

Dialed-Down Design: Insights from Developing VR for People with Autism

Lori Landay

Professor of Visual Culture + New Media
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This Is Spinal Tap,
1984,
dir. Rob Reiner

Nigel (Christopher Guest) admires the
amps that go to 11

Good design gives
people a way to dial
it up--or down



VIRTUAL SUBJECTIVITY

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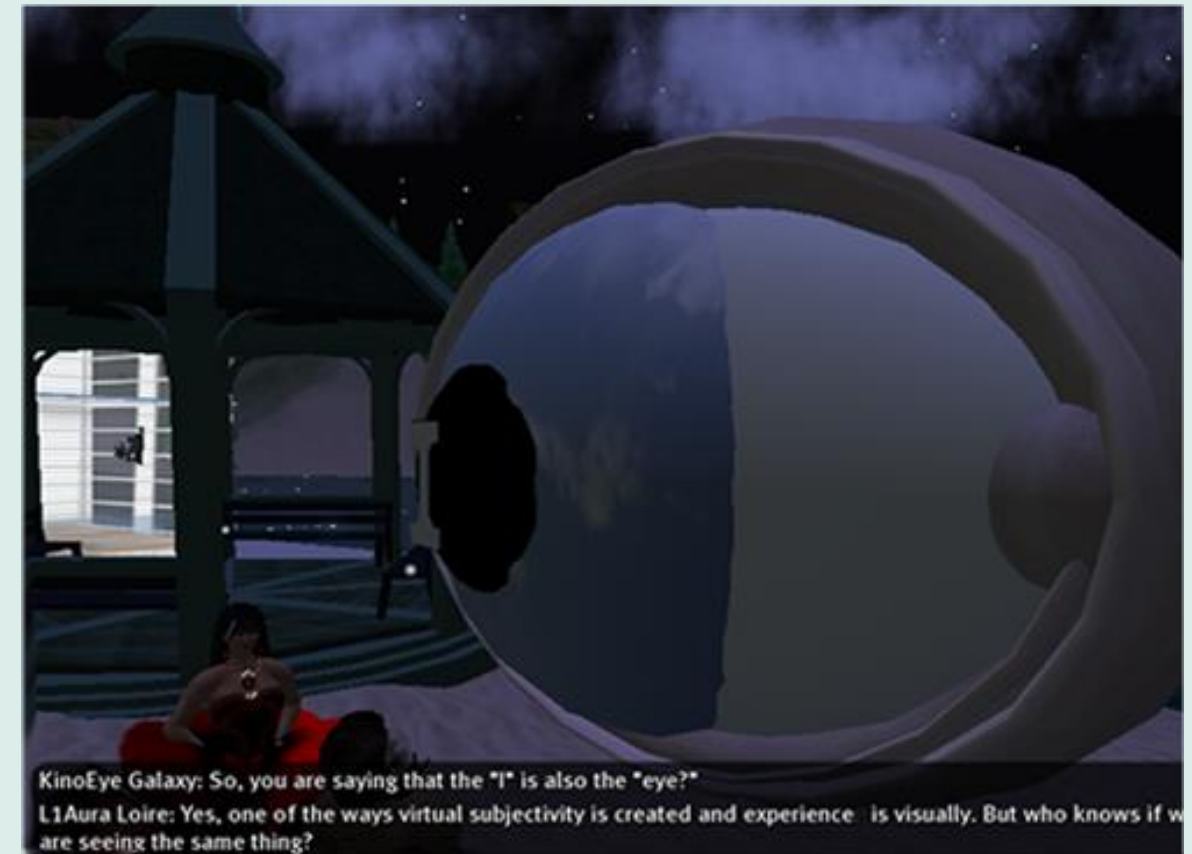


VIRTUAL SUBJECTIVITY



Second Life, 2008

VIRTUAL SUBJECTIVITY



Second Life, 2008



Institute for Arts Education
and Special Needs





Private Music Lessons

Learn to play a musical instrument in weekly, hour-long individual lessons. Instruction is available in all musical instruments, including voice, as well as in composition, arranging, and music theory.

