EVALUATION OF MANAGEMENT PRACTICES AS A RESULT OF AN IMPLEMENTATION OF A PARTICIPATORY ERGONOMICS PROGRAM IN A POULTRY PROCESSING PLANT

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by

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A Thesis submitted to the

School of Graduate Studies

in partial fulfillment of the requirements for the degree of

Masters of Science

Human Kinetics & Recreation

Memorial University of Newfoundland

July 2013

St. John's Newfoundland

ABSTRACT

The ergonomics program in this study was initiated when a poultry processing plant contacted a university-based research alliance requesting a participatory ergonomics (PE) program implementation to address the incidence of work-related musculoskeletal disorders (WRMSDs). This research observed changes in management practices as a result of the PE program. Management practices observed were communication, networking, and leadership. The PE program activities provided opportunities for quality social exchanges between levels of management, employees and project stakeholders. Results suggest that upper management committed financially to the PE program but did not engage management at all levels or promote stakeholder accountability. The program was driven by an Ergo-Team (ET) middle management member and much of the management participation was transactional in nature focusing on day to day program activities. The PE program remained at a superficial level within the organization, knowledge transfer capacities were not enhanced, and overall management practices were unchanged.

ACKNOWLEDGEMENTS

I would like to thank my family and friends for the support as I pursued graduate studies. I'm truly grateful to have had you all nearby while I studied and worked in St. John's. The visits, calls and just knowing you were only a few hours away helped inspire balance in a busy life.

I would like to acknowledge and thank MITACS Inc. for the opportunity to participate in the national internship Accelerate Program. The financial benefits of this program had a significant impact on my ability to focus on the research and enjoy the experience.

I would like to acknowledge and thank my industry partner Country Ribbon Inc. The opportunity to apply the research within industry and experience the challenges and opportunities that come with implementing a PE program not only helped me understand the value of this research but also helped prepare me for working in industry. Most importantly, the opportunity to work with your management team and workers was a rewarding experience.

I would like to thank SafetyNet for providing me support during my time on campus. You provided me with a network of people and resources for guidance and support from start to finish. Not only did you support me in my own research but you

gave me opportunities to participate in other on-going SafetyNet initiatives. Working with your team was an opportunity I'll be forever grateful.

I would like to express a sincere thank you to my supervisor Dr. Scott MacKinnon. During my journey in completing my research I encountered several detours and roadblocks. You supported me as I made both professional and personal choices along the way which impacted the completion of my research. For your on-going support, understanding and friendship, I can't thank you enough.

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List of Abbreviations and Symbols

DKTC – Dynamic Knowledge Transfer Model

ET – Ergo Team

ET Mgt Rep – Ergo Team Management Representative(s)

ET Wkr Rep – Ergo Team Worker Representative(s)

IEA – International Ergonomics Association

KT – Knowledge Transfer

LMX – Leader member exchange

NL – Newfoundland and Labrador

OHS – Occupational Health & Safety

PE – Participatory Ergonomics

POS – Perceived Organizational Support

SME – Small to medium enterprise

UM – Upper Management

WHSCC – Workplace Health, and Safety Compensation Commission

WRMSDS – Work-related musculoskeletal disorders

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1 Introduction

Work-related musculoskeletal disorders (WRMSDs) have become a health, safety, and economic concern in today's workplace as WRMSDs have implications for major financial burden to employees, employers and to industry (Denis, St-Vincent, Imbeau, Jette, & Nastasia, 2008; Lewis, Krawiec, Confer, Agopsowicz, & Crandall, 2002). The research shows evidence of attempting to reduce incidence of WRMSDs through ergonomic programs and workstation redesign aimed through reducing or eliminating ergonomic risk factors (Haukka et al., 2008; Lotters & Burdof, 2002; Pehkonen et al., 2009; Rivilis et al., 2008). However, research suggests that ergonomics programs barriers are often symptoms of their approach and are unable to instill long term management commitment and support (Molen et al., 2006). This is may be due to the program approach prioritizing ergonomic change at a micro-level with respect implementing physical ergonomic change, and less attention paid to macro-level problems and barriers embedded in the organizational management structure (Holden, Or, Alper, Rivera, & Karsh, 2008; Laitinen, Saari, & Kuusela, 1997). Based on these studies, it is of interest to investigate the means through which ergonomic program models and frameworks have the potential to influence program barriers embedded in organizational factors such as management practices and behaviour.

Organizations with mature safety and health programs realize that employee health and safety is intertwined with productivity, corporate sustainability, as well as business excellence (Koningsveld, Dul, Van Rhijn, & Vink, 2005). However, few have been able to effectively integrate ergonomics or other safety programs in their overall

business strategy (Caroly, Coutarel, Landry, & Mary-Cheray, 2010). The literature shows repeated attempts to find an ergonomics program implementation model, framework or research study design that will suggest improvements in the incidence of WRMSDs over time (Haukka et al., 2008; Lotters & Burdof, 2002; Tompa, Dolinschi, & Laing, 2009). Ergonomic programs have been viewed as successful relative to program -based deliverables and reduced incidence of WRMSDs. However, the literature has shown that program barriers to success are not always directly related to the program framework or model, but instead may be entrenched in the culture of the organization (Komaki, Heinzmann, & Lawson, 1980; Laing et al., 2005; Looze, Rhijn, Deursen, Tuinzaad, & Reijneveld, 2003). These barriers have been associated with organizational behaviour and performance and specifically related to day to day management behaviour and practices (Killimett, 2006). While ergonomic program approaches as an agent for stimulating change has not been studied in depth, the literature recognizes that certain ergonomics implementation approaches may have an impact on organizational factors such as management behaviour (Clarke & Ward, 2006).

Participatory Ergonomics (PE) frameworks have been developed as a means of attempting to overcome these barriers. PE programs are designed to draw upon the knowledge of workers, and provide them with the skills needed to participate in planning and modifying their own work tasks and practices (Wilson, 1991). The idea is that workers have the tacit knowledge and understanding of their work environments needed to make appropriate and meaningful ergonomic changes if given the necessary knowledge, tools, authority, and program infrastructures (Haukka et al., 2008; Hignett,

Wilson, & Morris, 2005; Pehkonen et al., 2009; Rivilis et al., 2008; Wilson, 1991). Each individual organization has its own contextual limitations (Ulfvengren, Rignér, & Mårtensson, 2009), contributing to the need for involving employees in the ergonomic intervention process and building the internal social capacity to establish and support the program related communication so vital for program success (Antle et al., 2011).

Research has begun to analyze change management concepts that will support the dynamic needs of safety initiatives (Gregory, Harris, Armenakis, & Shook, 2009; Hendrick, 2008), and better understand organizational factors that impede safety program sustainability (Tornstrom, Amprazis, Christmansson, Eklund, 2008). Recent research suggests that a holistic approach to safety management would better address an organization's ergonomic and health and safety needs (Holden et al., 2008; Laitinen et al., 1997). Over time, as research aimed to better understand a more holistic approach, it has been recognized that strong management support plays a key role in safety programs (Komaki et al., 1980), and will impact how lower levels of management and employees participate in the program. Individuals will behave and participate in the PE program in a manner that is congruent with their organization's culture and shared values (Gregory, Harris, Armenakis, & Shook, 2009). Research suggests that values held at the organizational level such as those reflecting safety and health goals, must be congruent with those demonstrated by management behaviour in order to instill such values on employees (Maierhofer, Griffin, & Sheehan, 2000). The development of these perceptions often determines whether sufficient management buy-in will occur through organizational levels. Management participation is valuable when financial resources are required for

program initiatives (Heller-Ono, 2006).However, allocation of financial resources is not always enough to convince foremen, supervisors and other members of production and operational management that the program requires their commitment.

The research has repeatedly demonstrated that management behaviours were responsible for a bottleneck to program sustainability and success (Komaki et al., 1980; Laing et al., 2005; Looze et al., 2003; Rivilis et al., 2008). Further investigation into the types of management behaviours responsible for this barrier to success found that certain social exchange-based relationships are linked to safety communication and commitment (Hofmann & Morgeson, 1999), which have also been linked to program sustainability (Hofmann & Morgeson, 1999; Tompa et al., 2009). In response, there has been an identified need to better understand the relationship between these social exchange-based management behaviours and the cultural mechanisms through which stakeholders build trust and relationships (Theberge & Neumann, 2010). Program sustainability and management practices have been investigated from the perspective of social exchange theory of Blau (1964) (Hofmann & Morgeson, 1999; Hofmann, Morgeson, & Gerras, 2003; Mearns & Reader, 2008; Walker & Hutton, 2006). This theory suggests that as one party acts to benefit another, there develops a perceived obligation that it will later be reciprocated and trust is formed based on this demonstrated reciprocation. Based on the findings of Hofmann & Morgeson (1999), social exchanged based management practices used to interact with employees are critical in the development of a safety program. This social exchange relationship built on proven trust and relationships has been described in the literature as resulting from two theories, perceived organizational support (POS) and

leader-member exchange (LMX) between individuals (Walker & Hutton, 2006). It is through the fulfillment of psychological contracts that people feel their organization cares about their well-being, ultimately influencing POS (Hofmann & Morgeson, 1999). Quality interactions made up of communication and the development of relationships between workers and leaders or LMX provide the opportunity for psychological contracts to be fulfilled. Both POS and LMX have been identified in the literature by Hofmann et al. (2003) as being positively related to safety attitudes, POS being related to safety communication, as well as LMX related to safety commitment and communication (Hofmann & Morgeson, 1999). It is through these two aspects of social exchange that management will use communication to establish expectations and anticipated outcomes and benefits (Settoon, Bennett, & Liden, 1996), and will demonstrate their commitment to a program directly through their actions and influence the beliefs and behaviours of others (Clarke & Ward, 2006; Mearns & Reader, 2008; Zohar, 2002b). In summary, expectations are met when there is communicated expectations and demonstrated commitment through action and follow through. It is based on this rationale that common management practices used to communicate and establish expectations and demonstrate commitment were selected for evaluation within this study. Upon reflecting on this literature in the context of PE program implementation and sustainability, the management practices of interest for further study are: leadership, communication and networking.

Leadership encompasses the opportunity to not only communicate with employees, but also influence their perceptions about a program or topic, type of

leadership used is of interest. A deeper look at leadership reveals that transactional leadership is driven by short term gains or immediate requests or demands whereas transformational leadership reflects exchanges that enhance the relationships through a quality interaction (Simola, Barling, & Turner, 2010).Leadership effectiveness as it pertains to social exchange has been studied based on the quality of communication (Hofmann & Morgeson, 1999) and the ability to clearly communicate expectations and priorities (Zohar, 2002a). Although communication occurs spontaneously and frequently within organizations, unless there aspects of organizational communication are intentional it will have little influence on the listener (Mabey, Kulich, & Lorenzi-Cioldi, 2012). Networking is the strategy used to create a medium through which management lead and communicate through social exchange with workers and other stakeholders. Networking is used to share on-going program related communications, lead, involve and engage organizational stakeholders and employees in the collaboration and decision making processes through knowledge exchange capacities (Parent, Roy, & St-Jacques, 2007).

Because of the ability of management to influence the behaviours of employees (Kristoff, 1996), researchers have realized that it is easier to redefine the roles of management than to change the perceptions and attitudes of less committed workers (Zohar & Luria, 2003), and it is through high quality interactions that influence the behaviours of others (Hofmann et al., 2003). This relationship reveals the value in understanding the management practices which serve as a medium for social exchange based interactions between workers and other stakeholders and the ability of a PE

program framework or model to stimulate desirable change in these management practices.

1.1 Study Objectives

The objective of this thesis was to observe social exchange based management practices: leadership, communication and networking behaviours between program stakeholders within the organization during the PE Program implementation. During the study, the PE ET and upper management members were observed as they carried out their roles and responsibilities as outlined in the SafetyNet PE program framework and as advised by university researchers during the study period.

The research question of this study is to determine if the PE program as outlined in the stepwise SafetyNet PE program framework will stimulate changes in these management practices that may suggest the development of the social capacity sustain the PE program over time. It is hypothesized that the current SafetyNet PE program framework is not designed to stimulate internal stakeholder accountability for program-related participation that will be sufficient to initiate the changes in leadership, communication and networking management practices needed to predict sustainability over time.

1.2 Context

This study was initiated when a poultry processing plant contacted a university-based research alliance called SafetyNet requesting that a PE program be implemented in their plant to address the incidence of WRMSDs. The need for the program was self-identified by the organization after the completion of previous work with SafetyNet on

implementing a participatory approach to knowledge transfer of knife sharpening practices (Antle et al., 2007; Antle et al., 2011).The PE program proposal from this organization provided a research opportunity to observe changes in management practices as a result of the PE program implementation.

This study was conducted with student financial support by MITACS, under the Accelerate program. MITACS Accelerate is a national internship program managed by MITACS Inc. which connects companies and other organizations with the vast research expertise in Canada's universities through funding of research already supported by industry (http://www.mitacs.ca/).

1.3 Participatory Ergonomics Framework

The PE framework considered in this study was developed and previously used by SafetyNet, a center for occupational health and safety research (Antle, et al., 2008; Antle, et al., 2007; MacKinnon, et al., 2008; MacKinnon, Antle, & Vezina, 2009). This model uses a stepwise approach, utilizing an Ergo-Team (ET) structure whereby worker and management representatives from the organization volunteer to undertake program activities. The program began with recruitment of ET members and a formal class room based training session provided by university researchers to provide the ET with basic ergonomic concepts and a training intervention designed to help develop and refine the skills needed to carry out a PE program intervention. The ET then identified workstations within the plant needing attention. The culmination of each workstation intervention produced a report containing recommendations for change that is then presented to management for consideration and implementation.

2 Literature Review

Organizations are said to be open systems that require adaptation to take place any time changes between the system's components occur (Moro, 2009). It is this concept that not only creates the need for an ergonomics program, but also challenges the sustainability of that program and ultimately its success. One particular definition of ergonomics reflects the discipline in the context where change is inevitable and expected within an organization. This definition is that of the International Ergonomics Association (IEA) whereby ergonomics is defined as:

"...the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance" (IEA, 2000).

Within this definition, an ergonomist is someone who possesses the knowledge and tools needed to perform critical analysis of humans as they interact with a work system, as well as how they perform these interactions and contribute to the overall functioning of the larger organization. Traditionally the ergonomist is called upon to remedy issues, often under severe economic constraints (Jensen, Broberg, & Møller, 2009). The ergonomist enters a workplace and assesses the environment, where they then identify ergonomic risks and make recommendations to reduce these risks using engineering, administrative and personnel related controls. Such ergonomic interventions often focus on manipulating a workstation or task such that it solves a short-term problem but does not provide sufficient opportunity to fully consider the organizational context

(MacKinnon, Antle, & Vezina, 2009). Problems may become evident when new job demands or organizational growth create changes in the work dynamic, environment, and the tasks performed by workers.

Although it has been identified that periodic re-visitation by an ergonomist helps to maintain an appropriate level of internal ergonomic training and knowledge, it has also been realized that this is not realistic when working with SME's operating under limited human and financial resources (Tornstrom, Amprazis, Christmansson, & Eklund, 2008). Ergonomic interventions can be expected to yield different results within different organizational contexts (Neumann, Eklund, Hansson, & Lindbeck, 2010). Examples of organizational characteristics which contribute to and influence the context of the ergonomic intervention are: producing a new product, addition of new technology, the employment of new staff etc. A recent review has found that interventions have consistently focused on making changes to the specific tools and work processes which may be the root of ergonomic risk factors, but fail to address organizational factors (van Eerd et al., 2010). Because of the short term transactional approach of these interventions, they are unable to encourage organizational learning (Broberg, Seim, & Anderson, 2009) or promote changes in the work habits of users (Huang, Chen, Krauss, & Rigers, 2004). It is this behavioural modification process that can improve safety of the organization overall (Griffin & Neal, 2000). To instill such behavioral change at the organization level, stakeholder roles and responsibilities must be clearly identified and reinforced (MacKinnon et al., 2009), and safety culture must be considered during program implementation and monitoring (Bentley & Tappin, 2010).

2.1 Participatory Ergonomics

PE programs are implemented to draw upon valuable tacit knowledge of experienced workers, as they provide workers with the skills they need to participate in planning and modifying their own work tasks and practices (Wilson, 1991) through engaging them in the design and implementation of ergonomic solutions (Buchel & Raub, 2002). This approach to change allows an organization to avoid dependency on consulting ergonomists; rather efforts are focused on drawing upon appropriate internal resources and building the capacity to sustain the program independently over time.

PE has often been used as a model for injury prevention programs (Haukka et al., 2008; Huang & Feuerstein, 2004; Pehkonen et al., 2009) and these models have employed many strategies for addressing WRMSDs (Pehkonen et al., 2009). Some approaches have been designed to make improvements in the physical work environment (Hignett et al., 2005; Laing et al., 2005; Laitinen, Saari, Kivisto, & Pirkko-Liisa, 1998; Molen et al., 2006; Pohjonen, Punakallio, & Louhevaara, 1998), and others focus on the psychosocial work conditions (Laitinen et al., 1998). However, research has found that not one program design will be effective for all contexts (Boocock et al., 2007).

PE effectiveness has often been evaluated in terms of reducing the incidence, and the severity of symptoms associated with WRMSDs. Research has found PE to be associated with decreased WRMSD-related symptoms (Rivilis et al., 2008), and a reduction in work load (Pehkonen et al., 2009). Despite these findings, research has been limited in its ability to demonstrate that ergonomics interventions can reduce WRMSD risk factor exposure (Lotters & Burdof, 2002), and has shown only moderate evidence of

PE interventions having positive impact on WRMSDs (Haukka et al., 2008; Rivilis et al., 2008). WRMSDs generally manifest clinical symptoms over a long period of time, and also require time before improvements in symptoms are observed. The dose-response relationship, or how much exposure reduction is needed to have a significant or measureable effect on reducing WRMSD (Westgaard & Winkel, 1997), has not been established. This further suggests that using the dose-response and WRMSDs as an outcome measure of PE program success to be unreliable. Due to the variety of challenges and barriers to observing and reliably reporting on changes in musculoskeletal health as a result of a PE initiative, it is not surprising that researchers suggest the need for longer follow up periods to better understand program effectiveness (Haukka et al., 2008; Tompa et al., 2009).

A recent review of ergonomic literature suggests PE programs address the contextual and systematic complexities of the organization (van Eerd et al., 2010). Research has made efforts to incorporate macro-ergonomic models in order to standardize terminology, identify facilitators, key stakeholders and barriers to success (Leyshon & Shaw, 2008). Macro-ergonomic principles are part of the foundation of any PE framework, where policies, processes and organizational culture are considered in the design and implementation of the program. In such an approach, attention is paid to all levels of the system, including culture, management, and environment. In a macro approach to PE, organizational change is expected and encouraged as it has been found that change is required for PE program sustainability (Holden et al., 2008). Holden et al.

(2008) recommends a framework built on research concepts of change management that can be easily implemented and monitored at the field level.

2.2 The SafetyNet Participatory Ergonomics Framework

SafetyNet, a centre for occupational health and safety research at Memorial University has developed a PE framework that has been implemented in both small rural and remote fish processing plants. The framework is built upon train-the-trainer PE concepts and principles of knowledge transfer (KT). KT is the by-product of active interactions between organizational stakeholders (Parent et al., 2007), where these groups have the capability to learn and grow based on the knowledge and experience of the another (Argote, Ingram, Levine, & Moreland, 2000). The premise of KT is that within every organization there is a need for knowledge and existing knowledge which can be harnessed to meet ever-changing organizational needs (Parent et al., 2007).

Much of the PE work completed by SafetyNet during 2007-2011 used a KT model developed by Parent et al. (2007) called the Dynamic Knowledge Transfer Capacity Model (DKTC). The DKTC is visually represented in

. The DKTC can be considered a realistic representation of how social capacities and knowledge exist and affect knowledge transfer within complex systems or organizations.

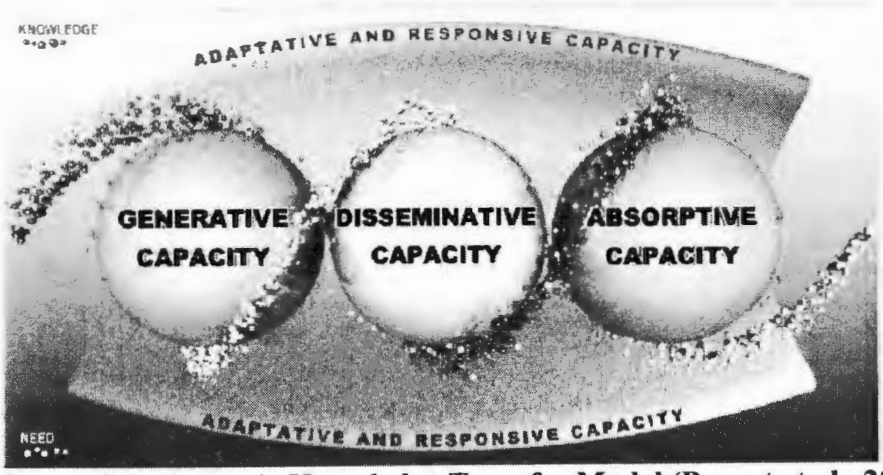


Figure 2.1: Dynamic Knowledge Transfer Model (Parent et al., 2007).

There are four types of capacities that exist within that social organization: generative, disseminative, absorptive, and adaptive and responsive capacities. The generative capacity refers to the ability to improve knowledge and the processes, technologies, products, and services that can result upon obtaining having such knowledge. Absorptive capacity has to do with the ability to identify the value of new knowledge from external resources and appropriately apply this knowledge to find solutions for internal system deficiencies. The disseminative capacity has to do with the ability to put knowledge into context, modify it, and share it through the social networks of the system to build management commitment. Adaptive and responsive capacities refer to the ability to learn and renew elements of the knowledge transferring system on a continual basis to meet the needs of a system as it encounters on-going and dynamic changes (Parent et al., 2007). The DKTC recognizes that within an organization, there exists knowledge, both tacit and practical, as well as the need for the new knowledge. An organization must possess certain social capacities in order to create and disseminate knowledge (Antle et al., 2007; Antle et al., 2011; MacKinnon et al., 2008; Parent,

MacKinnon, & Béliveau, 2006; Parent et al., 2007). Knowledge should be viewed not as an object which must be transferred, but instead as a systematic social construction that is specific to the context in which it is found and used (Parent et al., 2007). The development of knowledge networks and communications strategies has been found to be critical to engaging all levels of management in a PE framework (MacKinnon et al., 2009).

The DKTC model has been considered in the evaluation of the PE framework as a diagnostic tool to evaluate the KT capacities and predict PE sustainability (MacKinnon et al., 2008). SafetyNet used the PE model in 2007 in a study which observed the KT potential of an existing ergonomic program existing in a large industrial organization in Quebec Canada to a smaller industrial site in NL(Antle et al., 2007). This study investigated how the PE model could be used as a mechanism to transfer the research knowledge and skills from Quebec PE-action research team to a research team in NL. The study found challenges with disseminating the PE program implementation skills from the Quebec to Newfoundland based researchers. These findings were attributed to the logistical challenges with communication between research groups and the inability for the primary researchers in Quebec to act as the facilitating ergonomist at the early onset of the program (Antle et al., 2007). This study also found internal disseminative capacity challenges as a result of the inability to develop knowledge networks between management, supervisors, trainers, employees and other stakeholders (Antle et al., 2011). This finding is said to be attributed to inadequate development of roles and

responsibilities of management and other stakeholders at the onset of the program (Antle et al., 2007).

It is crucial to the development of social capacities to involve and engage stakeholders in the PE process (Parent et al., 2007). This research initiative found that although the PE intervention framework was employed, insufficient attention was paid to creating effective communications between the stakeholders, and therefore the process lacked in the ability to disseminate knowledge necessary for program uptake. The study recognized that a knowledge transfer model would initially have helped identify a lack of readiness for the intervention in terms of disseminative capacity (MacKinnon et al., 2008).

Research by SafetyNet in 2009 was designed to identify the gaps that small to medium sized enterprise would face due to the limited ability to interact with an ergonomic specialist. In this particular initiative, the framework considers the development of a researcher led internal worker-management ergonomics team approach. This framework assumes that this ET and its activities relate to a company's long-term operations and health and safety strategies, and is dependent upon many aspects of management commitment and support. This type of PE approach may be particularly useful for SME's located in rural and remote locations (MacKinnon et al., 2009). This study found that success was dependent upon the development and facilitation of knowledge networks and communications strategies and engagement from various levels of management participating directly or indirectly in the establishment of the Ergo-team. Building on this principle PE can be used as a platform for facilitating learning at the

organizational level as well as a framework to clearly identifies stakeholder roles and responsibilities needed to develop the social construct to build knowledge transfer capacity (MacKinnon et al., 2009). Understanding the characteristics of an organization and how management practices influence the social capital and culture will help research better understanding PE program sustainability.

2.3 The Role of Social Exchange in PE

Recent research arising from a SafetyNet PE program implemented to KT as part of the PE process found that the absence of a learning culture where members of management are ready to absorb knowledge and put it to practice will create an environment unable to sustain the program over time (Antle et al., 2011). Culture has to do with the more persistent and concrete values that help shape and guide the beliefs and behaviours in an organization which exist across multiple domains within the larger organization (Hartmann et al., 2009). PE is heavily influenced by the social capacities and social processes between stakeholders (Neumann et al., 2010), and culture is made of the perceptions and beliefs influenced by the behaviours of leadership (Zohar & Luria, 2005). As a result, it can be said that social exchange based management practices have become a factor for consideration in developing social capacities for KT in PE program models (Boone & MacKinnon, 2010).

Social exchange theory is built on a 'psychological contract', or the premise that a level of trust develops between leaders and members based on the assumption that their efforts will be reciprocated in the future (Blau, 1964; Mearns & Reader, 2008; Settoon et al., 1996). This social exchange relationship built on proven trust and relationships has

been described in the literature as resulting from two theories, perceived organizational support (POS) and leader-member exchange (LMX) between individuals (Walker & Hutton, 2006). It is through the fulfillment of psychological contracts that people feel their organization cares about their well-being, ultimately influencing POS (Hofmann & Morgeson, 1999). Quality interactions made up of communication and the development of relationships between workers and leaders or LMX provide the opportunity for psychological contracts to be fulfilled. Both POS and LMX have been identified in the literature by Hofmann et al. (2003) as being positively related to safety attitudes, POS being related to safety communication, as well as LMX being related to safety commitment and communication (Hofmann & Morgeson, 1999). Ultimately as management demonstrate their commitment to a program directly through their actions they will play a role in shaping perceived organizational support (Mearns & Reader, 2008; Zohar, 2002b), and will influence how others perceive that program to be supported by the larger organization (Clarke & Ward, 2006). This relationship between social exchange and culture is supported in the research as it has been said that a collaborative and holistic PE program equipped with the mechanisms to address the cultural component of the organization must be used to build trust and relationships between stakeholders (Theberge & Neumann, 2010). Considering culture as a factor in a PE program, social exchange can be the medium used to assess the environment which exists for social capacities required for KT to occur.

Because culture is routed in management behavior and the basis for social exchange, the most practical means of determining if an organization as the social

capacity for effective KT is through specific management practices. Three management practices that shape organizational culture through building trust and relationships as well as demonstrated commitment are: leadership, communication and networking.

