

# T-550

**DESIGNING FOR  
LEARNING BY  
CREATING**

**[bit.ly/t550-2015](http://bit.ly/t550-2015)**

**Curiosity encouraged.**

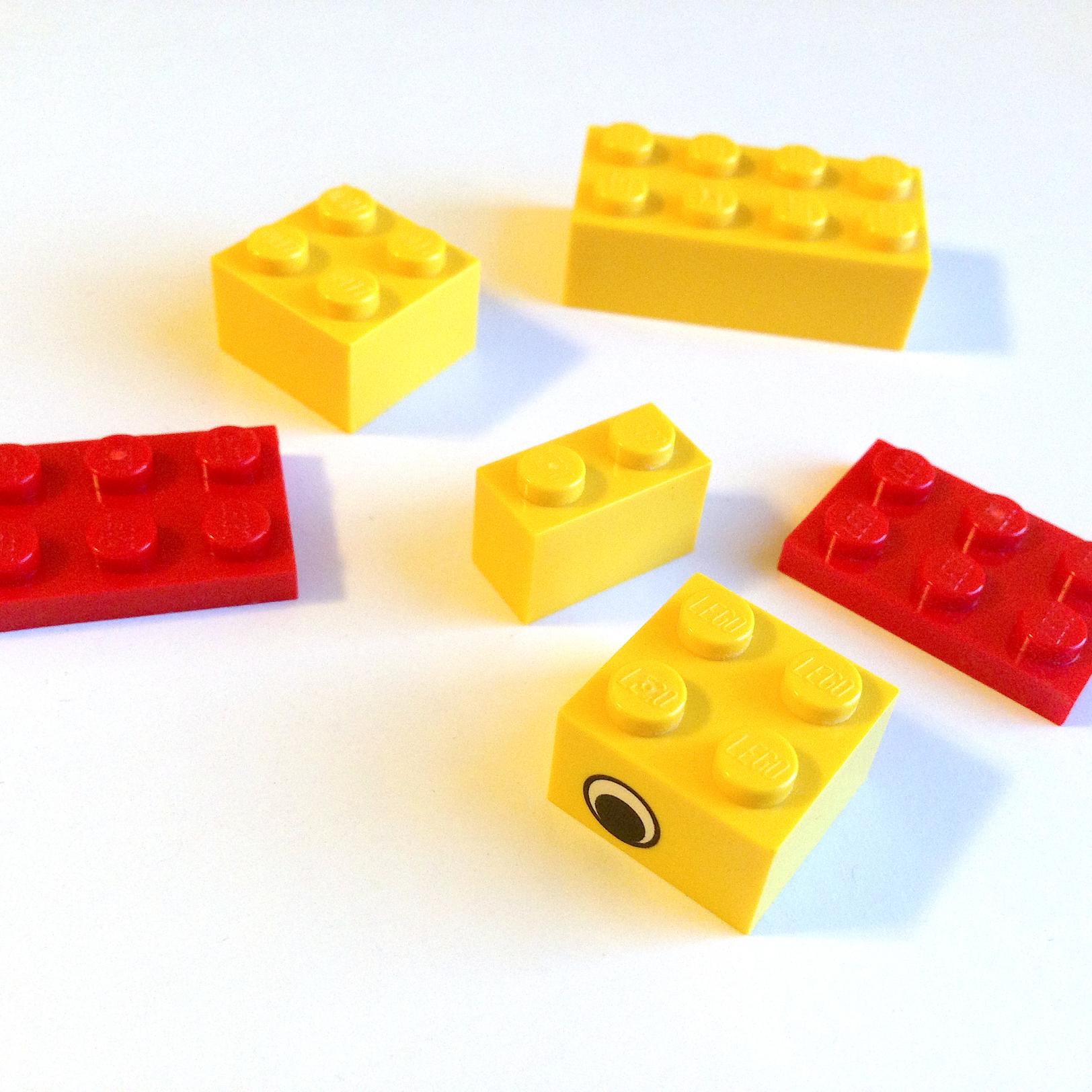
#tfivefifty



# What's inside

Overview	6
Practical matters	8
Expectations	10
Assessment	14
Weekly schedule	19
Credits	46

(last updated 2015.08.23)



# Overview

In formal learning environments such as classrooms, learners are too often positioned as passive — listening, watching, attending, consuming — rather than encouraged to engage as creators — designing, making, producing, constructing. In this course, we will (1) investigate the theoretical foundations of learning by creating, and (2) explore how to design learning experiences and technologies that support creating as a central activity.

