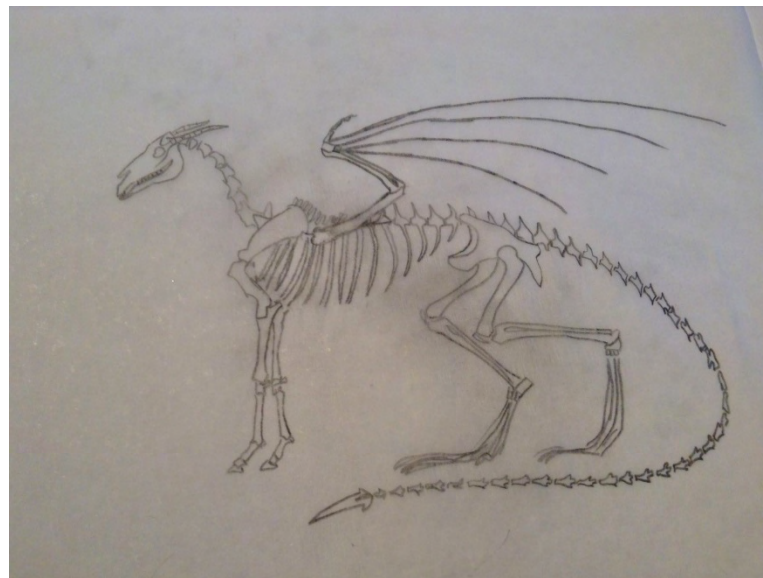
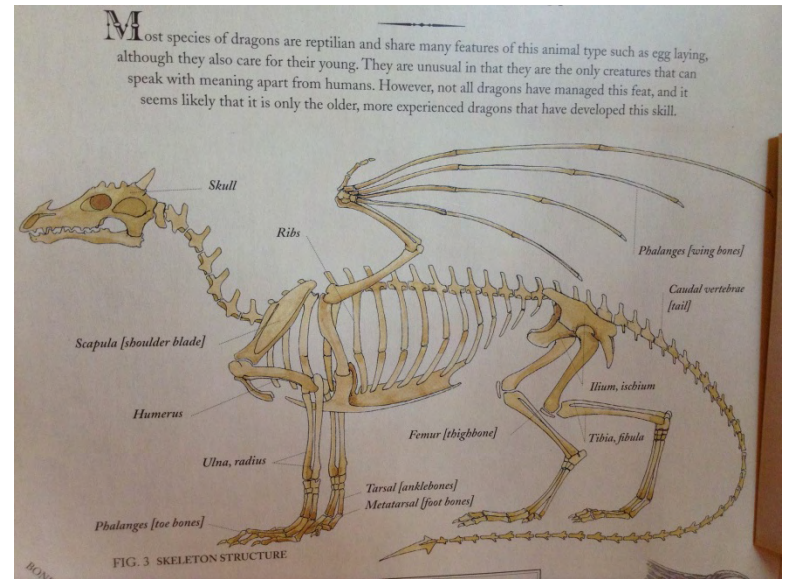
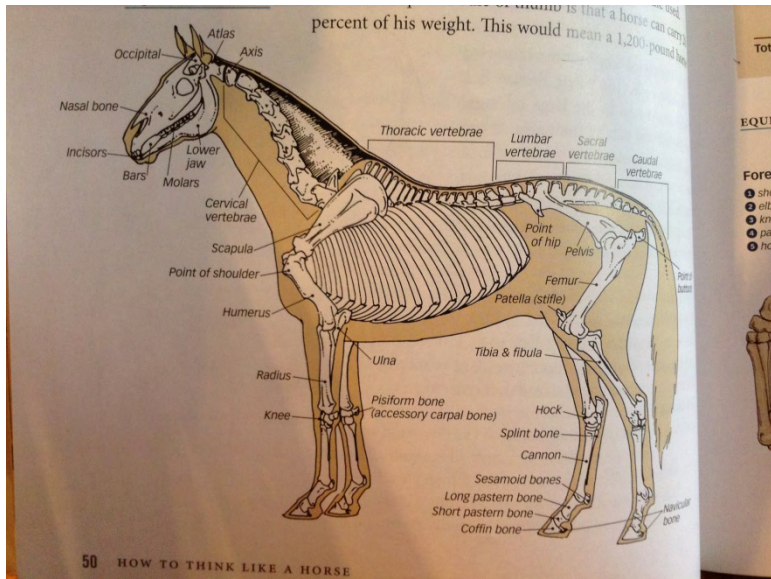
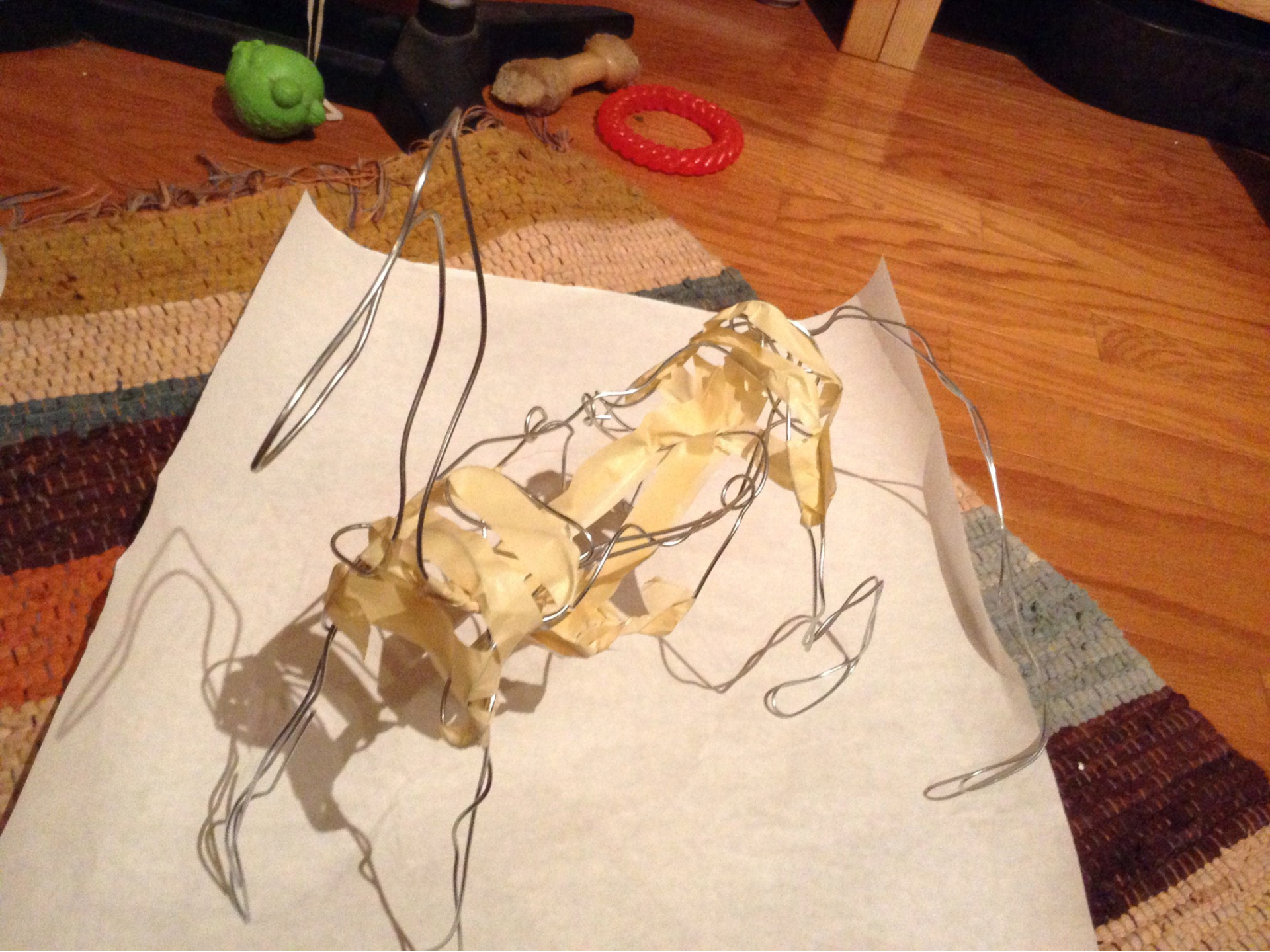


