



Ergonomics, Human Factors & Systems Engineering

www.exponentEHF.com

Ergonomics Considerations for WFH, Office and Educational Environments

Rachel Michael CPE, CHSP

<http://linkedin.com/in/rachelrmichael>

<http://linkedin.com/company/exponent-ehf>

Introduction

Rachel Michael M.Sc., CPE, CHSP

- ▶ Master of Science in Ergonomics
- ▶ Certified Professional Ergonomist and Certified Healthcare Safety Professional
- ▶ 20+ years consulting in ergonomics and risk control for varied industries
- ▶ SME and author of OSHA Ergonomics outreach materials
- ▶ 2018 Ergonomics Professional of the Year: ASSP
- ▶ President Emeritus - Board of Directors, Board of Certification in Professional Ergonomics
- ▶ Administrator: ASSP Ergonomics Practice Specialty
- ▶ Co-Chair of the National Ergonomics Conference



Agenda

1. Ergonomics challenges and solutions for newly working from home (WFH) employees.
 - ▶ Current State
 - ▶ Organizational needs and options
 - ▶ Individual employee needs and options
 - ▶ Prioritization of equipment
2. Equipment trends in traditional office spaces
 - ▶ Larger or multiple monitors
 - ▶ Customization of individual workspaces and tools
 - ▶ Programming your environment
3. Ergonomics challenges and solutions for college students
 - ▶ Prioritization of equipment and scheduling
 - ▶ Ergonomics and user health and safety

1. WFH Ergonomics Challenges and Solutions

Coronavirus Could Force Teams to Work Remotely

by Heidi K. Gardner and Ivan Matviak

March 05, 2020

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Image Credit: www.bloomberg.com



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Twitter says staff can continue working from home permanently

Brian Heater @bheater / 11:53 am MDT • May 12, 2020

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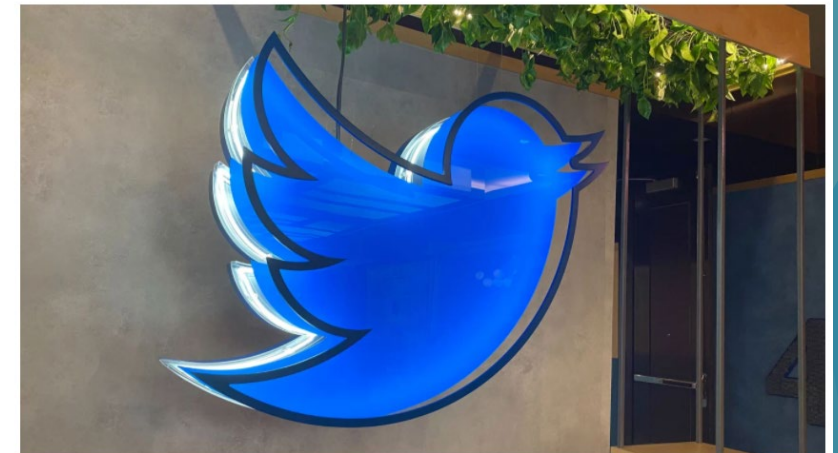


Image Credits: TechCrunch

1. WFH Ergonomics Challenges and Solutions

Current State:

- ▶ Prior to the pandemic, just 3.4 percent of Americans worked from home. But at the peak of the shutdown, an Upwork report in partnership with MIT found that nearly half of the U.S. workforce was working remotely. Today, the question in every sector is whether there will be a permanent change in the way businesses, workers, and customers think of the workplace.

1. https://john-joseph-horton.com/papers/remote_work.pdf
2. <https://www.flexjobs.com/blog/post/remote-work-statistics/>
3. <https://www.wework.com/ideas/growth-innovation/reimagining-work-in-the-era-of-covid-19>
4. <https://exponentehf.com/covid-19-work-from-home-employees-covered-by-hse-office-ergonomics-regulations/>
5. <https://www.wework.com/ideas/growth-innovation/reimagining-work-in-the-era-of-covid-19>

1. WFH Ergonomics Challenges and Solutions

- ▶ In a May 2020 CivicScience poll of the New York City metro area, the number of respondents saying that (barring safety concerns) they would prefer to work in the office at least part of the time was more than double the number who said they would prefer to stay fully remote.
- ▶ The majority—76 percent—of respondents said they felt an office setting was “very important” or “somewhat important” for collaboration and innovation.
- ▶ HSU (UK) clarifies ergonomics and display screen use regulations apply to employees working from home.

1. WFH Ergonomics Challenges and Solutions

- ▶ Starting to get data on WFH looks and feels like for employees and employers

1. [Davis KG, Kotowski SE, Daniel D, Gerding T, Naylor J, Syck M. The Home Office: Ergonomic Lessons From the “New Normal.” Ergonomics in Design. 2020;28\(4\):4-10. doi:10.1177/1064804620937907](#)
2. <https://www.employment-studies.co.uk/resource/ies-working-home-wellbeing-survey>

The Pandemic of Work-From-Home Injuries

Chiropractors report a surge in problems as millions of workers have spent months clacking away on sofas and beds and awkward kitchen counters.



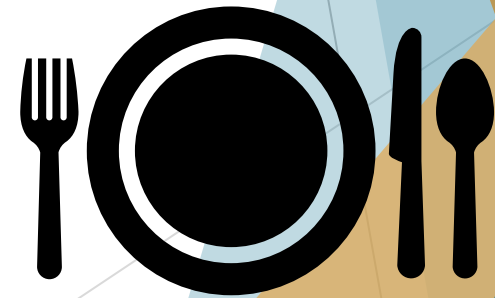
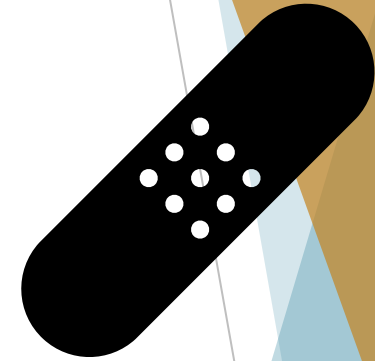
Getty Images

<https://www.nytimes.com/2020/09/04/well/live/ergonomics-work-from-home-injuries.html>

1. WFH Ergonomics Challenges and Solutions

Working at Home Wellbeing Study

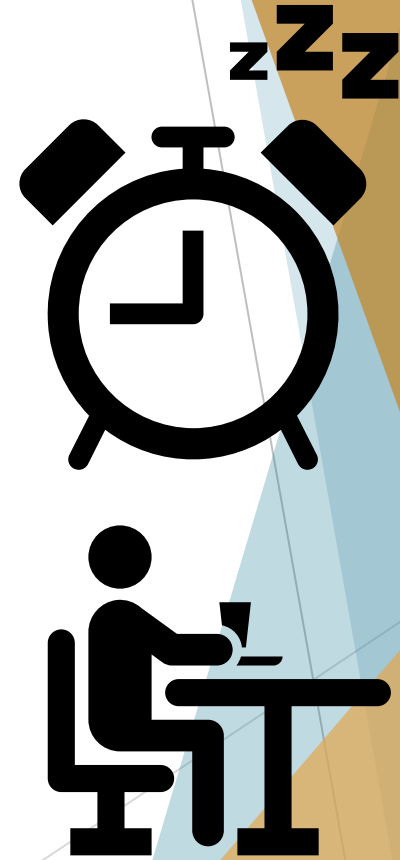
- There has been a significant increase in musculoskeletal complaints. **58%** of the survey respondents reported new aches and pains, especially in the neck, shoulder and back, compared to their normal physical condition.
- Diet and exercise are on the wane with 20% of respondents admitting to an increase in alcohol consumption, while 33% are eating a less healthy diet, and 60% acknowledging that they are exercising less.



1. WFH Ergonomics Challenges and Solutions

Working at Home Wellbeing Study

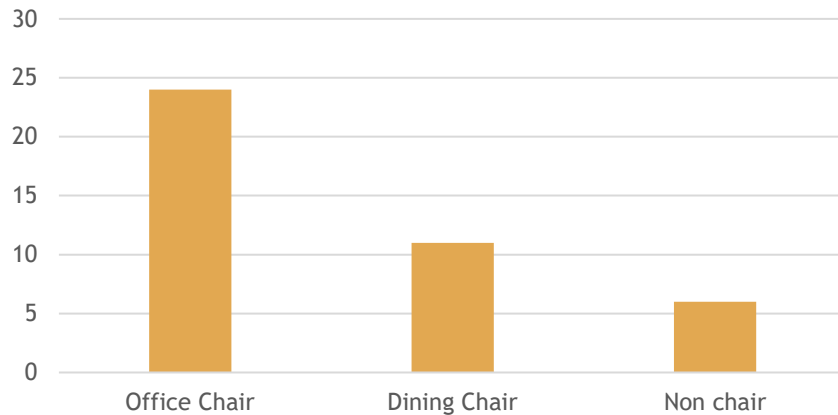
- 64% of respondents reported a loss of sleep due to worry; and corresponding increased symptoms of fatigue (60%), possibly as a consequence of 48% reporting working patterns that include long and irregular hours.
- 50% of all respondents reported not being happy with their current work-life balance; 33% frequently feel isolated, 21% are worried about job security, while just under half (41%) harbor health concerns for family members.



