Office Ergonomics Training

An instructional systems model for developing an effective program

By Michelle M. Robertson and Wayne S. Maynard

ERGONOMICS TRAINING is a critical element in effective ergonomics, safety and health programs. When ergonomics training is part of a comprehensive, systematic approach to integrating ergonomics into an organization, it can help an organization to link corporate goals with ergonomics practices, enhance organizational effectiveness and facilitate the change process. High-quality ergonomics training incorporates a participatory approach involving end users, managers, designers and health professionals. Such an approach ensures that each employee develops the knowledge, skills and motivation to make constructive suggestions for improvements. This participatory aspect, along with the ergonomics training and work system design, form the basis for creating an improved work environment and a positive continual change in the company.

Two telecommunications firms designed, developed, implemented and evaluated an office ergonomics training program in order to 1) reduce adverse health effects from video display terminal (VDT) work; and 2) impart knowledge about how to effectively use ergonomically designed VDT workstations. Company A was a telecommunications company where call center representatives and supervisors were trained (n=4,050). Company B involved system engineers who used computers extensively for their design work at a telecommunications development company (n=45).

This article focuses on how to optimally design, implement and evaluate an office ergonomics training program with the goal of reducing WMSDs and other health disorders. Key elements of an effective training program are described within an instructional systems model. Case studies provide relevant examples of how to successfully apply these training principles.

The Role of Training

Training alone does not constitute an office ergonomics program and it is not a panacea for reducing WMSDs that arise from exposures to hazardous conditions and other health disorders (e.g., visual discomfort, stress) (Verbeek). Typically, office ergonomics training programs are designed to address these disorders as well as the contributing workplace risk factors associated with intensive computer use. Training is a mechanism by which workers' performance and well-being are enhanced to maximize an organization's investment in people and technology.

Due to the multifaceted nature of these workplace risk factors, a work system design approach should be taken to effectively address the associated WMSDs and provide an injury-free office environment (Arras, et al; Hendrick and Kleiner). A successful office ergonomics training program should be incorporated into the organization's overall strategic plan for safety and health. Linking office ergonomics training program objectives with organizational policies and health prevention goals establishes the importance of—and commitment to—a comprehensive ergonomics program aimed at reducing negative health effects such as WMSDs.

It is also important to establish an evaluation plan to track the program's effectiveness. Results of training programs depend on several issues, such as the social and organizational culture; however, significant and positive effects of training programs have been demonstrated by workers' increased ergonomic knowledge, reduction in discomfort and increased

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healthy work practices (e.g., Bayeh and Smith; Brisson, et al).

Training is an integral part of a larger work system in which the individual or end user is central. It is important that the entire system (including job design factors, work organization, environmental design, technology and organizational structure) be considered in order to effectively minimize the negative health effects arising from poorly designed work systems.

Why Train?

There is an established need for office ergonomics training (e.g., Green and Briggs). While engineering controls such as workstation redesign or the use of adjustable furniture are often suggested (Verbeek), administrative controls such as training must accompany them so that employees and management understand the need for change when using VDTs and related office technologies. Training can build managerial and employee support during the introduction and implementation of an office ergonomics program, and it is needed to help employees understand workstation setup and the use of proper postures to avoid discomfort and WMSDs (Gross and Fuchs; Brisson, et al). Without these training concepts, the presence of other administrative and engineering controls will have limited success (Kukkonen, et al; Verbeek).

Key Elements for an Effective Office Ergonomics Training Program

Several elements are key to implementing and sustaining a successful training program.

Organizational Readiness: Senior Management Commitment

The foundation of any successful safety and health program is senior management support (Imada; Brown). Senior managers must have the vision and commitment to reduce adverse health effects and improve employees' quality of life and performance through the use of ergonomics. When top decision makers clearly support the mission and purpose of an office ergonomics program, organizational culture and safety climate changes. Senior managers should introduce the program by addressing employees and stating their support of the initiative. Without strong management support and commitment, the initiative will not produce the desired outcomes (Imada).

