

ARE THE NEEDS AND CONCERNS OF COMPUTER USERS AS IDENTIFIED  
THROUGH A PARTICIPATORY ERGONOMIC APPROACH REFLECTED IN THE  
CONTENT OF A TYPICAL OCCUPATIONAL THERAPY OFFICE ERGONOMIC  
EDUCATIONAL PRESENTATION?

by

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Submitted in partial fulfillment of the requirements  
for the degree of Master of Science

at:

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DALHOUSIE UNIVERSITY

SCHOOL OF OCCUPATIONAL THERAPY

The undersigned hereby certify that they have read and recommend to the Faculty of Graduate Studies for acceptance a thesis entitled “ARE THE NEEDS AND CONCERNS OF COMPUTER USERS AS IDENTIFIED THROUGH A PARTICIPATORY ERGONOMIC APPROACH REFLECTED IN THE CONTENT OF A TYPICAL OCCUPATIONAL THERAPY OFFICE ERGONOMIC EDUCATIONAL PRESENTATION?” by Jill M. Phillips in partial fulfilment of the requirements for the degree of Master of Science.

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Dedication Page

To my mother who encouraged me to read from a very young age,  
when all those around her could not understand why she was  
“wasting her time.”

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## **ABSTRACT**

Using a participatory ergonomic approach, this research explored if the self-identified needs and concerns of computer users are reflected in a typical occupational therapy office ergonomic educational presentation. While the study confirmed that generally the needs of computer users are met, the topics that the participants found to be most relevant were workstation layout and equipment adjustment. This study also revealed that knowledge transfer/translation is an important factor and that clinicians should consider involving clients at the initial development phase of client educational information. The study participants preferred ergonomic information to be communicated in a brief manner, emphasizing action-oriented information and avoiding medical references. They wanted client information to employ humour, colour and lots of “pizzazz.” The *manner* in which clinical information is communicated to clients is *vital* for effective client education.



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## **CHAPTER 1 INTRODUCTION**

### Introduction to Research Topic

As society has become more dependent upon technology, there has been an increased use of computers in the workplace. Since the 1980s this increased use of technology has also produced a corresponding increase in the number of repetitive workplace injuries to computer users. Many computer users experience pain and discomfort of the wrist, hands, neck and back. In the large healthcare organization in which I formerly practiced, each year hundreds of computer users experienced pain from the repetitive demands of using a computer, and consequently were referred for occupational therapy ergonomic assessment and education.

The word *ergonomics* derives from two Greek words, *ergos* (work) and *nomos* (natural law). The main purpose of the field of ergonomics is to match the worker with the job in a safe and efficient manner. In an outline of the original roots of occupation, Gainer (2008) indicates that ergonomics grew from the need to rehabilitate military personnel injured in the First and Second World War. In the 1980s there was increased involvement by occupational therapists in ergonomic programs which increased in the 1990s and on to the present day.

For the past 15 years, typical training approaches for safe methods of patient handling, materials handling and computer ergonomics have used relatively passive,

didactic ergonomic training sessions designed by professionals (Bohr, 2002; Briggs, 1986; King, 1993). The assumption is that if employees are provided with high quality professionally designed ergonomic information, they will understand this information as relevant, internalize it, and apply it in a contextually appropriate manner in the workplace.

In my practice as an occupational therapist in the discipline of ergonomics, the typical approach to client education was based on evidence from ergonomic research, with a special focus on the set-up of a computer workstation. This would include such information as anatomy and physiology of the neck, hand and back; positioning of the computer monitor and keyboard; chair height adjustments, lighting and heating; stretching exercises; and pacing (see Appendix M).

I chose to research this topic as it represented my interest of involving the client (end user) in the development and planning of an office ergonomics program. My question explores if clients' self-perceived needs and concerns are reflected in the content of a typical office ergonomic education session. This research represents my interest in exploring a different manner of approaching the presentation of ergonomic researchers. My question represents my interest in the content of computer users' workstation ergonomic needs and concerns and compares them with the content of a professionally designed office ergonomics program.

Current research posits that involving end users (those individuals who carry out the work on a day to day basis) in the development and implementation of an ergonomics program will result in greater retention of ergonomics information with increased

problem solving of ergonomic issues by the end users. Research supports the argument that the more involvement the end user has with development of the ergonomic program and problem-solving of the issues, the greater the compliance and effectiveness of ergonomic recommendations (van Eerd, 2101; Gravina, Lindstrom-Hazel & Austin, 2007; Kogi, 2008; Robertson & Huang, 2005).

### Personal Significance

My cultural roots are from a working class environment, in which providing food and shelter for the family was emphasized. Academic qualifications were not considered to be important by most families as they were not seen as being of help in providing the basic necessities of life. In that community however, there were natural leaders, who could guide the community in a direction of positive growth and improvement. As Bercuvitz (1999) has commented, “there are a lot of people who can do very important things for our communities, whom we would never think of as community leaders and yet whom we might not now be tapping.”

I have observed that there are natural leaders in many communities, including the work community, who can guide and positively develop their environment and who can make recommendations regarding action-orientated ergonomic improvements, as reflected in the findings of van Eerd (2010). These beliefs in natural leadership were further developed during my graduate coursework in community development, in which I developed and carried out a small injury prevention community development initiative with laundry employees. I was the subject matter expert/ facilitator and facilitated the front-line laundry workers to identify and problem-solve ergonomic issues. It was

surprising for me to observe how laundry workers, with appropriate support, changed their behaviors from complaining about ergonomic issues to providing solutions and leadership on ergonomic matters with co-workers (Phillips, 2006).

I have an extensive background in occupational therapy, with 25 years experience, during which time I have acquired experience in injury prevention and disability management as well as the field of mental health vocational rehabilitation. In my role as an ergonomic occupational therapist, I have carried out hundreds of computer workstation assessments and provided many ergonomic education sessions. I have the additional benefit of experience as an occupational therapy department manager, during which time I initiated, developed and administered a multidisciplinary vocational rehabilitation program. I have a clinical background in disability management and have developed generic return to work programs for computer users and other healthcare-related disciplines.

I have carried out ergonomic workstation assessments in all settings and with all kinds of individuals, from administrative assistants, to stores clerks, to nursing staff, to managers and senior hospital administration. My observation is that computer users have common behavioral traits and that they seek help usually when in active discomfort. They focus on the need for new equipment, but only occasionally do they make the behavioral changes required, such as adjusting their keyboard and chair throughout the work day or taking postural breaks. Computer users also focus on productivity requirements (getting the job done) and do not feel empowered to make changes to work demands. This has in turn led me to develop a personal interest in a participatory approach to office

ergonomics. Using this approach requires knowledge of ergonomics together with the ability to facilitate and nurture skills in others. It has been established that involving the worker in ergonomic recommendations increases compliance with such recommendations (Kogi, 2008) and so this study focuses upon determining the ergonomic needs and concerns of computer users.

### Professional Significance

Letts (2003), who is an occupational therapist with experience in participatory action research, states that “in participatory research then, the goal is to gain new knowledge that is useful to the group; and to do so in a way that is in the hands of the people who need the knowledge” (p.79). She states that there is a conceptual link between client-centered occupational therapy and participatory action research. Client-centered occupational therapy develops treatment programs centered upon the goals and priorities of the client and involves the client in the decision making element of the treatment process. It is a participatory partnership between the client and the therapist. The therapist provides the subject matter expertise and the client provides the context for implementation in the everyday setting. The therapist empowers the client to make decisions based on his or her own life experiences and individual circumstances; as Townsend (1997) has observed, “the transformative potential in occupation lies in recognizing that occupation is an active process through which people both experience and organize power” (p. 20).

A participatory ergonomics approach involves the computer user as an integrative part of the ergonomic program development; the user has active input into the design and

content of the ergonomic program (Laing et al., 2007). This approach requires that the professional be prepared to share information and power with the participants; not all professionals are prepared to relinquish this control. It is also initially more time-consuming to facilitate a participatory ergonomics program because the participants need to absorb and understand new information and then come to a consensus as to content and method (Young & Higgins, 2010). This approach also requires the facilitator to have skills to facilitate group dynamics, and develop empowerment of participants; not all facilitators have these skills. There is an ideal opportunity for occupational therapists practicing in this field to use their client-centered and facilitation skills to establish a strong presence in participatory research.

### Societal Significance

Community can be defined in many ways. Some communities have lives closely ‘interwoven’ and may be living with us, and other communities may have a common goal and be defined as holding membership (McMurray, 1999). We each operate in many communities and are constantly exchanging information to come to a group consensus on such issues as leadership and problem-solving. The workplace is one such community.

Participatory ergonomics is dependent upon group processes to develop a shared understanding of how information can be used. Its advantage is that it teaches the skills of empowerment and develops natural leaders and support systems and these developments can be applied to other issues within the society. The societal implications are that this approach empowers, develops and nurtures individuals to use the participatory approach

to problem solving. The skills learned through this process can be used both in the workplace and in other societal contexts outside of the workplace setting.

In the setting of computer users, the workplace community can develop an ergonomic program which addresses their distinct needs. It can encourage those natural leaders and problem-solvers to lead the community to make positive changes to the ergonomic set-up of the computer workstations. It may also increase the awareness of ergonomic issues within the workplace (Kogi, 2008).

This chapter provided background to the reader and outlined the rationale for the research question. The following chapter provides more detailed context, including a review of the current literature on participatory ergonomics.



## **CHAPTER 2 LITERATURE & RESEARCH CONTEXT**

### Introduction

A client-centered approach has been described as “a respectful partnership between therapists and clients” (Law, Baptiste & Mills, 1995, p.256). As a researcher and experienced occupational therapist, I have a strong interest in the participatory ergonomic process because of the identified similarities between a client-centered approach and participatory research (Letts, 2003). Letts (2003) concluded that participatory research is an approach which should be pursued more actively in occupational therapy because of these close conceptual links.

In participatory ergonomics the exact nature of ergonomic recommendations are determined by the employees engaged in the work process. The employees may for example recommend changes to the workplace which could increase awareness of ergonomic risk factors, by communicating through organizational magazines or ergonomic-related meetings (Laing et al., 2007; Robertson, 2002).

There appears to be a growing body of work to support the participatory ergonomic approach to ergonomic training. Such research shows an increase in compliance to ergonomic practices if the employees are involved in the ergonomic initiative from the very beginning. The review of literature relevant to my research topic focuses on processes related to participatory ergonomics, use of a subject matter expert, involvement of teams or focus groups, empowerment and knowledge transfer.

My question explores if the needs and concerns of computer users are reflected in a traditional occupational therapy office ergonomics presentation. I have used a participatory ergonomic approach so that the participant computer users are encouraged to become more involved with identification of ergonomic issues and action-orientated problem-solving (van Eerd et al, 2008, 2010). In van Eerd's systematic review of participatory ergonomic interventions it was found that there was no "one best way" to implement a participatory ergonomic program or intervention; van Eerd stated that the strength of participatory intervention is in its ability to adapt to the needs of the workplace, job tasks and workers (2010). Young & Higgins, who used participatory research to contextualize clinically relevant information for women, state that the advantage of a qualitative approach is that it uncovers broader issues which may not have been considered by the initial research question (Young & Higgins, 2010).

There are multiple issues which are of significance to computer users. The most frequently reported physical symptoms are of the shoulder, upper arm/elbow, wrist and low back (Hsu & Wang, 2003). Identified contributing factors are position of and adjustability of equipment (Chow, 2004; Fisher & Konkel, 2004; Robertson & Huang, 2005; Wong et al., 2006). Computer use is a highly repetitive activity; there are many thousands of key presses in the course of a single workday. The human body was designed to move, it was not designed to adopt a fixed posture. When we adopt a static posture there is decreased blood flow to the muscles and consequently decreased removal of waste matter from the muscles. Additionally the muscles are always in use, not having the opportunity to rest, and this constant muscle use is very fatiguing upon the musculature system (Fisher & Konkel, 2004). There are also, however, significant

psycho-social factors, such as workplace pace and deadlines, the influence of co-workers, attitude of management, and quality of ergonomics training (Haukka et al., 2010; Tompa et al., 2009).

This remainder of this literature review is divided into 5 sections. A review of the content matter of ergonomic presentations provides context for understanding the choices made by the participants in the study focus groups. The section on evidence supporting use of a team or focus group approach uses such groups for collecting the intimate view of participants and has been effectively used on other research to gather information. Evidence regarding use of a subject matter expert and facilitator explains why I have used this approach. The section on focus group empowerment discusses the important topic of participant growth which can occur within participatory groups. Lastly, knowledge translation is discussed as a means to understand how learning occurs.

### Content Matter of Ergonomic Presentations

There have been many studies which have used professionally prepared presentations containing ergonomic information and training to educate computer users in safe ergonomic practices (Fisher & Konkel, 2004; Szeto, 2002; Wong et al., 2006). The studies provided professionally prepared information in a classroom-type setting (Bohr, 2000; Olsen, 1999). Some studies focus upon ergonomic chair adjustments (Wong et al., 2006), and some focus on keyboard positioning and the position of arms and hands (Gravina, Lindstrom-Hazel & Austin, 2006).

The content of a typical ergonomic educational presentation is determined by the professionals providing the ergonomic session and is usually provided in lecture format

with visual aids (i.e., PowerPoint). For the purpose of this study, a review was carried out of those publically available office ergonomic presentations published on the internet. Some of these promote private companies and are used as an advertising tool for ergonomic services or the sale of office equipment; however some of these are only educational in nature.

The search was carried out in November of 2010 with the internet search engine *Google*. The search words used were “office ergonomic presentations.” This search revealed only ‘power point’ type presentations. I included only those presentations which were authored by healthcare professionals or which were endorsed by government or publically accountable organizations. I wanted to represent English speaking countries other than Canada and so chose presentations which included the United States and Australia.

The exclusion criterion was to limit the number of presentations to a maximum of 5 to facilitate ease of comparison. I disregarded any presentations which named or focused upon a specific product or service, such as advertising a specific brand of chair or equipment. I focused on government funded agencies and centres of learning to reduce any commercial influences upon the information presented. An example of such a presentation can be found in Appendix M. The presentations chosen were from the Eastern Health Regional Health Authority, the University of Texas, the University of Western Sydney; Memorial University of Newfoundland and Labrador/ SafetyNet and the City of Saskatoon, Saskatchewan.

The Eastern Health Regional Health Authority presentation was chosen because I had used variations of this in my ergonomic practice within the Employee Wellness

division (Eastern Health, 2010). Eastern Health is a large healthcare organization which has a dedicated ergonomic support program for employees. One of the roles of the occupational therapists within this program was to provide education to office computer users as an injury prevention initiative. The office ergonomic presentation used was the summation of many occupational therapists' input over a 15 year period of time, and may therefore be considered to be one representation of a typical professionally designed computer users' ergonomic educational presentation.

The University of Texas presentation was authored by Benjamin C. Amick III who is an associate professor at the University of Texas, School of Public Health and a research scientist at the Institute for Work and Health in Toronto. The University of Western Sydney presentation does not indicate the author; there is however a Faculty of Ergonomics which is led by occupational therapist Professor C. Cook. The SafetyNet/Memorial University of Newfoundland and Labrador presentation was authored by Professor Scott N. MacKinnon who is an ergonomist and SafetyNet research chair in workplace health and safety. The final presentation is from the City of Saskatoon; the author of this presentation is unstated.

I carried out a comparative content analysis across all 5 of the presentations and using my subject matter expertise identified common themes and topics, the details of which follow below. At the conclusion of the focus groups the definitions below were used to identify themes and topics and to categorize the discussions of the three focus groups.

This information is also summarized in table format in Appendix K and in detail in Appendix L.

The topics are:

- *Definition of office ergonomics*: This topic usually refers to the meaning of the word 'ergonomic' and how the purpose of ergonomics is for the task to fit the worker and not for the worker to adapt to the need of the task. Information which explains basic ergonomic terminology or provides contextual relevance was included in this section.
- *Anatomy and physiology*: Information on this topic usually has a representative diagram of the muscular and skeletal systems to assist the individual to understand what is occurring within their own body while at work. The information is medical in its focus.
- *Warning signs*: This section usually refers to a list of symptoms such as numbness, tingling, stiffness and fatigue. It may also refer to the 3 stages of injury.
- *Layout and design*: This section usually refers to equipment placement with an emphasis on the three zones for equipment placement. The zone closest to the computer user is where those items used more frequently are located; the least frequently used items should be placed furthest away from the user. This topic is frequently accompanied by a diagram of the computer workstation, showing appropriate placement and with information regarding height and distance measurements.
- *Equipment adjustment*: This section provides basic adjustment instructions for equipment, so that it is placed in an ergonomically supportive position. The usual

information provided relates to office chairs, keyboard heights, mouse and monitor placement.

- *Lighting/air quality/temperature*: This is not an ergonomic topic; however it is frequently included in ergonomic presentations. This is an awareness section to instruct the computer user of the influence of lighting and air temperature on fatigue and completion of work tasks. Lighting is a frequent concern with glare causing headaches, which also can increase fatigue.
- *Pace of work*: In this topic it is usual to explain that it is not only the repetition of task which can cause injuries, but also the ability to take breaks, including lunch and other breaks in task. It explains that if there is insufficient recovery time for muscles, there is a greater risk for injury.
- *Exercises and stretches*: Some practitioners include information on this topic and others do not. Stretches exercises while seated at the workstation improve blood flow to the upper extremities and thereby reduce injury risk.

Each of the five presentations was reviewed for content which could be categorized within the above topics. All five of the typical office ergonomics presentations include information regarding the definition of office ergonomics, workstation layout, and equipment adjustment. Four of the five presentations include warning signs of injuries, and three include stretching exercise information.