2.3.1 **Leadership**

Leadership is the medium through which the social exchange element LMX will occur. Safety leadership has been defined as "the process of interaction between leader and followers through which a leader can influence others to achieve organizational safety goals within the context of organizational and individual factors" (Wu, 2005, pp. 2). These interactions are only in part determined by the formalities such as policies and procedures in the workplace, where the perceptions and beliefs of management have the potential to influence how they are implemented by others (Zohar & Luria, 2005). It has been suggested in the literature that individuals will be more inclined to change their behaviour when they engage in high-quality interactions with their supervisors (Hofmann et al., 2003). In such high-quality interactions, where trust has been established, the members are able to engage in collaborative problem solving and recognize opportunities to venture outside of the typical way of doing things and feel supported in the process. It has been found that the quality of interactions increase over time (Nahrgang, Morgeson, & Ilies, 2009), and therefore require effort on behalf of individuals to carry out these interactions on a regular basis to build this social capacity over time.

The concept of social exchange has been adopted, studied and evaluated within the leadership literature more so than the ergonomics literature. A leadership study in particular that set out in evaluating management practices as leverage for modifying

safety behaviours found significant improvements in safety climate as a result of implementing transformational leadership practices (Zohar & Luria, 2003). One study that looked at the correlations between safety leadership, safety climate and safety performance and found that there is a path that exists from safety leadership, through safety climate and then to safety performance (Wu, Chen, & Li, 2008), indicating that through improvements in leadership benefits are observed in safety performance.

The quality of the leader member exchanges or the interactions between leaders and members is influenced by the leadership style used. Transactional leadership refers to exchanges that are motivated by economic, political and psychological perspectives of each organizational groups (Simola et al., 2010). Transactional leadership is driven by short term gains. Transformational leadership reflects exchanges that enhance the relationships of leaders and followers as they interact based on common goals (Simola et al., 2010). Transformational leadership, although built on simple social exchange concepts reflects high quality interactions which inspire and motivate others to behave in a desirable fashion (Simola et al., 2010). It has been supported in the literature that leadership style has positive impacts at the micro level of the organization through social exchange between leaders and members (Simola et al., 2010), but there is a macro-organizational level benefit to using appropriate leadership style (Bolman & Deal, 1984). Research indicates that upper management may have a more effective program if they take the approach from a transformational leadership perspective and decentralize the line of command (Simard & Marchand, 1994), using a more participative approach to interacting with subordinates. This leadership style encourages the exchanges among

leaders and members that represent common goals (Simola et al., 2010), where leaders promote information sharing and collaboration (Barling, Loughlin, & Kelloway, 2002). This means of interacting with another individual represents a more participative leadership approach than the bureaucratic transactional leadership approach. Because of the components of social exchange used in a transformational leadership style it can be said that this approach will promote relationship development and contribute to a culture that fosters trust, participation and reciprocated behaviours in others.

2.3.2 **Communication**

Communication is one of the means through which management demonstrate their commitment to a program or initiative and reinforce the expectations they have for their reporting supervisors and management within that program. Such communications also help clarify organizational goals and objectives that are so important in establishing program commitment and support from management. Laing et al. (2005) suggests that improvements in communication practices and strategies are required prior to observing improvements in individual perceptions about the organization and subsequent behavior changes. It has been observed in the literature that some of the main challenges and barriers encountered in PE have to do with lack of effective organizational communication between levels of management and the front line level (Hartmann et al., 2009). Hartmann et al. (2009) explains the need for openness and flexibility within the hierarchy of complex systems so that information can be communicated efficiently within the hierarchy. It's been said that although conversation occurs spontaneously and frequently within organizations, unless it is interactive and intentional it will have little

influence on the listener (Mabey et al., 2012). Understanding what is meaningful to the person you speak with will influence the effectiveness of the interaction regardless of the leadership style used and therefore requires a degree of rapport.

Using a conversational or personal approach to interact with another individual will serve as the high quality interaction needed to build the trust and relationships which have been discussed as the foundation for KT social capacities. The social capacities involved in communication are the adaptive and responsive capacities where members are able to consciously learn, think critically and engage in continuous improvement. These capacities require that an environment of learning exist where open and honest communication is welcomed, encouraged and supported in its outcomes. The leadership literature has investigated how this environment can be created. A recent leadership study by Groysberg & Slind (2012) investigated the business strategies of large and small organizations in the 21st century and found that a new model for engagement and internal communication is about to take precedent over the traditional top down approach used by leaders to interact with employees. "Today's leaders achieve far more engagement and credibility when they take part in genuine conversation with the people who work for and with them. A conversation is a frank exchange of ideas and information..." (Groysberg & Slind, 2012, p.79). It is not always intuitive that we speak to another person in this fashion, particularly as leaders have traditionally used a top down approach to communicating key messages and expectations (Mabey et al., 2012). It's been said that those leaders who take communication seriously understand that knowing when to stop

sharing their own thoughts and allow another person to speak is critical in making the conversation personal (Groysberg & Slind, 2012).

Leaders are often unaware of the effectiveness of their communication and leadership behaviours and the impact on their subordinates. Studies have found that providing management and supervisors with frequent and regular feedback on their safety-related interactions with their subordinates, together with communication from their superiors and senior management have been found to have a positive impact on a safety program (Zohar, 2002a; Zohar & Luria, 2003).

Not only does the content or message of the communication need to be considered, but the means through which communication is delivered, the opportunities for interaction between them and the social capacities between them (Antle et al., 2011). Antle et al. (2011) found that a communication strategy must be designed in such a way that it is regular, predictable, and accessible and must provide information in a timely manner. Knowledge networks are communication and interaction opportunities arranged through a series of established mediums designed to cross the limitations of organizational departments and functional areas to ensure key stakeholders are involved in the development of topics they are interested or invested in (Buchel & Raub, 2002).

2.3.3 **Networking**

Macro-ergonomic research today aims to describe a work environment that promotes interaction of organizational members and stakeholder groups in order to solve problems and overcome barriers throughout implementation (Loureiro, Leao, & Arezes, 2010). The literature recognizes that communication barriers between different

organizational groups and levels take time, and may require deliberate effort to overcome (Neumann, Ekman, & Winkel, 2009). This ability to engage and motivate individuals is lost without the pre-determined and planned opportunities to communicate and participate in those high quality interactions that have been described as critical to developing KT capacities.

The literature has found that with the help of management who are committed to participating in knowledge networks, a productive environment for information and KT can occur (Buchel & Raub, 2002). Based on the work by Buchel & Raub (2002), there are 4 steps that contribute to the building of knowledge networks. These steps are: focusing the knowledge network, or aligning the network with corporate priorities where appropriate linkages in the organization are made, creating the network context where communication mediums are identified in order to foster trust and commitment, routine network activities, roles and responsibilities are established and momentum is maintained, and the last step being leveraging network results, where network outcomes are shared and made visible to others within the organization. These 4 steps to knowledge network development are not independent of the other social exchange based management practices, but instead serve as a means of utilizing communication and leadership effectively and intentionally. Because the disseminative capacity facilitates the movement of the knowledge and generative capacity reflects the ability to put knowledge into meaningful action, whether an organization makes the effort to develop and execute a meaningful and effective networking strategy that truly reflects the needs of the system

will influence the generative and disseminative KT capacities within the DKTC (Antle et al., 2011; Buchel & Raub, 2002).(Parent et al., 2007)

Although PE literature identifies various stakeholders and appropriate roles and responsibilities, there is little guidance in how the formal and tacit knowledge fostered in the PE program can be leveraged. Given the role of management in the overall ability to maintain a PE program over time, and their role in shaping the overall culture in which the program must exist, knowledge networks are a logical means of improving the perceptions of others on the program, management commitment, support and program-related communication, as well as maintaining moment of the program overall.

KT literature has suggested that attention should be paid to how management can contribute to the development of social capacities within an organization in order to strengthen relationships between organizational groups and levels (Szulanski, 1996). It must also be considered that these networking opportunities, when properly endorsed by management, serve as an opportunity for management to not only communicate with other stakeholders and involved individuals, but also to have quality interactions with employees to build trust and relationships along the way. Improvements can be observed in management practices such as leadership, communication and networking through social exchange where it is possible to observe small improvements in the management practices that predict larger more sustainable changes within the organization.

2.4 Organizational Perspectives

Work organization reflects how management within an organization chooses to manage all aspects of its business and operations over time. Because management exist

across all levels of the organization and their behaviours and practices are so influential on the organization, research suggests that it is necessary to observe multiple perspectives and the impact of management and stakeholders on that organization (Tompa et al., 2009).Therefore, a model has been developed to explain these factors and their impact on the organization (Bolman & Deal, 1984). This model has been used in the literature and is said to "represent the four different perspectives of an organization which accentuate four different ways of looking at it and at what goes on inside it" (Hale & Hovden, 1998, p. 144). The social exchange based management practices leadership, communication and networking that have been linked to ergonomics program sustainability are embedded in these four perspectives, or frames as they are described by Bolman and Deal (1984). Activities in each of these frames can be used to understand how management behave, make decisions and contribute to the organization. Taking on not one but all four of these perspectives provide a holistic view on these management practices and how they may change over time.

2.4.1 **Structural Frame**

The structural frame reflects the need to get things done, and assigning individuals throughout the organization as being responsible for doing so (Bolman & Deal, 1984). In a large and diverse organization, or complex organization, it is challenging to coordinate all the different activities while ensuring they are properly aligned (Bolman & Deal, 1992). In the context of implementing an ergonomics program, policies, procedures and processes are critical to forming the foundation to support that program and its activities

over time. These structural elements provide the foundation for the activities of a PE program and are observed in the structural frame.

2.4.2 **Human Resources frame**

The human resources frame reflects the way the organization is able to manage the people in it and their contributions to the organization (Bolman & Deal, 1984). The premise is that people are the most valuable and important resource in the organization, it is how their skills, ideas, insights, energy and commitment interact to make the organization function (Bolman & Deal, 1992). Careful management of this valuable resource within the organization can be both productive and rewarding for the individuals and the organization. In this context it is recognized that there is a reciprocating dependency between organizations and individuals, and that the organization exists also to serve human needs. There should be a fit between the organization and the individual to benefit both parties where the individual can do meaningful and rewarding work and the needs of the organization are also met. As individuals interact, interpersonal relationships develop as they are aligned with their social needs and organizational expectations. Through this process individuals are communicating, offering and receiving feedback, reinforcing the behaviours their want and need from each other. Individuals are acting as leaders and are reinforcing what's important to them as well as to the organization. It is though this frame that LMX and POS, the basic elements of social exchange are observed.

2.4.3 **Political Frame**

The organization can be viewed as being dynamic and a political arena with complex interactions between organizational groups and stakeholders in relation to their needs, goals, and the expectations they have for each other(Bolman & Deal, 1984). This perspective recognizes that important decisions within an organization require careful allocation of limited resources, and that interests of individuals within various levels of the organization will determine how these resources are distributed (Bolman & Deal, 1992). Departments will compete for resources and power, while individuals compete for jobs, titles and recognition.

Management will employ different perspectives when making decisions and goal setting, based on their knowledge and their job objectives. As stakeholders work towards individual power and recognition the conditions will exist to create a natural amount of conflict. How the organization designs and utilizes a strategy to provide interaction, common interest and investment in organizational objectives will determine its ability to manage these various perspectives and priorities. Through a well designed and implemented networking strategy, stakeholders are able to share their views, perspectives, power, and work towards a solution that represents organizational goals that will illustrate political improvements. It is through this frame that the perspective of managing and promoting cohesive political activity through networking and decision making that will facilitate knowledge transfer.

2.4.4 **Symbolic Frame**

The symbolic frame is based on the basic understanding of human and organizational behaviour (Bolman & Deal, 1984). Within this perspective, the meaning behind the occurrence of an event and the impact it has on those involved is more important than the event itself. This frame encompasses the view that one's actions seem rational at the time, given the knowledge and understanding of the situation created by the climate and culture of that organization. It is through this frame that the perceptions held by individuals that contribute to their understanding of the organization. It is this subsequent culture that governs the ability of knowledge transfer to exist and become responsive to changing organizational needs.

3 Methodology

This study was initiated when a poultry processing plant contacted SafetyNet requesting a PE program be implemented in their plant to address the high incidence of WRMSDs. Plant management were now interested in working with SafetyNet to implement a PE program address the high incidence of WRMSDs, but also to implement a program that could be sustained in-house over time. This program implementation provided a research opportunity to observe changes in management practices as a result of the new PE program. The framework used for this program was developed and used by SafetyNet researchers in similar studies, the most recent of which was conducted in the same plant as that of this study (Antle et al., 2008a; Antle et al., 2007; MacKinnon et al., 2008; MacKinnon et al., 2009).

The complete reference list of literature which contributed to the academic development of the SafetyNet PE program framework and toolkit can be found in the SafetyNet PE program user manual on the Memorial University website (Antle et al., 2008b).

3.1 Plant Description

The poultry plant for which this PE program was implemented is described as a unionized work environment producing approximately 40,000 chickens every day, operating on a year-round basis. The plant has been in existence for approximately 30 years and has undergone many changes in production, automation, and administration processes during this period. As these changes occurred, much of the working population remained the same in the plant. Today, there are many workers who have been

performing highly repetitive work in poorly designed work stations for a substantial proportion of their working lives. The plant has a history of high incidence of WRMSDs in its working population, as suggested by a considerable workers' compensation claims history and further validated through past ergonomic audits and assessments. The past ergonomic audits identified several areas for improvement and ergonomic weaknesses, in both workstation design and organizational management. Given the anticipated challenges with ergonomics program uptake and sustainability, plant management were interested in a PE program implementation designed to build participation from key stakeholders and develop capacity to sustain the program in house over time.

The organizational design of the plant includes 8 functional departments: Finance and administration, human resources, sales and marketing, production/processing, plant services, feed, farm, continuous improvement. Each of these functional departments is operated by a member of the upper management team reporting directly to the Chief Executive Officer. Two of the 8 functional areas, feed and farm, are physically separated from the main plant. The operational areas of the plant are plant services and production/processing and plant services.

Occupational health and safety in the plant is governed by several committees within the organizational structure to promote union management alignment in safety initiatives and program management as well as oversight at the upper management level. The use of this committee structure to support the PE Program was of interest as it is an aspect of the management practice of networking observed within this study. Within this structure, the Occupational Health and Safety Steering Committee meets quarterly and

consists of the following core members: two representatives from the plant, director of human resources and occupational health and safety coordinator, two representatives from WHSCC, 2 co-chairs/alternates from the Occupational Health and Safety Committee and one representative from the union. The senior management Health & Safety Meetings is held quarterly and the following stakeholders are invited: Chief executive officer, union executive member, occupational health and safety coordinator, plant services manager, director of human resources. A joint occupational health and safety committee functions and includes front line staff representing all operational areas of the production/processing aspect of the plant, as well as union and middle management. As reflected in the committee terms of reference, these two formal committees and the senior management meetings are used to monitor the occupational health and safety program and ensure action at the floor level and oversight and management at the middle and upper management level.

3.2 Study Design

The SafetyNet PE framework was used as the foundation for this observational case study. An observational case study was selected because a specific aspect of the organization was of interest to researchers, and through the PE program implementation the practices of PE program stakeholders could be observed.

The SafetyNet PE program framework requires that certain prescribed activities occur from the onset of the program through the identification and training of the ET, as well as the implementation of an ergonomic-based workspace. Therefore an observational case study to evaluate the SafetyNet PE program framework was ideal as the program

itself served as a medium to observe changes in management practices of leadership, communication and networking as a result of the program implementation.

3.2.1 Ethical Considerations

Ethical considerations for this study required that participants sign the consent to take part in health research form which disclosed that the PE program was under observation for the purposes of graduate research. Ethical considerations taken as well as the consent for health research form were approved by the Human Investigation Committee of Memorial University. A copy of the informed consent to take in human research can be found in Appendix A: Consent to Take Part in Health Research Form.**Error! Reference source not found.**.

3.3 SafetyNet PE Framework Activities

The SafetyNet PE framework is a stepwise approach to implementing an Ergo Team driven ergonomics program using an external university-based researcher or practitioner. The SafetyNet PE framework is designed to aid in overcoming many organizational barriers associated with program sustainability through timely organizational communication and networking. The expectation of the university researchers is that during the study period they will help prepare organizational stakeholders for their role in the program, ensure initial program requirements are established and the PE process is understood, and there is adequate training provided for stakeholders to carry out their responsibilities. When an organization decides to work with SafetyNet to implement this program they will begin to work with internal PE program stakeholders to begin the program implementation. The primary goal at this

point is to identify a PE program Ergo-Team with both worker and management representatives. A consultative approach will be used to identify these individuals and then training for them will begin. Once the ET is trained and in place, a training intervention will be used by the university researchers and the ET to practice the newly acquired skills and apply their ergonomics knowledge. Throughout this first intervention the ET will be closely monitored and coached by university researchers to ensure competency in their skills and understanding of the program framework. The details of the stepwise approach to ET development and PE program implementation as per the SafetyNet PE program framework are outlined in this section.

3.3.1 Proposed Meeting with Plant Management and Union Executive

A meeting was held with plant management and the union executive in the preliminary stages of program implementation before SafetyNet was consulted. This union group requested SafetyNet to propose a 2-year PE program. SafetyNet was invited by plant management to the poultry processing plant to present the proposed framework and implementation plan for the PE program. The stakeholder groups represented were: upper and middle management, disability management, union representatives, plant services representative, and the occupational health and safety committee.

3.3.2 Information Meetings

PE program information meetings were held for plant employees, supervisors and management in the early stages of the program implementation to ensure they were aware of the intent of the program and how they can become involved in the PE program through the ET or as a participant in the intervention process. The information meetings

were held during the PE ET selection process, PE ET training and during the launch of the first intervention of the program. Information sessions were intended to be ongoing throughout the program to ensure employees have updates about the ET and program activities. These information meetings make up an awareness strategy to ensure employees know about the program objectives and its activities and to build workforce familiarity within the plant of ET worker and management representatives. The series of information meetings served as a strategy for promoting participation; ensuring questions/concerns and uncertainties are addressed early on in the program interventions and workers are able to directly participate in the project.

3.3.3 **ET Selection Process**

The stepwise PE program began with recruitment for the ET worker and management representatives. Under the PE program framework, the ET is intended to consist of 2 worker representatives and 2 management representatives. With the support of university researchers, the ET selection process was initiated by upper management, as they were the initial drivers for the program. The recruitment and selection strategies for ET worker representatives were discussed in a meeting with representatives from upper and middle management with the support from university researchers early in the PE program launch. The two members of middle management present at this meeting were ultimately selected as the ET management representatives. The involvement of these two management members was established early in the launch due to their formal and informal safety leadership roles and responsibilities in the organization.ET Mgt Rep 1 was selected based on their formal safety leadership role and ET Mgt Rep 2 was selected

based on their production supervisor position in order to all the ET to liaise with front line leadership to facilitate the ease of PE activity planning and execution purposes when front line staff are required from the floor. An alternate ET management representative was named to ensure another member of middle management was trained in the PE framework and activities for support as required. Two members of upper management would be considered PE program stakeholders, UM 1, and UM 2 as they will be involved in the implementation of recommendations that are presented by the ET after each intervention.

During this meeting, names for possible ET worker representatives were discussed and university researchers urged management to identify a strategy for identifying interested candidates from which to make an official selection. Management communicated their request for ET worker representatives using a poster campaign throughout the plant. As a result of this effort, workers throughout the plant contacted management and expressed their interest in learning more about the program. These individuals were then invited to attend a meeting with management and SafetyNet for an information session on PE and the potential benefits this program may have on health and safety in the plant over time. This process generated interested volunteers from the worker cohort and educated them on PE objectives and roles and responsibilities on the ET prior to formally committing their participation. After this information session, those who remained interested were asked to complete a short questionnaire. Upon review of the questionnaires submitted, ET members would be selected by ET management representatives based on a self appraisal of the following: desire to work as a group in a

challenging and problem solving environment, verbal, writing, computer, and oral presentation skills, as well as established peer relationships. This process of recruiting and selecting ET worker representatives was performed by ET management representatives and upper management under the guidance of university researchers. This aspect of the PE framework provides flexibility in the ET recruitment and selection process to meet the needs and culture of the organization. Middle management were involved in the selection process as they are familiar with the culture of the organization, how to ensure fair communication and recruitment is used, as well as the work ethic and personalities of workers who submitted the completed self appraisal questionnaire during the selection process. Having this context, middle management were able to narrow down and select which workers would be able to carry out the PE ET activities in a competent manner. Although this flexibility was intentionally given to the PE program stakeholders, it provides the unfortunate opportunity for personal and internal politics to influence the selection of worker representatives.

It was found that 88 % of those who attended the information session completed the recruitment questionnaire. It was decided by management that those interested in participating on the ET who were also on the Occupational Health and Safety (OHS) Committee would not be asked be considered. The decision based on the hope that identifying different individuals for the ET would only strengthen the body of workers involved in safety and health initiatives in the plant and engage as many people as possible. Four of the individuals who finished the questionnaire were selected by management to attend a 2-day training seminar on PE, ergonomic principles and

intervention and data analysis methods. ET management representatives were identified during one of the first PE management meetings in the fall of the first year of the program. Attendees of this meeting were: SafetyNet ergonomists, members of upper and middle management and the union executive. SafetyNet researchers facilitated a discussion around roles and responsibilities of management on the ET while those in attendance discussed who might be most suitable for the role given their job description and daily activities in the plant. Members of management needed more time to think about the roles and responsibilities and consider how it will interact with other functioning committees. The group reconvened several weeks later without SafetyNet after the worker representative recruitment was under way and finalized who would be the ET management representatives.

In summary, the ET was composed of 2 management representatives and an alternate representative (ET Mgt Rep 1, 2, 3), 4 worker representatives (ET Wkr Rep 1,2,3,4) and 4 members of upper management were named as PE program stakeholders for support and governance purposes (UM 1, 2, 3, 4). These PE ET representatives and program stakeholders can be seen in Figure 3.1: PE Program Stakeholders.

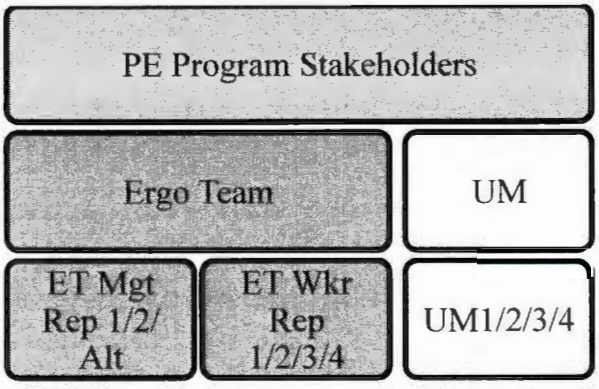


Figure 3.1: PE Program Stakeholders

3.3.4 **ET Training**

All of those who responded to the questionnaire and participated in the interview process and those selected from management to work on the ET were asked to attend two separate full day training sessions of eight hours each. This training was delivered by the university researchers and would prepare the ET for activities within the PE program. The training included lectures on: ethics and confidentiality when using volunteers when collecting personal information and information that will be presented to others, methods for identifying and choosing an area within the plant to conduct an intervention, basic ergonomic principles, movement analysis, basic computer skills and document management and organization, and interview conduction skills.

During this training session, the ET learned about various methods and factors in the selection for PE interventions. Using this knowledge, the team identified the In-feed room in the further processing department as the first intervention. This first intervention was closely monitored by the university-based ergonomist and was used as a training intervention to promote skill development and understanding of the ergonomic principles. Through this training intervention, the ET members were required to learn several PE program-related skills which included: conducting pre- and post-video analysis interviews, post-video analysis interviews, video analysis and report writing. The training sessions were on-going throughout the entire first intervention in order to consolidate newly acquired skills and to ensure the ET was moving through the PE program model properly. The first training intervention was followed by a second workstation intervention. The culmination of each intervention produced a report containing

recommendations for change which would be presented to upper management for consideration and implementation.

3.4 Intervention Descriptions

3.4.1 Intervention 1: Further Processing In-feed Room

The further processing in-feed room was chosen as the training intervention or Intervention 1 by management and worker representatives on the ET. This site was not considered a typical plant work environment as it does not operate every day of the year. The site chosen operates for 1 or 2 days every 4-6 weeks throughout the year. It was not practical to use workers off the line as volunteers as the workers on this line change each time it is in operation and would therefore not be able to provide the information of interest in an interview. Various individuals were selected that have worked and supervised the operations of this site to ensure appropriate tacit knowledge and understanding of the work was obtained and considered when putting recommendations forward. Following the intervention steps prescribed within the PE framework, a final report was produced and accepted by upper management.

3.4.2 Intervention 2: A Bins Grading Station

The A bins grading station was chosen for Intervention 2 because there has been a high incidence of WRMSDs and related lost time injuries associated with this workstation. Consideration for choosing this department also had to do with the obvious repetitive twisting motion performed as part of the operations on this part of the line. Efforts in the past to change the set up and eliminate the twisting had been unsuccessful. The existence of this poor workstation set up has to do with growth and changes in the

plant as it grew away from its original design and production capacity. Worker volunteers were obtained for participation in the pre and post video interviews, and video recording of work tasks. Volunteers for the intervention were found as a result a large poster in the intervention site which provided interested workers with the current and past activities of the ET, a visual representation of the PE process as well as the contact information for ET members. Following the intervention steps prescribed within the PE framework, a final report was produced and accepted by upper management.

3.5 Assessment of Study Objectives

The SafetyNet PE program framework identifies and proposes to the host organization a series of steps to initiate the program, identify and train the team and carry out an ergonomics intervention. As university researchers facilitated these activities, they focused on observing fundamental social exchange based management practices associated with the program outcomes. The study objective was to observe changes in such management practices that could be attributed to the implementation of the PE program. The management practices of interest were leadership, communication, and networking.

To determine if changes in these practices occurred as a result of the program implementation, they were evaluated using three methods. The first method was through the evaluation of the PE program implementation itself. Program communication and awareness at program launch are important to program uptake and acceptance and networking is critical to integration of the program into the organization and involving appropriate stakeholders. Therefore, the ET was asked to develop a PE program

communication and networking strategy in order to facilitate these two important aspects of the PE program framework.

Perception questionnaires were used to capture the beliefs held by PE program stakeholders about the management practices of interest in relation to the PE program and ET activities. The second method was through the Management Practices Observation Classification System using the four organizational perspectives, or frames described by Bolman and Deal (1984). The three management practices of interest, leadership, communication and leadership are associated with one of the four organizational perspectives. The Management Practices Observation Classification System allowed observed behaviours and events that occurred during the program implementation to be categorized within the Management Practices Observation Classification System relative to evidence based themes that have been linked in the literature to program success.

3.6 Data Analysis

3.6.1 PE Program Implementation

The PE program framework requires internal communication at program start up as well as on-going program communication and stakeholder involvement, or networking. The framework requires that strategies be designed and utilized for all communication related activities within the SafetyNet PE Framework. The internal PE program communication and networking strategies developed by the ET served as a predetermined strategy against which the program was evaluated. The utilization of these strategies by the ET management representatives and upper management and other stakeholders were

observed during program activities and were evaluated as described in 3.6.3Management Observation Classification System.

3.6.1.1 **Internal PE Program Communication Strategy**

As part of the consultation process with university ergonomist, recommendations were made to the ET to develop several lines of communication to ensure all levels in the organization were aware of the PE program and its objectives, mandate and team members upfront. The internal PE program communication strategy developed by the ET can be seen in

Table 3.1: Internal PE Program Communication Strategy. The strategy requested the CEO, union, management and workers and OHS committee all become familiar with PE and ET objectives and activities early in the program.

PE program communications were captured and documented using mediums such as e-mail correspondence; meetings between the ET, SafetyNet, workers, lower, middle and upper levels of management were documented. Attendance records for ET members as well as other key project stakeholders were documented for all meetings for which university researchers were in attendance. Unfortunately, it is possible that communications were made without having shared the information with university researchers.