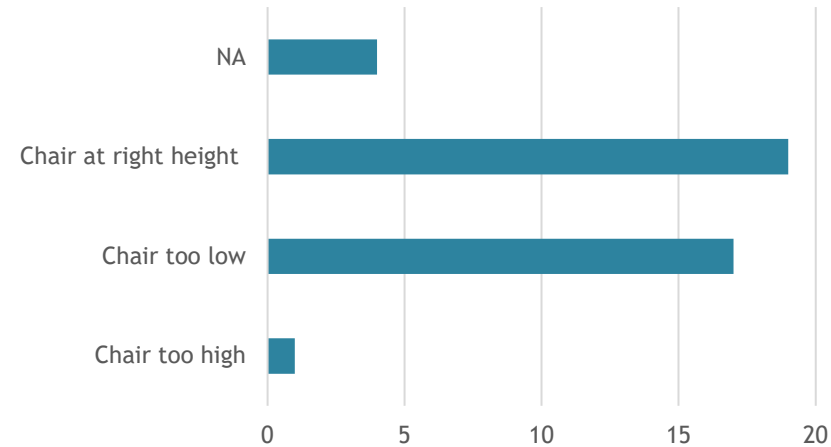
1. WFH Ergonomics Challenges and Solutions



Type of Chair



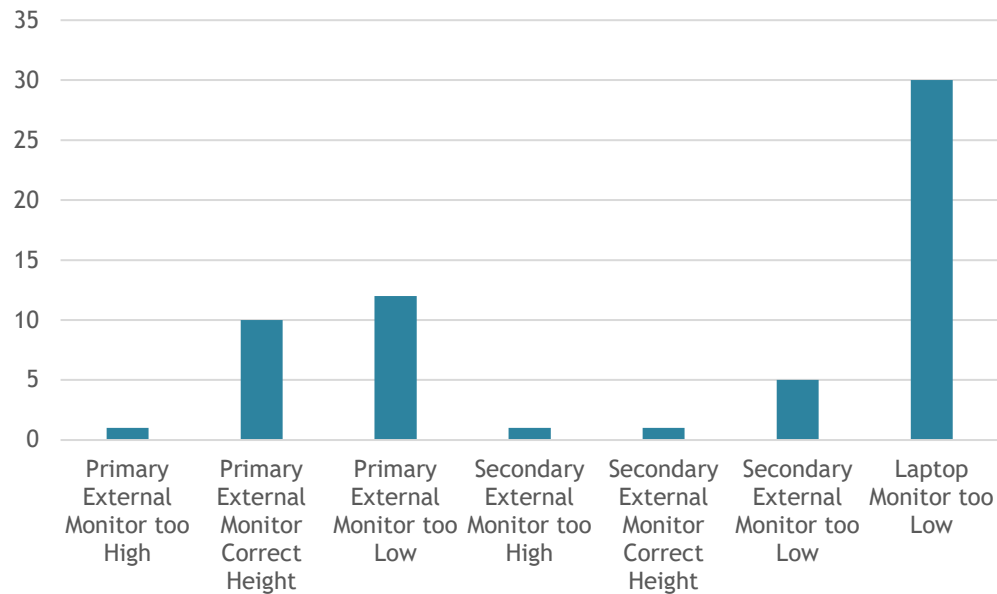
Chair Height



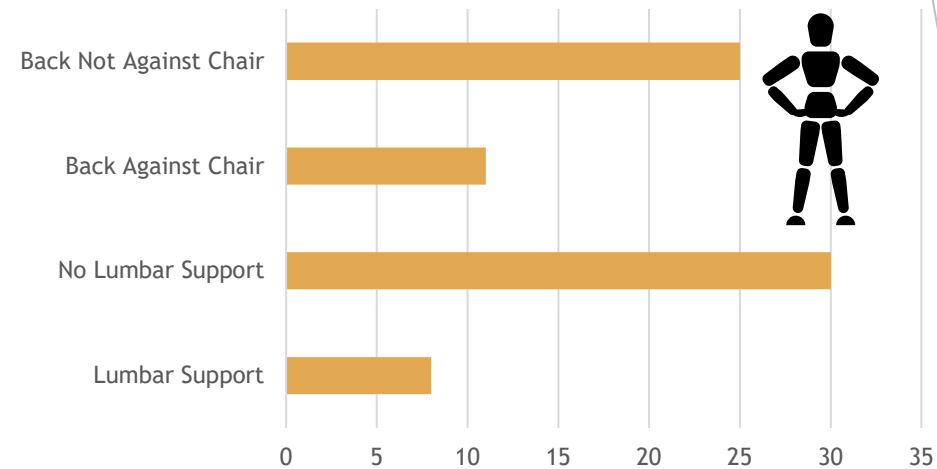
1. WFH Ergonomics Challenges and Solutions



Monitors



Back Support



1. WFH Ergonomics Challenges and Solutions

Work Surface Edge

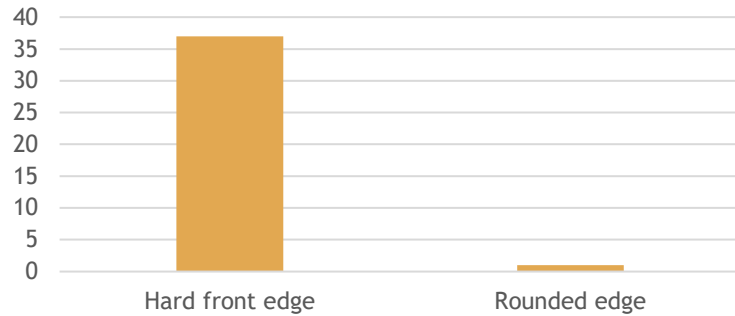
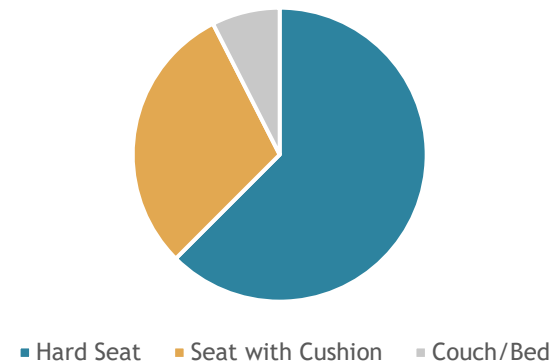


Image Credit: www.hfes.org



Seat



1. WFH Ergonomics Challenges and Solutions

- ▶ Position of the monitor was oftentimes too low or off to the side. Three quarters of monitors were laptops, which were too low.
- ▶ Another common issue with the monitors was the lack of the primary screens centered in front of the workers (31%), resulting in twisting of the neck and/or back to view the monitor. As expected, the secondary monitors were not centered for the most part (73%).
- ▶ Several other concerns were identified with the workstations such as poor lighting (17% had glare and 5% were too dark) and feet not touching the floor (7%).
- ▶ Very few work surfaces had a rounded edge; more than 90% had a hard, sharp edge.

1. WFH Ergonomics Challenges and Solutions

Twitter says staff can continue working from home permanently

Brian Heater @bheater / 11:53 am MDT • May 12, 2020

 Comment



 Image Credits: TechCrunch

Helping Tweeps set up their at-home offices

All employees, including hourly workers, will receive reimbursement toward their home office set up expenses, and we are working with our vendors to ensure our contractors' work-from-home needs are met as well. We listened to employee feedback and expanded our policy to include home office equipment, such as desks, desk chairs, and ergonomic chair cushions. We're also allowing Tweeps to expense online fees while working from home.

1. WFH Ergonomics Challenges and Solutions

·WORK TRANSFORMED·

Google will give every employee \$1,000 to WFH

- ▶ “For us [to be able to provide resources](#) for Googlers to set up the most productive workstation at home so that they have an opportunity to separate 'When I am in this space I am focused on my work and I am focused on these things, and when I step away from this space I am able to detach from work, I am able to connect with my family, my friends, my pets, the people in my community outside of this work box' is really important.
- ▶ That is really critical for us long term, as well as from a health perspective -- making sure that we have the best opportunity for ergonomically correct chairs, eye-line for monitors and those sorts of opportunities as well.”

1. WFH Ergonomics Challenges and Solutions

- ▶ Employers may not have a comprehensive policy covering equipment, taxable benefits, materials management, etc.
- ▶ Neither employers nor employees have easy access to information about when a certain product or tool will improve the ergonomics of the WFH environment.
- ▶ Build and installation of WFH equipment may introduce additional employer risk.
- ▶ Many employees are sharing workspace with partners, children or other household members and providing adjustability between users should be considered by both parties.