Ages: 9-adult for 60-minute lessons; 6-8 for 30-minute lessons.

When: 12 Saturdays in the fall and spring semesters; six Saturdays in the summer session.


Tuition: 60-minute lessons: \$1,000 per 12-week semester; \$500 per six-week semester. 30-minute lessons: \$500 per 12-week semester; \$250 per six week semester. Financial aid is available to families that qualify.

Additional Information

- No previous musical experience is necessary.
- More advanced musical opportunities will be available for students with experience.
- Students must have an instrument at home for practicing between lessons.
- Students must be able to participate effectively in lessons or classes, and maintain an environment that is safe for themselves and others.

Apply





Berklee Institute for Arts Education and Special Needs

A catalyst for the inclusion of individuals with special needs in all aspects of performing and visual arts education


[Academic Programs](#) / [Institutes](#)

BERKLEE INSTITUTE FOR ARTS EDUCATION AND SPECIAL NEEDS

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Berklee Institute for Arts Education and Special Needs

The Berklee Institute for Arts Education and Special Needs is a catalyst for the inclusion of individuals with special needs in all aspects of performing and visual arts education.




Educational Programs

What [arts education programs](#) do you offer for people with special needs?



Academic Programs

What are the [courses and degree programs](#) in which I can enroll?



Professional Development

How can I advance my [professional development](#) in this field?





Directors



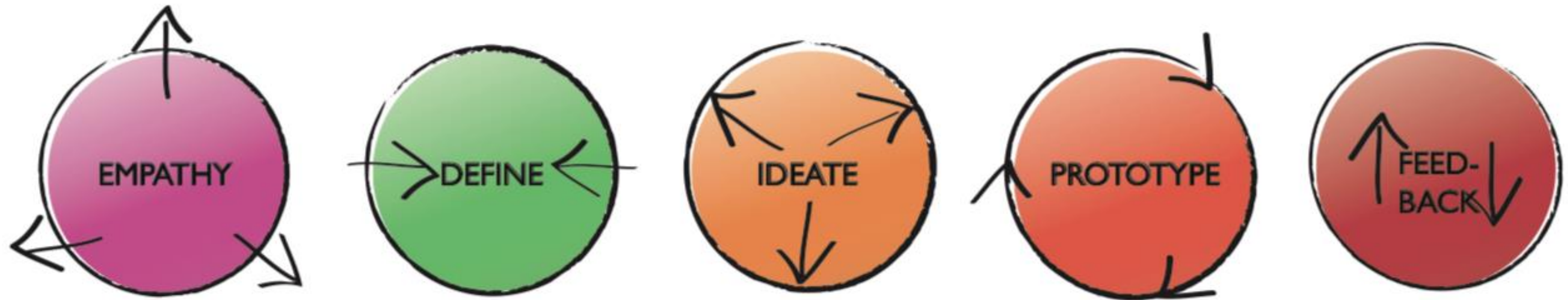
Lori Landay, Ph.D. and Rhoda Bernard, Ed.D.

Student Team



From left: Sarah Fard, Will Houchin, Melanie Bourgeault, Courtney Clark, seated: Joe Marchuk