Table 3.1: Internal PE Program Communication Strategy

Communication Opportunity	Objective
PE/ET update to CEO	CEO to be contacted and briefed on the program objectives, ET members and updated periodically on activities and goals
Plant PE/ET Awareness Strategy	Promotional materials distributed around the plant
	General information session for those interested in sitting on the ET
Crew Meetings	Provide in-person introduction of ET and the PE program to all employees
Weekly Senior Management Meetings	Introduce PE and ET to management
	Provide updates to management, particularly those managing the intervention areas
	Managers/supervisors to be provided with on-going PE/ET status updates
Union Meeting	Introduce the program and activities and ET
	Provide regular updates on PE/ET activities
OHS Steering Committee	Introduce the program and activities and ET
	Provide regular updates on PE/ET activities

3.6.1.2 **Internal PE Program Networking Strategy**

Program stakeholder groups were identified and it was expected that regular engagement, communication and networking with these stakeholder groups would be a foundation of the participatory approach of the program framework. The internal stakeholder groups identified for networking were: Occupational Health and Safety Steering Committee (OSH), weekly senior management meetings, OSH Committee and the Union. The university based researchers served as a resource for the duration of the study period. A summary of the strategy developed by the ET as part of the SafetyNet PE Framework can be seen in Table 3.2:Internal PE Program Network Strategy.

The networking opportunities utilized by the ET were captured through meeting minutes. Through the meeting minutes the network relationships were monitored for evidence that may suggest the network is effective in the participation and involvement of

identified stakeholder groups in the PE program, as well as evidence that may suggest other groups are making PE a part of their roles and responsibilities. Participation and representation of the ET within these networks was also monitored.

Table 3.2:Internal PE Program Network Strategy

Network Group	Frequency	ET Rep Responsible
Crew Meetings	Quarterly	ET Wkr Reps as appointed
OHS Steering Committee	Quarterly	ET Mgt Rep 1, UM1
Senior Management H&S Meeting	Quarterly	ET Mgt Rep 1, CEO, UM 1

3.6.2 Perception Questionnaires

In order to evaluate the change in perceptions and attitudes that may have occurred as a result of the PE program, questionnaires were distributed at various stages of the PE intervention program. The perception questionnaires used in this study were of a semi-structured design. The questions within this design allowed both qualitative and quantitative results from the respondent.

At the end of intervention 1 and 2, a custom questionnaire was designed specifically to be distributed to each of the following groups: ET worker representatives, ET management representatives, upper management. Perception questionnaires based on communications and support between ET members and groups as well as the ET and upper and middle management were requested to be filled out by ET management and worker representatives and non ET upper management. Both questionnaires were distributed and filled out after Intervention 1 and Intervention 2.

The questionnaires were designed to analyze the perceptions about the communication, leadership and networking patterns between each of the other groups

throughout the first intervention and second interventions. Individuals from each group were asked questions designed to help researchers understand the perceptions held about the management practices of the other groups. The questionnaires also included a section on program sustainability to evaluate the perceptions held by each group regarding the ability of the ET and the organization to sustain the program after the study period and long term. A table summarizing the questions asked to each group in each of the questionnaires can be found in

Appendix B: Perception Questionnaire Questions.

The questionnaire results were analyzed within each of the categories to show trends within each of the categories pertaining to the study objectives as well as to allow for unique data evaluation based on whether the questions required a numerical or written response.

3.6.2.1 **Leadership Question Analysis**

The leadership questions evaluated the perceptions held by respondents in relation to the leadership behaviours demonstrated by members of each stakeholder group throughout the study period. There were five leadership questions asked to all three groups in both questionnaires 1 and 2. When these questions were asked about ET management representatives two names were given as the response in order of perceived importance (ET Mgt Rep 1 or 2). The leadership category was evaluated based on the mean response rate each PE stakeholder group responded positively, or in favour of each of the ET management representatives between intervention 1 and 2. Although two responses were requested, the data was presented in relation to the first name given by the respondent suggesting their primary choice for that question.

3.6.2.2 **Communication Question Analysis**

There were four communication questions in total, two questions were asked to ET management representatives and the other two were asked to upper management (UM). The questions requested that participants provide an approximate number of times they initiated or received some form of communication from each member of the opposite stakeholder group. For example, ET Mgt Reps 1 & 2 was asked to give the approximate

number of times they initiated communications with each member of the UM group, and vice versa. Unfortunately the questions in the communication section were incorrectly interpreted by the respondents and therefore will not be used as a means of assessing changes in perceived communication behaviours. This assumption is based on the fact that the questions in questionnaire 2 referred to cumulative communication throughout the entire study period, therefore the number reported in second questionnaire should never be less than that reported in the first. However, the answers reported suggested that the question was misinterpreted and as a result the data would be disregarded.

3.6.2.3 **Networking Question Analysis**

Perceptions held by ET worker and management representatives as well as the PE UM stakeholder group in relation to networking were evaluated using perception questionnaire 2. The question results provide insight through an obvious anomaly in the responses as to how the ET and PE stakeholder groups perceived other network groups to be engaged in the PE program. UM and ET Mgt Rep groups were asked 7 questions which referred to the involvement of five network groups in PE activities. These groups were: UM, CEO, Union, OHS Committee, Line-supervisors.

3.6.2.4 **Sustainability of Change Question Analysis**

Perceptions held by members of the ET and upper management about the potential to sustain the program beyond the study period offers important insight into their level of commitment and that of other stakeholders. Eight questions were asked to UM and ET Mgt Rep and ET Wkr Rep groups on Questionnaire 2 in relation to the ability of the intervention outcomes to be sustained over time. Not all questions were asked to all 3

groups. Questions pertaining to challenges of sustainability and perceived likelihood of long terms impacts of the program were asked to all groups, and questions about participation on the team and what they liked about it were asked only to ET management and worker representative groups. The remaining questions were asked only to worker representatives. The questions in relation to sustainability of change were answered by respondents in a descriptive manner whereby examples and explanation for their answers were requested. Evaluation of this aspect of the questionnaire is through the identification of common themes specific to the PE program stakeholders ET Mgt and Wkr representatives.

3.6.3 **Management Practices Observation Classification System**

It is through an inductive approach that the impact of the program implementation on management practices was observed and analyzed. Given that communication, leadership and networking management practices are qualitative and both planned and unplanned in nature, an observation classification system was developed in order to capture and quantify events that occurred during the study period. Events reflecting these management practices were observed through both formal and informal meetings and discussions with PE participants, management and volunteers throughout the study period.

The Management Practices Observation Classification System is based on the Bolman & Deal (1984) framework for organizational perspectives whereby PE related activities are classified into one of the four organizational frames. This system allows evaluation of observed events and how they may suggest change in social exchange-based

management practices. The development of the Management Practices Observation Classification System as a means of observing and evaluating management practices is based on the same approach used to understand and interpret the causes of occupational accidents. A series of conceptual frameworks and theories have evolved over time to enhance the understanding of workplace incidents and provide explanations of why these events occur in an effort to address the cause and prevent re-occurrence (Hosseinian & Torghabeh, 2012).Some theories focus on human behaviour as the root cause while others focus on the structure or the system. Independently these theories are limited in their ability to identify the cause of the incident, but observing the workplace all perspectives taken by these theories proves useful in understanding the incident and its causal factors (Katsakiori, Kakellaropoulos, & Manatakis, 2009), In the same way, observing the factors contributing to success or failure of a PE program within a complex environment requires an approach that monitors all aspects of the organization and the role of management practices in that organization. The Management Practices Observation Classification System is based on the theoretical approach to understanding the organization from four main perspectives by Bolman and Deal (1984). In the application of this theoretical framework, an approach has been developed to associate management practices and their social exchange based drivers with program successful and projected sustainability.

Events within the Management Practices Observation Classification System were observed by university researchers, captured in field notes and classified using the Management Practices Observation Classification System. Items captured in the field notes were considered for classification as an 'event' under the following circumstances:

when an opportunity presented itself to enhance the PE program and it was availed or not, a decision was made or action taken that had the potential to impact the PE program, or information pertaining to the PE program or the organizational culture was shared directly from a plant member with university researchers. These events are codified into one of the four frames of Bolman & Deal (1984), and were then determined as negative or positive events giving a final aggregate number of events (represented in the table as Δ). A positive code suggests that the observed event yielded a positive or favorable result in that frame. A negative code suggests that an event was observed within a certain frame which had a negative impact or if an opportunity for improvement was observed and wasn't followed through or availed. Under each of the 4 frames there are codes which break down that frame into an aspect of that organizational perspective which makes it specific enough to observe within management practices related to PE program activities. To view the Management Practices Observation Classification System and the integration of Bolman & Deal frames and social exchange concepts see Table 3.3: Management Practices Observation Classification System.

Table 3.3: Management Practices Observation Classification System

Classification Code	Code Description
1.0 Structural Frame	
1.0.1	Policy Development
1.0.2	Program Development
2.0 Human Resources Frame	
2.1 Relationships	Leader/member exchange quality
2.2 Communication	
2.2.1	Feedback/verbal support
2.2.2	PE Awareness Building
2.3 Leadership	
2.3.1	Accountability
2.3.2	Leadership Style
2.3.3	Program Ownership
3.0 Political Frame	
3.0.1	Time/Production Compromise
3.0.2	Resource Allocation
3.1 Networking	
3.1.1	Existing Network Utilization
3.1.2	Network Development
4.0 Symbolic Frame	
4.0.1	General Organizational Climate
4.0.2	PE Specific Perceptions/attitudes
4.0.3	Organizational Culture

Based on the perspective of the Bolman and Deal (1984) frames, the Management Practices Observation Classification System identifies opportunities within the program in relation to their ability to impact management practices directly or indirectly. These program opportunities within each frame are then used to summarize the observed events in each frame into themes. The program opportunities identified for each frame can be seen in Table 3.4: Classification System PE Program Opportunities. These themes are assigned a negative or positive trend based on how the observed events in that frame are categorized, and an overall frame trend is identified.

Table 3.4: Classification System PE Program Opportunities

Frame	Program Opportunity
Structural	Align PE program with business strategy and formalization
Human Resources	Use PE program to enhance relationships with workers Use communication strategies to promote PE program Use PE program to enhance worker/supervisor communications Use PE program to demonstrate leadership
Political	Demonstrate PE program commitment
Symbolic	Use organizational culture to enhance uptake and participation in PE program
	Use PE program as opportunity to stimulate culture change

3.6.3.1 **Structural Frame**

Bolman and Deal (1984) suggests that the Structural Frame views the organization as large, complex and challenging to coordinate all aspects in a cohesive and co-existent manner. Organizational efficiency is dependent on a structural design that ensures operational needs are met, all individuals understand and are competent in carrying out their roles and responsibilities. It reflects upon the premise that even those considered competent will have difficulties if they are enmeshed in the wrong structure.

Positive observations in this frame would suggest improved integration of the program into the organizational structure; improvements in formalizing the program through policy and program development (code 1.0.1, 1.0.2, respectively), to instill accountability amongst stakeholders and promote the use of business processes to support the structure of the program in the organization over time. For the purposes of this study, the structural observations within this frame will reflect how the PE program is integrated into this complete system which may support the development of formal management practices observed in other organizational frames such as leadership, communication and networking.

3.6.3.2 **Human Resources Frame**

Bolman and Deal (1984) suggests that the Human Resources Frame reflects management behaviours that may have a positive or negative influence on organizational relationships through various social exchange-based concepts. Specifically this frame considers the means through which leaders and workers interact, as well as how leaders interact with each other and relationships are established through LMX or leader-member exchange (2.1). This frame also captures between group communications behaviours (2.2) and encouraging participation through leadership behaviours and style (code 2.3).

3.6.3.3 **Relationships**

Within the Human Resources Frame, the observation code category leader/member exchange (2.1) or LMX pertains to the social exchange theory of Blau (1964) which provides the opportunity to observe changes in relationships established between PE stakeholders and ET members as a result of the program implementation. A major component of this frame has to do with psychosocial factors and how they are a part of the individual need to engage in interpersonal relationships that are congruent with their own values and needs, as well as work on not only organizational tasks in work settings, but also work on satisfying social and interpersonal needs.

3.6.3.4 **Communication**

Within the Human Resources frame, the observation category communication (2.2) has two subsections, feedback/verbal Support (2.2.1), and PE awareness building (2.2.2). This classification category reflects the ability of the ET to promote participation,

engagement and commitment through feedback and general PE communication within the PE program activities.

3.6.3.5 **Leadership**

Within the Human Resources frame, the observation category leadership (3.2) has three subsections, accountability (2.3.1), leadership style (2.3.2), and program ownership (2.3.3). Because leadership is a part of how management interacts with their subordinates, as well as with stakeholders within the management structure of the organization, leadership events observed in these three subsections to reflect the ability of the leader to have a positive impact on the PE program through enhanced program commitment. Observations under these codes can provide insight as to if ET roles and responsibilities are carried out and the degree to which leaders are truly committed to their role as reflected in their leadership style. These codes also provide the opportunity to reflect on program ownership through leadership demonstrated by ET members and PE program stakeholders.

3.6.3.6 **Political Frame**

Bolman and Deal (1984) suggests that the political frame identifies opportunities to engage stakeholders, manage resources to reflect priorities and build organizational support and explain the motivation behind PE-related decisions made. The political frame is further described in later research by Bolman and Deal (1984) indicating that various groups within the organization and their interests will influence how they are allocated to meet their goals (Bolman & Deal, 1992). This frame is used to observe anticipated challenges with PE program implementation and management such as the

time/production conflict (3.0.1), resource allocation (3.0.2), as well as networking (3.1) with two subsections, existing network utilization (3.1.1) and network development (3.1.2).

3.6.3.7 **Time/production Conflict**

Events observed and categorized in this subsection are those which suggest a decision was made around employee time away from production for non production reasons. Events observed may be those directly resulting from a schedule PE or ET activity, or shared perceptions held by workers about production priorities.

3.6.3.8 **Resource Allocation**

Events observed and categorized in this subsection are those which suggest an approach to financial resource allocation. Events observed can be directly or indirectly related to PE decisions or resources allocated during the study period.

3.6.3.9 **Networking**

Within the Political Frame the networking management practice was observed in relation to the PE program. Bolman and Deal (1984) suggests that within this aspect of the frame, the ability for key stakeholders to participate in and influence the PE program through established networks and the development of new networks as a result of the program implementation were observed (code 3.1). This code was broken down into subsections in order to further understand if the PE program implementation influenced changes in this management practice. Existing network utilization was evaluated (code 3.1.1) as it pertained to the network strategy developed by the ET early in the program implementation. Development of new networks were also observed (code 3.1.2) in order

to observed whether the program implantation stimulated the need to involve or inform other organizational groups about the PE program and related activities.

Networking practices of ET management representatives and upper management and other stakeholders were observed during program duration to evaluate utilization of these networks, the opportunities they provided to enhance the PE program from the perspectives of other frames in this observation classification system.

3.6.3.10 Existing Network Utilization

Within the Political Frame the existing networking utilization (3.1.1) observation subsection captured the ability of the ET to utilize the established network strategy developed early within the PE program launch. The evaluation of these networks are relative to 3.6.1.2 Internal PE Program Networking Strategy.

3.6.3.11 Network development

Within the Political Frame the network development (3.1.2) observation subsection captured the ability of the ET to identify opportunities to enhance PE program activities through stakeholder engagement using networks that were not originally identified for use by the ET during the PE program study period.

3.6.3.12 Symbolic Frame

Within the Symbolic Frame the organization can be viewed from the perspective that individuals will develop perceptions about their organization and those within it in an effort to make sense of what they observe Bolman and Deal (1984). Observations under this frame reflect the components of organizational culture associated with management

practices. This frame has three subsections, general organizational climate (code 4.0.1), PE specific perceptions (code 4.0.2), and organizational culture (code 4.0.3).

3.6.3.13 General Organizational Climate

Events observed during the study period reflecting perceptions held by workers about the organization in general are categorized under this subsection. Observations in this category will reflect the information shared by the ET and workers regarding how they feel about the organization based on an event or situation they experienced.

3.6.3.14 PE Specific Perceptions/Attitudes

Events observed during the study period reflecting perceptions held by workers about the PE program are categorized under this subsection. Observations in this category will reflect the information shared by the ET and workers regarding how they feel about the PE program and their experience with the program.

3.6.3.15 Organizational Culture

Events observed during the study period reflecting perceptions by workers or the ET about the larger organizational performance such as challenges or opportunities are categorized under this subsection. An event categorized in this subsection may reflect a perception about the organization that is routed in their personal experience and ultimately givens insight into why they feel the organization is functioning in a certain manner.

4 Results

4.1 PE Program Implementation

The PE program implementation was evaluated against the activities outlined by the SafetyNet PE framework. At the end of the study period two interventions were initiated and related ET activities were observed. A program timeline can be seen in Table 4.1: PE Program Timeline Summary. The timeline indicates that two full interventions were conducted during the 2-year study period; both requiring approximately 8 months for the ET to conduct required intervention activities. Both interventions remained incomplete at the end of the study period as management action items related to ET recommendations for change remained outstanding.

Table 4.1: PE Program Timeline Summary

Program Component	Approximate Timeline	Calendar Timeline (mm/yyyy)
Program Launch	3 Months	09/2008 - 11/2008
ET recruitment process	3 months	11/2008 - 02/2008
ET initial training	<1 month	01/2009 - 02/2009
PE ET Intervention 1	9 months	05/2009 - 12/2009
PE ET Intervention 2	8 months	11/2009 - 06/2010
PE ET recruitment	1 month	01/2010
ET Train the Trainer	Unknow	Unknown
Intervention 1/2 recommendations ET Follow up		01/2010

Intervention 1 was conducted in the "in-feed room" of the further processing department. This intervention could be considered an opportunity to address the 'low hanging fruit' as the intervention would require minor recommendations such as general housekeeping improvements and an investment in a ventilation system to be considered in a future capital budget planning. Furthermore, these introductory PE activities would allow devoted time to focus on ET development, training, and communications rather

than efforts to address complicated ergonomic problems. The findings and recommendations report produced as a result of Intervention 1 and presented to management for implementation can be found in

LEADERSHIP	
1	Who spent the most time on the Intervention(s)?
2	Who acted as the main leader during the PE program?
3	Who do you think resolved issues when trying to perform ET activities?
4	Who do you think coordinated most ET activities?
5	Who do you think completed action items in a timely manner?
COMMUNICATION	
6	Approximately how many individual correspondences were you involved in?
	How many times did ET Mgt Rep 1 contact you?
	How many times did ET Mgt Rep 2 contact you?
	How many times did ET Mgt Alt contact you?
7	Were you interested in ET activities and the progress of the intervention(s)?
	How many times did you contact ET Mgt Rep 1
	How many times did you contact ET Mgt Rep 2
	How many times did you contact ET Mgt Alt.
8	Were you interested in keeping UM informed
	How many times did you contact UM 1?
	How many times did you contact UM 2?
	How many times did you contact UM 3?
9	Do you think UM were interested in knowing about the progress and activities of the PE program?
	How many times did UM 1 contact you?
	How many times did UM 2 contact you?
	How many times did UM 3 contact you?
NETWORKING	
10	Do you think the following groups were regularly and appropriately involved?
	UM
	CEO
	Union
	OHS Committee
	Lin Supervi. Floor managers
11	Do you think the following groups are important to the program?

	UM
	CEO
	Union
	OSH
	Line supervisor
12	Do you feel that mgt reps were interested in keeping you informed?
13	Which UM do you feel was most concerned about knowing about the ET activities and progress?
14	Do you feel that line/dept mgt were well informed about the PE process and ET activities?
15	Do you feel that line/dept mgt were critical to the completion of PE program
16	Was UM involvement critical to the completion of the intervention(s)?
SUSTAINABILITY OF CHAINGE	
17	What do you think was the biggest challenge to daily PE activities as faced by ET?
18	What do you think will be the biggest challenge in the year to come for daily ET activities?
19	What do you like about being on the ET?
20	Were ET representatives given the responsibilities and control over ET activities that were described in the initial PE team training
21	Do you think ET worker representatives have obtained the knowledge, skills and power to sustain an ergonomics program without regular help from outside ergonomist?
22	Do you think the ET worker representatives have the ability to plan and coordinate ET activities without management?
23	Was the ET provided with sufficient information about ergonomics and training to carry out their activities during the interventions?
24	What additional and/or supplemental ergonomic resources or skills do you feel should be added to the PE training program?

Appendix C: Intervention 1 Summary of Critical Findings.

Upon selection of the second intervention location it was understood that Intervention 2 would require significantly more effort to complete than the first. The intervention evaluated the A bins grading station in the further processing department. The main task at this workstation is to perform visual inspection or grading of the quality of each whole chicken to determine if each met the criteria to be sold whole or if it was to be cut into pieces and sold to fast food restaurants and grocery stores on a Styrofoam tray. Due to the growth and operational changes in the plant over time in relation to the initial design of the plant, this station had become substandard. The task of grading the product was awkward and employees were required to twist at the torso and throw back a significant portion of all birds handled into a bin several feet behind them. The ET recommendations required reconfiguration of the line and significant capital investment as well as the expertise from various internal stakeholders such as maintenance and engineering. It was observed that significantly more effort on behalf of stakeholders and ET team members was required to identify solutions to address the issues within Intervention 2. The Intervention 2 findings and recommendations report presented to management for implementation can be found in Appendix D: Intervention 2 Summary of Critical Findings. Management Practices - Classification System Observations

The events categorized under the four frames of the classification system were not in favour of management practices being positively influenced by the PE program. The results show a negative net number of observations within each classification frame. The Political Frame had the most negative outcome with -14, Human Resources Frame in with

-14, Symbolic Frame with -6 and Structural Frame was the most positive with -2. A summary table of events for each classification codes within these frames can be seen in Table 4.2: Management Practices Observation Classification Results. A detailed list of the observations and the description of that event can be found in Appendix F: Management Practices Observation Classification System Observations.

Although several opportunities were encountered to formalize the PE program into existing structures and networks of the organization, the follow through and internalization of these opportunities were not made and the program continued to exist superficially within these formal structures.

Analysis of the events classified in each classification system frame revealed a series of themes. The structural frame revealed three themes focused on the program opportunity within that frame. The frame trend was observed as negative as two of the three themes were negative relative to the program opportunity of the frame. The program opportunity for the frame was to align PE program with business strategy and formalization and the only positive theme reflected the development of a terms of reference document for the ET. The two negative themes were based on events whereby decision making power within the ET was closely held by management representatives on the committee and responsibilities of the ET worker representatives were withheld, showing deviation from the SafetyNet PE program framework.

Table 4.2: Management Practices Observation Classification Results

Classification Code	Code Description	Positive	Negative	Δ
1.0 Structural Frame				
1.0.1	Policy Development	1	0	1
1.0.2	Program Development	3	6	-3
2.0 Human Resources Frame				
2.1 Relationships	Leader/member exchange quality	0	3	-3
2.2 Communication				
2.2.1	Feedback/verbal support	0	1	-1
2.2.2	PE Awareness Building	5	7	-2
2.3 Leadership				
2.3.1	Accountability	0	4	-4
2.3.2	Leadership Style	0	4	-4
2.3.3	Program Ownership	2	2	0
3.0 Political Frame				
3.0.1	Time/Production Compromise	0	4	-4
3.0.2	Resource Allocation	1	1	0
3.1 Networking				
3.1.1	Existing Network Utilization	1	9	-8
3.1.2	Network Development	1	3	-2
4.0 Symbolic Frame				
4.0.1	General Organizational Climate	0	5	-5
4.0.2	PE Specific Perceptions/attitudes	1	3	-2
4.0.3	Organizational Culture	3	2	1
Total Observations	46	18	31	-13

The Human Resources frame revealed an overall negative frame trend based on 5 negative themes relative to four program opportunities. The opportunities revealed the potential within the PE program framework to stimulate organizational communication and relationship building as part of PE and ET activities. The negative themes resulting from the events within this frame highlight that relationship building between ET worker and management representatives was challenged by pre-existing relationships. In addition, a theme emerged whereby the communication plan developed to engage the plant and stakeholders in early PE program activities was underutilized and a communication breakdown occurred between floor level supervisors and the ET when it

came to PE activities and volunteer workers for participation. The final theme revealed that ET management representatives utilized the PE SafetyNet framework in a transactional sense to move through the steps of the interventions, but ET worker representative were a barrier to momentum.

The Political frame produced an overall negative frame trend as all three of the themes observed were negative in relation to the program opportunity. One of the themes observed the under utilization and development of the networking strategy identified by the ET, as well as the development of an informal network between an ET management representatives and upper management in an effort to include UM on ET recommendation development process. The final theme showed a potential symptom arising from this insufficient communication through repeated under commitment to the PE program and ET activities by front line supervisors as they used production as reason to deny worker volunteers the right to participate on the program.

The Symbolic frame overall produced a negative frame trend, whereby two four themes were developed relative to two program opportunities. The program opportunities were entrenched in the reciprocal and mutually beneficially relationship between organizational culture on the PE program. Two of the four themes in this program opportunity revolved around pre-existing negative perceptions workers held about the organization and management. The last negative theme observed was that of upper management as they make comments which "normalize" the lack of front line supervisory commitment and participation in the program.

These themes closely tie to that within the political frame as they reflect on the status quo of the organization whereby production takes precedent over other expectations and it is expected that front line supervisors will make decisions based on this norm. The only positive theme observed in relation to the program opportunity of using organizational culture to enhance the uptake of the PE program was relative to the union President voicing their desire to actively engage the ET with the union through the program.

Table 4.3: Classification System Program Opportunities and Themes

Frame	Program Opportunity	Event Themes Observed	Theme Trend	Frame Trend
Structural	Align PE program with business strategy and formalization	Documentation prepared to address ET as a committee	+	-
		ET Mgt Reps deviated from PE framework for convenience	-	
		ET decision-making power retained by ET Mgt Rep 1	-	
Human Resources	Use PE program to enhance relationships with workers	ET relationships negatively influenced by previously established relationships	-	-
	Use communication strategies to promote PE program	PE internal communication strategy insufficiently used/implemented	-	
	Use PE program to enhance worker/supervisor communications	Communication breakdown between ET Mgt Reps and floor level supervisors	-	
		ET Wkr Reps dissatisfaction with PE program communication with ET Mgt Reps	-	
	Use PE program to demonstrate leadership	ET Mgt Reps use transactional approach to working with ET Wkr Reps	-	
Political	Demonstrate PE program comm	Production repeatedly "trumped" worker time for PE and ET activities	-	-
		PE internal networkling strategy insufficiently used/implemented	-	
		Development of informal network between UM and ET Mgt Rep for UM involvement in recommendation development	-	
Symbolic	Use organizational culture to enhance uptake and participation in PE program	PE program resistence by floor supervisors 'normalized' by UM, reinforcing inconsistent commitment to PE program activities	-	-
		ET Wkr Reps hesitant to interact with UM as part of PE program	-	
		ET activity engagement of Union representative	+	
	Use PE program as opportunity to stimulate culture change	ET Wkr Rep commitment to PE program and possiblility of making changes in worker mindset about safety	-	

4.2 Perception Questionnaire Results

Not all of the members of these groups completed and returned the questionnaires. Table 4.4: PE Perception Questionnaires Submitted summarizes how many of each group completed the questionnaires for the interventions. Some questions also provided a

comments section to allow respondents an opportunity to elaborate on the rationale behind their answers. The questionnaires were made up of 4 question categories: leadership, communication, networking and program sustainability. The results of the questionnaires presented in these categories are discussed in 5.1 Management Practices Observations Classification System.