Each of these topics is perceived by the authors to be relevant to the multi-faceted issues of office ergonomics and reflect topics which they feel will benefit the client.

There is an assumption when a professional provides educational information to the client

that the information will improve the ergonomic posture of a computer user and that it will meet the user's need and concerns. This approach does not, however, consider if this information will meet the self-perceived needs and concerns of computer users, or if this is the correct delivery format for such information. For example there is no consideration of whether the participants prefer to have information presented in a face to face question and answer format. Neither does this approach consider the challenges of implementing ergonomic theory in a workplace setting. These challenges includes pace of work, supervisor and co-worker influence, and degree of financial support and cooperation provided by management, all of which influence implementation (Cann, MacEachen & Vandervoot, 2008; Nagamachi, 1995; Robertson & Huang, 2005).

Bohr (2001) noted that previous participatory research had used ergonomic training packages which were developed by ergonomics experts. She argued that participatory research should involve the participants at the ergonomic education development phase. Gravina, Lindstrom-Hazel & Austin (2006) state that "behavioral issues are also factors because of the issues of compliance" (p. 246). Their study on the effects of workstation changes and behavioral interventions on safe typing postures found that the involvement of ergonomic and behavioral features improves compliance with good ergonomic postures.

### Evidence Supporting Use of a Team or Focus Group Approach

The approach of my research was to employ focus groups to gather ergonomic information from the computer users. There is evidence to support the use of teams or focus groups to gather information and to assist in participatory problem-solving of



ergonomic issues. It has been shown that “focus groups are a useful tool for providing insight into people’s experiences, beliefs and opinions” (Teufel-Shone & Williams, 2010, p. 3). There are numerous recent studies which have used this approach (Ciccarelli et al., 2012; Koehorn, Ostry, Hussain & Village, 2010; Krause, Ruguiles & Maslach, 2010; Shaw et al., 2012; Vanderwal et al., 2011; Williams, Oschner, Marshall, Kimmel & Martin, 2010).

Many studies describe the effect of using focus groups in a participatory ergonomic approach. van Eerd (2010) carried out a systematic review into 52 articles which determined evidence regarding context, barriers and facilitators to the implementation of participatory ergonomics interventions in the workplace. This review confirmed that participatory ergonomics was effective in engaging workers in the identification and problem solving of ergonomic issues. They also identified the need to include groups and teams of employees as essential to the participatory ergonomics process. Kogi (2008) identified the essential role of the employees in the information gathering and problem-solving aspects of ergonomics.

In research into the effectiveness of participatory ergonomics intervention in improving communication and psychosocial exposures, a team approach was used. This team comprised of management, employees, health and safety and the researchers as members (Laing et al., 2007). They found that there was an increase in worker communication when using a participatory ergonomic team intervention approach.

Walmsley & Mannan (2009), in their research on participatory action research, found that considerable potential to contribute towards improved understanding of the

realities of the subject matter environment were identified with use of a focus group method. Blomqvist et al. (2010), in a study on involving patients as experts, used focus groups to make changes to the service provisions. It was noted however that when the core group which included professionals and the patient groups met, there was an uneven flow of information because of the uneven power distribution. Westmoreland et al. (2005), in her mixed method study of injured workers, used focus groups as a means to identify the workers' needs for job accommodation, communication and job re-training; they also used semi-structured interview formats. Timmins et al. (2007) found in a case study that participants of focus groups were interested in research findings and literature to problem-solve local problems. It was also noted however that implementation of the recommendations lacked widespread involvement of the community. Zlotnick et al. (2010), in a study of a community based research model, used focus groups to identify consumer information.

There are a few studies which do not support this approach. In an office ergonomics study which compared traditional methods (lecture format and handouts) and participatory methods (focus groups, interactive learning sessions, and problem solving exercises), there was no evidence that participatory methods were more effective than traditional; it was noted, however, that the participatory methods took double the time to administer (Boor, 2002). In a qualitative study, teams of workers identified and problem-solved hazards in the workplace. While the study did find that the employees were able to identify issues, at the implementation phase participants felt marginalized and the participatory nature of the program was curtailed (Drixon & Theiberg, 2011).

In conclusion, the overwhelming body of research supports the use of groups in participatory research to gather information and to understand the needs and concerns of the group being studied.

### Evidence Regarding Use of a Subject Matter Expert and Facilitator

In the participatory ergonomic component of my research, the key roles were facilitator and subject matter expert. To carry out this role effectively, some of the usual control I would have as a researcher over the group process and outcomes was relinquished in an endeavor to equalize the power balance.

A facilitator within participatory ergonomics encourages problem identification and problem-solving; the facilitator can also be the subject matter expert. The role of the expert is to facilitate the problem solving and ergonomic information as identified by the users. In a study of a participatory computer workshop, the facilitator was a subject matter expert; the expert provided the theoretical information for designing the workshop (Robertson et al., 2002).

An ergonomist expert provided safe manual handling information to hospital cleaners (Carrivick & Lee, 2005). Carrivick describes manual handling as the “use of force to lift, lower, push, pull, carry, move, hold or restrain something” (p. 908). Cann et al. (2008), in their study of food service workers, used an ergonomist who was familiar with the food service work to identify risks.

van Eerd (2008), in a systematic review by the Institute for Work and Health, found that the most usual form of participatory ergonomics is to have an ergonomic expert who provides the appropriate ergonomic information and who leads the group in its newly developed knowledge to make improvements in the workplace (Haims & Carayon, 1998; Halpern & Dawson, 1997; Reynolds et al., 1994).

van Eerd (2010) stated that it was important to involve an ergonomics specialist, which was the situation in the majority of the research reviewed. The role of the expert varied but usually involved initiating and guiding the participatory process as well as providing expertise in the field of ergonomics. Additionally, the expert in the reviewed research was often the collecting point of the ergonomic information, and would provide guidance and further facilitation to the workers involved with the initiative (van Eerd, 2008).

### Participant Empowerment

In Canada, a significant community development project was that of the 'Healthy Communities Movement,' launched by the World Health Organization in 1986. Its goal was to "promote the well being and health of communities by collaborative action at the local level" (Chalmers & Bramadat, 1995). The formation of groups of employees and other stakeholders - such as management - in a participatory ergonomic approach can have a positive impact on workers' health (Haims & Carayon, 1998; de Jong & Vink, 1997; Haines, Wilson, Vink & Koningsveld, 2002; Laitinen, Kurda & Sacri, 1997; Nagamachi, 1995; Simon & Leik, 1999).

The three main themes which emerged from the literature were empowerment, employee compliance and participants' knowledge. Chalmers and Bramadat (1995) also noted that participatory research "frequently also created an empowerment perspective that brings researchers and local participants together in joint enquiry, education and actions on problems of mutual interest" (p.728).

Involving the individual in the development and implementation of ergonomic programs empowers the individual and provides both knowledge and problem-solving skills development specific to workplace issues (Somerville & Brown-Sica, 2011). It noted that people can learn to create knowledge based on their concrete experiences which they reflect upon and thereby create new experiences. The underlying theme is that participatory research empowers and changes that individual in a positive manner.

More specifically, using a participatory approach has been found to empower the workplace community and increase the amount of co-worker co-operation and worker expectations of ergonomic standards and management compliance (Fisher & Konkel, 2004; Kogi, 2008; Prochaska et al., 1994; Reed, 2006).

Bade & Eckert (2008) found that participatory ergonomics "builds trust, ownership and subsequent commitment to targeted solutions or controls" (p. 106). Robertson et al. have also focused on a participatory approach in their research (2001, 2004, 2006); they state that a typical approach involves both subject matter experts and workers in developing and implementing programs. They also identified that participant groups display ownership and commitment to the program goals and execution.

Compliance is a significant factor in the ergonomic literature. It has been found that by empowering the employees to problem solve ergonomic issues there is greater

compliance with the ergonomic solutions (Robertson et al., 2002; Robertson & Huang 2005). In 2003, Martin et al. (with follow-up in Gatty, 2004) noted that feedback from co-workers during the implementation of the ergonomic changes enhanced these changes. These findings were later supported by Gravina, Lindstrom-Hazel & Austin (2006), in which it was confirmed that both workstation adjustments and behavioral approaches were needed to produce maximum improvements in ergonomics and to “produce a durable and meaningful change to behavior” (p. 246).

Halpern & Dawson (1997) have stated that the formation of a team “is essential for effective evaluation of the multi-factorial risks associated with MSD” (musculo-skeletal disorders). The expertise of the worker leads to a better understanding of the issues, improved job re-design and increased commitment to implementation through empowerment.

Inclusion of the worker in the participatory ergonomics process provides contextual knowledge of the workplace. It has been described by Robertson et al. (2002), who have published several pieces of research on participatory ergonomics, as involving "end-users in the planning, developing and implementing of workplace changes" (p. 306). They argue that this approach creates a sense of ownership on the part of the individual carrying out the job demands. It places ergonomic changes in the context of the individual both while using equipment and also when coping with other everyday environmental demands such as pace of work and interpersonal issues relating to supervisors and other coworkers.

Cann et al. (2008), in a study comparing lay and expert understandings of the risk in the food service industry, found that employees were “ a rich source of knowledge and experience concerning occupational risk and may be underutilized when designing interventions” (p. 219). This finding was confirmed in participatory ergonomics research by Boynton and Darragh (2008), in which they found that in problem-solving of issues a participatory approach permitted a “full and valued participation of workers and administration”(p. 99). When focus groups are actively involved with the process, they become empowered and this changes behaviour and improves the users’ workplace ergonomic choices.

In summary, there is much research to support that the formation of groups in participatory ergonomics increases participant empowerment, compliance and inclusion of participants’ knowledge.

### Evidence of Effective Knowledge Translation

During my research it became apparent that there are many different modes of providing ergonomic education. These include informational brochures, subject matter expert group presentations, and one on one education. Knowledge translation and its closely related concept of knowledge transfer have developed because there is a growing understanding that providing high quality knowledge *content* does not ensure that the information will be received by the user and then utilized.

Johnson (2005) describes knowledge *transfer* as the point at which knowledge is *delivered*, and knowledge *translation* as an “active, multi-directional flow of information which begins at project inception and continues to its application, it is integral in the

education of clients, students and the public” (p.12). Colquhoun et al. (2010) found knowledge transfer was critical in occupational therapy in a scoping study of three theories of knowledge transfer.

It has been found that professionally prepared ergonomic sessions have not always used effective methods of knowledge transfer and that other approaches need to be explored to improve the effectiveness of ergonomic training (Fischer & Konkel, 2004). It has been found that merely providing workers with ergonomic brochures does not improve work-related postures (Pillastrini et al., 2001). As a further example, the occupational therapist may prepare an ergonomics educational presentation with the most evidence-based and high quality content; however, if the client is not engaged in the learning process they may recall very little of the knowledge provided and will consequently use even less of the information to improve ergonomic positioning.

The central purpose of knowledge translation is to effectively communicate information to the target audience. Conveying information appropriately requires an understanding of the context of the knowledge users. Vink et al. (2008) noted that understanding a group’s “norms, language and concerns” were essential to positive responses to intervention. Zink & Strasser (2007) noted that to effect change in ergonomics, it is important to also understand the mechanisms of what motivates people to change.

Young & Higgins (2010) found that in participatory research, an exchange of information is more effective than a mere transfer from one individual to another, as it produces “more appropriate and effective promotion initiatives” (p. 352). While developing the final version of products may be beyond the abilities of participants, as



reported by Robertson et al. (2002), developing recommendations as to the *content* of the ergonomic recommendations was found to be within the participants' capacity.

Robertson & Huang (2005), in their quantitative study to explore the effects of office ergonomic training on worker knowledge and training found that there was no significant difference between the trained and untrained groups in the average level of ergonomic knowledge, although trained participants were more likely to make appropriate behavioral changes to their work stations. The researcher was "surprised" by these results. It is results such as these, from a researcher who has carried out many studies in this field, which encourage me to further explore more efficient ways to better understand the knowledge translation process in the field of office ergonomics. Consideration of knowledge transfer/translation is an essential component to any *effective* office ergonomics program.

### Summary

This chapter reviewed the existing research literature relating to participatory ergonomics, existing office ergonomics programs' focus groups, subject matter experts and knowledge translation. The next chapter discusses this study's methodology.

## **CHAPTER 3 QUESTION AND METHODOLOGY**

### **3.1 RESEARCH QUESTION**

My research question was:

**“Are the needs and concerns of computer users as identified through a participatory ergonomic approach reflected in the content of a typical occupational therapy office ergonomic educational presentation?”**

Sub questions:

- i. What are the computer users’ ergonomic needs and concerns as expressed through three focus groups (including the user developed office ergonomic program)?**
- ii. What is the content difference between the typical professionally developed presentation and the user developed office ergonomic presentation?**

The intent of this question was to explore the needs and concerns of computer users through the participatory action process of three focus groups; the last one of which would include the development of a user developed office ergonomic program. After the needs and concerns had been identified, they were compared with the content of typically prepared office ergonomic educational presentations.

The participants’ needs and concerns were identified through the content of three focus groups and a user developed ergonomic program. The issues were based upon participants’ intimate knowledge of the workplace environment. This study had the potential to encourage participants to problem-solve practical solutions which would lead to increased empowerment, permanent solutions and social change. The group

participants problem-solved the identified issues, with low cost ergonomic resolutions Kogi (2008). It was anticipated that the recommended ergonomic changes would include ergonomic training sessions and informational posters or other print materials. The actual format of the user developed program was determined by the participants.

### 3.2 RESEARCH APPROACH

Qualitative or naturalistic research is exploratory in nature and allows for new ideas and approaches to be used. The focus group part of my research was qualitative in nature and participatory action in design. DePoy and Gitlin describe the purpose of participatory research to be “to generate knowledge to inform action” with an “inclusive team of investigators and participants” (2005, p. 112).

It should however be noted that in this research the development of the study question and all other areas, with the exception of the content of the focus groups, were designed and determined by the researcher. In participatory action research, all aspects of the study are determined by the participants.

Participatory action research usually takes place in a group setting. It is the problem solving within the group setting which determines the goals and ultimately the form of the solutions. In this project, it was the sum of the focus group participants’ knowledge, experiences and intimate workplace knowledge, together with the subject matter expert’s ergonomic expertise, which identified the needs and concerns within the workplace.

This approach to research is interactive in its very nature; its foundation is that of a society with shared experiences. Park (1993) describes it as participants “sharing a life-world together - speaking with one another, and exchanging actions against the background of common experience, tradition, history and culture” (p. 6). A group of co-workers at the same employer and sharing the same roles as support staff would be part of such a society.

### 3.3 DETAILED METHODOLOGY

The study design utilized a participatory ergonomic approach, in which the experience and thoughts of the participants were highly valued, and their input was actively sought in identifying solutions to their office ergonomic concerns.

The main research tools were the three focus group meetings which I facilitated. The focus groups occurred during work hours in a conference room within the workplace to facilitate ease of attendance. The support of management was given, who continued to pay the employees. In this research, I assumed the role of the facilitator, subject matter expert and researcher. The purpose of these meetings was for the participants to identify their ergonomic issues and concerns. The same group of participants met in the workplace on three occasions. The first focus group identified the computer users’ needs and concerns. The second meeting continued to identify needs and concerns and provided the participants with subject matter expert-provided ergonomic information, to address the ergonomic issues and concerns identified in the first focus group. The third meeting further discussed ergonomic issues and developed the participants’ office ergonomic plan.

The duration of each group meeting was two hours. The group met at two-weekly intervals to allow me time to analyze topics and to prepare ergonomic information for the subsequent group. There were 8 stages to data collection for this study, which are summarized in Appendix A in a table format. The nomenclature used in the remainder of this section is identical to that in the table.

These study stages were:

- a) Permission for study, including ethical approval by Dalhousie University
- b) Liaison with administrative assistant, who provided meeting logistical support
- c) Recruitment of participants
- d) Consent of participants
- e) Workplace contextual overview
- f) First focus group
- g) Second focus group
- h) Third focus group

a) Permission for study

The management committee of the Legal Aid Commission was provided with an outline of the proposed research. The written letter of proposal enquired if they would agree to an ergonomic study to take place at their worksite. They were advised of the purpose of the study and of the duration. It was made clear to them that the participants

would be required to attend three meetings. A copy of this letter can be found in Appendix B. The committee agreed to the study and responded with a letter of confirmation also in Appendix B. Ethical approval was applied for and received from Dalhousie University before the participants were approached and prior to commencement of the study.

b) Liaising with administrative assistant

The management committee was approached to appoint a contact at the workplace; she was an administrative assistant. I contacted the coordinating administrative assistant via e-mail with the recruitment information (a copy of which can be found in Appendix B). She was instructed to forward the recruitment e-mail provided by me to the approximately 24 administrative assistants within the organization.

c) Recruitment

The recruitment location was at the Legal Aid Commission of Newfoundland and Labrador, St. John's office. The participants were employed by the commission and were computer users who used a computer keyboard for at least 50% of the day, and who were support workers to lawyers. The number of research participants was limited by the researcher to 12. The participants were all females between the ages of 20 and 65; they typically worked 8-hour work days from Monday to Friday.

The participants were volunteers who were recruited via an e-mail which outlined the project; the management committee was sent a copy of the recruitment document, which can also be found in Appendix B. The participants were asked to respond by e-mail to me if they had questions or were interested in participating.

d) Informed consent process

Following receipt of the participants' e-mails expressing interest in participation; I met with the participants in person at a mutually convenient time and place. Potential participants read through the consent form explanatory sheet and had the opportunity to seek clarification as to the purpose and format of the research. Upon agreement, they were then asked to sign the form to indicate that they gave their informed consent. All consent forms were signed prior to the initial meeting of the focus group; copies of the consent form can be found in Appendix C and D.

e) Evaluation of workplace and questionnaire

A worksite walk-through ergonomic evaluation took place at the study site to provide contextual information for the focus group and to promote a better understanding of the participants' needs and concerns. This was carried out by me, as the subject matter expert with significant experience in this field.