1. WFH Ergonomics Challenges and Solutions

- What is an 'ergonomic' product?

Starting with a 3-D cutting pattern, front pocket scoops were enlarged for comfort and easier access. The small front watch pocket was also enlarged and reshaped for function. Back pockets were lowered to avoid sitting on one's wallet and the traditional back yoke was replaced by darts for improved comfort. Cuffs were **ergonomically**-shaped and dropped down in the front to sit on the top of the shoe, but were shorter at the back to avoid drag. The jeans also included longer, skinner belt loops that were easier to use with a belt.

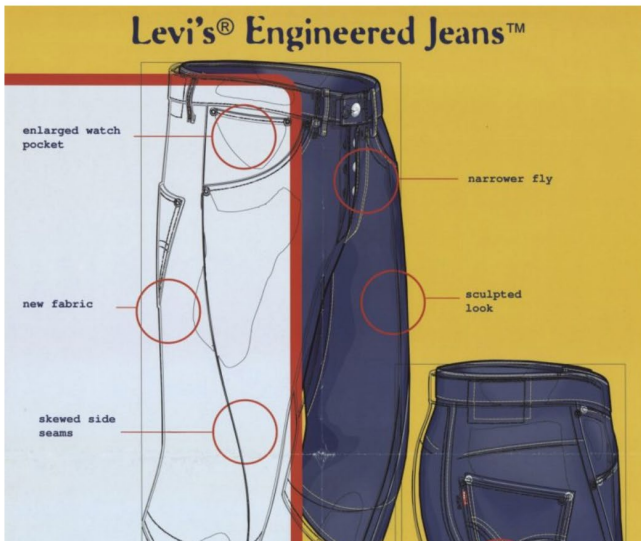


Image Credit: www.levi.com

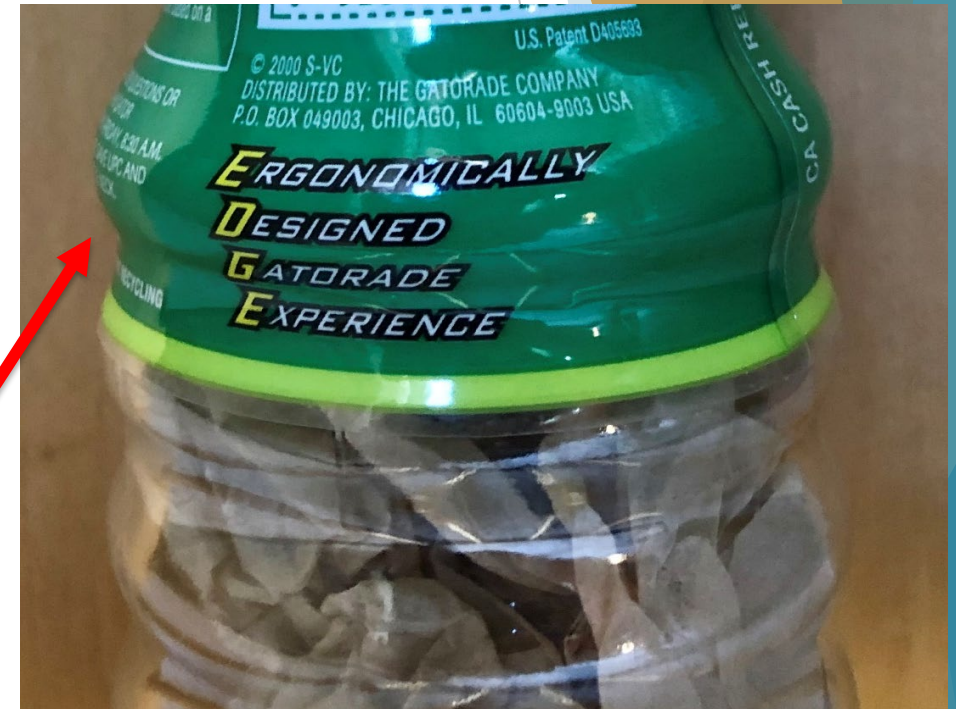




Image Credit: © Private

1. WFH Ergonomics Challenges and Solutions

For Organizations:

- A policy and program should include training and information in **WHY** a product may or may not be appropriate for a given situation.
- It might include specific information about vendor relationships, pricing, and recommendations for use.
- It may be visible to end users or used in conjunction with EHS/Ergonomics teams.

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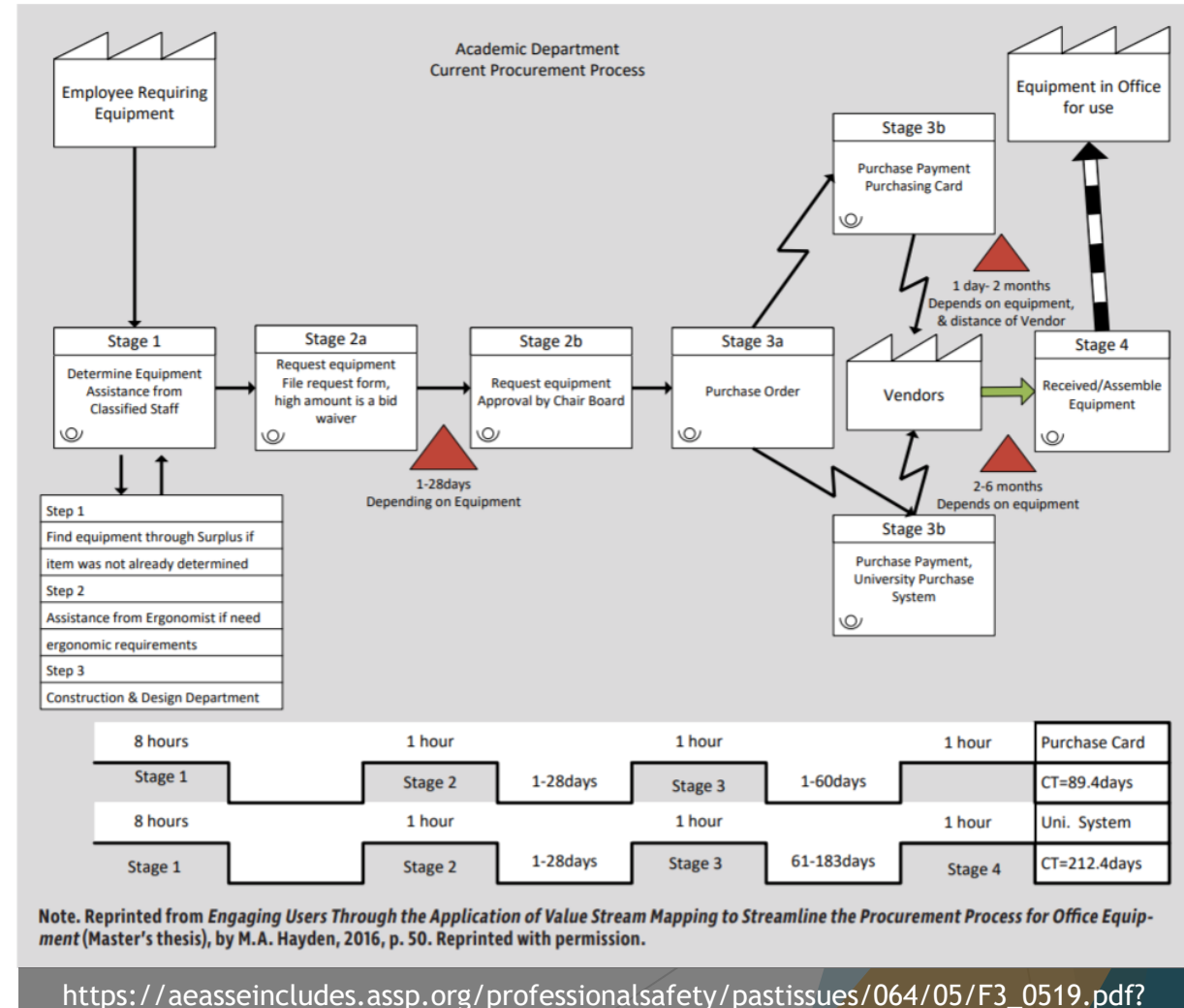
Wrist Pad / Rest ★	646017	Kelly Viscoflex™ Palm Support, Black, 3/4"H x 3 1/5"D x 6"L	Staples	Soft-to-touch Lycra™ covered contoured edges and memory foam filling. Antimicrobial treated with Aegis™ Microbe Shield technology. Non-skid base. Recommendation: Palm rest may be appropriate when awkward wrist angle is present without or discomfort is reported due to contact stress with the desk surface.	
Footrest ★	524546	Rubbermaid® Height-Adjustable Tilting Footrest Model: FG4653	Staples	Accommodate your leg length by changing the height or angle of the foot platform. The tilting design lets you make adjustments while sitting. Recommendation: Footrests are an appropriate recommendation for many seated and standing workstations. In addition to providing a place to rest the feet if the employee cannot reach the floor in a seated positions, footrests provide the opportunity for employees to change the foot posture which may increase low back comfort. Employees who habitually lean forward may benefit from a footrest which, when used, discourages forward bending through the hips.	

