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Integrating usability work into a large inter-organisational agile development project: Tactics developed by usability designers

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ABSTRACT

In this paper we examine the integration of usability activities into a large inter-organisational agile development project. Inter-organisational agile projects possess unique attributes. They involve multiple stakeholders from different organisational contexts and are thus characterised by competing priorities. Team members also lack a mutual awareness of what constitutes work. These issues make the collaboration between project teams challenging. Meanwhile collaboration between usability designers and agile project teams is an integral part of the integration of usability activities into agile development projects. We carried out an interpretive case study on a large inter-organisational agile development project to examine how usability designers and agile project teams collaborate in this project type. Results showed integration goals were achieved through five tactics deployed by the usability designers. These tactics were negotiating inclusion; upward influencing, placating expert users, establishing credibility and diffusing designs. The implications of these findings are summarised in the form of three propositions that pertain to how usability designer–agile project team collaborations might be organised in agile development projects. Further, the role of the usability designer in ensuring the integration of usability activities is also emphasised.

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1. Introduction

“We did all kinds of things, we did everything that worked, if being overly friendly with developers got us where we wanted then we did that. We also hung up, plastered the wall with sketches, that worked– we did everything that worked”. (Head usability designer, Beta)

This article presents a case study on how usability activities were integrated into a large inter-organisational agile development project. Our empirical analysis highlights five tactics, deployed by the usability designers, which were useful in facilitating this integration.

Usability, defined as “the effectiveness, efficiency and satisfaction with which specified users achieve specific goals in particular environments” (ISO, 2006) is a software quality attribute known for its benefits. It leads to improved user productivity, reduced training and documentation (Juristo et al., 2007). It is also critical for user system acceptance (Ferré et al., 2001). Although few would disprove the importance of including usability activities into the

software development process, actually doing so has proven difficult in practice (Abrahão et al., 2010). This is especially true of projects in which agile methods are used, since these methods neither give consideration to software usability nor the activities or competencies needed to ensure usability (Jokela and Abrahamsson, 2004; Blomkvist, 2005). These issues have led to an increased focus on how usability activities might be integrated into agile development methods, more so as there has been a widespread adoption of these methods in the software industry (Hussain et al., 2009).

Within these integration discussions, the general view is that it is the responsibility of the usability designer to ensure the integration of usability activities; hence their involvement is critical to the ensuring of usability (Lievesley and Yee, 2006; Ambler, 2008). In relation to this it is important that they are able to collaborate with their agile partners and that project conditions encourage these collaborations (Brown et al., 2012; Raison and Schmidt, 2013). However the establishing of these collaborations in agile settings is not without its challenges (Ferreira et al., 2010). For instance, challenges have been noted upon the introduction of the usability designer role into agile project teams previously not accustomed to this role (Lee et al., 2011).

In this paper, we examine how usability activities were integrated into a large inter-organisational agile development project where the Scrum of Scrums model was applied.

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Inter-organisational projects are known for their complexity (Paasivaara and Lassenius, 2003). Competing priorities are an inevitable part of these projects as participating organisations often have divergent goals and agendas (Barton, 2009). Further, as project team members are drawn from different organisations, there is an absence of the long standing professional and social relationships that provide a context and history within which problems and misunderstandings can be resolved (Herbsleb, 2007). The diversity in the organisational backgrounds of project team members also means that these team members do not have a shared work culture which leads to a lack of awareness on how they might coordinate their work (Paasivaara and Lassenius, 2003; Herbsleb, 2007). Here work culture describes the collectively constructed realities about work procedures and norms that a group of individuals have produced in the course of their shared interactions and which have become institutionalised among these individuals (Vaughan, 1998). The Scrum of Scrums model as used in these projects addresses these conflicts by prescribing a technique for scaling Scrum practices, thus enabling inter-team coordination and consensus (Sutherland et al., 2007).

The effectiveness of the Scrum of Scrums model in resolving the collaboration conflicts associated with inter-organisational agile projects has been well documented in the literature (Sutherland et al., 2007; Vallon et al., 2013). In this paper we broaden this discussion by examining what happens when usability activities are introduced into these projects and how the conflicts that emerge as a consequence of this inclusion are resolved. Specifically, we examine how usability designers and agile project teams are able to collaborate in inter-organisational agile projects, such that usability integration goals are achieved. Our examination of this matter may be seen as a response to calls (Kollmann et al., 2009) for more studies examining the integration of usability work in a variety of project contexts. Thus we ask,

“How are usability activities integrated into large inter-organisational agile development projects?”

The rest of this paper is organised as follows. In Section 2, we begin with an overview of related research on the integration of usability activities and agile methods, with a particular focus on studies that have examined the collaboration between usability designers and agile project teams. An overview of the Scrum method is also included in this section. Section 3 is a description of our research approach. Section 4 presents our results where we highlight the tactics employed by the usability designers which facilitated the integration of usability activities in the project. Section 5 is the discussion where we elaborate more on our findings and their implications. Section 6 concludes the study and directions for further research are discussed.

2. Related research

This section begins with a summary of current research on the integration of usability activities into agile software development. We then provide an overview on the use of Scrum in large agile projects.

2.1. Integration of usability activities into agile software development

Volatile business environments have resulted in an increased preference for agile software development methods, since these methods mitigate risks by delivering working software on time and within budget (Conboy, 2009; Misra et al., 2009). There are clearly benefits associated with these methods; but software usability is not one of these (Jokela and Abrahamsson, 2004). Agile methods

prescribe an evolutionary approach to requirements definition also known as Just-In-Time requirements analysis (Adikari et al., 2009) which contradicts the detailed approach to design that is characteristic of usability activities such as user research (Meingast et al., 2013). Additionally they lack the user perspective as they place more emphasis on the customer role (Jokela and Abrahamsson, 2004). The integration of usability activities into the agile software development process has been highlighted as a means through which these tensions might be resolved. This integration is argued to be possible since both agile methods and usability activities focus on delivering value, are iterative in nature and engage in continuous testing (Chamberlain et al., 2006; Hussain et al., 2009).

Usability designers play a critical part in this process. By accompanying the development process, these individuals ensure that users' requirements are considered and implemented (Wale-Kolade et al., 2013). Conversely studies have shown that the integration of usability activities into agile development projects is not as seamless as has been portrayed in the literature (Ferreira et al., 2012; Wale-Kolade et al., 2013). The same has also been observed to be true of the introduction of usability designers into agile project teams (Lee et al., 2013). There are accounts of how usability designers lose leverage in developmental decision making (Barksdale et al., 2009; Kuusinen et al., 2012) and their decreased visibility over the course of the project (Isomursu et al., 2012). These observations show how important it that usability designers are able to collaborate with their agile partners if integration goals are to be achieved (Kollmann et al., 2009; Brown et al., 2011; Raison and Schmidt, 2013). More so as this collaboration between usability designers and agile project teams enables the clarification of design intent and design rationale, and also ensures designs created are implementable (Ferreira et al., 2010, 2011).

