



HUMANWIN.AI FROM TEKOLOG.IO

TURNING ON “ACCESSIBLE MODE” FOR USERS WITH MOTOR IMPAIRMENTS

W3C Workshop on Web Games
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DISABILITY

PSYCHOLOGICAL IMPACT

More than 13 percent of non institutionalized adults have some sort of physical disability. The most common physical disabilities are trouble hearing, moving around or doing day-to-day tasks like getting dressed. About **70 percent** of non institutionalized adults with physical disabilities are over age 60.

Another type of disability is learning disability, a term used to describe a range of academic difficulties. Dyslexia, a reading disability, is one example.

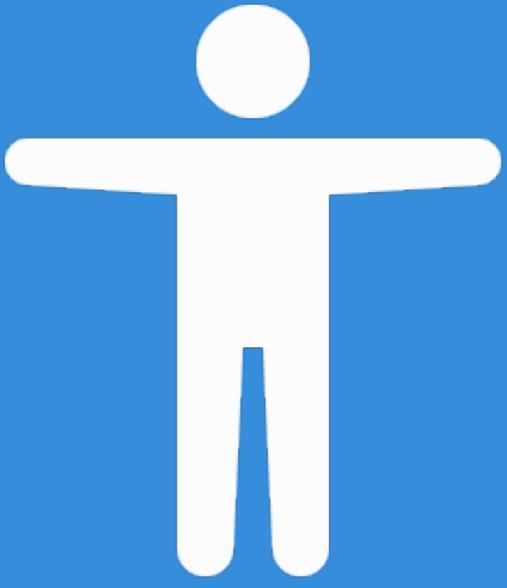
While some interventions focus on teaching stress management and other coping skills, others focus on the disability itself.



**MAKE WEB GAMES USABLE BY AS
MANY PEOPLE AS POSSIBLE**

GOAL

“Accessible” Mode



Making sure all views, interactions are clickable / tappable by keyboard, ability switches or voice enabled... provide alternate to gestures







ABILITY SWITCHES

REQUIRE ONLY THE SLIGHTEST TOUCH FOR
ACTIVATION, EASILY WITHSTAND BODY
MOVEMENTS OR SEVERE BLOWS.

VOICE ENABLED

ULTRA-SENSITIVE AND PERSONALIZED: RESPOND TO WHISPERS OR LOUD CLAPS AND SET THE SOUND SENSITIVITY TO RESPOND.

Motor Impairments

CEREBRAL PALSY

A congenital disorder of movement, muscle tone, or posture. Due to abnormal brain development, often before birth.

Includes: exaggerated reflexes, floppy or rigid limbs, and involuntary motions.

NEURAL TUBE DEFECTS

Birth defects of the brain, spine, or spinal cord.

Includes: upper body weakness and trouble breathing and swallowing, not being able to move legs, torso, or arms, also might include learning disabilities.

MUSCLE AND JOINT CONDITIONS

Discomfort, pain or inflammation from cartilage, bone, ligaments, tendons or muscles. Most commonly refers to arthritis or arthralgia.

Includes: pain that can be mild, causing soreness or it can be severe, making even limited movement extremely painful.

HEAD AND SPINE TRAUMA

Injuries or accidents to the brain and/or spinal cord such as concussions, blood clots and fractures.

Includes: confusion, loss of consciousness, nausea, loss of movement or sensation, trouble with balance or walking, pain or pressure in the back, neck or head.

Anxiety

Being Watched Working

Entering a Room Where
People Are Seated

Failure

Being Criticized

Losing Control

Making Mistakes

Speaking in Public

Feeling Rejected

“Looking-Staring”