1. WFH Ergonomics Challenges and Solutions

For Organizations:

- ▶ Map current state process to desired future state
- ▶ Comprehensive and singular policy addressing:
 - ▶ HR
 - ▶ Security
 - ▶ Purchasing
 - ▶ Materials Management
 - ▶ Risk Management
 - ▶ EHS and others
- ▶ Reduced risk of litigation for employers
- ▶ Improved comfort and productivity for employees

CURRENT VALUE STREAM MAP



1. WFH Ergonomics Challenges and Solutions



Image Credit: www.microsoft.com

For Employees:

- ▶ Ask about available resources, products/equipment, training, and access to ergonomics professionals. Are you able to safely remove equipment from the office?
- ▶ If equipment is not available from your employer, ask if any corporate discounts are available through vendor relationships if paid for personally.
- ▶ If corporate discounts are not available, check your network. Many organizations are offering competitively priced 'bundles' for WFH employees. Others are offering to pass along discounts to individuals.
- ▶ Prioritize your equipment needs.

1. WFH Ergonomics Challenges and Solutions

1

Raise the laptop with riser, sleeve, box, binders, pillow, etc.



3

Consider an external primary or secondary monitor.



5

Consider working surface and other needs.



2

Use separate input devices.



4

Consider seating needs. This may be where you are 6+ hours a day.



1. WFH Ergonomics Challenges and Solutions

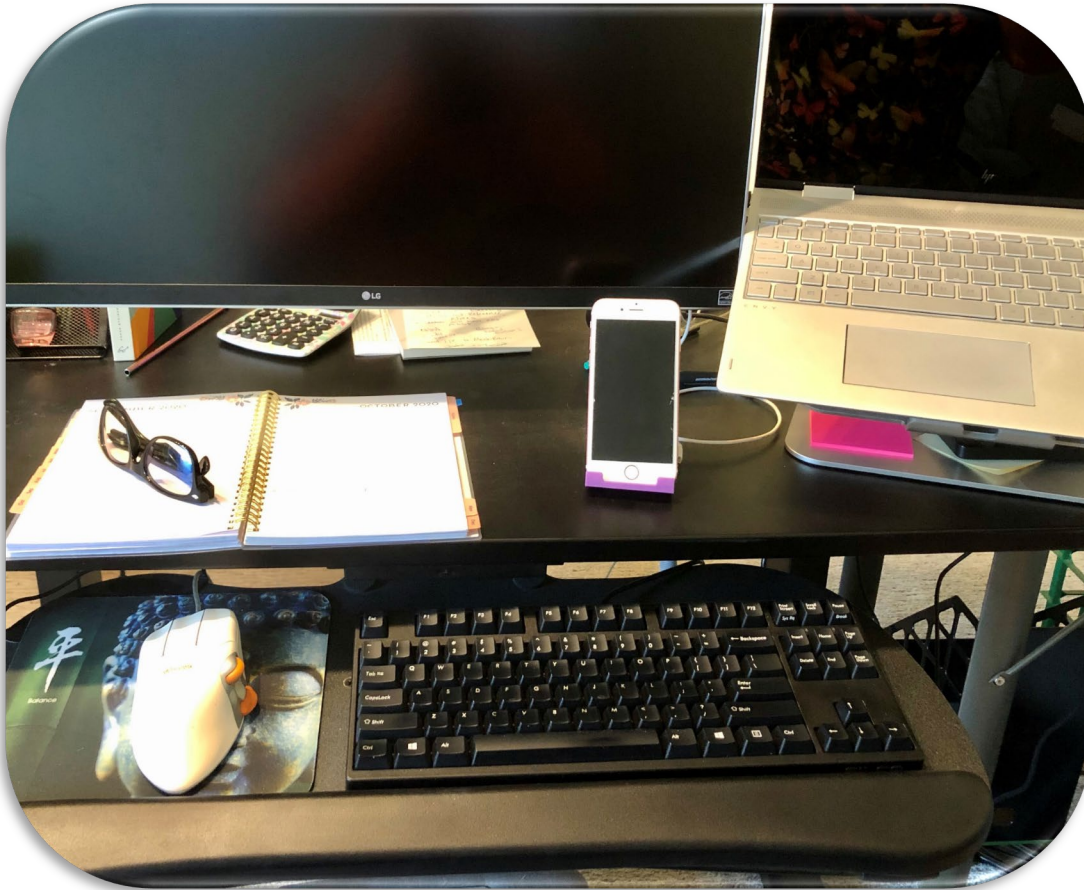


Image Credit: © Private

A CPE's Home Set Up

- Laptop riser
 - 27" Monitor
 - Separate keyboard (Cherry MX Red Switch and minus a 10-key) and left-handed mouse
 - \$2 plastic phone stand
 - Keyboard tray on a power height adjustable desk
 - Footrest
 - Chair with seat, backrest, tension, tilt and armrest adjustment
 - Footrest and chair mat (glass)
-
- ▶ Most used - Large monitor and footrest
 - ▶ Least used - Standing adjustment

1. WFH Ergonomics Challenges and Solutions

Tips, Tools and Habits of Mine

- Designated but mixed-use space
- Doorbell camera
- Visible communication to others in household
- Adjust chair between upright and declined throughout day
- Scheduling team meetings between 00:10-00:50
- Use break and hydration apps

► What is working for you?
#exponentehfWFH

► Let's look at what is trending in traditional office spaces

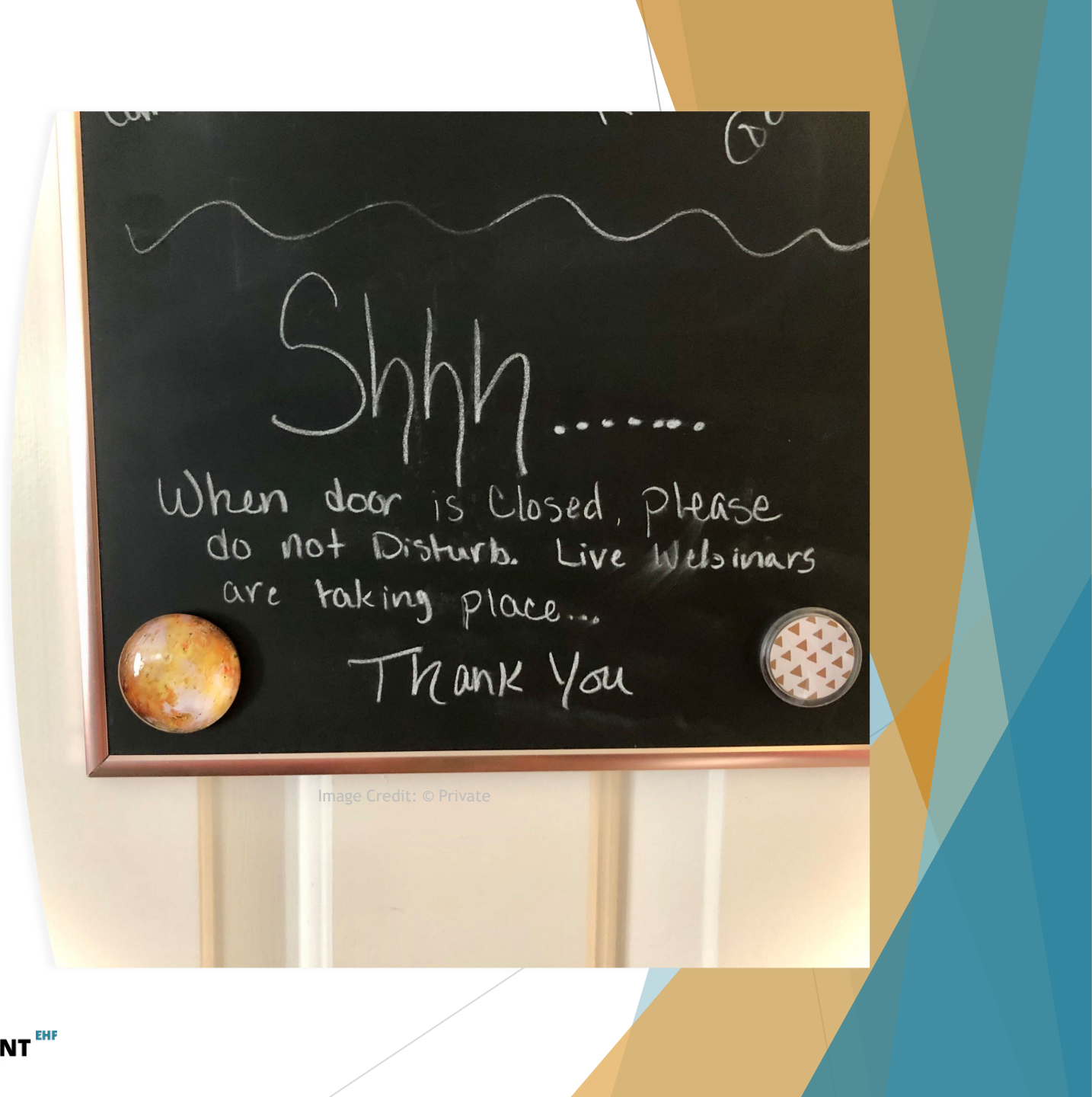


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2. Office Ergonomics Emerging Trends



