Situated Inter-organizational Communication:

Identifying the conditions for collaborative writing progress through a community of practice

By

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Contents

Abstract

This scholarly project describes an approach and methodology for situated inter-organizational communication as expressed by a community of practice in a collaborative writing project. With a grounded theory approach and retrospective analysis applied across an evolving series of drafts of an Industry Recommended Practice document for the underbalanced and managed pressure drilling industry, this study demonstrates conditions and methods to identify progress in a collaborative writing project. Analysis of the data suggests that inter-organizational communication can explicitly reify tacit knowledge of a group of subject matter experts in a document given four conditions: a mechanism to support inter-organizational communication, a clearly defined situation, a facilitated collaborative writing process and an established community of practice. This study demonstrates an analysis technique that identifies, therefore supporting, the importance of sharing stories, exploring possibilities and generating scenarios in the development of a well rounded document. It also describes a method to document group confirmation by incorporating different colours of text, which provides a way of reifying group consensus in the collaborative writing process through progressive changes to the text colour. Analysis of 15 drafts and over 1800 pages revealed that patterns of discussion, revision, edits and confirmation that occur during collaborative writing can be interpreted, and possibly predicted, as progressing work.

The Purpose

In this project, I examine the process of collaborative writing with a group of professionals belonging to a shared industry but employed by different organizations. These particular inter-organizational collaborative writing events are focussed around a single goal, to produce an Industry Recommended Practice, or IRP, for the upstream oil and gas industry. IRPs are publically available documents, sponsored by an independent organization that represents six oil and gas professional association. This independent organization defines the IRPs as “a set of best practices and guidelines prepared by knowledgeable and experienced industry and governmental personnel”.

I am interested in identifying successful conditions for this kind of collaborative writing, particularly methods that identify progress other than through the interpretation of the content. Obviously, evolving content in the iterative versions of the document is a high-level indicator of project progression. In the nuances of my experience however, I have learned that content quantity is not necessarily a reflection of completeness. At certain meetings, or at certain moments in the process, I have noticed a significant dynamic or ‘feeling’ where the group reaches repeated consensus in a moment of collective synergy. It is also apparent that the process of developing the IRP seems a bit like a drop in the industry knowledge pond where those closest to the participants developing the IRP are most affected and at some level eventually the industry as a whole senses these dissipating ripples.

These metaphors and senses have served me well in the moment, but are difficult if not impossible to quantify. My primary goal is therefore to explore the possibility to predict how a collaborative writing project might progress, so that consultants (like me) who have been tasked

with coordinating the development of IRPs could herd meeting discussions towards a potentially predictable pattern rather than reacting to a recognized experience. Ideally, an evaluation technique that could be repeated on, and enhance, future projects could provide a potential method for formative, summative, and collective evaluation over multiple projects carries great personal and professional appeal.

The nature of these IRP projects, whereby a group of experts gather to share knowledge via a collaborative writing process, resonates with Etienne Wenger's theory of communities of practice (CoP). Wenger defines such communities as a "group of people who share a concern, set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis" (Wenger et al, 2002, p. 4). The concept of CoPs grew out of Jean Lavé and Etienne Wenger's (1991) work on situated learning which proposes that learning occurs informally within its authentic context, similar to apprenticeship models, rather than in a formalized learning environment, such as a classroom. At a cursory glance the IRP projects appear to mirror these two criteria. A group of professionals gather to develop a document with the goal of sharing expertise. The majority of the work occurs in working sessions where participants share stories of experience to filter out meaningful knowledge. The research and analysis that follows is directly informed by Wenger's ideas and attempts to explore to what degree these types of collaborative writing projects elicit CoP characteristics.

My secondary goal for this research project is to develop a research method that embraces the efficiencies of retrospective analysis. To do this, I approach my research in a way that can be realistically implemented on an existing project and repeated on future projects.

My approach is to explore one inter-organizational collaborative writing project, specifically the development of an IRP from a specific sector of the Alberta upstream oil and gas industry, namely Underbalanced and Managed Pressure Drilling (UBD/MPD) industry. This collaborative writing project is typical of IRP developments and offers a broad collection of raw data. In this study I navigate the rich data landscape to hone in on relevant data and methods in an effort to support my document development process.

In academic terms, this scholarly project attempts to evolve a theory of inter-organizational communication by seeking predictable patterns using a grounded theory approach and applying retrospective analysis across the rich collection of data. To achieve the research goal, the subject of this study explores how a voluntary inter-organizational group from the UBD/MPD industry worked together to document best practices to further the UBD/MPD industry as a whole.

Contribution to the literature and personal motivation aside, this piece of research may provide guidance when considering knowledge transfer strategies from organization to industry-wide and may carry significance for the study of organizational communications, organizational learning and also for the oil and gas sector. In instances of inter-organizational communication, organizations are certainly concerned with competitive advantage afforded by proprietary processes and may be reluctant to share such knowledge with either collegial or competitive organizations.

Chen et al (2006) discuss two methods of inter-organizational communication: formal and informal. Informal inter-organizational communication occurs when experts ask one another for professional advice on a specific situation. For example, an engineer working through a design problem might connect with a fellow engineer at another organization to share and discuss

design knowledge. This might occur simply through a phone call, or more extensively when employees shift positions to a new organization. Formal inter-organizational communication occurs at professional events such as conferences, association meetings or projects like the IRP developments.

An organization's willingness to share knowledge inter-organizationally may differ depending upon circumstance. As emerging technologies spread across an industry, they reach what Rogers refers to as the critical mass. The critical mass is "the point after which further diffusion [of a new technology] becomes self-sustaining" (Rogers, 2003, p. 343). It is at this point when knowledge is diffused such that the knowledge or technology is no longer considered a competitive advantage and organizations are willing to share industry-wide.

For the upstream oil and gas industry, emergence of new techniques and methods frequently carries risk most imminently for on-site workers and thereby the organization itself. Frequently, efficiencies in new techniques are realized in the subtleties of implementation, not the formality of laboratory testing. Industry-wide knowledge sharing raises the 'knowledge bar' for the entire industry and offers the potential for collective progress. The degree of inter-organizational knowledge sharing is a fine line between collective progress and a detriment to competitive advantage. Where risk can be avoided and worker safety preserved, competitive advantage is more likely to go by the wayside in favour of industry knowledge sharing. The purpose of IRP developments are to develop practices for worker, public and environmental safety issues which supports clear yet neutral territory for organizations to share knowledge without risking competitive advantage yet advancing the industry.

Methodology

"Grounded theory is *what is*, not what should, could or ought to be" (Glaser, 1999, pg. 840).

As discussed in their seminal work, *The Discovery of Grounded Theory* (1967), the intention of Glaser and Strauss's grounded theory is to generate theory, not test theory. Qualitative data from a wide number of sources is continuously analyzed to define categories then compared for themes and patterns until the analysis reaches theoretical saturation. Theoretical saturation occurs when new information is no longer apparent for each category (Goulding, 2002; Denscombe, 2003).

A grounded theory approach has become one of the most prevalent methods cited in the management literature. With its basis in study on human interaction, and founded in a pragmatic approach, grounded theory marries well to organizational management research (Goulding, 2002; Lancaster, 2005; Locke, 2001).

Christina Goulding (2002) discusses the applicability of grounded theory to management research. She documents the diversity of topics in the management literature that employ a grounded theory approach. Interestingly, she highlights Strauss's contribution to the sociology of organizations through his focus on the work itself rather than organizational structures or division of labour. Strauss may have been one of the first to shine a scholarly light on the actions of workers rather than the structure within which they are contained. For this project, the data available for analysis (especially draft versions of the document) represent the actions, or work, of the participants in the project.

Goulding's work is supported by Geoff Lancaster who argues for the use of grounded theory particularly for the management consultant (2005). Typically the purpose of consultancy research is to produce recommendations rather than theory. Grounded theory allows for the evolution of theory by clearly defining a situation and; thereby, theorize recommendations for that situation. He suggests that grounded theory can be particularly useful for the unclear research problem within specific situations and circumstances. Such is the case in this project, a specific circumstance with a hazy research problem.