Stress

Disruptive Behavior

Social Norms

Functional Limitations

Adaptive Limitations

Coordination

Communication

Chronic Health

Relatives & Caretakers

Seek Independence

Coping Strategies

Information Seeking

Wish-Fulfilling

Medical Information

Mobile Apps & Internet

Other Sources

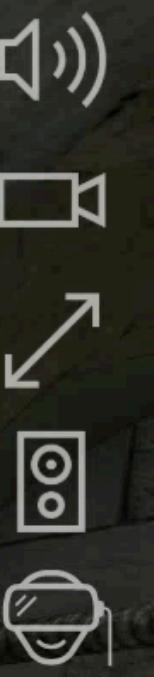
Plan of Action

Cognitive Efforts

Escapism

Adjustment

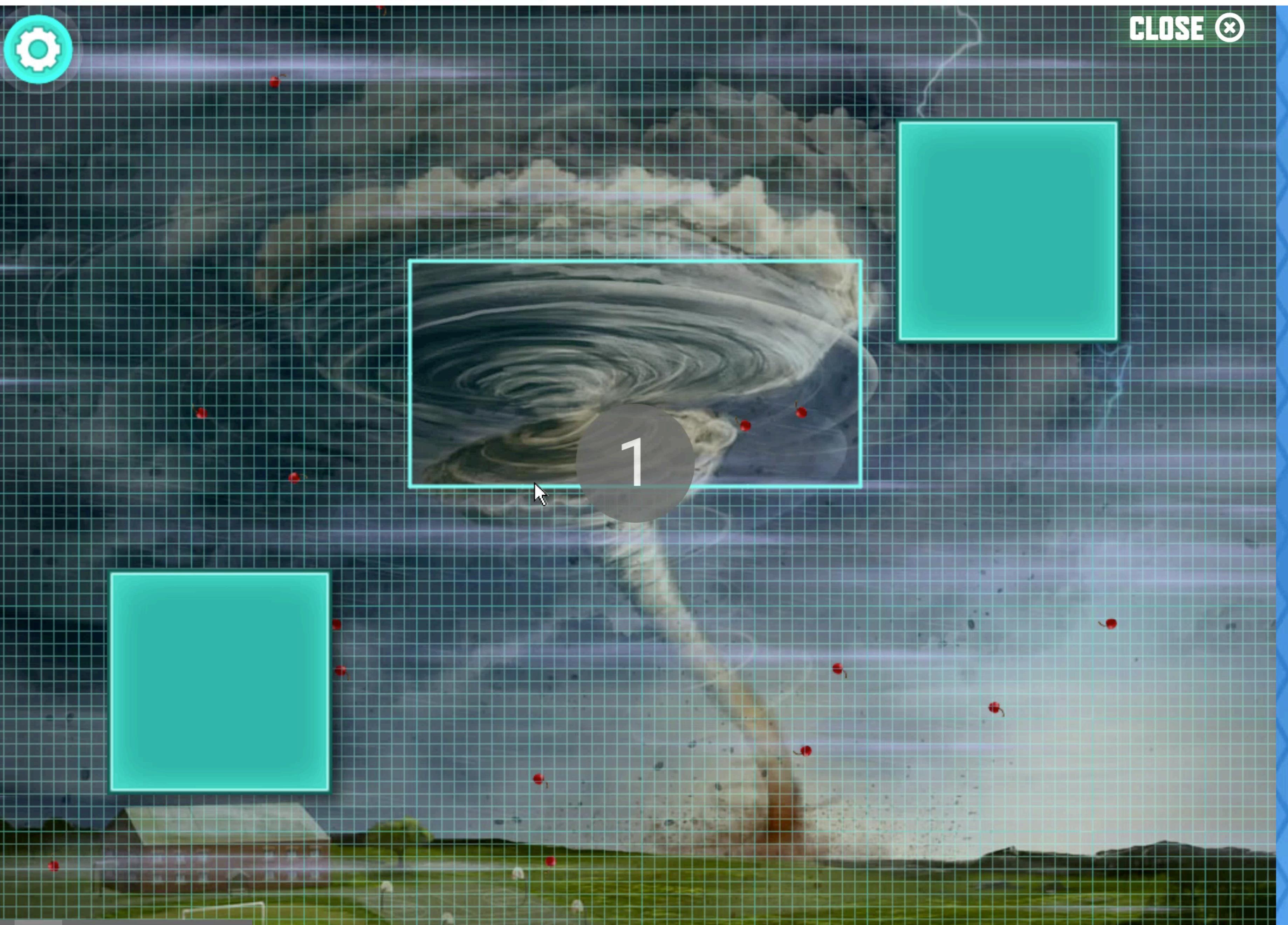
35 fps



[HTTPS://DRIVE.GOOGLE.COM/FILE/D/120MD9PMK8S3TlQJMDEGAUSLBMJGAPZZU/VIEW](https://drive.google.com/file/d/120MD9PMK8S3TlQJMDEGAUSLBMJGAPZZU/view)