Image Credit:
www.tweakyourbiz.com

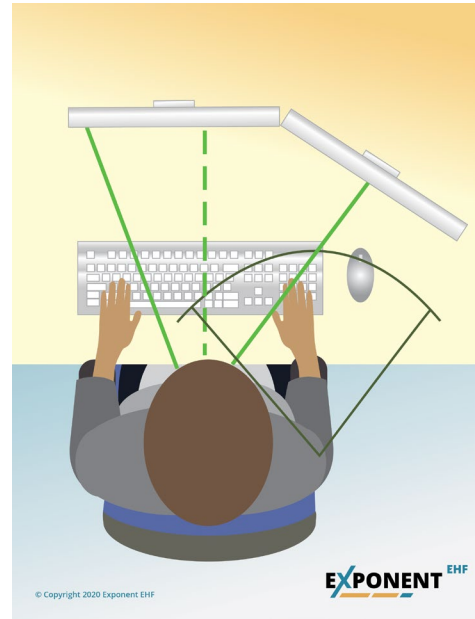


Image Credit:
www.standsteady.com

2. Office Ergonomics Emerging Trends

What are trends for monitors in the office workstation:

- ▶ Larger screen size
- ▶ Multiple displays
- ▶ Laptop screens being 2nd or 3rd monitor
- ▶ Monitors deep in corner
- ▶ Mounts not designed or placed for size of monitor being used
- ▶ Programming/settings not fully utilized
- ▶ Power cord length determines monitor placement



Image Credit:
www.tweakyourbiz.com

2. Office Ergonomics Emerging Trends

- ▶ Do you use more than one screen?



Image Credit: www.fixmypcfree.com



Image Credit: www.techgyd.com

2. Office Ergonomics Emerging Trends

- ▶ Multiple monitors and arms encouraging corner workstation placement impacting comfort of arms, shoulders, neck and back
- ▶ Double monitor placement a root cause for low back and sciatic discomfort
 - ▶ But I use them exactly 50% each!



Image Credit:
www.standsteady.com

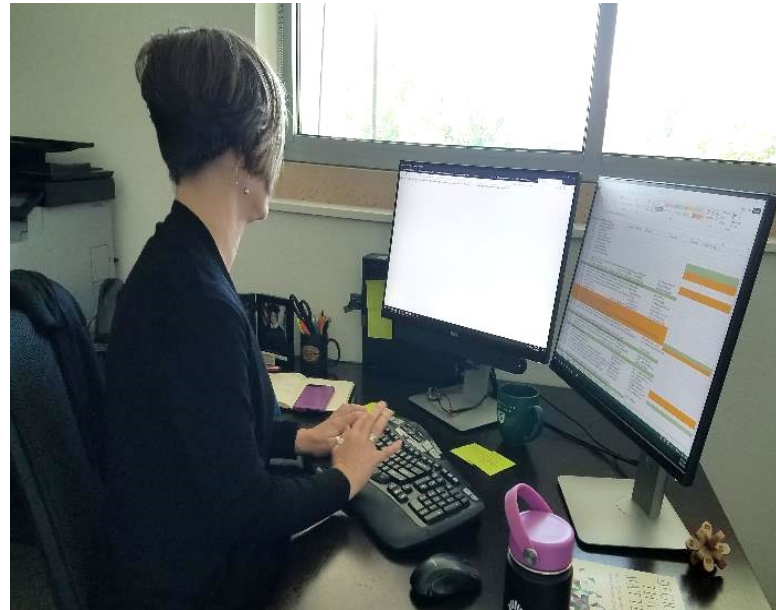


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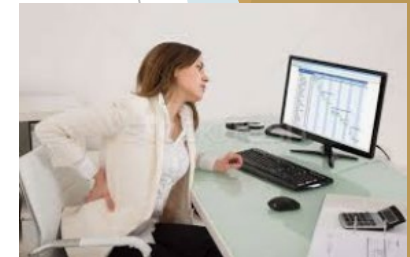


Image Credit:
www.stockfresh.com

2. Office Ergonomics Emerging Trends

- ▶ Double monitor arms used with ever increasing screen size and placed centrally on the desk can reduce arm adjustability



Image Credit: www.jestick.com

- ▶ Input device not optimized for increased 'distance' across multiple screens which can increase reaching and arm motion when mousing

2. Office Ergonomics Emerging Trends

- ▶ Mismatched arms/monitors and laptops can reduce desktop space leading to awkward postures when performing some tasks
- ▶ Users unfamiliar with programming features such as screen orientations, multiple desktops, desktop tiles, etc.



Image Credit:
www.homedepot.com



Image Credit: www.hp.com

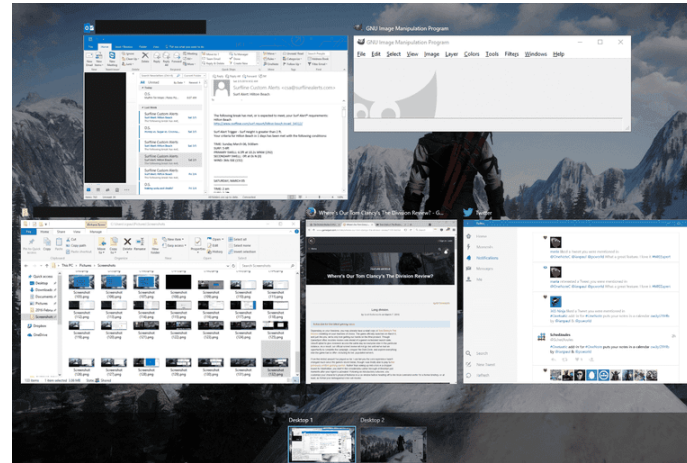


Image Credit: www.lifewire.com

2. Office Ergonomics Emerging Trends

- ▶ Laptop screens as secondary and not primary in many cases
- ▶ Laptops/screens raised to match primary monitor placement



Image Credit:
www.jarvis.com



Image Credit:
www.smartfit.com

2. Office Ergonomics Emerging Trends

Consider pros/cons for double versus single monitor

- ▶ Materials management
- ▶ Ability to 'split' single monitor
- ▶ Need for mixed orientation



Image Credit: www.samsung.com



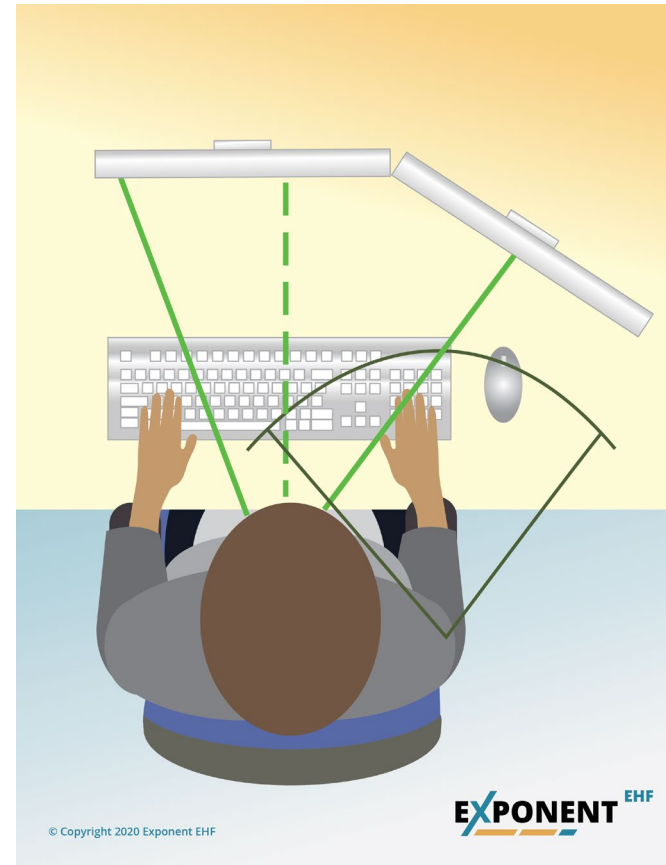
Image Credit: www.philips.com



Image Credit: www.blogs.alamode.com

2. Office Ergonomics Emerging Trends

- ▶ When using double monitors, designate a primary monitor to be directly front and center of the user while wrapping a second monitor to one side
- ▶ Review match between arms and monitor size/weight
- ▶ Consider placing double monitor mount off center for better adjustability