Factors noted were:

- age and condition of office furniture
- general use of space
- storage of boxes and ancillary items
- physical layout
- pace of work
- any concerns raised by the worker during the review

An amended job site analysis form was used to collect this information (see Appendix G).

f) First focus group

*First focus group – Duration: 2 hours*

The focus group format was chosen for this study in part because of research conducted by Robertson et al. (2002) and Letts (2003). Both studies used a subject matter expert as a facilitator for the participatory research focus groups; the expert provided the ergonomic theoretical knowledge and the participants provided the issues and contextual knowledge. The function of the focus group was to collect ideas, identify issues and determine how to address them. I facilitated the focus groups and categorized the identified needs and concerns of the computer users.

During the first focus group, the participants were welcomed and reminded that they had previously agreed to the need for confidentiality and they agreed to the proceedings being audio-recorded. The interview guide (Appendix H) was used as a tool to stimulate discussion about the computer users' ergonomic concerns. As discussion moved away from the topic, the interview guide was used to re-focus the group discussion.

The design of the interview guide for the first group was semi-structured with open ended questions to encourage group discussion. An interview in naturalistic research can take many forms and can be an “informal, open-ended conversation to a focused or long in-depth interview” (DePoy & Gitlin, 2005, p. 199).



Following this initial meeting, the information was analyzed for key concerns of the group from both journal notes and the digital recording. This was used to prepare for the following focus group.

g) Second focus group

*Second focus group – 2 weeks later – Duration: 2 hours*

At the second meeting the participants were again reminded of the need for confidentiality and that the discussions would be audio-recorded. The main focus of this group was to present ergonomic information in response to the issues and concerns raised in the first meeting. The information was designed to enable participants to begin the process of considering how to problem-solve their issues.

The ergonomic topics that were raised at the previous meeting were documented on the written agenda for this meeting; the data used was collected from the audio-recordings and field notes from the initial meeting. Ergonomic information provided to the group was as follows: a need for information on a typical computer ergonomic setup (as can be found in the Appendix F), anatomical and physiological information of the computer user discussions of how and where to locate key ergonomic information and information regarding pacing of computer work.

As this section of the research was participatory action research, the exact content of the focus group meeting was determined by participants through analysis of the participants' discussions from the prior meeting. However, the actual format of the meeting was already determined by the study design to be a focus group format. The group participants were provided with the information necessary to facilitate the

computer users' problem-solving of the identified ergonomic issues. Following this second meeting a further analysis of the audio-recording and field notes took place. Issues and topics discussed were identified and used to provide an agenda and information for the third and final meeting.

#### h) Third focus group

*Third focus group – 2 weeks later – Duration: 2 hours*

As in the previous meetings, the participants were reminded of the need for confidentiality and were again advised of the audio-recording. The main purpose of this meeting was for the participants to provide ergonomic recommendations which addressed the previously identified ergonomic concerns and issues.

An agenda for the meeting was prepared, which reflected discussions from the earlier meetings. All needs and concerns with the participants from the prior two meetings were summarized within the meeting and documented on a chart for all attendees to review. I asked the participants to rank in order of importance any ergonomic recommendations and to indicate who would carry out these recommendations and how they should be achieved.

Throughout the focus group meetings emphasis was placed upon participant facilitation. The participants were encouraged to identify computer related issues and to develop the ergonomics recommendations. At the conclusion of this focus group, the ergonomics plan, as determined by the computer users, was documented and developed in to an action plan.

As the researcher/subject matter expert for this study with an extensive background in ergonomics, I was able to provide the information requested by participants. My background in ergonomics led to anticipation of the group's needs, although the exact content of the program was determined by participants.

At the conclusion of the third and final focus group, the participants were provided with anonymous paper feedback forms (Appendix I). They had one week to complete these forms and they were collected 8 days later. Information from these forms was included in the final analysis.

The study data which was considered during analysis of the results and discussions was as listed below:

- transcripts of audio recording of all three focus groups
- subject matter expert/researcher/group facilitator field notes
- contextual information from the participant and the subject matter expert's ergonomic worksite review (Appendix G)
- anonymous feedback from participants (Appendix J)
- content of the 5 typical ergonomic programs as defined in Appendix M and summarized (Appendix K).

## Research Instruments

There were three research instruments in this study: the job site general contextual instrument; the interview guide to promote discussion in the initial focus group; and the anonymous feedback form from participants.

### Job site general contextual instrument

The abbreviated job site analysis form was used to obtain contextual worksite information to better understand the needs and concerns of participants. The document in Appendix G was, at the time of the study, used at Eastern Health Regional Health Authority and in the majority of the occupational therapy clinics in Newfoundland. It had also been approved by the Workplace Health and Compensation Services of Newfoundland and Labrador. It was used as the main template for collecting job site information.

A modified job site analysis was carried out, a copy of which can be found in Appendix G. The study site is located in a 3-storey building which was renovated within the past 18 months to meet the organization's needs. The environment is modern and has air conditioning. Most of the equipment is new and ergonomically designed. The social environment is positive, although the nature of the work is fast-paced and very deadline driven. The key physical demands are constant sitting (at a computer desk) and constant hand function (keyboarding). There are also lesser physical demands of frequent static neck positions with occasional walking and some minor standing. The group made numerous references to specific positions and types of equipment used.

## The interview guide

The meeting was audio-recorded and journal field notes were taken which highlighted key points to aid in analysis. The interview guide was designed to promote discussion in the initial focus group. It focused upon the anticipated ergonomic needs and concerns of computer users; it was designed to encourage the participants to verbalize and identify ergonomic concerns and needs regarding physical, environmental or workload related issues. The guide may be found in Appendix H.

My focus was upon identification of ergonomic issues and perhaps the development of a participatory action program. The goal was for the participants to feel in control of the ergonomic program - for them *not* to feel that they were being observed by a professional, but rather to feel empowered to use the information that they already possessed to problem solve their ergonomic issues. The guide was designed to stimulate discussion by the participants.

Throughout the interview guide attention was given to the level of language used in the questions. The sentences were written in clear English, avoiding verbose or clinical language without being overly simplistic or demeaning in phraseology.

The interview guide focused upon frequently raised issues of computer users (van Eerd, 2008; Robertson & Huang, 2005; Laing et al., 2007). There are very few published ergonomic interview guides in the literature. This dearth of information was also found by van Eerd in his systematic review of 88 ergonomic articles by the Institute of Work

and Health (2008). In van Eerd's subsequent published research the following year, he included the content of his ergonomic interview guide.

I used the content of this interview guide, which drew on office ergonomic factors as identified by van Eerd (2009) in a study in which he explored exposure of computer users to tasks encountered in an office environment. The formation of the questions also referenced my ergonomic background and the content was reviewed by a second subject matter expert; we both have numerous years of experience in the practice area of ergonomic workstation assessments and resolution of ergonomic issues.

The guide contained three categories to stimulate discussion. The first section focused upon computer equipment and desk setup. The second section focused upon the participants' work demands. The third section explored the participants' opinions and understanding of ergonomically related issues.

In the first section there were questions pertaining to equipment adjustability (Martin, Irvine & Gatty, 2003) and the overall environment such as heat, light and general storage. There were also questions relating to monitor placement. If the monitor is for example placed in front of the window, there may be issues regarding bright sunlight at either the beginning or the end of the workday. This may affect the ability of the computer user to see the monitor clearly and may result in headaches.

In the second section there were questions regarding the participants' perceptions of work demands. There can be a great deal of variation in the amount of keyboarding the employee is required to carry out; most computer users also have other duties in addition

to keyboarding. It is a common phenomenon in the workplace to see workers eating their lunches at their desks. The questions regarding the taking of scheduled work breaks were asked specifically in the context of the work demands. Many workers compress their workday, choosing not to take a lunch break so that they may finish work an hour earlier; this is not the information that is sought here. I was specifically looking at the inability to take work breaks because of work demands.

The final section of the guide related to the participants' opinions on ergonomic matters. As discussed earlier, there is evidence to support that providing ergonomic information in isolation does not result in a computer user implementing ergonomic information; the beliefs and values that the users hold are key factors in the effective behavior change necessary to effect improved ergonomic positioning. This section was designed to gain a greater understanding of the computer users' current awareness of ergonomics and to stimulate discussion regarding implementation of ergonomic practices.

The guide was also designed to help identify what venues there may be for on-going ergonomic education; for example was there an in-house newsletter which could contain ergonomic tips, or could the staff meeting be used as a venue for brief ergonomic tips? There were also questions regarding the early warning signs of repetitive stress injuries; this was to determine if the users can identify when they need to change postures to reduce injuries.

As indicated earlier, the purpose of this guide was to stimulate discussion as to the computer users' needs and concerns; the guide was merely a tool of common ergonomic

themes and functioned as a starting point while actual topics were determined by the participants.

### Anonymous feedback from participants

The purpose of this anonymous feedback form was to understand the experience of the participants and to determine if they found the process useful. The feedback was anonymous so that the participant, who is in a position of power disadvantage as an employee and research participant, could be open and honest without the fear of intimidation or retribution. Power disadvantage can limit conversation and participants can withhold expressing opinions if they feel vulnerable and at risk. The questionnaire can be found in Appendix I.

### In-field Analysis

This participatory study was qualitative in nature and the direction that the process took was iterative and was allowed to develop naturally. Analysis of data began while still in the field, with notes, observations and hunches developed from the subject matter expert's field notes taken while the focus groups were running. Immediately following the group, additional notes and observations were added to the field notes. The ergonomic work site visit provided context for the ergonomic issues, a report of which can be found in Appendix G.

While the study was in progress, categories and sub-categories of topics and themes raised were developed to assist in the final analysis of data and new connections or directions of discussion were noted. Meanings were attached to the topics raised and



the discussion, including any perceived underlying themes. Member checking with the participants was used to clarify any points. The final focus group was in fact a form of member checking, as the discussions and decisions from the first two focus groups were discussed with the participants in the third group prior to the information being used to form the ergonomic program for the study site organisation.

### Post-field Analysis

In the post-field analysis the audio recording, transcript of the audio-recording, field notes, contextual information and anonymous feedback by participants were reviewed and categorized by the topics in the 5 typical office ergonomic presentations. A comparison was carried out of the content of the typical ergonomic presentation and the categories identified in the focus groups. The differences were categorized and documented.

There was exploration of the participants' recommended ergonomic changes and the process which occurred to achieve this. Special note was made of approaches to problem solving and any topics developing which were of a similar theme.

Crystallization was used to compare one source of information with another. Reflexivity was used to consider and reflect upon any of my personal biases.

### Risk Analysis

In any group setting there is a risk of exposure of potentially damaging information to a participant. The focus of this study was the identification of ergonomic needs and concerns; the subject matter itself was not considered a sensitive or high risk

subject matter. Group settings in the workplace have the potential for coercion of fellow participants, either through intimidation, monopoly of discussion topic, or discussion of the group events outside the group environment. I could not guarantee absolutely that these events would not occur, but I used processes which protected the participants as much as possible. The outcome of the study did not have negative implications for the participants which affected their salary, their job security, or their position within the organization.

One of the key elements in risk reduction was the consent document; this document details risks and circumstances of the study (Appendix C). This document was read to the potential participant and the participant was asked if she had any questions. The consent form, when signed, represented the participants' informed consent, meaning that the participant was fully informed of all the potential risks and benefits of taking part in the study. Additionally, the purpose and structure of the study was made clear so that the participant fully understood what she was committing to and how it might impact upon her.

Management was approached regarding the content of this study and confirmed that they viewed it as an asset to the organization and that they were very supportive. This study was not imposed upon the participants, each participant voluntarily agreed to participate in the study. There was minimal stress from the group design of the study. Some individuals may have felt intimidated in a group setting; however participants were aware of the group format of the study before agreeing to partake.

There was minimal risk to individuals who used the ergonomic information to change the manner in which they carried out physical activities within the workplace. The information focused upon equipment positioning and work pacing. The information increased the ergonomic knowledge of the participants and could be of benefit to them in reducing injuries within the workplace. The participants were advised at the beginning of each group that if they had any pre-existing medical conditions about which they had concerns, they should discuss these with their healthcare practitioner. All information was advisory and was in response to the users' needs and concerns; there was no obligation for the participants to utilize the knowledge. The *content* of the ergonomic information reflected current professional standards for occupational therapists in the practice field of ergonomics; it was the *content* of the office ergonomic presentation which was being explored in this question.

Confidentiality can be a challenge in a group situation. The discussion which took place within the group setting, the surveys, and all audio recordings, remained confidential. Only I and the focus group participants had knowledge of the specific contents of the focus group.

While I could guarantee the confidentiality of the written and audio recordings, no such guarantee could be made in a focus group. I could not absolutely control the actions of the participants; I did however explain to all participants the importance of confidentiality and had them sign an agreement. Reminders were given to the participants at the beginning of each group meeting of the need for confidentiality. Discussion within the closed meeting room was confidential, only myself and study

participants were present. Following the study, all information was kept in a secure location for the post publication 5-year time frame; after this period of time it will be deleted or shredded as appropriate. Overall the subject matter of this study placed a low level of risk upon the participants.

### Benefit Analysis

To the study organization there was the benefit of acquiring ergonomic computer workstation information and training without paying professional fees. There were no direct financial or other intended benefits. The employees at the end of the study had an increased knowledge of how to beneficially arrange a computer workstation - which should increase comfort and may reduce the incidence of possible future injuries.

The participants also had the benefit of taking part in a participatory, problem-solving process in which they could acquire skills which may help them to identify and address issues which affect their work community. This could also have positive benefits in the participants' community outside of the worksite. Skills developed during the participatory process can help to resolve issues in other settings.

The participants may also have benefited from an improved computer ergonomic setup, greater understanding of how to reduce repetitive stress to musculature and enjoyment of a more comfortable work day. They may also have potentially benefited from feeling less tired at the end of the day. They could also feel more engaged in the workplace through an enhanced feeling of control over the work environment.

## Validity, Reliability and Trustworthiness

Participative action research is a form of natural inquiry in which the direction is determined by the participants. Validity and reliability are essential to the trustworthiness of research. DePoy and Gitlin (2005) believe that if the meanings from a study are to have relevance, other researchers should reach the same conclusions as if they conducted the same research process and analysis.

In any research, including that of qualitative research such as participatory action research, there is the possibility of the researcher's beliefs and biases influencing study conclusions. My background in ergonomics made me an ideal candidate as a facilitator for the focus groups. I also needed to be aware of any undue influence that could be brought to the groups in that I may have had expectations as to possible outcomes. The study was designed to bring the information from the prior meeting to the following meeting for input and suggestion. My intention was to address only those issues raised by the interview guide or by the participants themselves. In this respect, audio-recording the data enabled a review of the focus group dynamics that took place, including any biases that may have occurred.

To enhance the rigour of this research, I employed the techniques of credibility, crystallization (triangulation), saturation and member checking. Crystallization occurred when the findings from this study were compared with current research literature to determine if there were convergent conclusions and findings. This comparison from different and divergent sources may explain phenomenon. Member checking occurs when "the investigator checks an assumption or understanding with one or more of the

informants” (DePoy & Gitlin, 2005, p. 250). The process of participatory action research encourages member checking by its very design. The findings of each focus group meeting were used in the subsequent meeting, allowing participants to be aware of the information gathered and to discuss any incongruence.

In the final meeting, a summary of the group discussion was written on the flip-chart for all participants to give feedback upon. In terms of face validity of the interview guide, the questions contained therein were based on current research and practice, were general in nature and related to ergonomic issues which would be applicable to any computer user. The interview guide questions reflected those issues which had been repeatedly identified during my occupational therapy clinical experience, as well as clinical experience information contained in the literature researched for this study, and was reviewed by a second subject matter expert.

This chapter focused on describing the method of the participatory ergonomic focus groups and the results. The method of comparison of these results with content of a typical occupational therapy office ergonomic education approach program, necessary to answer the research question and sub questions, is detailed in the following chapter.

## **CHAPTER 4 RESULTS AND DISCUSSION OF FOCUS GROUPS**

The study site was advised that the maximum number of focus group participants was 12. There were 11 participants who agreed to take part in the study, from a total number of 20. The participants were all employed at the Legal Aid Commission of Newfoundland and Labrador, as support administrators to the lawyers. As a result of gender bias within these positions, all participants were female and between the ages of 18 and 65. Two of the 11 participants were unable to attend any of the focus groups, which effectively resulted in 9 active participants. The number attending the focus group fluctuated between 5 and 8 participants. Some participants had competing demands and were unable to attend all 3 groups. Some were sick or had family matters to attend to and were absent from the office on the day of the group. None of the participants dropped out of the study. The average number attending was 7.

Figure 1 (below) documents attendance of individual participants at each of the three group meetings:

**Figure 1. Participant attendance**

Participant	4 <sup>th</sup> October 2010	18 <sup>th</sup> October 2010	1 <sup>st</sup> November 2010
1	X	X	-
2	X	-	X
3	-	-	-
4	X	X	-
5	-	-	-
6	X	X	-
7	X	X	-
8	-	X	X
9	X	X	X
10	X	X	X
11	X	X	X

The purpose of the focus groups was to promote and generate discussion on the topic of office ergonomic needs and concerns. The actual direction of the dialogue and associated topics was determined by the participants. The interview guide raised ergonomic questions regarding equipment and the office environment as a starting point for discussion. There was good group cohesion, which was evidenced by the relaxed atmosphere within the group, and free-flowing active discussion from the participants. The participants easily shared experiential ergonomic information; for example they reported that a cordless mouse “works better” than a corded one because it has greater



flexibility of location. If they found a piece of equipment which was highly functional and easier to use, this information was freely shared with co-workers.