Karen Locke (2001) overviewed the 30-plus year history of grounded theory in management research. She supports this history by arguing for grounded theory's suitability to management research through its innate approach toward the analysis of situated problems. She goes on to discuss how the existing management literature has engaged grounded theory in several ways pertinent to this study. A grounded theory approach has the ability to "capture the complexity of the context" (p. 95). For this project grounded theory allows analysis of a small portion of data, yet provides space for the inclusion of important elements beyond the immediate data that may further inform analysis. Locke also suggests that grounded theory "links well to practice [by helping] organizational members gain a perspective of their own work situations" (p. 95). A connection to practice resonates with my stated purpose. Finally, Locke endorses how several management studies have accessed the flexibility of grounded theory to continually expand theory as the landscape changes. One of the goals of this research is to create an evaluation mechanism that is repeatable. A grounded theory approach will allow for expanding theory to complement this mechanism.

Situational Analysis

Grounded theory certainly offers an appropriate methodology through which to analyze my data, but the quantity of data still requires refinement. Grounded-theory-led management research focuses in on the 'situated-ness' of the research problem. Conveniently, Adele Clark's (2005) situational analysis provides a method of revealing ways to look at data within a grounded theory framework. Additionally, a situational focus aligns with Wenger's situational-based theory on CoPs.

According to Clark, the purpose of situational analysis is "simply to get the researcher moving into and then around in the data" (p. 84). Clark's approach in this instance was especially useful as it addresses both human and nonhuman elements of significance. She states that, "the goal [of situational analysis] is first to descriptively lay out as best one can all the most important human and nonhuman elements in the situation of concern of the research broadly conceived" (p. 87). Clarke's suggestion of the relationship between the 'who' and the 'what' in a situation provided an opportunity to explore the relationship between the people involved and the document that was the result of the project.

The review of the situation discussed below informed the situational maps that follow in Figures 1 and 2.

The Situation: Underbalanced and Managed Pressure Drilling IRP

In the province of Alberta oil resources attainable by conventional production methods have been mostly exhausted. New and emerging technologies and methods designed to exploit previously unattainable hydrocarbon reservoirs have been on the rise for many years. With these

new approaches comes inherent risk to the worker, the environment and, depending on proximity, the public.

Work on an oil lease frequently incorporates workers from multiple companies beyond the primary operator. Various service companies and their employees, regulators and consultants may all be present on the lease at any one time. It is in the best interest of industry to share a certain degree of knowledge about an emerging technology or recovery method to ensure worker safety for all on the lease including those immediately involved with the technique in question.

Oil exploitation methods are typically theorized by engineers and not necessarily developed in the field. Field testing may be part of the development process, but much is learned once the technology is implemented onsite during actual production. Unfortunately, many lessons are learned when something goes wrong. Those involved in such incidents certainly learn from the situation, but without inter-organizational communication it is unclear to what degree these learning moments are shared industry-wide. Undoubtedly, as a new method becomes more common and normalized across the industry, those involved become more familiar with the nuances of the technology best applied to reduce risk and ensure success.

In the realm of non-conventional production, UBD/MPD is one such technique. It intentionally manipulates pressures and properties to allow reservoir fluids to come to the surface. Manipulating reservoir pressures is not a simple task and one ripe with uncertainty and risk, potentially resulting in a blowout. UBD/MPD is a production technique that can be immensely beneficial to reach reservoir fluids unattainable by conventional methods, but it carries with it high risk that is diminished with experience and knowledge.

Today, the UBD/MPD industry has matured to include a significant group of experts with a broad spectrum of knowledge and experience. As Alberta's requirement for non-conventional techniques continues to grow, so do new entrants into the UBD/MPD marketplace. These new entrants into the UBD/MPD industry may not fully appreciate the risks associated with this technique. Experienced UBD/MPD experts felt it timely to collaboratively develop an industry-wide set of recommended practices to share what is considered good practice with the intention of reducing risk.

The development of a UBD/MPD Industry Recommended Practice (IRP) was sponsored by an independent organization representing a group of oil and gas professional associations which is referred to in the remainder of the document as the Petroleum Safety Organization or PSO. The PSO in turn sponsored the development of the IRP on behalf of oil and gas professional associations. An assigned representative from PSO attended all meetings and arranged all resources, both voluntary and acquired, which included financing additional expertise, providing meeting room space, administrative support, etc.

Along with the PSO representative, the IRP development group included subject matter experts, or SMEs, from several organizations representing three industry professional associations. All SMEs participated voluntarily with mixed motivation. Some were simply representing their professional association. Others contributed their expertise while portraying an industry presence on behalf of their employers. Some were senior experts dedicated to sharing their vast knowledge, while others were experts from service or consulting companies and familiar with the complex environment UBD/MPD operations often experience. Most participated with a combination of these motivations. Additionally, representatives from provincial regulatory bodies were also present at all meetings and working sessions to ensure recommended practices

resulting from discussion were within jurisdictional regulation and to work with industry to seek direction for future regulation.

A voluntary UBD/MPD Committee of experts collectively spent two years developing a risk register that identified key risks and mitigations inherent to UBD/MPD. The register highlighted critical concerns, and was developed as a risk analysis tool. The register did identify risk, but the recommended practices intended to mitigate each risk were yet to be fully developed. Further, the risk register itself did not represent a typical recommended practice document. Since the goal of the project was the development of an IRP, the risk register alone was not considered an end product.

To prepare the formal IRP document, the committee acquired two consultants, via PSO. One acted as Editor / Writer / Facilitator (in this case also the Researcher) who adopted the role of facilitating meetings, editing the final document and coordinating efforts.[1] The second consultant was a senior industry expert hired to develop content. Over nearly two additional years a smaller voluntary group met relatively regularly to collaboratively develop an IRP document that supported the risk register. This group spanned experts across the Western Canadian UBD/MPD industry and included regulatory representatives from Alberta, Saskatchewan and British Columbia. The entire committee met monthly with smaller special interest groups assigned to specific sections meeting at least monthly or more frequently as the work demanded.

By the Fall of 2009, a working draft was in place and ready for committee review and refinement. A regular core group of about 10 dedicated individuals consistently attended

[1] …while she was completing a Masters' degree, renovating her house, being pregnant and caring for a newborn.

committee meetings and working group sessions. Wenger et al (2002) describes a core group as a "group of people who actively participate in discussions, even debates in the public community forum" (p. 56). The UBD/MPD core group certainly did elicit these characteristics and represented a diverse yet balanced group of industry and regulators. It included experts from large, medium and small oil and gas producers; regulators from three provinces; experts with less than 10 years to 30 plus years experience; representation from oil and gas companies, service providers; and a self-employed consultant; along with the Editor / Writer / Facilitator and a key representative from PSO. In the end, it was this core group of 11 that refined the final IRP and corresponding risk matrix for publication. The final IRP document is comprised of three main sections. The entire document including the three content sections, a preface, table of contents and appendices reads about 130 pages long.

According to the established IRP process, once the IRP document proper was developed it was released for a 90-day industry-wide review. The IRP development group addressed comments before the revised final draft was again released for industry-wide review for an additional 30 days. Once all comments were resolved the IRP was sanctioned by industry and published publically[2].

This study focuses document analysis on activities from Fall 2009 to Winter 2009 and is restricted to the core group's concentrated efforts to prepare the document for the first 90-day industry review. Document analysis is limited to existing documentation that represents the activities of core group only. (see Document Analysis)

[2] At the time of this writing the IRP document is out for the second 30-day industry review. Final sanctioning and publication is expected in Fall 2010.

The document development process, or collaborative writing process, was open for interpretation and guided by the experience of the Editor / Writer / Facilitator. During the period included as part of this study, the core group met for six working group sessions. Each working session lasted between 2 – 3 hours and focussed on a particular portion of the document with a goal of reaching consensus on unresolved issues, documenting issues that required further clarification, and identifying or developing additional content where required. These sessions produced numerous edits and action items. Following each working session, the Editor / Writer / Facilitator copyedited and finalized a revised draft along with action items for distribution to the core group. Group members reviewed the draft and brought comments and concerns to the next meeting.