Create a Responsive Environment: Training Managers & Supervisors

Managers and supervisors must be trained in order to create a responsive environment in which employees are encouraged to use their training through reinforcement and reward. Since supervisors have more influence on the daily performance of individual employees, their participation in the training process is essential for the success of any ergonomics training program. Supervisors respond best to training that emphasizes situations over which they have some measure of control; this makes them more cooperative and supportive of change (Luopajarvi). Such training ensures that supervisors learn to respond effectively to employee suggestions. A participative safety culture is required with supervisor performance expectations clearly stated by senior management (Imada; Nelhorn, et al; Israel, et al).

Support Active Participation

Active involvement in the design of an office ergonomics training program stimulates individual ownership, inspires support of program goals and encourages a willingness to engage in the required cultural change process [Imada; Lawler(a), (b); Smith]. Being a member of a team designing and implementing such a program is motivating, rewarding and beneficial to both the individual and the organization.

Workers should share the responsibility of designing and implementing the educational program (Luopajarvi). Active participation gives workers the knowledge and skills they need to solve their health problems (Luopajarvi; Nagamachi and Yamada; Smith). If worker participation is lacking, workers' motivation for and understanding of the material presented will be low and their resistance to change will be high [Luopajarvi; Lawler(a), (b); Smith].

Develop Active Learning Experiences

For adult learners, "inquiry" or "discovery" learning is an effective instructional method. It emphasizes learner involvement by having trainees participate in problem-solving activities and group discussions (Gordon). The use of group exercises and office-ergonomics-related case studies promotes an active and motivating learning environment, which increases retention (Gordon; Reed). In such an interactive, motivating setting, adult learners do more than just passively receive the information—they actively apply and use the concepts and skills.

To enhance this approach, training sessions can be cofacilitated by workers who are trained in office ergonomics and specific work processes. These facilitators can encourage students to participate by bringing real-world experiences into the classroom and relating them to the learning materials. Involvement of the adult learners' expertise maximizes the learning process. Also, if the class consists of individuals from various functions in the organization, active and interactive discussions can provide an ideal opportunity to communicate intraorganizationally.

