different sets of expectations was to enable groups, user and technical, to understand each other better and set common ground for mutually beneficial user engagement. By presenting the different set of expectations in the open, one can use the

findings of this research for better coordination and improved relationship between the user and developer groups. Technical members will know what the users are expecting to do as part of their involvement in project development and any misconceptions can be cleared earlier on in the development process. The user group can be made aware of the technical team's expectations about the involvement of different user types so that they can endeavour to supply the right user types for engagement with developers.

High quality user involvement has been conceptualized taking into consideration the expectations of the various roles involved in a project. This comprised factors surrounding user stakeholders – high quality user characteristics, nature of involvement suitable for role characteristics and ease of accessibility of users. There were also factors related to the process of involving users – raising user awareness of expectations, making project a priority and high quality feedback. Each of these factors has been further broken down to the aspects that they are comprised of, providing a structured approach to achieving high quality user involvement. This is useful to both practitioners and researchers interested in exploring this area. It clarifies the meaning of the goal of high quality user involvement and could provide the basis for a future quality metric.

The findings from this research will not only aide current practitioners of Agile to improve the process around implementation of Agile techniques, but also help other business understand user involvement in Agile software development and give them an idea of what it is about, what its benefits are, how they can contribute effectively as users and derive optimum benefit from their involvement in software development. The findings from the comparison of the expectations of different roles within the technical team and with the user group will help members of different roles understand each other's expectations better, contributing to better coordination in a project and the creation of processes that lead to effective user involvement.

The findings from this research provide a deeper understanding of the alignment of expectations within a technical team as well as with the user stakeholder group. They generate an awareness about of the differences and similarities of expectations with the view to encourage discussion and an effort to align expectations in order to achieve benefit from user involvement. The meaning of “high quality” user involvement has

been conceptualized providing a structure to expectations around various aspects of user involvement and what enabling and impeding factors can be expected in Agile practices, in achieving quality user involvement.

5.1 Limitations

In interviewing members of the software companies that partnered in this research, interviews with their clients could not be obtained. This was either because the clients, of the projects studied were overseas or were not keen on participating in research. Ideally, it would have been helpful to get interviews with the user groups for projects studied in both organizations in order for the data to be treated equally for comparison. However, due to time constraints obtaining interviews with at least technical members became priority. Additionally, I was unable to interview other user types that comprised elements of the Repertory Grid. The expectations of End User could not be obtained, which would have added more value to the analysis of data. Further research in the direction can aim at obtaining expectations of a range of user types and comparing them with expectations of each technical role to check if the results of this research still hold true.

For this research, I was able to obtain only one interview with each role and interviews were scattered over a period of 3 months. Perhaps, obtaining interviews with technical members and the user group of a specific project, would have narrowed down the context to a more specific detail. It would have been interesting to obtain expectations of technical and user groups and various stages of the project, that is, the beginning, middle and end to observe how expectations evolve over a period of time. It would bring to light the factors affecting expectations at various stages and what is the expectation of high quality user involvement at each stage. An alignment or misalignment of expectations can be examined at every stage of the iteration to identify how they are managed at respective stages, in practice and how the management of expectations can be improved for high quality user involvement.

5.2 Further Research

This research can be taken further by examining expectations of practitioners of different Agile techniques. It would be of value to know how expectations differ in a range of different Agile organizations and whether the model for high quality user involvement conceptualized in my research is coherent with other practices to the Agile methodology.

Both organizations studied for this research had different set of user stakeholders. The project in Organization A was in-house, while all projects in Organization B were external. The expectations around high quality user involvement for both organizations were not markedly different, but the expectations around barriers and enablers for user involvement for in-house and external projects did differ to a great extent. Future work in determining the type of project as a factor influencing expectations around user involvement and the conceptualization of high quality user involvement would be a good area to research.

Lastly, for this research data was collected in the form of personal interviews and Repertory Grids. Perhaps more meaning could be added to this approach of the teams on projects can be observed by the researcher as a third party, supplemented by brief interviews when required and the constructs for the Repertory Grids obtained from these interviews, rather than being pre-decided. The fixed Repertory Grids used in this research can be validated against the grids created as a result of interviews to check which type of grid presents expectations that are closer to reality.

6 Appendices

Appendix 1: Questionnaire for Interviews

DEVELOPMENT TEAM MEMBERS

Background Information

- Please briefly describe the aim of the software development project you are currently involved in.
- Please describe the software development process your team is using to manage this project? Would you describe it as agile?
- How would you describe the current stage of the project?
- Please describe your role in this project.
- What do you consider your main responsibilities in this role for this project?
- How many years of experience do you have in this role?
- How many years have you been with this organisation?

Characteristics of users to be involved

1. Who do you consider are the main client stakeholders that need to be involved in this project and what are your expectations about their knowledge and skills?
2. How will you go about selecting users for participation in project related activities?
3. What characteristics, according to you, make a good candidate for participation in project related activities?

Expectations of User Involvement

1. How do you think the interaction with the users will contribute to this project? / What are you hoping to get out of the interaction with users?
2. In what ways do you think users of the software should be involved in the project and how will you go about getting them to contribute to the project? (stages of development, activities, expectations of time commitments)

3. In your experience, how aligned were the users' expectations of their role in the project with yours? In what way does this alignment or misalignment affect the success of the involvement and by extension, the project?

Defining the Quality of User Involvement

1. How would you judge the effectiveness of users' participation in/contribution to the project?
2. How do you distinguish between useful user contribution and poor user contribution? (Probe)
3. What are the barriers expected when involving users in project activities and how would you go about alleviating them?
4. If the involvement does yield the desired results, what will you do to get optimal benefit from the participation of users?

STAKEHOLDER TEAM MEMBERS

Background Information

- Can you please describe your role in in the organisation?
- How many years' experience do you have in this role?
- How many years have you been with this organisation?
- Have you been involved in a development project before?

Characteristics of user involvement

1. What knowledge or skills do you think you will be expected to have during your involvement in this project?

User Involvement

2. Please briefly describe the aim of the software development project you are currently involved in.
3. How did you come about to participate in the project?
4. What do you know about what you will be doing in the project and how do you think you will be contributing to this project?
5. About how much time do you think you will have to invest through the duration of this project and what are your thoughts on the expectations/demands of your time?

6. What do you think can be done to improve your understanding of your role in this project and help you contribute effectively?
7. Who do you think you will be interacting with from the development team (the roles)?
8. What are your thoughts on being part of this project?

Defining the Quality of User Involvement

9. How do you think the effectiveness of your contribution will be judged?
10. What according to you differentiates effective participation from ineffective participation in project related activities (assigned to you)?

Appendix 2: Thematic Analysis of Interview Data

Step 1: Reduction of information from Interviews

ORGANISATION A

PROJECT 1

Developer 1

Background:

Is a Technical lead and developer who has been with Organization A for around 2 years.

Project:

The aim of the project is to simplify commercial, java based front end and DB2 database that talks to the back end. It will replace the existing system.

Process:

The Business Analysts document stories, backlog and the ones that get put up on the wall are for analysis by the BA. There are discussions between the technical team and testers and then there is a sprint planning session. Some of it is Waterfall.

Client stakeholders:

Subject Matter Expert (SME), Product Owner (PO)

Nature of Involvement:

Every 4 weeks, we get the end users in for showcases. They get to interact with the module hands on and provide feedback about their experience with the system, which enables us to provide a more relevant system to them. We start with a powerpoint presentation and demo of the application, features and mock-ups of the functions and then we get them to interact with the system.

After a two week sprint, we showcase to the stakeholders, that is the Product Owner and SME. Then there will be a proper showcase with end users two weeks after this one.

We are the proxy to the users. From requirements perspective, BA gathers requirements by talking to the SME, not so much to the branch staff.

Observed User Characteristics:

We have recently changed SME. He is getting up to speed.

The PO is very prompt and response time is usually less when we need any information from him.

Desired User Characteristics:

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Observed Barriers:

There is only one SME on the project, which limits it to one perspective.

There are different requirements from diverse user groups. Sometimes it is difficult to accommodate everyone's suggestions.

It is difficult to get people together at the same time. An area we would like to improve.

Facilitators:

It would be helpful to have end users on the project team 24/7.

There should be more than one SME, to get more than one perspective.

End users are at a low level, but it would be helpful if they decided budget and functionality because it is they who use the application regularly. If they feel that a certain functionality should be given more importance, we can work on developing it immediately and probably delay release by a week.

End users need to have greater influence on a project, even though at the moment it is low.

Developer 2

Background:

Developer 2 is a Java developer with around 6 years of experience. He has been on this project for about 1.5 years.

Project:

This is a Commercial Risk project. We are developing an online application for commercial risk for Organization A.

The project is at a stage where they are trying to change from one type of transaction to another. The planned deadline for this module is early 2013 and I am currently in the process of discussing the screen with the BA.