PROMOTING EQUITY, COMPLEXITY, AND CENTRALITY IN MAKER SPACES

Lee Martin, University of California, Davis
August 18, 2017













Making and the Maker Movement





Make: Build This Smart Watch

34 PROJECTS INSIDE!

HOW I MADE MY \$250 ROBOTIC ARM*

GARAGE BIONICS

Intel's Edison

MECH RUNNER

Build This Smart Watch

makermedia.com

Make: ANNUAL GUIDE TO 3D PRINTING

26 3D PRINTERS TESTED

3D PRINT YOUR CAR*

GO BIG

makermedia.com

Make: GO BIG

INSIDE TECHSHOP

34 PROJECTS TO BUILD

makermedia.com

Make: MyBuster Grant Inohara: "This robot almost killed me!"

34 PROJECTS TO BUILD

makermedia.com

Make: EXPLORE THE DEEP

21 PROJECTS TO BUILD

makermedia.com

Make: Power Racing

22 COOL PROJECTS YOU CAN BUILD!

21 PROJECTS TO BUILD

makermedia.com

Make: FORGING MAGIC FROM PLASTIC

23 FUN PROJECTS

makermedia.com

Make: MOD YOUR BOB

29 PROJECTS YOU CAN BUILD

DIY SUPERHUMAN

makermedia.com

Make: JOIN THE ARDUINO REVOLUTION

21 PROJECTS YOU CAN BUILD

HELICOPTER ROCKET

makermedia.com

Make: AMAZING GADGETS YOU CAN BUILD!

18 FUN HOW-TO PROJECTS

makermedia.com

Make: REMOTE CONTROL EVERYTHING!

9 GREAT PROJECTS TO AUTOMATE YOUR LIFE

makermedia.com

Make: YOUR DESKTOP FACTORY

21 PROJECTS YOU CAN DO

makermedia.com

Make: TRY THIS AT HOME!

23 FUN PROJECTS

makermedia.com

Make: ROBOT'S, ROVERS, DRONES

23 FUN PROJECTS

makermedia.com

Make: REDISCOVER LOST KNOWLEDGE

11 VINTAGE PROJECTS TO BUILD A LITTLE

makermedia.com

Make: DIY MUSIC: 10

ROCKING INSTRUMENTS TO BUILD & PLAY

makermedia.com

Make: BUG'S EYE BUGGY

BUILD YOUR OWN V.R.C. RACER!

27 PROJECTS

makermedia.com

Make: IT'S MAGIC!

15 COOL TRICKS

makermedia.com

Make: Invasion of the Blimp Bots!