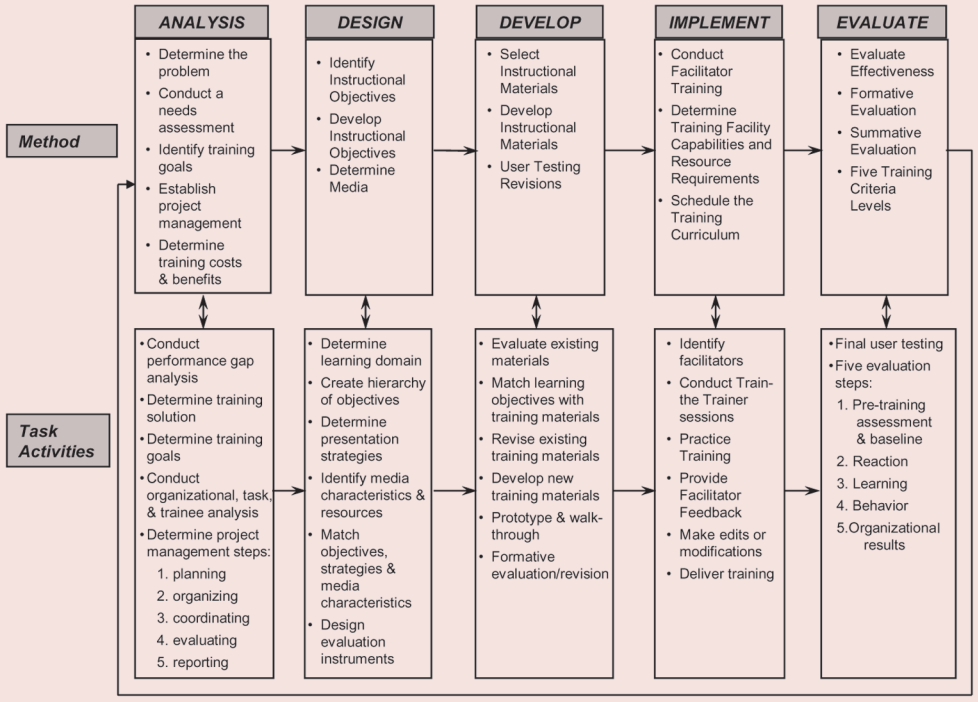
Ensure Ongoing Learning & Improvement

A work system changes over time. In the systems approach, office ergonomics training and practices must be viewed as part of the overall safety, health and ergonomics program. Therefore, the program must be adapted to changes that occur elsewhere in the system, as well as to changes in safety and health practices and technology. The concept of continuous change and adaptation is fundamental to making any system responsive to worker needs. Financial and organizational resources must be committed to actively support the safety culture change process.

Abstract: *With increasing incidence of work-related musculoskeletal disorders among office workers, one preventive strategy is to provide a well-designed office ergonomics training program. This article focuses on how to optimally design and implement an office ergonomics training program. An instructional systems model is used to describe the key elements of such a program. Two case studies provide relevant examples of how to successfully apply these training principles and the results that can be expected.*

Figure 1

Instructional Systems Design Approach



This includes commitment of human resources such as administrators, trainers and curriculum developers, and media and computer application developers. Long-term management commitment is needed to continuously modify and improve the program.

Observe & Reinforce Training

Performing individual VDT workstation ergonomic assessments requires the trained ergonomic facilitator and the employee to work together using collaborative problem-solving techniques. The training agenda should include types of disorders, job-related occupational risk factors, ergonomic solutions, and how to deal with resistance and conflict. Employees will better appreciate ergonomic solutions when they understand how proposed changes will help them. The ergonomic facilitator should be viewed as a coach, not as someone trying to enforce company policy. As a coach, the facilitator should advise the employee on how to perform his/her own workstation adjustments.

Provide Continuous Feedback

Performance improves more quickly when people receive feedback concerning their successes (or lack thereof). Timely feedback must be given to all workers and managers about the results of ergonomics training. Feedback helps to accomplish two performance improvement goals: 1) it reinforces the positive outcomes and benefits of using office ergonomics skills in the workplace and 2) it improves the program and identifies necessary corrective actions.

The Instructional Systems Design Approach

An instructional systems design approach encompasses several processes and activities:

1) Conduct a needs analysis.
2) Design training materials.
3) Develop training materials.
4) Implement and deliver the training.
5) Evaluate and measure the effectiveness of the training.

Figure 1 presents an instructional system design model and phase activities (Knirk and Gustafson; Gordon).

Step 1: Needs Analysis

In the needs analysis phase, an organizational task (job) and individual analysis is conducted. Two questions must be answered in order to derive the training objectives: 1) What is the current performance of the organization and the workers? 2) What is the desired performance for the organization and the workers?

If the performance problem is identified as a lack of knowledge, skill or ability of the workforce, then a training program should be designed as a necessary intervention strategy. However, if the needs analysis determines that the performance problem is because of a poorly designed work system (e.g., workstation design, work demands), then redesign intervention efforts are needed as well—in other words, training may not be the only solution.

Criteria for evaluating and measuring training effectiveness are also developed during this phase. These criteria are linked to the training objectives and are established at the trainee, departmental (strategic business unit) and organizational performance levels.

Step 2: Design

During the design phase, results of the needs analysis are used to define the instructional objectives and to determine how those objectives will be met. This involves determining: 1) training prerequisites; 2) trainee population; 3) desired learning outcomes (e.g., knowledge, skills and abilities in cognitive, affective and psychomotor domains); 4) training media and techniques; 5) training environment; 6) learning conditions (e.g., individual differences); 7) instructional strategies; and 8) learning principles.

Contextual factors involving organizational, environmental and social issues—such as designing training for new workers versus experienced workers—are determined in this phase. Since training occurs within an organizational culture, how a given organization values the training and its integration and link to the corporate strategy must be consid-

ered as well. Information derived from the needs analysis phase is used to identify these factors.