Studies that have examined usability designer–agile team collaborations as part of their investigations into the integration of usability activities have mostly focused on in-house agile development settings (Kollmann et al., 2009). These studies have highlighted two ways that the collaboration between usability designers and agile team collaborations is being organised within these settings (Kollmann et al., 2009; Sharp et al., 2009; Ferreira et al., 2010, 2012). In the first usability designers are separated from the developers and not immersed in the agile teams. In the second, usability designers are fully immersed into the agile teams. Team immersion in this sense refers to whether usability designers participate in sprint planning and in other team specific agile activities (Ambler, 2008). In project settings where the non-immersive approach has been adopted, it has been observed that the absence of synchronisation points between the usability designers and project teams leads to the creation of designs that are typically non-implementable (Ferreira et al., 2010, 2011). In those instances where the usability designers have the authority to demand changes and where such mismatches are crucial to the progress of developers' work, developers have been observed taking the initiative to meet with the usability designers for clarification (Ferreira et al., 2011). Conversely in the immersed teams, usability has been observed to be a shared team responsibility (Brown et al., 2012). This has been attributed to how this arrangement ensures team members have a mutual awareness of how work should proceed and a shared understanding of what constitutes work for each team member (Ferreira et al., 2012). Some in view of this apparent seamlessness have asserted that the integration of usability work into agile development in non-immersive settings is a difficult feat to achieve and that the immersive approach is a necessary precondition for integration (Silva da Silva et al., 2013). They also assert that without the mutual awareness that is a key feature of the immersive approach, usability work would end up being viewed as “irrelevant or a checkbox ticking exercise” (Raison and Schmidt, 2013).

Other considerations that have been highlighted in these discussions are whether appropriate collaborative spaces are available and whether the project settings encourage these collaborations between usability designers and agile teams (Brown et al., 2012). The importance of maintaining a reasonable balance between the number of usability designers and agile development teams in the project has also been noted (Williams and Ferguson, 2007). It is also important that team members have a mutual understanding about what the product should be, and what its goals are from a technical, a business and a usability perspective (Kollmann et al., 2009). Conversely on the part of the usability designers, it has been asserted that they must be persuasive (Cajander et al., 2013). It is also important they are able to negotiate, communicate and be flexible about their beliefs (Kollmann et al., 2009).

2.2. Agile methods in large projects

Scrum is a project management framework founded on empirical process control theory within which people can address complex adaptive problems in software development projects, while productively and creatively delivering products of the highest possible value (Schwaber and Beedle, 2002). Transparency, inspection and adaptation are the main goals of this framework (Schwaber and Sutherland, 2013). The Scrum method ensures this by describing principles which capture these three themes. In terms of transparency, Scrum requires that significant aspects of the process (e.g. definition of “Done, daily stand-up) be defined by a common standard so there is a shared understanding among participants. In inspection, Scrum artefacts and those which depict progress towards a sprint goal (e.g. product backlog, sprint backlog) must be frequently inspected by skilled inspectors to detect unwanted discrepancies. Adaptation, exemplified in activities such as sprint retrospectives, covers the adjustments made during Scrum to handle deviations observed during inspection. Scrum also emphasizes flexibility in how it does not define the software development techniques to be used during development (Abrahamsson et al., 2003). As such developers often use Extreme Programming (XP) practices such as pair programming in Scrum projects (Fitzgerald et al., 2006).

The increased globalization of world business has resulted in trends such as outsourcing, offshoring and inter-organisational software development projects (Ågerfalk et al., 2009). The appeal for these project arrangements comes from their ability to provide organisations with access to a broader skill base which facilitates the rapid creation of high quality software in a cost effective manner (Ågerfalk and Fitzgerald, 2006). In these project settings, scaled up versions of Scrum are typically used as these settings generate too much complexity for mainstream Scrum to manage (Schwaber and Sutherland, 2013). There is a need for effective inter-team coordination and collaboration as these projects are characterised by competing priorities (Barton, 2009). Additionally team members in these projects do not typically have a shared history of working together (Herbsleb, 2007) hence there is a greater need for transparency.

One of such Scrum modifications used in these project types is the Scrum of Scrums model (Sutherland et al., 2007). In this model, Scrum teams are set up to be cross-functional, isolated and independent; and integrated through a Scrum of Scrums meeting. These meetings are held in the same format as the Scrum daily stand-ups, but attendance is limited to the Scrum Masters of the various teams. The information exchanged here allows insight into what is happening in the Scrum teams, challenges they are facing and ensures synchronisation in the execution of the backlog (Paasivaara and Lassenius, 2010). An additional modification is the Meta-Scrum which unlike the Scrum of Scrums is Product Owner focused (Barton, 2009). In this meeting, the goal is to ensure that

consensus is reached among the stakeholders regarding how the backlog would be prioritised.

In large projects where these models are used, it is reasonable to expect that the integration of usability activities into this project type would not be without its challenges. Mainstream Scrum has been criticised for its product short-sightedness, since its main focus is on functionality and how quickly such functionality can be delivered (Singh, 2008; Lárusdóttir et al., 2012). Additionally though seemingly user centric with its use of user stories, it does not adequately take into account the user perspective (Cajander et al., 2013). There is also no recognition of the usability designer role in Scrum as tasks pertaining to the specification and gathering of individual user stories are assigned to the product owner, who is typically an individual concerned with issues pertaining to marketing, sales and not usability (Singh, 2008). Hence it is not expected that collaboration tensions that emerge when these individuals are introduced into these large projects would be addressed by the Scrum of Scrums model. It is therefore of interest to examine how usability activities are integrated in these large inter-organisational agile projects.

3. Case description

The project which provides a context for our study centres on the development of a pension handling software within Company XYZ in a Scandinavian country. Company XYZ is the country's main provider of public occupational pensions and this project was initiated due to the introduction of a new pension scheme in this country. Company XYZ also saw this as an opportunity to revamp their existing pension handling software and create one with a more standardised work flow. There were three main contractors involved in the project. In addition to Company XYZ, there was Company Beta which supplied both usability designers and developers, and Company Gamma which supplied only developers. Both software companies were unaffiliated software consulting companies and this was the first time all three companies were collaborating with each other on a project.

The project was the largest agile project in the country and spanned a period of four years (from 2008 to 2012). Two hundred individuals were involved in this project, none of which had ever participated in a project this size. During the project, a total of twelve Scrum teams were formed. Six of these teams were from Company XYZ, while Beta and Gamma contributed three Scrum teams each. These teams were cross functional in nature and grouped based on the application feature they were developing. These features included the software architecture, data warehousing, front end, back end development and integration with the government platform. A typical Scrum team was composed of nine individuals. The roles represented in these teams were a technical architect, one Scrum Master who also worked as a developer, one business analyst, one tester and five to six developers. Team composition remained mostly the same for the latter two years of the project as there were few exits of team members but there was within team rotation among the developers in order to spread competence.

In Scrum, every team is supposed to have a Product Owner but the size of the project meant that this role could not be limited to one individual; therefore it was split up into three categories. There was a sub project business Product Owner role which was occupied by an individual from Company XYZ who acted as the head Product Owner for the project. There was the contractor level Product Owner position where there were three Product Owner roles each filled by an individual from Company XYZ, Beta and Gamma. Then there was the team level Product Owner where the business analyst in the Scrum team acted as a Product Owner. This team level