31 NEW TRICKS

makermedia.com

Make: DIY WHEELS

25 FUN TO MAKE PROJECTS

makermedia.com

Make: HOME ELECTRONICS

20 PROJECTS

makermedia.com

table top
- acrylic
- 1/2" thick
- 48" x 30" x 1/2"

square cabinet
- 30" x 30" x 30"
- 1/2" thick
- 30" x 30" x 30"

BetaLAB

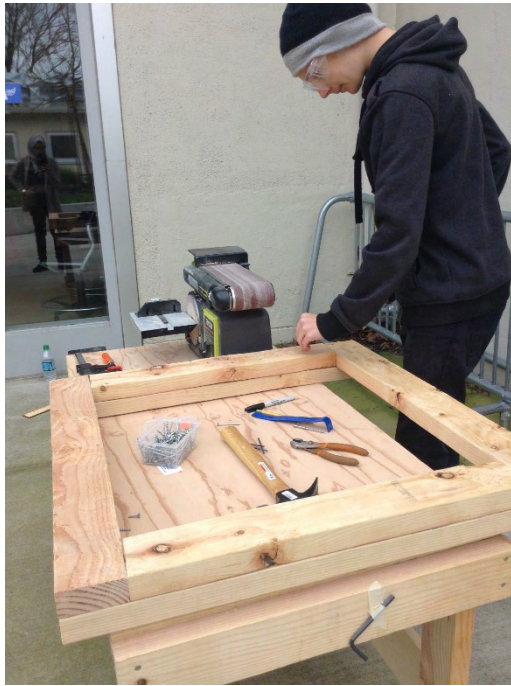
BUILDCINEERTINKERADAPT



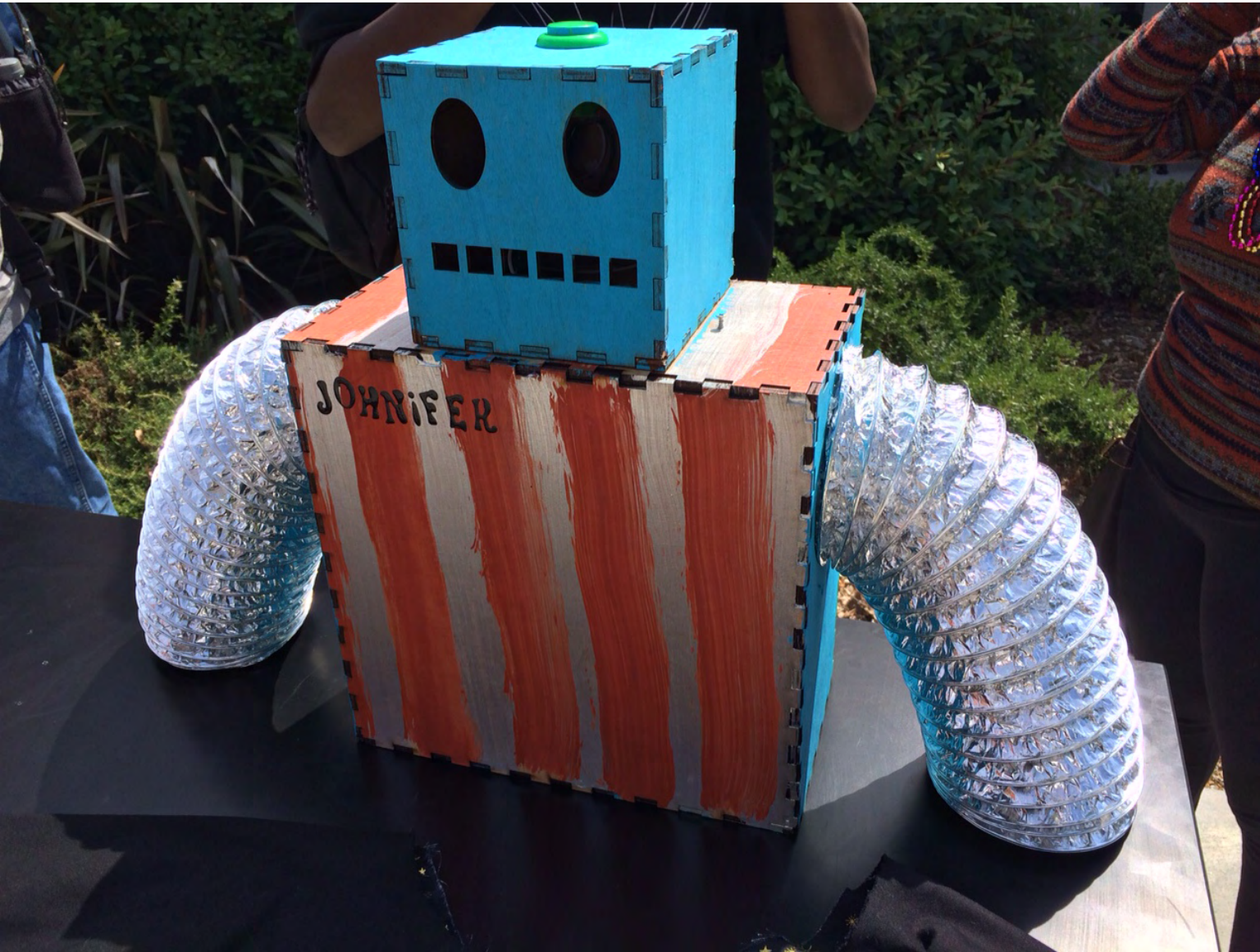
What do young people
get out of maker
experiences?

it depends ...