Working sessions were synchronous sessions held in a boardroom with the latest draft projected on a screen to facilitate collaborative writing and discussion. Group participants at a distance teleconferenced into the session and connected via desktop sharing. The Editor / Writer / Facilitator actively modified the document during the meeting and used several techniques to denote comments, questions or issues within the document. Since the document was produced in Microsoft Word™, comments were captured in comment bubbles in the right margin. Suggested content additions were noted in red text encased by triangle brackets. Content to be discussed and agreed by the group was noted in green text. Once consensus was achieved the text was turned to black. Document progress seemed apparent as comment bubbles and multi-coloured text diminished.

Asynchronous work continued between working sessions. The Editor / Writer / Facilitator addressed action items with SMEs between meetings often in one-to-one sessions. These one-to-

one sessions typically produced new content, revisions, and issues to be raised at the next working group session.

Situational Maps

The situation, or context, described above explores the evolution of a document (an IRP), developed by a group of SMEs across an industry, who are facilitated through a collaborative writing process. Clarke's (2005) approach to situational mapping and relational analysis provided a method to carefully analyze the context to seek clarity through a landscape of data and find research focus. The situational map in Figure 1 below describes the network of SMEs within their industry and their relationship to both human and non-human elements that influence the situation.

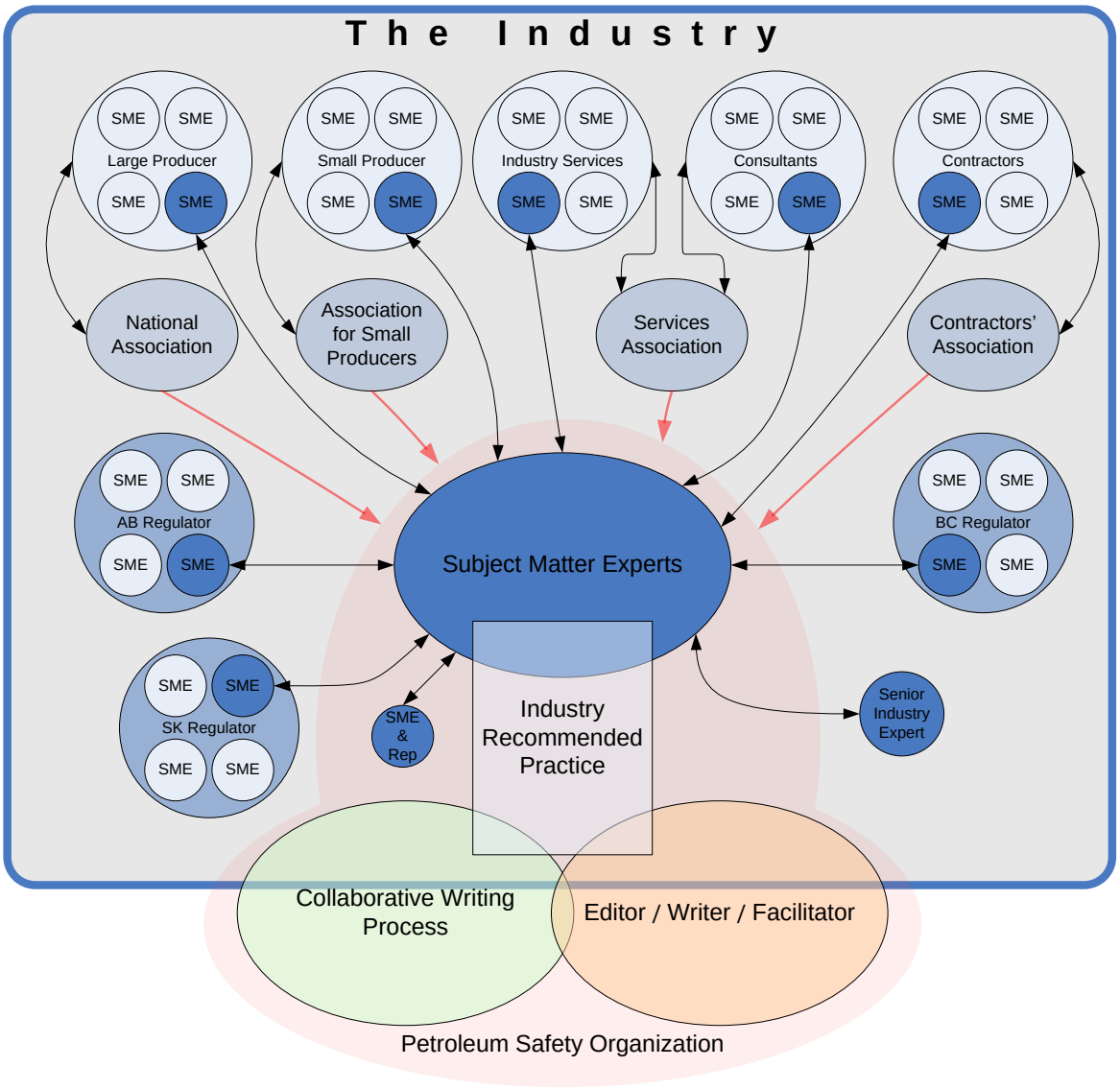

Figure 1. Situational Analysis.

The previous discussion regarding this specific UBD/MPD situation does speak to Figure 1, but to appreciate the complexity of this situation an exploration of how the situational map provided clarity follows below.

According to Clarke's terminology, the human elements noted in the diagram above include the SMEs, represented by the dark blue circles and the Editor / Writer / Facilitator, indicated by the

light orange ellipse. Non-human elements include organizations, professional associations, regulatory bodies, the collaborative writing process and the IRP document itself (illustrated with the gray-shaded rectangle). The red shape denotes the organization independently sponsored by the professional associations known as PSO that supported, financed, and publically published the IRP.

Figure 1 reveals the network between organizations and professional associations that make up the industry. It depicts the relationship among the industry, the IRP document itself, the collaborative writing process and my role as Editor / Writer / Facilitator. In this situation, there were 10 key individuals (not including myself) that participated in the most intensive portions of the project as the core group. Of these 10, six were industry experts and one was a PSO representative and three from provincial regulatory bodies. Of the six industry experts, five of those were employed by organizations, one was a senior independent consultant. Three of the organizations were affiliated with three separate industry professional associations while two other organizations were affiliated with a fourth professional association. Figure 1 clearly illustrates the broad dispersion of SMEs that represent the vastness of this industry and demonstrates the inter-organizational nature of the situation.

The red shape encompassing the SMEs, collaborative writing process, Editor / Writer / Facilitator and the IRP denotes the independently sponsored organization. This organization is critical to making the IRPs a reality. The SME circle noted as ‘SME & Rep’ represents the personnel link between the IRP project and PSO. The termination points of the arrows entering the red shape are most pertinent to this portion of the situation. The red arrows terminating at the red shape are meant to denote the professional associations’ support and sponsorship of PSO. Working backwards from the red arrows, the professional associations are funded by

professional association fees contributed by the SMEs' employers. The black arrows running through the red shape into the large blue SME ellipse are meant to illustrate the SMEs participating in the IRP development working under the umbrella of PSO.

Looming across the industry boundary rests my role as Editor / Writer / Facilitator and the collaborative writing process. Neither of these elements resides entirely within the industry. My role, like the collaborative writing process, can be adapted to any industry. It also depicts that my knowledge base does not rest within the industry; rather I am a visitor to this sector bringing a complementary skill set. As the project progressed, my knowledge of the industry grew. It never reached a point where I could claim expertise, nor was I ever completely immersed in the industry. Similarly, the collaborative writing process spans across industries. The process for this situation was subtly tweaked and modified to suit the project, but the genesis of collaborative writing is certainly not in the oil and gas industry.

What was most revealing from the situational mapping exercise is the significance of the IRP document itself. This non-human, yet indelibly tangible, element is the tie that binds the knowledge of industry experts via a facilitated collaborative writing process. The situational analysis not only added to the support for the use of grounded theory, it refined and supported the focus to the IRP document itself as the link that binds the relationship among SMEs, the collaborative writing process, and myself as Editor / Writer / Facilitator.