Table 4.4: PE Perception Questionnaires Submitted

Participants	Questionnaire Round 1	Questionnaire Round 2
UM	2 / 3	3 / 3
ET Mgt	3 / 3	2 / 3
ET Wkr	2 / 2	2 / 2

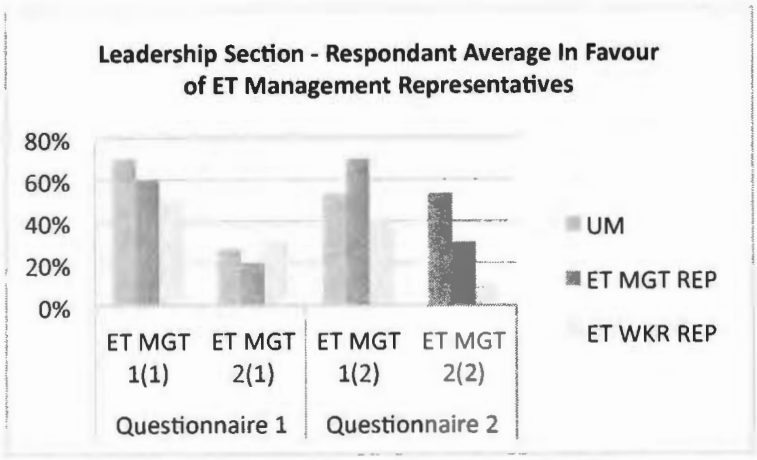
4.2.1.1 **Leadership**

The results of the average response rate from each PE stakeholder group indicates that ET Mgt Rep 1 was perceived to be the primary leader by all three groups during intervention 1 compared to intervention 2. These results are presented graphically in Figure 4.1:Average PE Stakeholder Group Response Rate for ET Mgt Rep 1/2. It is evident that a perception change occurred during intervention 2 as the second questionnaire demonstrates approximately 50% increase in positive response from the UM PE stakeholder group in favour of ET Mgt Rep 2 compared to the first questionnaire. Although the average positive response across all leadership questions by the UM stakeholder group was the same for both ET Mgt Rep 1 and 2 on the second questionnaire, the 50% increase in positive response for ET Mgt Rep 1 demonstrates a notable shift in perceived leadership. The exact opposite trend was shown in the data

whereby the ET Wkr Rep respondent group decreased by more than 50% in favour of ET Mgt Rep 1 from questionnaire 1 to 2.

Detailed responses from the questions in this section individually offer some insight into this observed trend. Question 2 inquired about the perceptions of stakeholders about who "acted as the main leader" for the ET. Both UM 1 and ET Mgt Rep 2 reported the main leader to be ET Mgt Rep 1 for both interventions. ET Wkr Rep 2 reported that ET Mgt Rep 1 was the main leader for the first intervention and changed to ET Mgt Rep 2 during the second intervention. UM 3 did not complete questionnaire 1, on the Questionnaire 2, UM 3 responded ET Mgt Rep 2 for all leadership questions. UM 2 and 3 offer a production perspective and UM 1 takes a more administrative approach as they are direct reflections of their organizational roles and the informal network developed with this ET management representative and upper management. This may suggest why ET Mgt Rep 1 was perceived as the main leader for Intervention 1, due to the confirmed perception of having completed more transactional ET leadership activities as found in question 1; while the main leader emerged as ET Mgt Rep 2 during intervention 2 due to having demonstrated more action oriented and operational activities during Intervention 2.

Figure 4.1:Average PE Stakeholder Group Response Rate for ET Mgt Rep 1/2



4.2.1.2 **Communication**

Due to the misinterpretation of the questions in this section of the questionnaires, the results will not be presented for later discussion and interpretation within this study. However, communication behaviours and interactions between stakeholder groups and other organizational groups were evaluated in the next section.

4.2.1.3 **Networking**

The 7 networking questions asked to ET Mgt, Wkr Reps and UM yielded positive responses from all PE program stakeholders across all questions and questionnaires except in the case of ET Mgt Rep 1 and ET Wkr Rep 2 in one area. ET Mgt Rep 1 responded on questionnaire 2 with the answer "no" when asked if the OSH Committee was "regularly and appropriately involved in the PE program". This perception was mirrored by ET Wkr Rep 2 as they indicated that the union, line supervisors and upper management were not regularly and appropriately involved in the PE program and that they did not think the union was important in the PE program overall.

4.2.1.4 **Sustainability of Change**

The questions in the sustainability of change category requested qualitative responses from respondents. Respondents were grouped in themes where commonalities existed. The themes used to summarize the responses provided by the PE program stakeholders can be viewed in Table 4.5: Sustainability of Change Question Themes.

Table 4.5: Sustainability of Change Question Themes

Sustainability of Change	UM	ET Mgt Rep	ET Wkr Rep
What do you think was the biggest challenge to daily PE activities as faced by ET?	Scheduling and conducting PE and ET activities in the face of operational demands		
What do you think will be the biggest challenge in the year to come for daily ET activities?	Project selection and successful completion		Building on ET knowledge
What do you like about being on the ET?		Increase sphere of influence	
Were ET representatives given the responsibilities and control over ET activities that were described in the initial PE team training			No theme identified
Do you think ET worker representatives have obtained the knowledge, skills and power to sustain an ergonomics program without regular help from outside ergonomist?			No theme identified
Do you think the ET worker representatives have the ability to plan and coordinate ET activities without management?			No theme identified
Was the ET provided with sufficient information about ergonomics and traning to carry out hteir activities during the interventions?			Sufficient Training Provided

The themes identified reveal that all PE program stakeholder groups recognize the challenges with scheduling and organization ET activities, however the theme identified for moving the major challenge moving forward reflects the perceived abilities and competencies of the ET to use their knowledge base to carry out interventions to completion. The last four questions were asked to ET Wkr Reps only of which 3 questions did not reveal a theme due to conflicted responses from the representatives. In the absence of a theme, an noteworthy comment was made by ET Mgt Rep 1on Question #20 which asked if they feel they have "*...responsibilities and control over ET activities that were described in the initial team training*". ET Wkr Rep 1 replied "no, no control

over ET activities, no control to act, just opinion", whereas ET Wkr Rep 2 simply answered "Yes". The last question reveals that both ET Wkr Reps felt training for the ET was sufficient, suggesting that this perceived lack of control may be reflected in the execution of the ET activities and intervention, not the PE framework or training provided.

5 Discussion

5.1 Management Practices Observations Classification System

The events categorized using the management practices observation classification system have allowed the development of prevalent themes and discussion points for discussion and interpretation in the context of this case study and for future research using the SafetyNet PE framework. These discussion points are presented relative to the frame within which the events and themes were categorized.

5.1.1 Structural Frame

The predominant program opportunity within this frame was to align the PE program with business strategy and formalization. Although several opportunities were encountered to formalize the PE program into existing structures and networks of the organization, the follow-through and internalization of these opportunities were not made and the program continued to exist superficially within these formal structures. One such example was during Intervention 2 whereby program development was crucially impacted when ET Mgt Rep 1 made the decision on behalf of the ET not to train another ET management representative before the university researchers would withdraw from the future ET activities. Although it can be said that ET management are the mobilizing cog of the ET in terms of engagement and mentoring of worker representatives on the team, they were observed as allowing minimal program ownership opportunities for the ET worker representatives to exercise their roles on the ET. However, this recommendation was not acted upon and ET Mgt Rep 1 did not initiate the review of the

mandate or handover of roles and responsibilities to workers as required by the PE model implemented.

Middle management continued to dominate the program and the intervention progress, but much of the decision-making power was maintained by one individual ET Mgt Rep 1 who often acted outside of the SafetyNet PE framework and recommendations of university researchers. This finding is significant in terms of the ability to maintain the program after the study period and develop disseminative capacity within the organization as this individual was the liaison between all ET networks.

5.1.2 **Human Resources Frame**

The program opportunities within this frame were driven by the fundamental elements of social exchange whereby relationships are enhanced through communication and leadership. Unfortunately the observed events within these themes contributed to an overall negative frame trend deeply rooted in communication and leadership deficiencies as worker representatives were negatively impacted by minimal communication by ET management representatives

5.1.2.1 **Relationships**

The themes within this frame made it evident that worker representatives were fully aware of the approach taken by management on the ET and had experiences with middle management prior to the program which established a less than ideal working relationship. An event observed in this frame includes comments from ET Wkr Rep 2 whereby they voiced the distrust held by workers of middle management. Another observed event in this frame at the end of Intervention 2, where worker ET

representatives were not invited to attend the meeting for the ET to present Intervention 2 recommendations to upper management for consideration and implementation. This activity and approach for recommendation development and approval was not a part of the SafetyNet PE framework, and worker representatives were upset, further impacting the relationships between ET worker representatives and management members. This observation is also supported by the results of the second perception questionnaire question #20 whereby ET Wkr Rep 1 responded to the question *"were ET representatives given the responsibilities and control over ET activities that were described in the initial ET team training"* with the response "no, no control over ET activities, no control to act, just opinion". Ultimately it appeared as though the transactional nature of the tasks on the ET that were given to the worker representatives contributed to their overall perception of not having control over their work activities and the changes recommended through the ET and PE program.

5.1.2.2 **Communication**

The observed theme for this aspect of the frame reflected use of communication strategies to promote the PE program. Communications between the ET and upper, middle and floor level management, as well as organizational stakeholders were generally unidirectional; the majority of PE-related communications were originated by ET management. It was found that the ET management representatives did not effectively utilize the initial PE program communication strategy recommended by university researchers and ET communications were predominantly through e-mail correspondence. This is known as university researchers were copied on internal e-mail communication

activity. Worker representatives on the ET were not informed of upcoming ET activities through e-mail, and were often out of the loop in terms of ET activities and intervention status. This lack of knowledge about daily ET activities was confirmed in the worker version of the perception questionnaire about their opinion of whether ET recommendations will be effective. ET Wkr Rep 1 responded on this questionnaire by saying "changes?...what changes? We never did follow up". This may have negatively influenced the ability of the ET to promote PE awareness within the plant and subsequently affected program buy-in at the plant level previously discussed. The feeling held by ET worker representatives that they are "out of the loop" may have contributed to the lack of trust between them and middle management, including those on the ET. This is confirmed through one of the observed events within this frame whereby ET Worker Reps shared their dissatisfaction with being uninformed about the intervention status. ET Wkr Rep 1 regularly voiced dissatisfaction with the communications between management and the worker representatives on the team with regards to the program and the activities they are engaging in outside of ET specific meetings. ET Wkr Rep 1 shared the following comment with university researchers during the study period that expressed their dissatisfaction with the level of communication with ET management about status of the interventions; *"I hear the negative feedback from workers on the floor about the project and I want to share the positive things that are happening, this is why we (ET Wkr Reps 1 & 2) need to know what is happening"*. Restricting the program communication to a unidirectional, one point of contact strategy may contribute to limitations in the social and knowledge transfer capacities

The analysis of the communication strategy revealed that communication with PE program stakeholders outside of the ET was inconsistent and the degree to which each member of the UM stakeholder group were included in correspondence through email communication was not governed by any specific approach or guideline. This is important as e-mail was the primary means of internal program related communication. E-mail communication and distribution was inconsistent and created a situation where certain individuals such as UM 3 were not regularly included in PE communication through e-mail. This challenge with ensuring all program stakeholders were informed of program activities may have been related to the lack of clarity of stakeholder roles and responsibilities as part of the program. It is unrealistic to expect all stakeholders to be "copied" on all program-related correspondence and therefore the absence of this clarity allowed the decision to be at the discretion of the sender, usually ET Mgt Rep 1. Knowing what type of communication or topic of the communication each stakeholder has interest or responsibility would have improved the ability for the ET Mgt representatives to consistently inform and communicate with internal stakeholders and keep them engaged in program activities throughout the study period.

5.1.2.3 **Leadership**

The observed theme for this aspect of the frame reflected the use of the PE program to demonstrate leadership. Leadership roles in the PE program were assigned to ET management members in terms of their organizational roles. It was assumed that the Mgt Rep 1 would coordinate ET related activities due to their administrative role in the organization, and (ET Mgt Rep 2) would implement recommendations found in each

intervention due to their operational role. This is supported by comments section of UM 1's Intervention 2 questionnaire, where it was noted "one person needs to be the contact person (for the ET), and that is most appropriately held by ET Mgt Rep 1, our H&S coordinator", and "ET Mgt Rep 2 would have more knowledge and contacts with production, as to better intervene with production supervisors...". This arrangement decreased the visibility of ET activities and enforced that the program was management driven.

ET Mgt Rep 1 participated in other committees and attended meetings whereby there were the designated liaison and the PE ET representative. PE was included as part of an agenda for all networking groups, however minutes of these meetings suggested no positive PE or ET related conversation, outcomes, action items, takeaways or further opportunities for networking or communication. Instead the PE information was transactional in nature; it remained unidirectional without engaging the groups at the meeting and did not require their involvement or action after the meeting adjourned. Given that ET Mgt Rep 1 was most commonly the liaison between the ET and the networking groups, they are responsible for ensuring a meaningful network is maintained. The lack of engagement and outcomes throughout these networks was the rationale behind assigning negative status to the observed events in this frame. This missed opportunity to enhance generative and disseminative capacity may be a symptom of the personal leadership style used by ET Mgt Rep 1.

This leadership approach was reinforced and shown to be supported by upper management. UM 1 was observed and quoted in the study field notes saying "Asking

people nicely doesn't always work" during an upper management meeting as they discussed challenges faced during the intervention. An individual with a transactional leadership style often will use tell-assertive communications (Clarke & Ward, 2006), and therefore this statement suggests that this member of upper management has adopted this ineffective means of leadership when working with the ET and reporting employees. During Intervention 2, a front line supervisor also demonstrated a transactional approach to implementing an ET recommendation to improve communication between front line staff. This event was about the fact that the supervisor controls the belt speed and drop of product at the A bind station through the use of a handheld radio process with floor staff. There was a recommendation that originated with the worker volunteers during Intervention 2 that workers would be provided with a stop button to have control over the drop of product as required. When this recommendation reached ET management level this was not considered an option given the requirements for production as well as expressed management distrust in workers to use this option properly. The ET decided to change how the radio communication process would be used to allow those on the front-line to interact with the supervisor in control of the belt drop speed. Because of some of the history and lack of trust between front line staff and management, a degree of frustration at implementing the new process was detected in the words of the front line supervisor when they were tasked with implementing the change process and informing staff. Upon follow up it was found that the front line supervisor who was tasked with implementing the change was frustrated with the decision, frustrated with historical implications of this recommendation and had used a transactional tell assertive approach

to inform the employees in how to use the radios. This approach not only appeared disrespectful given the recommendation made by the ET, but it also was not effective in helping them understand how it would allow them achieve what they initially asked for during the intervention interview process; better belt speed management in times of heavy product drop and back up. It was unfortunate that the approach of this front-line supervisor and the leadership style used to implement this recommendation impacted the perceived credibility of the PE program and the ET solutions for the intervention. The other floor level supervisor's negative observation in 2.3.2 had to do with PE volunteers from participating in scheduled activities due to short handedness on the floor.

This frame revealed that ET management representatives were deviating from the SafetyNet PE program framework. It was observed that ET management representatives completed activities typically completed by ET worker representatives such as drafting potential solutions for the intervention and sharing them with engineering and maintenance for preliminary analysis as well as having them reviewed with other stakeholders for implementation consideration. This deviation from the framework is possibly a symptom of the challenge with having workers relieved from the floor for ET activities, but it may also be due to the lack of perceived importance for ET worker involvement in PE activities and recommendations.

5.1.3 **Political Frame**

The nature of the observations in this frame suggests that management made decisions in favour of production when a compromise was required between PE ET activities and managing production-line output. This evaluation is in relation to floor

management demonstrating resistance to facilitating a relationship between the ET and floor management. Specifically when ET worker representatives or PE volunteers were required to be relieved from regular duties for PE related activities, floor management did not appear to cooperate. This observation can be associated with the insufficient use of communication and networking strategies as stakeholders at all levels including front line supervisors did not fully understand the impact the program on their day to day operations. As a result, it is not surprising that they were observed making decisions in favour of production in the face of a conflict, as they did not realize they were responsible under this program to fulfill this commitment. Observations coded under 2.3.2 Leadership Style also suggest that ET Mgt Rep 1 felt as though they were often left with their hands tied when it came to moving interventions forward by not having access to worker representatives and volunteers to carry out their roles and responsibilities. As a result, the university researchers observed PE activities that did not follow the PE framework and required protocols initially proposed for implementation, but instead a framework emerged that reflected personal decisions and opinions of ET Mgt Rep 1.

5.1.3.1 **Time/Production Conflict**

From the very beginning of the PE program, a sense of union/management misalignment and competing time versus production priorities which impacted the ability for plant workers to participate in the PE program and intervention activities. During the ET training session ET Wkr Rep 1 offered a comment which summarizes much of what will be discussed in this category. ET Wkr Rep 1 said "if there was a problem involving production, it would be fixed immediately, but the comfort (of employees at work) is not

a priority, even if that means there is an ergonomic issue....maintenance doesn't even have time for preventative maintenance..." This comment was the first observed event under 3.0.1 and it reflects the perception held by workers that the priorities at the upper and middle management level were production and that essentially the expected level of support for the program from middle management will be in line with this priority.

The remaining observations were a direct example of the concerns above, whereby the inability to relieve ET worker representatives was a barrier to completing ET activities under the PE program. A comment captured in this category made by ET Mgt Rep 1 reflected that the challenges experienced with having workers relieved for ET activities also translate into other aspects of health and safety training. ET Mgt Rep 1 said, "They wonder why it takes so long to get training done, people aren't relieved". Clearly the challenge is not specific to the PE program and ET activities, but instead is a part of the larger organizational culture regarding how priorities are established.

Some of the negative events observed with respect to the leadership behaviour of ET Mgt Rep 1 may be a by-product of the frustration experienced when attempting to organize and execute ET activities when also faced with the demands imposed by floor level management. ET Mgt Rep 1 was observed and documented in the field notes making a comment that reflected a manager feeling isolated and unsupported in their role on the ET. The comment was "If I were to leave this project, it would not exist any longer". Ultimately this feeling of isolation is a by-product of not having the floor level support when needed to have the ET worker representatives and volunteer relieved. In addition, reflecting on the negative events observed under the Human Resources Frame

code 2.2.2 Communication as well as the findings in section 4.2.2 whereby the internal PE communication strategy was abandoned. It can be said that if floor level management better understood the expectations upon them and the implications of ET activities on production a solution may have been found early in the program for relieving workers from the floor for PE activities.

5.1.3.2 **Resource Allocation**

Resource allocation is part of the political frame whereby PE stakeholders will be required to make decisions around resource allocation and competing priorities. Although not classified as a specific event within the program, it's important to recognize the broad initial financial resource commitment from upper management to engage the University Researchers and introduce a PE program and the administrative resources provided to establish the ET.

The only observed positive event in the resource allocation (code 3.0.2) had to do with the effective use of internal human resources when engineering and maintenance became involved in Intervention 2 during the preparation of recommendations to upper management. These stakeholders were used in the intervention to prepare a cost analysis of the draft solutions for ET and upper management consideration. The negative observed event under resource allocation (code 3.0.2) had to do with an action by upper management which reflected the initial commitment made to the PE program and ET. After Intervention 2 solutions were prepared by the team and evaluated for cost by the maintenance department, upper management gave the go ahead for the team to make a decision on which of the two recommendations to implement and it would be executed.

Although this appeared to be a substantial level of support and autonomy for the ET, the negative observation in this category reflects a means through which UM were able to influence which solutions were abandoned early in the process to ensure they were not presented for consideration at all. Throughout the study period ET Mgt Rep 2 unofficially floated between two positions, upper management assistant production manager and middle management as a production supervisor during the course of the study period. The perception questionnaire results found in section 5.1.2.3 Leadership described that ET Mgt Rep 2 appeared to have been perceived as more of a formal leader during the second of the two interventions. This change in leadership behavior may reflect the hands-on or action oriented approach taken by this ET management representative towards the end of Intervention 2 while still acting as a production supervisor in middle management. However, the political observation in this frame found that the level of activity by this ET member demonstrated at the end of Intervention 2 was intended to inform upper management of the costly implications of the ET's draft recommendations prior to the release of the ET report to management. Although ET Mgt Rep 2 clearly demonstrated leadership on the team and helped maintain momentum of ET activities, it's clear that they continued to think in terms of management resource allocation and implementing the developing intervention solutions from an UM perspective and deviated from the PE framework for proposing solutions and recommendations. This deviation from the PE framework also served to undermine the ownership and empowerment behind the recommendations made by the ET at the time they were presented to upper management for consideration, given that the highest cost option had been abandoned. Overall, time,

production and resources were observed as taking priority over ET activities and PE program needs.

5.1.3.3 **Networking**

The Networking code (3.1) includes the following subsections: Existing network utilization (3.1.1) and Network Development (3.1.2). In total, there were 2 positive events and 14 negative events. Both the external and internal network groups were found to be utilized irregularly and ineffectively.

The positive events observed when PE became a regular agenda item on the senior management safety meetings. On this committee ET Mgt Rep 1 and UM 1 represented the ET. Through ET Mgt Rep 1, updates on the PE program were given to upper management to be shared with other upper management members for the purposes of engaging this stakeholder group. However, whether the information was indeed relayed to those absent from the safety meetings is questionable and cannot be confirmed as meeting minutes for the senior management meetings were not consistently provided to university ergonomists and dissemination of the minutes within upper management was not observed.

The negative events observed in Existing Network Utilization reflected the fact that the strategy for utilization of network opportunities was determined prior to program implementation but not properly used. These networks were established upon program launch and PE was added as a regular item for business discussion, but was not maintained throughout the course of the program nor was the network utilized to add

value to the program objectives and intervention solutions. Instead, much of the program communication through these networks was driven by ET Mgt Rep 1.

Meetings with the OHS Committee and the Union were originally included in the internal PE communication and network strategy to ensure this group was regularly updated and engaged in the PE program. The first meeting was held early in the first quarter of year 1 and included ET representation from worker and management. Union involvement was irregular throughout both interventions. During Intervention 1, the OHS Committee did not participate or volunteer causing the Union to be unrepresented in the volunteer pool. This eliminated the Union from Intervention 1 until the final report was presented at the upper management meeting where Union representatives were in attendance. ET worker representatives were told, after the intervention was concluded and by a union worker who attended the meeting, that the lack of union involvement in the intervention was unacceptable. The poor utilization of this network may have manifested further resistance to the program's progress and a reduced social network between PE stakeholders. Over time it was observed that the network opportunity to use union meetings to maintain awareness off ET activities was underutilized. Initially the ET decided to use this as an opportunity to introduce the PE program, project and ET to the union. Unfortunately this opportunity could not be accommodated due to full agenda and fears that the proposal would not be well received. The opportunity was rescheduled and occurred two weeks later where ET Mgt Rep 1 introduced the university researcher to the group and against the recommended method of delivery, ET Mgt Rep 1 asked the university researcher to give a briefing of the program scope and framework. There were

no questions from the Union and it was observed that there was a clear lack of interest in the PE program early on in the study period. The remaining negative observations reflect the scheduled meetings with the outlined network groups whereby the meeting minutes reflect insufficient utilization of that opportunity.

Observations under Network Development found 1 positive event and 3 negative events. The positive event reflected the network developed between the ET and maintenance and engineering to work on solution development for ET interventions prior to presenting them for consideration at the upper management level. This increased the credibility and perceived competency of the team and also increased efficiency of the intervention recommendation process. In terms of the negative events observed, one had to do with an opportunity to engage the union early in the PE program and provide an ET update. ET Mgt Rep 1 invited university researchers and insisted that a program overview and ET update be provided by researchers themselves. This approach was taken but observed as being a step back from engaging the union members in the team and taking the ownership needed to inspire other stakeholder groups to become involved.

The next negative event had to do with the development of an unofficial network between the ET and upper management despite having already established a network through senior management meetings to provide regular updates. PE was a regular agenda item for the senior management meetings, however as discussed the extent to which PE issues were discussed was rudimentary. As a result of insufficient information and depth provided to upper management of PE status and ET activities, informal communications between ET Mgt Rep 2 and upper management were thought to have occurred between

ET Mgt Rep 2 and UM 3 through their reporting arrangement and working relationship. This network has been discussed throughout this chapter as having an impact on other aspects of management practices. As a result, ET Mgt Rep 2 was told to divert attention away from the high cost, larger organizational design issues, and instead focus on micro-level changes. During report finalization meeting with the ET, ET Mgt Rep 2 said "there are reasons that cannot be discussed here regarding why the initial larger problem exists and can't be addressed right now". This management representative was told to address the A bin design only. ET Mgt Rep 2 also presented management with an ET recommendation without using the PE process and instead used an informal approach that confirmed the relationship or network established between ET Mgt Rep 2 and UM for the purposes of engaging UM at a stage of the intervention where the PE framework does not require their participation. ET Mgt Rep 2 felt that the cost analysis could be done "off-line" sent for informal review before the report was finalized and put through the ET report and recommendation process. This informal networking brought on by a change in reporting structure is thought also to have impacted the participation and engagement of upper management with the ET.

The last negative event observed in Network Development (code 3.1.2) had to do with the finalizing of Intervention 1 recommendations and reports and the opportunity to present findings to the OH&S Steering Committee. ET Mgt Rep 1 voiced unwillingness to engage in this network to present findings and required persuasion from university researchers to remind them of the importance of open communication and transparency in ET activities and intervention outcomes.

The negative observations in this frame reflected the challenges faced by the ET in developing a participatory environment for stakeholder engagement in program activities when ET management representatives hold all of the program decision making authority and do so without considering or perhaps fully understanding the goals of the program itself.

It was observed that the identified networks were under utilized to ensure program activities were embedded in various levels of the organization. The Union meetings were originally included in the networking strategy to ensure regular PE program updates and union-management alignment in implementing recommendations as they are presented by the ET. The first meeting was held early in the first quarter of year 1 and included ET representation from worker and management. Union involvement was irregular throughout both interventions. During Intervention 1, Union was not represented in the volunteer pool as they did not come forward to participate. This eliminated the Union from Intervention 1 until the final report was presented at the upper management meeting where Union representatives were in attendance. ET worker representatives were told at the end of this meeting by a union worker in attendance that the lack of union involvement in the intervention was unacceptable. The poor utilization of this network opportunity may have contributed to further resistance to the program's progress within Intervention 2. Senior management meetings were attended by ET Mgt Rep 1 who represented the ET and provided a program update. Although PE was a standing agenda item for this meeting, the extent to which PE issues were discussed was minimal and there were no observed senior management activities resulting from these meetings.

In addition to these strategic networks, one significant network developed spontaneously. During Intervention 2, ET Mgt Rep 2 developed an informal network with upper management member UM 3, whom had appeared to become formally uninvolved in ET activities. Due to the change in organizational role of ET Mgt Rep 2 between assistant production manager and production supervisor during the study period it was observed that an informal program network had occurred between the ET and upper management. While upper management is not included in the recommendations development process of the intervention, a network developed which provided an opportunity for upper management to learn what recommendations were materializing as a result of the intervention and to anticipate what they will require from a resource perspective once the ET put forth their report for management consideration.

The significant event which suggested this network was observed during Intervention 2. During a meeting to finalize intervention recommendations with the ET, ET Mgt Rep 2 made a comment which suggested that the team should abandon one of their recommendations in favour of another as the [issue] "...can't be addressed right now". ET Mgt Rep 2 also requested to have recommendations informally presented to upper management where cost analysis could be done "off-line" for informal review before report was finalized and presented to upper management. Although it may not have been the intention of this network, it is thought that the network was used during Intervention 2 to divert attention of the ET away from more costly solutions using the voice of ET Mgt Rep 2 prior to the final ET meetings where recommendations are presented to UM.

Although PE was a topic of discussion at the tables of the meetings with identified stakeholders, the consistency, quality and action which came out of these activities was transactional in nature and did not produce meaningful contribution to the program overall. The networking strategy established was largely underutilized and the ability to engage stakeholders in the strategy may be due to a lack of their understanding of their program roles and responsibilities.