Skills



Identity shifts and Confidence



Resourcefulness (Adaptive Expertise)



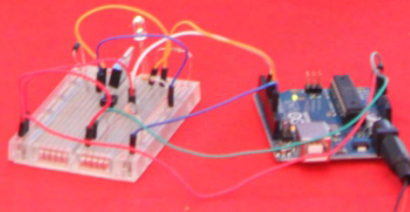


Maker Faire

Bay Area 2013

Dragon Horse

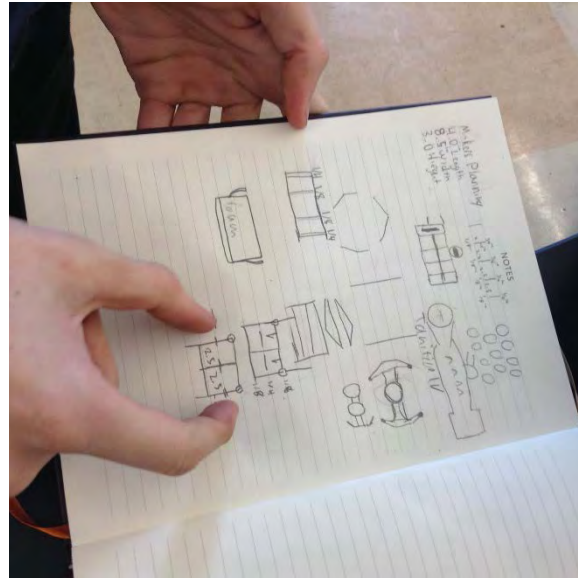
My project is a sculpture of a mix between a horse and a dragon with a sensor that moves the wings.



Three Requirements



Equity



Complexity



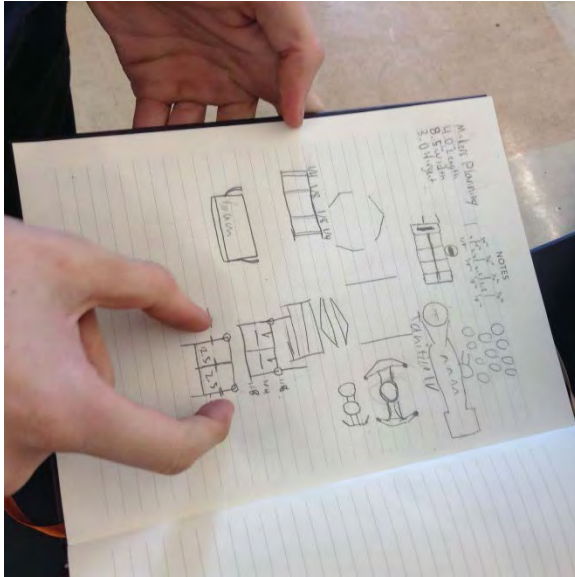
Centrality

Equity



- Equity is complex
- Who is in the room?
- Who has opportunities? Who is taking them up?
- What ideas and practices are celebrated, welcomed, tolerated, or devalued?
- Are all students' ideas and practices taken seriously?