STANFORD D.SCHOOL DESIGN THINKING

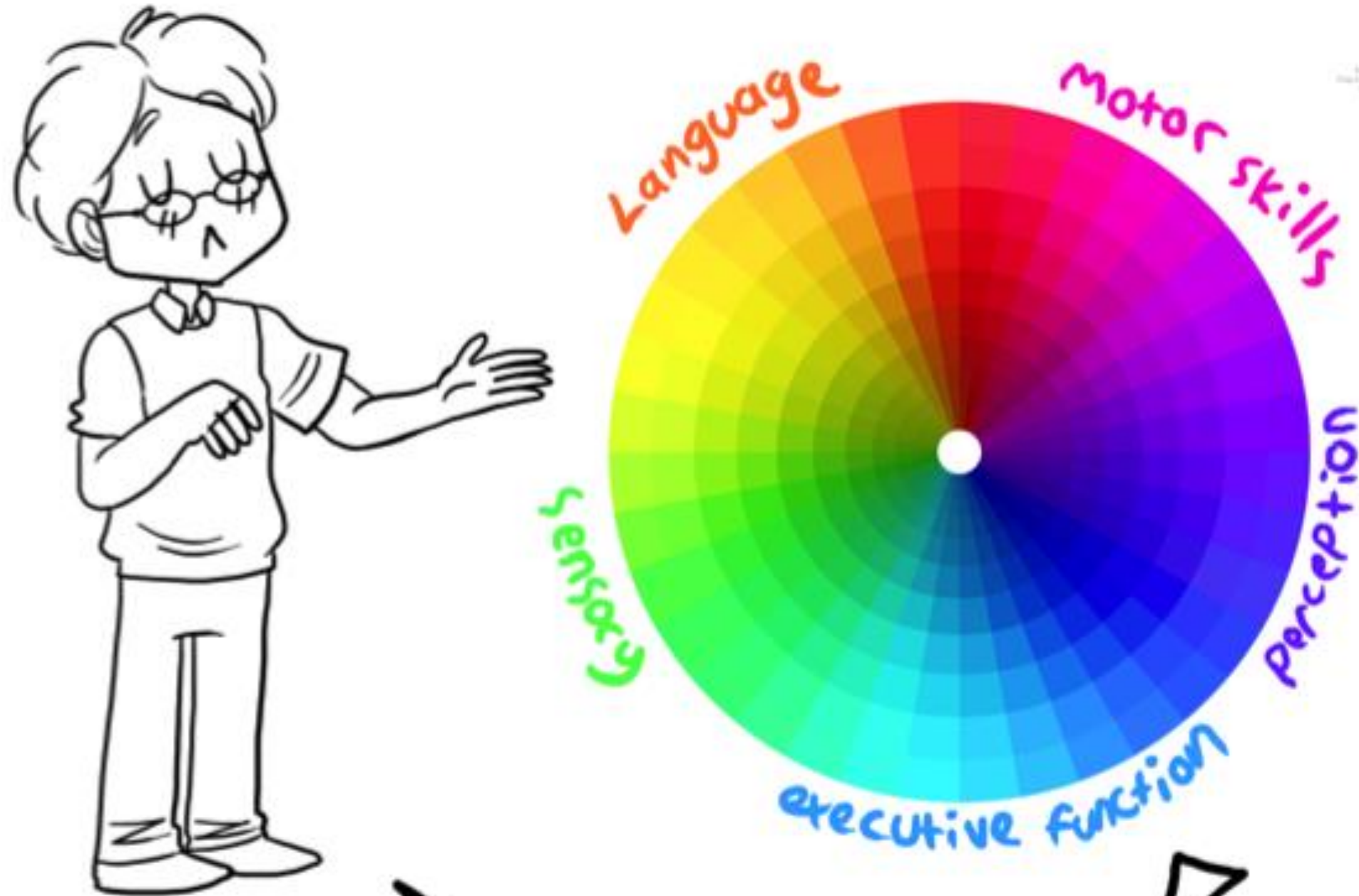


Neurotypical
Neurodiverse

Sometimes when people think of this word,
they think of the autism spectrum
as being like this:



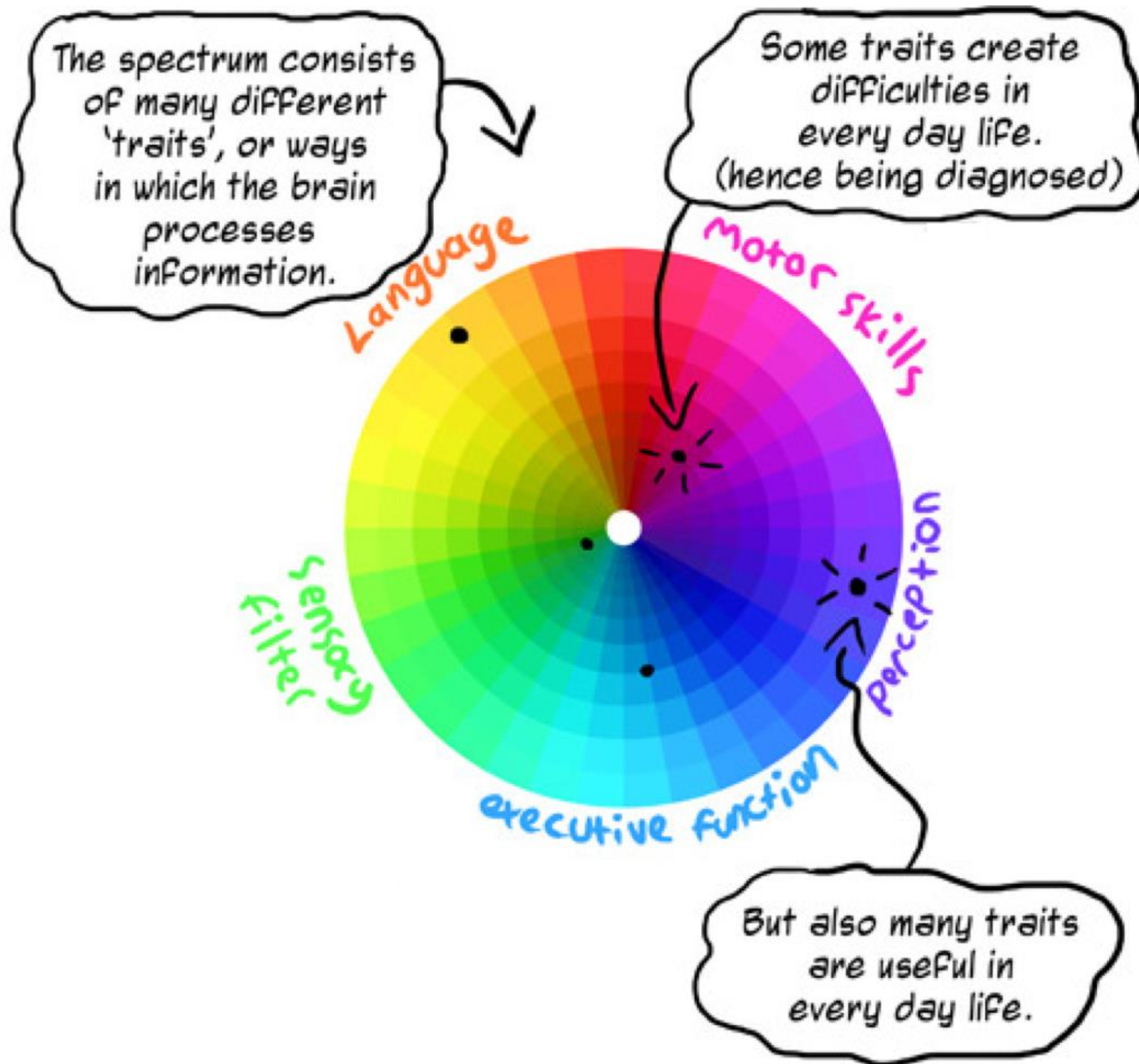
Understanding the Spectrum, Rebecca Burgess,
THEORAAH - [TUMBLR.COM](https://www.tumblr.com/theoraaah)



You see, the autistic spectrum looks something more like this.