Interestingly, the words of the omnipotent Marshall McLuhan (1964) seem appropriate at this juncture. "The medium is the message because it is the medium that shapes and controls the scale and form of human association and action" (p. 24). In my informal observation of several of these types of projects, the medium is the evolving drafts of the IRP. Its message is in the

shape of the document and the group's perceived degree of the document's completeness. Given the situational analysis illustrated in Figure 1, I am most curious about the specific situational relationships illustrated in Figure 2 below.

Figure 2. Key situational relationships.

Situational Relationships

What is best appreciated by experiencing collaborative writing events, such as the development of an IRP, is the camaraderie that evolves within the group, or in this case the situational relationships. This camaraderie is significant given the nature of the project. An IRP is intended

to reflect industry-wide shared knowledge that documents what the industry expects from its members. The development of the IRP offers industry players neutral territory to gather, discuss, and affect the shape of the industry.

Unlike typical projects, when the document is complete the group disbands; IRP groups are part of a larger community. Although the core group disbands when the mandate of the IRP development is fulfilled, the knowledge imparted in the IRPs is actively dispersed, shared and actualized in the industry in two notable ways. First the industry review process welcomes and encourages all industry participants to comment on the IRP. Industry reviews are sent out to all professional associations' memberships. A second component to PSO's mandate is training. When recommended by the IRP Committee, content from the IRP is rolled into a training program that is developed and also offered through PSO. Since regulators are an integral part of the IRP committees, they are included as part of the industry. This industry connection keeps lines of communication open between regulators and industry outside the context of only regulatory concern.

The relationships at times seem convoluted and complex, but at the core the situation is one of collaboration in a community which points to two key areas of the literature: collaborative writing (CW) and communities of practice (CoP).

Collaborative Writing

There is no dispute that collaborative writing is essential in today's workplace (Colen & Petelin, 2004; Jones, 2007; Knipstein, 2007, Lowry, Curtis, & Lowry, 2004). Understandably so, it is persistent in the literature, yet remains difficult to define. Ede and Lundsford's (1990) seminal CW study supports the importance of CW activities in the workplace and recognizes the

challenge of its vagueness. Farkas (1991) acknowledges the complexity of CW and attempts to expand the understanding of CW by observing other forms of collaboration. Morgan and Murray (1991) continue to search for clarity by seeking 'insights' in CW groups.

More recently scholars continue to redefine the shifting scope of CW. Lowry et al (2004) discuss the dynamic nature of CW in the iteration of drafts, expansion and contraction of groups, shifting roles and activities. Colin and Petelin organize their discussion around cultural, political and technological influences (2004). Jones's (2007) scan of the literature revealed that "researchers have approached [CW] from a variety of disciplinary and interdisciplinary perspectives" that contributes to its complexity
(p. 283).

What is apparent from the broad scope represented in the literature is that CW is defined by researchers in ways appropriate to the particular research situation. Diana Wegner's (2004) study attempts to explain the situated-ness of "how participants use the shared contextual resources of an activity system to decide on a textual form" (p. 413). Her ethnographic study relates Wenger's notion of CoPs, negotiation of meaning and reification to the collaborative development of a management plan.

Wenger's concept of CoPs rests on his early work with Jean Lavé on situated learning, where learning takes place within its original context (Lave and Wenger, 1991). It can be argued that groups in the moment of synchronous collaborative writing are immediately engaged with the activity, or situation, of producing content. It is this thread between CW activities and the social structure of CoPs that this study attempts to clarify.

In their discussion of CW, Lowry et al (2004) acknowledge that CW cannot be bound by the simple act of putting pen to paper or fingertips to keyboard. They suggest that CW includes writing strategies, activities, document control, team roles and work modes. As mentioned above, my consulting projects are typically inter-organizational collaborative writing endeavours that involve a group of SMEs who contribute their knowledge in a variety of ways. Some provide previously developed documents. Others work with me to develop an outline and then access my skills, primarily as an editor, as we evolve through versions. The most common method by far is what I call 'collaborative writing events'. This involves a group of SMEs gathering in a space at the same time (be it meeting room or teleconference or both) to write collaboratively and synchronously. My role moves far beyond editor and writer and into facilitator and team leader. According to Lowry et al's (2004) taxonomy of common CW roles I acted as team leader, "A person who is part of a collaborative writing team, who may fully participate in authorship and reviewing activities, but also leads the team through appropriate processes, planning, rewarding and motivating" (p. 88). I also filled the role of editor, "A person who has responsibility and ownership for the overall content production of the writers, who can make both content and style changes to a shared document" (p.88).

In my process-oriented style consultancy, my primary objective is project progression advanced by consensus-based content accuracy. My concern is not the subject matter itself, rather identifiers that signify the group has reached consensus and thereby furthering the document. Where the words of the content speak volumes to the SMEs, the evolving shape of the content reveals to me the movements of the group and progression towards a constantly refined goal.

Lowry et al's (2004) taxonomy also considers CW strategies and document control modes. This project employed mostly a reactive writing strategy with centralized control. Reactive writing

occurred in what the group referred to as working group sessions. Selected SMEs developed content for specific portions of the document and presented these pieces to the larger group for review. Working group sessions involved collectively reviewing pieces of content which resulted in shifting content, creating new content, or editing new content. This synchronous collaborative activity may be in contraction or consensus with the group and for this reason is described by Lowry et al as reactionary writing (2004).

Through the process I, as facilitator and editor, maintained control of all versions of the document. This entailed not just version control, but literally acting as scribe and writer during working group sessions. The section up for discussion was projected in the meeting room (and offered via desktop sharing to those connecting at a distance). I re-worked content during meeting discussion while continuously questioning the direction, tone, focus, and structure of the wording. The combined effort or reactionary writing and centralized control allowed the SMEs to engage in dynamic discussion yet maintain topical focus. As the Editor / Writer / Facilitator the reactionary writing and centralized control strategy allowed me to keep the discussion and the shape of the document from straying onto a tangent.

Strategies and control aside, the dynamic in the room was one of healthy debate, shared experience and thoughtful reflection most accurately described by a CoP.

Communities of Practice

The notion of shared experience or camaraderie is described in the literature in various ways. Karl Weick and Karlene Roberts (1993) note the significance of the “collective mind” for a group to achieve its goal, and describe collective mind as “a pattern of heedful interrelations of actions in a social system”

(p. 357). Don Cohen and Lawrence Prusak (2001) frame social capital in organizations as "the trust-based connections between people, and the networks and communities through which they engage in cooperative action" (p. x). It is Etienne Wenger's concept of CoPs that considers community beyond only the organization including inter-organizational situations (2002).

In the IRP process, the SMEs' shared tacit knowledge is made explicit via the IRP document itself. This connection between network or community and text or document is also supported in the literature. John Seely Brown and Paul Duguid (2000) speak to the power of documents which, "help structure society, enabling social groups to form, develop and maintain a sense of shared identity" (p. 189). Clearly the purpose of the project is to collaboratively produce a document. Lowry et al (2004) describe CW, "as an iterative and social process that involves a team focused on a common objective that negotiates, coordinates and communicates during the creation of a common document" (pg. 72). It is Wenger (1998), however, who clarifies **how** a CoP moves from shared experience to documented text. He describes this transition as the reification of negotiated meaning. For Wenger reification covers "a wide range of processes that include making, designing, representing, naming, encoding, and describing, as well as perceiving, interpreting, using, reusing, decoding, and recasting" (p. 59).

It has been 20 years since Jean Lavé and Etienne Wenger coined the term communities of practice (1991). Today, the organizational literature is thick with CoP research from numerous notable organizational scholars. John Seely Brown and Paul Duguid encompass CoPs within their larger notion of "networks of practice" (Brown & Duguid, 2000, p. 141). Paul Hildreth and Chris Kimble explore the realm of virtual or distributed communities of practice (Hildreth, 2003; Hildreth & Kimble, 2004). CoPs have been drawn into the fold of discussion surrounding knowledge management (Davenport & Prusak, 1998; McDermott, 2007; Wenger, McDermott, &

Snyder, 2002), organizational learning (Brown & Duguid, 1991; Snyder, 1997) and social capital in organizations (Lesser & Prusak, 1999; Lesser & Storck, 2001).