Process:

The general principle of this project is Agile. We work with the BA and tester and a story board.

Client stakeholders:

Commercial business manager – He looks after the portfolio and how branches operate.

Stakeholder 2 – She looks after the business process throughout Organization A.

SME – He used to be an end user and has been brought on board only recently. He consults with Stakeholder 2.

Different branch members are selected by Stakeholder 2 to attend different showcases.

Nature of Involvement:

Observed User Characteristics:

A co-located user, currently played by our SME is perfect. He knows the business process inside-out.

The end users are very helpful during the showcase. They get a feel of the application when they are given a chance to interact with it hands on.

Desired User Characteristics:

Users should be willing to interact with prototypes hands-on and should have some knowledge of web development.

Some skill or knowledge about popular online applications will help them provide better suggestions.

They must know the whole business process. It is helpful to obtain inputs from users who belong to the core business as well as exceptional cases that are different from mainstream but know minor details about the business and/or application to be developed.

Observed Barriers:

Differences in knowledge area – If they (users) haven't used the system in day to day process, they lack interest in the hands-on process and can only keep up during presentations, instead of being proactive during the acceptance testing exercise.

Facilitators:

The quality of suggestions provided could really make a difference to the project. If the users can provide reasons along with their suggestions it would really help us design solutions that will suit them.

The user should be able to explain a real business scenario to us.

Users should do some more analysis on their side to be able to make us aware of exceptions which will enable us to come up with clearer requirements.

Business Analyst 1

Background:

Project:

The aim of the project is to build an online tool for the internal branch staff to write and manage information. The technical team comprises 2 testers, 1 project manager, 1 SME and 4 developers. We are currently in the delivery phase. There are a number of features we will be developing, which are deliverable in March 2013.

Process:

During the requirement phase, we gather requirements from the stakeholder by talking to them about their expectations in terms of what they need and why they need it. We then involve the SME and obtain users' view by thinking of scenarios. The online

support team and team leader is involved in these discussion as they know how branch users interact with the software.

Client stakeholders:

SME

Product Owners

Branch Staff

Nature of Involvement:

“I do not interact with the end users apart from in the showcases. There are sometimes decisions we need to make that could affect branch users”.

The branch users are invited to showcases. Typically there are 2-3 users, which is not a great representation. When they attend showcases, the work hands on which enables them to give us better feedback.

We have a designated SME in the team and therefore the number of issues is significantly low

Observed User Characteristics:

Getting input from the end users is not difficult. We collate information through the support of the Team Leader at branches.

Desired User Characteristics:

Experienced with system – Someone who has industry knowledge and has been across different policy types and is able to give voice to different scenarios.

The user should be comfortable using the system and knows it well

The user should be able to bring to light information early on in the development process.

Forward thinking - A user who thinks about the bigger picture and is happy to offer information outside of the current topic

Observed Barriers:

There were no barriers or issues in gathering information as we have a designated SME in the team.

Resistance to change – People who are pedantic about little things and cannot see the bigger solution

Facilitators:

Screen Mock ups of process flow to get across to users.

Project Manager 1

Background:

Project Manager 1 has been in this role for 5 years, all with Organization A. It is a scanning role, that she describes as one who tries to prevent issues before getting there. She removes obstacles for the team.

Project:

The aim of this project is to allow branches to process endorsements for business insurance. The project is at a stage where we are steering down and looking to release early. We have a roadmap of

Process:

The software methodology being used is Agile. It is useful for breaking down barriers. Analysts, developers and testers work with the user for acceptance of the system. We have stand-ups every morning where we plan for the next sprint in the coming two weeks and a showcase that is conducted at branches every 4 weeks. We put up stories on the wall. We do not put up any retrospectives without knowing what has already been done. We have got a story board and when we showcase, we receive feedback which goes on to the wall and then into a spreadsheet.

Client stakeholders:

We have two key stakeholders and a dedicated SME.

One of the key stakeholders is a Segment Manager; he knows strategy and direction. He tells us what needs to be done from an underwriting perspective to enable us to make quick decisions and lets us know if we have missed anyone in process.

Our SME has used the software before and he knows the challenges that users face. The SME guides us on the processes followed in the branches, that is how they process insurance from day to day.

Branch users who use the software are involved through the SME.

Nature of Involvement:

The Segment Manager, being the main product owner, chose to be part of the project.

SME: He was a user of the application at one of the branches. We advertised for the role internally and he expressed an interest. He fit the role well and was therefore selected to fill in as a full time SME on the project. He has used the software every day in the past, was good at sales and knows how long it takes to introduce a new functionality. He is the main “user” on this project. We have features that we know we have to build. The SME gets an opportunity to design screens and based on data cleanse strategies gets to draft communications to the branches. He is greatly involved in retrospectives and sprint planning every two weeks. He is involved in analysis workshops with the Business Analyst, in stand ups and conducts showcases. He brings awareness around targets and helps identify priorities around them. He usually accompanies the BA in all activities.

Branch staff - We invite people from the branches for the showcases. These include the sales support staff, branch staff and the sponsor. We have a quick half an hour presentation and then get them to play with the system. The purpose of the feedback from the branches is, to the greatest extent possible, reuse what is currently in production to make it look the same so it is intuitive and there are no surprises. We put up screen shots and mockups of what we would be doing in two weeks’ time and get feedback on the same.

Observed User Characteristics:

The SME, being the main user on this project exhibited the following characteristics:

- He has best interest of the project at heart as he has used the existing application and he knows the business insurance process well enough. He is enthusiastic and committed to the project and always puts his hand up when a new task comes along.
- If there was something he didn't know, he sends an email to a member of the branch staff and they provide him with the necessary information. He knows what happens at the branch and his knowledge can be used to bring people up to speed quickly.
- He is aware of all outstanding issues and where they are sitting currently.

Desired User Characteristics:

They must have the best interest of the project at heart and should focus on the project.

They should have a good understanding of the project and expertise, good relations with people and credibility.

They must have good communication skills to be able to articulate issues.

A Product Owner should be able to make quick decisions.

Observed Barriers:

The SME needed to be educated a little about his role, although originally we assumed he would know what was expected of him.

Facilitators:

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Tester

Background:

The tester has had 12 years of experience in this role and has been working with Organization A for 1.5 years. She has been working on this project since August 2012. Her role is that of a software test engineer and a software test lead wherein she develops Test cases and standards for re-testing defects.

Project:

We are developing an endorsement module for the business in general.

Process:

-

Client stakeholders:

Product Owner and Segment Manager

SME

Nature of Involvement:

Product Owners are consulted when I have any questions regarding the Tests to be developed.

SME conducts showcases, helps track defects and checks back with the product owners in changes.

Observed User Characteristics:

SME and Product Owners are very helpful and always available when required.

Desired User Characteristics:

They need to have good communication skills and have good knowledge of what end users need.

They need to be communicative with end users.

They must have a strong power to decide.

Users need to understand risk, cost and consequence of change.

It is important for users to fully understand the proposed solution so that they can approve of what they see when it is done.

Observed Barriers:

When stakeholders don't really know what they want, they lack the power to decide.

They lack the knowledge of what they want and later on they say the software is not like the way they wanted it to be.

Some members of the user side (eg: the logistics department), whose inputs are very valuable are usually busy. They are in a rush to take decisions and even though they know best.

It is hard to find someone who knows everything about the business.

Facilitators:

It would be nice not to have deadlines. Sometimes, things take longer than expected and you need to take Waterfall decisions in order to obtain Agile results.

PROJECT 2

Developer 3

Background:

I have been a developer for the last 12 years. My role is front end oriented as I am the User Interface developer on this project. I have been with Organization A for 13 months and on this project for 3 months.

Project:

The project is about exposing sale of insurance to public and what is different from previous versions of the same thing. It aims at enabling the users to sell home and contents insurance and for customers to get a good experience on mobile applications. This is a web-based product and is a sales extension to the website, which used to be internal and is now going to be public. The repository is a legacy system based on Java stack, Spring framework, Html 5 and JQuery The sprints for this project have typically been 2-3 weeks long. There are 6 people on the time comprising a Business Analyst, Project Manager, 3 developers and a tester.

Process:

Organization A has their own take on Agile and have added their own flavor to the Agile methodology. The Project Manager oversees team progress and what is working for us. User Stories are broken down into tasks, story pointing, subtasks for each story based on which we come up with time estimation for each story. We usually have a 4 week sprint but for this particular project there have mostly been 3 week sprints with a couple of 2 week ones.

Client stakeholders:

Product Owner – He is the product sponsor. He is not considered part of the build team as his role is only concerned with presenting the product to the public. He makes decisions around resource allocation for a particular problem.

The BA is the proxy to client and is responsible for facilitating what we need to do.

There is also a User Experience team that is the other proxy to client.

The Sales team, Underwriting team and the Claims team are the people that currently use the existing system and are the main stakeholders.