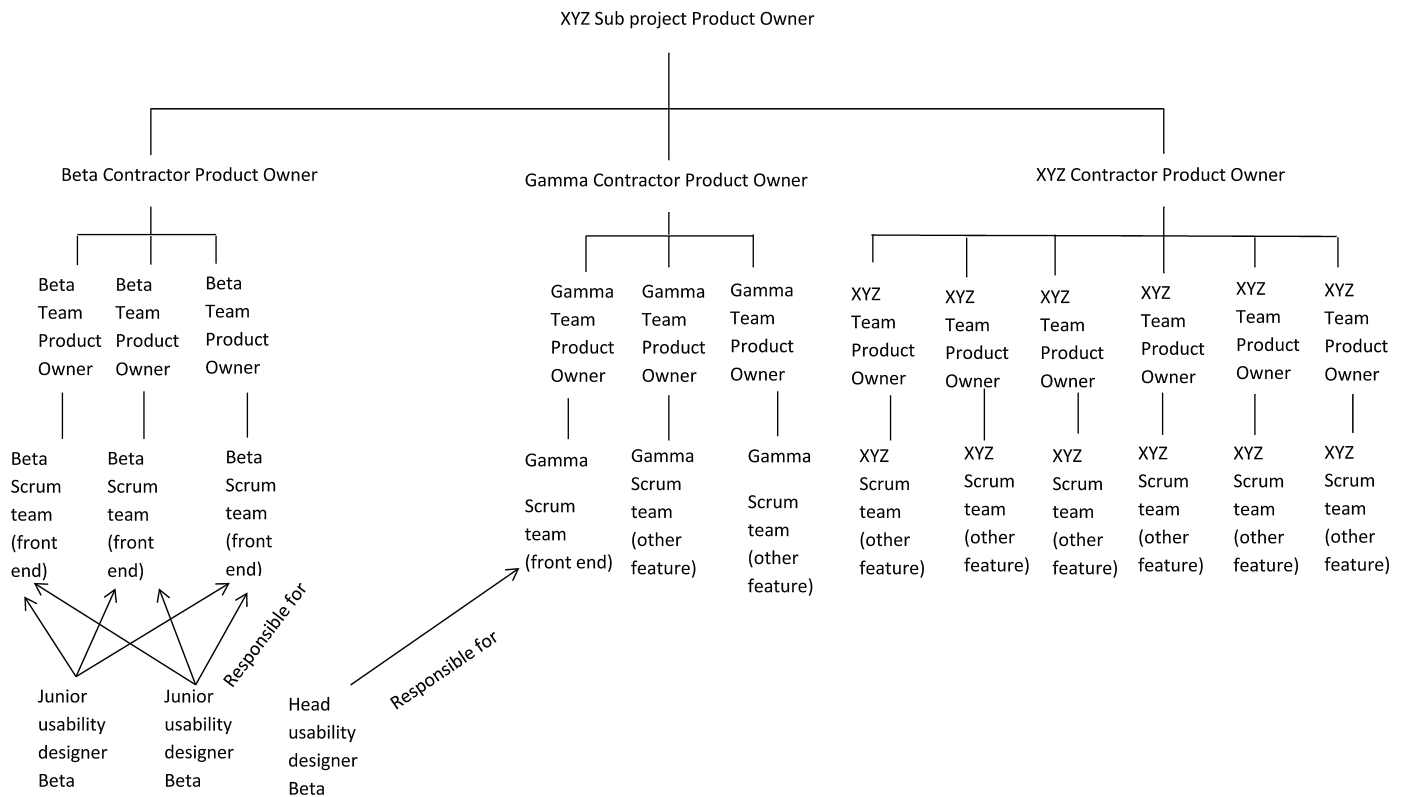


Fig. 1. Illustration of project organisation.

product owner role was in some cases also occupied by individuals from XYZ. To ensure coordination across the teams, a Scrum of Scrums and Meta-Scrum was introduced. The Scrum of Scrums was held three times a week and the Scrum Masters from each team participated in these meetings. Twice a week they held a Meta-Scrum meeting where the contractor level Product Owners would meet with the main project manager, the project manager from the business side, the project director, and some testers and architects. Unlike the main project manager who was responsible for overall project planning and implementation, the project director mainly acted as a liaison between the project implementation team and the project steering committee. This project steering committee was made up of XYZ's top management, one employee representative and one representative from the government ministry. The project manager from the business side, on the other hand, was responsible for ensuring the business interests of XYZ were being safeguarded.

The project's original start date was 2008. The focus at this time was integration with the government platform and finalising plans for the main project. This aspect was handled by Company XYZ. In autumn 2008, XYZ sent out a public tender and in January 2009, the two software consulting companies joined the project. Project groups were split based on what company they came from and put in different parts of the building where the project was being carried out. Each Scrum team participated in site specific Scrum activities but the format remained the same across all the Scrum teams. There were daily stand up meetings and iterations lasted three weeks. Sprint planning meetings took place on the Monday before the start of a sprint cycle and ended with a retrospective meeting on the Friday at the end of the three week print cycle. Pair programming was also used by the developers.

The project master plan contained 308 epics (large user stories) which defined the scope of the project. These were divided into 11 functional areas and prioritised by importance relative to the effective date of implementation of the pension regulations. About

a week and a half ahead of sprint planning, these epics would be broken down into smaller user stories by the Product Owners based on considerations such as compliance with agreed product vision for the release, and put into a single product backlog. Each Scrum team would form their own Sprint backlog from this single product backlog.

There were twelve deliveries during the entire duration of the project organised as three yearly deliveries. In order to verify their 'definition of done' of the features developed in the sprint, a control gate was introduced at the end of each Sprint. The focus at this point was ascertaining whether functionality requirements had been met and code quality. This verification was done by the testers and business analysts from each of the Scrum teams. For accountability purposes, this testing was set up such that no Scrum team tested their own deliveries at the control gate.

There were only three usability designers in the project and they were mainly involved with the Scrum teams handling the front end. In contrast to the small number of usability designers, there were four Scrums teams involved in the development of the front end. Three of these were from Company Beta and the fourth was from Company Gamma. Fig. 1 is an illustration of how the Scrum teams were organised.

A lot of money had been allocated to the project but Company XYZ felt that the usability designers were an added cost. Additionally, as has earlier been noted, this was the first time all three companies were collaborating together on a project. How usability activities were integrated into this environment in spite of these tensions is the focus of our data analysis.

3.1. Research design

The study was performed as an interview-based case study. A case study is an empirical inquiry that investigates a contemporary phenomenon in depth; and within its real world context when the boundaries between phenomenon and context are not clearly

Table 1
Profile of Participants.

Main companies	Profile of company	Number of scrum teams contributed	Role in project	Interviewees
XYZ	Public occupational pensions provider	6	Project leadership, administration, product ownerships and analysis/design of the total solution (requirements phase and solution description)	Main project manager
Beta	Information Technology consulting services	3	Responsibility for the task flow system	1 head usability designer, 2 junior usability designers and 1 front end developer
Gamma	Management consulting, technology services and outsourcing	3	Pensioners' work area presenting information and the whole	2 front end developers

evident (Yin, 2013). As an exploratory tool, it is useful in the examination of phenomenon where the researcher has less a priori knowledge of what the variables of interest will be and how they will be measured (Benbasat et al., 1987). It is also versatile, able to manage data acquired from various sources such as documents, artefacts, interviews and observations (Yin, 2013).

The research stance we adopt is interpretivism. The interpretive case study approach asserts that a researcher's understanding of the phenomenon being examined is acquired through the meanings assigned to it by individuals (Walsham, 1995; Myers, 1997). It is this viewing of case members as active participants in the construction of the case narrative that distinguishes this approach from the positivist case study approach which does not accord a similar role to case members (Bygstad and Munkvold, 2010).

3.2. Data collection and analysis

Data collection was carried out from February to May 2013 using semi-structured interviews. Seven individuals participated in our study. These were the main project manager, a head usability designer, two junior usability designers and three front end developers. A profile of our participants is provided in Table 1, while Table 2 gives an overview of our interviews.