Our investigations and explorations will be supported through readings, as well as hands-on experimentation with (and critical analysis of) construction-oriented learning experiences. Additionally, we will develop projects related to the theme of “designing for learning by creating” and connected to individual participants’ interests.

Anyone who is interested in exploring the theory and practice of learning through designing, producing, making, and creating is encouraged to enroll.

This course focuses on **constructionism**, a theory of learning developed by Seymour Papert. Yasmin Kafai and Mitch Resnick (1996) offered the following definition of constructionism:

Constructionism builds on the constructivist theories of Jean Piaget, asserting that knowledge is not simply transmitted from teacher to student, but actively constructed by the mind of the learner.

Moreover, constructionism suggests that learners are particularly likely to make new ideas when they are actively engaged in making some type of external artifact, ... which they can reflect upon and share with others.

T-550 is based on a course (MAS.714) taught by Mitch Resnick at the MIT Media Lab. I took MAS.714 in 2007, and was involved with course facilitation until I graduated in 2012.

I love the ideas in this course — they form the intellectual basis of my research and shape the way in which I make sense of the world. As such, my goals for the course are to: (1) help you become familiar (or more familiar) with these core ideas by examining the literature related to constructionist approaches to learning, (2) create opportunities for you to experience and analyze technologies and contexts, using these core ideas as a framework, and (3) support you in developing a project that explores these core ideas.

# Practical matters

In this document, I have attempted to provide enough detail to express the culture and process of the course, but there are undoubtedly aspects that I have forgotten — or are simply better experienced than expressed through text. If you have any questions that remain unanswered, please do not hesitate to let me know.

Class sessions are on Wednesday, from 9:00 am to 12:00 pm. They are (tentatively) scheduled in Longfellow Hall, Room 319.

Our first class is on Wednesday, September 9, 2015.

Our final class is on Wednesday, December 2, 2015.

To participate, you need to register for credit (unfortunately, no auditors) and must be in attendance at the first session of the course on September 9 (unfortunately, no exceptions).

Members of the teaching team include:

**Karen Brennan**

My office is Longfellow 334. You are welcome to drop by, but it is probably safer to make an appointment. For an appointment, please send me a note via email with dates and times that work with your schedule.

Email: [karen\\_brennan@gse.harvard.edu](mailto:karen_brennan@gse.harvard.edu)

Skype: karen.brennan

**Wilhelmina Peragine (AIE 2013)**

Office hours by appointment.

Email: [wilhelmina\\_peragine@mail.harvard.edu](mailto:wilhelmina_peragine@mail.harvard.edu)

# Expectations

A few words on what I expect of you and what you can expect of me, as we work together to build a learning community throughout the semester.

## What do I expect of you?

Some of what I expect is obvious — that you will attend class, participate in activities, and invest yourself in the course. I expect that you will be curious about new ideas, humble when faced with the challenges of learning, honest in your intellectual output, generous with your colleagues in our learning community, and respectful of different learning styles.

There are three specific expectations that I consider especially important: (1) being there, (2) the 1/N rule, and (3) academic honesty.

First, I look forward to seeing you in class, which will start promptly at 9:05 am and end promptly by 11:55 am. If you are unable to make it to class (due to illness, unavoidable travel, etc.), please send me an email in advance of the session, or as soon as possible. I cannot overstate the importance of punctual, regular attendance! If missing a class is unavoidable, I will ask you to submit supplementary writing on the week's theme.