OUR WORK



[SIGN IN TO PBS KIDS](#)[NOW PLAYING](#)Pienado (0:11)
Goals: Math [More info](#)[APPS](#) [SHOP](#) [WETA](#) [PARENTS](#) [TV TIMES](#) 



Profile



My Classes



Experiments



Demonstrations



Grid View



List View



Sort By



Experiments

***Please note:** Due to a reporting error, we have discovered that NEW DATA generated through the Lexical Decision, Muller-Lyer Illusion, Self-Reference, and Social Balance studies are not accurate at this time. Although the experiments themselves work for students to have the experience of participating, we regret that the data reports are not showing accurate results. You can still download data reports from the OLD DATA files to have your students run analyses.



Cognition



Be A Juror



1 2 3 4

Numerical Memory



Object Location Memory



Pitch Memory



Word Recognition



Facial Recognition



Lexical Decision*

Individual Differences





Profile



My Classes



Experiments



Demonstrations



Data



Müller-Lyer Illusion

Quit

Trial 1 of 22



MATCHED



Profile



My Classes



Experiments



Demonstrations



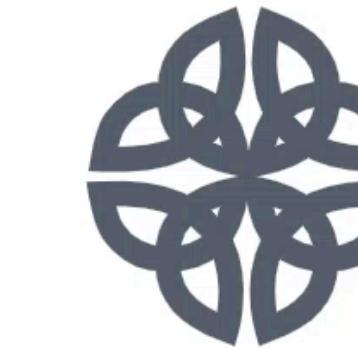
Data



Learning and Memory

Quit

Which design is hiding the coin?



Design on the Left

Design on the Right

1st Feb 1894

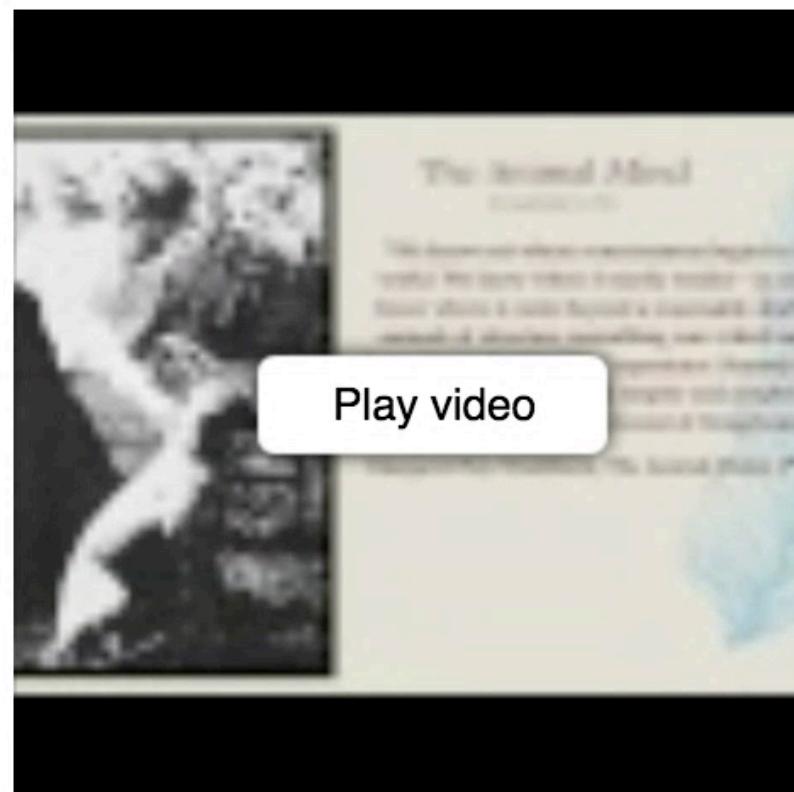
Videos (1)

1st February 1894

PEOPLE

James asks to change professor of philosophy
0th June 1897

In a letter to Harvard President Charles James asks that from professor professor...



Play video

FIRST WOMAN EARNS PSYCHOLOGY PHD

Margaret Floy Washburn becomes the first woman to earn a doctoral degree in American psychology and the second woman, after Mary Whiton Calkins, to serve as APA president. After graduating from Vassar in 1891, she wants to attend Columbia University but women were not generally permitted in graduate programs so she sits in on classes as an observer. She later attends the Sage School of Philosophy at Cornell to work with experimental psychologist E.B. Titchener, who founds the theory of psychological structuralism.