In the following sections, the three focus groups will be reported upon separately. It should be noted that not all topics were raised at each focus group. In participatory action research, participants lead the discussion; matters to be explored are those of relevance to the group. The purpose of the topics introduced by me was to generate discussion; once the discussion was flowing, it was the prerogative of the participants to determine the direction.

The results of the focus groups are summarized using the same topics as identified in the five office ergonomic education topics, namely: *definition of office ergonomics; anatomy and physiology; warning signs of injuries; workstation layout; equipment and adjustment; lighting and air temperature; work pace;* and *stretching exercises*. An important finding was that the topic of knowledge translation was not raised by myself but was raised by the focus group participants. They were very emphatic that the ergonomic information be presented in a stimulating and engaging manner. They wanted information to be presented in a practical manner, with the emphasis on what actions they could take. They also wanted the information to be in colour, to be humorous and to have as little medical terminology as possible.

#### 4.1 FOCUS GROUP 1: INITIAL IDENTIFICATION OF NEEDS

The purpose of this group was to outline the rationale for the meeting, to generate discussions regarding ergonomics and to create a relaxed atmosphere in which the

participants would feel free to express their opinions. All three goals were achieved in this first meeting.

*Definitions of office ergonomics:* No discussion by participants.

*Anatomy and physiology:* No discussion by participants.

*Warning signs of injury:* Prior to most chronic overuse injuries there are usually minor symptoms such as numbness, fatigue, aches and pains. During the discussion it was observed that the participants were actively able to recognize body symptom warnings, such as any discomfort which concerned them, and they would comfortably request a work station review by an ergonomics expert if they had concerns: “I was looking to the left and I had kinks in my neck, so I requested an ergonomic review and they designed a tray that comes in front.” This response indicates identification and problem-solving of an ergonomic issue and the empowerment to request an ergonomic review which may be paid for by the employer.

The participants instinctively made the connection between ergonomics and safety and that if ‘they’ (management) were prepared to replace office equipment for some employees, that they should replace it all who required the change. The participants were aware that the assertiveness of an individual in asking for items was a factor in obtaining ergonomic equipment and services, outside of education.

The participants stated that they actively adapted work activities and realized that these were work demand adaptations. They also monitored their body symptomatology and used experiential knowledge to modify job tasks to minimize discomfort.

*Workstation layout:* The participants reviewed a Health Canada poster (Appendix F) that provided a pictorial representation of an ergonomically correct workstation, with accompanying explanations and rationale of good ergonomic postures. When the participants reviewed the information with me, it became apparent that they were not aware of basic ergonomic computer principles such as the recommended height of computer monitors and keyboard tray heights. They had experiential opinions as to which position they wanted the monitor to be located in. Some preferred to have the monitor to off-centre (to make room for files) while others wanted it to be directly in front of them. They were able to identify activities which resulted in over-reaching, although they were unsure as to how to resolve these issues. Some participants were aware of the need for a 27 inch wide keyboard tray so that they could accommodate the mouse. They identified that a 25 inch wide keyboard tray was not long enough to include space for a standard mouse.

It was reported that boxes were stored under desks, but this is as the result of personal preference and not a necessity. Storage space is not an issue at this location and there is a purge process in place for old files.

*Equipment and adjustment:* This theme refers to the participants comments on equipment adjustment and ordering. Adjustment of office chairs was a topic in which there was a lack of knowledge. The participants did not have a good awareness of chair adjustment which included very basic knowledge such as height adjustment. They were not aware of how to operate the adjustment levers on the chair; for example they did not know how to tilt the angle of the back of the chair, although some did report lowering the

chair if someone else had changed the height. Participants were interested in the fact that there is no fixed seat height recommendation which was ergonomically beneficial, and that it was good to readjust chair positions, including chair back recline angles, throughout the day. Office chairs are an important piece of ergonomic equipment and their adjustment is vital to reduce injuries.

The participants reported that when the new chairs were delivered, there were no adjustment instructions accompanying them and that they were unaware as to where to find any such operating information. It was reported that chairs were assembled at the worksite, and the workers were told by the suppliers “here you go; figure it out.” If insufficient education accompanies an unfamiliar piece of equipment, the user will be unable to adjust it correctly.

There was an acute awareness within the group of the importance of workstation assessments. Participants felt that ergonomics in general had become more of a priority within the last 10 years within their organisation. It was perceived that management now understood the negative financial and personal impact of unresolved ergonomic issues on both the worker and the bottom line of the organisation. Participants also felt that the response by management to ergonomics had improved in part because the budget had improved; one participant commented: “Well things have gotten better here...and I think it’s because the budget got better.” Another participant noted that “fifteen years ago we were getting used chairs. There were a lot of hand me downs.”

When the study site offices relocated, new furniture was purchased. The participants were unsure if the new office setup was ergonomically appropriate. Some did

not however ask to be reassessed because of concerns about expense to the employer. This was not an empowerment issue; it was a choice that the participants made. Some participants did recognize the need for new furniture: “my desk was set up horrible out there”...“It’s a bit better now, but I was over six months before I got a proper desk.” The ordering process for equipment was repeatedly raised. Participants were aware of the person who placed the orders, but they were unsure of the timeframes for receiving the equipment. One participant reported that she had requested a spilt keyboard, which arrived within one day, but that she had to wait for six months for the ordered desk to arrive.

In ergonomics, adjustability of equipment is essential to enable the equipment to fit the *person*, rather than the person fitting the *equipment*. It was reported by the participants that very few of the keyboard trays were height adjustable. Additionally, they stated that some keyboards trays did not lock in place, causing the tray to move forward while it was being used; this resulted in additional strain to the neck and shoulders.

While using the telephone, hands-free headsets are important to enable the computer user to speak on the telephone and to keyboard simultaneously. It was reported that the workplace supplied the Plantronics brand of hands-free headsets (both wired and wireless models). There had been difficulty with the voice quality and hearing. It was the same model that has been at my workplace for many years without difficulty, and so I am puzzled by this report. It was reported that the supplier had adjusted the equipment several times, but there were still difficulties. The models were eventually removed by the employer as they were not being used. It was suggested that the receptionist position

have a hands free headset as she is frequently using the phone and taking messages. One of the participants suggested that it would be useful to identify those work positions which would benefit from a hands-free telephone headset: “wouldn’t it kinda make sense to have certain jobs mandatory to use those things.” The other significant issue identified by participants was that of ‘cradling’ the telephone while keyboarding; the participants were aware that it was poor ergonomic practice and they reported that this habit was “hard on the neck” and they stated that they “tried not to do this now.”

*Lighting and air temperature:* Heating is important to the computer user. If the environment is too hot or too cold it can result in be a contributing factor to workplace injuries. When air temperature is cool, there is less blood flow and a high correlation with increased risk of injury (Gold, Cherniak, Hanlon & Soller, 2010; Sharma, Smith, Hazleman & Jenner, 1996; Zeisig, Ohberg & Alfredson, 2006) Lighting, if it is of the incorrect intensity or location, can result in headaches and eyestrain. The participants did not report any problems with the heat and lighting in the office. Some temperature adjustment issues were noted in shared areas, which were related to personal preferences.

*Work pace:* Pace of work impacts significantly upon the risk for injuries: generally, the higher the pace, the greater the risk. At the study site, the pace of work was very deadline-driven, involving preparation for fixed court dates and appearances. The participants reported that it was essential to prioritize work, as it was not always possible to complete the work. There was a pressure felt by the participants to complete all necessary work on time.

Participants did remind each other to take breaks; however there were occasions when coffee or lunch breaks were worked through. Most reported not shortening the work day to compensate for the extra time worked; some reported that they were not able to leave the workplace early as they shared a ride home. Participants reported tiredness when they worked through their breaks and the group was fully aware of the need to exercise and take a break. It was made clear that there had been no suggestion from anyone within the organisation to miss any breaks. Occasionally, participants reported that extra time worked was used for doctor's appointments.

There was a wide variation reported in terms of the work demands; this applies to both the day to day and intra-day job demands. Tasks were as varied as switchboard, keyboarding (document typing), research on case files, transcription and support in the court.

*Stretching exercises:* No discussion by participants.

## 4.2 FOCUS GROUP 2: ERGONOMIC NEEDS IDENTIFICATION

The purpose of the discussions which took place in Focus Group 2 was to provide ergonomic information to the participants and to receive feedback on which ergonomic themes were relevant to their needs. A summary of the responses, organized by the topics contained in a typical ergonomic education session, follows.

*Definitions of office ergonomics:* In response to education on the definition of the term *repetitive stress injury* and other terms, the participants stated they were not seeking information about definitions, but rather they were seeking information on what they

could do to alleviate symptoms. The participants' needs were very action orientated; they wanted to know what *they* could do. If they wanted more information, they stated that they would ask the family physician. They had little interest in supportive theory, stating that their lives were too busy for what was viewed as extraneous information.

*Anatomy and physiology:* The participants repeatedly stated that they did not find information on anatomy and physiology to be relevant to their needs. The participants, in response to diagrams and information relating to tendons, muscles, and bundles of muscle fiber, were very definite in this opinion by using such phrases as “that’s out.” In response to diagrams showing blood circulation and flow related to muscle contractions, the same response was received. This information was again viewed as extraneous to their needs as the medical professional could provide this information to them. Overall the comments were that this information was “too medical” and that any education session with this content would “lose the audience.” They said that the message had to be “fun and add a little kick to it.” I stated that “in the professionals’ world, if you put a medical diagram next to this information, the assumption is everyone is going to read the tips.” The participants’ response was that they are busy too and just want to know what to do to change their setup and “leave the theory to the medical professionals...they [the participants] will ask for the detail from the professionals if they want it.”

*Warning signs of injury:* The participants had little interest in learning of the warning signs of injuries. Again they were more pragmatic in their needs; the information on the 3 stages of pain were referred to as “medical mumbo-jumbo” ... “if it hurts they go to the doctor...how does knowing there are 3 stages make it any better?” This could



possibly be because of the context and the manner in which the information was communicated, or the participants may have been correct in their assessment of the relevance of this information. This would be an interesting subject to pursue further.

The participants were seeking information on the adjustments which they could make to the office ergonomic equipment. The group expressed a need to talk about how *they* handle their symptoms, rather than be told by a professional what their symptoms are. The group again displayed that it was very action orientated and wanted to know *what to do* and not *why* they were doing it. The group placed a high value on experiential learning, and would listen to the advice of professionals only if it fit with their own values and ideas.

The group repeatedly stated that they were looking for general information. “To have enough general information to know that, depending on what part of your body is hurting, you need to just kind of know that, okay, I haven’t adjusted my chair right.”

Specific examples provided by the participants included: “Okay, today if it’s my shoulder, then I can probably look and see that I’m not positioning my back right today” or “...that’s a part of my chair that I need to adjust today because I’m feeling my shoulder or if you’re feeling your knees another time..... then maybe it’s just the general information that is needed. Do you understand – general?” The group was very emphatic that they did not require the level of “medical” detail that most of the typical ergonomic educational sessions provided.

*Workstation layout:* The participants repeatedly referred to the Health Canada workstation layout ergonomic poster (Appendix F) as providing the information that they found to be the most relevant. The information was easy to read and understand, and general in nature. The group agreed that an electronic copy of this, sent by e-mail, would be helpful to distribute throughout the whole workplace. The group felt that the poster provided a basic diagram and that they "...don't need any other information." They also expressed a wish to have the document in colour because it would be more attractive and easier to read: "colour makes a huge difference."

*Equipment adjustment:* As mentioned earlier, office ergonomic chairs are an essential element in correct ergonomic positioning. Generally there was insufficient information regarding chair adjustment. Some participants had experimented with the operative levers on the chairs to carry out adjustments, but the majority had not. The key issue was the lack of clear operating instructions from the manufacturer of the chair.

The participants discussed the challenges of knowing how to adjust chairs, especially as the chairs did not have instructions or in some instances did not have the operative levers labeled as to the purpose. It was reported that there was a reluctance to experiment with adjusting the chairs when they were not sure what the function of the levers was, and when there were immediate deadlines at work to be met. The reason for this is that some chairs are difficult to adjust and taking 20 minutes out of the busy day to adjust the chair was too time-consuming.

Some participants reported that the seat was too deep for them; however when I suggested a new chair with adjustable seat depth, concern was raised about the cost of a

new chair. It was felt that a new chair should not be replaced just because it did not have the sliding seat adjustment function. This indicated that not only ergonomic factors were considered; financial impact was also a consideration.

*Lighting and air quality:* No participant discussion.

*Work pace:* No participant discussion.

*Stretching exercises:* I suggested that stretching exercises would be helpful information in managing symptoms. The participants' response was that it was not practicable: they said that it was "not going to happen in the real world." This statement was confirmed by another participant who confirmed that "no, not in our world."

In this participatory approach it is the decision of the participants which guides and forms decisions; it is the group consensus which ultimately directs what to include and what exclude from the ergonomics program. This issue is discussed further in the following chapter.

It should be noted that throughout the group discussion there was ample opportunity for the participants to express their views. There was much nodding of heads in agreement to statements made. At times there were differing opinions raised and they were openly discussed and at times initial opinions were amended. All members of the group participated in the discussions, either through verbalization or nodding of heads or other non-verbal communication. The conversation was not dominated by one or two participants. There was no indication of a power imbalance between myself and the

participants. Group attendance appeared to be a useful and enjoyable experience as evidenced by the attendance numbers and the written feedback (which is detailed later).

*User developed ergonomic program:* This discussion began in the second focus group and continued in the third group. I asked the group how they wanted to improve ergonomics throughout the organisation, and to be mindful that e-mails are frequently deleted without being read. The group decided “like if you sent out a 2-page e-mail on office ergonomics, they’d probably delete it but if you sent out an ergonomic tip once every so often”... “then people would read the two lines and go” ... “Oh yeah, maybe”... “Yeah, especially it’s just two lines,...that type of thing.”

There was general agreement on this and the idea of an “Ergonomic tip for Monday morning.” The group then decided upon the format for what was eventually called ‘2-line tips’ because “at least they’ve read the two lines before they’ve deleted it.”

The participants stated that humor was essential: “little stick men or funny diagram...but not medical.” They suggested that there should be a Monday morning e-mail: “Are your shoes under your feet? Are you wearing them? If not move them!” ... “Plain and simple, right...”

The participants said that messages had to be relevant to people’s lives and very applicable, not theoretical. For example, a suggestion was made to use a pumpkin face in October, to make the message seasonal and fun. They reiterated that if the message was medical in nature it would not be read. An example would be: “Have you been naughty

or nice? Is your desk tidy? Santa doesn't like naughty...you know" ... "When people laugh about something, they'll tend to remember it more."

#### 4.3 FOCUS GROUP 3: NEEDS & ERGONOMIC PLAN

The purpose of focus group 3 was to summarize the computer users' ergonomic needs and concerns, which had been discussed during the course of two prior focus groups. A flip-chart was used to summarize points from the meetings and repeatedly I asked the participants if they agreed with the content of the program; this was a form of member checking. The details of the office user developed ergonomic program can be found in Appendix M.

In summary, the agreed upon ergonomic plan was as follows:

- to distribute 2 line tips (1 every two weeks, for a three month trial)
- to distribute a copy of Health Canada's ergonomic poster

The participants decided that the ergonomic program should be communicated by an e-mail message which is a maximum of 2 lines in length. These are short ergonomic messages, delivered in a humorous and seasonal context where possible. The rationale for 2-line tips was that most people in the office would read two lines of any e-mail before deleting it.

A few examples of two-line tips that were developed during the group are provided in Figure 2.

Figure 2 Two-line tips example

*Xmas is coming.....Santa does not like a cluttered desk...all that extra reaching is bad for your neck and shoulders.....have you been naughty or nice? ✎*

Christmas in July? Still storing Christmas decorations under your desk...give your

feet some room..... Move those boxes to the storeroom.

*Crumbs in your keyboard? Give your keyboard (and your body) a break..... take lunch away from your desk,*

The participant group wanted to have an introduction to the rationale for the poster being e-mailed and to advise the organisation that the “tips would be coming.” They wanted to have both paper and e-mail copies of the poster.

It was recognized by the participants that attracting the e-mail readers’ attention was key to communicating the ergonomic information. It was acknowledged that the ergonomic information would be competing with the general work demands of the stress-filled and time constrained day. Throughout the two prior groups the participants had stressed the need for the information to be eye-catching, through the use of color humor and seasonal themes; there was a “need to put some pizzazz in it; something to catch their eye.” The participants agreed that the reference source of ergonomic information would

be the Health Canada information poster on workstation adjustments which should be provided in colour.

The participants recommended that any ergonomic information be delivered with only one topic in each message so that recipients would find it quicker to read and therefore easier to retain the information. An example of this would be a simple one line reminder such as: “What is the position of your monitor. Do you have neck strain?”

It was also recommended that an overall explanation which included an introduction to the rationale for sending the ergonomic tips be made via the workplace internal e-mail system. The participants felt that if the tips were sent out without an explanation that the staff would be asking basic questions, such as why is this being sent and where did the information come from and who within the organisation had endorsed the e-mails and their contents. They suggested the phrase: “it’s only general tips that may assist you in managing your workstation.”