Second, please be aware of your contributions in relation to others. I love enthusiastic participation. That said, some people need more time to think through ideas or are just shy. (This may come as a surprise, but I am incredibly shy in groups of people.) As such, I am fond of the 1/N rule in groups — with N people, each person should have 1/N of group airspace.

Third, be aware of appropriate credit and attribution in writing. I cannot overstate the seriousness of plagiarism in the academic world. If you're worried about accidentally plagiarizing, I encourage you to complete the following tutorials:

Principles of Paraphrasing

<http://isites.harvard.edu/icb/icb.do?keyword=paraphrasing>

APA Exposed

[http://isites.harvard.edu/icb/icb.do?keyword=apa\\_exposed](http://isites.harvard.edu/icb/icb.do?keyword=apa_exposed)

If you're considering intentionally plagiarizing, don't do it! It is not worth jeopardizing an amazing academic career. I would much rather have a conversation about an extension than about copying.

## **And what can you expect of me?**

You can expect that I will strive to curate meaningful, rich learning opportunities for you and with you, that I will give you honest feedback, that I will be curious about what you are passionate about, that I will have extremely high expectations of you, and that I will be available to meet with you, as you need.

I think that learning is (and should be) hard (more specifically, as Seymour Papert said, hard fun). As such, you can expect that I will encourage you and support you in taking on challenges.

You cannot expect to hear much from me in a lecture format. I want you to have the space to develop your own responses to the course ideas, without distraction from my interpretations. More importantly, if I'm talking, I can't listen — to you and to how you are making sense of the course ideas.

The combination of big challenges and my approach to learning experience design may sometimes feel bewildering (c.f. “How to Draw an Owl” on the next page). If you're struggling, don't panic (too much). Embrace the uncertainty and let me know how I (and the teaching team) can help.

As noted earlier, I schedule office hours by appointment. Please do not hesitate to let me know if you would like to meet (either in person or online) — you need only send me an email with suggested dates and times. I would be very happy to hear from you.

---

---

# How to draw an Owl.

*"A fun and creative guide for beginners"*

---

---

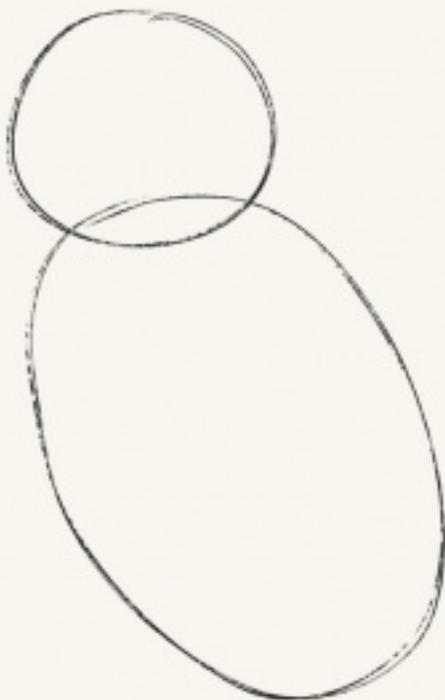


Fig 1. Draw two circles



Fig 2. Draw the rest of the damn Owl

# Assessment

Full disclosure: I find grades stressful.

Too often, I see grades preventing people from taking intellectual risks, discouraging people from being bold, causing people to worry about the least important part of the experience. So let us remove that concern.

The course can only be taken as SAT/NCR (Satisfactory/No Credit), and you start the course with a SAT.

If you're attending class, participating in activities, making a sincere intellectual investment in the course material, etc., this will not change. Throughout the course, you will get written feedback from the TFs, your colleagues, and yourself (in the form of reflective memos). The purpose of this feedback is to highlight strengths and areas of potential growth — ideally, moving you from where you are to a deeper engagement with the course material.

Sound good? If so, let's look at what the course involves...