Specific instructional strategies and an outline of how the instructional activities relate to accomplishment of training objectives and goals must be determined before the materials are developed. A series of nine instructional events must occur for learning to occur:

1) Gain trainees' attention.
2) Inform trainees of the training objectives.
3) Use recall or transfer from trainees' existing experience.
4) Present training material to be learned.
5) Provide learning guidance.
6) Elicit desired performance.
7) Provide feedback.
8) Assess performance.
9) Enhance retention and facilitate transfer of training to actual task performance (Gagne, et al).

The training delivery system is selected by matching the training media strengths with the training objectives as determined in each instructional event. Instructional media have different characteristics for providing the various events of instruction. In developing a strategy for instruction, the delivery system can be selected event-by-event, objective-by-objective in order to best achieve training goals.

Step 3: Development

Developing and testing training materials is the next phase in the instructional system design process. One should note that it is the instructional design process—not the training media and technology—that determines the effectiveness of a training program. The development phase involves piloting and walkthroughs of all training materials. During this phase, instructional strategies are applied sequentially to each training activity and the most effective media delivery techniques are selected. The format of delivery is also determined (e.g., facilitator-controlled, trainee self-paced or e-learning).

Step 4: Implementation

Implementing training consists of scheduling how and when it will be delivered. Also, train-the-trainer or facilitation skills must be taught and practiced before the trainers and/or facilitators deliver the training. In particular, the facilitator should learn how to lead and control active and interactive discussions among trainees.

Step 5: Evaluation

Evaluating training effectiveness and providing feedback to the organization and trainees is the last phase in the instructional system design. When training results match established goals and objectives, the program can be considered effective.

The two primary types of evaluation are formative and summative (Knirk and Gustafson). Conducting a formative evaluation while training materials are in a draft form allows essential and meaningful feedback to be collected from learners and is part of user prototyping activities. Summative evaluation is conducted after the training course has been developed, implemented and delivered. It typically determines the extent to which the training program has been successful in meeting its stated training, behavioral and organizational objectives. It also determines the value of the training program and indicates what modifications are needed to make the program more effective.

A summative evaluation should follow these general principles:

1) Conduct the evaluation in an environment that is as similar to the ultimate job environment as possible.
2) Conduct the evaluation after a realistic period of time (preferably two, six and 12 months following training).
3) Conduct the evaluation based on the targeted job tasks and conditions (Gordon). Table 1 presents an evaluation assessment process and examples of evaluation measures (Kirkpatrick; Gordon).

A systematic, multiple measure, five-level training evaluation model can be used for evaluating training effectiveness (Kirkpatrick). This five-level model and examples of measurements that could be taken at each of these training evaluation levels are:

- Level I: Pre-training assessment and baseline. Examples include pre-training knowledge, attitudes, behaviors and organizational safety indexes.
- Level II: Reaction to the training program. Examples include post-training questionnaire asking the trainee to evaluate the relevancy and usefulness of the training.
- Level III: Learning of principles, facts, techniques and attitudes. Examples include pre-post questionnaires/tests assessing how well the trainee learned the information taught as well as observations/interviews with the trainee. Figures 2 and 3 present a VDT individual workstation assessment tool that could be used for observations.
- Level IV: Behavior relevant to job performance. Examples include assessment of the trainees' behavior on the job—how well was the trainee able to transfer the knowledge and skills to the job. This may be completed by observations and/or interviews.
- Level V: Results of the training program related to organizational objectives. Examples include reported WMSDs, time off work, workers' compensation rates, and health- and stress-related costs. Leading and lagging safety and health performance measurements should be analyzed and tracked over time (Table 1). Tracking these pre- and post-measures, as well as other training costs, determines the basic variables for calculating a return on investment of the training program.

Case Studies: Development of Workshops

The content of the two programs included a definition of ergonomics; basic physiology of the upper extremities; causes of discomfort and injuries; ergonomics principles regarding workstation layout; techniques on how to adjust and use a workstation properly; recommendations for analyzing a worksta-

tion; procedures for reporting discomfort; and relaxation and exercise techniques to relieve VDT stress.