Not surprisingly, the initial appeal of CoPs offered organizations an approach for organizational efficiency and the potential for market gains; therefore, the existing literature is heavily weighted toward CoPs in an intra-organizational context. Less common in the literature is study surrounding inter-organizational contexts with the majority of research seated in virtual communities (Tan, 2007; Wagenaar, Hulsebosch & Schuman, 2008 ; Zucchermaglio & Talamo, 2003). Soekijad, Huis in ‘t Veld and Enserink (2004) offer one of the few studies that explores the applicability of CoPs in an inter-organizational context while Turner and Tennat (2010) consider a government inter-organizational collaboration. This study will consider the uniqueness of the inter-organizational CoP and contribute to this leanly researched area of CoPs.

According to Wenger (2002), the basis of any CoP includes three fundamental elements: a domain of knowledge, a community, and a shared practice. This is true for the observed experience of the UBD/MPD industry. A CoP with a well-defined domain refers to the common ground that “legitimizes the community by affirming its purpose and value to members and other stakeholders” (Wenger, et al, 2002, p. 27). For the UBD/MPD industry, the IRP development process sets the stage for a shared domain. IRP developments are familiar to several sectors of the oil and gas industry. The process carries a degree of rigour similar to standards development common to other industry standards organizations such as the American Petroleum Institute (API), the Canadian Standards Association (CSA), the Institute of Electrical and Electronics Engineers (IEEE), or even the International Standards Organization (ISO).

Participation is voluntary, and typically includes participants across industry and including provincial and national regulators. Since the IRPs are technical documents, ground floor experts are essential and cannot be replaced by corporate communications representatives. The IRP process removes the possibility of middle men and puts ground floor experts at a non-confrontational and equitable table with equally knowledgeable regulators. It is well known that regulators are involved in IRP developments and look to IRP documents for guidance to develop new regulation and modify existing regulation. This connection to legislation provides industry a voice of validity with a single motivation of bettering the industry for all. It allows industry and regulators to dialogue at a common table outside of regular interactions (e.g., applying for leases or waivers, attending investigations, etc.). Ultimately Wenger et al (2002) state that "a well-developed domain becomes a statement of what knowledge the community will steward" (pg. 32). The final IRP document is an expression of such a statement.

Clearly, a sense of community is essential within a CoP. Once again, Wenger et al (2002) suggest a community is "a group of people who interact, learn together, build relationships and in the process develop a sense of belonging and mutual commitment" (p. 34). Committee meetings and working group sessions acted as a locale for joint activities and discussions. Several examples of community building were apparent throughout the IRP development process. With each meeting trust was built, relationships evolved and a degree of comfort among participants developed. It was clear in discussion that participants either understood and appreciated each individual's domain of knowledge, or discussion continued until agreement was achieved. A facilitator was in place to build the practice, manage boundaries, and bring the group to consensus where necessary. The group met regularly to discuss issues pertinent to the development of the IRP and create shared understanding. These activities and characteristics

demonstrated this group's ability to "build a sense of common history and identity" (p. 35) both of which are deemed essential in a community.

The final key characteristic of a CoP is the practice. Wenger et al (2002) define the practice, "Whereas the domain denotes the topic the community focuses on, the practice is the specific knowledge the community develops, shares, and maintains" (p. 29). The clearest illustration of the practice is the evolving IRP document itself. This shared document in all its drafts is the artefact of the CoP. Sharing war stories were one of the most common expressions of practice during working sessions. As the group debated the inclusion of a particular topic, the discussion usually began with storytelling about a specific example. Those with similar experience would share their stories and so on until the group had enough shared knowledge to debate the topic and decide its worthiness. This sharing of war stories is an example of shared understanding and fulfills Wenger et al's requirement that "a community must have a shared understanding of what aspects of its domain are codifiable and which are not, and what to do in each case" (p. 39).

Along with its expression of the key characteristics of a CoP, this group also exhibits Wenger et al's (2002) description of "levels of participation" (p. 55) in CoPs. Levels of participation include a coordinator, a core group, an active group, and a peripheral group. As it was established earlier, the group in question does include a coordinator, known as the facilitator, and acts a core group. True to form the core group represented about 10 percent of the entire committee. The active group was best witnessed at the monthly committee meetings. Expectedly, the size of the active group waxed and waned with seasonal oil and gas activity. Monthly committee meetings included approximately 10 additional people who regularly attended. Similar to the features of an active group, these monthly extras did not participate excessively in core group activities. Finally, the largest portion of the group was peripheral. These peripheral

players rarely contributed to committee activities. Peripheral players were most obviously apparent during the industry review cycles.[3]

For Wenger, reification is the significant tangible result of a CoP. It is "the process of giving form to our experience by producing objects that congeal this experience into 'thingness'" (1998, p. 58). Participation among members of a CoP is necessary to negotiate meaning and reify the practice. Although Wenger's view of reification supports many forms, the key form for this study are the draft versions of the final IRP which act as the conduit to an inter-organizational CoP and the primary data source for analysis. Within the context of this study, each draft of the document is a body of reification, an expression of human experience, of participation, of negotiated meaning, that has been reified from dialogue and stated into the written word.

For this project, I am most curious about the interplay between CW and CoPs revolving around the axis of an evolving document. How does the structure and shape of the evolving document represent the activities of a CoP and CW? More interestingly what does this tri-mensional dynamic (document, CoP, CW) offer from a theoretical perspective? Are there patterns in the modifications of the document that indicate typical and predictable shifts in document progression?

Document Analysis

Data for grounded theory analysis typically comes from a variety of sources. Denscombe (2003) suggests that raw unstructured data is preferred. For this portion of the study I engaged in a retrospective analysis of the core group's concentrated efforts exhibited in existing evolving

[3] Once the core group felt the draft had reached a level acceptable to them, it was released industry-wide for review and comment. Participation from the peripheral group was most apparent during this industry review cycle.

drafts of the IRP from Fall 2009 to Winter 2009. As suggested by the grounded theory methodology, the depth to which these documents were analyzed was determined by approaching "theoretical saturation" (Denscombe, p. 117). Based on the situational analysis and limits of this material, I worked towards a preliminary theory of inter-organizational communication.

Data, such as draft documents, was considered secondary data as it was not compiled explicitly for the purposes of study. Goulding (2002) discusses the use of secondary data and highlights the clear limitation that the researcher is unable to conduct additional interviews which may limit the degree of theoretical saturation. She goes on to suggest that if secondary data is the only available source, a large enough data set to allow for constant comparison and theoretical sampling is required to ensure the integrity of the grounded theory approach. A significant amount of data was available for this study: over 15 evolving drafts, representing over 1800 pages. Following the situational analysis and additional four rounds of document analysis were completed: the first round established data incidents, the second reviewed CW activities, the third round considered elements of a CoP, and the fourth round consisted of a combined analysis and observation across the previous three. The detailed methodology for each round of document analysis is described in turn below.

Data Fracture

Data was fractured by "gathering slices of data" (Glaser & Strauss, 1967, p. 45) into relevant data incidents. A strategy was devised to pare down over 1800 pages of written content. Each draft included collective, or individual, editorial comments. Comments were notated in a comment bubble located in the right margin of the document and affiliated with highlighted text. A data incident was captured for each comment starting with the earliest draft. The comment

bubble and affiliated content was placed into a table in a separate document and titled with an appropriate topical title. A total of 45 data incidents were coded and tracked across the 15 drafts. Appendix A offers a sample of one data incident.

During the CW process the group used two methods to track modifications for group consideration and review. This strategy provided a useful unintended consequence for the study. Content that required group discussion typically would first be highlighted with a comment bubble. Unresolved issues were added to the comment bubble in subsequent drafts. Content that had been modified but not reviewed was denoted in green text and was considered approved once it was turned black. By tracking expansion and contraction of content in the comment bubble and the colour of the corresponding content in each data incident, I was able to identify when a data incident was created, how many (and when) modifications occurred, and in which draft the comment was resolved. The evolution of each data incident was reviewed across all 15 drafts.

