A Joint Labor/Management Comparative Study of Various Non-Keyboard Input Devices in a Call Center Environment

A presentation by
Joe Petersen, CWA District 7
and
James M. Stewart, M.S., M.P.H., CPE, CIE
U S WEST, Inc.
Introduction and History of Ergonomics Between CWA and U S WEST

1987: Complaints of Cumulative Trauma Disorders (CTDs) from directory assistance operators in Denver, CO. OSHA investigates. Ergonomics agreement between CWA and U S WEST.
A Joint Labor/Management Comparative Study of Various Non-Keyboard Computer Input Devices in a Call Center Environment

◆ CWA and U S WEST agree to co-sponsor a NIOSH Health Hazard Evaluation (HETA 89-299-2230) on VDT use by operators
◆ CWA and U S WEST develop ergonomics language in collective bargaining agreements
◆ Joint labor/management cooperative approach to ergonomics
History of Ergonomics in Albuquerque

◆ In December, 1998 (at the Mutual Occupational Safety and Health Committee or MOSHC meeting), discussion was raised on conducting a comprehensive pilot study of computer input devices in order to see if “ergonomic” devices were of any help in overcoming discomfort or pain and, if so, which devices were appropriate under what circumstances.
Why Albuquerque was selected:

- Cadre of trained ergonomic assessors in place and familiar with workstations at location
- Single building with multiple workgroups performing the same tasks, with similar workstations and computer software/hardware
- Robust ergonomics program where employees understood and “valued” ergonomics
- Support for the study by employees and management
A Joint Labor/Management Comparative Study of Various Non-Keyboard Computer Input Devices in a Call Center Environment

Why the study succeeded in Albuquerque:

- People believed in the study
- Employees were “open-minded”
- The study dealt with “real issues”
- Employees were the “expert” in their jobs
- Elements of the study were “training-oriented”
- Union involvement and management support
- No names used in the study
A Joint Labor/Management Comparative Study of Various Non-Keyboard Computer Input Devices in a Call Center Environment

Difficulties that had to be overcome:

- Four questionnaires were time-consuming
- People didn’t understand why questions had to be repeated each time
- Everything had to be done “just right” in order to maintain the integrity of the data and study
- Some people lost enthusiasm for the study as time progressed (study fatigue)
A Joint Labor/Management Comparative Study of Various Non-Keyboard Computer Input Devices in a Call Center Environment

Methods and Results

This pilot study involved a repeated measure design and custom instrumentation to measure perceived ease of operation, productivity and comfort with regards to three types of input devices.
A Joint Labor/Management Comparative Study of Various Non-Keyboard Computer Input Devices in a Call Center Environment

The Subjects

- 44% were able to place their “mousing” device next to their keyboard
- 79% place their “mousing” device further away from and/or higher than the keyboard
- 5% have used input devices in their lap
A Joint Labor/Management Comparative Study of Various Non-Keyboard Computer Input Devices in a Call Center Environment

Previous Experience with Input Devices

<table>
<thead>
<tr>
<th>Input Device</th>
<th>Percent &quot;Yes&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mouse</td>
<td>90</td>
</tr>
<tr>
<td>Touchpad</td>
<td>10</td>
</tr>
<tr>
<td>Ergo</td>
<td>20</td>
</tr>
</tbody>
</table>
A Joint Labor/Management Comparative Study of Various Non-Keyboard Computer Input Devices in a Call Center Environment

Positive Reaction to the Devices

![Bar chart showing positive reaction to devices over 3 and 6 weeks.]

Control | Ergo | Touchpad
---|---|---
3 Weeks | 90 | 60
6 Weeks | 80 | 65
A Joint Labor/Management Comparative Study of Various Non-Keyboard Computer Input Devices in a Call Center Environment

Reported Positive Attributes

![Chart showing percent responding positively for comfort, ease of use, accuracy, feel, and ease of position for different input devices.]

- Comfort
- Ease of use
- Accuracy
- Feel
- Ease of position

Legend:
- Control
- Ergo
- Touchpad
A Joint Labor/Management Comparative Study of Various Non-Keyboard Computer Input Devices in a Call Center Environment

Responses of Primary Interest

- Force required to activate the device
- Smoothness of operation
- General effort required to operate the device
- Comfort level
- Ease of accuracy
- Overall ease of operation
- Reports of pain/discomfort and location
No Differences Found

- Force required to activate the device
- Comfort level
- No age effect
- No gender effect
- No effect from hours of use per week
- Unable to assess effect of experience
A Joint Labor/Management Comparative Study of Various Non-Keyboard Computer Input Devices in a Call Center Environment

Smoothness of Operation

Differences between groups over time significant at p<.025
A Joint Labor/Management Comparative Study of Various Non-Keyboard Computer Input Devices in a Call Center Environment

Effort Required for Operation

![Graph showing the mean response over time for different devices. The graph indicates a significant difference between groups over time at p<.05.]

Difference between groups over time significant at p<.05

CUSWEST
life's better here®
A Joint Labor/Management Comparative Study of Various Non-Keyboard Computer Input Devices in a Call Center Environment

Perceived Accuracy of the Device

Difference between groups over time significant at p<.001
A Joint Labor/Management Comparative Study of Various Non-Keyboard Computer Input Devices in a Call Center Environment

**Ease of Use of the Device**

![Graph showing ease of use of devices over time](graph.png)

**Mean Response**

- Control
- Ergo
- Touchpad

**Difference between groups over time significant at p<.001**
Response Variables as a Group

- **Time effect for group of variables as a whole:**
  - Responses in general changes over time

- **Group by time effect for group of variables as a whole:**
  - Responses in general changes differently for the groups over time

- **Total years of experience with computers affected responses**
A Joint Labor/Management Comparative Study of Various Non-Keyboard Computer Input Devices in a Call Center Environment

Reported Pain or Discomfort

Difference between groups over time significant at p<.001
Reports of Pain or Discomfort

- Most dramatic reductions in pain were relative to shoulder, back and neck

- No effect of age or gender overall
Summary

- Contour mouse groups responded most positively during the study period. Positive assessment of smoothness of general effort required, accuracy and ease of use.
- Cirque Touchpad group responded less favorably during the study period for the same variables, but had best results four week post-test for pain.
- All three treatment groups reported significantly less pain during the study period with a return to pre-study levels for the Contour groups four weeks post-test.
Where do we go from here?

- Data supports strategies for input device selection and position at workstation.
- Data supports positioning the input device at the same level as and left or right of the keyboard.
- Data supports premise that awkward posture and biomechanical forces to overcome disadvantages, not repetitive motion, are the issues with mice.
- “Sculpted, ergonomic mice may or may not have any long-term effect (e.g., maintaining reduced discomfort).
- Although not particularly favored, the touchpad had greatest impact on employee comfort post-test.
Questions