There is also a Business Intelligence team that is involved in the internal sales. They are concerned with the data that goes into the system.

The Architect is part-time but comes to some of the stand-up meetings.

The End user is the general public and they are not involved on this project.

Nature of Involvement:

The POs aren't directly involved at the story level but they can see what is going on and how things progress.

The User Experience team is part of the design process. They deliver wireframes depending on the scope of the project. They are highly involved in the project.

At this stage of the project, there isn't much end user involvement. They have reviewed what we have built to make sure we have hit the mark in terms of their expectations.

Meetings and discussions are conducted on a regular basis to make sure we have understood the end-user requirements well. When it concerns the solution of a problem, it is the BA who does the gathering of requirements etc.

Observed User Characteristics:

The PO attends all stand-up meetings and is quite involved because he is vested in the project.

The users consulted on this project, that is the Sales team, the Underwriting team and the Claims team is pretty helpful. It is a nice change from their day to day work and they find it interesting to be involved. They know that involvement in the system is positive for them.

People understand requirements and are very positive about being involved in the project.

The User Experience team, although greatly involved, do not always make themselves available. They tend to think long and hard and do not reply quickly, whereas we want a response immediately.

Desired User Characteristics:

The ability of users to be involved and accessible would be highly appreciated. They should be able to dedicate their time.

A decision maker should be reasonably involved in the project considering they are the ones who are paying for the features they want on a project.

Observed Barriers:

Time – The users have a job to do and are expected to meet their goals. Project involvement is outside their defined role and even though they may want to be more involved, they are either not allowed to or cannot find the time.

Technical knowledge – Some things are technical and business people cannot understand why they cannot have certain things.

Facilitators:

It is important to understand the end users' role and it would be helpful to try and involve them earlier on in the project.

Developer 4

Background:

I have been a developer for over 10 years and have been with Organization A for 2.5 years. I have been working on this project since the beginning, which is about 3 months ago. My role is mainly backend development. I am Java programmer and do a little bit of analysis work.

Project:

Same as developer 3

Process:

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Client stakeholders:

Product Owner

Internal Support team – People that are actually going to use the application. They are the Sales, Underwriting and Marketing teams.

Nature of Involvement:

We interact with all client stakeholders either face to face, via email or over the phone. Most information gets fed down the chain by the Business Analyst.

Observed User Characteristics:

The internal Support team members do not attend all stand-up meetings.

It is only the PO who attends most stand-up meetings.

Only a little feedback came through during the User Acceptance Testing when a lot was expected.

Desired User Characteristics:

A good user is one who understands the balance that has to take place – business and technology

Users need to be stricter during the User Acceptance tests

Observed Barriers:

Users not having enough time to do a thorough test during the User Acceptance testing phase,

Facilitators:

A logical layout should be followed from the development point of view as opposed to the UI team focusing on what looks nice.

A collaborative approach – Users should be flexible and open to ideas and change. If they are out on a limb and have their own ideas about how things should be done, they will not budge and this does not help the project at all.

Workload and schedules for users should be managed in such a way that everyone gets to have their say in time.

Business Analyst 2

Background:

I have been a Business Analyst for 6 years and with Organization A for 1 year.

Project:

Building a new application that enables the internal staff of the client (sister concern of Organization A) to lodge claims for customers online. This is mainly to help them access and record information when speaking to customers. Earlier, they were forced to go through older screens in order to access information. This application is more flexible. There will be two releases. We have just finished the first release which is the

pilot version of the application to help staff lodge claims on motor vehicles. The second release will allow them to lodge claims for home and contents.

Process:

It is basically talking, prioritization, sprint planning and sometimes the client BA and I do some testing. We have backlog cards. As the project progresses, they help us pick on technical things.

Client stakeholders:

Client BA – He is the BA and SME on this project.

Nature of Involvement:

The BAs sit with the users and listen on calls with them to understand claims process. We have many demos and showcases where users get to see the prototypes.

The Client BA does UAT and sometimes users come to the workshops.

Observed User Characteristics:

They are pretty switched on, accommodating and friendly.

They are quite approachable

Desired User Characteristics:

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Observed Barriers:

Main issues are around availability.

Their knowledge is good around operations and business side but not so much on the technical side.

Prioritization with stakeholders can be an issue. Sometimes they may want everything all at once whereas in Agile we focus on Minimum Viable Product (MVP) where the focus is the prioritization of must haves rather than can haves.

Facilitators:

As long as users and stakeholders come to stand up meetings and it has a productive outcome, they will be able to see the progress of the project.

ORGANISATION B

Developer 1

Project:

The project is about creating a site which allows the user to alter content on their intranet site. The purpose is to keep them informed about the office move. It has just entered the commercial phase. The design and UI is complete and they have just begun development.

Client stakeholders:

The UI designer and the project manager are the proxy and they talk to the client.

User Characteristics (Expected and Observed):

The expectations for this project were small. The users were “reasonably” technical. They were the client Business Analyst and their People Manager. They interacted with the end users and conveyed requirements to the development team.

Desired User Characteristics:

A good user is one who is open to ideas and willing to listen.

Being logical and leaving the ego out of the door.

Observed Barriers:

Users are willing to help, but are not sure whether their input does count and if they will contribute to positive change.

Facilitators:

People (on client side) take more interest when they are made aware of the commercial value of a project and are willing to step in when there are bigger commercial issues.

Keeping channels of communication open. Knowing who to go to for relevant information is helpful and there should be good communication between members of the client side as well.

Developer 7

Background

Has an overall experience of 2 years and has been with Organization B for the same duration. The duration of work on this project was 3-4 months. Main responsibility on this project is coding, testing and acting liaison between the developers and outsourced testing company.

Project:

This is our biggest client. The client has asked us to create a base template for a sharepoint implementation they have. It is to facilitate the Human Resources department which basically includes data migration from an existing system. The project is on the

brink of the testing phase. Design and development is complete and we are at the end of this project. The technology that has been used is C# and .NET.

Client stakeholders:

End Users, Client Sharepoint team who help us get and understand information and their Project Manager. The head of the Sharepoint team is the Product Owner. All questions are directed to him or to any other person of the client Sharepoint team.

Observed User Characteristics:

They understood exactly how the process worked on their side and we knew exactly who to go to for information or were directed to the relevant person.

The developer on the client Sharepoint team had intimate knowledge of the code we had written and why it was written.

Desired User Characteristics:

Users who give a lot of feedback and have a short response time to our queries or requests for feedback.

Observed Barriers:

Approval process was a hindrance. It was very difficult to obtain approval to contact users easily.

Users often don't really know what they want unless we show them what they want.

People do not understand the software being written. The knowledge gap to understand how it works is a barrier.

Sometimes clients don't want end users to be involved because they may lack technical knowledge and may not necessarily understand what is being said.

Sometimes, people on the client side need justification for every step which is infuriating and a massive setback.

Aversion to change – In large companies, they may be used to doing things a certain way and refuse to change a process or an aspect of the way things work.

Facilitators:

Make project a priority – Often clients really want the project done but want no involvement whatsoever, which is a very frequent occurrence.

Desire to participate – Users who are active in wanting to get project done, understand parts that need to be finished, understand what to expect of us and basically have the knowledge to answer developers' questions is helpful to us. Prompt response from the user really helps.

Communication – Keeping things open and flowing. Everyone should know what is going on and should be responsive to queries. It makes it easier when channels of communication are clear and we are aware of who and how to get in touch with for information.

End users – It is very useful to talk to end users. They tend to understand better than people conveying specifications, about what they want the product to do. They are the ideal Subject Matter Experts when it comes to the testing phase.

Project Managers – They know how Sharepoint is being implemented. They can be very helpful in making things a priority when other people don't see them as such. They can be responsible for driving the process and for approving what should and shouldn't be there in the project.

Quick release cycles and early feedback are very helpful to find out anything and having their involvement helps speed things up.

Developer 3

Background:

Overall experience of 5 years and has been with Organization B for around 2.5 years.

Project:

The application that we have built is in Windows Forms. It will be used to generate reports on sales distribution, management process, stock inventory, invoices, purchases and reporting. It will be used mainly by the management and the Sales staff. The project is starting to mature. After 5 years of integration, services are running continuously. We have slowed down releases to monthly at the moment which are more adhoc as they are maintenance plus new module kind of releases. There is adding and changing of reporting screens. A lot of work we're doing is chunky and the modules we have released make it easier to get information out. As developers, we not only do coding and testing but also talk to the client on a regular basis and solve technical issues. The client thinks of us as a sounding board for the project.

Client stakeholders:

The main client stakeholder is the CIO. Until 6 months ago, he was the only person we were talking to. Now he has an "offsider", who we transition through. They come on-site regularly for chats when we have a module release coming up. The offsider used to come on-site 4 days a week. The client's IT department comprises CIO, IT hardware technician and IT support. They do not have architects or testers.