In Appendix B, two categorizations were noted for each data incident: the draft where the incident was generated (G) and the subsequent drafts where incidents were modified (M).

Collaborative Writing Activities

Lowry et al (2004) offer a categorization of CW activities that considers the iterative nature of the writing process. It is this categorization which included "brainstorming, converging on brainstorming, outlining, drafting, reviewing, revising, copyediting" (p. 82) that provided the codes to analyze the evolution of each data incident. Each data incident was reviewed and coded for the presence of corresponding CW activities as described in Table 1 below:

Table 1

Summary of Collaborative Writing Activity Categorization

CW Activity	Demonstrated in document by…
Brainstorming	- Addition or removal of a heading - Note requesting the consideration of added content
Converging on brainstorming	- Comment bubbles or additional discussion on whether to include the new topics
Outlining	- Discuss direction or roughly sketched content to be considered for inclusion
Drafting	- Write incomplete content to be reviewed and approved by the entire group, usually indicated with green text
Reviewing	- Clear content modifications in green text, may include additional comment bubble discussion
Revising	- Clear content modifications agreed upon by the group as noted in the shift from green to black text
Copyediting	- Small modifications to grammar or logic typically to maintain consistency in the document

Three additional activities became obvious during document analysis and were noted: content reduction, content expansion and structural shifts. An occurrence of content reduction was considered when two or more sentences of content were eliminated. The contrary was considered content expansion. Structural shifts were apparent when blocks of content, meaning a paragraph or more, were shifted into another portion of the document and relocated under a different heading. Paragraph switching, or changing the order of paragraphs or sentences within a given portion of a document was not considered a structural shift, rather was included as part of reviewing.

Community of Practice Elements

A definition for CoP elements was not as clearly defined as Lowry et al's tidy taxonomy for CW. A deeper exploration into CoPs revealed a potential coding method. Wenger's initial discussion on CoP, *Communities of Practice: Learning, Meaning and Identity*, offered clarity on the search for appropriate analyzable data incidents. Wenger describes 'practice as meaning'. He states that "the social production of meaning is the relevant level of analysis for talking about practice" (Wenger, 1998, p. 49) and he calls this social production 'negotiation of meaning'.

Negotiation of meaning involves both participation and reification. Participation among members of a CoP is necessary to negotiate meaning and reify the practice. During working group sessions, active participation was obvious in group discussion. The action of negotiated meaning occurred in these discussions, but was not recorded verbatim. Rather, indications of these negotiations were noted as comments in the drafts. For Wenger, reification is the significant tangible result of a CoP. Although Wenger's view of reification supports many forms, reification in this instance takes SME tacit knowledge and documents it explicitly in the IRP document. The duality between participation and reification provided a method of document

analysis. Instances of reification were considered negotiated meaning incidents. Recognition of a specific incident of reification offered the possibility to track the process of negotiated meaning.

True to the iterative nature of grounded theory, an additional round of document analysis was necessary to evolve and expand the data categories. This round considered Wenger's modes of belonging. Given this study focuses on only the reified component of a CoP it became clear quickly that only two of Wenger's three modes of belonging were expressed in the drafts themselves: engagement and alignment. Wenger (1998) refers to engagement as "active involvement in mutual processes of negotiation of meaning" (p. 173). Data incidents that were initiated with a comment, and where negotiation of meaning was apparent, were considered acts of engagement. Alignment allows participants to "become connected through the coordination of their energies, actions, and practices" (p. 179). Alignment was most clearly represented in data incidents with multiple modifications as a process of refinement working towards consensus and confirmed reification. Wenger's third mode of belonging, imagination, was not reified explicitly in the drafts, rather only revealed during combined analysis in the negative space of Appendices C and D.

Beyond Wenger's modes of belonging, instances of confirmation were considered present when text was turned from green to black. This action, similar to the CW activity of revision, denotes agreement among the group that the content is acceptable.

Introspection

Grounded theory supports the use of researcher introspection which allows the researcher to consider and include prior experience and insights as a method of comparison toward theoretical saturation (Glaser and Strauss, 1968). Given the use of secondary data, and knowing the

researcher played a key role on the project, introspective insights were incorporated throughout the situational analysis and to broaden the theoretical sample.

Discussion

The following discussion overviews the results of each of the three rounds of document analysis: data fracture, CW activities and CoP elements, then considers the interplay among all rounds of document analysis in a final combined analysis.

Data Fracture Analysis

The data fracture process revealed clusters of document progress (Appendix B).[4] The majority of data incidents were generated in two drafts (Draft 1 and Draft 5). Of the 45 captured data incidents, modification clusters occurred on three occasions, Draft 6, 7, and 10.

Data incidents are ordered in the analysis table in Appendix B in the same order they are presented in the document. Modification groupings tended to be in close proximity. For example in Draft 6 a concurrent string of modifications occurred in data incidents 5 through 14. Although the frequency of modifications diminishes, this trend toward proximal grouping appears consistent across the drafts suggesting that work progressed in a linear fashion in the order content appeared in the document. It is worth noting that prior to this stage of the project extensive work was completed and group consensus achieved to structure, categorize and order topics in a document outline.

The frequency of modifications varied from 1 to 4 modifications within a single incident. Single modifications were in the majority (28). Eight data incidents were modified twice. Three data

[4] Ten or more incident generations or modifications were considered a cluster.

incidents were modified three times, and three other data incidents were modified four times. The month of September, as represented by drafts 5 through 7, was particularly productive. Draft 5 generated 16 data incidents and Draft 6 and 7 resulted in 13 and 12 modifications respectively.

Collaborative Writing Activities

Appendix C depicts the collaborative writing activity analysis that revealed a strong emphasis on reviewing and revising with 44 instances of reviewing and 40 instances of revising. Both reviewing and revision cycles were low and did not exceed two cycles in any single data incident. A minimal amount (less than 5) of brainstorming, converging on brainstorming, outlining, drafting, and copyediting activity occurred in any of the data incidents. What became of interest in this round of analysis was the reduction and expansion of content. Content was significantly reduced in four data incidents and expanded in 16 data incidents.

Communities of Practice

The CoP element analysis tracked a number of modifications based initially on Wenger's concepts of reification, negotiation of meaning and modes of belonging as illustrated in Appendix D. All data incidents were identified as instances of reification by virtue of their existence. Most instances of reification, with the exception of one, exhibited negotiation of meaning. Negotiation of meaning was considered apparent if one or more modifications of significance occurred. The single incident in question was a topic heading the group considered for inclusion in the final document. This topic heading was added, remained in several drafts, then simply deleted. Since the topic was deleted no meaning about the topic itself was negotiated.

All incidents represented one of two apparent modes of belonging: engagement or alignment, with two exceptions. The first exception, mentioned above, did not exhibit any negotiation of meaning; therefore, it could not express a mode of belonging. Only one data incident exhibited neither engagement nor alignment. This single incident was unprompted by the SMEs and represented a major editorial re-structure prompted by the Editor.

The vast majority of data incidents indicated engagement (38) or alignment (34). Of the seven incidents that did not demonstrate engagement, one represented a topic that was never developed and deleted, the other six represented incidents of unprompted content development or editing. These incidents were unprompted by an instance of engagement (i.e. a comment bubble) and were noted as modifications worthy of exploration although they did not have a corresponding comment that initiated the revision cycle. They appeared as either the addition of new content of significance or changes to existing content.

Most data incidents demonstrated alignment; however, there were four fewer instances of alignment than engagement. These four can be accounted for in data incidents where content remained unchanged or content was added.

Although not considered in Wenger's CoP, the notion of confirmation was also captured as part of this round of analysis. Modifications were considered confirmed when text was turned from green to black. Confirmation was noted in all but two data incidents: one being the major structural shift mentioned above and the other demonstrated content expansion.

Combined Analysis

When the three rounds of document analysis described above are reviewed in consort, a few key observations are revealed.