The group recommended that the e-mails be explained as “tips that we got from doing this ergonomic study with Jill and we’ll just kind of refresh your memory once every couple of weeks.” The e-mail will be sent out “twice per month, January, February and March, on the 1<sup>st</sup> and the 15<sup>th</sup> of each month with any holiday that might be going.” The group stated that it should be fun to do and that they would “want to get enjoyment out of it.” They also noted that it should include a “do not reply to e-mail” instruction.

In terms of ergonomic content, the group felt that it was important to state clearly why the ergonomic issues were relevant although the participants did not choose to

include any anatomical or medical information. If the participants were going to e-mail ergonomic tips, they felt that it was important for the recipients to understand why it was important information and how it would benefit them. This comment reflects the participants' action-orientated approach to ergonomics.

I noted that the participants did at times defer to me as subject matter expert, although in my professional judgment I felt that I had provided them with all of the information required to develop the ergonomic tips independently. During the decision making process, the participants suggested a 3-month trial for the two-line tips "and then we'll see what happens with it." Three group members volunteered to meet further and discuss the implementation. As the implementation is outside the scope of this research question, no further comment will be made on this. Another issue was the recurrent concern about liability if there were an injury as a result of the ergonomic information being used by the recipients: "What if one tip is tried and it doesn't work and they have issues?" ... "What if you told me to do it and I have been seized up for days?"

I perceived that this was in part a factor because the study took place in a law office and so the support staff was aware of possible legal ramifications because of the nature of their work; although there was some awareness in the group that the tips were general and "should fit everyone." One participant suggested a disclaimer which said that "If you have a medical condition, go see your doctor." When I asked if they wanted to send the tip out under a professional's name, the group said "no, I don't think so." Thus overall there was some ambivalence on this point. On the one hand they wanted to send



out the tips independently, but they also wanted not to cause any harm or for there to be any repercussions as a result of doing so.

In summary, I concluded that my role was to guide and promote a practical conclusion to the questions raised. Throughout the meetings the participants emphasized that any goals had to be low cost and practical, which concurs with the findings of Kogi (2008, 2010).

#### 4.4 SUMMARY OF ANONYMOUS FEEDBACK

The feedback sheets consisted of 5 questions which were answered anonymously by the participants. Of the 9 active participants, 7 completed a feedback sheet. The individual respondents' comments can be found in Appendix I. The anonymous feedback was very positive. The participants found the focus group very informative and they all reported learning ergonomic information which was useful. The majority of the participants stated that the duration and frequency of the meetings was appropriate. All liked the convenience of having the meetings at the workplace. There were no significant further suggestions.

#### Summary

In this chapter the results and discussion were reviewed. In the final chapter, discussion of the findings and recommendations for future study are made.

## **CHAPTER 5 DISCUSSION**

### Introduction

The main purpose of this study was to explore the ergonomic needs and concerns of computer users and to compare these findings with the content of a typical occupational therapy office ergonomic presentation.

The study found that the needs and concerns of computer users in this study were *generally* reflected in a typical occupational therapy presentation. However, during the course of this research, other themes emerged which were: content matter of educational presentation; design process; role of the occupational therapist/subject matter expert in group facilitation; focus group empowerment and knowledge translation. The last theme of knowledge translation deserves special commentary as I was surprised that the study participants had such definite opinions on the ergonomic content matter and method of communication.

### Content Matter of Ergonomic Presentation

During my research on the topic of office ergonomic training, I found that while there is a huge amount of information on the effectiveness of ergonomic methods and approaches in general, there is a dearth of reported information which explores which *specific topics* within an office ergonomics presentation are found by the participants to be most relevant. In the published office ergonomics literature, training is a general title, but this literature does not report the content of the training or the rationale for choosing

ergonomic topics. Generally, it was found that there would be a reference in the literature to ergonomic training which may refer to an ergonomics presentation or indicate that a professional had given an ergonomics training session. However, the literature has very little detail as to the specific content of the ergonomics sessions (Bohr, 2000, 2002; Robertson et al., 2002, 2012; Haims & Carayon, 1998).

In figure 3 (below) is a topic summary of five office ergonomic presentations, the content of which was reviewed for this research.

**Figure 3 Ergonomic Presentation Summary**

Topics	Eastern Health	City Of Saskatoon	University of Western Sydney	SafetyNet MUN	University of Texas	Legal Aid
Definition of office ergonomics	X	X	X	X	X	X
Anatomy & Physiology				X		
Warning signs of injury	X	X		X	X	
Workstation layout	X	X	X	X	X	X
Equipment adjustment	X	X	X	X	X	X
Light/Temperature		X			X	X
Work pace	X	X				X
Stretching exercises	X		X	X		

Within the 5 typical office ergonomic education presentations that were considered in this study, there were found to be 8 topics. These topics were categorized as *office ergonomics; anatomy and physiology; warning signs of an injury; workstation layout, equipment adjustment; lighting and air temperature; work pace; and stretching exercises*. The study participants, during the course of three focus groups, identified their ergonomic needs and concerns, which I also categorized under each of these topic definitions. A summary of the focus group topic definitions appear in the last column of table 2 under the heading of ‘Legal Aid.’

It should be emphasized that in the focus group part of this research, it is the participants’ experience and intimate knowledge of the workplace which is highly valued. It is the participants who determine which topics are of value and therefore to be included. This process is not based upon professional or medical determinants, but is based instead upon the needs and experiences of the computer users themselves. My role at the focus groups was to facilitate discussion and to provide subject matter expert input. It was not my role to determine which needs and concerns were relevant to the participants. The study participants identified the topics that they wanted to include.

*Definition of ergonomics:* This is a descriptive section in a typical office ergonomic presentation which explains the meaning of the word ergonomics and provides a description of the phrase ‘soft tissue injuries.’ This information provides context to the computer users and explains why ergonomics is an important factor in the workplace and what the basic ergonomic principles are. The participants identified the definition of ergonomics to be relevant to their needs and concerns and recommended

that it be included as an introduction to any ergonomic information. They did not however want other definitions which were ‘medical’ in nature to be included such as ‘repetitive strain injury’ or the 3 stages of an injury.

As an occupational therapist, I perceive that the participants’ needs are to have information defined in terms of their everyday lives. The participants repeatedly stated that they did not want medical information. They did however appear to be seeking action-oriented, functional information which they could implement themselves.

*Anatomy and physiology:* The information presented in a typical office ergonomic education session would usually include details of the anatomy and physiology of the arm and hand, as these are the most commonly injured parts of the body during computer use. It is usual to find graphical representations of the upper extremities, which explain the relationship between reduced blood flow, inactivity and increased risk of injuries.

The participants did not want to have this information included in an office ergonomic presentation. It was viewed by them as expert medical information. The study participants made it very clear that if they required any “medical” knowledge, they would visit their family physician. They stated that they were very busy and overloaded in terms of the expectation placed upon them, both in their workplace and personal lives. In their view, it was the physician’s role to provide medical information placed within the context of each individual’s medical information. The participants had no desire to be taught this information; in their view, it was extraneous to their needs and unnecessary in an office ergonomic presentation.

This information was included from the occupational therapy perspective, as it would increase the participants' knowledge of how their body functioned. The assumption is that if you understand that reduced blood flow to limbs increases the risk of injury, then the participants would understand the need to maintain blood flow by taking rest-breaks from work.

My perception is that anatomy and physiology information would be better understood by the participants if it was provided in a manner with greater context and relevance to the clients' functional needs. If information was presented showing the injury process and how it relates to blood flow, this might be a better communication tool. How information is presented to clients can have a tremendous impact upon learning; this constitutes an interesting topic for further study.

*Warning signs of injury:* The warning signs of injuries would include the early, intermediate and late indications that an injury is forming; such as tingling in the hands and arms as an early sign of carpal tunnel syndrome. The participants did not find this helpful information and again regarded it as expert medical information which they would seek from their family physician. The participants were not interested in acquiring this information themselves.

*Workstation layout:* This information was presented in the form of the Health Canada poster which shows a graphical representation of how to set up a workstation to reduce injuries. The workstation layout poster contained recommendations as to heights and positions of computer monitors, keyboarding heights and chair seat and arm heights.

A copy of the first page of this poster appears in figure 4 (below), with the entire poster shown in Appendix F.

Figure 4 Health Canada Ergonomic Poster

## ADJUSTING AND ADAPTING YOUR COMPUTER WORKSTATION

# CHECKLIST

### A COMFORTABLE POSTURE...

EVERYTHING WITHIN REACH...

- Place the mouse next to the keyboard and at the same height. *(See over, Note 7)*
- Document(s) should be on a document-holder that is placed either between the keyboard and the screen or next to and at approximately the same height as the monitor screen.
- A task light improves lighting on the document(s) you are reading. *(See over, Note 8)*

A properly adjusted workstation allows you to adopt a natural and comfortable posture. To benefit from these adjustments, your work should be properly organized. *(See over, Note 9)*

- 1 YOUR THIGHS SHOULD BE PARALLEL TO THE FLOOR**  
• Adjust the height and/or angle of the chair seat.
- 2 YOUR FEET SHOULD LAY FLAT ON THE FLOOR OR ON A FOOTREST**  
• Adjust the height of the chair seat. *(See over, Note 1)*
- 3 BACK OF THE KNEES SHOULD BE CLEAR OF THE FRONT EDGE OF THE SEAT**  
• Adjust the depth of the chair seat so that you can easily place your fist behind your knee.  
• Be sure to specify the appropriate seat depth length when ordering a new chair.
- 4 YOUR BACK: LOWER AND MID-BACK SHOULD BE WELL SUPPORTED**  
• Adjust the height, tension, and angle of the backrest, to ensure the lumbar support is positioned at your waist.
- 5 YOUR FOREARMS SHOULD BE SUPPORTED AND YOUR SHOULDERS RELAXED AT ALL TIMES**  
• The height of and distance between your armrests should allow freedom of movement for your forearms when performing tasks, yet provide support for them during rest periods or when using your mouse.  
• Avoid hunching your shoulders and ensure that the elbows/upper arms remain close to your torso. *(If armrests do not adjust, see over, Note 2)*
- 6 YOUR ELBOWS SHOULD BE AT APPROXIMATELY THE SAME HEIGHT AS THE KEYBOARD**  
• Adjust the height of your keyboard tray or work surface so the keyboard is at the height of your elbows. *(If this is not possible, see over, Notes 3 and 4)*
- 7 YOUR WRISTS SHOULD BE STRAIGHT AT ALL TIMES AND YOUR HANDS IN LINE WITH YOUR FOREARMS**  
• Adjust the angle and height of the keyboard tray or work surface to ensure straight wrists.  
• If your keyboard tray or work surface is not adjustable, adjust your seat to ensure straight wrists. You will need to use a footrest if you have raised the seat and your feet are not flat and well supported on the floor. *(See over, Notes 4 and 5)*
- 8 THE MONITOR SHOULD BE AT A COMFORTABLE READING DISTANCE AND HEIGHT**  
• The viewing distance should be within 16" to 29" (40cm-74cm). About one arm's length.  
• The monitor height should allow the neck to be in a neutral position when looking at the top row of text on the screen. *(See over, Note 6)*

The participants found this information to be interesting and well presented; they frequently referred to this document and asked for copies to take away with them from

the focus group. They felt that this was the most important piece of ergonomic information that was provided by me, and it was the central point of reference for the ‘two-line tips’ aspect of the participant devised ergonomic program.

Throughout the focus groups, the participants stated that they were looking for information to be presented in a succinct manner. They were busy and wanted to learn only the information that would enable them to make changes to their computer workstation which would reduce the aches and pains of repetitive keyboarding. My perception is that the poster provided contextual and action-orientation information in a colorful and non-medical manner. Kogi (2008) found that action-orientated information helped to guide groups of end users through the process of problem-solving ergonomic issues.

The poster advised computer users what to do and how to make the changes; it is very action-orientated. It did not focus upon teaching the participants medical information; it provided only the minimal amount of information needed for the computer user to improve his or her posture. The information was presented in a very quick to read format, it is displayed using a diagram of a computer workstation setup with information in text boxes and it avoids presenting information in a narrative manner, which would take more time to read and understand.

*Equipment adjustment:* Closely related to the design of the workstation is the topic of how to adjust equipment. This topic concerns the need to adjust equipment to meet each individual user’s needs. Two main themes emerged under this section: adjustment of the keyboard tray and ergonomic chair adjustment.



Keyboard tray adjustment usually relates to tray tilt and height adjustment. The study site did not have equipment with such adjustments and so it was not perceived as a need or concern for the participants. As a subject matter expert in ergonomics, I felt that an adjustable keyboard may have improved the keyboarding posture of some of the participants. I believe that it was the participants' lack of equipment knowledge that led them to the conclusion that an adjustable keyboard was unnecessary.

The other main theme, discussed extensively by participants, was office ergonomic chair adjustments. They found the generic information on chair adjustments to be helpful, but they were ideally looking for specific information relating to adjustment of their individual chair model. The participants highlighted the fact that most of the chairs were provided without any instructions as to how to adjust them. Additionally, many chairs do not have the adjusting levers labeled, which also makes them difficult for the end user to adjust. The focus group was unable to resolve this problem.

As a subject matter expert in this area I have found that one of the major challenges for computer users is chair adjustment information. There are many different models of chairs and they each have different controls for adjustment. In the organisation that I previously practiced in which there are 14,000 employees, there are only 3 or 4 chair model choices approved, in order to make it easier to teach chair adjustment to the employees. However, chair designs change over time, so an employee who was provided with the same model chair 5 years ago would not have the same chair as the updated version. It is impracticable to provide details of many different chair model adjustments in an educational session. In my professional experience, the resolution to this issue is a

communication one; it is in effect a knowledge translation issue. Many of the manufacturers of office chairs have videos on their website or You Tube showing how to adjust the chair. When the chair enters the organisation, it should be labeled with the chair make, model number *and* the website address for the location of the video. There should also be a requirement of the manufacturer that each of the adjustment levers on the chairs be clearly labeled as to their purpose. The computer users would be able to watch the video repeatedly until the chair was adjusted.

*Lighting and air temperature:* This topic was included in the presentations by the City of Saskatoon and the University of Texas, but not in the other presentations reviewed. It is sometimes excluded from presentations because it is not considered to be an ergonomic issue. However, the environment can contribute to such issues as headaches (from incorrect lighting), and cold muscles (from insufficient heating when sitting), and could place the computer user at a higher risk of a work absence. In my study, this topic generated a great deal of conversation during the focus group meetings; the participants were enthusiastic about learning of the impact of lighting and air temperature upon their health. My perception is that heating and light impacted upon the participants' comfort level, and so this is why they were interested in this topic.

*Work pace:* The pace at which work is carried out can impact upon injuries; the faster the task has to be completed the less time there is for muscle recovery and the greater the risk that an injury may occur. The work pace discussion included such topics as the need to take scheduled breaks, how to deal with workplace deadlines and emergencies, and the connection between tiredness and working through lunch breaks.

The participants were engaged in much open discussion and exchange of information between co-workers.

There are certain topics which would benefit from this two-way form of information exchange, and as an ergonomic expert I would recommend that this would be one of them. However, the participants did not recommend group discussion in their final ergonomic plan. The group wanted to implement a plan that was administered by them, which was quick and easy to carry out, and which had minimal time requirements.

*Stretching exercises:* Some therapists recommend exercises which improve blood flow; this may also include educating computer users of the need for short breaks from constant keyboarding. In a typical occupational therapy office ergonomic presentation, one power point slide would be devoted to stretching exercises with additional information being provided on paper handouts for the participants to (perhaps) read later. The response of the participant group was very strongly that this was not one of their needs or concerns. Comments were made that the presenter would “lose the audience” and that there was insufficient time to carry out the exercises during the busy work day. The participants did not want to have this included in the presentation.

I have observed a great deal of resistance to clients being observed by co-workers carrying out these exercises at the workstation. In my professional experience this is because the corporate culture of the organisation needs to change to one in which it is socially acceptable to carry out exercises; this is a common compliance issue with stretching exercises. I have observed that this extends to both nursing and housekeeping

staff, who may benefit from stretching exercises before patient handling. This is also supported by the findings of Galinsky et al. (2007).

### Commentary on the Design Process of Computer Users' Ergonomic Program

The group participants identified excellent points throughout the discussion on ergonomics and were very able to discuss and express what the issues were and which topics they found to be relevant and wanted to include in the ergonomic program. In summary the participants felt there was value in the topics of ergonomics definitions, workstation layout, equipment adjustment and lighting/air temperature. It should however be emphasized that by far the most interesting topic to them was the workstation layout. The topics of anatomy and physiology, warning signs of injury and stretching exercises, were considered to be extraneous to their needs and were largely disregarded; as one participant stated: “we would just glaze over when you were talking about it.”

In addition to the *topics* which were of interest to the participants, the *method* for communication was also discussed. During the last of the three groups, the participants decided very definitely that they wanted to self-administer the ergonomic plan. They were very emphatic that they did not need an ergonomics expert to assist with this (Ciccarelli et al., 2012; Koehorn et al., 2011). The computer-user participants program consisted of brief messages of ergonomic tips, together with a copy of the Health Canada poster.

The communication format that the group chose for their ergonomic program was to use e-mail on the internal office system. They decided to use two-line ergonomic tips

and to have them distributed once a week. A one-way method of communication has been proven to have minimal effectiveness (Laing et al., 2007; Robertson et al., 2002; Young & Higgins, 2010) and was an interesting choice considering there had been so much two-way animated discussion during the focus groups.

It is possible that, because the participants already had the opportunity to discuss computer ergonomics with a subject matter expert (during the focus groups), the need for a series of short an ergonomic reminder was reflective of the needs of the focus group participants only. It is possible that the co-workers would have preferred a two-way ergonomic learning opportunity and not only e-mail. It would be interesting to explore this through further research.