Nature of Involvement:

We share screens with the CIO and get feedback that way. We shared application on a Microsoft link and that allows him to use it as he fancies. He is very good with SQL, so he will write something and get us to have a look at it.

Observed User Characteristics:

As a client, the CIO is involved the whole way through which has driven the success of the project so far. He is available and quite an investigator. He likes to understand what is going on and how things work; that makes him very a knowledgeable person and that's how he can talk with know-how about the subject.

He is very approachable and open to suggestions.

It is almost as though he works here and we have an almost informal relationship with him.

We celebrate project success and milestones together. He has a positive influence on the project.

Desired User Characteristics:

Constant involvement with instant feedback is always appreciated.

The CIO can easily be described as the ideal candidate for user engagement.

Observed Barriers:

Sometimes having only one go-to person can be quite challenging. You may not get everything from the end users as he could be filtering it.

Trust can be a barrier (too much of it) – It is sometimes assumed or he has let us run with things a bit and we may not have given him enough touch point. The client is trying to move into strategic position as well which means he is able to get a lot of feedback from a lot of people in the organization and some of it filters through to us. Perhaps, more than it should ideally be.

Facilitators:

It is better to be able to pick up the phone and ask for what you need as that provided more scope for discussion as opposed to email. We usually talk on the phone or share screens. At one point, when he was overseas, communication was quite email driven and we had to make sure we gave him options in the form of screen shots.

Constant involvement is always preferred rather than some in the beginning and at the end. We use card stories for tracking milestones on the project.

Workshops work well with the offside or any other member from client side apart from the CIO, if they are short and focused. After a workshop, you have a good debate coming up and then you see people are passionate about what they are doing and believe in the project, so it is a good engagement.

Developer 4

Background:

Has over 1.5 years of overall experience as a developer.

Project:

Currently working on the same project as developers 3, 5 and 6. The project went live in 2011. They are currently in post-production phase and are looking to add more functionality. We break down the project into multiple tasks and divide into several small chunks of tasks. There is an estimation process and then we clarify requirements in the “discovery phase” with client. User stories are created and then we divide and conquer.

Client stakeholders:

CIO and one more person who is second in command to CIO.

Nature of Involvement:

We conduct workshops initially (formal) and later ease into more informal interaction after we form a rapport with the client. We walk them through the project in the middle, through to the end. Information comes in waves.

Observed User Characteristics:

The people we engage with are not end users. They are in-charge and make decisions. There were certain areas where we felt it would be difficult for end users to comprehend, but we have no feedback from end users.

We speak to the client (CIO or second-in-command) 2-3 times a week on the phone. Some concerns are brushed off as unimportant, but we don't know what end users would've thought of them.

Desired User Characteristics:

Open minded

Attention to detail – Pay attention to what they're trying to do, pay attention to finer aspects.

Users need not have technical knowledge, but an eye for when things feel wrong.

Having a bit of a voice.

Observed Barriers:

We aren't able to interact with end users. There are certain areas where we feel it would have been beneficial to obtain feedback from the end users, but because our interaction was limited to the CIO and his offside we never really got to know about difficulties end users could have been facing.

Facilitators:

Developers having more confidence in knowing that they are creating a system that users want and need

Walking users through the application, even at prototype stage and having a lot of demos

Users should have a realistic expectation of what might and might not be possible.

Developer 5

Background:

Has been with Organization B for around 2.5 years, with same amount of experience as a developer.

Project:

The project is an ERP system that manages information sales, customers, delivery, purchasing etc. We usually conduct fortnightly meetings to identify pieces of work for

the next few weeks. The project is ongoing and has gone through a lot of support work. We looking to add new features; lots of little things.

Client stakeholders:

There are two main people- The CIO and one other person, who has now replaced the former as our main point of contact. They used to be here a lot, but they're now overseas. We use Open Collaboration Services (OCS), email and phone for communication. They are always available and I like the constants.

Nature of Involvement:

The product owner is available at all times. The main engagement is over OCS, phone or email.

We send them chunks of the developed module or snap shots of the same and they give us feedback or suggestions for us to implement.

Screen sharing

Observed User Characteristics:

Very involved in the project.

Always available

Desired User Characteristics:

Available whenever we need information

Available for face to face meetings

Observed Barriers:

OCS and phone are not as good as talking in person.

Communication over email is time consuming

Facilitators:

Good Communication – Having clearly defined and detailed requirements is very helpful.

Screen Sharing

End user feedback would be nice as it would give a better idea of what is useful and what should be discarded.

Developer 2

Background:

Has been with Organization B for 2 years. This is his first IT job and he has been on the current project for a year. My main role is to fix bugs and work with the tester.

Project:

This is a Secret Server Reporting Service (SSRS) based project. We are creating a dashboard for the client. They have a sale (of real estate) every two months. The application will help create reports about the number of houses sold in an auction. It maintains information about the staff, business and customers. The client also handles home insurance for their clients and organizes flights for the house owner, in case it is an overseas buyer. The report generates receipt and invoice for the customer as well as about the sales. The technology used for the project is SQL and SSRS. We have just given the current module to the client for acceptance testing.

Client stakeholders:

The main client stakeholders are the tester, department manager of the sales and marketing departments.

Nature of Involvement:

An hour long session was conducted with each department where they gave us information about the information they wanted to see on the report. Frequency of these face to face discussions was not much. In the beginning, the manager did not even know our Business Analyst visited the clients once a fortnight and we communicated over the phone or via email the rest of the time.

Observed User Characteristics:

In the past, there have been users where if there is a problem, user just wants you to fix it. They, however, don't know how. They were difficult and fussy, especially if a particular bug took long to fix.

Demanding clients – they do not listen to you and just cut you off and tell you what they want.

On this project, the manager decided whom we spoke to. If I emailed a user, the response time was pretty quick.

Desired User Characteristics:

Quick response time to queries.

Good communication skills

Not too difficult and demanding

Patient

Good listeners

Some knowledge of IT

Observed Barriers:

Sometimes, it was difficult talking to someone without IT background

Would have liked to talk to the system user. Sometimes, the manager doesn't know everything about the system, but the actual user does and therefore, their opinion is more useful.

Facilitators:

To be able to talk to End users and get their feedback would be very useful.

Business Analyst

Background:

The role is one that comprises that of a Business Analyst, System Architect, Developer lead and at times a developer. The BA has an overall experience of 13 years, has been with Organization B for 2 years and on this project for 2-3 months. Technical skills include the ability to program in C#, VB.NET, VBA, MS Office customizations, CRM package configuration and scripting and SQL.

Project:

The client is a fleet management company that services and maintains vehicles in and around New Zealand. The aim of the project is to implement a simple dispatch unit that integrates Microsoft NAV to allow the Service Manager to dispatch jobs in field crew. The idea was to replace excel spreadsheet with a version that integrates NAVMAN with their back end. We have nearly finished developing and testing the pilot version built for single user. The expectation is to build it for a wider user base.

Client stakeholders:

Client BA, CIO, Dispatch Manager, Service Manager

Nature of Involvement:

We arrange a meeting, workshops, individual meetings with users and present concepts in the form of screen mock ups. Our perception of the solution is then mapped out to their roles and we get feedback after presenting it to them.

Observed User Characteristics:

Sometimes users lacked enthusiasm

Desired User Characteristics:

The user should know the business domain and area within it well. He should have a good understanding of the wider areas and be able to communicate, listen, explain and comprehend.

The user should be available, readily accessible and responsive to questions.

There should be a high level of fit with reality as far as user expectations are concerned.

Observed Barriers:

Users who deliberately withhold information where it would affect project negatively for political reasons

Facilitators:

Raising relevant issues, like functionality for example, instead of aesthetics

There should be any surprises. They should tell us what they need.

Passionate about the project - How much they care about what the solution does for them is important. They need to believe and feel passionate about the project.

Willingness to participate – they should care about the outcome enough to actively participate. More engagement leads to natural progression to comprehend other cases.

Open and proactive lines of communication

Developer 6

Background:

Has had an overall experience of 5 years in development using C# and has been with Organization B for around 2.5 years.

Project:

The project is about developing a tablet for a client to enable them to go to farms and collect data about livestock to show to companies that buy livestock based on this information. The technical team on this project comprises the BA, Technical Consultant and a developer.

Client stakeholders:

Client Business Analyst

1 Tester

Board of Members

Nature of Involvement:

The Member of Board defines functionality and works with the BA to decide what functionality should be there in the application. The Client has hired a Business Analyst externally to represent their needs. The Member of Board is one of the Product Owners/User Representative and does the final sign off on functionality.

Observed User Characteristics:

The Clients want more done in less amount of time and less cost.

Desired User Characteristics:

Client should be reachable at all times. Ideally, he should be sitting with the development team. (Our client is in Dunedin so he is reachable at all times).

Users should have good communication skills

Technology Savvy – Users who are not tech savvy tend to misunderstand why we can or cannot use something. They should have an overall understanding of software.