In Company A, a three-tiered training program was designed for senior managers, supervisors and employees (Robertson and Robinson). Each program included specific content areas relating to trainees' job responsibilities—including how they were expected to respond when employees reported ergonomics problems. This promoted interaction and participation between employees and managers to support changes in the work environment.

A similar approach was taken at Company B, although a greater focus was placed on a high level of user control as the ergonomic workstations were designed with the intent to allow for high flexibility and mobility (Robertson and O'Neill). Managers involved in this training program were faced with different change issues since employees were applying their ergonomics knowledge in a more systematic manner by rearranging workstations and work environment components.

Table 1

Evaluation Assessment Process & Outline: Examples of Evaluation Measures

Evaluation Process	Possible Measures
Formative Evaluation	**Prototype testing:** Usability and measures of attitude toward the instructional strategy and approach •Observation protocols •Questionnaires •Interview protocols •User verbal protocols **Final user testing:** Measures of comprehension, retention and transfer •Pre- and post-training questionnaire •Interview protocols •Observation protocols •User retrospective verbal protocols
Summative Evaluation	**Pre-training assessment and baseline** •Current task performance measures •Current attitudes, opinions •Current skills, knowledge, abilities **Post-training assessment** •Trainee reaction; post-training questionnaire; interviews •Learning outcomes measured by pre- and post-training questionnaires •Self-reported intentions—attitudes and behaviors **Follow-up questionnaires** •Two-, six- and and 12-month follow-up training questionnaires **Observable behaviors** •Interview and observation protocols (two, six and 12 months) •Supervisor and ergonomics facilitator VDT assessment **Organizational results and outcomes** •Leading indicators •Work unit performance and health (e.g., absenteeism; wellness) data •Discomfort ratings; monitoring and tracking •Office environment risk factor analyses; monitoring/tracking •Ergonomic evaluation requests; interviews and qualitative data •Ergonomic observations of workstation redesign/modification •Attitudinal and ergonomic/safety organizational practices; self-reported perceptions •Lagging indicators •Workers' compensation claims and OSHA log data analyses and tracking

Case Studies: Training Program Evaluation

To evaluate the two programs, the following measurements were taken at each of the evaluation levels. Findings are given as well.

Level I

Level I measurements consisted of baseline assessment questionnaires that provided a measure of the trainees' skills, knowledge and abilities before training. A pre-training knowledge test was given to trainees at both companies. The percentage of correct responses were 67 percent and 69 percent for Company A and B, respectively.

Level II

Level II measurements included questions on the post-training questionnaire regarding the usefulness and relevancy of the training, and overall course delivery. More than 94 percent of trainees from both companies rated the training highly favorable, useful, informative and relevant to workstation design.

Level III

Level III measurements consisted of pre- and post-training discomfort surveys and pre- and post-training ergonomics knowledge tests. The post-training ergonomics knowl-

edge test asked employees open-ended questions about how they planned to use the training when they returned to work. Levels II and III served as a type of formative evaluation of the instructional materials indicating whether the training program was well received; whether training materials were clear and understandable; and whether training objectives were met. Trainees for both companies reported a significant change in their knowledge of VDT ergonomics, with correct responses of 92 percent and 93 percent for Company A and B, respectively, compared with 67 percent and 69 percent on the pre-training knowledge test.

Level IV

Level IV measurements consisted of pre- and post-observational ergonomic analyses of posture and work habits. Measures taken after the training provided data on what the trainee did or did not change in the workplace as a result of the training. Significant self-reported and observed positive behavioral changes were found among trainees at both companies. More than 86 percent of Company A trainees reported that they had applied the ergonomics knowledge to their jobs, which included placement of the VDT screen, position of their wrists at the workstation and sitting posture. Follow-up observations and interviews by the corporate ergonomist confirmed these self-reported behavioral changes.