Another possible interpretation of the group's decision is that the participants chose this format because it would require no additional funding, and would be easy to administer, as they had the ergonomic poster to refer to as reference material. The participants did not have a background in effective knowledge translation and assumed that if the information was presented to the computer users, it would be read and internalized. This is not however, how adults learn, and so a more two-way and repetitive method of sharing ergonomic information should be considered (Fisher & Konkel, 2004; Pillastrini et al., 2010). The effectiveness of the participants' ergonomic program is outside the scope of this research, but it could be an interesting subject for further exploration.

My perception is that the decision to use e-mail was driven by both empowerment and financial factors. The group was very comfortable with the concept of ergonomic

issues and felt that they could easily provide ergonomic information to the remainder of the office staff (Reynolds et al., 1994; Haims & Carayon, 1998). However, the participants had expressed little awareness of the complexities of adult learning principles, and I feel that they over estimated the effectiveness that ergonomic e-mail messages would make on behaviour change. There was also little understanding among the group participants of the complexities of effective communication of ergonomic issues. The participants stated that if an ergonomics expert was involved it would be expensive to the organization and they felt that this was an unjustified expense and one for which they did not want to approach the management committee. As the subject matter expert, I was aware of these difficulties, but the focus groups were not.

#### Use of Subject Matter Experts and Medical Professionals

As a therapist, I was anticipating that the participants would want to know about their own anatomy and physiology so that they could better understand the causes which lead to workstation injuries. My professional assumption was that end users would want to understand the structure and functionality of their own bodies so that they could avoid injuries in the workplace. However, the participants made it very clear that they wanted only information that they felt to be useful, such as adjusting chairs and the workstation equipment. Their rationale was that they were too busy with work and their own lives and consequently wanted to be educated with only the minimal amount of information. It had not occurred to me that clients had busy and overloaded lives too and that they wanted to focus on action-orientated information. Research by Kogi (2008) found that the

participants were more engaged in the ergonomic process when it had an action problem-solving focus.

The participants' rationale was that medical professionals are the "owners" of detailed medical information such as anatomy and physiology, and that if the participants wanted this information they would approach the healthcare professional and ask for specific information about their own medical situation. The group was only interested in information which they could directly use in the day to day adjustments to their computer workstation. Information about the anatomy of the hand was not of interest to the group because it was information that they perhaps could use possibly sometime in the future, the information had to have immediate meaning. The participants were focused on the action-orientated information.

It was my client-centered training as an occupational therapist which enabled me to reflect upon this fact and to encourage the participants to take "control" of the ergonomic recommendations. The core tenet of occupational therapy is client-centered enablement in which "the purpose of the client-professional relationship is for enabling individual and social change, through occupation" (Townsend and Polatajko, 2007, p. 109). This partnership approach with clients encourages reflection and discovery towards the clients' "own motivations in desired occupation" (Townsend & Polatajko, 2007, p. 119). I would perceive from the group discussion that the participants had decided that they did not see their time being used in the "occupation" of having detailed medical information to be part of their day. An interesting research topic would be to explore further the participant rationale for which topics were excluded.

It would however be remiss of me not to discuss the possibility that the participants' reluctance to learn for example about basic anatomy and physiology does indicate that at times there is a significant role for the subject matter expert to play in terms of guiding the group processes. There is a role for occupational therapists that can understand the clients' needs and can translate that information into a form which is contextually relevant; who can, in effect, take medical information and present it in a functionally appropriate manner.

### Group Empowerment

My perception of all three groups was that the participants enjoyed the group process and sharing of experiences. At no time was there an awkward silence in the group and there were many ideas and opinions freely discussed.

As an occupational therapist I was surprised by the confidence that the group displayed throughout the three focus groups and in particular the last focus group, in which the ergonomic program was defined and developed by the participants. The participants were interested and focused upon the topic from the initial meeting. While my ergonomic experience over 25 years no doubt helped to guide the participants, they did however make all of the decisions relating to the final format of the program. I was somewhat surprised that they did this with minimal dissent within the group, and without years of ergonomic training. The acceptance of this fact took some readjustment of my professional identity. The need to adjust one's own professional identity has been found by other participatory researchers, which has generally been documented as a learning



experience for the professional, who gains a greater understanding of clients' needs and perspectives (Kristensen, Borg & Houndsgaard, 2011; Mason, 1997).

As the subject matter expert, I am aware that the content and manner in which I present information can affect the clients' ultimate decision and that consequently, if I had presented information differently, the group may have made different decisions. This made me question at what point I would have lost the true meaning of participatory research, in which the focus group members determine the outcome. It is very difficult for clients to ask for information if they are not aware of its existence. Earlier in this chapter, I questioned if the participants lacked the ergonomic knowledge to determine if an adjustable keyboard tray would be a need. It is sometimes a challenge to determine if occupational therapists are being client-centered or if we are determining what information the clients need. If as professionals we feel that a decision is detrimental to the client, at what point do we acknowledge their right to make a choice which we feel is not in their best interest?

As a health care professional I reflected upon my ethical knowledge and background and determined that I should consider if the group had sufficient information to make informed decisions. If I observed that the decisions within the group were fully informed and yet the participants still chose to make the same decision, this would indeed be an informed choice. Woolf et al. (2005) found that the role of the health care professional was to "help patients to understand the potential risks, benefits, and uncertainties of clinical options and to assist them in selecting the option that best accommodates their personal preferences" (p.293).

What initially piqued my curiosity about participatory research was the observation over many years of practice that the client was often the source of excellent ideas as to problem-solving of issues within their own workplace. The degree of problem-solving demonstrated by the group surpassed my professional expectations. The group was very engaged, shared their history and openly shared their preferences as to ergonomic education content (Gravina & Lindstrom-Hazel, 2007; Kogi, 2010; Robertson et al., 2002); this offers support for the argument that the more involvement the end-user has in the development of an ergonomic program, the more effective the program is.

The focus group members were clearly empowered in their decision making and took ownership of the content of the ergonomic program. Bade & Eckert (2008) believe that participatory ergonomics “builds trust, ownership and subsequent commitment to target solutions and controls” (p.106). The focus group members were known to one another before the research shared similar workplace, family/work balance and ergonomic challenges. There was a definite increase in the amount of problem solving and independent thought between the first and the third group. The first focus group relied more heavily upon the questions provided by the subject matter expert; however the third group required minimal facilitation and the discussion was animated and flowed very easily. At any point in time when a client’s opinion is sought and ideas integrated into a program, this would increase the validation of the client’s views and their self-confidence in the subject matter. In effect the client is empowered, which may in turn result in a greater behaviour change as a direct result of being engaged in the education process. It is by focusing on the psychological processes that underlie knowledge transfer (Argote, Ingram, Levine & Moreland, 2000) that we may effectively engage the client.

In my professional view, empowerment reflects the current trend in healthcare in that the client becomes a partner in the development and implementation of their own treatment program. I would suggest that a participatory approach be adopted in more occupational therapy interventions. McMurray et al. (2003) have stated that empowerment is an essential psychological construct which facilitates decisions for good health and that individuals need to “feel that sense of control.”

While it is acknowledged that the core tenet of occupational therapy ensures that one on one client contact is very client focused, I would suggest that the same maxim does not always apply to education of groups of clients. When preparing for a group presentation, therapists tend to rely upon their own professional judgment when determining what information to include in a presentation. Typically, therapists do not involve clients when developing group educational information.

Power sharing is an essential component of client-centered therapy. Townsend and Polatajko (2007) state that for power sharing to occur, the occupational therapist must ensure that the participants are aware of the fact that they are entitled to share power: “Ideally occupational therapists invite clients to exert their power to express what they want, or are expected to do to participate in the occupations of their choice that are meaningful to them” (p. 107). In this research the clients had a sense of empowerment which was evidence by the candid opinions of the group and their wish to be the sole providers of the ergonomic program; with no subject matter expert involvement.

As an occupational therapist, I used my core professional skill of client-centered enablement to encourage the participants to express their needs and concerns;

occupational therapists use this approach to facilitate the clients' (participants') choices (Townsend & Polatajko, 2007).

### Knowledge Translation

I have learned from this research that to present information in a medical format, with clinical diagrams, is not what the client is seeking. Clients have busy and at times difficult lives; when they give up their valuable time for an education session it will receive more of their focus if it is relevant to their lives and presented in an interesting and engaging manner. Knowledge translation is therefore vital in effective communication of ergonomic and medical information.

Adults learn experientially; they take their life-time experience and determine the relevance of any new information in the context of their needs. Experiential learning has been thoroughly researched over many decades (Durkheim, 1982; Piaget & Elkind, 1970; Smith, 2001; Thiagarayan, 2006); it is the process of learning through everyday experiences and it has been found to be an effective key to adult learning (Trotter, 2006).

The most enduring impression I will have of this research is how much laughter and active discussion there was throughout all three of the focus groups; yet the final product was a well thought-out office ergonomics program. It proves that learning can be fun and interactive and yet also very productive. The overall message from the group participants was one of simplicity. They were very pragmatic in their knowledge acquisition, they really wanted the ergonomic message to be compressed to meet their basic ergonomic needs, and it had to be fun, quick, easy to read and eye-catching. I want

to emphasize how much the participants felt that the way in which the information was conveyed impacted upon the information absorbed. They placed emphasis on interactive learning, making it fun and interesting, moving away from medical-looking pictures and including humour in the presentation.

As I reflect upon some of my own ergonomic presentations and those of other occupational therapists, I recall that they were certainly very professional in their appearance. I do have to comment however, that few were considered to be fun and eye-catching; and yet in terms of effective knowledge translation perhaps they should have been. One of the major findings of my research supported earlier findings that clients do not always benefit from professionally prepared ergonomic sessions (Fischer & Konkel, 2004; Pillastrini et al., 2010; Young & Higgins, 2010). To quote from one participant, all communication should have “pizzazz,” so that it is attractive to read. It is possible, even with a serious subject matter such as office ergonomics, to inject some humour, colour, and interactivity which will enhance the learning experience. As one participant stated: “When people laugh about something, they’ll tend to remember it more.”

During all three focus groups the experience was very positive for the participants. As the experience was positive, it was well attended, this is another advantage of making an education session humorous and interactive. As therapists we should not lose sight of the fact that clients can choose whether or not they attend any education session. If it is fun, relaxed, interactive and informative we will reach more clients and have their attention for a longer period of time and they will absorb more of the information we share with them.

The participants made it very clear that they did not want to see medical information or anatomical diagrams in the presentation. Discussion in the groups was about how to implement the ergonomic program and the emphasis was on *how to* rather than *why* the clients did or did not want to understand the rationale. Upon reflection, it would have been beneficial to question further the rationale of the group for some of their choices, such as the group's decision not to include anatomy and physiology as a topic in the final plan.

This raises the question of how much do we as therapists 'promote' information because we feel we are more realistic. Richard & Kris-Matthews, (2010), raised this point in their research which questioned if as therapists we are really client-centered. In their small study, which used the Canadian Occupational Performance Measure, they found that clients' preferences were not acknowledged because the therapist perceived her goals to be more "realistic." If we as clinicians can improve the clients' health, because of our specialized knowledge, how much do we promote this view? When do we cross the line of undue influence in the clients' life decisions?

It is essential that we communicate in an effective manner with clients, including considering the relevance of the information presented to them. If clients do not understand why information is being presented to them, it will be dismissed and the information will not be reflected upon. If our clinical information has little relevance to clients' perceived needs (as illustrated by the participants' reluctance to see relevance with regard to information regarding anatomy and physiology), we as clinicians should

evaluate if this is an effective means of client education; I would suggest that it may not be.

The participant-designed ergonomic program created during the course of this study consisted of brief messages of ergonomic tips together with a copy of the Health Canada poster, both of which would be sent by the internal e-mail system to all employees at the study site. The participants wanted to self-administer the ergonomic program, without the assistance of a subject matter expert.

The participants chose e-mail as their method of communication. It was quick and easy to administer. The participants stated that they had busy lives and so this was their preferred means of communication. E-mail, however, is not the most effective means of communication and I feel that a two-way communication with repeated messaging may have been a more effective means of communication. However, a two-way approach is more time consuming and requires more resources. It was cheaper and easier to communicate with e-mail, but unfortunately this has not been shown in the literature to be as effective as two-way communication (Neuhauser, 2002).

I would suggest that occupational therapy as a profession should consider exploring knowledge translation as well as how we communicate information to clients. This would enhance our profile within the healthcare system as we would be perceived as being effective communicators of clinical information. We are taught to be clinicians with advanced practice knowledge and to practice in an evidence-based manner, yet perhaps we should also be considering how that knowledge and evidence can most effectively be delivered. If the client is well educated, they are more able to make

informed decisions as to the myriad of minor decisions that they must make during the course of a day which can negatively or positively impact upon their health. I would suggest that effective knowledge translation be explored as an essential skill set for therapists, and that perhaps the days of black and white photocopy information sheets be re-examined to include more diagrams, less narrative and different modes of communication information, including multi-media...and also perhaps a dash of humour.

### Conclusion

Using a participatory ergonomic approach, this research explored if the self-identified needs and concerns of computer users are reflected in a typical occupational therapy office ergonomic educational presentation. While the study confirmed that generally the needs of computer users are met, the topics that the participants found to be most relevant were workstation layout and equipment adjustment. Knowledge of anatomy and physiology and warning signs of injuries were not identified as needs and concerns; participants indicated that they would seek this information from a health care provider as needed.

This study also revealed that clients would prefer medical information to be communicated in an action-orientated manner employing humour, colour and lots of “pizzazz.” Knowledge translation is an essential component of effective client education and it is important to remember that we are competing for the client’s attention and that they have busy and distracting lives too.



As an occupational therapist, I would recommend a greater emphasis on knowledge translation within our profession, to further enhance our professional identities as exceptional client-centered communicators within the health care environment.

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## APPENDIX A Study Process Table

Question:

Are the needs and concerns of computer users as identified through a participatory ergonomic approach reflected in the content of a typical occupational therapy office ergonomic educational presentation?

	<u>Action</u>	<u>Journal</u>	<u>Audio Record</u>
1	Obtain permission of manager		
2	Request management committee designate an administrative assistant	X	
3	Send participant recruitment information by e-mail to administrative assistant to be circulated to administrative support staff	X	
4	Upon receipt of e-mails from volunteer participants, arrange a time to visit each individual and obtain informed consent.	X	
5	Visit the workplace to gain a general overview.	X	
6	First focus group -- develop questions based on the research topic and upon specific contextual information obtained from the work place visit and from the general information obtained from participants.	X	X
7	Second focus group -- present ergonomic educational information as requested in the prior focus group	X	X

8	<p>Third focus group -- discuss how to problem solve and implement ergonomic issues and concerns.</p> <p>At the end of the third and final focus group provide anonymous feedback forms which should be placed in a collection box in the office in a mutually agreeable location</p>	X	X
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## **APPENDIX B Recruitment Information**

### Content of e-mail to Management

Dear Sirs,

Re: Office Ergonomics Study

Thank you for your support with the study to date.

As advised earlier, I now require the name of an administrative support individual who can send an e-mail on my behalf giving details of the study and asking for participants.

If you can send me her e-mail address I will contact her and then provide her with the information to be circulated, with a copy for yourselves for information purposes.

Regards.

Jill Phillips OT(C) (R)NL

MSc. OT Candidate

Content of e-mail to administrative support

Dear (to be completed),

As recently discussed, I attach an e-mail which should be forwarded on to all administrative support staff within the St. Johns Office only. If you have any difficulties with the attachment, please do not hesitate to contact me.

If you receive any questions, please encourage people to contact me at home either through e-mail or telephone.

Many Thanks

Jill Phillips OT(C) (R)NL

MSc. OT Candidate

Participant Recruitment e-mail

WANT TO MAKE YOUR LIFE EASIER?

Do you have questions about how to make your day physically easier on your body?

Want workable, practical ideas that would make your computer more comfortable to use?

Want to have a tailor-made office ergonomic program just for your work place?

Want to be part of a study that highly values your work experience and ideas?

THEN JOIN THIS WORKPLACE ERGONOMIC STUDY

Questions you might have:

So how much of my busy time will it take? After a 15 minute individual meeting, there are three 1.5 hour meetings, 2 weeks apart, which take place at your workplace, during work time. That is all there is to it, I will do the rest.

Do management know about this? Yes, I approached them earlier in the year and it is done with their full cooperation.

So who are you? My name is Jill, I have been working with people in office settings for well over 15 years, I know about the realistic demands of work (and life in general), how to work with what you have got (and how we all have budgets to stick by), and the need to consider issues from all sides. I am a licensed and registered Occupational therapist, carrying out research as part of my Masters degree, which is why this professional service is free.

OK, so if I am interested or have any questions what do I do? Just click on my e-mail address to sign up (the words “yes, I am in” will be fine), or send me a question, If you prefer to phone here is my number 747 0560.

Thanks for taking the time, and hope to work with you.