Willingness to help – They should be proactive about what they want and not change requirements.

They need to be well aware of the business process to be able to tell us exactly what they need.

The clients should not micromanage and should trust the development team on the project.

Observed Barriers:

The Clients want more done in less amount of time and less cost.

If communicated requirements are wrong then the project will not meet its deadline.

Facilitators:

It is preferable to speak to an end user.

The client should be with the development team until sign off. For example, for a two week Agile release cycle, the client should test it immediately and provide feedback. It would be of great help if the client could be physically present in the office.

A developer should not start without an official micro-level document that states details of the requirements with a work-task breakdown of with a time frame for each task.

Educating the clients, especially those from non IT backgrounds, through workshops to help them understand different technologies, software development methodologies and processes.

Step 2: Thematic Coding and Analysis of Interviews

Theme	Developer	Project Manager	Business Analyst	Tester
<i>Good User Characteristics</i>				
Open to ideas and flexible to change	Org B(D1, D4), Org A(D4)			
Willing to listen	Org B(D1, D2), Org A(D4)			
Knowledge of business process	Org B(D6), Org A(D2)	Org A(PM1)	Org A(BA), Org A(BA1)	
Provide detailed feedback	Org A(D2)		Org B(BA)	
Short response time to queries	Org B(D7, D2)		Org B(BA)	
Attention to detail	Org B(D4), Org A(D2)		Org A(BA2)	
Have a bit of a voice and more authority on prioritization of requirements/functionality	Org B(D4), Org A(D1)			Org A(Tester)
Easily accessible	Org B(D5, D6), Org A(D3)		Org B(BA), Org A(BA2)	
Good Communication Skills	Org B(D2, D6)	Org A(PM1)		Org A(Tester)
Not too difficult and demanding	Org B(D2)			
Patient	Org B(D2)			
Some knowledge of IT	Org B(D2, D6), Org A(D2)			
Have realistic expectations			Org B(BA)	Org A(Tester)
Co-located with development team	Org B(D6), Org A(D2)			
Willingness to help	Org B(D5, D6), Org A(D2)			
Good relations with other users		Org A(PM1)		Org A(Tester)
Good understanding of proposed solution				Org A(Tester)
<i>Facilitators</i>				
Open channels of	Org B(D1,		Org B(BA)	

Communication	D3, D5)			
Make project a priority	Org B(D7)			
Users desire to participate	Org B(D7), Org A(D3)		Org B(BA)	
More involvement of end users and end user feedback	Org B(D7, D4, D5, D2, D6), Org A(D1)			
Quick release cycles and timely feedback	Org B(D7), Org A(D3)		Org A(BA1,	
Constant involvement of users	Org B(D3, D6), Org A(D3)			
Workshops with users	Org B(D3, D6)			
Walking users through the application, even at prototype stage	Org B(D4)			
Face-to-face meetings	Org B(D4)			
Raising relevant issues (like functionality instead of aesthetics, being strict during acceptance tests)	Org A(D4)		Org B(BA), Org A(BA1,	
Passionate about the project		Org A(PM1,	Org B(BA), Org A(BA1,	
Official micro level document with detailed requirements and task break down	Org B(D6)			
Time allocation for users to participate in project related activities	Org A(D3, D4)		Org A(BA2)	
Product Owner should be able to make quick decisions		Org A(PM1)		
Barriers				
Unrealistic expectation of timeframe and cost of deliverables	Org B(D6)			
Political Agenda (Users who deliberately withhold information)			Org B(BA)	
Lack of technical knowledge	Org B(D7, D2), Org A(D3)		Org A(BA2)	
Little or no end user involvement and feedback	Org B(D7, D3) D2), Org A(D4)			
Long response time	Org A(D3)			

Having only one source of information	Org B(D3, D4), Org A(D1)			
Too much or too little trust	Org B(D3)			
Tedious process of approval for requirements and prioritization	Org B(D7)		Org A(BA2)	
Aversion to change	Org B(D7)			
Micro management of project	Org B(D7, D6)			
Users being unsure of their contribution being valued	Org B(D1)	Org A(PM1,	Org B(BA)	Org A(Tester)
Communicating via email or phone instead of in person	Org B(D5,			
Too many users, diverse demands	Org A(D1)		Org A(BA2)	
Difficulty in getting people together in a room/ users not being able to find time for involvement	Org A(D1, D3, D4)		Org A(BA2)	Org A(Tester)
Users not knowing what they want	Org B(D7)			Org A(Tester)

Step 3: Themes identified

Good User Characteristics

The themes obtained from the coding showed that participating users' knowledge of business process, the proposed solution and easy accessibility were the most popular characteristics

Users who are open to ideas, good listeners and flexible to change are also referred for user involvement.

Good communication skills and some knowledge of IT are also highly desired characteristics in good users. Also, they should have good relations with other users so that if they do not know about something, they can ask someone who does.

Users who pay attention to detail, provide detailed feedback and have a keen to help out. This would be facilitated if users would voice their opinions when they notice something does not feel right and bring to light any issues early on in the development cycle.

Users who can strike a balance between business and technology, are not too demanding and can provide timely feedback are considered very helpful to a project.

Users should have realistic expectations from the development team and proposed solution.

Users who respond quickly are good facilitators to a project. Users who are co-located with the development team are generally preferred for involvement as they are easily accessible whenever the technical team has a query and response time will be less.

Enablers to Good Quality User Involvement

The greatest enabler to user involvement was found to be end user involvement in project related activities, wherever possible and end user feedback. This was supported by a total of 6 people comprising 5 developers from Organization A and a developer from Organization B.

Open channels of communication between users and developers as well as among the users themselves was purported to be an important facilitator for quality user involvement.

Users should be involved at every stage of the development and not just in the beginning and the end. It is important to have quick release cycles and timely feedback of users throughout the development process.

User who are passionate about the project and have a strong desire to participate are preferred for involvement as they think of the bigger picture and genuinely have the best interests of the project at heart. Such users are considered very useful to facilitating good user involvement. Additionally, users with a willingness to participate should be facilitated by their managers by managing their workloads and allocating their time for involvement in project related activities. This would avoid hasty decision making and

would enable the users to have the time to think about, discuss and bring to light important issues.

Users should also be facilitated by conducting workshops to provide them with some background knowledge about the technology and walk them through the proposed solution, even if it is at prototype stage. There should be as many face-to-face meeting with users as possible.

Users should be responsible about their involvement by showing up for meetings and providing feedback. They should raise relevant issues during these meetings and be stricter during Acceptance Tests.

Quick decision making would be highly beneficial to a project and a Product Owner who is proactive about what needs to be done is a facilitator for beneficial user involvement.

Development should not start until there is a micro-level document specifying detailed requirements and task breakdown.

Barriers to User Involvement

The biggest barrier to user involvement was found to be the inability of users to make time for meetings related to project development. Members from both Organizations found that users are either too busy to find time to participate or it was difficult to get everyone to be at the same place, at the same time. Email and phone communication was not seen to be as effective as face-to-face meetings.

Little or no feedback from end users was also seen as a major impediment in software development. A lot of times executive decisions are made on behalf of the end users and even though something could be more important or a bigger issue than it appears to be, end user feedback is brushed off as unimportant. It was found that often, there is only one person to provide feedback on behalf of the users and who may not even necessarily be an end user. This would limit the perspective to one person and the development teams felt that having more than one perspective was more beneficial.

Users who are selected for participation, sometimes do not know what is expected of them and are therefore not sure if their contribution would be valued at all.

Users often don't know what they want and this can cause delays and changes in a project. There may be too many users, with diverse demands which become difficult to accommodate in the proposed solution. The approval process for requirements sometimes was a tedious process and this can be a major setback.

Unrealistic expectations of time and budget often cause problems and friction between development teams and users.

Users who are dogmatic in their outlook and averse to change are often seen as a major hindrance to user involvement. Also, product owners who tend to micromanage the

project and need justification for every step are seen as major impediments to good user involvement.

Although not a major barrier, lack of technical knowledge was seen as a barrier to establishing good user-developer relationship.

Long response time to developer queries was also seen as a barrier to good user involvement.

It was also noticed that in some cases, users who have a political agenda and deliberately withhold information were seen as barriers to user involvement as well.