All participants from Company B exhibited a high level of user control as they continually adjusted their workstations to meet various job demands. This involved arranging the workstation for sitting and standing postures. In addition, a significant decrease in overall body discomfort was found in this group as compared to a control group with no training. Follow-up interviews and observations by the ergonomist supported these results, as more than 85 percent of the trainees said that they were able to apply many of the principles taught in class to their workplace.

Of the workplace changes reported, most involved chair adjustments, monitor placement, workstation configuration and layout, and height adjustments of the keyboard and working surfaces. For both companies, many participants reported that the awareness developed through training led to changes in posture and an increase in the number of breaks for exercise or movement.

Employees at Company A had the ability to change the workstation configuration within defined constraints that provided some means of user control at the individual level. At Company B, workstations were highly mobile and groups of workers were able to change not only the configuration of an individual workstation, but also the overall configuration of the group's work area. One manager was very supportive and encouraged members of his workgroup to change their workstation configurations within certain boundaries to support their varying job processes.

Level V

Level V measurements addressed organizational performance objectives. A return on investment (ROI) analysis for the office training program for Company A revealed that the program resulted in a positive health payback for trainees and the company. The analysis involved calculating the direct and indirect costs of company-defined upper extremity WMSDs, costs of training development and implementation, workstation redesign costs and ergonomics workstation evaluation costs as well as the number of reported WMSDs that occurred after the training program was implemented.

Company A experienced a 15-percent decrease in reported upper extremity WMSDs as well as a 33-percent decrease in average lost workdays per WMSDs case in the year following the office ergonomics training program. Additionally, in years two through four after the intervention and workstation changes, these decreases continued.

In Company B, as employee knowledge of control over their workstations increased, self-reported stress decreased. Self-reported upper/lower back discomfort dropped 31 percent among workers who received the training and a highly adjustable workstation. For this same group, self-reported upper limb discomfort was reduced 56 percent.

Case Studies: Training Effectiveness

Overall, the ergonomics VDT training produced positive results for both companies. For Company A, all five levels of the evaluation model were applied and clearly documented. Significant results were accomplished for all 2,500 individuals trained. Company B also demonstrated positive results for the five evaluation levels with the results of the fifth level showing a significant decrease in self-reported musculoskeletal discomforts for the 20 individuals trained.

Other successful components were top management commitment to the ergonomics program itself, active employee involvement, positive response by management to employee requests for VDT workstation redesign or reconfiguration, and continuous management support of applying ergonomics principles to the work environment. Furthermore, an essential part of sustaining a successful ergonomics training program is heightening the awareness of supervisors to reinforce positive employee behaviors. This was effectively completed in Company A as part of the overall strategic plan to address health issues associated with VDT work. In Company B, a comprehensive ergonomics program is being designed and will be implemented in the near future.

Conclusion

For both companies, the office ergonomics training programs produced positive results for each of the

A well-designed office ergonomics program, coupled with a properly designed work environment, provides the foundation for creating a responsive environment for all involved.

Figure 2

Individual VDT Workstation Assessment: Part 1

Company Name/Location _____ Assessment Completed By _____

Department _____ Date _____

Employee Name/Occupation _____

Workstation Design and Size

Using the following symbols, draw the location of keyboard (▬), monitor (▮), and mouse (●).

Work surface being evaluated:

☐ Fixed ☐ 3-Section ☐ L-Shaped ☐ Computer Stand

Desk or fixed work surface | Three section work surface | L-Shaped or with rounded corner | Adjustable computer stand

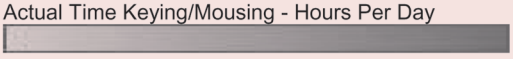
Workstation dimensions_____

Adjustable sections can be moved by:

☐ User
☐ In-house office services
☐ Requires service representatives

Job and Workload Demands

Actual Time Keying/Mousing - Hours Per Day



0 2 4 6 8 ++

Time Spent on VDT Work

Numeric keypad data entry _____hrs. Graphic/design mousing _____hrs.

Dictation/copy from text _____hrs. Composing/writing _____hrs.