2. Office Ergonomics Emerging Trends

- ▶ Offsetting a double monitor stand or arm

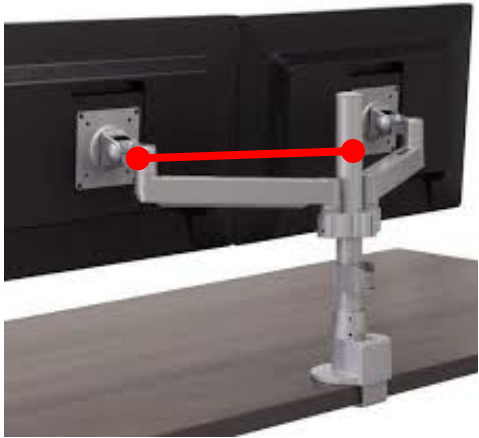


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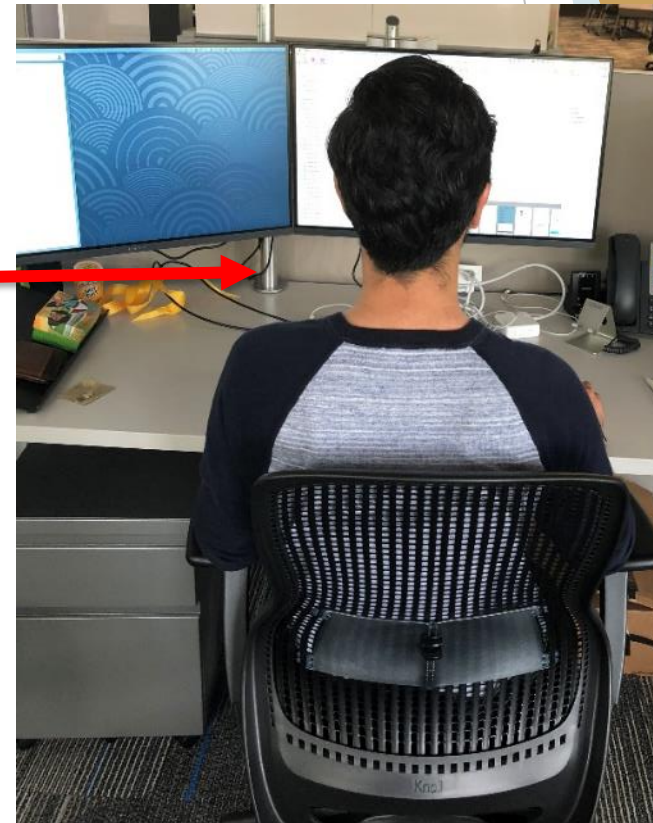
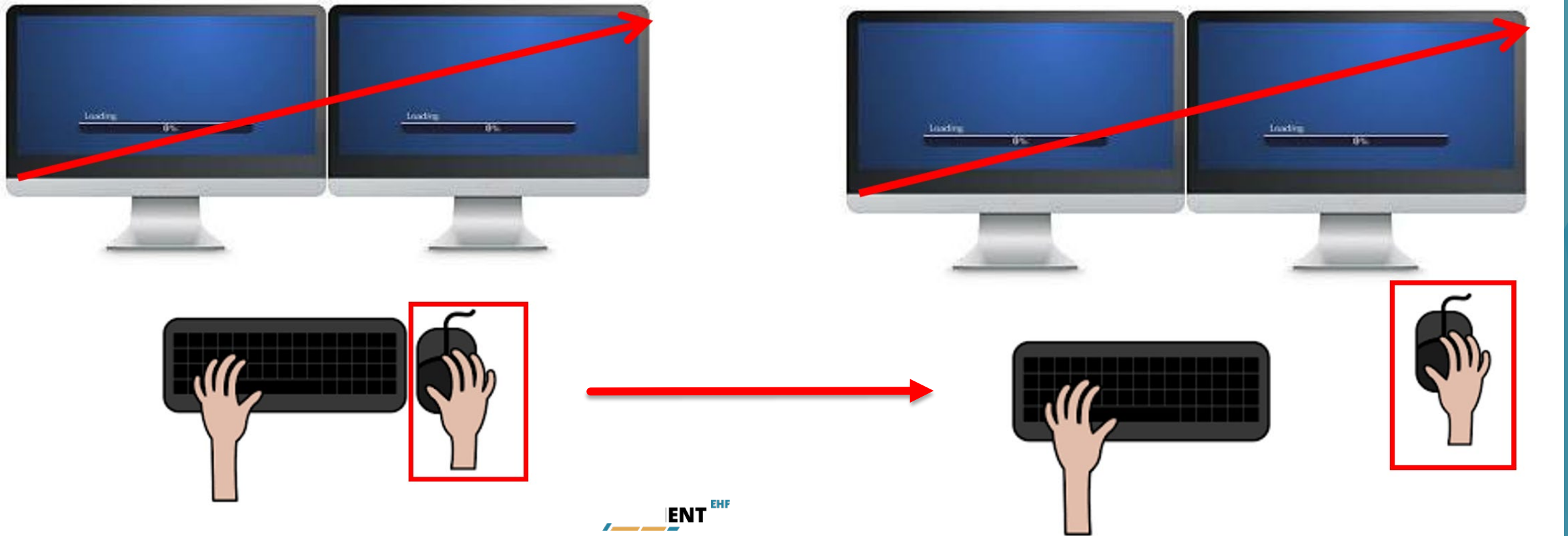


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2. Office Ergonomics Emerging Trends

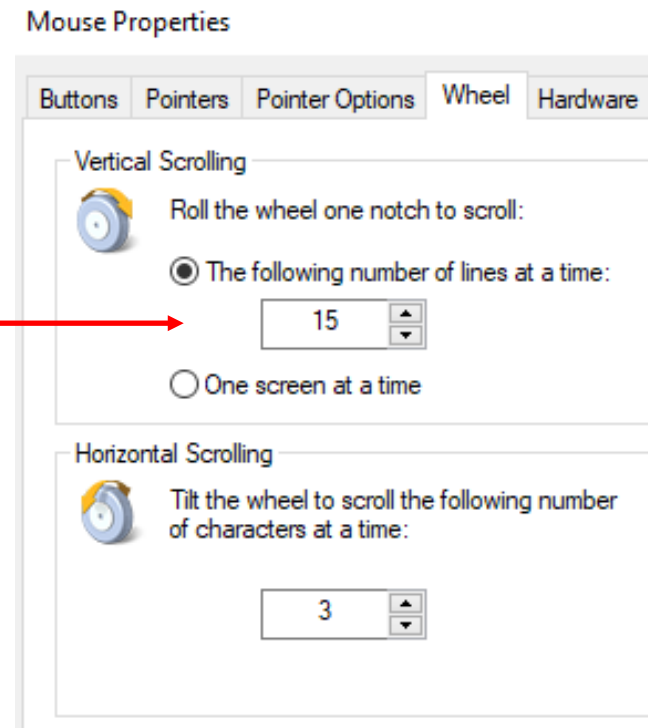
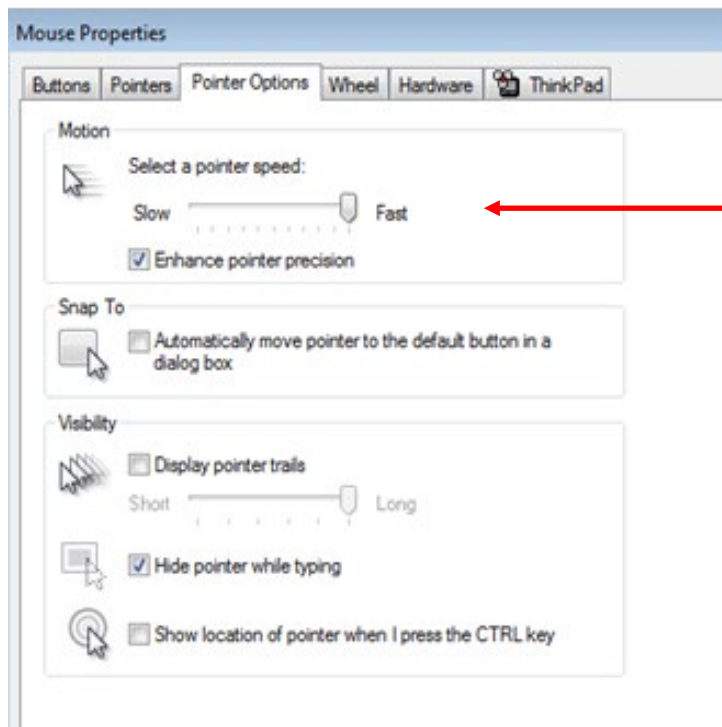
Consider programming/setting components

- ▶ If you feel your mouse tends to “creep” across the desk during the day while using double monitors OR
- ▶ If you often utilize scrolling



2. Office Ergonomics Emerging Trends

- Consider programming/setting components
 - The mouse settings are adjusted in the **Control Panel > Mouse > Pointer Options > Motion** and adjusting the dial to the “**Fast**” position to the right. Apply and Save changes.
 - Changes to scroll wheel settings can be made in the **Wheel** tab.