Jill

Jill Phillips OT(C) (R)NL

MSc OT Candidate

[jill.phillips@nl.rogers.com](mailto:jill.phillips@nl.rogers.com)

Supervisors Contact Information:

Robin L. Stadnyk, PhD, OT(C), OT Reg (NS)

Assistant Professor



School of Occupational Therapy  
Room 161 Forrest Building  
5896 University Avenue  
Dalhousie University  
Halifax, NS B3H 3J5  
Phone: (902) 494-8434  
Fax: (902) 494-1229

## **APPENDIX C Consent Form**

**Study Title: “Are the needs and concerns of computer users as identified through a participatory ergonomic approach reflected in the content of a typical occupational therapy office ergonomic presentation?”**

Student Contact Information:

- Jill Phillips 709-747-0560
- [jill.phillips@nl.rogers.com](mailto:jill.phillips@nl.rogers.com)

- Supervisors Contact Information:

Robin L. Stadnyk, PhD, OT(C), OT Reg (NS)

Assistant Professor

School of Occupational Therapy

Room 161 Forrest Building

5896 University Avenue

Dalhousie University

Halifax, NS B3H 3J5

Phone: (902) 494-8434

Fax: (902) 494-1229

You are invited to take part in a research study being conducted by Jill Phillips who is a graduate student at Dalhousie University, as part of her Master’s of Science degree in

Occupational Therapy (post professional). Your participation in this study is voluntary and you may withdraw from the study at any time. Your participation or withdrawal from this study will not in any way affect your work performance evaluation.

The study is described below. This description tells you about the risks, inconvenience, or discomfort that you might experience. Participating in the study might not benefit you, but we might learn things that benefit others. You should discuss any questions you have about this study with Jill Phillips.

### Purpose of Study

This is a study to find out what information you would want in an office ergonomics program; ergonomics means that the workplace fits the needs of the person doing the work. The purpose of this study is to design a program which helps computer users adjust their office equipment setup and work demands to meet their individual needs. This study uses a participant approach in which the experience of the person doing the work is highly valued and is used to solve problems. The computer user identifies their concerns and issues, and contributes to providing solutions.

The study uses the concerns and issues of people like you, who spend most of the day at the computer; the study will be conducted by myself; an occupational therapist who is an ergonomics expert. This is an opportunity for you to have active input into the design of a program to meet your needs.

It will involve three meetings with some of your co-workers, of approximately 1.5 hours in length; it will take place at the office in a conference room during work time.

Management has given permission for you to attend. The meetings will focus on discussions around ergonomic issues and what you would like to have put in place to make computer use more comfortable, I (Jill Phillips), will lead the group, no management will be present for the meetings; only those people agreeing to be in the group will attend.

At the end of the study, I will gather the information together and give the group a presentation of the recommended ergonomic program. I will also be comparing the ergonomic issues that you raise, with a professionally designed presentation to see if there are any differences. There is significant research which supports this approach to office ergonomics.

Please note that if you have any questions regarding your own medical situation and the implementation of ergonomics information, you should discuss this matter with your individual health care provider. It is not the purpose of this study to provide medical advice or help.

### Study Design

The study design is participant based research; this means that it is based on your opinions and ideas about finding solutions to workplace ergonomic problems. You will be fully involved in the design and development of the office ergonomics program; this

means that your work experience will be a crucial factor identifying and problem-solving solutions. So, if you feel that there is a problem with keyboard heights being uncomfortably high, you may also have some suggestion as to how to deal with this issue,

#### Who can participate in the Study?

The participants must be employed by the study site, and should be administration assistants who use the keyboard for 50% or more of the workday.

#### Who will be conducting the Research

The research will be conducted by myself, Jill Phillips; I am a licensed and registered occupational therapist with 25 years of experience. I have carried out numerous workstation reviews, and have helped many computer users find solutions to their computer related problems. I also have a lot of knowledge of the reality of workplace demands; the need of working within budgets, and am aware of the dynamics that occur between co-workers.

#### What will you be asked to do

The study will take place over four weeks, with the three meetings being two weeks apart. The meetings will be in a group setting, at which all those involved in the study will attend. At the meeting, discussions will take place around the computer desk setup,

spacing of work, general ergonomic information, and ways in which you would like to see this ergonomic information presented.

At the end of the study you will be asked to give your opinion about the process.

#### Possible risks and discomforts

There are minimal risks and discomforts associated with this study. There may be some minimal stress to individuals who find difficulty expressing themselves in a group setting. Individuals should not feel that they have to participate, although the more you contribute, the better the information will reflect your ergonomic needs. The nature of the information being discussed [ergonomics] is one which should have minimal risks in terms of repercussions on relationships; while you are employed by the Legal Aid Commission, the location at which the study takes place, there are no perceived financial repercussions from the information discussed at the meeting. The recorded and typed copies of what is discussed at the meetings will remain only with me, only the summary and recommendations will be shared with the employer and made public outside the group. No-one will be identifiable from the recommendations; no one will be quoted from the study meetings.

#### Possible Benefits

The benefit of participating in this study is that you will be provided with office ergonomics computer workstation information from a professional expert. This information will enable you to set up your workstation in a manner which may reduce future injuries and which will generally make your keyboard experience more

comfortable. It also enables you to meet with your coworkers and determine how your ergonomic needs and concerns can be addressed.

### Confidentiality and Anonymity

This study uses a focus group format, the other people in the group will be your coworkers and you will be known to one another, you will be aware of who is participating and what conversations occur in the focus group meeting. However, at no time will you or the others in the group be identified in any verbal discussions, reports, publications or presentations.

Your confidentiality is of one the most important things to me in this study; I want you to feel that you can express yourself fully. I will protect your confidentiality as much as I am able to, all participants will sign the same consent form as you do. I should however explain that although I will ensure that everyone in the study agrees to and signs a confidentiality form, and I will remind everyone at the beginning of each meeting; I cannot absolutely control the actions of the participants. If I am aware of confidentiality issues I will address them as they arise, so please keep me aware of any issues that may develop. All information gathered at the meetings will be combined, and reported in a group basis only

The electronic and paper data will be accessed only by myself; (Jill Phillips) as the researcher. The information from the group will be securely maintained in a locked filing cabinet in my home office, digital information will be kept in a secure file and be

password protected, I will comply with the requirement to keep this information for five years from publication date, during this time only I will have access. After the 5 year period such data will be destroyed in a secure manner.

### Questions

If you have any questions about this study you may ask me now or later on [jill.phillips@nl.rogers.com](mailto:jill.phillips@nl.rogers.com) or by telephone at 709-747-0560. If any further information affects the study format, you will of course be advised so that you can make an informed decision as to your participation.

### Problems or Concerns:

If you have difficulties with, or wish to voice concern about any aspect of taking part in this study, you may contact Patricia Lindley, Director of Dalhousie University's Office of Human Research Ethics Administration, for assistance (902) 494-1462, [patricia.lindley@dal.ca](mailto:patricia.lindley@dal.ca).



## APPENDIX D Consent Form Signature Sheet

**Study Title: “Are the needs and concerns of computer users as identified through a participatory ergonomic approach reflected in the content of a typical occupational therapy office ergonomic educational presentation?”**

I, participants name (capital letters please)

\_\_\_\_\_, have read the explanation about this study. I have been given the opportunity to discuss it and my questions have been answered to my satisfaction.

I hereby consent to take part in this study. However I realize that my participation is voluntary and that I am free to withdraw at any time.

Participants Signature: \_\_\_\_\_.

Dated: \_\_\_\_\_

I also give consent to audio recording, which will take place at the focus group meeting

Participants Signature: \_\_\_\_\_

Dated: \_\_\_\_\_

Researcher’s Signature: \_\_\_\_\_

Dated: \_\_\_\_\_

Problems or Concerns:

If you have difficulties with, or wish to voice concern about any aspect of taking part in this study, you may contact Patricia Lindley, Director of Dalhousie University's Office of Human Research Ethics Administration, for assistance (902) 494-1462,

[patricia.lindley@dal.ca](mailto:patricia.lindley@dal.ca).

## APPENDIX E Letter of Permission from Study Site

NEWFOUNDLAND  
AND LABRADOR  
LEGAL AID  
COMMISSION



SUITE 300  
251 EMPIRE AVENUE  
ST. JOHN'S, NL. A1C 3H9  
TEL: (709) 753-7860  
FAX: (709) 753-7851

8 April 2010

Ms. Jill Phillips  
326 Canada Drive  
St. John's, NL

Dear Ms Phillips

Re: Research study

This is to confirm that permission is granted for you, the researcher, to observe the St. John's Legal Aid Office as part of the study taking place at this site.

Sincerely

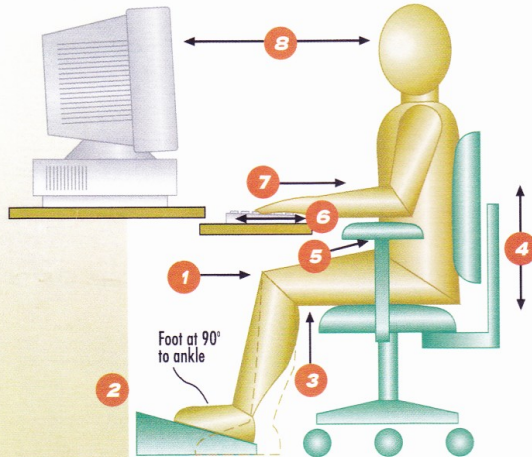
## **APPENDIX F Health Canada Computer Workstation Ergonomics**

Please see next page for copy of information

## ADJUSTING AND ADAPTING YOUR COMPUTER WORKSTATION

# CHECKLIST

### A COMFORTABLE POSTURE...



### EVERYTHING WITHIN REACH...

- Place the mouse next to the keyboard and at the same height. (See over, Note 7)
- Document(s) should be on a document-holder that is placed either between the keyboard and the screen or next to and at approximately the same height as the monitor screen.
- A task light improves lighting on the document(s) you are reading. (See over, Note 8)

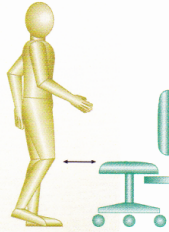
*A properly adjusted workstation allows you to adopt a natural and comfortable posture. To benefit from these adjustments, your work should be properly organized. (See over, Note 9)*

- 1 YOUR THIGHS SHOULD BE PARALLEL TO THE FLOOR**
  - Adjust the height and/or angle of the chair seat.
- 2 YOUR FEET SHOULD LAY FLAT ON THE FLOOR OR ON A FOOTREST**
  - Adjust the height of the chair seat. (See over, Note 1)
- 3 BACK OF THE KNEES SHOULD BE CLEAR OF THE FRONT EDGE OF THE SEAT**
  - Adjust the depth of the chair seat so that you can easily place your fist behind your knee.
  - Be sure to specify the appropriate seat depth length when ordering a new chair.
- 4 YOUR BACK: LOWER AND MID-BACK SHOULD BE WELL SUPPORTED**
  - Adjust the height, tension, and angle of the backrest, to ensure the lumbar support is positioned at your waist.
- 5 YOUR FOREARMS SHOULD BE SUPPORTED AND YOUR SHOULDERS RELAXED AT ALL TIMES**
  - The height of and distance between your armrests should allow freedom of movement for your forearms when performing tasks, yet provide support for them during rest periods or when using your mouse.
  - Avoid hunching your shoulders and ensure that the elbows/upper arms remain close to your torso. (If armrests do not adjust, see over, Note 2)
- 6 YOUR ELBOWS SHOULD BE AT APPROXIMATELY THE SAME HEIGHT AS THE KEYBOARD**
  - Adjust the height of your keyboard tray or work surface so the keyboard is at the height of your elbows. (If this is not possible, see over, Notes 3 and 4)
- 7 YOUR WRISTS SHOULD BE STRAIGHT AT ALL TIMES AND YOUR HANDS IN LINE WITH YOUR FOREARMS**
  - Adjust the angle and height of the keyboard tray or work surface to ensure straight wrists.
  - If your keyboard tray or work surface is not adjustable, adjust your seat to ensure straight wrists. You will need to use a footrest if you have raised the seat and your feet are not flat and well supported on the floor. (See over, Notes 4 and 5)
- 8 THE MONITOR SHOULD BE AT A COMFORTABLE READING DISTANCE AND HEIGHT**
  - The viewing distance should be within 16" to 29" (40cm-74cm). About one arm's length.
  - The monitor height should allow the neck to be in a neutral position when looking at the top row of text on the screen. (See over, Note 6)

## MORE INFORMATION

## ADJUSTING AND ADAPTING

## YOUR COMPUTER WORKSTATION



### NOTE 1 ADJUSTING THE HEIGHT OF YOUR CHAIR SEAT

- Adjust the height of your chair seat so that it is below or at knee height.

### NOTE 2 ARMRESTS

- Your forearms can be supported by armrests. If your armrests are not adjustable, replace with adjustable armrests if possible.

### NOTE 3 WORK SURFACE

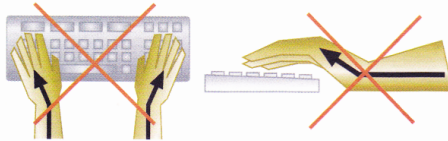
- If your work surface is not adjustable, adjust the height of your chair seat so that your elbows are at the same height as the keyboard.
- The height of the chair should be adjusted considering the height of the work surface and the work being done.

### NOTE 4 FOOTREST

- A footrest may be necessary when the chair is raised for a worker to reach a work surface and when feet are unsupported.
- If a worker moves his or her chair frequently between different work surfaces, more than one footrest may be required.

### NOTE 5 HAND POSITION

- The purpose of a hand/wrist support is to prevent your wrists from resting on hard surfaces during rest periods between keyboard tasks.
- Good habits include avoiding extreme wrist postures, such as those illustrated below.



### NOTE 6 POSITION OF COMPUTER MONITOR

- If you wear bifocals and view the screen with the lower portion of the lenses, it may help to position the monitor lower or tilt it back slightly. (Watch out for glare!)

### NOTE 7 SIZE AND POSITION OF THE MOUSE

- Your mouse should be the proper size to fit your hand and be positioned directly beside your keyboard.
- If you have a keyboard tray that is not wide enough to accommodate the mouse, consider the use of adjustable shelves that may be attached to the work surface or those that may extend the keyboard tray.
- Another option is to eliminate your keyboard tray by placing your keyboard and mouse on the work surface. Note that if you choose this option, remember to apply the necessary adjustments to the chair and monitor height as required.
- Ensure your arms are close to your body while using the mouse.



### NOTE 8 LIGHTING AND GLARE

To avoid glare and increase monitor screen visibility, you can:

- Reduce, eliminate or diffuse any overhead lighting that is reflected on your screen;
- Position your monitor so that your line of vision is parallel to the window;
- Ensure that the monitor screen has a light background colour and dark characters;
- An antiglare screen should be avoided unless other measures are not applicable.

Please note: glare control measures should ensure that a comfortable posture can be maintained.

### NOTE 9 WORK ORGANIZATION

Even the most comfortable posture should be changed periodically.

- Tilt your chair seat and backrest to vary posture;
- Take short breaks frequently to avoid prolonged static postures;
- Alternate work at the computer with non-computer tasks;
- Adopt a work pace that is regular and reasonable for you;
- Periodically look away from the screen to a farther distance;
- Stretch regularly and perform relaxation exercises;
- Swivel your chair to face your next task instead of twisting your body.

**Conception**  
Direction de la santé publique  
de Montréal-Centre  
- Santé au travail

 Health Canada Santé Canada Workplace Health and Public Safety Programme Programme de santé au travail et de sécurité du public

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## **APPENDIX G Job Site Analysis**

### **JOB SITE ANALYSIS (adapted to reflect general work information)**

#### Section One

##### General Information

This is a general analysis of a workplace environment to provide general contextual information for the research study. The location is the Legal Aid Commission, St. John's office for the province of Newfoundland and Labrador. The participants were all administrative assistants, who acted in the role of support to the Lawyers of the organisation. There was some variation in tasks; however all were keyboarding for the majority of the day.

<b>Job Title:</b>	Administrative Assistants
<b>NOC Code and Classification:</b>	N/A
<b>Degree of Strenuousness:</b>	Light
<b>Employer:</b>	Legal Aid Commission of Newfoundland and Labrador
<b>Address:</b>	Freshwater Road, St. John's NL
<b>Location:</b>	St. John's Office
<b>Contact Person(s):</b>	Roxanne M.

**Staff Interviewed:** Participants in focus groups

**Analysis Completed by:** Jill Phillips

Employed by Eastern Health

**Prof. Designation:** OT(C), R(NL) Master's Candidate

**Date & Time of Observations:** December 2010

**JSA Requested by:** N/A

**Date JSA Finalized:** June 2010

**Strength Requirement:** N/A

1.02 Brief Description of Job:

The Legal Assistants for the organisation use computers to provide support services to Lawyers. They are keyboarding for the majority of the day. The type of work varies from constant keyboarding (during transcription), to intermittent keyboarding such as completing documentation and answering of phones.

The environment is a 3-storey stand alone building. The majority of the equipment is ergonomic in fairly new and ergonomic in nature.

Essential Elements as per:

Supervisor    X Employee    X Observations    Job Description



Job is:            Unionized                    **X** Non-bargaining

### Brief Description of Environmental Conditions

a).Physical Environment: The environment is air-conditioned, with modern heat and lighting standards. The heat for the shared offices is centrally controlled. The individual offices have independent controls. The environment is a new location for this organisation and is pleasant and the building was newly renovated for their specific needs.

b)        Social Environment: Positive working environment, with good communication amongst the support staff.

### 1.03 Pace of Work

Low Pace:                    (tasks are intermittent, allow self-pacing)

Medium Pace:                (tasks are performed at a steady, controlled pace, some opportunity to take short break)

High Pace:                **X** (tasks are performed up to a maximum speed, controlled by external factors or deadlines).

1.04 Hours of Work

Shift Hours:            4                    X 8                    12                    Other    (comment)

                                 X Days            Evenings            Nights

Typical Schedule:    Monday to Friday. 8:30 to 4:30

Part Time Available:    Yes                    X No                    If yes, number of hours per shift:

Flexibility available re: Scheduled shifts                    Hours                    Unknown

Some Overtime:            Rarely                    Regularly            X Frequently

Extra hours worked, to meet deadlines.