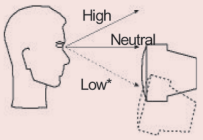
Workstation Layout

Component Location to Worker

	Left	Center	Right	High	Center	Low
Monitor						
Keyboard						
Hard Copy						

Copy stand provided ☐ Yes ☐ No

Screen Height



*low needed for bifocal readers

Keyboard Tray

	High	Neutral	Low	Far	Close
Mouse					

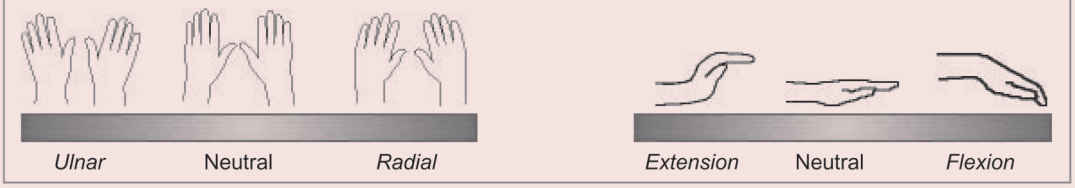
Distance from keyboard

☐ Tray for mouse ☐ Height adjustment

☐ Retractable ☐ Tilt adjustment

Wrist Posture

☐ Hand/Wrist Discomfort Reported



Is there mechanical pressure on wrist(s) or forearm(s) from:

☐ Wrist rest ☐ Work surface

☐ Jewelry ☐ Other _____

Do work methods contribute to poor wrist posture?

☐ Poor seated position ☐ Bracing wrist/hands against front edge of work surface

☐ Aggressive keying

☐ Other _____

training evaluation levels. This supports the concept that the combination of user control and training are important—since they can provide the worker with a high degree of environmental control through an increased knowledge of office ergonomics and the ability to effectively apply ergonomic principles to their office work environment. With an increase in office ergonomics knowledge as well as implementation of an evaluation process, the value of ergonomics training can be demonstrated. A well-designed office ergonomics program, coupled with an ergonomically designed work environment, provides the foundation for creating a responsive environment for all stakeholders. As these individuals interact with one another, applying and seeking ergonomic solutions, a sense of participation is created.

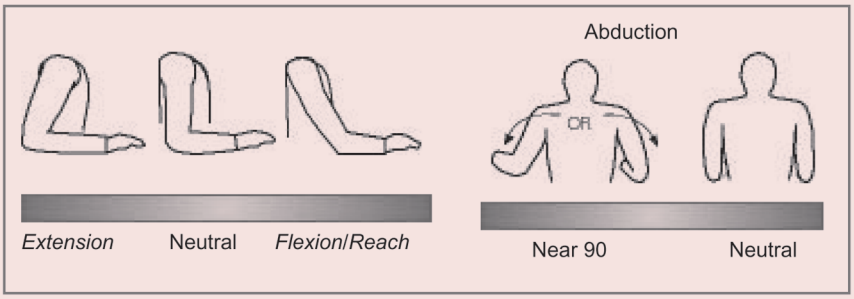
The two case studies show that a systems approach can influence health and stress effects

Figure 3

Individual VDT Workstation Assessment: Part 2

Shoulder Posture

☐ Upper Arm/Shoulder/Neck Discomfort Reported



Shoulders and Back

- ☐ *Hunched* (elbows high or pushed up)
- ☐ Relaxed (elbows hang normally)
- ☐ *Slouched* (shoulders or back bent forward)

Stressful postures observed during:

- ☐ Keying
- ☐ Using Mouse
- ☐ Office equipment (phones)
- ☐ Other VDT hardware
- ☐ Other _____

Seating and Back Support

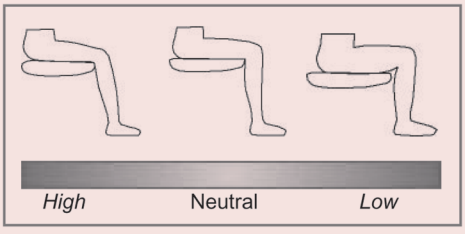
☐ Back or Leg Discomfort Reported

Note seating conditions:

- ☐ Seat height NOT adjustable
- ☐ Height adjustment difficult
- ☐ Adjusted incorrectly to match height of keyboard or monitor
- ☐ Seat cannot be lowered low enough (foot rest needed)

Seating back adjustment:

Back support	☐ Yes	☐ No
Padded back	☐ Yes	☐ No
Height adjustable	☐ Yes	☐ No
Depth adjustable	☐ Yes	☐ No
Clearance for legs:		
Leg clearance	☐ Yes	☐ No
Knee clearance	☐ Yes	☐ No
Foot clearance	☐ Yes	☐ No
Are employees:		
Straddling file drawers	☐	
Sitting sideways	☐	

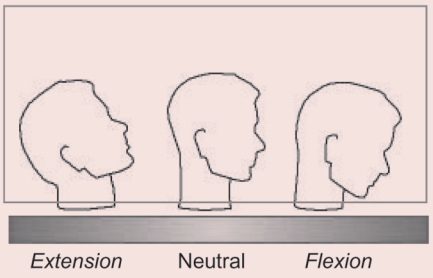


- ☐ Padding added to back rest
- ☐ Seat back not adjusted
- ☐ Leaning forward, back not used

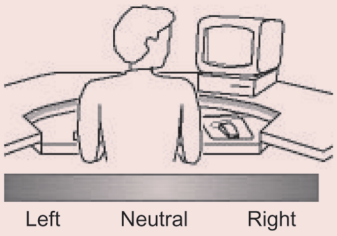
Look for these telltale signs of seating problems:

Head and Neck Posture

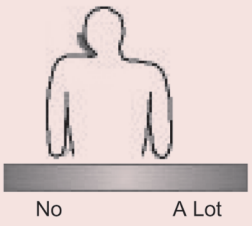
☐ Neck or Shoulder Discomfort Reported



Rotated? (looking left or right)



Tilted to side? (cradling phone)



- ☐ Frequent phone use
- ☐ Headset not available

Vision and Lighting

☐ Eye Strain or Headaches Reported

Monitor Condition		Lighting Condition		Employee Eyesight	
Out of Focus	☐	Glare on screen	☐	Squints or leans forward	☐
Screen Flicker	☐	Direct sunlight	☐	Difficulty with bifocals	☐
Dirty, scratched	☐	Looking at light	☐	Screen too far away	☐
Poor brightness and contrast	☐	Paperwork hard to read	☐	Characters too small	☐

Comments:

Tips for Effective Office Ergonomics Training

•Set objectives to reflect what the company wants to achieve through the ergonomic training program. Don't just start training.

•Establish methods that will measure the program's effectiveness in meeting those objectives.

•Make training relevant. Use actual examples from operation to illustrate ergonomic principles.

•Involve and train line management, especially supervisors, in planning, carrying out and reinforcing the training.

•Don't rely solely on a videotape or film to do the training. Audiovisual materials serve to support training, not to replace it.

•Follow-up, follow-up, follow-up. One-shot training is rarely successful. Schedule frequent refresher courses. Employees can be helpful in designing effective refreshers, so solicit their input.

•Train the ergonomics facilitator in how to best conduct an ergonomic evaluation and provide recommendations. (See Figures 2 and 3.)

•Reinforce the positive. Provide rewards or incentives when supervisors and employees apply the training lessons to their workplace and computing habits.

•Listen to relevant feedback from employees on existing risk factors and on how to ergonomically improve their workplace. Make them part of the solution.

•Outside training consultants may be helpful to supplement expertise, but do not rely on them to run the program. Management retains the ultimate responsibility for safety at a given facility.

•Stress off-the-job as well as worksite ergonomics. Emphasize the importance of ergonomic layouts in home offices also.

•Remind employees that overall fitness, diet and nutrition, and other lifestyle considerations are also important.

associated with office work environments. Office ergonomics training programs and environmental control can be successful interventions at both the individual and organizational level. Both of these strategies help to reduce WMSDs and other related health issues. Both can also enhance organizational effectiveness. ■

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