### **Maintaining a design journal**

*(weekly)*

You will maintain a (semi-)public design journal that is accessible to other members of class, both for reading and for commenting. The format of the design journal is a Google Presentation. (Further information about creating and sharing the journal will be available on the course site.) Each week, reflection questions will be made available on the course site, alongside the weekly readings and explorations.

I cannot overstate the importance of the design journal — everything related to your class activities should be shared here. I ask that the weekly posting be completed by Monday evening, so that others (particularly our wonderful T-550 facilitators) have an opportunity to read your journal before class on Wednesday.

### **Developing a self-directed project**

*(make progress at least every other week)*

Either by yourself or in a small group, you will develop a final project that is related both to the course themes and to your personal interests. Projects can take different forms, but will involve designing something — e.g., set of design mockups, video, narrative, unit plan — and analyzing this creation in a ~4,000 word paper, using the ideas and readings from the course.

We will have structured waypoints throughout the term to ensure that everyone is making progress. A draft of your project artifacts and the paper that analyzes your work will be due on Wednesday, November 25. Project presentations will be conducted during the last session on Wednesday, December 2. Your final project artifacts and paper will be due on Wednesday, December 9.

- (Sep 23) Brainstorm potential projects
- (Sep 30) Prepare project outline
- (Oct 7) Prepare project abstract and timeline
- (Oct 21) Share project update, round 1
- (Oct 28) Share project update, round 2
- (Nov 4) Share project update, round 3
- (Nov 25) Submit draft of final paper
- (Dec 2) Present project
- (Dec 9) Submit final project artifacts and paper

## **Reading**

*(weekly)*

I lovingly curated the reading list for you, striving to maximize the amazing-ideas-to-page-count ratio. Read as much as you can, as deeply as you can. If pressed for time, please try to skim any content that you were unable to closely read. I hope you find these readings as useful for your intellectual toolkit (a phrase I borrow from Sherry Turkle) as they have been for mine.

## **Making things**

*(throughout the term)*

Unsurprisingly, a course about learning through creating involves making things. Here is a summary of things you will be making, which will serve as concrete things for us to think with, in relation to the course readings.

(Sep 9) Create a design journal

(Sep 9) Write a 500-word personal learning statement

(Sep 16) Develop an interactive media project with Scratch

(Oct 14) Create a remix

(Nov 18) Revisit personal learning statement from first week

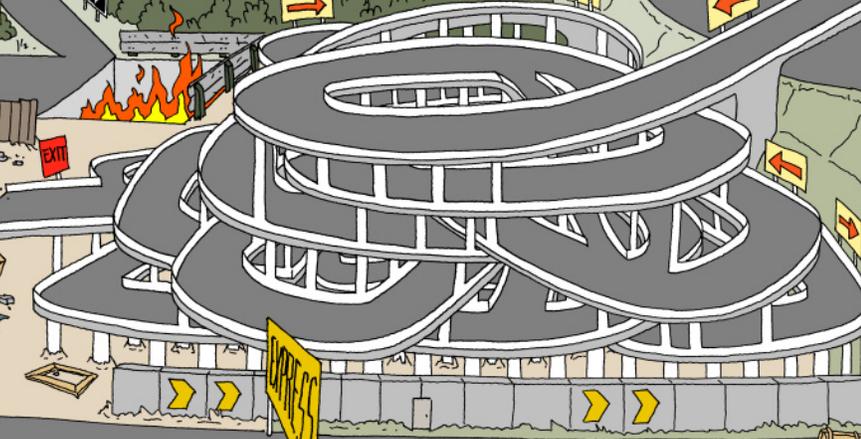
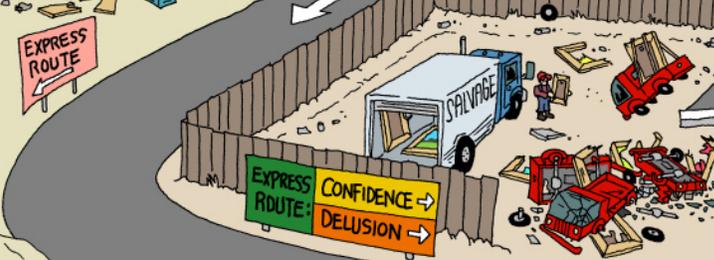
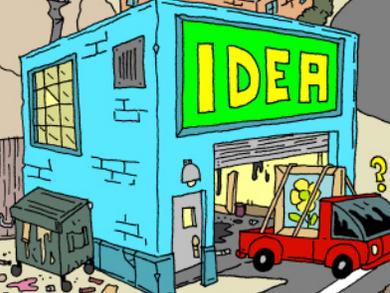
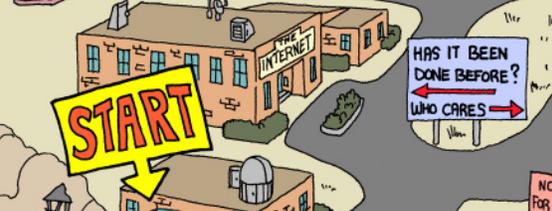
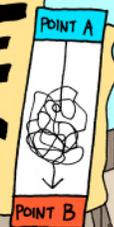
(Nov 18) Create self-assessment