5.1.4 **Symbolic Frame**

This frame focused on two reciprocal program opportunities whereby the PE program could be impacted by the existing organizational culture and vise versa. The negative observations within this frame are a result of certain stakeholders failing to promote change through the PE framework, but also symptoms of the current state of the organization upon program implementation. The positive theme was relative to the recognition of the current state of the organizational culture. The general organizational climate reveals a state whereby ET worker representatives are holding on to past negative experiences with management and allowing that to influence their perceptions/beliefs about the PE program. Although the organizational culture reveals constraints in terms of working relationships between groups and a production focused value system, it is evident that the recognition of the current state exists among workers and PE program stakeholders and desire for change is present.

5.1.4.1 **General Organizational Climate**

The observations in General Organizational Climate were each of comments made by plant workers during ET activities which suggested beliefs held of the organization in

terms of their commitment to the program or to safety in general. As was observed and presented in the Political Frame when production operations and PE program activities were in conflict for time and human resources, floor level management was uncomfortable manipulating production operations to accommodate the ET activities because upper management support was not clear. This is unfortunate for buy-in of the program at the plant level as it has been found that floor level management have the greatest influence on perceptions of employees (Dixon, Theberge, & Cole, 2009). ET Wkr Rep 1 was documented in the field notes saying "other than our ET sessions, I see no evil because I'm a line worker and management involvement after our [ET] session is over is a mystery to me", and "workers don't believe that things will be seen to their end". Worker perceptions of management indicate a history of transactional leader-member exchanges, and un-met psychological contracts.

One of the themes of this frame reflects that resistance to the PE program by floor supervisors was 'normalized' in that it was not surprising to upper management that floor supervisors did not fully commit to the program due to competing priorities and responsibilities during day-to-day duties. This observation and resulting theme is supported in their response on the perception questionnaires after Intervention 1. UM 1 was asked whether they felt line/department supervisors and lead hands were well informed about Intervention 1, and their response was "Yes, I believe so, but ergonomics is merely one of their responsibilities, so sometimes it's a juggling act to commit to all initiatives as they'd like to". This suggests that UM 1 recognizes that floor level support was lacking, and that this can be attributed to their organizational roles being of equal or

greater importance than their participation in the PE program. As a result, poor perceived organizational support exists for the program and other safety-related activities.

5.1.4.2 **PE Specific Perceptions/attitudes**

The observations in PE Specific Perceptions/attitudes (code 4.0.2) included a positive observation whereby ET Wkr Rep 1 made a comment which suggested they fully understood the impact of leadership behavior on workers and the impact on the PE program. The first negative observations for code 4.0.2 reflect resistance by ET Mgt Rep 1 to follow the PE framework due to the personal belief that management should take part in intervention interviews with plant member volunteers despite the PE program confidentiality requirement between these volunteers and ET worker representatives. The remaining 2 negative observations reflected comments made by ET Mgt Rep 1 I their dissatisfaction with the PE program in terms of the dependence of the program success on their participation. In the meantime, ET Mgt Rep 1 did not demonstrate trust in the PE framework from the onset of the program. They were dissatisfied with the framework, and requested that the protocols for carrying out ET activities be such that management representatives on the team are allowed to interact with volunteer workers during video analysis and interviews. ET Mgt Rep 1 felt that not allowing management on the team to do so is "old school" thinking that fosters distrust between management and workers. Given the personality and beliefs of this individual, having structured the team such that all decision making and ET activities were controlled by this one individual may have compromised the ability of the program to become entrenched in business processes through leadership, communication and networking was a fail from the very design.

Although upper management commitment was made, their perceived involvement and role in the program was purely transactional.

5.1.4.3 **Organizational Culture**

The positive events under this aspect of the frame reveal the recognition workers and stakeholders had in relation to the challenges they face within their organization. Worker representatives made observations about their culture which reflect their understanding of the participatory approach of the program and the value other stakeholders offer, and the president of the local union the reality that challenges with relieving workers from the floor may impact the recruitment of a strong ET. ET Wkr Rep 2 said that there needs to be a "will to change" instilled in employees to make the program work. This comment was made in a positive context whereby the worker saw the program as a means of promoting this change itself. The negative observations under code reflect comments made by ET worker representatives which reflect behaviours that happen at the front line level that are directly based on perceptions about the organization which have impacted the culture.

It is possible that the level of maturity within the organizational culture may have made the pure ET approach unrealistic for this organization to use at the onset of the program. Had an ergonomist driven approach been used at the point of program launch and throughout the training aspect of the program, it is possible that changes in micro levels of the organizational culture such as PE specific attitudes and perceptions may have been positively impacted, creating an environment where the ET could work together without historical events interfering with PE activities.

5.2 Developing KT Social Capacities Through Organizational Practices

Parent et al. (2008) discusses that organizational capacity for knowledge transfer relies on the context and a systems thinking approach of understanding the relationships existing within an organization. Within the DKTC Model for knowledge transfer, it is understood that social capacity is required for the dissemination, generation and utilization of knowledge.

Communication, leadership and networking are social exchange based management practices make up organizational culture and impact the performance of that organization. These management practices are the foundation for building the social capacity needed for KT to be efficient. The organizational perspectives which contain these management practices have been deemed to impact one or more of the DKTC social KT capacities as outlined in Table 5.1: Developing Social Capacities Through Organizational Practices. It's the functioning and maturity of each of the organizational perspectives that will create a holistic systems approach to developing sound management practices and social capacities required for KT.

Table 5.1: Developing Social Capacities Through Organizational Practices

	Social KT Capacities			
Organizational Perspectives	Absorptive	Disseminative	Generative	Adaptive/Responsive
Structural				
Human Resources				
Political				
Symbolic				

The Structural Frame observes the organization in terms of the processes, structure and policies which set the conditions for organizational behavior (Bolman &

Deal, 1992). It is said by Parent et al. (2007) that KT requires an organization to be able to contextualize and adapt and diffuse knowledge through complex systems as well as they must be able to improve that knowledge or process using the disseminative and generative social capacities respectively. It is interpreted that management practices observed within the structural frame are representative of these social capacities. Given that the Structural Frame (code 1.0) found a net number of negative observations, it can be said that management practices under this frame do not suggest a favorable absorptive capacity. The observations in this code confirmed this observation as ET management representatives disregarded the PE framework and developed their own strategy for completing ET activities. It is the combination of poor follow through on the strategy to build the structure, awareness and processes for PE to exist within the organization that set up the conditions through which ET management representatives were unable to follow the PE framework throughout the study period. Because of the inability of the program to become an integrated part of the overall business strategy and receive the commitment and support from stakeholders, it can be said that the organization will be unable to assimilate the new knowledge obtained through the PE program and entrench this knowledge in the operational environment in the long term.

The Human Resources Frame observed the organization in terms of the most basic elements of the interactions between individuals, and the development of relationships (Bolman & Deal, 1992). This frame observes the quality of these interactions and relationships and considers the degree of readiness for change within the organization. The management practices included in this frame were derived from basic social

exchange theory and are interpreted to impact the absorptive social capacity of the DKTC model by Parent et al. (2007). These social capacities allow an organization to recognize external knowledge and assimilate and apply it to relevant issues as discussed by Parent et al. (2007). This capacity requires trust between members, flexibility in the work environment and strong management support driven by accountability demonstrated through the fundamental management practices of leadership, communication and the relationships held between members. The Human Resources Frame (code 2.0) captured a total of 21 negative observations and 7 positive, given a net number of -14 observations. This finding suggests that the management practices built on fundamental social interactions and exchanges that are responsible for readiness for change and the susceptibility of new knowledge did not develop throughout the study period.

Given that the PE program activities themselves served as the opportunity to engage in PE-related interactions and exchanges between ET members, management and employees, it is of interest why this frame found negative observations. The literature has suggested that individuals will work and behave based on the roles that are expected of them within the organization (Graen, 1976; Katz & Kalm, 1978). The observations under this code indicate an overall lack of endorsement and formal integration of the PE program within the structures and systems as found and discussed under the Structural Frame (code1.0). The lack of endorsement at the upper management level suggested that commitment was insufficient to hold middle management accountable for their participation in the PE program. This lack of endorsement and accountability reinforces

why ET management representatives did not always demonstrate the behaviours expected by the PE Framework as well as those outlined within the Human Resources Frame (2.0).

Based on the Bolman & Deal (1984) organizational frames discussed and used to observe the opportunities to enhance the social linkages within the organizations were not properly engaged, such as a failure to demonstrate program leadership, ownership and accountability. Because of this failure to demonstrate commitment, it is possible that perceptions about program commitment were negative at the floor level. This is supported in the observation under the Political Frame regarding PE participants not being relieved from the floor for production purposes despite having scheduled ET activities. Because these social linkages and psychological contracts were not formed, middle management mobilization of the program was pushed along by ET activities that ultimately were used to maintain program momentum. This approach provided little opportunity to expand the participation and role of stakeholders within the program beyond the transactional ET activities that move the ET from beginning to end of an intervention. Ultimately it was the lack of clear stakeholder expectations, the lack of accountability for the program at all management levels and the underutilization of communication and networking which contributed to the negatives observations under the Human Resources Frame. Because of this insufficient readiness for change throughout the study period, the absorptive social capacity as identified in the DKTC model by Parent et al. (2007) was negatively impacted by the program.

The Political Frame observes the organization in terms of how decisions are made, the involvement of stakeholders through networking and their negotiation and

compromise of competing priorities and demands (Bolman & Deal, 1992). Much of the challenge with the political aspect of an organization is the ability to involve the right people at the right time to make the right decisions. According to Parent et al. (2007) social and technological infrastructure of communication is required in order to adapt and translate knowledge through complex organizational political levels. Because the Political Frame observes management practices through the context of political decision making at all levels, the observations made in this frame can be representative of the disseminative social capacity. The Political Frame (code 3.0) found 16 net observations which suggest that the management practices observed under this frame were not in favour of the PE program activities or outcomes. This frame contained observations from the study period which reflected that the PE program repeatedly fell second to other demands and priorities such as production. This frame also suggested that the networks established that were so critical to building the support and opportunities for collaboration and sound decision making were not consistently or effectively utilized. As a result of these findings the disseminative capacity or the ability to enhance the functioning of established networks was not positively influenced by these management practices.

The Symbolic Frame observes the organization in terms of the socially constructed interpretations held by members of the organization and the culture that is determined by these constructs (Bolman & Deal, 1992). Because this frame is focused on the culture of the organization, it can be said that observations are representative the organizations ability to recognize and discover new knowledge as well as its ability to

continuously learn and renew the knowledge. The social capacities which foster this kind of organizational behavior are generative and adaptive/responsive social capacities.

The Symbolic Frame (code 4.0) found -6 net observations which suggests this was not a culture prepared to be supportive of the PE program and its activities. The observations under this frame were a reflection of the general organizational climate of the organization, or the widespread beliefs held by workers and management about the program. Often these program related perceptions are formed over time due to historical events and observed leadership behaviors that suggest a lack of commitment similar programs.

The majority of the observations in this frame had to do with deviations from the PE program framework as well as the poor support for the PE program and its activities at the floor level. Although stakeholders were not formally held accountability to participate in the program as discussed within the Human Resources Frame (code 2.0), ET management representatives were still responsible to deliver results within the program and execute interventions and bring forward solutions. As a result, members of leadership on the ET were left to push the activities of the program to the organization, upper management and floor level management for ET activities requiring volunteers. Floor level management met this approach with much resistance each time ET members and participants were relieved. This resistance was also experienced at upper and middle management when financially demanding recommendations were anticipated from the ET Interventions. As a result, ET Mgt Rep 1 was in a situation responsible for maintaining momentum of the program, where the PE framework required cooperation and

involvement of these stakeholders, as well as buy-in from the ET worker representatives and floor level employees. It was this environment that encouraged ET Mgt Rep 1 to deviate from the PE framework and by-pass elements which are fundamental to the participatory approach to program implementation and to building the capacities needed to sustain the program over time.

The observations suggested that historical events have not been supported and have ultimately left a general organizational climate and culture which is resentful and pessimistic about new ideas and opportunities as they present themselves. Middle and ET management representatives were put in a situation where they had little support outside of the ET to execute activities and see follow through of changes, and therefore created a knowledge push scenario that was met with resistance and easily seen by those on the floor. This was interpreted as a lack of support for the PE program and ultimately it is possible that this program too was interpreted by employees as less than important to management. Without a culture that is accepting of new knowledge and ready to use it to make change, be accountable under the program and challenge the way things are done, the generative and adaptive/responsive capacities will not be optimal for effective KT.

5.3 Study Strengths and Limitations

With this study were some limitations experienced. In terms of the methodology, the perception questionnaires were designed to capture the perceptions held by ET members and management stakeholders at two precise points in time during the study period. Upon analysis of the communication section of the questionnaire results, it was evident that the time period within which respondents were meant to reflect and answer

the questions was misinterpreted. As a result, this entire questionnaire section was not included in the analysis and study findings.

The Management Practices Observation Classification system was designed to capture events observed by university researchers through various mediums. However, it is possible that events occurred without having been observed by university researchers. This classification system may be influenced by the Hawthorne Effect whereby observed events may reflect the fact that ET members and stakeholders behave in a manner while under observation that is consistent with the SafetyNet PE framework and university researcher expectations, but manage the program differently on a day to day basis. An example of such deviance from the expected behaviours would be the informal network developed between ET Mgt Rep 2 and upper management, which formed as a result of their day to day interactions with upper management in regular operations. This network was only observed as a result of a comment made by ET Mgt Rep 2 during a PE activity whereby university researchers were present.

The Management Practice Observation Classification System has been developed based on the theoretical organizational perspectives framework of Bolman and Deal (1984). This framework has not been previously used in the context of classifying and evaluating management practices and using the observations to reflect on changes in such practices. Based on the fact that university researchers only observe events for classification when they are informed, it is possible that much happens that may not be classified, and the events classified are also at the subjectivity of the university researcher. The reliability of this approach to observing and classifying management

practices can be improved through a revised Management Practices Observation Classification system whereby pre-determined events or activities are identified relative to the SafetyNet PE program framework. This would allow a more objective observation approach similar to the means through which Internal PE program communication and networking strategies were evaluated. The strategies were identified at the beginning of the program and it was objective whether they delivered as it was against a set standard of performance.

This limitation also reflects the strengths of this study as it demonstrates the early development of an approach at observing and evaluating the management practices that have been repeatedly linked to the limitations of a PE program implementation and its sustainability. With further development and refinement of this Management Practices Observation Classification System, research can begin to intimately understand the limitations of their PE Program frameworks and implementation approach, as well as provide precise performance indicators for program success. As organizations implement their PE program against these performance standards and meet pre established deliverables, it can be said that changes in management practices directly related to the program may be transferred into the larger organization and become a part of management practices in all aspects of the business.

5.4 Lessons Learned

Upon reflecting on the results and study strengths and limitations of the implementation of a PE program using the SafetyNet Framework in this case study, a number of lessons learned have been recognized.

The implementation of the SafetyNet PE program framework was repeatedly challenged by ET Mgt Rep 1 in terms of how and why the framework required certain approaches to carrying out the program activities, such as peer to peer interviews instead of being the role of ET management representatives. In the absence of a pre-program assessment of the organization, it is difficult to determine if an ET approach will be successful or whether a hybrid with other PE approaches should be considered. This case study may have experienced less resistance from the ET management representatives had there been an ergonomist driven approach used for the first few intervention projects in order to create a level of awareness and understanding in the framework and the stepwise approach to implementation among the ET. Instead of the university researchers merely observing the leadership, networking and communication management practices employed by the organization and key program stakeholders, they would have clearly identified how these practices could be used in relation to the program and the benefits that could be expected by following the recommendations. This approach would have allowed management stakeholders to understand the critical management practices that drive the participative approach of the program and are critical to program sustainability over time. At an appropriate time, the ET can be formed and supported in taking on their roles within the program by a third part ergonomist.

Despite the importance of developing in-house capacity to manage and sustain a PE program over time, the need for continued support by university researchers should not be disregarded. The ability for an organization to promote continuous improvement in their technical ergonomics skill set held by the ET, as well as the effectiveness of the

networking and communication practices would benefit from periodic check points with university researchers after the study period has ended. These check points could serve the purpose of on-going monitoring of the program momentum and use of the SafetyNet PE framework as well as provide the opportunity for university researchers to answer questions from the host organization. This check in would also provide an opportunity for university researchers to perform post intervention analysis if desired and provide follow-up period and continue to monitor changes in management practices of interest.

It was an important finding that the communication and networking internal strategies were not used by the ET as they were intended. These strategies are intended to provide a medium for employee engagement and program awareness throughout the plant. University researchers may have been able to encourage appropriate use of these strategies had they informed the program stakeholders that they would be monitoring and measuring their adherence. For the same reason it is important to expect the organization to develop communication and networking strategies and identify clear roles and responsibilities for program stakeholders, it is equally as important that university researchers create an environment where the ET understands it is their responsibility to ensure these strategies are followed and these internal stakeholders are engaged as part of the program. The ET utilized ET Mgt Rep 1 as the primary point of contact for all communication, networking and program related activities, creating a situation where the capacities within the DKTM were dependent upon one person for facilitation. In future implementations of the SafetyNet PE framework, university researchers should oversee

the development of the internal networking and communication strategies to ensure they will allow the flow of knowledge within the social capacities of the DKTM .

The development of this unilateral and transactional to program management may have been a symptom of the inability to see beyond the physical and deliverable aspects of the PE program such as training sessions and intervention-related program activities. It is important that the stakeholders understand the organizational barriers they will face during the program and that they will be monitored on their ability to exercise desirable management practices and overcome these barriers. Had the organization been prepared to use the participatory approach for more than simply working through ergonomic interventions and implementing solutions, they may have spontaneously created knowledge networks with those that would help overcome these barriers naturally. For example, if ET Mgt Rep 1 was told they would face challenges with front line supervisors when it came time for workers to be relieved, they may have identified an opportunity to enhance the communication and networking strategies to interact with the supervisors and ensure they understood their role. Under such direction, the ET, primarily the ET management representatives ,may demonstrate changes in their management practices as a result of the program implementation in order to simply execute the physical and transaction aspects of the program, such as carrying out a meeting or training session with the ET.

6 Conclusion

Safety culture has to do with the concrete values that guide organizational behaviors across multiple domains of the larger organization (Hartmann, et al., 2009; Maierhofer, Griffin, & Sheehan, 2000). Simply, if supervisors at each level do not act in congruence with the organizational goals set by upper management through action, subordinate workers will be less likely to demonstrate similar priorities during their leader-member exchanges (Zohar & Luria, 2003, 2005). The study objectives were to determine if the implementation of a PE program resulting in changes in management practices, communication, leadership and networking.

Although the need for a PE program was self identified and internally motivated, the PE program observed in this study was launched in a culture where PE was not an organizational goal. The program was not made a formal part of the organization, PE program stakeholders were not prepared as program stakeholders in terms of understanding their roles and the expectations, and the university driven implementation approach was not designed to stimulate changes in management practices as part of the program lead-up discussions with the organization, nor where they aware that certain behaviours were critical to program success.

As part of the university researcher implementation approach, upper management should be prepared to establish expectations in relation to how middle management and front line supervisors would reflect the commitment to this program in an effort to promote change in management practices.. This conclusion is based on the themes

synthesized from the events evaluated using the Management Practices Observation Classification System and perception questionnaire results.

The Structural Frame showed effort by upper management who initiated the PE program implementation with university researchers and the ET to formalize the PE program. However, the other frames reflect the transformational aspects of the program whereby it becomes a part of the organization and the observed trends provide perspective on the lack of integration of the program within business strategy.

The Human Resources Frame provided insight into many aspects of the outcome of this program implementation. The ability of a participatory approach to provide a medium for leaders to influence, empower and motivate others through ET activities was not significantly observed due to transactional based management communication and leadership behaviors and practices. As a result, the opportunity to generate new ideas and engage the stakeholders who held valuable tacit knowledge and to allow them to apply, adapt, utilize or disseminate that knowledge in a responsive manner was lost. These capacities are basic requirements to facilitate effective networking and effective decision making and program follow through. An organization without these capacities has a compromised ability to sustain a program in house. Because the program was launched with the lack of structure for the program, expectations for accountability and role clarity in a culture of distrust and poor working relationships, all four of the KT capacities were challenged from the very onset of the program implementation.

Upper and middle management roles and responsibilities within the PE program were not established and clearly communicated at program launch. The Human Resources

Frame revealed that all levels of the organization were not informed about the program and given direction on their specific roles within that program, nor were they regularly engaged using the networking strategies developed. Most crucially to the program, front line supervisors did not see the program as a priority and repeatedly impacted the ability of the PE interventions to move forward as the denied worker volunteers and ET representatives the time to participate in planned activities. Stakeholders were not held accountable for their participation in the program, and thus were not motivated to engage in the program nor were they able to understand where the program fit among all of the day to day decisions and competing priorities. This inability for front line supervisors to prioritize ET activities in the face of daily operational demands was clear in the themes of the Political Frame and was reinforced in the Symbolic Frame themes whereby UM 1 normalized the lack of commitment by front line supervisors as they must manage production and operational targets. The lack of incentive for program stakeholders such as front line supervisors to participate created the missed opportunity to utilize the PE program to stimulate change in management leadership practices. As a byproduct of this disengagement, much of the knowledge and skills obtained by ET members through the PE program remained at the middle management level. Ultimately, the PE program existed at a superficial level within the organization and did not become integrated into organization roles in a manner that would drive their behaviour and performance. The sustainability of change section of the perception questionnaires reinforced this notion as it was recognized by the ET and upper management that maintaining momentum of the

program will be challenge going forward, largely due to ET training and ensuring time was allotted for the team to work on the interventions.

The re-occurring challenge of role clarity and accountability created a thread throughout each of the themes observed within the Management Practice Observation Classification System. The lack of demonstrated commitment through active participation was reflected within the Symbolic Frame as the themes reveal workers revealed their poor POS for the program and organization overall. Over and above the absence of role clarity, established expectations and performance monitoring of program stakeholders against program expectations, the poor working relationships between management and workers set a substandard foundation for change in the social exchange based management practices; communication, leadership and networking. Without having already established the fundamental communication and networking practices in the organization, there were insufficient opportunities for quality social exchanges and knowledge transfer to occur.

These findings require consideration into the fact that the SafetyNet PE framework does not contain an evaluation component for assessing an organization's pre-program readiness to accept changes resulting from program implementation or a component to actively prepare stakeholders to take action based on the assessment. Although upper management committed financially to the program, management resource allocation and leadership were impediments to the integration of the program within the organizational structure. Had the framework been designed to stimulate activity within appropriate organizational networks, and had upper management integrated the program into its internal responsibility system and pre-determined roles and responsibilities to hold

stakeholders accountable for their participation, the foundation for the program through structure and stakeholder expectations may have helped stimulate change in management practices in communication, leadership and networking. The management practices observation classification system used in the analysis of this case study provides a structure for evaluation of program readiness as well as a needs assessment prior to program implementation. This would allow the resources from university researchers as well as internal resources to be appropriately built into the PE program implementation communication and networking strategies to help overcome potential barriers to success. The management practices observation classification system can also be used throughout the study period in the identification and monitoring of fundamental social exchange based management practices associated with knowledge transfer capacities to predict program sustainability.

The literature has strongly suggested that a long term strategy for organizational change is needed to influence the culture (Schutz, Counte, & Meurer, 2007; Zink, Steimle, & Schroder, 1998), and must be supported by all levels of management within the system (Zohar & Luria, 2003). However, if stakeholders are not held accountable for specific deliverables within defined roles, it can only be expected that commitment will be relative to ever changing priorities. Therefore, it is recommended that further PE research be carried out observing management practices using a framework which provides a readiness evaluation with recommended pre-defined roles and performance indicators as well as a structured strategy for program launch and implementation. This strategy should be based on developing fundamental management practices and

deliverables within the Management Practices Observation Classification System relative to the Bolman & Deal (1984) framework. This enhanced approach to program implementation and monitoring will establish a holistic approach to building the social KT capacities of the DKTC Framework needed for long term program sustainability and will allow improved evaluation of changes in management practices during the study period. It is recommended that in future studies, it be assumed that each organization is different and will require a customized approach from the university researchers to prepare management and other stakeholders. It is also recommended that the SafetyNet PE Framework be equipped to employ a systematic approach for measuring change using the management practices observation classification system. As a result of this revised approach, a customized strategy for implementation and monitoring of the PE program can be established with clear expectations embedded in a performance management process.

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Appendix A: Consent to Take Part in Health Research

Form

Faculty of Medicine, School of Human Kinetics & Recreation
Memorial University of Newfoundland

Consent to Take Part in Health Research (For Interventions and Project Team Members)

TITLE: Poultry Processing Occupational Health

INVESTIGATOR(S): Scott MacKinnon, Christie Boone (Research Assistant)

You have been invited to take part in a research study. It is up to you to decide whether to be in the study or not. Before you decide, you need to understand what the study is for, what risks you might take and what benefits you might receive. This consent form explains the study.

The researchers will:

- **discuss the study with you**
- **answer your questions**
- **keep confidential any information which could identify you personally**
- **be available during the study to address any problems and answer questions**

If you decide not to take part or to leave the study, this will not affect your current employment status.

1. Introduction/Background:

Poultry processing, like any type of work, is related with some work-related health and safety risks. Over the past five years SafetyNet at Memorial University of Newfoundland has been working on work-related health problems in the industry and more specifically musculoskeletal disorders (for example tendonitis and carpal tunnel syndrome). We have found a number of ways that the work can be improved to decrease the risks of such health problems. We want to prevent these problems in the future. We will involve managers, workers, and the union at the plant to come up with a process that could be used in this and other similar plants.

2. Purpose of study:

In our project, workers and managers will work together. We will develop a process to reduce workers' risk of these work-related problems. We will develop training to support this.

3. Description of the study procedures and tests:

We will use a number of activities in this project. We would like you to be involved through the whole project. We will give you some training in ergonomics which will help you find ways to adjust the work station or work process to make the work easier. Working with you, we will collect information on what you know, what you learn and what you see happening in the project. With your consent we would like to record meetings on video or audio tape, and do the same for general interviews. We will use these meetings and workshops and this information in our project. You will be given copies of any information we collect where you have been a participant. You will be able to check and correct anything we write about you and what you say.

4. Length of time:
The project will take place from January 2009 to August 2010. During that time you will participate in a training workshop, in the exercises to develop the process and we will have up to 10 meetings of up to 2 hours duration. We estimate the total time commitment for trainees will be approximately 40 hours over the next two years.

5. Possible risks and discomforts:
There are no anticipated risks associated with participating in this study.

6. Benefits:
It is not known whether this study will benefit you.

7. Liability statement:
Signing this form gives us your consent to be in this study. It tells us that you understand the information about the research study. When you sign this form, you do not give up your legal rights. Researchers or agencies involved in this research study still have their legal and professional responsibilities.

8. Confidentiality:
We will not use your name in any report or publication based on this work without your permission but you should be aware that local people reading the report from this work might be able to identify who said what – particularly for people who have been leaders in this study.