The front end developers we interviewed had joined the project at different times. The developer from Beta joined in 2009, another from Gamma joined in 2010 and the third also from Gamma joined the project in 2011. The mix of these developers was useful as it enabled us examine the variations in participants' description of the project setting on their entry into the project. These variations which mostly pertained to the status of the software or the interactions between the Scrum teams in the project helped in obtaining a comprehensive picture of the project settings. For instance FED Beta talked about initial schisms between them and the Gamma front end developers at the start of the project and how this had led to the grouping of the Scrum teams according to their organisations. This was not an occurrence that the front end developers from Gamma were aware of when they joined the project. The seven individuals who participated in our study enabled us have coverage of our research question. At project level, we interviewed the main project manager. With respect to the usability designer role, we interviewed all the three usability designers that had been involved in the project. At front end Scrum team level, we had a representation from the two companies that supplied front end developers. Hence our interviewees represent for the most part the interactions between the usability designers and front end Scrum teams. To enhance the quality of our data we also examined secondary data sources, mainly project related documents. The project was highly publicised and the organisations involved are well known in the software industry, so it was relatively easy to source for information related to the project online. The documents we examined included a 36 page final report of the project which described the entirety of the project as well as challenges experienced in

the course of the project. We also examined project related press releases of the participating organisations. Furthermore XYZ, Beta and Gamma provided us with project slides, usability test reports. Document analysis served as our analytical tool for the analysis of these documents. This iterative process which combines elements of contents analysis and thematic analysis aids in the understanding of the historical roots of specific issues and can also be used to highlight the conditions that impinge upon the phenomena currently under investigation (Bowen, 2009). Following this approach we read through these documents and used the information there to contextualise the data collected during the interviews.

Our interviews were semi-structured and were conducted using an interview guide. In the interview guide we asked each participant to reflect on their experiences in the project. The questions related to this were also tailored to take into account the role played by each interviewee in the project. The interviews were audio recorded and later transcribed. The data, in textual format, were loaded into Dedoose, a cloud-based tool and analysed using qualitative contents analysis (Miles and Huberman, 1994). In qualitative content analysis, the systematic classification process of coding and identifying themes or patterns is used to subjectively interpret the content of text data (Hsieh and Shannon, 2005). This process is not limited to the counting of words but also extends to the intense examination of language in order to classify large amounts of text data into an efficient number of categories that represent similar meanings in order to provide understanding of the phenomenon under study (Hsieh and Shannon, 2005). In the data analysis we examined the transcripts for information about how collaboration issues between the usability designers and project teams were addressed in the project. This examination was done against the backdrop of accounts of opposition to the integration of usability activities, sources of such opposition and the basis for these, and how such opposition was intercepted. The retrospective nature of our data meant that we had to ensure convergence in the information being provided. To do this, the principal investigator adopted a feed forward approach where each interview was based on data obtained from an earlier interview with a previous participant. We also conducted a few successive interviews. Those who were willing to participate in these successive interviews communicated with us predominantly by email, although we scheduled an additional one hour long interview with the head usability designer. The tactics we identified from this analytical process were those which adequately answered our research question. These were selected based on their explanatory power and not the number of instances they were mentioned.

4. Analysis

Our analysis resulted in the identification of five tactics. These have been summarised in Table 3 and we describe these in more detail in the following sections.

Table 2
Overview of interviews.

Interviewee	Total length of interview	Role assigned in project
Project manager (PM)	1 h	In charge of project implementation
Head usability designer Beta (HUD Beta)	2 h 2 min	Supervising front end Scrum teams from Beta and indirect supervision of Gamma
Junior usability designer1 Beta (JUD1 Beta)	1 h	Working with front end Scrum teams from Beta
Junior usability designer2 Beta (JUD2 Beta)	1 h 11 min	Working with front end Scrum teams from Beta
Front end developer Beta (FED Beta)	1 h	Member of front end Scrum team from Beta
Front end developer 1 Gamma (FED1 Gamma)	1 h	Member of front end Scrum team from Gamma
Front end developer 2 Gamma (FED2 Gamma)	1 h	Member of front end Scrum team from Gamma

Table 3
Summary of tactics.

Tactic	Description
Negotiating inclusion	How the usability designers negotiated their inclusion in the project by being persistent
Placating the expert users	How the usability designers placated the expert users by aligning themselves with the project short term goals of meeting the project deadline and long term goals of having an efficient system
Upward influencing	How the usability designers increased their influence in the project by ingratiating themselves with the front end developers
Establishing credibility	How the usability designers established their credibility by demonstrating their competence and making their intentions visible in the project
Diffusing designs	How the usability designers diffused their designs to the non-collocated front end Scrum team as a means of demonstrating their authority

4.1. Negotiating inclusion

In Company Beta, where the usability designers were employed, the usability designers enjoyed much leverage. There was a high premium placed on their skill, and they had an established, separate division for usability design in the company. Additionally, when responding to offers to participate in client-based development projects, Beta typically included usability designers as part of the resources they had to offer to clients. This approach in Beta was unlike the existing approach in XYZ, where there was no usability designer role. According to the PM, this “*competence*” was not needed, “*because the things (in this organisation) that [were] very important or hard to learn [and], where they [had] to maintain and have people for a fair amount of time [were] the business rules and not if the button [was] here or there*”.

When Beta joined the project in late 2008, XYZ had not specifically asked for individuals with usability designer skills. The HUD Beta mentioned this was because XYZ for this project “*wanted to have more developers doing actual code than more usability people*”. This led to initial negotiations between XYZ and Beta which resulted in company XYZ agreeing to include only one usability designer in the project. The individual in this case was the head usability designer who was then given the task of overall design of the user experience involving concept development and graphical design. The agile nature of the project meant that if these usability designs were to be included in the sprint cycles, they were expected to be completed one sprint ahead of the front end developers. In a smaller project, such a parallel approach to usability design might have been feasible, but in this large project as pointed out by JUD1 Beta, “*this was too much work for one usability person because there were several [Scrum] teams and one usability person*”. JUD 2 Beta corroborating this, talked about how at this point the head usability designer Beta was “*basically an octopus in the project*” as this individual had his hands in too many things. JUD 2 Beta in relation to this further narrated:

“There had only been one usability person in the first few months of the ---- project. We had three [Scrum] teams from Company Beta working with the user interface. The head usability designer was there by himself. It was a money issue basically - after about 3

months he managed to sell the fact that they needed more personnel.”

Eventually two more usability designers were included in the project. These were placed in the Scrum teams in Company Beta and given tasks related to providing detailed clarifications of the design guidelines and developing site outlines and process flows. The head usability designer was then taken out of the teams and made a member of a project management team in charge of coordinating the activities for the Scrum teams handling the development of the front end.

In summary, the head usability designer’s negotiation of inclusion facilitated the inclusion of more usability designers into the project. The tactic worked because the head usability designer was persistent. With this inclusion usability designing gained more effort, there was more focus on usability issues, and gradually usability design became established as a necessary part of the project. The negotiation of inclusion was in this way a significant prerequisite for the integration of usability activities into the project.

4.2. Placating the expert users

XYZ wanted the new software to have a more standardised work flow and at the same time be easier to use. The existing software was complex to navigate and required expertise that was limited to a few individuals who through years of working with the application had developed ways to override the system. Their mastery meant that there was a high dependency on these expert users in the organisation and that there was a skills barrier which new recruits found difficult to scale. This disparity in users’ skills was not something the usability designers had factored in when they started carrying out user research during the initial design phase. They had entered the project with preconceived notions of similarities between the system’s existing users.