## **Preparing for guest speakers**

*(throughout the term)*

I have invited several guest speakers to join class throughout the term. I hope that you will find their stories and experiences as exciting as I do. I kindly request that you conduct a brief web investigation of our guests before they arrive, so that you have some context for their work. (I will provide links, but I have no doubt that some of you are web super-sleuths.)

# THE CREATIVE PROCESS



# Weekly schedule

This course explores constructionism — an approach to learning that emphasizes the importance of constructing, building, making, and designing as ways of knowing.

Constructionism is grounded in the belief that the most effective learning experiences grow out of the active construction of all types of things, particularly things that are personally or socially meaningful, that are developed through interactions with others, and that support thinking about one's own thinking.

These four aspects of constructionism — which I define as learning through the activities of **making**, **personalizing**, **sharing**, and **reflecting** — serve as the major organizing strands of the course sessions, and are considered in the context of the digital era.

Each session is (typically) organized into three 50-minute blocks — 9:05-9:55, 10:05-10:55, 11:05-11:55 — with time in between the blocks for short breaks.

These blocks include readings discussion, guest presentations, participant facilitation, and creative activities.

For one of the three blocks, we will alternate weekly between:

- (1) discussing and analyzing a creative activity and/or technology (i.e., the artifacts that you will be developing outside of class time, which include writing a personal statement, creating interactive digital media, remixing digital media), and
- (2) making progress on course projects.

**The schedule will not change dramatically during the term — but I reserve the right to make minor adjustments (such as swapping out/in readings) as the course develops.**

For more details, a description of each class session follows.



An overview of the major strands and sub-themes, organized by week:

### **Foundations**

Session 1: Designing, Learning, Creating

### **Making**

Session 2: Digital materials

Session 3: Physical materials

### **Personalizing**

Session 4: Agency

Session 5: Self-theories

### **Sharing**

Session 6: Remix culture

Session 7: Learning communities

### **Reflecting**

Session 8: Critique

Session 9: Metacognition

### **Conclusion**

Session 10: Looking back

Session 11: Celebrating

Unser wahres Analphabetentum  
ist das Unvermögen,  
schöpferisch tätig zu sein.

OUR REAL ILLITERACY  
IS OUR INABILITY TO CREATE.



# Session 1: Designing, Learning, Creating

*September 9*

What do we know about how people learn?

What do we know about how people learn through creating?

## Before class

### *Reading*

- Course syllabus
- Sawyer, K. (2006). Introduction: The new science of learning.
- Papert, S. (1993). The children's machine (Chapter 7).