Appendix 3: Repertory Grids

Organization A

NATURE OF INVOLVEMENT

Project 1

Constructs\Elements	E1	E2	E3	E4	E5
C1	7	7	7	5	7
C2	7	7	7	3	7
C3	7	7	7	2	7
C4	7	7	7	1	7
C5	7	7	5	1	5
C6	3	3	3	1	3
C7	5	5	5	7	5
C8	3	3	3	7	5
C9	1	1	1	3	3

Technical Lead (Developer)

Constructs\Elements	E1	E2	E3	E4	E5
C1	4	6	6	7	6
C2	5	6	6	6	7
C3	4	7	7	4	7
C4	4	7	7	4	7
C5	5	7	7	2	7
C6	1	1	1	1	1
C7	1	1	1	7	1
C8	4	6	6	7	6
C9	3	4	4	4	4

Developer

Constructs\Elements	E1	E2	E3	E4	E5
C1	3	7	6		6
C2	2	7	6		6
C3	1	4	5		7
C4	1	6	7		7
C5	7	7	7		7
C6	1	1	1		1
C7	1	7	4		4
C8	3	5	4		4
C9	1	2	2		6

Tester

Constructs\Elements	E1	E2	E3	E4	E5
C1	5	7	7	7	7
C2	1	7	7	7	7
C3	7	7	7	7	7
C4	7	7	7	7	7
C5	6	7	7	5	7
C6	1	1	1	1	6
C7	1	1	1	5	3
C8	3	3	3	7	7
C9	1	2	2	3	3

Project Manager

Constructs\Elements	E1	E2	E3	E4	E5
C1	2	7	4		6
C2	5	7	5		7
C3	2	2	4		7
C4	3	6	6		7
C5	3	2	4		5
C6	7	2	2		2
C7	1	7	2		5
C8	3	6	3		5
C9	1	3	5		6

Business Analyst

Constructs\Elements	E1	E2	E3	E4	E5
C1			4		
C2			4		
C3			3		
C4			4		
C5			4		
C6			1		
C7			1		
C8			4		
C9			2		

Subject Matter Expert

Constructs\Elements	E1	E2	E3	E4	E5
C1		7			
C2		5			
C3		6			
C4		6			
C5		1			
C6		1			
C7		4			
C8		5			
C9		3			

Product Owner

Project 2

Constructs\Elements	E1	E2	E3	E4	E5
C1	1	2	5	4	5
C2	1	3	7	5	5
C3	1	1	6	4	7
C4	1	1	7	7	7
C5	4	7	7	6	6
C6	2	4	5	5	3
C7	1	2	3	7	5
C8	1	3	3	7	7
C9	1	1	3	3	7

Developer

Constructs\Elements	E1	E2	E3	E4	E5
C1	1	3	5	7	3
C2	1	2	7	4	1
C3	1	2	5	5	6
C4	1	2	7	3	1
C5	7	7	7	5	5
C6	1	1	2	1	4
C7	1	2	5	7	4
C8	2	5	4	7	1
C9	1	1	6	7	5

Developer 2

Constructs\Elements	E1	E2	E3	E4	E5
C1	4	7	6	5	7
C2	5	7	6	4	7
C3	1	7	1	1	7
C4	5	7	6	4	7
C5	5	7	6	4	7
C6	5	7	5	1	7
C7	1	7	1	7	7
C8	1	7	1	6	6
C9	1	2	1	1	1

Project Manager

Constructs\Elements	E1	E2	E3	E4	E5
C1	1	1	2	1	3
C2	2	2	2	1	3
C3	2	2	2	1	2
C4	1	1	5	2	2
C5	6	4	6	2	4
C6	1	1	1	1	2
C7	1	1	1	1	2
C8	1	1	2	3	2
C9	1	1	1	1	2

Business Analyst

USER CHARACTERISTICS

Constructs/Elements	E1	E2	E3	E4	E5
C1	4	6	7	5	5
C2	7	7	7	7	7
C3	7	7	7	7	7
C4	4	5	7	4	6
C5	4	7	5	5	5
C6	3	5	4	6	6
C7	2	3	3	3	4
C8	7	5	7	4	5

Technical Lead (Developer)

Constructs/Elements	E1	E2	E3	E4	E5
C1	3	7	7	6	7
C2	4	6	6	4	6
C3	4	6	6	4	7
C4	5	6	6	5	7
C5	5	6	6	7	6
C6	4	5	5	4	6
C7	2	3	3	2	6
C8	6	6	6	6	6

Developer

Constructs/Elements	E1	E2	E3	E4	E5
C1	1	7	7		7
C2	4	7	7		7
C3	5	7	7		7
C4	2	5	6		7
C5	1	7	6		5
C6	1	5	6		7
C7	1	2	2		5
C8	7	7	7		7

Tester

Constructs/Elements	E1	E2	E3	E4	E5
C1	2	7	7	7	7
C2	5	7	7	7	7
C3	5	7	7	7	7
C4	7	7	7	7	7
C5	5	6	6	7	6
C6	3	3	3	6	7
C7	2	4	4	5	7
C8	7	7	7	6	7

Project Manager

Constructs/Elements	E1	E2	E3	E4	E5
C1	1	6	7		7
C2	5	6	7		7
C3	5	7	7		7
C4	5	6	7		7
C5	1	7	5		6
C6	1	5	7		7
C7	3	4	6		7
C8	6	5	7		6

Business Analyst

Constructs/Elements	E1	E2	E3	E4	E5
C1			7		
C2			7		
C3			5		
C4			6		
C5			5		
C6			4		
C7			6		
C8			7		

SME

Constructs/Elements	E1	E2	E3	E4	E5
C1		7			
C2		7			
C3		7			
C4		7			
C5		7			
C6		3			
C7		3			
C8		7			

Product Owner

Project 2

Constructs/Elements	E1	E2	E3	E4	E5
C1	1	4	6	4	7
C2	2	5	7	6	7
C3	1	5	5	5	7
C4	1	6	6	4	7
C5	1	5	4	4	4
C6	1	5	4	3	6
C7	1	3	3	2	6
C8	1	4	5	4	7

Developer

Constructs/Elements	E1	E2	E3	E4	E5
C1	2	4	7	6	4
C2	1	6	7	7	6
C3	3	6	7	6	6
C4	1	5	7	5	4
C5	5	6	7	7	4
C6	1	5	6	7	6
C7	1	3	3	5	7
C8	1	7	7	6	1

Developer 2

Constructs/Elements	E1	E2	E3	E4	E5
C1	6	7	6	3	7
C2	6	7	7	7	7
C3	7	7	7	7	7
C4	7	7	6	5	7
C5	4	7	6	6	6
C6	1	4	4	2	7
C7	1	2	2	2	7
C8	1	7	6	5	7

Project Manager

Constructs/Elements	E1	E2	E3	E4	E5
C1	2	2	7	2	7
C2	5	5	7	2	7
C3	5	4	6	3	6
C4	5	2	6	2	7
C5	1	6	6	6	2
C6	2	4	4	4	7
C7	2	2	3	3	4
C8	5	5	5	5	5

Business Analyst

MODE OF COMMUNICATION

Constructs\Elements	E1	E2	E3	E4	E5
C1	7	7	7	7	7
C2	7	7	7	7	7
C3	5	5	5	5	5
C4	5	4	4	5	4
C5	2	2	2	2	2
C6	1	1	1	1	1
C7	1	1	1	1	1

Technical Lead (Developer)

Constructs\Elements	E1	E2	E3	E4	E5
C1	4	7	7	6	7
C2	4	7	7	5	7
C3	4	6	6	5	6
C4	6	6	6	6	6
C5	4	6	6	4	6
C6	4	5	5	4	5
C7	4	5	5	4	5

Developer

Constructs\Elements	E1	E2	E3	E4	E5
C1	7	7	7		7
C2	4	6	7		7
C3	3	3	3		3
C4	3	4	4		7
C5	0	0	0		0
C6	0	0	0		0
C7	0	0	0		0

Tester

Constructs\Elements	E1	E2	E3	E4	E5
C1	5	7	7	6	7
C2	3	7	7	7	7
C3	6	7	7	5	7
C4	7	7	7	6	7
C5	1	1	1	1	1
C6	1	1	1	1	1
C7	1	1	1	1	1

Project Manager

Constructs\Elements	E1	E2	E3	E4	E5
C1	5	7	7		7
C2	5	7	7		7
C3	5	7	7		7
C4	5	7	7		7
C5	2	2	2		2
C6	1	1	1		1
C7	1	1	1		1

Business Analyst

Constructs\Elements	E1	E2	E3	E4	E5
C1			6		
C2			4		
C3			3		
C4			4		
C5			5		
C6			1		
C7			1		

SME

Constructs\Elements	E1	E2	E3	E4	E5
C1		7			
C2		7			
C3		4			
C4		5			
C5		2			
C6		2			
C7		1			

Product Owner

Project 2

Constructs\Elements	E1	E2	E3	E4	E5
C1	1	4	5	4	7
C2	1	4	6	4	7
C3	2	5	6	4	7
C4	2	5	6	4	7
C5	1	4	6	4	7
C6	1	1	1	1	1
C7	1	1	1	1	1

Developer 1

Constructs\Elements	E1	E2	E3	E4	E5
C1	1	3	7	5	3
C2	7	3	7	5	7
C3	1	3	6	7	4
C4	1	5	7	6	7
C5	3	3	3	4	3
C6	1	1	1	1	1
C7	1	1	1	1	1