“We thought it would be easy because we had a couple of hundred of case workers. They are homogenous, they are users and all the same, they can be any age, any sex, any background or skill set but

they are a very uniform group of users because they are experts in pensions". (JUD2 Beta)

However, as the usability designers soon found out, the expertise which they had assumed would be a unifying factor among the existing system's users turned out to be highly divisive.

"We asked, this feature, how should it support your work flow? And they said, oh it should be like this and I should see all the numbers, all the data and I should have full flexibility. And we were like, are you sure? Because that is really hard, and they went, sure it is hard for you but I am an expert. And so we started [hearing] alarm bells". (JUD2 Beta)

It turned out that the expert users wanted to maintain their status in the organisation, so their description of the work flows was based on their present use of the existing system. This presented a dilemma for the usability designers who upon entry into the project had recognised the complexity of the existing system and were determined to ensure the new system was easier to use. They wanted to obtain access to other user groups in XYZ, but direct negotiations with these expert users proved fruitless. The expert users felt their expertise and involvement in the project made them indispensable and they could not understand why the usability designers insisted that it was for these reasons the expert users were not suitable resources. JUD2 Beta mentioned how the expert users could not understand why the usability designers did not want to accede to their demands, since according to these users, *"we (expert users) pay you to build the system"*. There was also no support from XYZ's management. JUD1 stated, *"(XYZ's) first words when we came in and said we want to do usability tests, were, well use the people that were already in the project"*. According to JUD2 Beta, XYZ argued that they had *"sacrificed their best people and they said you [usability designers] can't have anyone else, no [censored word] way"*. This again presented a dilemma to the usability designers since, they (usability designers) *"couldn't use [these expert users] because they had already been part of the discussion[s] so they knew a lot more about the process"*. (JUD1 Beta)

It was a complex situation. These expert users had a central position in the organisation. Some of them were designated product owners in the project, hence it was impossible for the usability designers to simply bypass them. It was clear that a different approach was needed. The usability designers decided to adopt a more conciliatory stance towards the expert users. According to head usability designer Beta, they tried to *"compromise"*, by highlighting how a redesign of the system would make it *"easier"* for these experts to do things the *"normal way"* and achieve a better work flow. This tone also reflected in their negotiations with XYZ management where in asking for access to the less skilled users, they emphasised that it would be an informal process and would only last 5 min. They also offered to give the users who would participate in these tests some rewards. Eventually they were given access to other user groups in company XYZ. From these sessions, they were able to gather proof that the requirements being requested by the expert users were going to be expensive and that they were not in line with the project goal of achieving a standardised and efficient work flow. Though the usability designers were not able to conduct any evaluation of the system at the end of the project, their efforts in this regard might otherwise be described as successful. This is as FED1 Gamma asserted, *"Overall the users are a lot happier with the new solution than the old solution and in my books that is a success"*.

In summary the usability designers' decision to adopt a placatory approach allowed them to acquire a more comprehensive overview from the users regarding the system usability. This tactic worked because they were able to align themselves with the project short term goals of meeting the project deadline and also

the long term goals of having an efficient system. This enabled them to move from being perceived as antagonists by the expert users and XYZ management to being seen as allies.

4.3. Upward influencing

The placing of the two usability designers with the Scrum teams from Company Beta was because this Company was handling the majority of the development of the user interface. There was a downside however to this arrangement as it led to the usability designers having limited influence in the project. They had no representation at the Product Owner level and the Product Owners they had contact with were the team level Product Owners in the Beta Scrum teams company and not the contractor level Product Owner or subproject business Product Owner. Therefore the extent to which they could influence the prioritisation of the backlog was limited. Change requests they made based on the few usability tests they carried out ended up being discarded on the basis of their being large and unnecessary once they reached the backlog prioritisation phase. The application of Scrum in the project at this moment was described by JUD2 Beta as a *"series of mini-waterfalls"*; since the product was being built incrementally and teams were not allowed to revisit previously developed features to improve the quality based on new information or feedback. The PM explaining the reasons why some of the changes the usability designers were suggesting were being ignored, mentioned that, *"there were things that were designed in the user interface that the designer said we should have, that we took out because we saw that it took far too long in the drawing and so they became, ohh this again"*.

This side-lining was also occurring at the team level, even though these usability designers were co-located with other members of the Beta Scrums teams. The usability designers were being bypassed by the team level Product Owners in the development and communication of user stories to the front end developers. They were present in these teams but only as floor members. Their input was not considered critical during planning meetings and they were not aware of what features the front end developers had decided to develop in a sprint.

"The problem of sitting with developers is that you are not a Scrum Master, so the Product Owner deals with the Scrum Master. They say we want you (Scrum Master) to develop this and this for this iteration. We don't know as usability persons which developers are going to pick a certain task off the Scrum board. So the way it works is the team agrees to some tasks, they break it down and put it down on a Scrum board. Developer picks up the note and says this is some weird graphical user interface [censored word]. We (developers) have to ask the graphical user interface guy and they ask me, how is this going to look and I say I don't know". (JUD2 Beta)

To tackle this, the usability designers set up a separate product backlog, which they (usability designers) called a *"shadow backlog"*. This backlog contained issues such as interface inconsistencies and omitted usability tasks that the usability designers hoped would be addressed. This tactic turned out to be ineffective as this backlog was also ignored. The goal in the project was to maintain a single backlog. This as detailed in the final project report was because XYZ considered the idea of each contractor having a separate backlog to be contrary to the principles of agile development. They averred that it was *"most appropriate to gather all the tasks in one backlog according to a joint master plan"*. (Final project report)

JUD1 Beta noted how they *"tried to argue for why these (the items in the shadow backlog) [were] important and some battles [they] lost and some [they] won"*. They realised from these occurrences that they would need to change their approach in order for their suggestions to be implemented. The usability designers eventually resorted to what they described as *"fixing things under the*

table" with the front end developers in the Beta Scrum teams. JUD2 Beta elaborating on this mentioned,

"We actually started bribing developers with candy and so on to get them to fix. Yeah seriously it was like, can we just add the . . . , just make the escape button active; the next time you are doing something with the code in that window? So yeah they did. It was impossible doing that through the normal channels."

This individual also noted how they even bought carrots for a developer who was vegetarian. The head usability designer in relation to this mentioned how the front end developers who received these items "worked extra hours to correct the usability things that we thought were important to do".

This approach might have as noted by the head usability designer been a "bit out of the normal procedure", but it was necessary since according to this individual, "sometimes it was difficult to even get very small changes". FED Beta corroborating this, talked about how some front end developers in the Beta Scrum teams had described the fixes being presented to them by the usability designers as involving "pixel pushing", on the basis that it entailed tiny details such as "oh no the button is supposed to be just a fraction of an inch to the left or the right or whatever". This individual supported the tactic employed by the usability designers on this basis, asserting, "I guess the ice cream was necessary to tackle the pixel pushing by some people because some people did not like it as much as others". JUD2 Beta also justified their (usability designers) actions, mentioning how as consultants they could have chosen to close their eyes to these things, but that "it was a sort of professional pride thing and we did not want to go through the proper channels because that would have taken weeks and we would not have gotten things done".

This approach taken by the usability designers eventually paid off. The "fixes" made their impact on the project more visible, leading to their eventual inclusion in planning meetings. Project members "saw that what [we] did was to improve the quality and make the system better to work with and that helped with this situation in that project". (JUD2 Beta)

In summary upward influencing by the usability designers was critical in enabling the usability designers create leverage for usability at the higher levels of the project hierarchy. The tactic worked because the usability designers successfully ingratiated themselves with the front end developers. This enabled them to transition from floor member status to active member status.