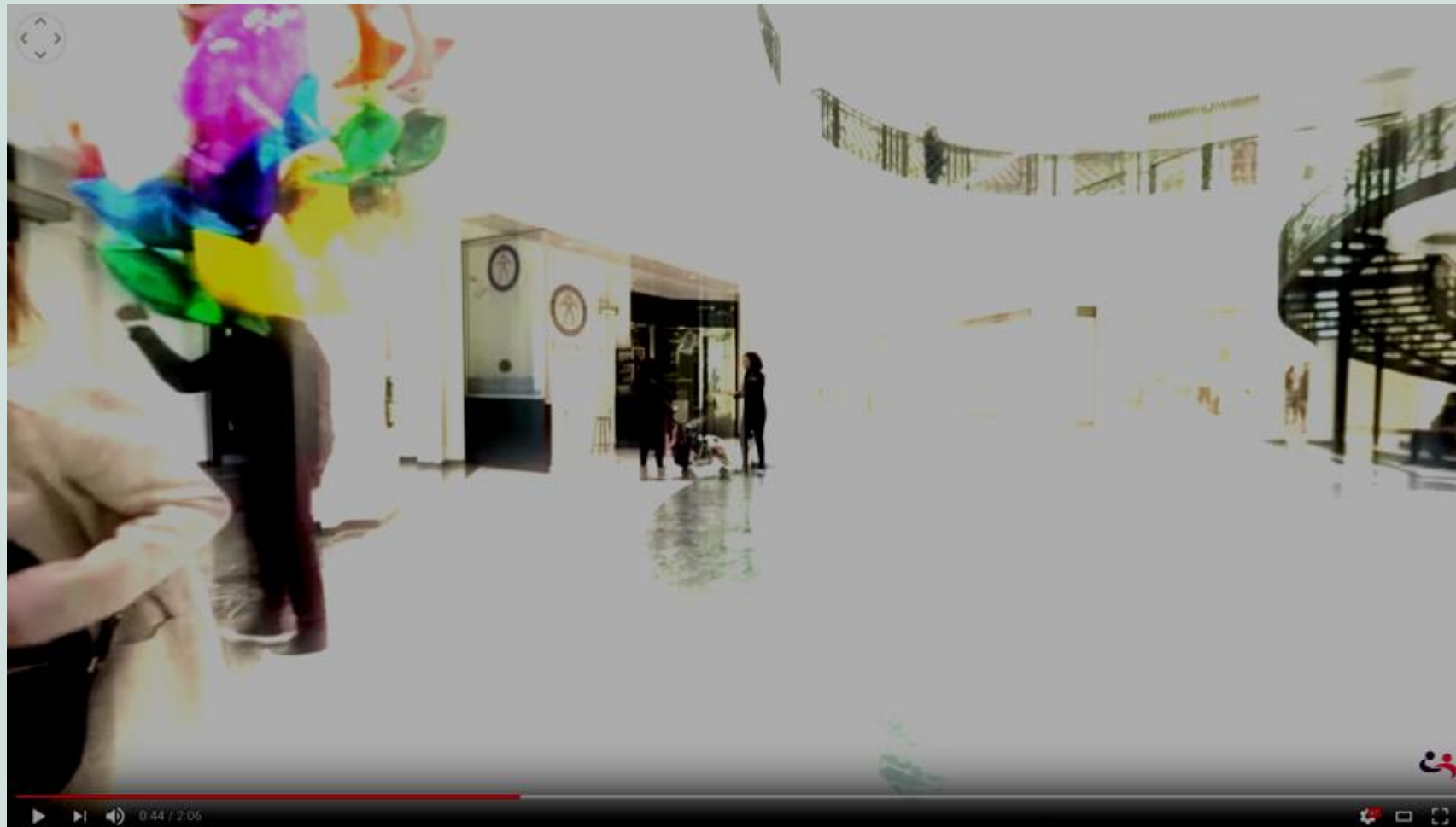
Autism Spectrum

Understanding the Spectrum,
Rebecca Burgess,
THEORAAH - [TUMBLR.COM](https://www.tumblr.com/rebecca-burgess)