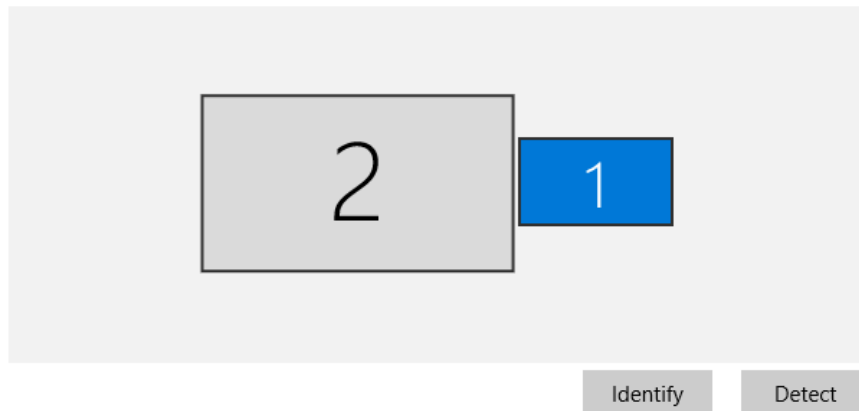
2. Office Ergonomics Emerging Trends

Consider programming/setting components

- ▶ The display (screen/monitor) settings can be found in the **Control Panel > Display** where you can select how to orient and use your monitors.
- ▶ For Apple users this is in Apple menu > System Preferences > Displays

Select and rearrange displays

Select a display below to change its settings. Some settings are applied to all displays.



Orientation

Landscape

Portrait

Landscape (flipped)

Portrait (flipped)

Multiple displays

Multiple displays

Extend these displays

2. Office Ergonomics Emerging Trends

► Before/After Example

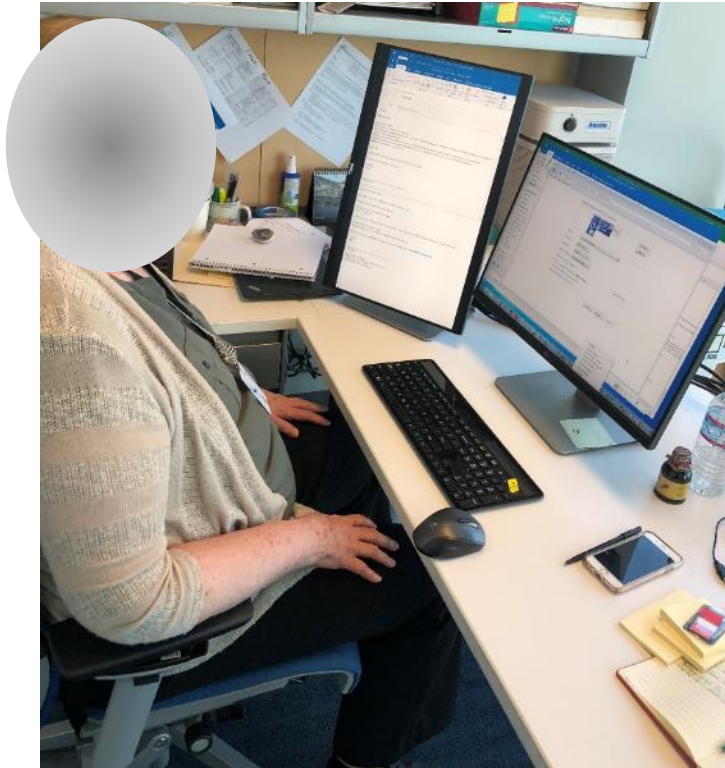
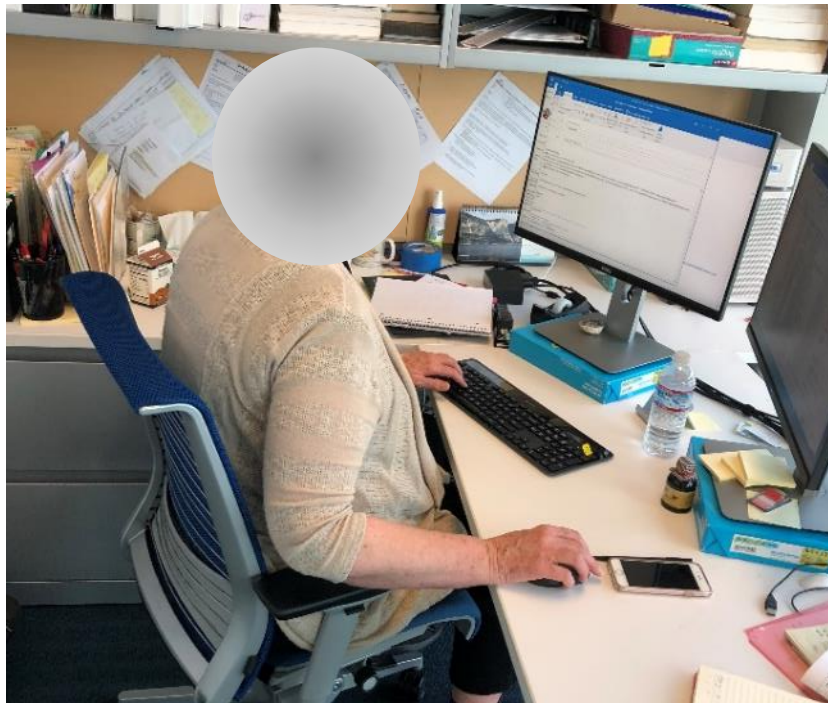


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2. Office Ergonomics Emerging Trends

Consider programming/setting components

- ▶ Virtual desktops
- ▶ Tiles or split screen on single large monitor
- ▶ Night light setting

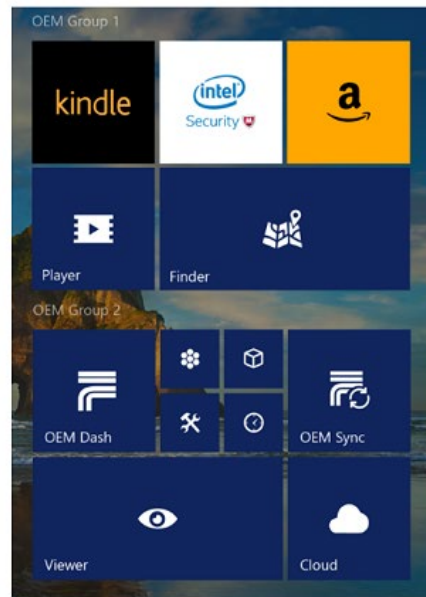
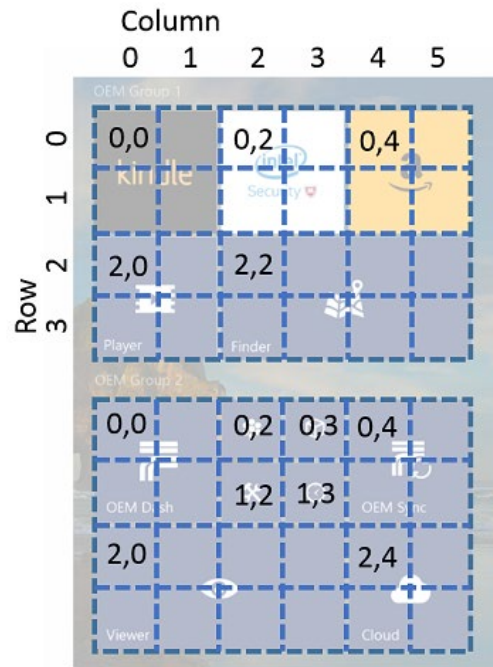