Developer 2

Constructs\Elements	E1	E2	E3	E4	E5
C1	6	7	6	5	7
C2	6	7	6	5	7
C3	6	7	6	5	7
C4	5	5	5	4	5
C5	6	7	6	5	7
C6	1	1	1	1	1
C7	1	1	1	1	1

Project Manager

Constructs\Elements	E1	E2	E3	E4	E5
C1	7	7	7	7	7
C2	7	7	7	7	7
C3	3	3	3	3	3
C4	3	3	1	2	3
C5	1	1	1	1	1
C6	1	1	1	1	1
C7	1	1	1	1	1

Business Analyst

Organization B

NATURE OF INVOLVEMENT

Constructs\Elements	E1	E2	E3	E4	E5
C1	5	6	6	4	1
C2	4	6	6	5	2
C3	4	7	5	4	2
C4	2	4	6	4	3
C5	3	4	5	4	2
C6	1	2	3	1	1
C7	1	1	1	7	7
C8	2	3	4	5	2
C9	2	3	5	4	5

Developer 1

Constructs\Elements	E1	E2	E3	E4	E5
C1	6	6	6	6	6
C2	5	6	5	5	6
C3	5	5	5	5	5
C4	6	6	6	6	6
C5	7	6	6	6	6
C6	3	3	3	3	5
C7	4	6	5	6	5
C8	5	6	5	6	5
C9	6	6	6	5	5

Developer 2

Constructs\Elements	E1	E2	E3	E4	E5
C1	1	2	4	4	6
C2	7	5	5	2	3
C3	6	4	6	2	2
C4	7	2	3	1	1
C5	7	1	3	1	1
C6	1	1	5	1	1
C7	1	1	1	7	7
C8	1	1	1	7	7
C9	1	1	2	2	1

Developer 3

C1	1	2	4	2	4
C2	2	3	5	2	5
C3	3	4	5	2	5
C4	2	3	5	2	6
C5	3	4	4	1	4
C6	2	3	3	1	5
C7	1	1	1	3	3
C8	2	2	2	3	3
C9	1	1	2	2	3

Developer 4

Constructs\Elements	E1	E2	E3	E4	E5
C1	5	6	7	4	1
C2	5	6	7	5	2
C3	6	6	6	3	1
C4	5	6	7	4	1
C5	6	7	7	6	1
C6	4	4	1	4	1
C7	1	1	1	7	6
C8	2	2	1	6	6
C9	1	1	1	3	1

Developer 5

Constructs\Elements	E1	E2	E3	E4	E5
C1	5	5	7	7	7
C2	7	7	7	5	7
C3	7	7	7	5	7
C4	7	7	7	4	7
C5	7	7	7	4	4
C6	1	1	1	1	7
C7	1	1	4	7	7
C8	1	1	3	7	7
C9	1	1	2	4	7

Developer 6

Constructs\Elements	E1	E2	E3	E4	E5
C1	5	5	6	4	4
C2	3	3	6	5	5
C3	7	6	4	4	4
C4	5	5	6	6	5
C5	7	5	6	6	5
C6	5	5	6	6	5
C7	1	1	1	6	6
C8	4	4	6	6	6
C9	3	3	6	4	6

Developer 8

Constructs\Elements	E1	E2	E3	E4	E5
C1	7	5	7	4	7
C2	7	5	7	5	7
C3	7	6	7	2	7
C4	7	6	7	3	7
C5	7	5	5	2	5
C6	4	3	3	1	6
C7	4	4	1	7	4
C8	4	4	1	5	7
C9	3	3	1	3	4

Business Analyst

USER CHARACTERISTICS

Constructs/Elements	E1	E2	E3	E4	E5
C1	1	2	3	3	5
C2	6	7	7	6	6
C3	6	6	7	7	7
C4	2	3	5	5	6
C5	2	3	5	6	2
C6	2	3	5	5	6
C7	1	3	5	4	4
C8	2	3	5	5	6

Developer 1

Constructs/Elements	E1	E2	E3	E4	E5
C1	3	1	1	5	5
C2	5	5	6	5	6
C3	5	3	5	3	6
C4	5	3	6	3	6
C5	5	5	5	5	6
C6	4	4	6	4	6
C7	5	5	6	4	6
C8	5	3	5	3	6
C9	5	5	5	5	6

Developer 2

Constructs/Elements	E1	E2	E3	E4	E5
C1	7	7	7	7	7
C2	7	4	7	3	4
C3	7	4	7	1	3
C4	5	4	6	3	2
C5	1	3	7	4	4
C6	3	2	2	5	4
C7	1	1	3	1	1
C8	4	3	6	6	5

Developer 3

Constructs/Elements	E1	E2	E3	E4	E5
C1	1	3	3	1	3
C2	1	3	5	3	4
C3	3	4	3	2	4
C4	1	3	1	1	4
C5	1	4	3	3	4
C6	1	2	2	1	3
C7	1	3	3	1	3
C8	3	5	5	2	3

Developer 4

Constructs/Elements	E1	E2	E3	E4	E5
C1	3	6	6	5	6
C2	6	6	7	5	7
C3	6	7	7	7	7
C4	6	7	7	7	7
C5	3	6	7	7	6
C6	3	6	7	7	6
C7	1	4	2	2	2
C8	5	7	6	6	4

Developer 5

Constructs/Elements	E1	E2	E3	E4	E5
C1	4	4	5	2	6
C2	6	6	6	4	6
C3	6	6	7	5	6
C4	7	7	7	7	7
C5	7	7	7	5	7
C6	5	5	5	4	5
C7	1	1	4	1	6
C8	7	7	7	7	7

Developer 6

Constructs/Elements	E1	E2	E3	E4	E5
C1	3	3	3	7	7
C2	5	5	6	6	6
C3	7	7	5	7	5
C4	5	4	6	6	6
C5	4	4	6	6	6
C6	6	5	6	6	6
C7	1	3	5	4	5
C8	6	5	5	5	5

Developer 7

Constructs/Elements	E1	E2	E3	E4	E5
C1	7	7	5	2	7
C2	5	6	6	2	7
C3	7	7	7	7	7
C4	6	7	5	2	7
C5	2	3	3	7	5
C6	5	5	4	3	7
C7	2	2	2	1	7
C8	4	6	4	2	7

Business Analyst

MODES OF COMMUNICATION

Constructs\Elements	E1	E2	E3	E4	E5
C1	6	5	4	5	5
C2	3	4	5	6	6
C3	2	3	5	5	5
C4	1	2	4	5	5
C5	3	4	5	4	5
C6					
C7					

Developer 1

Constructs\Elements	E1	E2	E3	E4	E5
C1	6	5	5	4	6
C2	4	4	5	4	6
C3	4	4	4	3	6
C4	6	6	6	6	7
C5	4	4	4	4	5
C6	3	3	3	3	3
C7	3	3	3	3	3

Developer 2

Constructs\Elements	E1	E2	E3	E4	E5
C1	5	2	6	2	2
C2	4	2	7	1	1
C3	3	1	4	1	1
C4	3	1	4	1	1
C5	5	4	5	1	2
C6					
C7					

Developer 3

Constructs\Elements	E1	E2	E3	E4	E5
C1	2	3	5	2	4
C2	1	3	5	2	4
C3	1	2	5	2	4
C4	1	2	5	2	4
C5	1	2	5	2	4
C6	1	1	1	1	1
C7	1	1	1	1	1

Developer 4

Constructs\Elements	E1	E2	E3	E4	E5
C1	7	7	7	5	5
C2	7	7	7	4	7
C3	6	6	7	5	5
C4	2	2	2	4	3
C5	7	7	7	4	4
C6	1	1	1	1	1
C7	1	1	1	1	1

Developer 5

Constructs\Elements	E1	E2	E3	E4	E5
C1	7	7	7	2	7
C2	7	7	7	2	7
C3	6	6	6	2	6
C4	6	6	6	4	7
C5	6	6	6	3	6
C6	1	1	1	1	1
C7	4	4	4	1	3

Developer 6

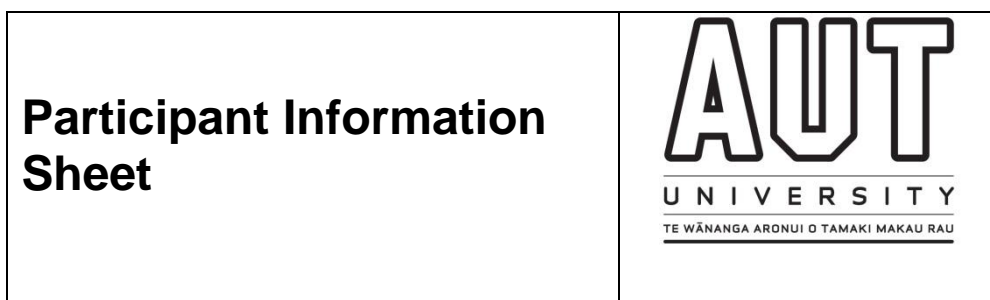
Constructs\Elements	E1	E2	E3	E4	E5
C1	5	4	6	6	6
C2	2	2	5	4	5
C3	2	2	5	6	6
C4	1	1	5	7	7
C5	3	3	6	6	6
C6					
C7					

Developer 7

Constructs\Elements	E1	E2	E3	E4	E5
C1	6	6	6	6	6
C2	7	7	6	7	7
C3	5	5	6	2	6
C4	5	5	5	5	7
C5	6	6	6	5	6
C6	3	3	3	1	4
C7	4	4	4	2	6

Business Analyst

Appendix 4: Participant Information Sheet



-
- **Date Information Sheet Produced: 1 May 2012**
 - **Project Title: Examining whether expectations about user involvement influence the quality of user involvement, in software projects**
 - **An Invitation**

My name is Amrita Shinde. I am a student from AUT University, currently doing a research thesis as partial fulfilment of a Master of Computer and Information Sciences degree. I would like to invite you to participate in my research into the area of User Involvement in Software Development. In particular this research relates to understanding how expectations about user involvement influence the overall quality of user involvement in a project and contribute to sharing understanding about effective practice of user involvement.