Autism Spectrum

Understanding the Spectrum,
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WARNING: this 360 video, non-immersive VR experience has very loud noises, bright flashing lights, and intense color to give a neurotypical person a sense of what it can feel like for one person on the autism spectrum

Too Much Information

iOS/Android
YouTube





Difficulties to Address with Immersive Tools

- recital unfamiliarity/anxiety
- dynamics
- internalization of steady beat
- chord changes





IMMERSIVE TOOLS: XR (360 + AR + VR)



360 DEGREE VIDEO:

computer, mobile device, with a VR viewer
at home, in lesson (during breaks, as reward)

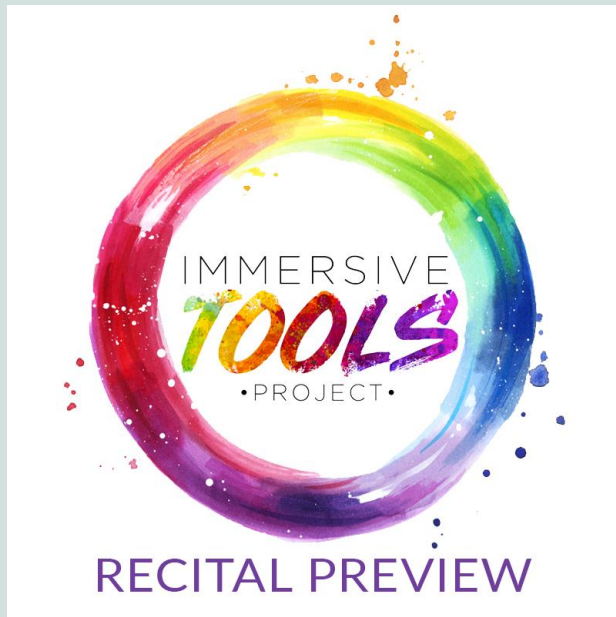
AUGMENTED REALITY:

mobile device (iPad, phones)
in lesson, at home

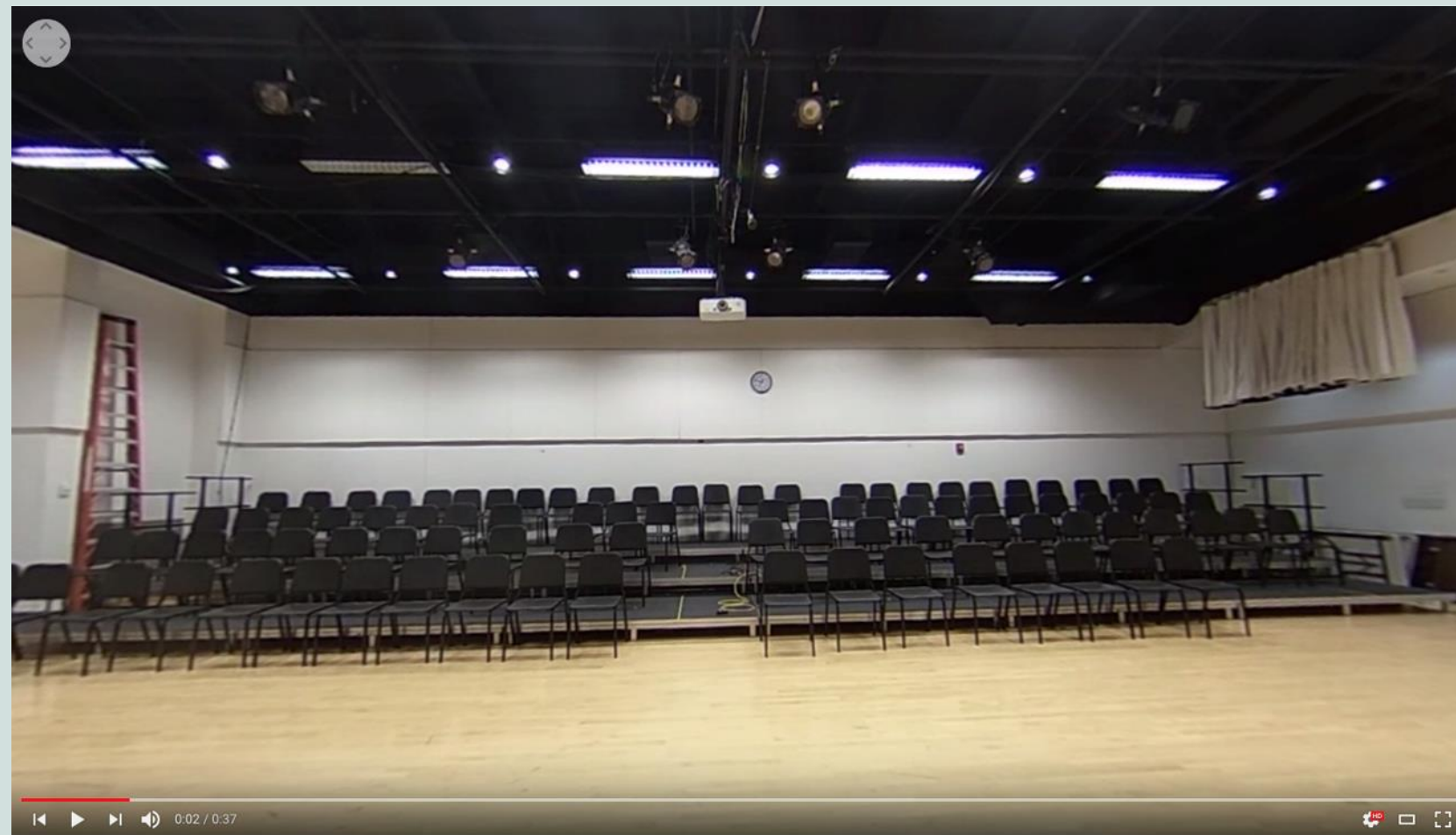
VIRTUAL REALITY:

VR headset, in lesson
mobile device + viewer, in lesson, at home





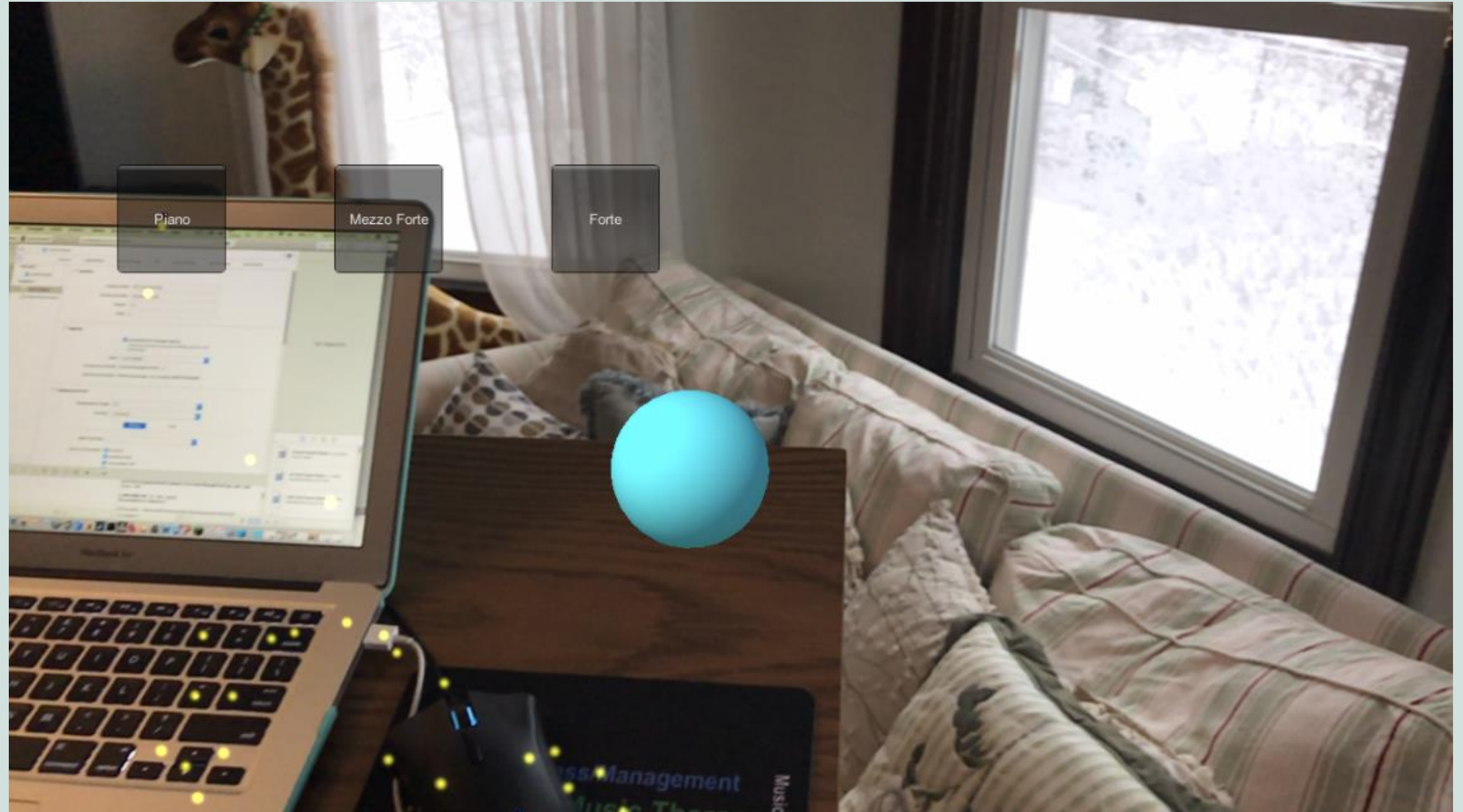
Recital Preview



YouTube: Recital Hall Sound + Applause (Immersive Tools Project, Berklee)



Dynamics



Prototype of ARKit on iOS (made in Unity)



Dialed-Down Design

- intensity matters
- guide attention
- vary thresholds
- balance realism with abstraction





INTENSITY MATTERS

Consider the sensory load you are providing





GUIDE ATTENTION

Eliminate extraneous material
Cueing
Biofeedback





VARY THRESHOLDS

Customizable settings

Adjustable parameters

Design levels





BALANCE REALISM + ABSTRACTION

**BORROW FROM ARCHITECTURE
TO CONSTRUCT ATMOSPHERES**

scale – light – phenomena – mood
performance – time – visibility
absence – ambiguity – shadows
transparency – flexibility – reflections





Design Perspectives from Architecture

- Sensory Sensitive Approach
- Neurotypical Approach
- Research on both suggests efficacy of VR

USA Architects,
Morris-Union Jointure Commission's (MUJC) Developmental Learning Center (DLC)



Stuart Duncan, Autcraft Minecraft Server

Rewards
players for who
they are



Virtual Interactive Training Agent (VITA)



USC Institute for
Creative Technologies
(Director: Skip Rizzo)
in partnership with
the Dan Marino
Foundation

VR job interview
system



Lori Landay with High Fidelity Co-Founders Ryan Downe Karpf and Philip Rosedale

BerkleeXR Summit, February 7, 2018

With Joyce Bettencourt as Mingus JazzCat

Filmed in High Fidelity by Michael Bailey



Lessons Learned

- SPECTRUM OF ABILITY => SPECTRUM OF MODULATION
- MORE MODALITIES: text, image, voice, gesture,
- OFFER MULTIPLE LEVELS OF IMMERSION (WebXR)
- MOD, MAKE, FILTER, AND ACCOMMODATE
- GIVE PEOPLE A WAY TO DIAL IT DOWN + UP



**Questions?
Comments!**

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