

DESIGN FOR NEURODIVERSITY (DFN*)

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^^^

What my family sees.



^^^

What I see.

DESIGN STORIES



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Fostering creativity and change in education.

WHAT IS NEURODIVERSITY?

“Neurodiversity is a concept where neurological differences are to be recognized and respected as any other human variation. These differences can include those labeled with Dyspraxia, Dyslexia, Attention Deficit Hyperactivity Disorder, Dyscalculia, Autistic Spectrum, Tourette Syndrome, and others.

For many autistic people, neurodiversity is viewed as a concept and social movement that advocates for viewing autism as a variation of human wiring, rather than a disease. As such, neurodiversity activists reject the idea that autism should be cured, advocating instead for celebrating autistic forms of communication and self-expression, and for promoting support systems that allow autistic people to live as autistic people.”

From <https://neurodiversitysymposium.wordpress.com/what-is-neurodiversity/>

NEW YORK TIMES BESTSELLER

NeuroTribes

The Legacy of Autism
and the Future of Neurodiversity



WINNER
of the
National
Book
Award

STEVE SILBERMAN

Foreword by Oliver Sacks

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“Not everything that steps out of line, and thus ‘abnormal’, must be inferior.” - Hans Asperger (1938)

FRAMEWORK FOR TODAY'S STORY

WHO

WHEN

WHY

EXAMPLES

WHAT

WHERE

HOW

1 IN 68

“The identified prevalence of ASD has increased significantly in a short time period across multiple studies, including data from the CDC’s U.S.-based Autism and Developmental Disabilities Monitoring (ADDM) Network.”

WHO?

All ages, all demographics, all nationalities
5x as many men than women

From <http://www.cdc.gov/ncbddd/autism/data.html>:

Identified Prevalence of Autism Spectrum Disorder

ADDM Network 2000 – 2012

Combining Data from All Sites

Surveillance Year	Birth Year	Number of ADDM Sites Reporting	Prevalence per 1,000 Children (Range)	This is about 1 in X children...
2000	1992	6	6.7 (4.5–9.9)	1 in 150
2002	1994	14	6.6 (3.3–10.6)	1 in 150
2004	1996	8	8.0 (4.6–9.8)	1 in 125
2006	1998	11	9.0 (4.2–12.1)	1 in 110
2008	2000	14	11.3 (4.8–21.2)	1 in 88
2010	2002	11	14.7 (5.7–21.9)	1 in 68
2012	2004	11	14.6 (8.2–24.6)	1 in 68

AUTISM SPECTRUM CHARACTERISTICS



SYSTEMATIZING



**EXTREME
SENSORY
SENSITIVITY**



**HIGH EMOTIONAL
EMPATHY**



**DETAIL &
HYPERFOCUS**



ASSOCIATION



**LOW COGNITIVE
EMPATHY**



DIFFICULTIES WITH EXECUTIVE FUNCTIONING

WHAT IS DFN(*)?

*Design for X
(DfX)*

DfMA, DfE,
DfR, DfS
& 55 others

*Neurodiverse
Population
Needs*

DFN(*)

Six Sigma

- Guidelines
- Heuristics
- Metrics
- Models

- Reduce Defects
- Reduce Variation
- *Increase Variation*

- Reduce Ambiguity
- Optimize Sensory Density
- Increase Engagement



DFN(*) CLOSES THE GAP

Whereas accessible design envisions systems that are useful to people with disabilities, and inclusive design (or universal design) creates systems that are usable by all people to the greatest extent possible, there have been no structured design techniques targeting the unique needs associated with neurodiversity.

APPLYING DFN(*)

When?

- ✦ Designing new systems
- ✦ Improving performance of existing systems
- ✦ Making systems perform to specifications

Where?

- ✦ Products
- ✦ Work Processes
- ✦ Work Environments

The background of the slide is a detailed, sepia-toned reproduction of Leonardo da Vinci's 'Vitruvian Man' drawing. It features various sketches including architectural structures like domes and towers, mechanical devices such as gears and a crane, and anatomical studies of the human body, including a Vitruvian Man figure and a detailed study of a hand. The overall style is that of a historical manuscript or sketchbook page.

WHY DFN(*)?