Complexity

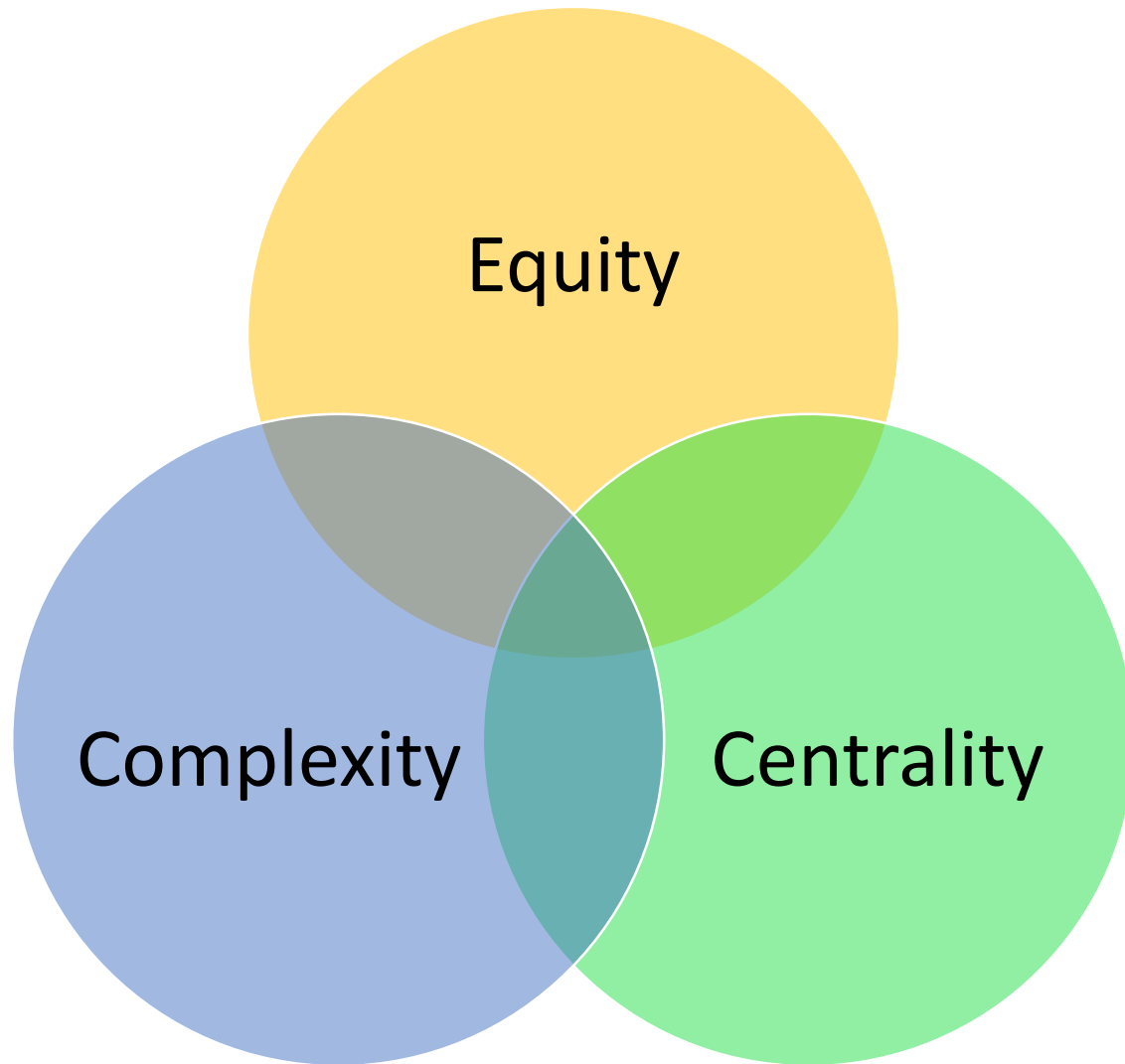


- What is the nature of the work?
- Are students moving out of their comfort zone?
- Are students challenging themselves intellectually?
- Is there opportunity for students to “level up”?

Centrality



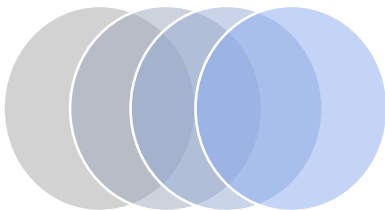
- Are students central participants in the learning activity system?
- Are they engaged in valued practices, like figuring things out, prototyping, and getting feedback?
- Are they being pushed to the margins of their project work?



Equity principle: meet youth where they are, as who they are

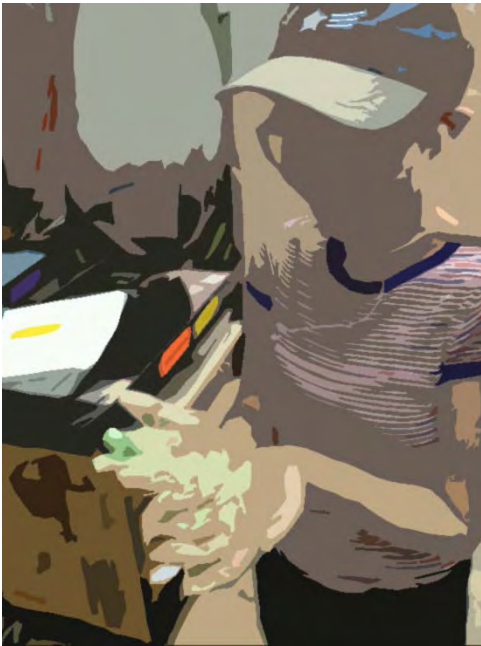


- Mobile / local
- Encourage playfulness
- Start from areas of comfort and familiarity
- Youth-driven project choice



Familiar Novel

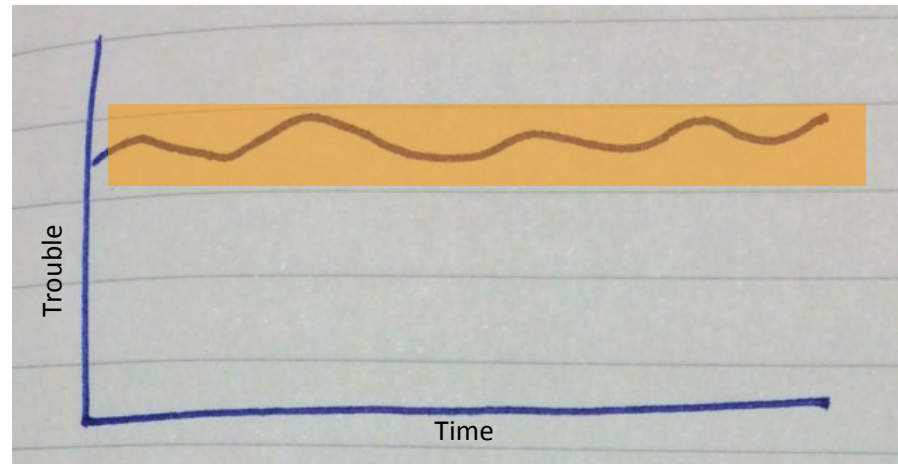
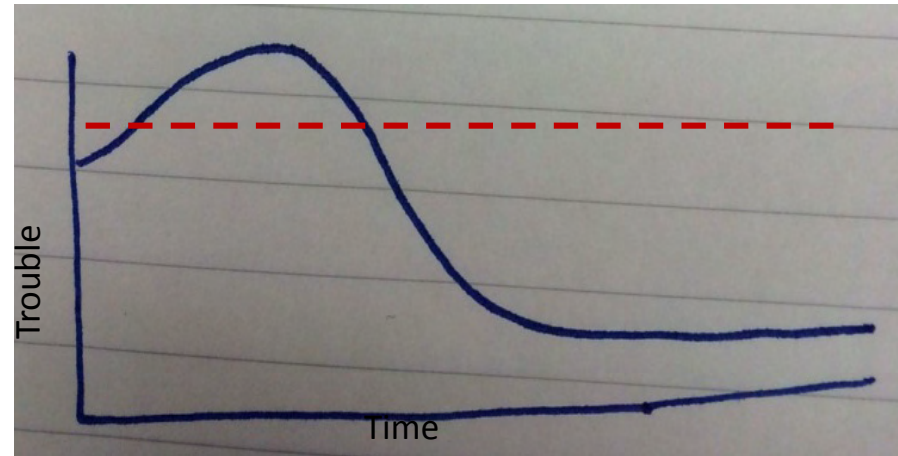
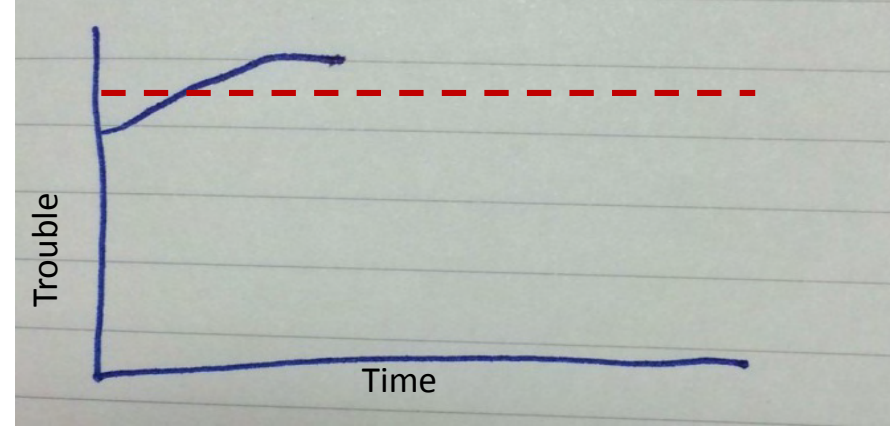
Complexity