[Find out more](#)

APA holds second meeting

◀ 11 of 250 stories ▶

Harvard refuses to admit Calkins

Psychology
11th December

James McKeen Cattell and James Mark Baldwin are original editors of the journal. This journal and three others were transferred to the APA by their...

3d

the first woman to earn a doctoral degree in American psychology and the second woman, after Mary Whiton Calkins, to...

viewed as the founder of clinical psychology, opens the first psychological clinic, at the University of Pennsylvania, to study...

More ➔

17th December 1892

11th December 1893

27th December 1893

1st February 1894

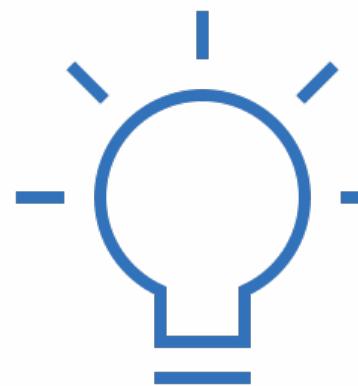
29th October 1894

1896

10th June 1897



OPPORTUNITY



“IN THE ZONE”

FOCUS

CONCENTRATION

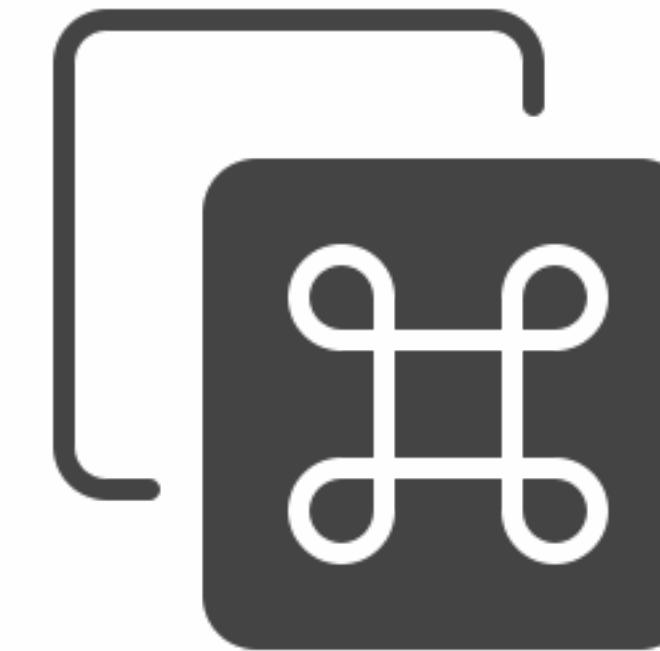
DETERMINATION

RETHINK INPUTS AND OUTPUTS

TURN OFF:



Specific targets with
mouse pointer



Specific key presses



Exact touch targets



DEVICE WEIGHT

HANDHELD

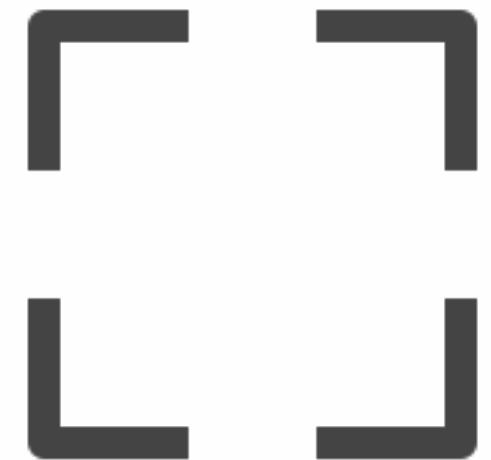
Don't require holding devices such as mobile phone for too long to interact with web game