4.4. Establishing credibility

Both software consulting companies had no domain knowledge of pensions and the existing system was complex. FED Beta talked about how they (project team members) found the manner in which data was being presented to the users in the existing system "a lot more complicated than we first thought it should be". The usability designers felt the impact of these issues more, since in the project they were responsible for the design of the task flow and the user interface. However their late inclusion into the project meant that they did not have sufficient time to understand the system.

"It was incredibly hard coming after they have had a three month advance in understanding the project. It [was] like coming to a country where people speak a language you have never heard of. There are so many words and terms and so on, that it was completely incomprehensible. So it [was] like learning a new language". (JUD2 Beta)

They also had to ensure consistency since they had a number of teams working in parallel. Furthermore due to the Scrum of Scrums

model that had been adopted; these teams were working independently of one another. The impact these issues had on the project came to light during the pilot test of the new system which was conducted midway into the project. A lot of change requests were made as there were inconsistencies observed and some of the features that had been assumed to be useful for the case workers were being rejected by them.

"There were some of the things that were designed that the [usability] designers [thought], oh, this must be good for the case workers. But then when that was out in the pilot then came hundreds of changes, [like] can you remove that thing?"(PM)

The client company began to have some reservations about the competency of the usability designers.

"They went oh; you did not get it right the first time. And we said this is the method, you make something and you try it, perhaps something needs to be changed and then you need to change it. But then they went oh, there is no time for that we have the increments all planned until the third year (Usability designer 2 Beta).

The PM was of the opinion that the usability designers had found it difficult to understand how to work with Scrum and to work within the time limitations of the project. This individual asserted that the usability designers had not "know[n] how to have the design done gradually in the beginning, how not to do too much [upfront] design but just to do enough and . . . what [was] good enough". Since at this point, the project deadline was fast approaching; the usability designers were relegated to a lesser role in the project.

"The second year was actually us trying to sit on our hands because we were told to shut up and [censored word] don't tell anyone to make any changes because it messes up the schedule". (Usability designer 2 Beta)

The usability designers had to wait until after the project deadline when the new system would be up and running before they would be able to make any changes. They decided to focus on developing a pattern library which would serve as a common user interface guide for the front end developers and ensure that there was consistency in how the application was being developed going forward. This proved useful as this pattern library was eventually adopted in the latter part of the project as the checklist for the graphical user interface.

In addition, the usability designers began to put up sketches on the walls to show the impact a certain action could have on the work process and persona descriptions to ensure the front end developers were focused on the user perspective. They also put up personas on the walls. Furthermore, they organised training sessions for the Beta Scrum teams where they emphasised the importance of usability. The head usability designer mentioned that these training sessions enabled them prove to the front end developers that they (usability designers) were not trying to "make life complicated for them (developers)". FED Beta when asked to assess the contributions of the usability designers to the project said,

". . . If we did not have them there I do not know what we would have ended up with. Actually I have no idea. . . . If the developers would have done it themselves, I am not so sure if it would have become much to brag about really in terms of the user interface". (FED Beta)

In summary, the usability designers' establishing of their credibility in the project changed how they were viewed in the project. They did this by concretizing their knowledge of the new system through the usability artefacts they developed in the project. This tactic worked because it made their intentions visible in the project and created an aura of trust. In this way they were no longer seen as incompetent but competent.

4.5. Diffusing designs

There was only one Scrum team from Gamma working on the front end and there were no usability designers located in this team. The head usability designer assumed responsibility for this group, but the interaction between this individual and this Scrum team was not as structured as that of the Beta Scrum team. A closer interaction was impossible since the head usability designer was located with the Scrum teams from Beta. Further the limited number of usability designers meant that he was the main person responsible for the design of the user interface both in the short and long term.

At the time the front end developers from Company Gamma joined the project, the collaboration set up they met was a 'bridge solution' whereby their team level Product Owner acted as an intermediary between their Scrum team and the usability designers. The usability designers would draw sketches and pass it on to this individual who in turn would pass it on to the front end developers. This individual was also in charge of carrying out usability related activities such as testing and verification. The front end developers in this Scrum team therefore had no awareness of usability related activities that had been conducted by the usability designers.

"As a developer I was never in the usability loop so to say. We never got a result of the usability testing. I know they did usability testing but we never got the results for it". (FED1 Gamma)

A consequence of this arrangement was that the Gamma front end developers did not understand the reasoning behind the artefacts which the usability designers were using to guide how the system should be developed. FED1 Gamma mentioned, *"We just got screen shots that said we were going to make this as a front end and this is the back end that is going to talk with it, so I don't know if it was from the interaction designers or where it came from"*. This led to the developers having some misgivings regarding the intentions and competencies of the usability designers.

"I am not sure why they need[ed] to have this documented in what they call guidelines because that is not really a guideline in my world" (FED1 Gamma).

These Gamma front end developers also talked about the difficulties in sourcing for the guidelines developed by the usability designers.

"You had to find them by yourself on the wiki, so if anyone asked, how are you doing the front end work? You would just say check. So there was no information pushing only information pulling". (FED1 Gamma)

Interestingly despite these issues, the usability designers experienced a higher level of 'cooperation' from the Gamma team than what they experienced in their collaboration with the Beta Scrum team.

"If you gave a sketch to the Company Gamma team, they made it look exactly like it, but they didn't necessarily use the same glasses. As long as it looked the same that was their ideal and maybe they didn't ask many questions either. Like if you (usability designer) made it that way, they made it exactly like that. With the Beta team, they made it., they approached it partly differently. Sometimes they just did it their own way or sometimes asked us, should we do this instead?" (JUD1 Beta)

The usability designers attributed this to be due to the hierarchical culture that they had observed in the Gamma organisation. JUD2 Beta described how in Gamma, there was a "follow the leader" approach which was unlike the "individualistic" approach in Beta where it was "the company soul to encourage people to sort of think for themselves and not be so rigid in following your leader or following the system". Head usability designer corroborating this noted, "The

Gamma people are more trained to follow what the leader say and they are more hierarchical and as long as they looked upon me as one of the responsible people for this, they did what they were told and the cooperation was actually quite good". The usability designers' recognition of these differences explained their assigning of the head usability designer to this team and the indirect manner in which designs were being passed on to them. The usability designers did not anticipate that there would be any resistance on the part of the developers and this assumption ended up being valid. For example, FED2 Gamma had this to say about the one time in the project where this individual had met with the head usability designer. *"I implemented the view as requested and didn't argue". (FED2 Gamma)*

In summary the usability designers' tactic of diffusing designs ensured an easier collaboration between the usability designers and the Gamma Scrum team. The tactic worked because it created an aura of authority that fit well with the hierarchical tendencies of the Gamma Scrum team. In this way whatever obstacles that might have arisen from their not being co-located with the Gamma Scrum team or their organisational differences were eliminated.

5. Discussion and implications

We have presented a case study of how usability activities were integrated into this large agile project. We have also identified the tactics which facilitated this integration. These as described in our analysis include negotiating inclusion, placating expert users, upward influencing, establishing credibility and diffusing designs. It has been asserted that the onus is on usability designers to define and justify their roles in agile projects (McInerney and Maurer, 2005) and these tactics may be considered a means through which this may be achieved. A similar tactic that has been noted in the literature is the "Trojan horse" technique, where usability designers subtly integrate usability activities using mediums such as usability workshops (Cajander et al., 2013). It would be useful to examine how influential such work tactics are on the integration of usability activities into agile development projects and further research on this is encouraged.