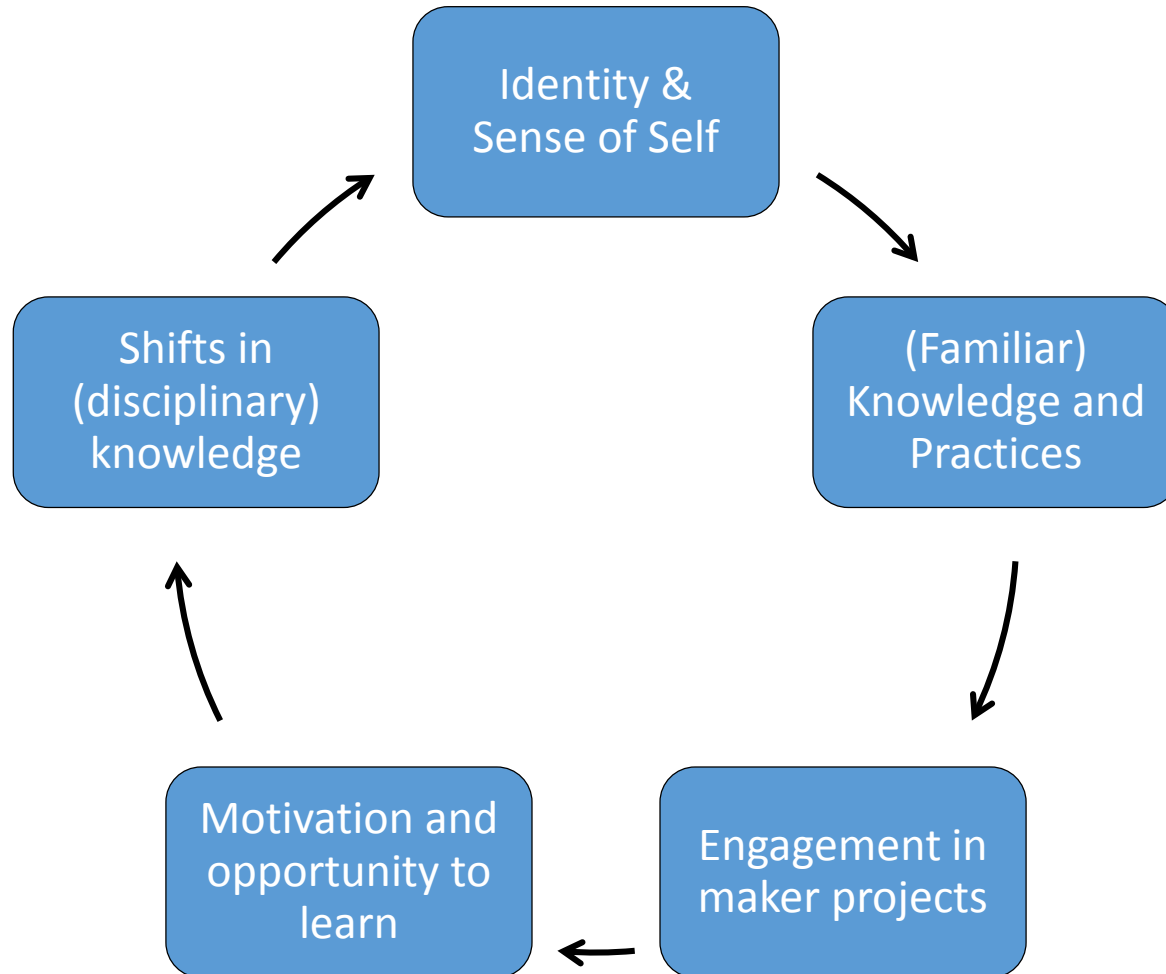
- Encourage intellectual risk taking
- Culture of drafting and feedback
- Always seek out others' ideas
- Encourage leveling up
- Saturate the environment with resources
- Build toward disciplinary knowledge
- Peer mentoring