9. Questions:
If you have any questions about taking part in this study, you can meet with the investigator who is in charge of the study at this institution. That person is:
Dr. Scott MacKinnon: 709-737-7249; email: smackinn@mun.ca

Or you can talk to someone who is not involved with the study at all, but can advise you on your rights as a participant in a research study. This person can be reached through:

Office of the Human Investigation Committee (HIC) at 709-777-6974

Email: hic@mun.ca Participant's initials _____

Signature Page

Study title: **Poultry Processing Occupational Health**

Name of principal investigator: Dr. Scott MacKinnon

To be filled out and signed by the participant (Trainee):

Please check as appropriate:
I have read the consent [and brochure]. Yes (Norris, 2009) No (Workplace Health, 2009)
I have had the opportunity to ask questions/to discuss this study. Yes ( ) No ( )
I have received satisfactory answers to all of my questions. Yes ( ) No ( )
I have received enough information about the study. Yes ( ) No ( )
I understand that I am free to withdraw from the study Yes ( ) No ( )
· at any time
· without having to give a reason
· my employment will not be affected

I understand that it is my choice to be in the study and that I may not benefit. Yes ( ) No ( )
I agree to take part in this study. Yes ( ) No ( )
I agree to have my participation video taped. Yes ( ) No ( )
If yes, I understand that these video tapes will not be used outside the
training sessions without my written permission Yes ( ) No ( )

_____ _____
Signature of participant Date

_____ _____
Signature of witness Date

To be signed by the investigator:

I have explained this study to the best of my ability. I invited questions and gave answers. I believe that the participant fully understands what is involved in being in the study, any potential risks of the study and that he or she has freely chosen to be in the study.

_____ _____
Signature of investigator Date

Telephone number: _____

Appendix B: Perception Questionnaire Questions

LEADERSHIP	
1	Who spent the most time on the Intervention(s)?
2	Who acted as the main leader during the PE program?
3	Who do you think resolved issues when trying to perform ET activities?
4	Who do you think coordinated most ET activities?
5	Who do you think completed action items in a timely manner?
COMMUNICATION	
6	Approximately how many individual correspondences were you involved in?
	How many times did ET Mgt Rep 1 contact you?
	How many times did ET Mgt Rep 2 contact you?
	How many times did ET Mgt Alt contact you?
7	Were you interested in ET activities and the progress of the intervention(s)?
	How many times did you contact ET Mgt Rep 1
	How many times did you contact ET Mgt Rep 2
	How many times did you contact ET Mgt Alt.
8	Were you interested in keeping UM informed
	How many times did you contact UM 1?
	How many times did you contact UM 2?
	How many times did you contact UM 3?
9	Do you think UM were interested in knowing about the progress and activities of the PE program?
	How many times did UM 1 contact you?
	How many times did UM 2 contact you?
	How many times did UM 3 contact you?
NETWORKING	
10	Do you think the following groups were regularly and appropriately involved?
	UM
	CEO
	Union
	OHS Committee
	Lin Supervi. Floor managers
11	Do you think the following groups are important to the program?
	UM
	CEO
	Union
	OSH

	Line supervisor
12	Do you feel that mgt reps were interested in keeping you informed?
13	Which UM do you feel was most concerned about knowing about the ET activities and progress?
14	Do you feel that line/dept mgt were well informed about the PE process and ET activities?
15	Do you feel that line/dept mgt were critical to the completion of PE program
16	Was UM involvement critical to the completion of the intervention(s)?
SUSTAINABILITY OF CHAINGE	
17	What do you think was the biggest challenge to daily PE activities as faced by ET?
18	What do you think will be the biggest challenge in the year to come for daily ET activities?
19	What do you like about being on the ET?
20	Were ET representatives given the responsibilities and control over ET activities that were described in the initial PE team training
21	Do you think ET worker representatives have obtained the knowledge, skills and power to sustain an ergonomics program without regular help from outside ergonomist?
22	Do you think the ET worker representatives have the ability to plan and coordinate ET activities without management?
23	Was the ET provided with sufficient information about ergonomics and training to carry out their activities during the interventions?
24	What additional and/or supplemental ergonomic resources or skills do you feel should be added to the PE training program?

Appendix C: Intervention 1 Summary of Critical Findings

Critical Situations*	
Critical Situation 1	Un-adjustable stands Small stand
Why Critical?	All workers will vary in height and will therefore need to adjust stands in order to assume a neutral posture while working
Why does this critical situation exist?	Workers must use stands in order to reach the product and perform their work tasks
Solutions Worker Investigator Line Workers ErgoTeam	A1. (Appropriate #), sufficiently large, adjustable stands Larger stand would allow for more variation in standing position to enhance comfort, as well as making it less probable that acute injuries will occur (ie. Falling from stand) Can also be used in other work areas, would enhance job rotation as it will allow shorter workers to also be utilized in this work are B1. Stands need to be bigger. Add anti-fatigue mats in order to increase the height of the stand to make it more comfortable for shorter workers Ergo Team comment: adding numerous mats on a stand to increase height causes a possible physical hazard of trips or falls or other acute injury. Also, handling mats creates possibility of cross contamination. Re-occurring cost to company must also be considered, as mats are lost or misplaced, misused and damaged. C1: Investigate how a properly sized adjustable stand can be fitted on the right side of the in-feed belting (design must consider the ease of cleaning (consider solution used on evis floor) C2: Provide larger and vertically adjustable stands C2: Provide properly fitting anti-fatigue mats for stands

Critical Situation 2	House-Keeping Clutter including floor and hanging wires and hoses (Both electrical and hydraulic) Oil spills on floor
Why does this critical situation exist?	These hazards and risk factors put workers at risk of assuming a non-neutral posture while working as they avoid hanging and floor clutter, as well as at risk of having acute injury such as slips or falls.
Solutions Worker Investigator Line Workers ErgoTeam	A1. Clean up floor clutter (ie. Hoses/cords)/oil spills to provide a less restricted work area and reduce risk of acute injuries for all workers in that work area (ie. Trips/falls). A2. Create a ramp that will allow free movement over the wires and hoses on the floor B1. Reposition and secure wires and hoses such that they are not obstructing the free movement of workers, and to allow neutral ergonomic postures B2. Hanging mechanism for sliding wires and cords out of the working space C1: Provide a ramp or stand that will be placed over the hydraulic hoses on the floor C2: Suspend the hoses from the ceiling and have them moved out of the way C3: Hoses to be suspended off the floor (electrical from ceiling or support frame, batter hoses in the air, hydraulic suspended to the framework or belt itself) C4: Retractable chords
Critical Situation 3 Why Critical?	Ventilation (design on the line being used) Critical because air quality is largely related to the ability of the body to produce work efficiently as the body requires oxygen to produce muscular work. This has implications for workers maintaining safe (ie. Neutral), ergonomically sound working

	postures
Why does this critical situation exist? Solutions Worker Investigator Line Workers ErgoTeam	Ventilation equipment is changed due to the change in the line design as a result of the product being produced A1. Improve airflow to reduce dust levels. This will require possible appropriate placement of vents or increased number of CFM's. Engineering attention required to provide appropriate solution. B1. Better ventilation design C1: It has been proposed that this project will be addressed in a larger Capital project in the near future C2: Until this critical situation is resolved, it is highly recommended that in non-normal operating modes of this line, PPE is to be worn C3: Jason Rose to verify that under normal working conditions, the ventilation is adequate
Critical Situation 4 Why is this situation critical?	Non-neutral posture, resulting in arms resting on belt/Foot resting on machinery Workers leaning on a sharp edges, such as seen in Appendix A: Critical Situation 4, are at risk of experiencing pain and discomfort at the point of contact, as wells the possibility of nerve impingement and related musculoskeletal conditions and disorders. Critical because there is risk of catching the sleeves in the equipment and putting workers at risk of acute injury. Having a foot resting on machinery is critical because it is resting on the machinery, not on an ergonomic foot rest set at appropriate height for worker, as well as it is unhygienic as it may contaminate the product. Subject 1 was thought to be leaning/resting arms on belt due to poor posture as a result of restricted work area as there are hanging cords and hoses behind worker. There was also a restricted base of support due to using a small stand.

Solutions Worker Investigator Line Workers ErgoTeam	Subject 1 appears uncomfortable due to restricted work area, and accommodated the posture by using a piece of equipment as a foot rest to shift body weight and assume a more comfortable/ergonomically sound position A1. Add appropriately placed foot rests (MEASUREMENTS) A2. Solutions to critical situation 1 and 2 are necessary for providing a work station to promote a neutral posture that will discourage leaning and resting on the machinery B1. Foot rests Ergo Team comment: Workers assume machinery is sufficient for use as a foot rest. An appropriate foot rest should be installed to maintain this ability to raise one leg to ensure workers have a comfortable working posture C1: Foot rest to be placed on the framework of the equipment C2: Edges of sharp ledge to be reduced in height and rounded

Appendix D: Intervention 2 Summary of Critical Findings

Critical Situations*	
Critical Situation 1	Twisting action performed to throw back utility birds to the blue tub behind worker
Why Critical?	Any repetitive motion puts stress on the soft tissues of the body, creating a situation where fatigue of these tissues will occur over time. Muscles that are fatigued and continually worked will be damaged on a small scale repeatedly. When the repetitive motions are continued, and work is performed despite fatigue, the damage on the tissues will accumulate and put the worker at risk of injury over time. Shoulder and back injuries in this area have been statistically identified in the past, indicating the need for attention to be paid in this area. See appendix A, critical situation 1, for a picture of the workstation set up.
Why does this critical situation exist?	The location of the blue tub used to hold downgraded utility birds is located directly behind the grader at the grading station. As birds are graded, utility birds must be thrown behind the worker into the blue tub repetitively at a rate that keeps up with the flow of production.
Solutions Worker Investigator Line Workers ErgoTeam	A1. Holes in bins, conveyer running under the bin, relocate blue tub for utilities at the end of bin 1. Please see Appendix B, Figure 1. A2. Reducing the number of utility birds dropped. CI initiative to be addressed. A3. Consider reducing drop rate at the stations, and more evenly distribute the chicken over the entire day to create a more even flow of product. B1: Move the A-bins back 4 feet, workers will still face the same direction, split bins 2 & 3, position a conveyer between the two. This conveyer will carry the graded utility birds forward and drop them in a blue tub. Station 1 will remain the same. See Appendix B Figure 2. C1: Install a utility line in front of the workers at the A bins. Run this line to the Linco line. This would eliminate twisting since the workers would hang utility birds in from of them on this line, instead of throwing them behind. A birds process would remain the same. See Appendix B, Figure 3.

Critical Situation 2	Shoulder Flexion when grabbing bird from A bin to be graded
Why critical?	Front edge of metal bin causing interference with the task of picking up and grading birds. Shoulder flexion needed to pick up and grade bird, causing fatigue in the muscles in the shoulder region. See Appendix B, Figure 3.
Why does this critical situation exist?	This critical situation exists because the height of the bin used to hold the birds waiting to be graded is not appropriate for the average worker, as well as the edge on the bin needed to hold the birds in place forces the worker to flex at the shoulders to reach over the edge of the bin each time they pick up a bird for grading.
Solutions Worker Investigator Line Workers ErgoTeam	A1. Re-shape the front edge of the metal bins to allow a reduced degree of flexion needed at the shoulders to reach the birds before grading B1. Same as A1. C1. Same as A1.
Critical Situation 3	Congested work area (Stations 1-3)
Why Critical?	Does not allow free movement of pans from stations 1 and 2 down the rollers. Worker at station 3 is responsible for lifting their pan to allow workers at station 1 to move their red pan down the belt.
Why does this critical situation exist?	The nature of this workstation requires the use of 2 large blue tubs to hold utility birds, requiring a significant amount of space, and must be positioned as close to the worker as possible. The direction of the line requires that workers stand side by side, using the same belt to distribute red panned A-birds, all of which must go in the same direction. Workers will fill their pans at different rates as a result of the size of the birds on the truck coming in, as well as the orders that are being filled at each drop. Because of this, pans may be filled by a worker at station 1 before that of station 2/3, requiring station 2/3 worker to move their pan, and push along that of the first station, creating congestion along the belt as well as an interruption in the task being performed by both workers. Red pans are stacked directly behind the workers, on either side of the blue tub for utility birds. These pans are used as a reservoir of lined red pans for use when production speed makes it challenging

	to prepare pans on a need basis. Pan stacks contribute to the congestion, however if pans were not pre-made, a break from grading to make pans would cause product flow piles up (See critical situation 3: solution A3).
Solutions Worker Investigator Line Workers ErgoTeam	A1. Consider changing the drop kickoffs on a daily basis to ensure the larger bird orders are dropped at number three. This will reduce the frequency that red pans will need to be pushed down the line past station 2 and 3. B1. Same as A1. C1. Same as A1. Supervisor to manipulate drop station specs in order to ensure busiest drop is at station 3. This will reduce the number of time worker at station 2/3 must life pan and interrupt work in order to allow pans from station 1 to enter main belt.
Critical Situation 4	Communication
Why is this situation critical?	Communication is inefficient between the A-bins and the office. When orders are filled, worker is responsible for calling into the office and turning off the drop. When drops are not turned off on time, all birds dropped are thrown back as utility birds, whether they are utility birds or A birds. When more birds are thrown-back, and cumulative trauma, increased fatigue and cumulative trauma will be experienced by the worker.
Why does this critical situation exist?	Radios have been proposed in the past, for use by lead hands and floor management, to ensure that drops are turned off when orders are full as communicated by workers. However, practices have not been implemented to ensure radios are being used by these persons responsible for turning off the drops.
Solutions Worker Investigator Line Workers ErgoTeam	A1: Radios to be provided and designated specifically to two supervisors (supervisor and lead hand) A2: Implement charging task to a designated person B1. Supervisor to designate on a daily basis the duty of lining red pans in preparation for A bin process (Possibly a modified duty position) This would reduce production interruption due to pans unprepared.

	B2: A turn off button to be given to workers on the A-bins to give them the ability to turn bins off when orders are filled, reducing re-work in several places downstream. C1. Radio procedure designated to supervisor/lead hand and A bin employee. In this procedure the radios must be on a designated channel solely devoted to A bin production. Supervisor/lead hand responsible for charging and ensuring they are carrying their own radios. A bin employees responsible for carrying their own radio, and putting them on the charging station at the end of shift. Initially, supervisor/lead hand responsible for overseeing these responsibilities.
Critical Situation 5 Why Critical? Why does this critical situation exist? Solutions Worker Investigator Line Workers ErgoTeam	PPE (Gloves) Gloves of the proper size are not provided on a regular basis. Workers using gloves that are too small experience increased sensation of cold due to insufficient circulation. Needed glove size not available suddenly (Ansell Size 11). Workers in this station have larger than average size hands and require size 11. There is no procedure in place to predict when gloves will be gone, and when ordering needs to be done to ensure gloves are available at all times. The organization of gloves in the kiosk is not in compliance by workers. A1: Put a procedure in place to predict when gloves will be gone, and when ordering needs to be done to ensure gloves are available at all times. A2: Implement a procedure to ensure the organization of gloves in the kiosk B1. Same as A2. C1. Situation resolved regarding correct type and size of glove. In addition, duty to be assigned to manage gloves by size and right hand vs. left hand.
Critical Situation 6 Why Critical?	Temperature Cold air directed at the workers on A-bins. Cold temperature will decrease the level of comfort of the workers as well as decrease blood circulation. Poor circulation will increase the level of fatigue experienced by the worker as the tissues of the body are not

	provided with sufficient blood and nutrients.
Why does this critical situation exist?	Air is not diverted properly to avoid the direct path of workers. Shipping door left open, temperature of the air in poultry pack decreased due to cold air coming from this area.
Solutions Worker Investigator Line Workers ErgoTeam	A1: Maintenance to create a reflector device to divert airflow away from backs of workers to the empty space behind A bins. A2: shipping door to be kept closed when not in use B1. Same as A1 and A2. C1. Increase signage indicating the need to keep shipping cooler door closed. C2. Same as A1, must consider condensation issues. C3. same as A2.

Appendix E: Perception Questionnaire Results

Key		Abbreviations (for table purposes only)
x	question was left unanswered	ET Mgt Rep = EMR
N/A	question was answered but did not give an appropriate answer	ET Wkr Rep =EWR
	question was not asked to this individual on this questionnaire	Univ 1 = Primary University Researcher

LEADERSHIP																
Individual Respondent			UM 1		UM 2		UM 3		EMR1		EMR2		EWR1		EWR2	
Questionnaire #			1	2	1	2	1	2	1	2	1	2	1	2	1	2
1	Who spent the most time on the Intervention(s)?	Response 1	EMR 1	EMR 1	EMR1	EMR 1	x	EMR 2	Self	Self	EMR 1	EMR 1	EMR 1	EMR 1	EWR1	Univ 1
		Response 2	EMR 2	EMR 2	EMR2	EMR 2	x		EMR2	EMR 2	Self	Self	Team	Team	EMR 1	EMR1
2	Who acted as the main leader during the PE program?	Response 1	EMR 1	EMR 1	EMR1	EMR 2	x	EMR 2	Univ 1	Self	EMR 1	EMR 1	Univ 1	EMR 1	EMR 1	EMR2
		Response 2	EMR 2	EMR 2	X	x	x		Self	x	EWR1	EWR 1	Team	Team	EMR 2	EMR1
3	Who do you think resolved issues when trying to perform ET activities?	Response 1	EMR 2	EMR 2	EMR2	EMR 1	x	x	Self	EMR 2	Self	EMR 1	EMR 1	EMR 1	EMR 1	Sup
		Response 2	EMR 1	EMR 3	X	EMR 2	x		Dept Sup.	Self	EMR 1	Self	x	x	x	Lead Hand

4	Who do you think coordinated most ET activities?	Response 1	EMR 1	EMR 1	EMR1	EMR 1	x	EMR 2	Self	Self	EMR 1	EMR 1	EMR 1	x	EMR 1	EMR1
		Response 2	EMR 2	EMR 2	X	x	x		SM	EMR 2	N/A	Self	Univ 1	x	x	x
5	Who do you think completed action items in a timely manner?	Response 1	EMR 1	EMR 1	Maintenance Supervisor	x	x	EMR 2	N/A	EMR 2	EWR1	EMR 1	N/A	N/A	N/A	EMR2
		Response 2	EMR 2	EMR 2	Engineering	x	x		N/A	x	EWR2	Self	x	x	x	x

COMMUNICATION											
Individual Respondent		UM 1		UM 2		UM 3		EMR1		EMR2	
Questionnaire #		1	2	1	2	1	2	1	2	1	2
6	Approximately how many individual correspondences were you involved in?	12	72	20	20	x	25	30	30	9	35
	How many times did ET Mgt Rep 1 contact you?	12	15	20	10	x	10				
	How many times did ET Mgt Rep 2 contact you?	6	12	10	10	x	10				
	How many times did ET Mgt Alt contact you?	0	3	2	2	x	2				
7	Were you interested in ET activities and the progress of the intervention(s)?	Y	Y	Y	Y	x	Y				
	How many times did you contact ET Mgt Rep 1	8	24	10	10	x	5				
	How many times did you contact ET Mgt Rep 2	4	20	8	10	x	5				
	How many times did you contact ET Mgt Alt.	0	3	2	2	x	2				

8	Were you interested in keeping UM informed							Y	Y	Y	Y
	How many times did you contact UM 1?							20	10	7	12
	How many times did you contact UM 2?							10	10	7	12
	How many times did you contact UM 3?							3	10	7	12
9	Do you think UM were interested in knowing about the progress and activities of the PE program?							Y	Y	Y	Y
	How many times did UM 1 contact you?							20	10	5	10
	How many times did UM 2 contact you?							10	10	5	10
	How many times did UM 3 contact you?							3	10	6+	10

NETWORKING															
Individual Respondent		UM 1		UM 2		UM 3		EMR1		EMR2		EWR1		EWR2	
Questionnaire #		1	2	1	2	1	2	1	2	1	2	1	2	1	2
10	Do you think the following groups were regularly and appropriately involved?														
	UM		Y		Y				Y		Y		Y		N
	CEO		Y		Y				Y		Y		Y		Y
	Union		Y		Y				N/A		Y		Y		N
	OHS Committee		Y		Y				N		Y		N/A		Y
	Lin Supervi. Floor managers		Y		Y				Y		Y		N/A		N
11	Do you think the following groups are important to the program?	See below													
	UM												x		Y
	CEO								Y		Y		x		Y
	Union								Y		Y		x		N
	OSH								N		Y		x		Y
	Line supervisor								Y		Y		x		Y
12	Do you feel that mgt reps were interested in keeping you informed?	Y	Y	Y	Y	x									
13	Which UM do you feel was most concerned about knowing about the ET activities and progress	UM 2	UM 2	UM 2	UM 1	x									
14	Do you feel that line/dept mgt were well informed about the PE process and ET activities?	Y	Y	Y	Y	x		Y	Y	Y	Y	x	x	x	N
15	Do you feel that line/dept mgt were critical to the completion of PE program	Y	Y	Y	Y	x		Y	Y	Y	Y	x	x	x	Y

16	Was UM involvement critical to the completion of the intervention(s)?	Y	Y	Y	Y	x		Y	Y	Y	Y	x	x	x	Y

Appendix F: Management Practices Observation Classification

System Observations

Classification Code	Code #
1.0 Structural Frame	
1.0.1 Policy Development	
PE ET Terms of reference developed	1.0.1+
1.0.2 Program Development	
PE ET discussion about having PE terms of reference	1.0.2+
ET developed a resource to improve PE implementation approach to better fit the plant context	1.0.2+
ET made the decision to keep all 4 volunteer ET Wkr reps after initial training to better meet needs of this large organization during the PE program	1.0.2+
ET Mgt Rep 1 did not take advantage of the opportunity to modify a training resource to better fit the context of the organization (interview schedule)	1.0.2Neg
Decision by ET Mgt Rep 1 to hold the ET member selection meeting without university ergonomist present	1.0.2Neg
Workshop by Parent (2007) KT Tool Kit (Attended by ET Mgt Rep 1), attended, but no action came out of the session and the lessons learned	1.0.2Neg
University researcher suggested that ET train new management and worker ET members before university researcher withdrawal; decision by ET Mgt Rep 1 not to train new members of management for the ET.	1.0.2Neg
ET management were observed performing the tasks of ET worker representatives. ET management did not hand over responsibilities to the ET workers during the train the trainer phase.	1.0.2Neg
ET Mgt Rep 1 indicated that another management representative was not selected for training intentionally against recommendations by researchers as they did not see it as necessary	1.0.2Neg
2.0 Human Resources Frame	
2.1 Leader/member exchange quality	
Wkr rep 2 informally discusses with university researchers the distrust between workers and members of middle management, including ET Mgt Rep 1	2.1Neg
At the end of Intervention II worker ET representatives were initially uninvited to attend the meeting where recommendations from the ET were presented to upper management; worker representatives voiced their dissatisfaction	2.1Neg
2.2 Communication	
2.2.1 Feedback/verbal support	

Intervention site supervisor present when recommendations were presented to upper management, they were displeased with one of the recommendations, and not open to the ET suggestions for implementing the solution	2.2.1Neg
2.2.2 PE Awareness Building	
Poster developed for awareness and keeping employees up to date on ET activities and Intervention status	2.2.2+
Good communication between upper management in the final stages of implementing the recommendations for intervention 1, regular meetings held to create accountability.	2.2.2+
ET Mgt Rep 2 organized PE ET awareness event, where ET gave info session to employees as a part of safety week initiatives (year 2 of program)	2.2.2+
ET Mgt Rep 1 provided an Introduction to PE at Management Meeting	2.2.2+
Promotion materials developed by ET and distributed during PE during Safety Week	2.2.2+
Volunteer had been told by supervisor that they were wanted to leave the floor without explaining why. Volunteer arrived visually nervous/uneasy until realizing it was the ET meeting which they had volunteered. Poor communication between supervisor and workers	2.2.2Neg
Several aspects of PE communication strategy not implemented. ET MGT REP 1 failed to initiate contacts with crew and ET reps in crew meeting as outlined in communication strategy	2.2.2Neg
Informal discussion reveals that ET Mgt Rep 1 feels that communications of the project and ALL activities will be originated with them; acting as the liaison between ET and all stakeholders.	2.2.2Neg
Poor communication observed between floor and ET, Wkr Rep 2 not relieved for scheduled ET activities due to high volume sick calls	2.2.2Neg
ET Wkr Reps did not attend crew meetings to recruit volunteers for the intervention.	2.2.2Neg
Crew meetings were used to recruit intervention volunteers. Crew meetings were supposed to be used as an opportunity first and foremost to built awareness and promote PE and the ET activities.	2.2.2Neg
Poor communication to university researchers resulting in a missed ET meeting	2.2.2Neg
2.3 Leadership	
2.3.1 Accountability	
Update provided ET activities at an OHS Steering Committee Meeting in March 2009. There were no action items assigned to any attendees with regards to the program	2.3.1Neg
Senior management meeting in Sept 2009 immediately after intervention 1 was completed, PE update was provided but little engagement was reflected in the minutes and there were no action items assigned or takeaways	2.3.1Neg

Under agenda item: Ergonomics Audit, Initiation of having PE as a regular agenda item for this committee's meetings, but little engagement observed, no takeaways or actions assigned. PE update served as the update on the WHSCC audit recommendations for ergonomics.	2.3.1Neg
Senior management meeting after intervention 1 just prior to launch of intervention 2, PE update was provided but little engagement was reflected in the minutes and there were no action items assigned or takeaways	2.3.1Neg
2.3.2 Leadership Style	
Transactional leadership demonstrated on behalf of upper management in a senior management meeting with respect to how they interact with floor level workers	2.3.2Neg
Poor leadership on behalf of floor management as they were observed holding PE volunteers back from ET and PE activities when shorthanded	2.3.2Neg
Communication/radio recommendation not successful due to poor implementation procedures. The process and behaviours of those required to use the solution were not addressed, instead a rule was thrown at workers, told what they were to do, and leadership on behalf of the ET to implement the correct protocols was not followed. Leadership on behalf of floor management to coach workers into using the new recommended procedure was poor and also transactional in nature.	2.3.2Neg
ET worker reps not considered to be crucial in developing the final intervention report by ET Management Representatives and were not invited to a meeting with upper management and maintenance to review recommendations.	2.3.2Neg
2.3.3 Program Ownership	
ET Mgt Rep 2 volunteered to provide resources to ET workers for them to conduct their ET roles. This task was completed in a timely manner but in response to ET Mgt Rep 1 not doing so and allowing workers on ET to perform their roles	2.3.3+
ET Mgt Rep 2 initiator email to "get project moving", available ASAP, Email sent in the absence of ET Mgt Rep 1 and an unacceptable time lapse between ET management communication	2.3.3+
ET Mgt Rep 1 developed own recommendations and solutions before data and movement analysis was complete by worker representatives. Demonstrating disregard for PE model	2.3.3Neg
ET Mgt Rep 1 attempt to override the role of workers in performing certain ET tasks	2.3.3Neg
3.0 Political Frame	
3.0.1 Time/Production Compromise	
ET Wkr Rep 1 disclosed that they feel that management priorities are at the production level not at prevention of WRMSDs	3.0.1Neg
ET session rescheduled with inability to have employees relieved to participate. ET Mgt Rep 1 commented "they wonder why it takes so long to	3.0.1Neg

get training done...people aren't relieved	
Mgt from the floor exercising resistance to PE when the ET attempted to schedule a meeting for ET workers off the floor to complete interview schedule revisions	3.0.1Neg
A meeting re-scheduled again due to having too many people from the floor off sick	3.0.1Neg
3.0.2 Resource Allocation	
Maintenance department provided cost analysis, given to UM, UM provided feedback. UM responded for the ET to select one of the analyzed solutions for implementation	3.0.2+
During early stages of intervention 2 recommendation development, ET Mgt Rep 2 encourages one of the possible ET solutions to be disregarded until later notice as the cost is too substantial. Member said "fix the a bins and leave it at that". Potential exists that this member had been asked by UM to discourage option before formally bringing it forward for implementation	3.0.2Neg
3.1 Networking	
3.1.1 Existing Network Utilization	
PE became a new standing item on senior management meeting agenda	3.1.1+
ET Wkr Rep 1 disclosed that departmental changes are made to improve safety and health, but are often not shared	3.1.1Neg
Opportunity to give PE program update at the union meeting, not availed. It was felt that there was too much happening at the time, and that it would not be well received	3.1.1Neg
Opportunity to give OSH a role in the program and help working towards the ergo audit recommendations not utilized	3.1.1Neg
ET Wkr Reps to attend crew meetings to recruit volunteers for the intervention. Event was not scheduled and executed	3.1.1Neg
PE on Agenda, no quality interactions, discussions or actions derived from the meeting. Simple update given by ET Mgt Rep 1 (Senior Management Meeting Sept 2009)	3.1.1Neg
PE on Agenda, no quality interactions, discussions or actions derived from the meeting. Simple update given by ET Mgt Rep 1 (OHS Committee Sept 2009)	3.1.1Neg
OHS was not involved at any level in the first intervention, there was not an OHS rep interviewed, nor was the report brought to them for review as an FYI before implementation	3.1.1Neg
PE on Agenda, no quality interactions, discussions or actions derived from the meeting. Simple update given by ET Mgt Rep 1 (Senior Management Meeting Dec 2009)	3.1.1Neg
PE on Agenda, no quality interactions, discussions or actions derived from the meeting. Simple update given by ET Mgt Rep 1 (OHS Committee Dec 2009)	3.1.1Neg