RETHINK MOVEMENTS

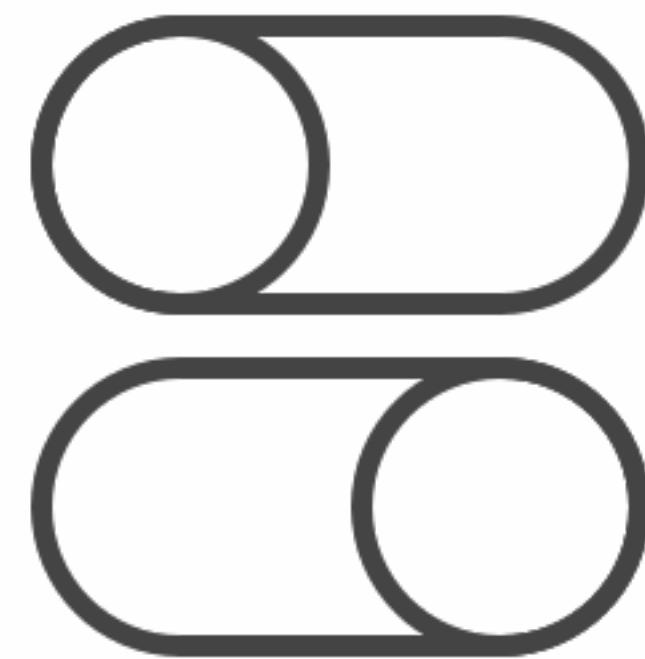
WIDEN



Mouse areas



Touch targets



UI controls

RETHINK MOVEMENTS

CONT'D

ELIMINATE



Selecting text



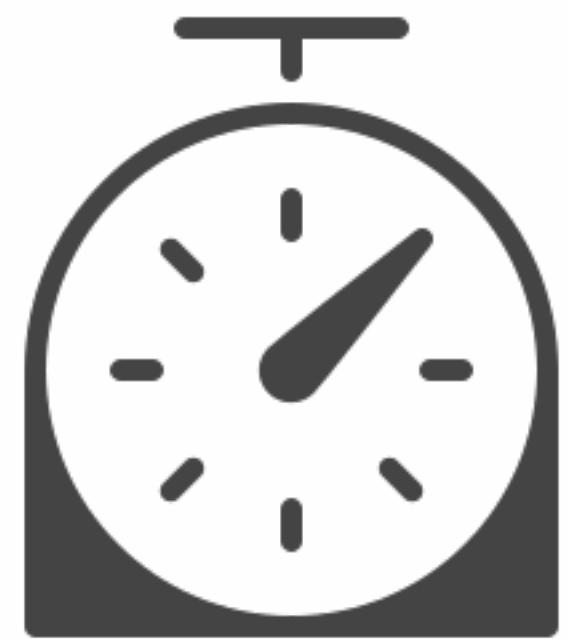
Right clicking text



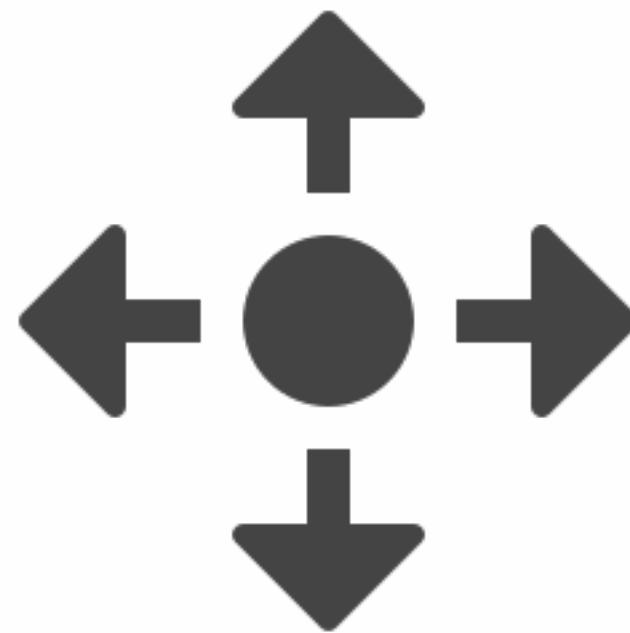
Small precise movements

RETHINK FEEDBACK

REEVALUATE



Requiring time based
interactions



Requiring movement



Other mechanisms?