The existing literature on the integration of usability activities into agile development has been criticised for being dominated by a process perspective where integration is depicted as a rational, mechanical process (Ferreira et al., 2011). There is the issue of how this literature is dominated by theoretical reflections, experience reports or academic-practitioner trials (Silva da Silva et al., 2011), with few rigorous studies of practice (Ferreira et al., 2011). The strength of this paper is that we have addressed these concerns. We have examined practice and the tactics we have identified show the error in portraying the integration of usability activities into agile development as being purely the outcome of a methodological process. For instance the practice of usability designers' working in parallel sprints with Scrum teams is one that has been asserted to be necessary if usability designers are to work in agile projects (Fox et al., 2008; Wale-Kolade et al., 2013). However as we have shown in our study, this recommendation fails to consider how challenging it would be to implement this practice when there is more than one Scrum team involved. Processes might provide a repeatable formula to create a quality product (Hartson and Pyla, 2012), but (as is evident in this study) without an understanding of what occurs in practical settings, the utility of proposed processes and tools as relates to the integration of usability are questionable (Ferreira et al., 2012). Increased globalization means that projects such as the one we examined are gradually becoming the norm. Our findings suggest that the usability-agile dilemma is one further aggravated in inter-organisational contexts. Thus there is room for further systematic investigation of this matter. For instance such examinations could be extended to projects where team members

are geographically distributed. It would also be useful to examine the specific usability activities being carried out in these contexts as a way of enhancing knowledge in this area.

We have also carried out an interpretive study of a large inter-organisational agile project and in this way provided insight into the intricacies surrounding the integration of usability activities into this project setting. Specifically we have highlighted what issues might be expected to arise when usability designers are introduced into these types of projects. For instance there is the matter of how many usability designers should be allocated into such large projects, which the present literature with its focus on in house development projects is yet to address. We have also shed light on how contextual issues influence the integration of usability activities in a large scale inter-organisational agile project. Previous literature has highlighted how the level of import organisations place on usability determines how and whether usability activities are integrated (Ambler, 2008). Also how a shared work culture and the mutual awareness between team members that is a consequence of this shared work culture, plays a critical role in ensuring the collaboration between usability designers and agile project teams (Ferreira et al., 2012). In this paper we see the effect these issues had on the integration of usability activities in this inter-organisational agile project. Project team members had differing interpretations of how the project should be organised and how it should proceed. In a single organisational project, this might have been mitigated by participants having a shared work culture. Also the usability designers might not have had to expend so much effort as they would have been working with a much smaller number of Scrum teams. However the multiplicity of organisations involved meant that this was not the case.

Further, though the project organisers had taken steps to ensure inter-Scrum team coordination by implementing the Scrum of Scrums model, this consideration was not extended to the collaboration between the usability designers and the Scrum teams. The usability designers were generally the sole advocates of usability as the client organisation did not place a high value on the usability designer role. They had to 'negotiate their inclusion', 'placate the expert users' 'engage in 'upward influencing' 'establish their credibility', and 'diffuse designs' in order to create optimal conditions for the integration of usability activities. Previous research has examined the use of artefacts in the collaboration between usability designers and agile project teams (Brown et al., 2011). Our study shows how artefacts such as sketches were used by the usability designers to achieve their goal of "ensuring their credibility". In view of this, we propose that the examination of such collaborative artefacts should be extended further to investigating the intentions behind these artefacts, for instance what tactic informs their selection, and their effectiveness in such instances.

Although we have identified these tactics within the context of a large inter-organisational agile development project, where the Scrum of Scrums model was used, we believe that our findings are also relevant to projects where mainstream Scrum models are used. The Scrum method is known for its lack of a clear picture of the responsibility for usability (Lárusdóttir et al., 2012; Cajander et al., 2013), and for its strong focus on functionality (Singh, 2008). Our study shows that this is also true of large projects even if the Scrum method used is a scaled up version. The integration of usability activities into agile development is clearly a difficult process and our findings where we have highlighted five tactics being deployed to ensure this integration is proof of this difficulty. Thus we can generalise that whether this integration of usability activities occurs in a project using mainstream Scrum or in a large project where the Scrum of Scrums model is used, whatever variations might exist with regards to the tactics used may have more to do with the scope of effort needed to ensure this integration.

Table 4

Theoretical propositions regarding the integration of usability activities in agile development.

Proposition 1	The benefits resulting from the involvement of usability designers in agile projects are more discernible when the usability designers have the clout needed to make this impact.
Proposition 2	Successful collaboration of usability designers and developers is less a question of how they are located, but more a question of how willing they are to align themselves.
Proposition 3	User involvement is only successful to the extent that usability designers are empowered and are responsible for how to involve users.

5.1. Theoretical implications

There are implications to be derived from our study when we consider team arrangements that have been described in the literature as optimal for the integration of usability activities into agile development methods. These are the involvement of usability designers; the immersion of usability designers and developers; and the involvement of users (Wale-Kolade et al., 2013). On the basis that these arrangements were also evident in our case study, the following theoretical propositions which we have listed in Table 4 be seen as applicable not only to large agile development projects where the Scrum of Scrums model is used, but also in those where mainstream Scrum models are used. These are elaborated in the subsequent paragraphs.

First, the literature emphasises that usability designers must be involved in the project. Their involvement ensures usability concerns are always at the fore (Wale-Kolade et al., 2013) and is in this regard critical to the ensuring of usability (Lievesley and Yee, 2006; Ambler, 2008). In our case study, the usability designers were tied to the project, but the integration of usability activities was not solely an outcome of their being involved in the project. They had to 'negotiate their inclusion' in order to gain greater access into the project. They had to 'establish their credibility' and 'diffuse designs' before they could be seen as valuable by the other team members. They had no clout in the project which would have enabled them influence the manner in which the project was being executed and had to resort to 'upward influencing' in order to make any discernible impact. We can thus propose that;

The benefits resulting from the involvement of usability designers in agile projects are more discernible when the usability designers have the clout needed to make this impact.

Secondly, the immersion of usability designers into agile development teams has been described as useful in ensuring usability concerns are given the primacy they deserve during requirement gathering activities and the development phase (Düchting et al., 2007). It creates a mutual awareness among project teams (Ferreira et al., 2012) and ensures usability design suggestions are not misinterpreted (Najafi and Toyoshiba, 2008). It allows for easier communication and collaboration between usability designers and developers (Ferreira et al., 2011; Silva da Silva et al., 2013). Where there is no immersion it has been asserted that usability is perceived to be irrelevant and considered a "checkbox ticking exercise" (Raison and Schmidt, 2013) and the usability designer becomes an optional "add-on" (Cajander et al., 2013). An alternative stance that has been noted is that when usability designers are immersed, their creativity is hampered as they become more involved in software construction issues (Ferreira et al., 2010). Further that this arrangement calls for the usability designer to have a higher cross specialisation of skills in order that this individual may be able to communicate with the developers (Wale-Kolade

et al., 2013). Our case study allows us evaluate both sides of these arguments since both arrangements; immersed and non-immersed were put into effect in the project. In terms of ensuring focus on usability, both arrangements were insufficient in themselves in ensuring integration. Usability activities were considered even more irrelevant in the immersed teams than in the non-immersed teams as seen in how the developers in the immersed teams were less willing to accede to the usability designers. For these immersed teams, it took the usability designers 'establishing their credibility' in order to ensure usability concerns were brought to the fore. In the non-immersed, it only required them to 'diffuse designs', as this team even though they did not fully understand what they had been given, chose to accord credibility to the usability designers. On the other hand there were also benefits to each of these arrangements. We see this in how the usability designers were able to succeed in 'upward influencing' by reason of their being with the immersed teams. We also see it in how rather than being viewed as irrelevant by the non-immersed Scrum team, they were considered individuals whose authority could not be questioned. A new environment was created for usability that was not an outcome of whether the usability designers were immersed or not but on whether in each case Scrum teams and usability designers were willing to work together. Thus we can suggest that;

Successful collaboration of usability designers and developers is less a question of how they are located, but more a question of how willing they are to align themselves.