3.1.2 Network Development	
Using internal maintenance and engineering as a resource for resenting necessary information to UM in order to have recommendations implemented	3.1.2+
PE program overview asked to be given by university researchers by ET Mgt Rep 1 during a Union meeting, ET Mgt Rep 1 did not feel comfortable or prepared in doing so.	3.1.2Neg
Informal network developed between ET Mgt Rep 2 and UM3 as a result of reporting structure and used to provide information from the ET to upper management to deter certain solutions from being developed and presented for consideration by upper management	3.1.2Neg
ET Mgt Rep 1 indicates fear of or unwillingness to present intervention 1 report to OSH Committee. University researchers remind ET of the importance of transparency and open communication	3.1.2Neg
4.0 Symbolic Frame	
4.0.1 General Organizational Climate	
Worker verbalizes that reporting is not a priority for employees because they don't have the time, and this worker in particular expresses that they don't have the patience for reporting	4.0.1Neg
difficulties with having volunteer relieved from he floor.	4.0.1Neg
Volunteer for ET comments on production in the plant. They say "130,000 birds last week, company proud, but fail to mention that 2 people went off on compensation"	4.0.1Neg
ET Wkr Rep 2 shares with university researchers that workers have been "burned" by management one too many times	4.0.1Neg
During a discussion with PE volunteer about noise levels, the volunteer expressed frustration about a the policy against music on the floor. Volunteer also said "I wear hearing protection to avoid being told by management to put them back on"	4.0.1Neg
4.0.2 PE Specific Perceptions/attitudes	
Discussion by Wkr Rep about actions and opinions of one person can cause others to also have neg. perceptions	4.0.2+
ET Mgt Rep 1 expresses opinion on the framework and opinion that management should be permitted to interact with volunteer employees during interviews. Member feels that using worker representatives for this and not management is based on the "old" school principle that management and workers do not interact well, and that we are going backwards in establishing a culture of safety.	4.0.2Neg
Negative perceptions expressed by ET Mgt Rep 1 regarding the future outcome of the program and it's sustainability, particularly if they were no longer a part of the team	4.0.2Neg
ET Mgt Rep 1 verbalized dissatisfaction with PE program thus far, and the fact that they are the key driver behind all activities.	4.0.2Neg

4.0.3 Organizational Culture	
Union president discusses challenges with relieving workers from the floor, and the neg. Impact it may have on recruiting the right people	4.0.3+
ET Wrk Rep 2 identifies that there needs to be a "will to change" instilled in workers o make this work	4.0.3+
ET Wkr Rep 1 acknowledges that labour relations often impedes the ability of safety procedures to work properly (i.e.. Job rotation)	4.0.3+
ET Wkr Rep 2 says workers are uncomfortable speaking with upper management and CEO	4.0.3Neg
Worker from the floor complains about being the only person trained to do their job and therefore not having a break and working over time etc, but according to ET Mgt Rep 2, efforts have been made to have him train others in, but deliberately leaves things out so that this person does not succeed, ET Mgt Rap 2 feels this has to do with fear of job loss	4.0.3Neg

EVALUATION OF MANAGEMENT PRACTICES AS A RESULT OF AN IMPLEMENTATION OF A PARTICIPATORY ERGONOMICS PROGRAM IN A POULTRY PROCESSING PLANT

by

© Christie Boone

A Thesis submitted to the

School of Graduate Studies

in partial fulfillment of the requirements for the degree of

Masters of Science

Human Kinetics & Recreation

Memorial University of Newfoundland

July 2013

St. John's Newfoundland

ABSTRACT

The ergonomics program in this study was initiated when a poultry processing plant contacted a university-based research alliance requesting a participatory ergonomics (PE) program implementation to address the incidence of work-related musculoskeletal disorders (WRMSDs). This research observed changes in management practices as a result of the PE program. Management practices observed were communication, networking, and leadership. The PE program activities provided opportunities for quality social exchanges between levels of management, employees and project stakeholders. Results suggest that upper management committed financially to the PE program but did not engage management at all levels or promote stakeholder accountability. The program was driven by an Ergo-Team (ET) middle management member and much of the management participation was transactional in nature focusing on day to day program activities. The PE program remained at a superficial level within the organization, knowledge transfer capacities were not enhanced, and overall management practices were unchanged.

ACKNOWLEDGEMENTS

I would like to thank my family and friends for the support as I pursued graduate studies. I'm truly grateful to have had you all nearby while I studied and worked in St. John's. The visits, calls and just knowing you were only a few hours away helped inspire balance in a busy life.

I would like to acknowledge and thank MITACS Inc. for the opportunity to participate in the national internship Accelerate Program. The financial benefits of this program had a significant impact on my ability to focus on the research and enjoy the experience.

I would like to acknowledge and thank my industry partner Country Ribbon Inc. The opportunity to apply the research within industry and experience the challenges and opportunities that come with implementing a PE program not only helped me understand the value of this research but also helped prepare me for working in industry. Most importantly, the opportunity to work with your management team and workers was a rewarding experience.

I would like to thank SafetyNet for providing me support during my time on campus. You provided me with a network of people and resources for guidance and support from start to finish. Not only did you support me in my own research but you

gave me opportunities to participate in other on-going SafetyNet initiatives. Working with your team was an opportunity I'll be forever grateful.

I would like to express a sincere thank you to my supervisor Dr. Scott MacKinnon. During my journey in completing my research I encountered several detours and roadblocks. You supported me as I made both professional and personal choices along the way which impacted the completion of my research. For your on-going support, understanding and friendship, I can't thank you enough.

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List of Abbreviations and Symbols

DKTC – Dynamic Knowledge Transfer Model

ET – Ergo Team

ET Mgt Rep – Ergo Team Management Representative(s)

ET Wkr Rep – Ergo Team Worker Representative(s)

IEA – International Ergonomics Association

KT – Knowledge Transfer

LMX – Leader member exchange

NL – Newfoundland and Labrador

OHS – Occupational Health & Safety

PE – Participatory Ergonomics

POS – Perceived Organizational Support

SME – Small to medium enterprise

UM – Upper Management

WHSCC – Workplace Health, and Safety Compensation Commission

WRMSDS – Work-related musculoskeletal disorders

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1 Introduction

Work-related musculoskeletal disorders (WRMSDs) have become a health, safety, and economic concern in today's workplace as WRMSDs have implications for major financial burden to employees, employers and to industry (Denis, St-Vincent, Imbeau, Jette, & Nastasia, 2008; Lewis, Krawiec, Confer, Agopsowicz, & Crandall, 2002). The research shows evidence of attempting to reduce incidence of WRMSDs through ergonomic programs and workstation redesign aimed through reducing or eliminating ergonomic risk factors (Haukka et al., 2008; Lotters & Burdof, 2002; Pehkonen et al., 2009; Rivilis et al., 2008). However, research suggests that ergonomics programs barriers are often symptoms of their approach and are unable to instill long term management commitment and support (Molen et al., 2006). This is may be due to the program approach prioritizing ergonomic change at a micro-level with respect implementing physical ergonomic change, and less attention paid to macro-level problems and barriers embedded in the organizational management structure (Holden, Or, Alper, Rivera, & Karsh, 2008; Laitinen, Saari, & Kuusela, 1997). Based on these studies, it is of interest to investigate the means through which ergonomic program models and frameworks have the potential to influence program barriers embedded in organizational factors such as management practices and behaviour.

Organizations with mature safety and health programs realize that employee health and safety is intertwined with productivity, corporate sustainability, as well as business excellence (Koningsveld, Dul, Van Rhijn, & Vink, 2005). However, few have been able to effectively integrate ergonomics or other safety programs in their overall

business strategy (Caroly, Coutarel, Landry, & Mary-Cheray, 2010). The literature shows repeated attempts to find an ergonomics program implementation model, framework or research study design that will suggest improvements in the incidence of WRMSDs over time (Haukka et al., 2008; Lotters & Burdof, 2002; Tompa, Dolinschi, & Laing, 2009). Ergonomic programs have been viewed as successful relative to program -based deliverables and reduced incidence of WRMSDs. However, the literature has shown that program barriers to success are not always directly related to the program framework or model, but instead may be entrenched in the culture of the organization (Komaki, Heinzmann, & Lawson, 1980; Laing et al., 2005; Looze, Rhijn, Deursen, Tuinzaad, & Reijneveld, 2003). These barriers have been associated with organizational behaviour and performance and specifically related to day to day management behaviour and practices (Killimett, 2006). While ergonomic program approaches as an agent for stimulating change has not been studied in depth, the literature recognizes that certain ergonomics implementation approaches may have an impact on organizational factors such as management behaviour (Clarke & Ward, 2006).

Participatory Ergonomics (PE) frameworks have been developed as a means of attempting to overcome these barriers. PE programs are designed to draw upon the knowledge of workers, and provide them with the skills needed to participate in planning and modifying their own work tasks and practices (Wilson, 1991). The idea is that workers have the tacit knowledge and understanding of their work environments needed to make appropriate and meaningful ergonomic changes if given the necessary knowledge, tools, authority, and program infrastructures (Haukka et al., 2008; Hignett,

Wilson, & Morris, 2005; Pehkonen et al., 2009; Rivilis et al., 2008; Wilson, 1991). Each individual organization has its own contextual limitations (Ulfvengren, Rignér, & Mårtensson, 2009), contributing to the need for involving employees in the ergonomic intervention process and building the internal social capacity to establish and support the program related communication so vital for program success (Antle et al., 2011).

Research has begun to analyze change management concepts that will support the dynamic needs of safety initiatives (Gregory, Harris, Armenakis, & Shook, 2009; Hendrick, 2008), and better understand organizational factors that impede safety program sustainability (Tornstrom, Amprazis, Christmansson, Eklund, 2008). Recent research suggests that a holistic approach to safety management would better address an organization's ergonomic and health and safety needs (Holden et al., 2008; Laitinen et al., 1997). Over time, as research aimed to better understand a more holistic approach, it has been recognized that strong management support plays a key role in safety programs (Komaki et al., 1980), and will impact how lower levels of management and employees participate in the program. Individuals will behave and participate in the PE program in a manner that is congruent with their organization's culture and shared values (Gregory, Harris, Armenakis, & Shook, 2009). Research suggests that values held at the organizational level such as those reflecting safety and health goals, must be congruent with those demonstrated by management behaviour in order to instill such values on employees (Maierhofer, Griffin, & Sheehan, 2000). The development of these perceptions often determines whether sufficient management buy-in will occur through organizational levels. Management participation is valuable when financial resources are required for

program initiatives (Heller-Ono, 2006).However, allocation of financial resources is not always enough to convince foremen, supervisors and other members of production and operational management that the program requires their commitment.

The research has repeatedly demonstrated that management behaviours were responsible for a bottleneck to program sustainability and success (Komaki et al., 1980; Laing et al., 2005; Looze et al., 2003; Rivilis et al., 2008). Further investigation into the types of management behaviours responsible for this barrier to success found that certain social exchange-based relationships are linked to safety communication and commitment (Hofmann & Morgeson, 1999), which have also been linked to program sustainability (Hofmann & Morgeson, 1999; Tompa et al., 2009). In response, there has been an identified need to better understand the relationship between these social exchange-based management behaviours and the cultural mechanisms through which stakeholders build trust and relationships (Theberge & Neumann, 2010). Program sustainability and management practices have been investigated from the perspective of social exchange theory of Blau (1964) (Hofmann & Morgeson, 1999; Hofmann, Morgeson, & Gerras, 2003; Mearns & Reader, 2008; Walker & Hutton, 2006). This theory suggests that as one party acts to benefit another, there develops a perceived obligation that it will later be reciprocated and trust is formed based on this demonstrated reciprocation. Based on the findings of Hofmann & Morgeson (1999), social exchanged based management practices used to interact with employees are critical in the development of a safety program. This social exchange relationship built on proven trust and relationships has been described in the literature as resulting from two theories, perceived organizational support (POS) and

leader-member exchange (LMX) between individuals (Walker & Hutton, 2006). It is through the fulfillment of psychological contracts that people feel their organization cares about their well-being, ultimately influencing POS (Hofmann & Morgeson, 1999). Quality interactions made up of communication and the development of relationships between workers and leaders or LMX provide the opportunity for psychological contracts to be fulfilled. Both POS and LMX have been identified in the literature by Hofmann et al. (2003) as being positively related to safety attitudes, POS being related to safety communication, as well as LMX related to safety commitment and communication (Hofmann & Morgeson, 1999). It is through these two aspects of social exchange that management will use communication to establish expectations and anticipated outcomes and benefits (Settoon, Bennett, & Liden, 1996), and will demonstrate their commitment to a program directly through their actions and influence the beliefs and behaviours of others (Clarke & Ward, 2006; Mearns & Reader, 2008; Zohar, 2002b). In summary, expectations are met when there is communicated expectations and demonstrated commitment through action and follow through. It is based on this rationale that common management practices used to communicate and establish expectations and demonstrate commitment were selected for evaluation within this study. Upon reflecting on this literature in the context of PE program implementation and sustainability, the management practices of interest for further study are: leadership, communication and networking.

Leadership encompasses the opportunity to not only communicate with employees, but also influence their perceptions about a program or topic, type of

leadership used is of interest. A deeper look at leadership reveals that transactional leadership is driven by short term gains or immediate requests or demands whereas transformational leadership reflects exchanges that enhance the relationships through a quality interaction (Simola, Barling, & Turner, 2010).Leadership effectiveness as it pertains to social exchange has been studied based on the quality of communication (Hofmann & Morgeson, 1999) and the ability to clearly communicate expectations and priorities (Zohar, 2002a). Although communication occurs spontaneously and frequently within organizations, unless there aspects of organizational communication are intentional it will have little influence on the listener (Mabey, Kulich, & Lorenzi-Cioldi, 2012). Networking is the strategy used to create a medium through which management lead and communicate through social exchange with workers and other stakeholders. Networking is used to share on-going program related communications, lead, involve and engage organizational stakeholders and employees in the collaboration and decision making processes through knowledge exchange capacities (Parent, Roy, & St-Jacques, 2007).

Because of the ability of management to influence the behaviours of employees (Kristoff, 1996), researchers have realized that it is easier to redefine the roles of management than to change the perceptions and attitudes of less committed workers (Zohar & Luria, 2003), and it is through high quality interactions that influence the behaviours of others (Hofmann et al., 2003). This relationship reveals the value in understanding the management practices which serve as a medium for social exchange based interactions between workers and other stakeholders and the ability of a PE

program framework or model to stimulate desirable change in these management practices.

1.1 Study Objectives

The objective of this thesis was to observe social exchange based management practices: leadership, communication and networking behaviours between program stakeholders within the organization during the PE Program implementation. During the study, the PE ET and upper management members were observed as they carried out their roles and responsibilities as outlined in the SafetyNet PE program framework and as advised by university researchers during the study period.

The research question of this study is to determine if the PE program as outlined in the stepwise SafetyNet PE program framework will stimulate changes in these management practices that may suggest the development of the social capacity sustain the PE program over time. It is hypothesized that the current SafetyNet PE program framework is not designed to stimulate internal stakeholder accountability for program-related participation that will be sufficient to initiate the changes in leadership, communication and networking management practices needed to predict sustainability over time.

1.2 Context

This study was initiated when a poultry processing plant contacted a university-based research alliance called SafetyNet requesting that a PE program be implemented in their plant to address the incidence of WRMSDs. The need for the program was self-identified by the organization after the completion of previous work with SafetyNet on

implementing a participatory approach to knowledge transfer of knife sharpening practices (Antle et al., 2007; Antle et al., 2011).The PE program proposal from this organization provided a research opportunity to observe changes in management practices as a result of the PE program implementation.

This study was conducted with student financial support by MITACS, under the Accelerate program. MITACS Accelerate is a national internship program managed by MITACS Inc. which connects companies and other organizations with the vast research expertise in Canada's universities through funding of research already supported by industry (http://www.mitacs.ca/).

1.3 Participatory Ergonomics Framework

The PE framework considered in this study was developed and previously used by SafetyNet, a center for occupational health and safety research (Antle, et al., 2008; Antle, et al., 2007; MacKinnon, et al., 2008; MacKinnon, Antle, & Vezina, 2009). This model uses a stepwise approach, utilizing an Ergo-Team (ET) structure whereby worker and management representatives from the organization volunteer to undertake program activities. The program began with recruitment of ET members and a formal class room based training session provided by university researchers to provide the ET with basic ergonomic concepts and a training intervention designed to help develop and refine the skills needed to carry out a PE program intervention. The ET then identified workstations within the plant needing attention. The culmination of each workstation intervention produced a report containing recommendations for change that is then presented to management for consideration and implementation.

2 Literature Review

Organizations are said to be open systems that require adaptation to take place any time changes between the system's components occur (Moro, 2009). It is this concept that not only creates the need for an ergonomics program, but also challenges the sustainability of that program and ultimately its success. One particular definition of ergonomics reflects the discipline in the context where change is inevitable and expected within an organization. This definition is that of the International Ergonomics Association (IEA) whereby ergonomics is defined as:

"...the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance" (IEA, 2000).

Within this definition, an ergonomist is someone who possesses the knowledge and tools needed to perform critical analysis of humans as they interact with a work system, as well as how they perform these interactions and contribute to the overall functioning of the larger organization. Traditionally the ergonomist is called upon to remedy issues, often under severe economic constraints (Jensen, Broberg, & Møller, 2009). The ergonomist enters a workplace and assesses the environment, where they then identify ergonomic risks and make recommendations to reduce these risks using engineering, administrative and personnel related controls. Such ergonomic interventions often focus on manipulating a workstation or task such that it solves a short-term problem but does not provide sufficient opportunity to fully consider the organizational context

(MacKinnon, Antle, & Vezina, 2009). Problems may become evident when new job demands or organizational growth create changes in the work dynamic, environment, and the tasks performed by workers.

Although it has been identified that periodic re-visitation by an ergonomist helps to maintain an appropriate level of internal ergonomic training and knowledge, it has also been realized that this is not realistic when working with SME's operating under limited human and financial resources (Tornstrom, Amprazis, Christmansson, & Eklund, 2008). Ergonomic interventions can be expected to yield different results within different organizational contexts (Neumann, Eklund, Hansson, & Lindbeck, 2010). Examples of organizational characteristics which contribute to and influence the context of the ergonomic intervention are: producing a new product, addition of new technology, the employment of new staff etc. A recent review has found that interventions have consistently focused on making changes to the specific tools and work processes which may be the root of ergonomic risk factors, but fail to address organizational factors (van Eerd et al., 2010). Because of the short term transactional approach of these interventions, they are unable to encourage organizational learning (Broberg, Seim, & Anderson, 2009) or promote changes in the work habits of users (Huang, Chen, Krauss, & Rigers, 2004). It is this behavioural modification process that can improve safety of the organization overall (Griffin & Neal, 2000). To instill such behavioral change at the organization level, stakeholder roles and responsibilities must be clearly identified and reinforced (MacKinnon et al., 2009), and safety culture must be considered during program implementation and monitoring (Bentley & Tappin, 2010).

2.1 Participatory Ergonomics

PE programs are implemented to draw upon valuable tacit knowledge of experienced workers, as they provide workers with the skills they need to participate in planning and modifying their own work tasks and practices (Wilson, 1991) through engaging them in the design and implementation of ergonomic solutions (Buchel & Raub, 2002). This approach to change allows an organization to avoid dependency on consulting ergonomists; rather efforts are focused on drawing upon appropriate internal resources and building the capacity to sustain the program independently over time.

PE has often been used as a model for injury prevention programs (Haukka et al., 2008; Huang & Feuerstein, 2004; Pehkonen et al., 2009) and these models have employed many strategies for addressing WRMSDs (Pehkonen et al., 2009). Some approaches have been designed to make improvements in the physical work environment (Hignett et al., 2005; Laing et al., 2005; Laitinen, Saari, Kivisto, & Pirkko-Liisa, 1998; Molen et al., 2006; Pohjonen, Punakallio, & Louhevaara, 1998), and others focus on the psychosocial work conditions (Laitinen et al., 1998). However, research has found that not one program design will be effective for all contexts (Boocock et al., 2007).

PE effectiveness has often been evaluated in terms of reducing the incidence, and the severity of symptoms associated with WRMSDs. Research has found PE to be associated with decreased WRMSD-related symptoms (Rivilis et al., 2008), and a reduction in work load (Pehkonen et al., 2009). Despite these findings, research has been limited in its ability to demonstrate that ergonomics interventions can reduce WRMSD risk factor exposure (Lotters & Burdof, 2002), and has shown only moderate evidence of

PE interventions having positive impact on WRMSDs (Haukka et al., 2008; Rivilis et al., 2008). WRMSDs generally manifest clinical symptoms over a long period of time, and also require time before improvements in symptoms are observed. The dose-response relationship, or how much exposure reduction is needed to have a significant or measureable effect on reducing WRMSD (Westgaard & Winkel, 1997), has not been established. This further suggests that using the dose-response and WRMSDs as an outcome measure of PE program success to be unreliable. Due to the variety of challenges and barriers to observing and reliably reporting on changes in musculoskeletal health as a result of a PE initiative, it is not surprising that researchers suggest the need for longer follow up periods to better understand program effectiveness (Haukka et al., 2008; Tompa et al., 2009).

A recent review of ergonomic literature suggests PE programs address the contextual and systematic complexities of the organization (van Eerd et al., 2010). Research has made efforts to incorporate macro-ergonomic models in order to standardize terminology, identify facilitators, key stakeholders and barriers to success (Leyshon & Shaw, 2008). Macro-ergonomic principles are part of the foundation of any PE framework, where policies, processes and organizational culture are considered in the design and implementation of the program. In such an approach, attention is paid to all levels of the system, including culture, management, and environment. In a macro approach to PE, organizational change is expected and encouraged as it has been found that change is required for PE program sustainability (Holden et al., 2008). Holden et al.

(2008) recommends a framework built on research concepts of change management that can be easily implemented and monitored at the field level.

2.2 The SafetyNet Participatory Ergonomics Framework

SafetyNet, a centre for occupational health and safety research at Memorial University has developed a PE framework that has been implemented in both small rural and remote fish processing plants. The framework is built upon train-the-trainer PE concepts and principles of knowledge transfer (KT). KT is the by-product of active interactions between organizational stakeholders (Parent et al., 2007), where these groups have the capability to learn and grow based on the knowledge and experience of the another (Argote, Ingram, Levine, & Moreland, 2000). The premise of KT is that within every organization there is a need for knowledge and existing knowledge which can be harnessed to meet ever-changing organizational needs (Parent et al., 2007).

Much of the PE work completed by SafetyNet during 2007-2011 used a KT model developed by Parent et al. (2007) called the Dynamic Knowledge Transfer Capacity Model (DKTC). The DKTC is visually represented in

. The DKTC can be considered a realistic representation of how social capacities and knowledge exist and affect knowledge transfer within complex systems or organizations.

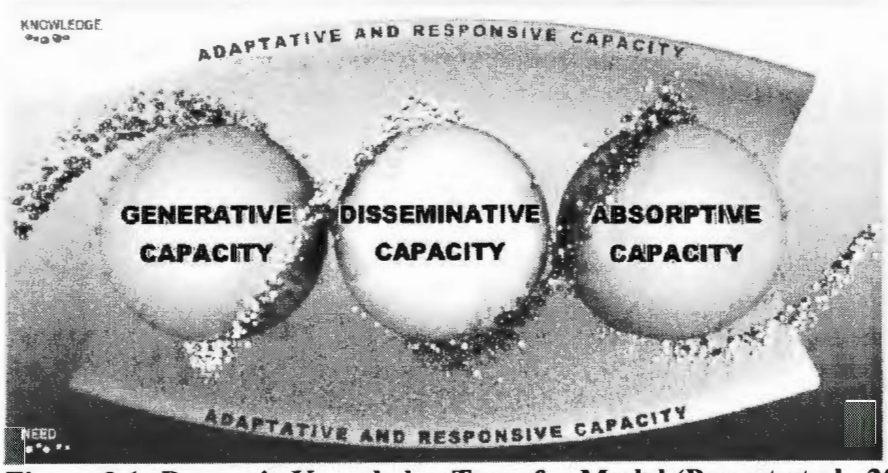

Figure 2.1: Dynamic Knowledge Transfer Model (Parent et al., 2007).

There are four types of capacities that exist within that social organization: generative, disseminative, absorptive, and adaptive and responsive capacities. The generative capacity refers to the ability to improve knowledge and the processes, technologies, products, and services that can result upon obtaining having such knowledge. Absorptive capacity has to do with the ability to identify the value of new knowledge from external resources and appropriately apply this knowledge to find solutions for internal system deficiencies. The disseminative capacity has to do with the ability to put knowledge into context, modify it, and share it through the social networks of the system to build management commitment. Adaptive and responsive capacities refer to the ability to learn and renew elements of the knowledge transferring system on a continual basis to meet the needs of a system as it encounters on-going and dynamic changes (Parent et al., 2007). The DKTC recognizes that within an organization, there exists knowledge, both tacit and practical, as well as the need for the new knowledge. An organization must possess certain social capacities in order to create and disseminate knowledge (Antle et al., 2007; Antle et al., 2011; MacKinnon et al., 2008; Parent,

MacKinnon, & Béliveau, 2006; Parent et al., 2007). Knowledge should be viewed not as an object which must be transferred, but instead as a systematic social construction that is specific to the context in which it is found and used (Parent et al., 2007). The development of knowledge networks and communications strategies has been found to be critical to engaging all levels of management in a PE framework (MacKinnon et al., 2009).

The DKTC model has been considered in the evaluation of the PE framework as a diagnostic tool to evaluate the KT capacities and predict PE sustainability (MacKinnon et al., 2008). SafetyNet used the PE model in 2007 in a study which observed the KT potential of an existing ergonomic program existing in a large industrial organization in Quebec Canada to a smaller industrial site in NL(Antle et al., 2007). This study investigated how the PE model could be used as a mechanism to transfer the research knowledge and skills from Quebec PE-action research team to a research team in NL. The study found challenges with disseminating the PE program implementation skills from the Quebec to Newfoundland based researchers. These findings were attributed to the logistical challenges with communication between research groups and the inability for the primary researchers in Quebec to act as the facilitating ergonomist at the early onset of the program (Antle et al., 2007). This study also found internal disseminative capacity challenges as a result of the inability to develop knowledge networks between management, supervisors, trainers, employees and other stakeholders (Antle et al., 2011). This finding is said to be attributed to inadequate development of roles and

responsibilities of management and other stakeholders at the onset of the program (Antle et al., 2007).