Since this research involves understanding current practice, an essential element is partnering with expert practitioners in this area of software development. As expert practitioners in this area, you are invited to share *your* perspective and contribute to the body of knowledge in this area.

Please note that your participation in this research is voluntary in nature, and you may decline or withdraw your participation without any adverse consequences. None of the participants are identified nor will the information gathered be used to hamper, hinder or harm your career.

The following questions and answers are intended to address the most common questions that the participant may ask about this particular research project. If you need further information, feel free to contact the researcher, Amrita Shinde. My contact details can be found at the end of this document. It is recommended that you use e-mail to reach me.

- **How was I identified and why am I being invited to participate in this research?**

This research project will gather data from interviews. As a member of the software development team or the customer involved in the project you have been identified as potential interview participant.

- **What is the purpose of this research?**

The purpose of this research is to investigate and better understand the expectations around user involvement that could influence the quality of user involvement in the project with an aim of contributing to making user involvement an effective practice in software development. The primary focus of this research is to understand these factors from current practitioners' perceptions and observation of team interactions. Understanding current practice and perceptions will suggest possible process improvements and lead to the design of better support tools. This will ultimately contribute to more effective software development.

At the end of this research a report summarising the main results will be made available to you if requested. Furthermore, it is expected that papers may be published in academic journals relating to this particular research project, with all information kept anonymous.

- **What will happen in this research?**

If you accept this invitation to participate, you will be interviewed on a one-to-one basis by the researcher. This will be a loosely structured interview where you will be asked some open-ended questions related to your experience of user involvement. There are three sets of interviews planned: one at the start of a project iteration, one during the iteration, and one after the completion of the iteration. This allows the dynamics of the evolution of expectations to be tracked

The interviews will be held at a neutral and private place such as a meeting room. The researcher will take some notes for later analysis and also record the interview as a memory aid for clarification of the interview notes taken. The analysis will involve coding and anonymising the data to identify trends and themes that provide insights to practitioners' perceptions of user stories. Note that it is anticipated that the recording of the interview will not be transcribed in full.

At the end of this research a report summarising the main results will be made available to you if requested. Furthermore, it is expected that papers may be published in academic journals relating to this particular research project, with all information kept anonymous.

- **What are the benefits?**

As well as adding to the body of knowledge and influencing practice in this general area, the insights gained from this study will be made available to

yourself and your colleagues and it is hoped that the knowledge gained will be useful for improving the practice in your organization.

- **How will my privacy be protected?**

All of the materials related to the participants' information (consent form, tape, and interview notes) will be stored at AUT in a locked cupboard for at least 6 years. After that the material will be destroyed.

It is not anticipated that a transcriber will be involved transcribing the recorded interview. If for some unforeseen reason a transcriber is required, they may be given permission to transcribe the recorded interview session only after they sign a confidentiality contract.

The data from the interviews will be anonymised and analysed for principles and insights that are independent of the interviewee's identity. Furthermore, demographic data will be coded and the data stored in a separate place so that the identity of each participant will be separated from their responses.

If participants decide to withdraw from this research project for any reason before the completion of data collection, it is guaranteed that all of the materials relating to their interview will be destroyed as soon as practicable after your request.

In addition, your employer will not hear or see the content of my research. The only people who will have access to your data the researcher and research supervisors.

Finally, as per the confidentiality agreement signed by the researchers and your company, the information obtained from the interviews will only be used for the purposes of this research and won't be shared with any other companies. All of the interview data will be available only to the researchers identified (student researcher, principal supervisor and secondary supervisor).

- **What opportunity do I have to consider this invitation?**

Due to time restrictions in undertaking the fieldwork for the research, we would ideally like to have notice of your agreement within a week of you receiving this invitation.

- **How do I agree to participate in this research?**

To follow up on this invitation to participate in this research, please confirm your acceptance by email to mxr6285@aut.ac.nz. You will also confirm your consent to participate in the interview by signing the Participant's Consent just prior to the interview.

- **Will I receive feedback on the results of this research?**

If you would like a report summarising the results of this research, please tick the appropriate box on the consent form.

- **What are the discomforts and risks?**

- During the interview session there is a possibility you may feel uncomfortable about sharing your point of view about the project operations.
- You may feel uncomfortable that your employer will know who is participating in the study and who has selected not to take up the invitation.
- You may feel uncomfortable about having your interview recorded.
- You may feel uncomfortable that your colleagues or managers may overhear what you may say during the interview.

- **How will these discomforts and risks be alleviated?**

- In order to alleviate the first area of possible discomfort, you will be reminded of our assurance of anonymity and confidentiality of all interview data at the start of the interview process. You may choose not to answer specific questions, and you can also withdraw from participating in the interview at any stage. You can also request that your interview data be withdrawn from the study before the completion of data collection.
- The second possible area of discomfort will be addressed by stressing the voluntary nature of participation to both you and your company. We understand the time pressures faced by the company and you, as its employee, and understand that it is not always feasible or practical to participate in such studies. While your employer will know you have been approached, participation or non-participation will not be specifically recorded or communicated apart from the need to organise specific time and dates for your interview.
- Recording of the interview is not a prerequisite of conducting the interview. Before the interview begins you will be asked for permission to record the interview, or not. You will be reminded that you can request that the recording be stopped or wiped at any stage of the interview.
- A meeting room will be used for the interviews at a neutral place away from your immediate workplace.

- **What are the costs of participating in this research?**

Time is the only cost to you. There will be a total of three interviews, the duration of each being around one hour, over a period of 4-6 months depending on the software development project.

- **What do I do if I have concerns about this research?**

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor,

Jim Buchan

Senior Lecturer
School of Computing and Mathematical Sciences
Auckland University of Technology
Private Bag 92006
Auckland 1142
New Zealand
Phone: + 64 9 921 9999 x 5455
Email jim.buchan@aut.ac.nz

Concerns regarding the conduct of the research should be notified to the Executive Secretary, AUTECH, Dr Rosemary Godbold, rosemary.godbold@aut.ac.nz, 921 9999 ext 6902.

- **Whom do I contact for further information about this research?**

Researcher Contact Details:

Amrita Shinde
Master of Computer and Information Science Lab,
School of Computing and Mathematical Sciences
Auckland University of Technology
Private Bag 92006
Auckland 1142
New Zealand
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Approved by the Auckland University of Technology Ethics Committee on *type the date final ethics approval was granted*, AUTECH Reference number *09/46*

Appendix 5: Consent to Participate

Consent to Participate in Research (Interview)



Project title: **Examining whether expectations about user involvement influence the quality of user involvement in software projects.**

Project Supervisor: **Jim Buchan**

Researcher: **Amrita Shinde**

- I have read and understood the information provided about this research project in the Information Sheet dated 1 April 2012.
- I have had an opportunity to ask questions and to have them answered.
- I understand that notes will be taken during the interviews and that they will also be audio-taped and possibly transcribed.
- I understand that extant documents may be referenced (but not their specific content) as evidence of the use of user involvement in this project.
- I understand that I may withdraw myself or any information that I have provided for this project prior to completion of data collection, without being disadvantaged in any way.
- If I withdraw, I understand that all relevant information including tapes and transcripts, or parts thereof, will be destroyed.
- I agree to take part in this research.
- I wish to receive a copy of the report from the research (please tick one):
Yes ☐ No ☐

Participant's signature:

.....
.....

Participant's name:

.....
.....

Participant's Contact Details (if appropriate):

.....

.....
.....
.....

Date:

***Approved by the Auckland University of Technology Ethics Committee on
31/5/2012 AUTEK Reference number 12/113***

Note: The Participant should retain a copy of this form.

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