Seasonal work:                    Yes                    X No                    If yes, comment:

Scheduled breaks: When/Length: x2 15 minute coffee breaks and 1 hour for lunch

Flexible:                    X Yes                    No                    (Comment) Dependant upon court  
schedule

Job Is:                            Routine                    X Varied    (Comment)

Order of Tasks can be Chosen by Employee:    X Yes                    No                    Other

Comments:    Must prioritize needs, impossible to complete all tasks in workday.

Task Rotation Possible:            X Yes                    No                    Other

Comments:

**Section Two**            *Task Description and Analysis*

Item/Work Area	Comments	Measurements
Keyboarding	Very deadline driven	
Answering telephones	Mostly from clients	

2.02    Generic Task Analysis (adapted)

Essential Job Tasks:

Job Tasks and Physical Demands:

Frequency is defined by the following table as the frequency of physical demands during performance of tasks.

<b>Frequency Rating</b>	
Not Required	NR
Seldom Requirement (not daily)	S
Minor Requirement (0-10% of task)	M
Occasional Requirement (11-33% of task)	O
Frequent Requirement (34-66% of task)	F

Constant Requirement (67-100% of task)

C

### 2.03 Order of Tasks

Job tasks are described in order that employee performs them

Job tasks are described in rank order of frequency/duration

X Job tasks are performed in no particular order and therefore are described in no particular order and the frequencies may vary

### 2.04 Generic Tasks

1. Task Description: Keyboarding and telephone work.

Essential Job Element?                      X Yes                      No

Task Observed                                      X Yes                      No

Physical Demand Analysis:

Generic Physical Demands		Frequency	Comments
Sitting		C	
Standing	Static	M	
	Dynamic	M	
Walking		O	
Bending/Stooping	Floor to Knuckle	S	
	Horizontal Lift	S	

	Knuckle to overhead	S	
Turning		S	
Crouching		S	
Squatting		S	
Kneeling		S	
Twisting		S	
Crawling		N	
Climbing Stairs		N	
Lifting	Waist to overhead	S	
	Floor to waist	S	
	Horizontal Lift	S	
Carrying	Right handed	M	
	Left handed	M	
	Bilateral	M	
Whole Body Pushing		N	
Whole Body Pull		N	
Upper Extremity Push/Pull		N	

Repetitive Lower Extremity Movement		N	
Horizontal Reaching	Midrange(< 10 inches)	M	
	Extended (> 10 inches)	N	
Overhead Reaching		M	
Hand Function		C	
Neck Postures		F	

Equipment Used: Computer keyboard, Telephone work.

Number of times per shift: throughout

Duration: Per Task: varied

Per Shift: varied

Opportunity to change posture/rest?  Yes  No

Modifications/Opportunity for postural change: Yes

### Section Three Summary of Generic Physical Demands Required

Frequency Rating	Code	4 Hour Shift	8 Hour Shift	12 Hour Shift
Not Required	NR	0	0	0
Seldom Requirement (not daily)	S	0	0	0
Minor Requirement (0-10% of task)	M	<0.5 hr	<1 hr	<1.25 hrs
Occasional Requirement (11-33% of	O	0.5-1.25 hrs	1-2 hrs	1.25-4 hrs

task)				
Frequent Requirement (34-66% of task)	F	1.25-2.5 hrs	2.5-5 hrs	4-8 hrs
Constant Requirement (67-100% of task)	C	>2.5 hrs	>5 hrs	>8 hrs

<b>Generic Physical Demands</b>	<b>N</b>	<b>S</b>	<b>M</b>	<b>O</b>	<b>F</b>	<b>C</b>
Sitting						X
Standing			X			
Walking			X			
Lifting		X				
Carrying			X			
Pushing/Pulling		X				
Bending/Stooping		X				
Turning		X				
Crouching		X				
Kneeling	X					
Crawling	X					
Climbing Stairs	X					
Horizontal Reaching			X			
Overhead Reaching		X				

Hand Function						X
Neck Postures					X	



## **APPENDIX H Interview Guide for Initial Focus Group**

Interviewer: I realize how busy you are and want to thank you all for taking the time to be here today. This is the first of three meetings in which we will talk about computer office ergonomics issues, and how to resolve some of them. It is hoped that you will learn some information which will make your work day a little easier. There is research to support that the people who are most qualified to make positive ergonomic changes to a computer setup, are those who carry out the work, only you know the day to day demands and issues of your work setting.

I would like to ask you about your work so that I can better understand any ergonomic needs and concerns you may have, this group should take approximately an hour and a half. At the end of this session, the questions and concerns you raise will be compiled and we will look at how to address some of those issues in our next meeting.

You have each already signed a confidentiality form and I would like to remind you that all comments you make at this meeting are strictly confidential. This means that at no time should anyone outside this room be able to identify what has been said by you. I would advise you that I cannot absolutely guarantee confidentiality, as I cannot control the actions of others. I will however remind all participants at the beginning of each group setting of the need for confidentiality, and if I am advised of any confidentiality issues I will address them promptly and appropriately.

I have a tape recorder so that I can listen to what you are saying and not be distracted by taking notes. No one individual will be identified from this tape, all findings will be

grouped together. Remember that you are in control of this situation and you may end your group attendance at any time.

Do you have any questions?

Interview Guide:

Interviewer: To help promote discussion, I will begin by asking questions about your computer equipment and desk setup.

- 1) How many of you have a computer keyboard tray that can be adjusted up and down in height?
- 2) Do you know at what height to adjust the keyboard tray to?
- 3) Have you tried to adjust the keyboard tray?
- 4) How many of you have a chair that can be adjusted up and down in height?
- 5) Have you ever tried to adjust your chair?
- 6) Do you know how to adjust the levers on the chair? Do you know what they are for?
- 7) How many of you have an older larger monitor and how many have one of the LCD flat screen ones?
- 8) Do you have monitor raisers, or books or paper to adjust the height of the monitor.

- 9) Do you know at what height to place the monitor?
- 10) How many of you have a hands-free telephone headset? Do you find it useful?
- 11) How many of you have asked for replacement equipment to replace something which is worn out?
- 12) Any other comments you want to make about equipment?

Interviewer: This section is about your work demands; these are duties which you are asked to do at work. It should not include duties you chose to do, such as helping a co-worker.

- 1) Could each of you indicate approximately what percentage of your day do you spend keyboarding?
- 2) Could each of you indicate what percentage of the day do you spend on the telephone?
- 3) Could each of you indicate what percentage of the day are you on the telephone and keyboarding at the same time?
- 4) On average, how many times each week do you NOT take a coffee break, because of work demands?
- 5) On average, how many times each week do you NOT take a lunch break because of work demands?

- 6) Are there any other changes that you have successfully made to your workstation?
- 7) Is there adequate light and heat in your work area? Raise your hand if you have a problem, and explain.
- 8) Is there a storage issue in your area so that boxes are stored under or near your desk? Each, please give details.

Interviewer: I am looking for your opinions in this section. Please feel free to express your thoughts candidly, it is important that I understand your concerns so that meaningful questions can be asked in the focus group.

- 1) What is your understanding of office ergonomics?
- 2) Do you know what the early signs of muscle overuse are when using a computer?
- 3) Have you ever had a review of your workstation, carried out by an occupational therapist or someone else? Where you satisfied with the recommendations?
- 4) Is there anything about your desk setup that you would like to change? What task do you find the most difficult to do?
- 5) What could be done to improve the comfort at your work station?
- 6) Do you feel the problems with your workstation are related to equipment?
- 7) Do you feel that workload is a factor?
- 8) Is there an in-house newsletter?

9) Would ergonomic information at staff meetings be helpful – 10 min tips?

We have now finished the questions, is there anything else that you would like to add?

## **APPENDIX I Participant Feedback Form**

ERGONOMIC STUDY – ANONYMOUS PARTICIPANT FEEDBACK SHEET

PLEASE DO NOT SIGN OR WRITE YOUR NAME ON THIS SHEET

I would appreciate you feedback, it will only take you a few minutes. If you need more space please use the back of the sheet. Thanks!!

Have you made any ergonomic changes as a result of this study? Let me know what they are.

Do you plan to make any ergonomic changes in the future? What are they?

Do you see any problems with getting any ergonomic changes made? What are the problems?

Did you find the group approach useful? Why or why not?

Is there anything else you want to let me know?

PLEASE PUT THIS SHEET IN THE BOX AT YOUR OFFICE, WITHIN 7 DAYS.

## **APPENDIX J Aggregated Feedback Comments**

### What did you like most about this study?

- I found it interesting, learned a few tips and think it's important for people to know this information.
- I thought the group discussion went well and everyone seemed to take part.
- Very informative learned new and interesting things. Reminder to stop and stretch.
- The information sheet (1) we received about the workstation, height distance from monitor etc.
- It was very informative, it will hopefully make employees stop and think about their work station and how a small change can make a difference.
- It was very informative. I learned some tips that I didn't realize I needed to know.
- That we dealt with some very simple but effective measures, on a daily routines to aid in our "ergonomic setup."

### What did you like least about this study?

- Some of the ideas put forward about this study. Diagrams information sheet. Information too long, should be less detailed. Something brief and to the point would catch people's attention better.
- Frustrating that it was sometimes difficult to get all who volunteered to actually be able to participate.
- The span of time it took to reach our ultimate goal.



- I don't think that I fully understood what I was getting into when I agreed to be part of this study, Went into it blind, but came out with the knowledge of what ergonomic is about.
- Blank
- Nothing
- I never found anything about this study that I didn't like.

Did you find the number and length of the meetings too long, too short or appropriate?

- I felt the number and length of meetings were appropriate.
- Appropriate.
- Too long.
- The meetings were fine, enough time was given to whatever topic we were discussing. It wasn't dragged out to fill the time slot.
- The number too many, length of meetings was appropriate.
- Meetings were an appropriate length – we discussed issues until we were finished, Time well spent.

Did you find the location of the meetings, in the workplace to be an asset or a problem, and why?

- It was an asset because you never had to leave the office and once the meeting was over, you could just go back to your workstation.

- Asset convenient appropriate as we were discussing our working environment – Bonus that our “tips” could be taken “home.”
- Asset so we could refer to problems that could be visible to everyone at the time.
- It was very suitable.
- Found it difficult to attend during the workday as workload very high.
- No problem
- Having the meetings in the workplace worked well as it was easier to get the participants together.

Do you have any other suggestions or comments?

- I think this is an important issue that should be a part of every workplace.
- Not at this time.
- Thank you for the opportunity to be part of the group.
- Blank
- It was a positive group to be part of.
- N/A
- blank

## APPENDIX K Summary of Office Ergonomic Topics

Topics	Eastern Health	City Of Saskatoon	University of Western Sydney	SafetyNet MUN	University of Texas
Definition of office ergonomics	X	X	X	X	X
Anatomy & Physiology				X	
Warning signs of injury	X	X		X	X
Workstation layout	X	X	X	X	X
Equipment adjustment	X	X	X	X	X
Lighting/ air quality		X			X
Work pace	X	X			
Exercises	X		X	X	

## APPENDIX L Content Definition of Typical Office Ergonomic Presentation


Topics -

- *Definition of Office Ergonomics*: Usually refers to the meaning of the word ‘ergonomic’ and how the intention of ergonomics is for the task to fit the worker and not for the worker to adapt to the need of the task.
- *Anatomy and physiology*: Usually has a representative diagram of the muscular and skeletal systems to assist the individual to understand what is occurring within their own body while at work.
- *Warning Signs*: This section usually refers to a list of symptoms such as numbness, tingling, stiffness and fatigue.
- *Layout and Design*: This section usually refers to equipment placement with an emphasis on the three zones for equipment placement. In the zone closest to the computer user are where those items used more frequently are located, with the least frequently used items should be placed furthest away from the user.
- *Equipment Adjustment*: This section provides basic adjustment instructions for equipment so that it is placed in an ergonomically supportive position. The usual information provided relates to office chairs, keyboard heights, mouse and monitor placement.
- *Lighting/air quality/temperature*: This is an awareness section to instruct the computer user of the influence of lighting and air temperature on fatigue and completion of work tasks. Lighting is a frequent concern with glare causing headaches, which also can increase fatigue.

- *Pace of Work* : It is not only the repetition of task which can cause injuries, but also the ability to take breaks, including lunch and other breaks in task. If there is no recovery time for muscles, there is a greater risk for injury.
- *Exercises and Stretches*: Some practitioners recommend stretches, while seated at the workstation to improve blood flow to the upper extremities and thereby reducing injury risk.

## **APPENDIX M Eastern Health Office Ergonomics Presentation**



Please see next page for copy



## Office Ergonomics



Financial Services – Eastern Health

Melissa Mulrooney BSc OT (c)  
Occupational Therapist  
Recovery Management/Injury Prevention  
Human Resources Consulting Services  
Occupational Health and Rehabilitation  
[www.easternhealth.ca](http://www.easternhealth.ca)



### Objectives

- Define ergonomics
- Understand soft tissue injury
- Recognize the symptoms of a soft tissue injury
- Understand the risk factors which may cause or contribute to the development of soft tissue injuries
- Understand how to minimize your risk of soft tissue injury through proper ergonomic work setup



### What is Ergonomics?

- Ergonomics is the study of the relationship between the person, work and the working environment.
- The goal of ergonomics is to match the job demands and work environment as closely as possible to the physical abilities and characteristics of a worker.



### What is a Soft Tissue Injury?

- Discomfort or persistent pain in muscles, tendons, ligaments and other soft tissues tissues of the body.
- May develop over a period of time due to small daily traumas which have a cumulative effect.
- Can affect the neck, shoulder, forearms, wrists, back


### Symptoms of Soft Tissue Injury

- Symptoms can vary, but often include
  - Pain
  - Numbness
  - Tingling
  - A feeling of heaviness
  - Restricted movement
  - Weakness in or around the muscles of the affected site

### Stages of Soft Tissue Injury


- Stages of a soft tissue injury
  - Early
    - Experience symptoms later in the workday
  - Intermediate
    - Experience symptoms throughout the work day, in the evening and the symptoms go away with rest
  - Late
    - Experience symptoms all the time, symptoms interfere with activities outside of work




**Risk Factors For Soft Tissue Injury** 


- Awkward/Sustained Postures
- Repetition/Duration
- Force
- Contact Stress




**How to Minimize the Risk for Injury** 


- Body positioning
- Workstation Layout
- Job design/Work organization




**Body Positioning** 





- Feet positioned flat on the floor or fully supported on a foot rest
- Thighs positioned horizontal to the floor with knees and hips at equal (or slightly lower) height
- Hip angle 90-100 degrees
- Low back should be fully supported by the backrest or lumbar curve
- Arms should be in a relaxed position by your side
- Elbows at 90-100 degree angle
- Wrists straight when keyboarding
- Neck in an upright position




**Workstation Layout/Design** 


- Adjust components of your workstation to achieve ideal body positioning
- Adjustable workstation components include:
  - Keyboard position
  - Mouse position
  - Monitor
  - Chair
  - Source documents
  - Work surface
  - Frequently used office items ie. Telephone




**Keyboard Positioning** 

- Directly in front of the body
- At a distance which allows elbows to stay close to the body at a 90 degree angle
- Height should be adjusted so shoulders are relaxed and arms by ones side, elbows at 90 degrees with hands straight
- Keyboard should lie flat
- If using wrist rests do not use rest while typing. Use during micro breaks




**Mouse Positioning** 

- Within easy reach
- The same height and as close to the side of the keyboard as possible
- Mouse cord is free from restriction
- If using wrist rests do not use rest while mousing. Use during micro breaks







### Monitor




- Monitor should be centralized on work surface directly in front of user
- The documents window should be at eye level or slightly below eye level. Bifocal users may need screen lower
- Monitor viewing distance should be 18-30 inches (arms length) from user
- Tilt monitor down to decrease glare if needed




### Chair




- Adjust chair height so that your feet are flat on the floor with knees and thighs at the same height
- Adjust backrest so that lumbar support is positioned adequately to support lumbar curve
- Adjust armrests so that elbows are at 90 degrees




### Source Documents




- Documents should be placed on document holders placed either between the keyboard and screen or next to and at the same height as the monitor screen




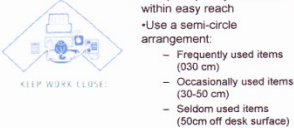
### Work surface




- Top of the work surface should be at elbow height
- Adjust your chair height and use a foot rest if needed




### Frequency Used Items


- Keep frequently used items within easy reach
- Use a semi-circle arrangement:
  - Frequently used items (30 cm)
  - Occasionally used items (30-50 cm)
  - Seldom used items (50cm off desk surface)




### Job design/work organization




- Alternate positions
  - Avoid long periods of repetitive activity
  - Take work "micro breaks" for 30 – 60 every 30 minutes to give muscles/joints time to rest and recover
  - Stand to change position allowing muscles to rest and recover from prolonged sitting
  - Look away from your screen to a farther distance
- Alternate job tasks
  - Alternate computer work with other tasks such as photocopying, phone calls, filing, and meetings
  - Avoid overuse of muscles
  - Allow your body to work different muscle groups throughout the workday
- Breaks
  - Follow regular breaking schedule
  - Stretch muscles regularly






### Office Stretches






- Please refer to handout
- Perform a 5 -10 minute general body warm-up (walking, stairs, marching, etc.).
- Get into stretch position carefully and gently take up muscle slack until a stretch is felt.
- Pay close attention to posture and body alignment, only stretching one specific muscle at a time.
- Do **NOT** bounce while stretching. Simply **hold stretch** and **breath deep** to encourage relaxation.




### Quiz



### Questions




### Evaluation




Please return completed forms to Melissa Mulrooney

Thank you



### Contact Information



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