A third consideration has to do with the issue of user involvement. It is argued that it is a means to ensure that user needs are adequately taken into account (Blomkvist, 2005). It empowers end users by enabling them express their opinions about activities, practices and tasks (Bonacin et al., 2009). Conversely it has been noted that this practice is unable to cater for the different mental model of users regarding usability and can also lead to diminished user representativeness (Wale-Kolade et al., 2013). Our study provides evidence of this latter observation. We see how the usability designers had to focus on 'placating the expert users' in order to be able to gain a more comprehensive overview of what was expected from the system in terms of usability. The information the expert users were providing was no doubt relevant since they were more familiar with the system, but this information was based on their own mental models and not that of the less experienced users. The involvement of users without the intervention of the usability designers would have resulted in a usability that was only suitable for a select group of individuals. Undoubtedly the involvement of users is a crucial part of usability, and it is impossible to adequately take into account every individual's needs for usability. Therefore what can be derived from this is that beyond user involvement, the usability designers need to be empowered to make the necessary adjustments when users are involved. Thus we can propose that;

User involvement is only successful to the extent that usability designers are empowered and are responsible for how to involve users.

These three propositions may be seen as a means by which optimal conditions can be created for the integration of usability activities in agile development projects irrespective of their size. They allude to the fact that the ideal arrangements described in the literature concerning the involvement of designers, whether they are immersed or not, and the involvement of users are insufficient in themselves to guarantee the integration of usability activities nor usability designer-agile team collaborations. There is an inadequacy in these arrangements which become evident when they are implemented in large agile projects. Additionally in some cases such as ours they may only exist to give off an impression of interest in usability issues.

From a practitioner perspective, what relevance do our findings have for these individuals? It has been asserted that for usability designers working in agile projects, it is important that they understand their job role (Kollmann et al., 2009). They must be able to adapt (Meingast et al., 2013); be able to argue and be persuasive (Cajander et al., 2013). Our findings corroborate each of these assertions. The usability designers' understanding of their job role and its importance played a key role in enabling them establish their credibility. We saw evidence of their adaptability in how they resorted to 'placating the experts' by making concessions when initial discussions with these individuals were not fruitful. Also, it is evident in how they 'diffused designs' due to their not being co-located with the Gamma Scrum team. Persuasiveness was evident in how they 'negotiated their inclusion', and in their 'upwards influencing'.

One issue we want to emphasise at this point pertains to responsiveness. Responsiveness is at the heart of agile methods. Responsiveness means that there is an acknowledgement of the chaotic nature of software development and that there is a recognition of the need to be proactive, rather than rigid (Chow and Cao, 2008). In our study, the usability designers had entered into the project with preconceived notions of how the project would proceed based on their previous experiences in other projects. An example of this can be seen in how they had initially assumed that all the end users in Company XYZ operated at the same skill level as the expert users. Also they had never worked in a project as large as this. The resulting chaos which emerged from the usability designers not having their initial expectations fulfilled in the project led to their deploying the five tactics that we have identified. We have no means of ascertaining whether it would have required less effort on the part of the usability designers' part to integrate usability activities if from the start they had been more proactive and recognised that the project would be difficult. But on the basis that it was the usability designers' tactics that ensured the integration of usability activities and not just their performance of their designated usability tasks, validates why usability designers need to embrace the change that is agile software development (Norman, 2006). Indeed agile methods impose new demands on the usability designer role and it is the responsibility of usability designers to meet these demands (Nielsen and Madsen, 2012).

5.2. Limitations

Our study is not without its limitations. There have been discussions regarding the artificiality of interviews in how it forces individuals to create opinions under time pressure (Myers and Newman, 2007). As our study was based on an already completed project, our data could not be supplemented with data acquired from participant observations. Participant observations would have allowed us validate what our participants were saying. We tried to meet this criterion by basing the questions asked in successive interviews on data obtained from prior interviews, but we cannot guarantee that this was sufficient. Further studies may follow a live project. Related to this, we also suggest that potential researchers should consider employing an alternative research approach other than the case study approach that was used in this study. For instance action research known for how it combines theory generation with researcher intervention (Sein et al., 2011) is a research approach whose utilisation could prove very valuable. This is as it would provide these potential researchers an opportunity to study the integration of usability activities into such large projects in greater detail and also provide them with an avenue to effect change.

There is also the issue of the small number of participants who were involved in this study. Indeed it would have been useful to incorporate the views from other project members such as the end users and other agile developers. Unfortunately it was difficult

to obtain further access due to concerns the client company had about their privacy. Conversely, some of the issues that have been highlighted here are not solely unique to inter-organisational agile development projects. For instance, with reference to how the usability designers were perceived in the project, it is known that agile project teams consider usability designers retrogressive due to their focus on periods for user studies prior to project start (Norman, 2006). Usability designers are also viewed as technically incompetent when they demonstrate a lack of understanding of the agile process (Kollmann et al., 2009). There is an acknowledged scepticism towards the usability designer role within software development settings and it is a role that requires a person with a “great deal of stamina and backbone, and a strong belief in what he/she is doing” (Boivie et al., 2006). Similarities between these observations concerning the challenges usability designers face when collaborating with agile project teams and those we have noted in this study suggests we have observed a valid concern even if the sample that has been examined is small. Moreover the fact that we examined this issue within an inter-organisational agile project has enabled us broaden the scope of this discussion. Thus on this basis we argue that the evidence from our data is compelling enough to warrant our investigation of this matter. However we admit that a more heterogeneous selection of participants would allow for more robust findings and incorporate a broader perspective, unlike in this study where our findings are mostly based on the perspective of the usability designers. Thus we encourage researchers who might wish to explore our research question further to take this matter regarding participant selection into consideration.

6. Conclusion

Our main interest in this study pertained to the integration of usability activities in large inter-organisational agile projects. Our study highlights how difficult it is to integrate usability activities into this project type. The complex nature of this project does not foster the creation of the collaborative environment needed to integrate usability activities. Our findings suggest that it is possible to integrate usability activities into these projects but only as long as the usability designers are able to put in the required effort needed to ensure this integration. In this case study, this effort was demonstrated in the form of the five collaboration tactics that were identified in this study. These as mentioned in the paper are negotiating inclusion, upward influencing, placating expert users, establishing credibility and diffusing designs. Though these findings are by no means conclusive, since they represent the usability designers' perspective on the issue, they highlight the important role collaboration plays in the integration of usability activities into agile projects.

We have also highlighted the implications our findings have on team arrangements in agile projects where usability designers are involved and the usability designer role. Based on which we have made three propositions regarding how a collaborative environment may be created for the integration of usability activities in large agile development projects. We thus call for further studies to validate as well as elaborate more on these propositions. For instance regarding the issue of clout, what might this translate to for usability designers in a large agile development project? Potential future studies might also consider examining which usability activities are being performed in large inter-organisational agile projects in order to enhance knowledge in this area. In acknowledgement of the limitations we have identified in our study, such research should involve: (a) live inter-organisational agile projects; (b) and incorporate a broad range of perspectives, including but not limited to usability designers.

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