- *Improve quality of life for neurodiverse people*
- *Improve quality of life for neurotypical people who love them*
- *Improve quality of products, services, work processes, and work environments for everyone*
- *The neurodiverse population is growing and could become the majority; today's economy is designed for neurotypical people*

HOW: DFN(*) ELEMENTS

Reduce Ambiguity

Articulate all steps!
Autistic people can't always decipher what you mean, even if you think you're being straightforward; teasing, sarcasm, and joking is not easy to understand unless explained

Optimize Sensory Density

Many visuals, smells, sounds, and tactile stimuli are not only distracting but can be *painful* to autistic people; triggers must be understood and controlled

Increase Engagement

Cultivate a sense of psychological safety; do not emphasize eye contact or interactive discussion; provide enough time and sufficient channels for communication so that engagement *can* occur

HOW: GUIDELINES AND HEURISTICS FOR DfN(*)

Six Sigma Improvement Goals:			
DfN(*) Elements:	Reduce Defects	Reduce Variation	Increase Variation
<i>Reduce Ambiguity</i>	Monitor and control misunderstandings and misrepresentation	Increase signal to noise for messages and content	Provide many forms for content and messages
<i>Optimize Sensory Density</i>	Define ergonomic specifications for acceptable sensory levels	Keep visuals, sound, tactile stimuli within tolerable ranges <i>for each person</i>	Help each person develop tolerance for wider range of sensory environment
<i>Increase Engagement</i>	Provide enough time and multiple channels for interaction	Reduce frequency of m; improve unevenness	Provide many channels for content and messages

HOW: METRICS & MODELS FOR DfN(*)

	Six Sigma Improvement Goals:		
<i>DfN(*) Elements:</i>	Reduce Defects by:	Reduce Variation by:	Increase Variation by:
<i>Reduce Ambiguity</i>	?	PARADOX OF CHOICE (HICKS HYMAN)	PARADOX OF CHOICE
<i>Optimize Sensory Density</i>	PHYSICAL ERGONOMICS	?	COGNITIVE ERGONOMICS
<i>Increase Engagement</i>	?	?	?

How: DFN(*) LESSONS FOR PEDAGOGY

Reduce Ambiguity

Provide framework,
Convey messages in
multiple ways, Repeat
and remind often,
Ask for confirmation
and clarification

Optimize Sensory Density

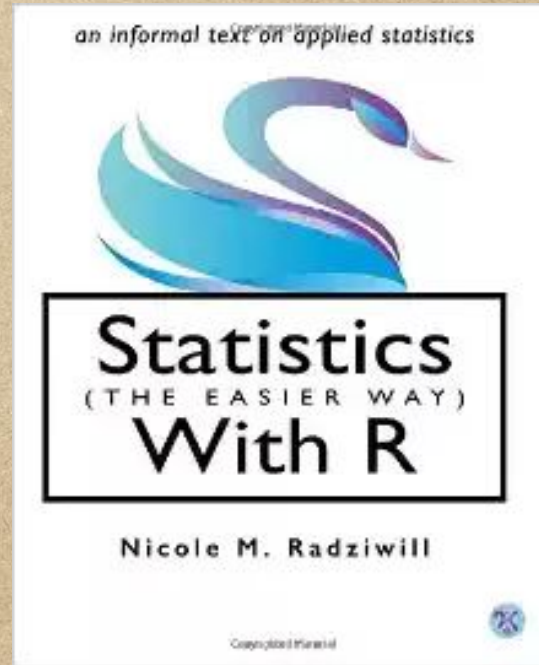
Multimodal,
multichannel access
to course materials
and means of
learning; provide
physical space and
refractory time;
Don't overwhelm,
provide signals for
breakpoints

Increase Engagement


Reduce face time, Increase
time to response, Increase
options for interacting
with others and
demonstrating
competency (writing,
video, teaching)



EXAMPLES



“English is not my first language, and this is the first technical book I’ve ever been able to understand. Please write more.”

The background of the image is a detailed reproduction of Leonardo da Vinci's 'Vitruvian Man' drawing. It features the iconic figure of a man inscribed within a circle and a square, surrounded by various anatomical sketches, architectural drawings, and handwritten notes in his characteristic mirror-image script. The entire composition is rendered in a sepia or brownish-gold tone on a textured, parchment-like surface.

*Designing to accommodate
neurodiversity has the potential
to help everyone*

THANKS!

Any questions?

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Special thanks to all the people who made and released these awesome resources for free:

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