Image Credit: www.docs.microsoft.com

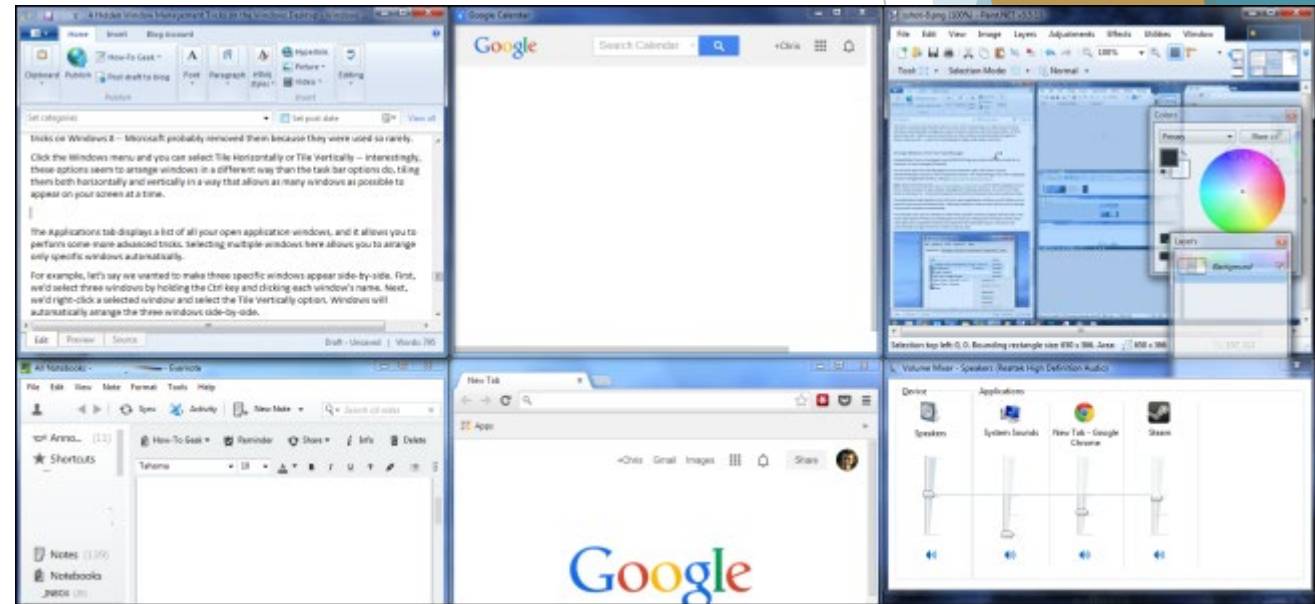


Image Credit: www.howtogeek.com

2. Office Ergonomics Emerging Trends

Consider programming/setting components

- ▶ Learn shortcuts for your programs/workflow
 - ▶ I use Ctrl+Alt+Tab & Windows+Arrow Keys
- ▶ Check system help pages and YouTube videos for more info

3. Ergonomics Challenges and Solutions for College Students



Image Credit: www.grcc.com



Image Credit: www.zoom.us

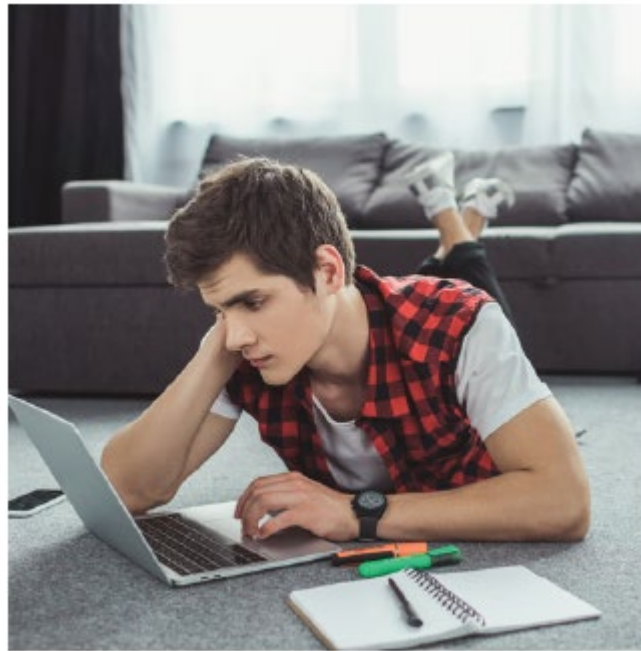


Image Credit: www.hfes.org



Image Credit: www.usatoday.com



Image Credit: www.growandflown.com

3. Ergonomics Challenges and Solutions for College Students

Challenges:

- ▶ Increased use of laptop/tablet rather than lecture viewed in person.
- ▶ Varied study/work locations and environments.
- ▶ Lack of exposure to good ergonomics.
- ▶ Built in movement through campus potentially reduced.
- ▶ Potential lack of experience in creating micro-environments.

3. Ergonomics Challenges and Solutions for College Students

Recognition of Challenges from Higher Education

- ▶ The Washington Post spoke with six university instructors who have spent the summer helping faculty rearrange classes for the start of the year. Many of them said students should expect more opportunities for “asynchronous learning,” which means students will complete portions of a course on their own time — not during a set Zoom call with the entire class.

<https://www.washingtonpost.com/education/2020/09/06/remote-learning-college-zoom/>

3. Ergonomics Challenges and Solutions for College Students

- ▶ As Tobin explains it, asynchronous instruction flips the standard lecture on its head. Jenae Cohn, an academic technology specialist at Stanford University, said students will have a bit more flexibility and agency to decide how they spend their time completing coursework.
- ▶ “They don’t have to be thinking of classes as the time that their butt is in the chair in the lecture hall,” Cohn said.

<https://www.washingtonpost.com/education/2020/09/06/remote-learning-college-zoom/>

3. Ergonomics Challenges and Solutions for College Students

Challenges:

- ▶ Increased use of laptop/tablet rather than lecture viewed in person.
- ▶ Varied study/work locations and environments.

Potential Solutions:

- ▶ Personal and portable equipment
 - Portable laptop/tablet/phone stand
 - Input devices
 - External cameras/tripods
 - House TV



Image Credit: www.grownandflown.com

3. Ergonomics Challenges and Solutions for College Students



Image Credit: www.contourdesign.com

3. Ergonomics Challenges and Solutions for College Students



CTA Digital Height-Adjustable Gooseneck Floor Stand for 7 - 13 Inch Tablets (PAD-AFS)

★★★★★ 105 product reviews

CTA Digital

This Universal Adjustable Gooseneck Floor Stand holds your device in the perfect position for hands-free reading, games and movies. The bracket rotates for portrait or ... [more»](#)

Other options

\$41.99

+ \$3.91 tax and \$11.95 shipping

[Office Depot](#)

94% positive seller rating

\$35.45 [Walmart - BuilderDepot, Inc.](#)

\$38.95 [Walmart - The Twister Group](#)

\$32.40 [Walmart - Zoro](#)

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3. Ergonomics Challenges and Solutions for College Students

Challenges:

- ▶ Lack of exposure to good ergonomics.



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A Guide to Creating an Ergonomic Workstation for Studying



Programs Campuses Admissions

25 Ergonomic Tips For Students When Working At A Computer



Get Health Care Medical Services About Costs & Insurance Health & Wellness Especially for

Computer Ergonomics: How to Protect Yourself from Strain and Pain

On this page:

- Why computer ergonomics?
- Arrange your workstation
- Adapt laptops
- Modify your body mechanics
- Adjust your work patterns
- Move!



3. Ergonomics Challenges and Solutions for College Students

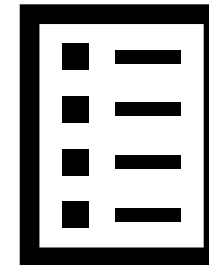
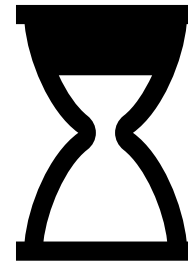
Challenges:

- ▶ Built in movement through campus potentially reduced.
- ▶ What worked well for you and physical movement? Pre Covid-19, did you feel energized after walking from the parking lot or bus stop across the campus before sitting down in your first class? – Yes!
 - ▶ Schedule your 'commute' time before online learning. A 5-10 minute session of some kind of movement that would replicate what you enjoyed in the past.
 - ▶ Did you typically walk to an area on/off campus for a meal? Give yourself 10 minutes of movement before a meal even if just in your living room.

3. Ergonomics Challenges and Solutions for College Students

Challenges:

- ▶ Potential lack of experience in creating micro-environments.
- ▶ Set schedules and micro-environments.
 - ▶ These are available postures for participating with camera facing classes and these are for self-paced
 - ▶ This is an option for standing workspace



Recap

- ▶ Office workstations are increasingly incorporating multiple and/or larger monitors and display screens
- ▶ Monitor placement and orientation may be a root cause for musculoskeletal discomfort of the back, neck, arms and lower extremities
- ▶ One large monitor may be an alternative to double monitors
- ▶ If using double monitors, designate a primary monitor and consider screen orientation
- ▶ Monitor arms may allow for greater adjustability when offset from center
- ▶ Programming/Settings changes may improve work performance when using multiple monitors
- ▶ Consider what environment/tools you need for specific tasks

Additional References

- ▶ Reach out to professionals to chat to your teams!



AMERICAN SOCIETY OF
SAFETY PROFESSIONALS

Ergonomics Practice Specialty

- ▶ <https://www.assp.org/resources/covid-19/webinars/covid-19-ergonomics-during-and-after-the-pandemic>
- ▶ <https://www.assp.org/news-and-articles/2020/07/23/three-ergonomics-tip-to-improve-your-home-office>
- ▶ <https://www.backtoworksafely.org/>

Thank You



Rachel Michael

DIRECTOR OF CONSULTING SERVICES

Main +1.833.393.6343


Direct +1.801.864.8193

Rachel.Michael@ExponentEHF.com


Ergonomics, Human Factors & Systems Engineering



 www.ExponentEHF.com

 @ExponentEHF

 <https://www.linkedin.com/company/exponent-ehf>

 <https://www.facebook.com/Exponentehf>

 info@ExponentEHF.com

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