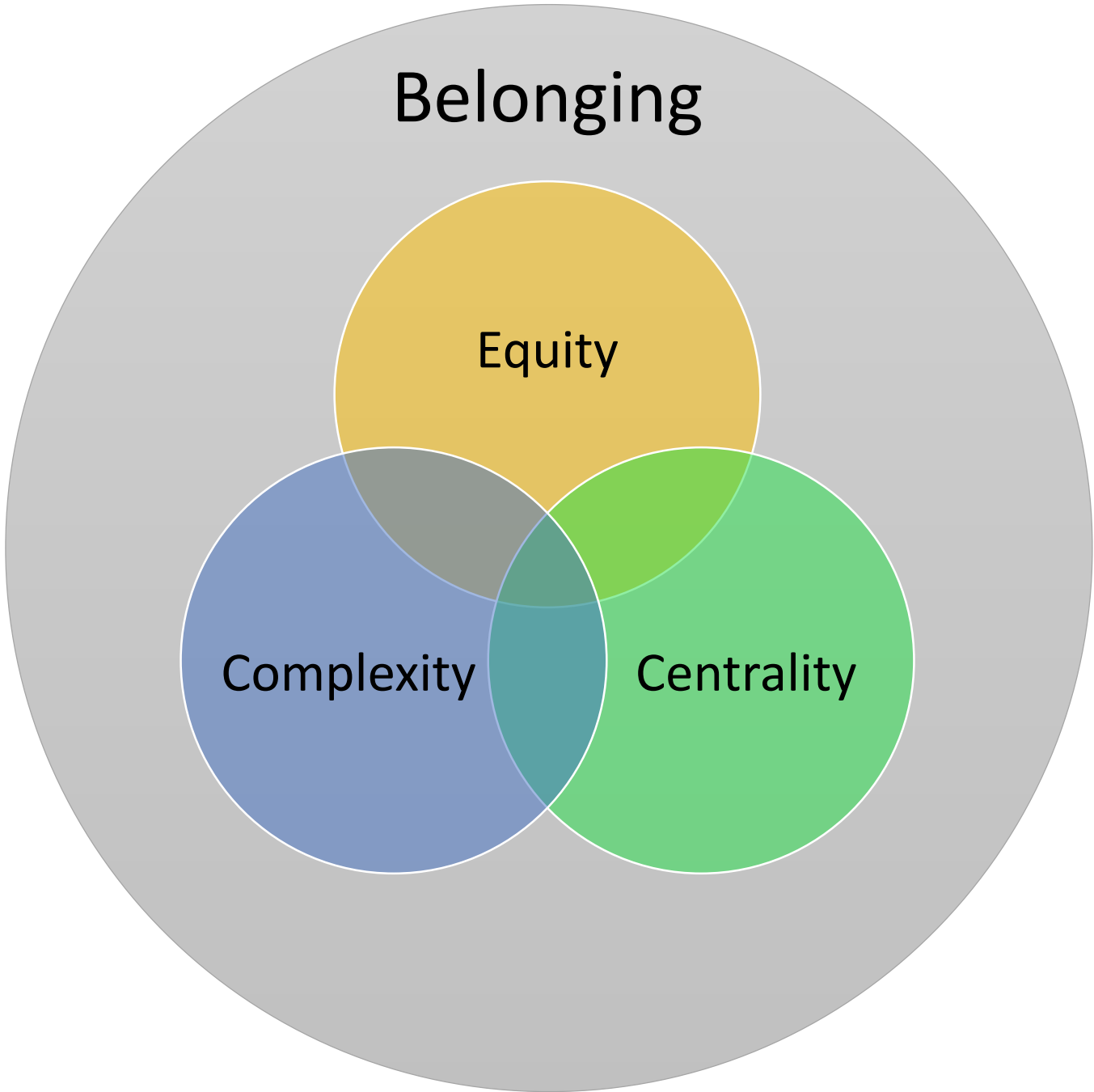
Centrality

- Pedagogical moves for scaffolding difficulty up and down
- Focus on “desirable difficulties”
- Patience