- Instances of data incident generation from the data fracture analysis align directly with instances of reification in the CoP element analysis.
- Occurrences of data incident modification from the data fracture analysis align directly with occurrences of negotiated meaning in the CoP element analysis.
- Occurrences of reviewing and revising from the CW activity analysis align directly with occurrences of engagement and alignment from the CoP element analysis.

What is perhaps most interesting; however, is the negative space in the analysis tables. Appendix C and Appendix D share 13 data incidents that do not exhibit the four interrelated traits: reviewing, revising, engagement, alignment as illustrated in the rows shaded pink in Appendix B. Upon review and personal reflection of the topics, these data incidents raised fervent discussion particularly around questions of scope and appropriateness. To my memory, these discussions did not revolve around accuracy in existing content, rather around what should, or should not, be included in the document and what degree of detail should be considered. Since the understanding of the group was that the document was a representation of industry, these dilemmas were in continuous discussion in a single working session until resolution was achieved. Basically, we talked about the issue until we found consensus.

These non-reified discussions typically retold relevant SME experiences and explored what-if scenarios to expand and contract content possibilities, refine the framing of the document and its placement in the industry. Wenger describes imagination as the mode of belonging that "create[s] images of the world and see[s] connections through time and space by extrapolating from our own experience" (Wenger, 1998, p. 173). He stresses the importance of imagination to identify a sense of place in the world, yet notes that imagination requires existing reification to act as tools for imagination. He states, "With insufficient reification, there may not be enough

material to play with, to bounce off from, and to shake free from time and place" (p. 186). A review of the negative space data incidents reveals that the earliest modifications regarding these topics occurred in Draft 6 which suggests that a considerable amount of content was available for imagination to take place. What is most interesting about this discovery is the ability to document the presence of an imagination activity by what is not explicitly stated, i.e., acknowledging the negative space.

Conclusion

At the highest level, analysis of the data suggests that shared tacit knowledge can be made explicit in a document via a facilitated collaborative writing process and within an established CoP for a specific and defined situation. Figure 3 illustrates the interrelationship among inter-organizational communication, CoPs, CW, and the situational to illustrate a theory of situated inter-organizational communication.

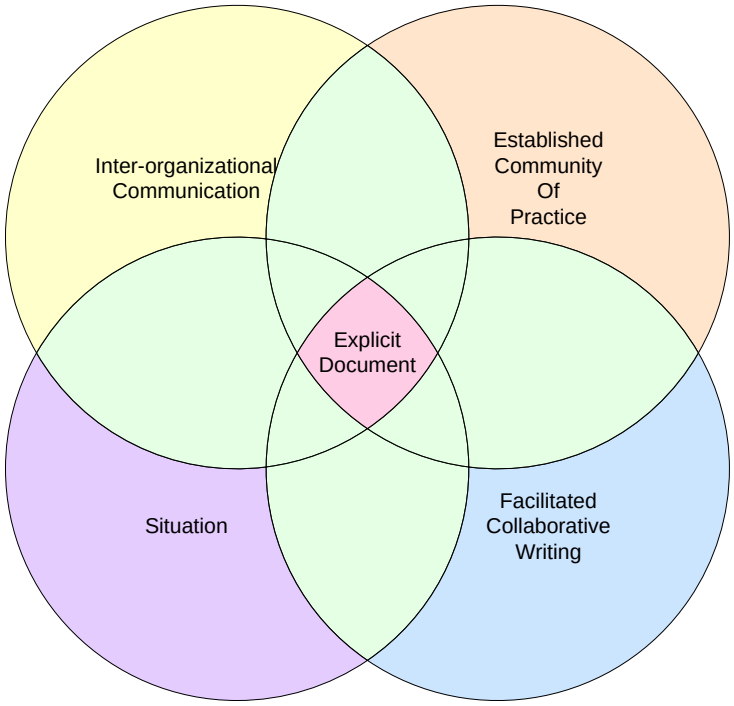

Figure 3. Theory of situated inter-organizational communication

The illustration in Figure 3 above suggests that one way to produce an inter-organizational document is the inclusion of each of the circles. The yellow ‘Inter-organizational Communication’ circle represents the support of PSO that provided the environment and resources necessary. The orange ‘Communities of Practice’ circle represents the established CoP that already existed in the UBD/MPD industry via professional associations, and was refined through the project. The blue ‘Collaborative Writing’ circle represents the activity of CW that emerged specific to this situation. The violet ‘Situation’ circle represents the unique context for this situation. Each circle in its entirety represents all possibilities of that realm. Moving toward the centre of the circle denotes the specificity of this situation. The green intersection shapes represent elements of the other circles comingling to reach the centre. Finally, the rose coloured centre denotes the ideal, being an explicit document (in this case an IRP), when these particular four circles intersect.

This inter-organizational communication approach and methodology purports that inter-organizational communication can be represented in a tangible document when each of the elements (represented by circles) is present or considered. In other words, the potential for situated inter-organizational communication is possible when some combination of these elements exists. The nature of the IRP document and the requirements for its sanctioning demand the participation of SMEs across an industry representing multiple organizations. A situation that supports inter-organizational communication is necessary. In this case PSO provided the resources necessary and network of SMEs. An established inter-organizational CoP has the potential for SMEs to reify the practice into a document. In this case, a CoP was well established by virtue of the earlier work on the risk register. Finally a facilitated collaborative writing

process will keep the goal in sight. The work of the Editor / Writer / Facilitator ensured the quality of the document and that it indeed progressed.

At its core, this study evolved a method to identify and document the actions of a CoP during a collaborative writing event. In my work, onlookers observing my projects have sometimes mistakenly assessed that fervent discussion and numerous revisions are a reflection of a stalled project. The alignment of CoP elements (engagement and alignment) and CW activities (reviewing and revising) shows that the discussion, revisions, and edits that occur during collaborative writing are not an expression of dissension within the group, but rather an expression of the progressing work, and strengthening relationship of the group. Although seemingly elusive, this study demonstrates that the CoP act of imagination can be identified through analysis further supporting the importance of sharing stories, exploring possibilities and generating scenarios in the development of a well rounded document.

Further to Wenger's modes of belonging and Lowry et al's taxonomy of CW, this study demonstrates a method to document group confirmation by incorporating different colours of text and provides a way of reifying group consensus in the collaborative writing process through progressive changes to the text colour. This method has a twofold benefit. From a continuing research perspective, it offers a visual identifier to track group consensus for analysis. For participants engaged in the project, the gradual transition of text colour from green to black provides clear visual feedback of project progression resulting in group confidence and cohesion.

Future Research

The presented research approach and methodology allows for similar analysis to continue on similar projects. The situational analysis produced a situational map typical of the IRP development process which suggests this situation as a constant and the document analysis as a repeatable practice on future IRP projects. This methodology allows me to simply identify and document both CW activities and CoP elements on future projects. With an organized method in place, including a system for data fracture and collection, I can gather data during projects and analyze as the project progresses. This first research project can act as a baseline for future summative evaluation. Additional projects may provide data that relays obvious patterns to suggest an eventual theory of situated inter-organizational communication.

For new situations, a situational analysis, as demonstrated here, will illustrate the situational landscape and establish if, and to what degree, the four elements are present or possible. At a deeper level the data fracture, CW activity and CoP element analysis provide a structured method for scholars of the future to explore this leanly documented area.