It is crucial to the development of social capacities to involve and engage stakeholders in the PE process (Parent et al., 2007). This research initiative found that although the PE intervention framework was employed, insufficient attention was paid to creating effective communications between the stakeholders, and therefore the process lacked in the ability to disseminate knowledge necessary for program uptake. The study recognized that a knowledge transfer model would initially have helped identify a lack of readiness for the intervention in terms of disseminative capacity (MacKinnon et al., 2008).

Research by SafetyNet in 2009 was designed to identify the gaps that small to medium sized enterprise would face due to the limited ability to interact with an ergonomic specialist. In this particular initiative, the framework considers the development of a researcher led internal worker-management ergonomics team approach. This framework assumes that this ET and its activities relate to a company's long-term operations and health and safety strategies, and is dependent upon many aspects of management commitment and support. This type of PE approach may be particularly useful for SME's located in rural and remote locations (MacKinnon et al., 2009). This study found that success was dependent upon the development and facilitation of knowledge networks and communications strategies and engagement from various levels of management participating directly or indirectly in the establishment of the Ergo-team. Building on this principle PE can be used as a platform for facilitating learning at the

organizational level as well as a framework to clearly identifies stakeholder roles and responsibilities needed to develop the social construct to build knowledge transfer capacity (MacKinnon et al., 2009). Understanding the characteristics of an organization and how management practices influence the social capital and culture will help research better understanding PE program sustainability.

2.3 The Role of Social Exchange in PE

Recent research arising from a SafetyNet PE program implemented to KT as part of the PE process found that the absence of a learning culture where members of management are ready to absorb knowledge and put it to practice will create an environment unable to sustain the program over time (Antle et al., 2011). Culture has to do with the more persistent and concrete values that help shape and guide the beliefs and behaviours in an organization which exist across multiple domains within the larger organization (Hartmann et al., 2009). PE is heavily influenced by the social capacities and social processes between stakeholders (Neumann et al., 2010), and culture is made of the perceptions and beliefs influenced by the behaviours of leadership (Zohar & Luria, 2005). As a result, it can be said that social exchange based management practices have become a factor for consideration in developing social capacities for KT in PE program models (Boone & MacKinnon, 2010).

Social exchange theory is built on a 'psychological contract', or the premise that a level of trust develops between leaders and members based on the assumption that their efforts will be reciprocated in the future (Blau, 1964; Mearns & Reader, 2008; Settoon et al., 1996). This social exchange relationship built on proven trust and relationships has

been described in the literature as resulting from two theories, perceived organizational support (POS) and leader-member exchange (LMX) between individuals (Walker & Hutton, 2006). It is through the fulfillment of psychological contracts that people feel their organization cares about their well-being, ultimately influencing POS (Hofmann & Morgeson, 1999). Quality interactions made up of communication and the development of relationships between workers and leaders or LMX provide the opportunity for psychological contracts to be fulfilled. Both POS and LMX have been identified in the literature by Hofmann et al. (2003) as being positively related to safety attitudes, POS being related to safety communication, as well as LMX being related to safety commitment and communication (Hofmann & Morgeson, 1999). Ultimately as management demonstrate their commitment to a program directly through their actions they will play a role in shaping perceived organizational support (Mearns & Reader, 2008; Zohar, 2002b), and will influence how others perceive that program to be supported by the larger organization (Clarke & Ward, 2006). This relationship between social exchange and culture is supported in the research as it has been said that a collaborative and holistic PE program equipped with the mechanisms to address the cultural component of the organization must be used to build trust and relationships between stakeholders (Theberge & Neumann, 2010). Considering culture as a factor in a PE program, social exchange can be the medium used to assess the environment which exists for social capacities required for KT to occur.

Because culture is routed in management behavior and the basis for social exchange, the most practical means of determining if an organization as the social

capacity for effective KT is through specific management practices. Three management practices that shape organizational culture through building trust and relationships as well as demonstrated commitment are: leadership, communication and networking.

2.3.1 **Leadership**

Leadership is the medium through which the social exchange element LMX will occur. Safety leadership has been defined as "the process of interaction between leader and followers through which a leader can influence others to achieve organizational safety goals within the context of organizational and individual factors" (Wu, 2005, pp. 2). These interactions are only in part determined by the formalities such as policies and procedures in the workplace, where the perceptions and beliefs of management have the potential to influence how they are implemented by others (Zohar & Luria, 2005). It has been suggested in the literature that individuals will be more inclined to change their behaviour when they engage in high-quality interactions with their supervisors (Hofmann et al., 2003). In such high-quality interactions, where trust has been established, the members are able to engage in collaborative problem solving and recognize opportunities to venture outside of the typical way of doing things and feel supported in the process. It has been found that the quality of interactions increase over time (Nahrgang, Morgeson, & Ilies, 2009), and therefore require effort on behalf of individuals to carry out these interactions on a regular basis to build this social capacity over time.

The concept of social exchange has been adopted, studied and evaluated within the leadership literature more so than the ergonomics literature. A leadership study in particular that set out in evaluating management practices as leverage for modifying

safety behaviours found significant improvements in safety climate as a result of implementing transformational leadership practices (Zohar & Luria, 2003). One study that looked at the correlations between safety leadership, safety climate and safety performance and found that there is a path that exists from safety leadership, through safety climate and then to safety performance (Wu, Chen, & Li, 2008), indicating that through improvements in leadership benefits are observed in safety performance.

The quality of the leader member exchanges or the interactions between leaders and members is influenced by the leadership style used. Transactional leadership refers to exchanges that are motivated by economic, political and psychological perspectives of each organizational groups (Simola et al., 2010). Transactional leadership is driven by short term gains. Transformational leadership reflects exchanges that enhance the relationships of leaders and followers as they interact based on common goals (Simola et al., 2010). Transformational leadership, although built on simple social exchange concepts reflects high quality interactions which inspire and motivate others to behave in a desirable fashion (Simola et al., 2010). It has been supported in the literature that leadership style has positive impacts at the micro level of the organization through social exchange between leaders and members (Simola et al., 2010), but there is a macro-organizational level benefit to using appropriate leadership style (Bolman & Deal, 1984). Research indicates that upper management may have a more effective program if they take the approach from a transformational leadership perspective and decentralize the line of command (Simard & Marchand, 1994), using a more participative approach to interacting with subordinates. This leadership style encourages the exchanges among

leaders and members that represent common goals (Simola et al., 2010), where leaders promote information sharing and collaboration (Barling, Loughlin, & Kelloway, 2002). This means of interacting with another individual represents a more participative leadership approach than the bureaucratic transactional leadership approach. Because of the components of social exchange used in a transformational leadership style it can be said that this approach will promote relationship development and contribute to a culture that fosters trust, participation and reciprocated behaviours in others.

2.3.2 **Communication**

Communication is one of the means through which management demonstrate their commitment to a program or initiative and reinforce the expectations they have for their reporting supervisors and management within that program. Such communications also help clarify organizational goals and objectives that are so important in establishing program commitment and support from management. Laing et al. (2005) suggests that improvements in communication practices and strategies are required prior to observing improvements in individual perceptions about the organization and subsequent behavior changes. It has been observed in the literature that some of the main challenges and barriers encountered in PE have to do with lack of effective organizational communication between levels of management and the front line level (Hartmann et al., 2009). Hartmann et al. (2009) explains the need for openness and flexibility within the hierarchy of complex systems so that information can be communicated efficiently within the hierarchy. It's been said that although conversation occurs spontaneously and frequently within organizations, unless it is interactive and intentional it will have little

influence on the listener (Mabey et al., 2012). Understanding what is meaningful to the person you speak with will influence the effectiveness of the interaction regardless of the leadership style used and therefore requires a degree of rapport.

Using a conversational or personal approach to interact with another individual will serve as the high quality interaction needed to build the trust and relationships which have been discussed as the foundation for KT social capacities. The social capacities involved in communication are the adaptive and responsive capacities where members are able to consciously learn, think critically and engage in continuous improvement. These capacities require that an environment of learning exist where open and honest communication is welcomed, encouraged and supported in its outcomes. The leadership literature has investigated how this environment can be created. A recent leadership study by Groysberg & Slind (2012) investigated the business strategies of large and small organizations in the 21st century and found that a new model for engagement and internal communication is about to take precedent over the traditional top down approach used by leaders to interact with employees. "Today's leaders achieve far more engagement and credibility when they take part in genuine conversation with the people who work for and with them. A conversation is a frank exchange of ideas and information..." (Groysberg & Slind, 2012, p.79). It is not always intuitive that we speak to another person in this fashion, particularly as leaders have traditionally used a top down approach to communicating key messages and expectations (Mabey et al., 2012). It's been said that those leaders who take communication seriously understand that knowing when to stop

sharing their own thoughts and allow another person to speak is critical in making the conversation personal (Groysberg & Slind, 2012).

Leaders are often unaware of the effectiveness of their communication and leadership behaviours and the impact on their subordinates. Studies have found that providing management and supervisors with frequent and regular feedback on their safety-related interactions with their subordinates, together with communication from their superiors and senior management have been found to have a positive impact on a safety program (Zohar, 2002a; Zohar & Luria, 2003).

Not only does the content or message of the communication need to be considered, but the means through which communication is delivered, the opportunities for interaction between them and the social capacities between them (Antle et al., 2011). Antle et al. (2011) found that a communication strategy must be designed in such a way that it is regular, predictable, and accessible and must provide information in a timely manner. Knowledge networks are communication and interaction opportunities arranged through a series of established mediums designed to cross the limitations of organizational departments and functional areas to ensure key stakeholders are involved in the development of topics they are interested or invested in (Buchel & Raub, 2002).

2.3.3 **Networking**

Macro-ergonomic research today aims to describe a work environment that promotes interaction of organizational members and stakeholder groups in order to solve problems and overcome barriers throughout implementation (Loureiro, Leao, & Arezes, 2010). The literature recognizes that communication barriers between different

organizational groups and levels take time, and may require deliberate effort to overcome (Neumann, Ekman, & Winkel, 2009). This ability to engage and motivate individuals is lost without the pre-determined and planned opportunities to communicate and participate in those high quality interactions that have been described as critical to developing KT capacities.

The literature has found that with the help of management who are committed to participating in knowledge networks, a productive environment for information and KT can occur (Buchel & Raub, 2002). Based on the work by Buchel & Raub (2002), there are 4 steps that contribute to the building of knowledge networks. These steps are: focusing the knowledge network, or aligning the network with corporate priorities where appropriate linkages in the organization are made, creating the network context where communication mediums are identified in order to foster trust and commitment, routine network activities, roles and responsibilities are established and momentum is maintained, and the last step being leveraging network results, where network outcomes are shared and made visible to others within the organization. These 4 steps to knowledge network development are not independent of the other social exchange based management practices, but instead serve as a means of utilizing communication and leadership effectively and intentionally. Because the disseminative capacity facilitates the movement of the knowledge and generative capacity reflects the ability to put knowledge into meaningful action, whether an organization makes the effort to develop and execute a meaningful and effective networking strategy that truly reflects the needs of the system

will influence the generative and disseminative KT capacities within the DKTC (Antle et al., 2011; Buchel & Raub, 2002).(Parent et al., 2007)

Although PE literature identifies various stakeholders and appropriate roles and responsibilities, there is little guidance in how the formal and tacit knowledge fostered in the PE program can be leveraged. Given the role of management in the overall ability to maintain a PE program over time, and their role in shaping the overall culture in which the program must exist, knowledge networks are a logical means of improving the perceptions of others on the program, management commitment, support and program-related communication, as well as maintaining moment of the program overall.

KT literature has suggested that attention should be paid to how management can contribute to the development of social capacities within an organization in order to strengthen relationships between organizational groups and levels (Szulanski, 1996). It must also be considered that these networking opportunities, when properly endorsed by management, serve as an opportunity for management to not only communicate with other stakeholders and involved individuals, but also to have quality interactions with employees to build trust and relationships along the way. Improvements can be observed in management practices such as leadership, communication and networking through social exchange where it is possible to observe small improvements in the management practices that predict larger more sustainable changes within the organization.

2.4 Organizational Perspectives

Work organization reflects how management within an organization chooses to manage all aspects of its business and operations over time. Because management exist

across all levels of the organization and their behaviours and practices are so influential on the organization, research suggests that it is necessary to observe multiple perspectives and the impact of management and stakeholders on that organization (Tompa et al., 2009).Therefore, a model has been developed to explain these factors and their impact on the organization (Bolman & Deal, 1984). This model has been used in the literature and is said to "represent the four different perspectives of an organization which accentuate four different ways of looking at it and at what goes on inside it" (Hale & Hovden, 1998, p. 144). The social exchange based management practices leadership, communication and networking that have been linked to ergonomics program sustainability are embedded in these four perspectives, or frames as they are described by Bolman and Deal (1984). Activities in each of these frames can be used to understand how management behave, make decisions and contribute to the organization. Taking on not one but all four of these perspectives provide a holistic view on these management practices and how they may change over time.

2.4.1 **Structural Frame**

The structural frame reflects the need to get things done, and assigning individuals throughout the organization as being responsible for doing so (Bolman & Deal, 1984). In a large and diverse organization, or complex organization, it is challenging to coordinate all the different activities while ensuring they are properly aligned (Bolman & Deal, 1992). In the context of implementing an ergonomics program, policies, procedures and processes are critical to forming the foundation to support that program and its activities

over time. These structural elements provide the foundation for the activities of a PE program and are observed in the structural frame.

2.4.2 **Human Resources frame**

The human resources frame reflects the way the organization is able to manage the people in it and their contributions to the organization (Bolman & Deal, 1984). The premise is that people are the most valuable and important resource in the organization, it is how their skills, ideas, insights, energy and commitment interact to make the organization function (Bolman & Deal, 1992). Careful management of this valuable resource within the organization can be both productive and rewarding for the individuals and the organization. In this context it is recognized that there is a reciprocating dependency between organizations and individuals, and that the organization exists also to serve human needs. There should be a fit between the organization and the individual to benefit both parties where the individual can do meaningful and rewarding work and the needs of the organization are also met. As individuals interact, interpersonal relationships develop as they are aligned with their social needs and organizational expectations. Through this process individuals are communicating, offering and receiving feedback, reinforcing the behaviours their want and need from each other. Individuals are acting as leaders and are reinforcing what's important to them as well as to the organization. It is though this frame that LMX and POS, the basic elements of social exchange are observed.

2.4.3 **Political Frame**

The organization can be viewed as being dynamic and a political arena with complex interactions between organizational groups and stakeholders in relation to their needs, goals, and the expectations they have for each other(Bolman & Deal, 1984). This perspective recognizes that important decisions within an organization require careful allocation of limited resources, and that interests of individuals within various levels of the organization will determine how these resources are distributed (Bolman & Deal, 1992). Departments will compete for resources and power, while individuals compete for jobs, titles and recognition.

Management will employ different perspectives when making decisions and goal setting, based on their knowledge and their job objectives. As stakeholders work towards individual power and recognition the conditions will exist to create a natural amount of conflict. How the organization designs and utilizes a strategy to provide interaction, common interest and investment in organizational objectives will determine its ability to manage these various perspectives and priorities. Through a well designed and implemented networking strategy, stakeholders are able to share their views, perspectives, power, and work towards a solution that represents organizational goals that will illustrate political improvements. It is through this frame that the perspective of managing and promoting cohesive political activity through networking and decision making that will facilitate knowledge transfer.

2.4.4 **Symbolic Frame**

The symbolic frame is based on the basic understanding of human and organizational behaviour (Bolman & Deal, 1984). Within this perspective, the meaning behind the occurrence of an event and the impact it has on those involved is more important than the event itself. This frame encompasses the view that one's actions seem rational at the time, given the knowledge and understanding of the situation created by the climate and culture of that organization. It is through this frame that the perceptions held by individuals that contribute to their understanding of the organization. It is this subsequent culture that governs the ability of knowledge transfer to exist and become responsive to changing organizational needs.

3 Methodology

This study was initiated when a poultry processing plant contacted SafetyNet requesting a PE program be implemented in their plant to address the high incidence of WRMSDs. Plant management were now interested in working with SafetyNet to implement a PE program address the high incidence of WRMSDs, but also to implement a program that could be sustained in-house over time. This program implementation provided a research opportunity to observe changes in management practices as a result of the new PE program. The framework used for this program was developed and used by SafetyNet researchers in similar studies, the most recent of which was conducted in the same plant as that of this study (Antle et al., 2008a; Antle et al., 2007; MacKinnon et al., 2008; MacKinnon et al., 2009).

The complete reference list of literature which contributed to the academic development of the SafetyNet PE program framework and toolkit can be found in the SafetyNet PE program user manual on the Memorial University website (Antle et al., 2008b).

3.1 Plant Description

The poultry plant for which this PE program was implemented is described as a unionized work environment producing approximately 40,000 chickens every day, operating on a year-round basis. The plant has been in existence for approximately 30 years and has undergone many changes in production, automation, and administration processes during this period. As these changes occurred, much of the working population remained the same in the plant. Today, there are many workers who have been

performing highly repetitive work in poorly designed work stations for a substantial proportion of their working lives. The plant has a history of high incidence of WRMSDs in its working population, as suggested by a considerable workers' compensation claims history and further validated through past ergonomic audits and assessments. The past ergonomic audits identified several areas for improvement and ergonomic weaknesses, in both workstation design and organizational management. Given the anticipated challenges with ergonomics program uptake and sustainability, plant management were interested in a PE program implementation designed to build participation from key stakeholders and develop capacity to sustain the program in house over time.

The organizational design of the plant includes 8 functional departments: Finance and administration, human resources, sales and marketing, production/processing, plant services, feed, farm, continuous improvement. Each of these functional departments is operated by a member of the upper management team reporting directly to the Chief Executive Officer. Two of the 8 functional areas, feed and farm, are physically separated from the main plant. The operational areas of the plant are plant services and production/processing and plant services.

Occupational health and safety in the plant is governed by several committees within the organizational structure to promote union management alignment in safety initiatives and program management as well as oversight at the upper management level. The use of this committee structure to support the PE Program was of interest as it is an aspect of the management practice of networking observed within this study. Within this structure, the Occupational Health and Safety Steering Committee meets quarterly and

consists of the following core members: two representatives from the plant, director of human resources and occupational health and safety coordinator, two representatives from WHSCC, 2 co-chairs/alternates from the Occupational Health and Safety Committee and one representative from the union. The senior management Health & Safety Meetings is held quarterly and the following stakeholders are invited: Chief executive officer, union executive member, occupational health and safety coordinator, plant services manager, director of human resources. A joint occupational health and safety committee functions and includes front line staff representing all operational areas of the production/processing aspect of the plant, as well as union and middle management. As reflected in the committee terms of reference, these two formal committees and the senior management meetings are used to monitor the occupational health and safety program and ensure action at the floor level and oversight and management at the middle and upper management level.

3.2 Study Design

The SafetyNet PE framework was used as the foundation for this observational case study. An observational case study was selected because a specific aspect of the organization was of interest to researchers, and through the PE program implementation the practices of PE program stakeholders could be observed.

The SafetyNet PE program framework requires that certain prescribed activities occur from the onset of the program through the identification and training of the ET, as well as the implementation of an ergonomic-based workspace. Therefore an observational case study to evaluate the SafetyNet PE program framework was ideal as the program

itself served as a medium to observe changes in management practices of leadership, communication and networking as a result of the program implementation.

3.2.1 Ethical Considerations

Ethical considerations for this study required that participants sign the consent to take part in health research form which disclosed that the PE program was under observation for the purposes of graduate research. Ethical considerations taken as well as the consent for health research form were approved by the Human Investigation Committee of Memorial University. A copy of the informed consent to take in human research can be found in Appendix A: Consent to Take Part in Health Research Form.**Error! Reference source not found.**.

3.3 SafetyNet PE Framework Activities

The SafetyNet PE framework is a stepwise approach to implementing an Ergo Team driven ergonomics program using an external university-based researcher or practitioner. The SafetyNet PE framework is designed to aid in overcoming many organizational barriers associated with program sustainability through timely organizational communication and networking. The expectation of the university researchers is that during the study period they will help prepare organizational stakeholders for their role in the program, ensure initial program requirements are established and the PE process is understood, and there is adequate training provided for stakeholders to carry out their responsibilities. When an organization decides to work with SafetyNet to implement this program they will begin to work with internal PE program stakeholders to begin the program implementation. The primary goal at this

point is to identify a PE program Ergo-Team with both worker and management representatives. A consultative approach will be used to identify these individuals and then training for them will begin. Once the ET is trained and in place, a training intervention will be used by the university researchers and the ET to practice the newly acquired skills and apply their ergonomics knowledge. Throughout this first intervention the ET will be closely monitored and coached by university researchers to ensure competency in their skills and understanding of the program framework. The details of the stepwise approach to ET development and PE program implementation as per the SafetyNet PE program framework are outlined in this section.

3.3.1 Proposed Meeting with Plant Management and Union Executive

A meeting was held with plant management and the union executive in the preliminary stages of program implementation before SafetyNet was consulted. This union group requested SafetyNet to propose a 2-year PE program. SafetyNet was invited by plant management to the poultry processing plant to present the proposed framework and implementation plan for the PE program. The stakeholder groups represented were: upper and middle management, disability management, union representatives, plant services representative, and the occupational health and safety committee.

3.3.2 Information Meetings

PE program information meetings were held for plant employees, supervisors and management in the early stages of the program implementation to ensure they were aware of the intent of the program and how they can become involved in the PE program through the ET or as a participant in the intervention process. The information meetings

were held during the PE ET selection process, PE ET training and during the launch of the first intervention of the program. Information sessions were intended to be ongoing throughout the program to ensure employees have updates about the ET and program activities. These information meetings make up an awareness strategy to ensure employees know about the program objectives and its activities and to build workforce familiarity within the plant of ET worker and management representatives. The series of information meetings served as a strategy for promoting participation; ensuring questions/concerns and uncertainties are addressed early on in the program interventions and workers are able to directly participate in the project.

3.3.3 **ET Selection Process**

The stepwise PE program began with recruitment for the ET worker and management representatives. Under the PE program framework, the ET is intended to consist of 2 worker representatives and 2 management representatives. With the support of university researchers, the ET selection process was initiated by upper management, as they were the initial drivers for the program. The recruitment and selection strategies for ET worker representatives were discussed in a meeting with representatives from upper and middle management with the support from university researchers early in the PE program launch. The two members of middle management present at this meeting were ultimately selected as the ET management representatives. The involvement of these two management members was established early in the launch due to their formal and informal safety leadership roles and responsibilities in the organization.ET Mgt Rep 1 was selected based on their formal safety leadership role and ET Mgt Rep 2 was selected

based on their production supervisor position in order to all the ET to liaise with front line leadership to facilitate the ease of PE activity planning and execution purposes when front line staff are required from the floor. An alternate ET management representative was named to ensure another member of middle management was trained in the PE framework and activities for support as required. Two members of upper management would be considered PE program stakeholders, UM 1, and UM 2 as they will be involved in the implementation of recommendations that are presented by the ET after each intervention.

During this meeting, names for possible ET worker representatives were discussed and university researchers urged management to identify a strategy for identifying interested candidates from which to make an official selection. Management communicated their request for ET worker representatives using a poster campaign throughout the plant. As a result of this effort, workers throughout the plant contacted management and expressed their interest in learning more about the program. These individuals were then invited to attend a meeting with management and SafetyNet for an information session on PE and the potential benefits this program may have on health and safety in the plant over time. This process generated interested volunteers from the worker cohort and educated them on PE objectives and roles and responsibilities on the ET prior to formally committing their participation. After this information session, those who remained interested were asked to complete a short questionnaire. Upon review of the questionnaires submitted, ET members would be selected by ET management representatives based on a self appraisal of the following: desire to work as a group in a

challenging and problem solving environment, verbal, writing, computer, and oral presentation skills, as well as established peer relationships. This process of recruiting and selecting ET worker representatives was performed by ET management representatives and upper management under the guidance of university researchers. This aspect of the PE framework provides flexibility in the ET recruitment and selection process to meet the needs and culture of the organization. Middle management were involved in the selection process as they are familiar with the culture of the organization, how to ensure fair communication and recruitment is used, as well as the work ethic and personalities of workers who submitted the completed self appraisal questionnaire during the selection process. Having this context, middle management were able to narrow down and select which workers would be able to carry out the PE ET activities in a competent manner. Although this flexibility was intentionally given to the PE program stakeholders, it provides the unfortunate opportunity for personal and internal politics to influence the selection of worker representatives.

It was found that 88 % of those who attended the information session completed the recruitment questionnaire. It was decided by management that those interested in participating on the ET who were also on the Occupational Health and Safety (OHS) Committee would not be asked be considered. The decision based on the hope that identifying different individuals for the ET would only strengthen the body of workers involved in safety and health initiatives in the plant and engage as many people as possible. Four of the individuals who finished the questionnaire were selected by management to attend a 2-day training seminar on PE, ergonomic principles and

intervention and data analysis methods. ET management representatives were identified during one of the first PE management meetings in the fall of the first year of the program. Attendees of this meeting were: SafetyNet ergonomists, members of upper and middle management and the union executive. SafetyNet researchers facilitated a discussion around roles and responsibilities of management on the ET while those in attendance discussed who might be most suitable for the role given their job description and daily activities in the plant. Members of management needed more time to think about the roles and responsibilities and consider how it will interact with other functioning committees. The group reconvened several weeks later without SafetyNet after the worker representative recruitment was under way and finalized who would be the ET management representatives.

In summary, the ET was composed of 2 management representatives and an alternate representative (ET Mgt Rep 1, 2, 3), 4 worker representatives (ET Wkr Rep 1,2,3,4) and 4 members of upper management were named as PE program stakeholders for support and governance purposes (UM 1, 2, 3, 4). These PE ET representatives and program stakeholders can be seen in Figure 3.1: PE Program Stakeholders.

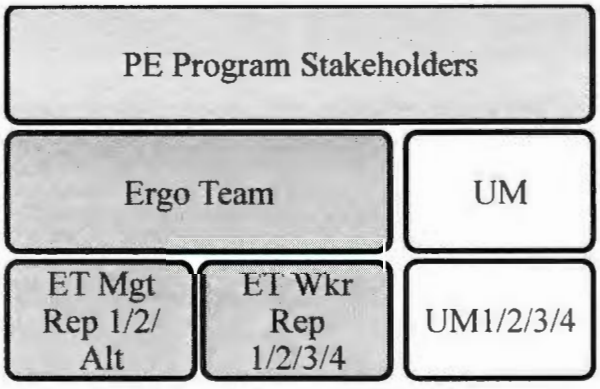

Figure 3.1: PE Program Stakeholders

3.3.4 **ET Training**

All of those who responded to the questionnaire and participated in the interview process and those selected from management to work on the ET were asked to attend two separate full day training sessions of eight hours each. This training was delivered by the university researchers and would prepare the ET for activities within the PE program. The training included lectures on: ethics and confidentiality when using volunteers when collecting personal information and information that will be presented to others, methods for identifying and choosing an area within the plant to conduct an intervention, basic ergonomic principles, movement analysis, basic computer skills and document management and organization, and interview conduction skills.

During this training session, the ET learned about various methods and factors in the selection for PE interventions. Using this knowledge, the team identified the In-feed room in the further processing department as the first intervention. This first intervention was closely monitored by the university-based ergonomist and was used as a training intervention to promote skill development and understanding of the ergonomic principles. Through this training intervention, the ET members were required to learn several PE program-related skills which included: conducting pre- and post-video analysis interviews, post-video analysis interviews, video analysis and report writing. The training sessions were on-going throughout the entire first intervention in order to consolidate newly acquired skills and to ensure the ET was moving through the PE program model properly. The first training intervention was followed by a second workstation intervention. The culmination of each intervention produced a report containing