### *Making*

- Create your online design journal
- Write a 1-page (~500 word, single-spaced) personal statement about how you learn

### *Reflecting*

- N/A

## During class

### *Part 1*

- Welcome
- Course overview
- Q&A

### *Part 2*

- Sharing personal learning statements

### *Part 3*

- Connecting personal statements and readings



# Session 2: Digital materials

*September 16*

What do we do with digital technologies?

What could we do with digital technologies?

## Before class

### *Reading*

- Papert, S. (1980). Mindstorms: Children, computers, and powerful ideas (Introduction).
- Rushkoff, D. (2010). Program or be programmed: Ten commands for a digital age (Chapter 10).
- Brennan, K. (2013). Learning computing through creating and connecting.

### *Making*

- Create an interactive media project with Scratch

### *Reflecting*

- Respond to reflection questions on course site

## During class

### *Part 1*

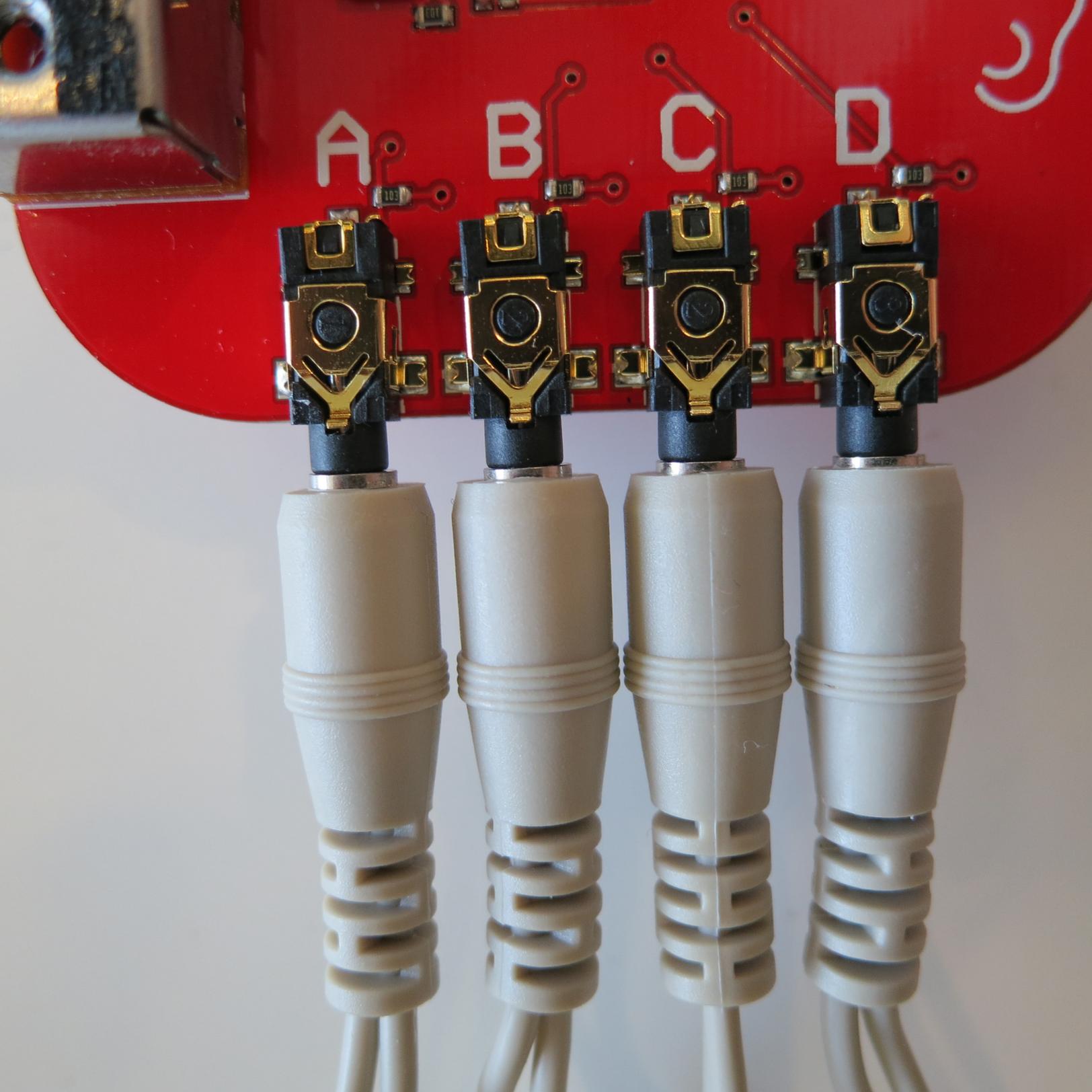
- Readings exploration

### *Part 2*

- Sharing Scratch projects

### *Part 3*

- Conversation with Mitch Resnick, MIT Media Lab



# Session 3: Physical materials

*September 23*

What roles can tangible materials serve in learning?