Build from Strengths Bridge to Disciplines





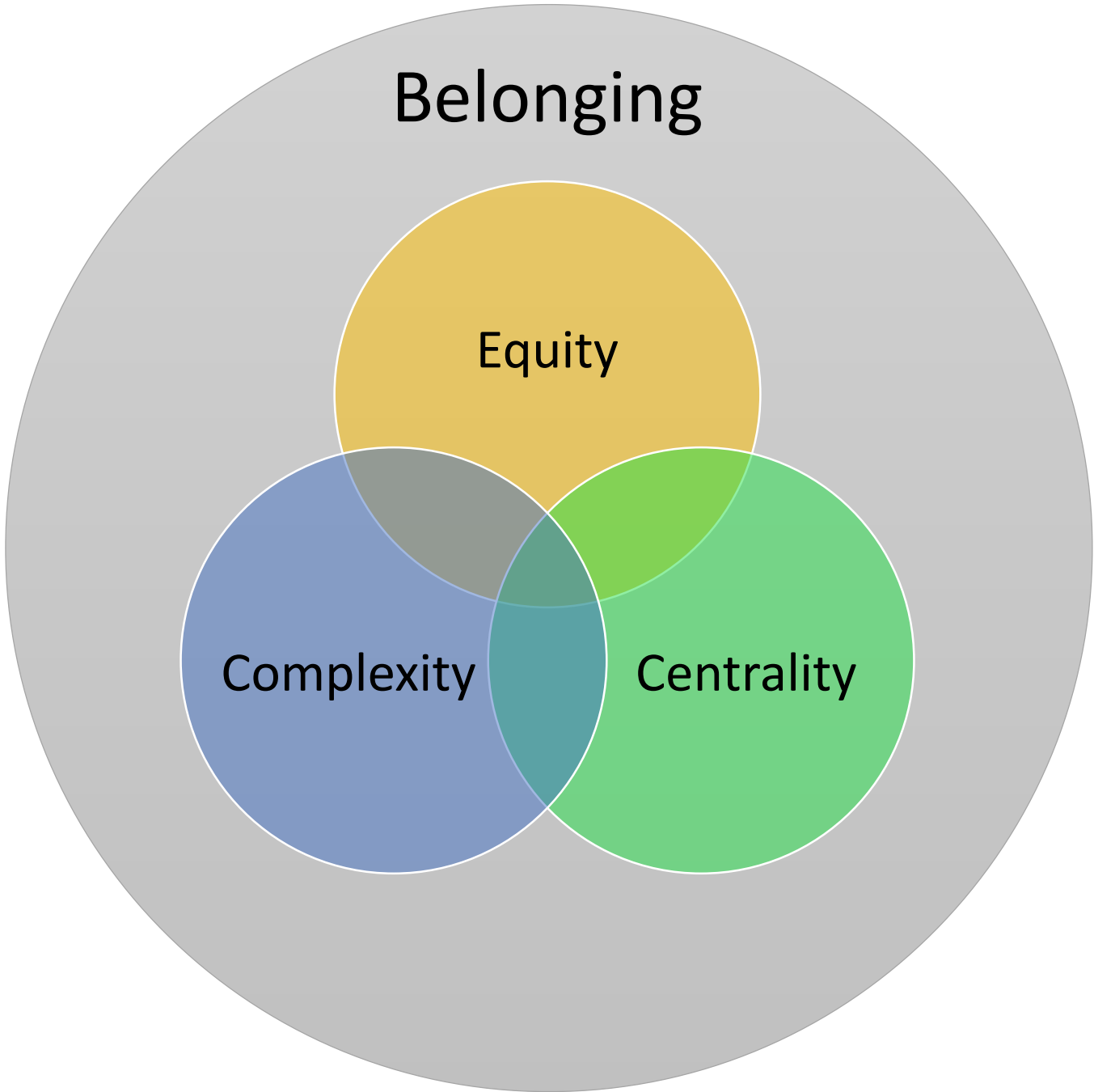
Belonging

Equity

Complexity

Centrality

Just being able to be myself in a space with a lot of people. I can only be myself when I'm alone. I act like someone else when I'm in front of other people. Being able to sit down, work on my own stuff, and describe it to other people. Knowing that that is me talking. It's just something that really helped me out.



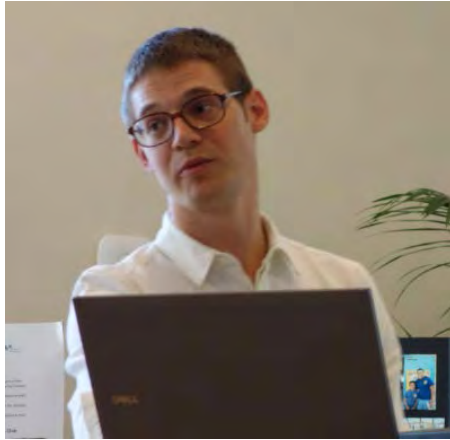
Belonging

Equity

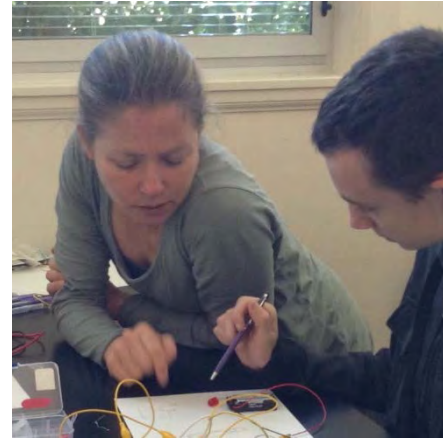
Complexity

Centrality

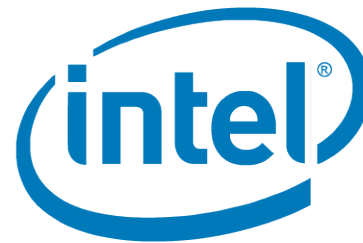
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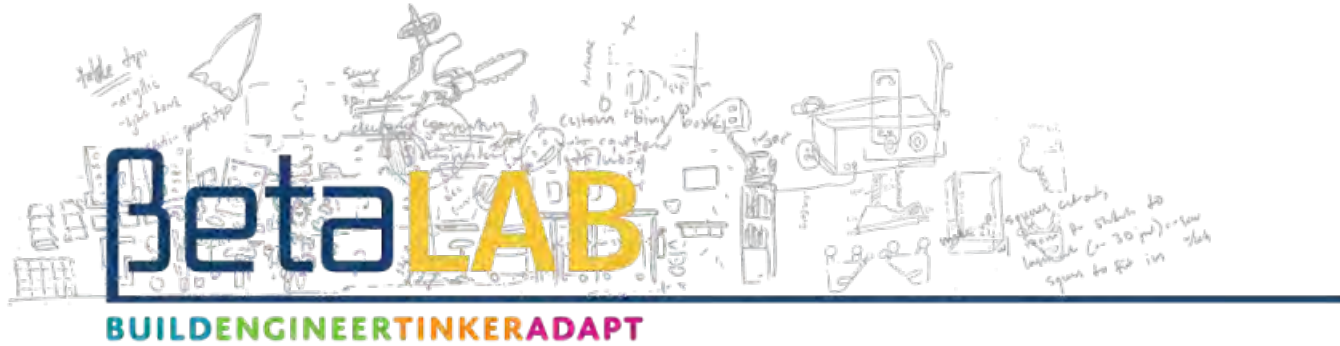


Colin Dixon



Sagit Betser





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