RETHINK ENGAGEMENT

ACCESSIBILITY FROM THE START



Interaction



Task

RETHINK IMPACT

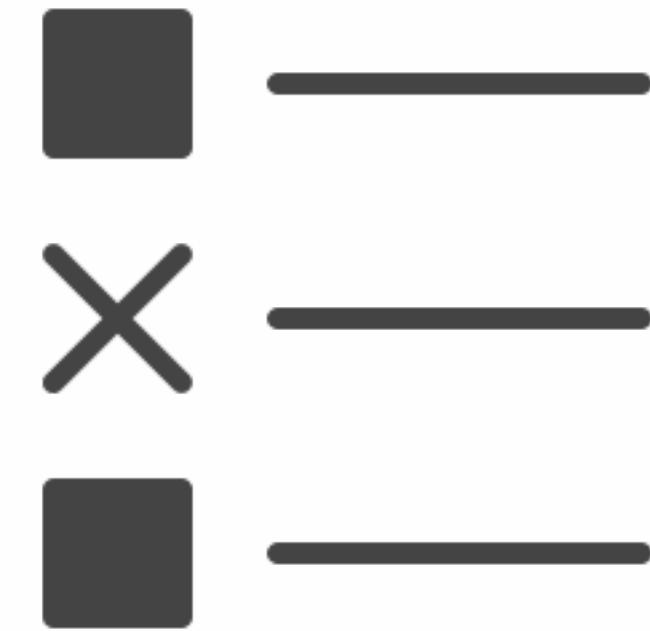
FOR DESIGNERS AND DEVELOPERS



Standards



Limitations

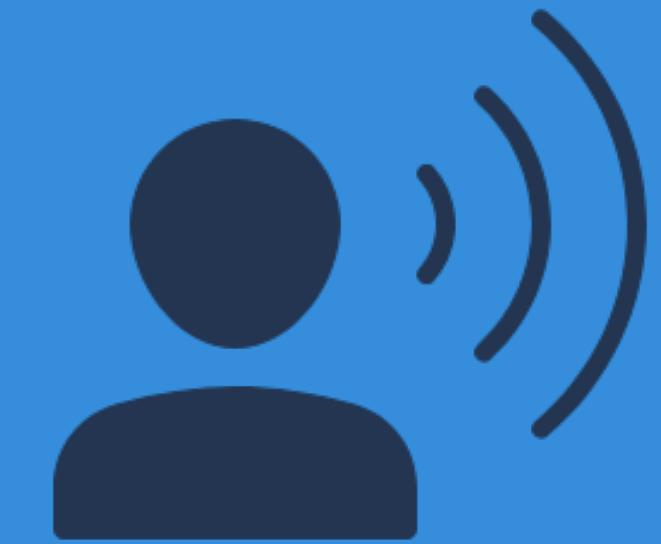


Testing



Statement

Building Voice Capability Into Web Games



Ceases fine-motor control interactions with hands and opens new opportunities.

Voice UX Ecosystem

Trend? Or Worth the Costs?

Additional Opportunities

Common Appliances

Hardware

Digital Signal Processing (DSP)

New Services for
Voice Interaction

Micro-Electrical
Mechanical Systems

Legal Ramifications

Branding and Marketing

OPPORTUNITIES

BENEFITS FAR OUTWEIGH THE RISKS FOR ACCESSIBILITY

LOCALIZATION AND PERSONALIZATION

Adapting to a specific locale or market

MULTI-DEVICE SESSION

Experience across many devices

MIC USAGE DISCOVERY

Leads to engagement

WIN OVER USERS

More access than just one channel

NEW TERRITORY

And many, many more

COSTS, BENEFITS, RISKS AND OPPORTUNITIES

BUILDING THE CASE FOR VOICE UX

Should you design a VUI and experience to your web game or as a capability?

KEEP IT SIMPLE

Will people want to
talk to your web game?

YES OR NO?

YES!

PEOPLE WILL WANT TO ENGAGE

RELATIONSHIP

Form a connection or bond
with your company or organization.

VALUE

They'll look for you in the future.

POTENTIAL

Leverage all the interesting and
sophisticated things of VUI. Manage
the flow of information just like
websites or apps.

SPEECH ANALYTICS TOOLS

A NEW SET OF CUSTOMER METRICS FOR SUCCESS

Speech analytics tools that can spot spoken keywords or phrases, either as real-time alerts on live audio or as a post-processing step on recorded speech.