Appendix A: Data Incident Example

Data Incident: Air Drilling

CoP Categories Expressed	CW Activities Expressed
• Reification • Negotiation of meaning Mode of Belonging: engagement, mostly alignment	• Reviewing (2) • Revising (2)

Filename	Page	Content	Memos
			Starts with negotiation and reification
IRP 22_UBD_MPD_August_DRAFT_v10k	91	Air drilling usually involves diverting the air, drilled cuttings and any formation inflow to a flare pit. Such systems should only be used for drilling sweet wells. If the air drilling includes bringing annular returns back through a separator, ensure the following:	Engagement apparent from the comment reviewing

IRP 22_UBD_MPD_August_DRAFT_v10n	90-93	**Air Drilling Operations (IRP 22.4.26)** Three glossary terms added: Atmospheric flow-back tank Flush production event Ignition source Soft shut-in MACP Plus comment ~~API~~ also recommends cleaning out dust from BOP cavities at least once per 24 hours. Except for emergencies, BOPs should be cleaned prior to function testing.	The whole section was re-written, 3 pages total. Alignment only Revising Reviewing
IRP 22_UBD_MPD_Sept_DRAFT_v10p	89-90	<Glossary terms and comments remain>	All green content turned black indicating acceptance, except for first paragraph Some confirmation

IRP 22_UBD_MPD_Oct_ DRAFT_v10p	88		First paragraph turned black. Some confirmation
IRP 22_UBD_MPD_Oct_ DRAFT_v10r	91	Debris accumulation in the BOP stack can compromise BOP integrity and operability. The operator must assess this risk appropriately. *API Recommended Practice 92U (Section 10.8.1.3)* also recommends cleaning out dust from BOP cavities at least once per 24 hours. Except for emergencies, BOPs should be cleaned prior to function testing.	Final comment addressed with this rewrite Boundary object confirmation Revising

Appendix B: Data Fracture Analysis

Data Incidents	Draft 1 August	Draft 2 August	Draft 3 August	Draft 4 August	Draft 5 September	Draft 6 September	Draft 7 September	Draft 8 October	Draft 9 October	Draft 10 October	Draft 11 November	Draft 12 November	Draft 13 November	Draft 14 November	Draft 15 November	Total Generated	Total Modifications
01 terms of use				G							M					1	1
02 PMP					G		M									1	1
03 hazard and risk assessment					G	M	M	M			M					1	4
04 well parameter review														G		1	0
05 reservoir pressures	G					M										1	1
06 fluid types	G					M										1	1
07 sweet or sour fluids	G			M		M	M			M						1	4
08 wellbore integrity					G	M										1	1
09 directional drilling	G					M										1	1
10 tool temperature					G	M										1	1
11 erosion corrosion	G					M										1	1
12 well kill					G	M		M								1	2
13 rig choke system					G	M										1	1
14 casing pressure monitoring					G	M										1	1
15 sample catchers	G				M		M									1	2
16 atmospheric system					G	M				M						1	2
17 second RCD	G				M				M							1	2
18 spacing diagram	G				M		M							M		1	3
19 flow control matrix					G	M										1	1
20 ESD	G						M									1	1
21 check valve	G												M			1	1
22 tripping methodology			G											M		1	1
23 sour EPZ	G	M					M									1	2
24 venting	G												M			1	1
25 groundwater	G												M			1	1
26 BOP stack					G					M						1	1
27 kelly hose	G	M							M							1	2
28 blind or lowest					G								M			1	1
29 HCR valve					G								M			1	1
30 blind or shear rams					G								M			1	1
31 BOP equipment	G									M						1	1
32 erosion hazards					G								M			1	1
33 operational communications					G					M						1	1
34 PPE requirements				G						M						1	1
35 left hand tubulars					G					M						1	1
36 formation integrity	G	M					M									1	2
37 RCD element	G	M	M							M						1	3
38 double block and bleed		G														1	0
39 in-flow test		G														1	0
40 pipelight point	G		M													1	1
41 sour considerations	G		M				M		M							1	3
42 air drilling	G			M			M	M		M						1	4
43 coil operations				G			M									1	1
44 pressure equalization				G			M									1	1
45 non-routine operations				G						M		M				1	2
																45	65
Total Generated	20	2	1	5	16	0	0	0	0	0	0	0	0	1	0	45	
Total Modified	0	4	3	2	3	13	12	3	3	10	2	1	7	2	0	65	

Appendix C: Collaborative Writing Activities

Data Incidents	Brainstorming	Converging on Brainstorming	Outlining	Drafting	Reviewing	Revising	Copyediting	Content Reduction	Content Expansion	Strurctural Shift
01 terms of use					1	1				
02 PMP					1	1				
03 hazard and risk assessment					2	2	1		1	
04 well parameter review										1
05 reservoir pressures					1	1				
06 fluid types					1	2			1	
07 sweet or sour fluids					1	1	1	1	1	
08 wellbore integrity						1			1	
09 directional drilling					1	1			1	
10 tool temperature					1	1			1	
11 erosion corrosion					1	1		1		
12 well kill					1	1			1	
13 rig choke system					1	1			1	
14 casing pressure monitoring					1	1				
15 sample catchers					1	1			1	
16 atmospheric system					1	1			2	
17 second RCD					2	2			1	
18 spacing diagram			1		1	1			1	
19 flow control matrix					1	1				
20 ESD					2	1				1
21 check valve					1	1		1		
22 tripping methodology	1	1						1		
23 sour EPZ					1	1				
24 venting					1					
25 groundwater					1	1			1	
26 BOP stack					1	1				
27 kelly hose					2	2				
28 blind or lowest					1	1			1	
29 HCR valve					1	1				
30 blind or shear rams					1					
31 BOP equipment					1	1				1
32 erosion hazards					1					
33 operational communications					1	1				
34 PPE requirements					1					
35 left hand tubulars					1	1			1	
36 formation integrity					1	1			1	
37 RCD element					1	2			1	
38 double block and bleed	1								1	
39 in-flow test	1								1	
40 pipelight point					1	1				
41 sour considerations				1	2	1			1	
42 air drilling					2	2				
43 coil operations				1	1					
44 pressure equalization				1						
45 non-routine operations			1	1						
Totals	3	1	2	4	44	40	2	4	21	3

Appendix D: Communities of Practice Elements

Data Incidents	Reification	Negotiation of meaning	Modes of Belonging	Engagement	Alignment	Boundary Object	Participation	Confirmation	Content Reduction	Content Expansion
01 terms of use	X	X	X		X			X		
02 PMP	X	X	X	X	X			X		
03 hazard and risk assessment	X	X	X	X	X			X		X
04 well parameter review	X	X								
05 reservoir pressures	X	X	X	X				X		
06 fluid types	X	X	X	X	X			X		X
07 sweet or sour fluids	X	X	X	X	X		X	X	X	
08 wellbore integrity	X	X	X		X					X
09 directional drilling	X	X	X	X	X			X		X
10 tool temperature	X	X	X	X	X			X		X
11 erosion corrosion	X	X	X	X	X			X	X	
12 well kill	X	X	X	X	X			X		X
13 rig choke system	X	X	X	X	X			X		X
14 casing pressure monitoring	X	X	X	X				X		
15 sample catchers	X	X	X	X	X			X		X
16 atmospheric system	X	X	X	X	X			X		X
17 second RCD	X	X	X	X	X			X		X
18 spacing diagram	X	X	X	X	X	X		X		X
19 flow control matrix	X	X	X	X				X		
20 ESD	X	X	X	X	X			X		
21 check valve	X	X	X	X	X			X	X	
22 tripping methodology	X							X	X	
23 sour EPZ	X	X	X	X	X			X		
24 venting	X	X	X	X				X		
25 groundwater	X	X	X	X	X			X		X
26 BOP stack	X	X	X	X	X			X		
27 kelly hose	X	X	X	X	X			X		
28 blind or lowest	X	X	X	X	X			X		X
29 HCR valve	X	X	X	X	X			X		
30 blind or shear rams	X	X	X	X				X		
31 BOP equipment	X	X	X	X	X			X		
32 erosion hazards	X	X	X	X				X		
33 operational communications	X	X	X	X	X			X		
34 PPE requirements	X	X	X	X				X		
35 left hand tubulars	X	X	X	X	X			X		X
36 formation integrity	X	X	X	X	X			X		X
37 RCD element	X	X	X	X	X			X		X
38 double block and bleed	X	X	X	X				X		
39 in-flow test	X	X	X	X				X		
40 pipelight point	X	X	X	X	X			X		
41 sour considerations	X	X	X	X	X			X		X
42 air drilling	X	X	X	X	X	X		X		
43 coil operations	X	X	X		X			X		
44 pressure equalization	X	X	X		X			X		
45 non-routine operations	X	X	X		X			X		
Totals	45	44	44	38	34				4	16

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