VOICE UX ANALYTICS CREATES OPPORTUNITIES

ITERATIONS

Based on usage, data emphasizes which features were more popular

INTERRUPTIONS

Detect where in the voice interactions users get stuck and give up

PERFORMANCE

Adjust server limits in real time as usage spikes happen

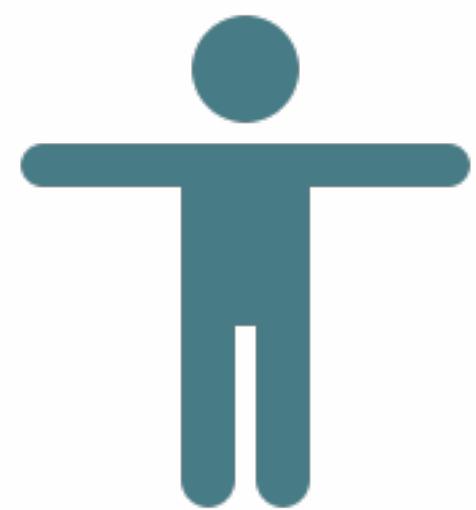
Do You Use Voice Commands To Accomplish Tasks in Daily Life?

EMPATHY

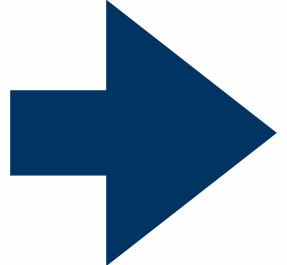
Remember that adding a voice capability work best in a specific context only and when we break this rule or not prepare to adapt for additional contexts the experience fails tremendously.

TRADITIONAL ACCESSIBLE SOLUTION

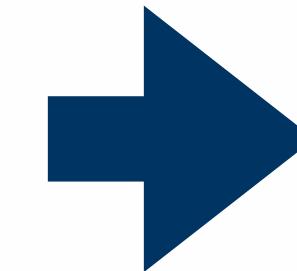
PROGRAMMERS UNDERSTAND WHAT THEY ARE DOING



Understand accessibility tasks



Code libraries with
useful behaviors



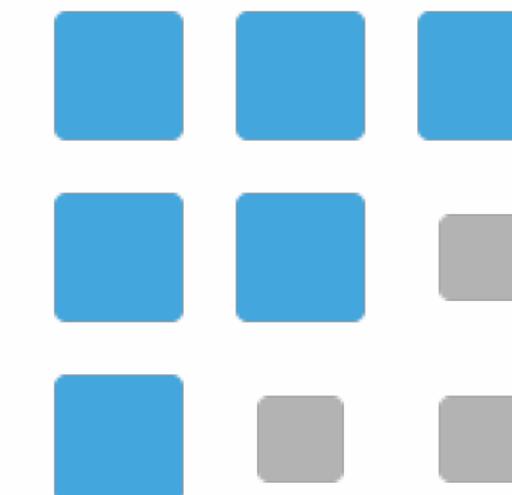
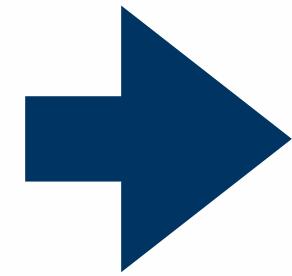
Formulate Explicit solution

AI FINDS ACCESSIBLE SOLUTION

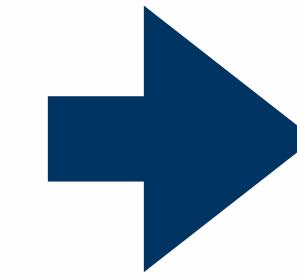
OFFLOADING COGNITIVE LABOR



Accessibility criterion



Heuristics,
Discovery methods &
Solution Structures



Accessible
web game

TURNING ON “ACCESSIBLE MODE” FOR USERS WITH MOTOR IMPAIRMENTS





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THANK YOU!

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QUESTIONS FOR DISCUSSION

OPEN FLOOR

ARE CONSTANT FEEDBACK LOOPS
BEING CONSIDERED WHEN
SUBMITTING NEW INFORMATION TO
A PLAYER?

IS TRUE ECOLOGICAL VALIDATION
BEING APPLIED EARLY ON TO A WEB
GAME IN DEVELOPMENT?

**DOES IT ACCOUNT FOR TRUE TO LIFE
CONDITIONS OF THE WIDER WORLD
AND POPULATION?**

**IF THE WEB GAME IS ACCESSIBLE
TODAY WILL IT BE TOMORROW?**

**DOES AN ACCESSIBLE EXPERIENCE
MEAN A GREAT GAMING
EXPERIENCE?**