## Before class

### *Reading*

- Turkle, S. (Ed.) (2007). Evocative objects: Things we think with (Introduction).
- Wilkinson, K., & Petrich, M. (2014). The art of tinkering (pp. 12-17).
- Resnick, M., & Rosenbaum, E. (2013). Designing for tinkerability.

### *Making*

- Brainstorm potential project concept(s)

### *Reflecting*

- Respond to reflection questions on course site

## During class

### *Part 1*

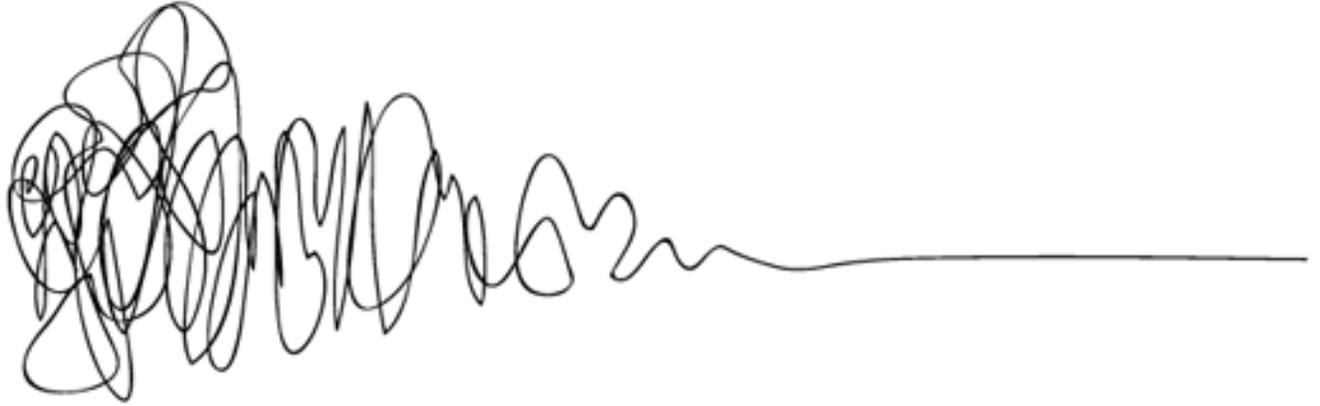
- Share potential project concept(s)

### *Part 2*

- Readings exploration

### *Part 3*

- Conversation with Jie Qi, MIT Media Lab



# Session 4: Agency

*September 30*

Who is in charge of our learning?

## Before class

### *Reading*

- Dewey, J. (1938). Experience and education (Chapter 5).
- Skinner, B.F. (1986). Programmed instruction revisited.
- Bandura, A. (2001). Social cognitive theory: An agentic perspective.
- Brennan, K. (2013). Best of both worlds: Issues of structure and agency in computational creation, in and out of schools (Excerpts).

### *Making*

- Prepare project outline

### *Reflecting*

- Respond to reflection questions on course site

## During class

### *Part 1*

- Readings exploration

### *Part 2*

- Sharing project outlines

### *Part 3*

- Sharing project outlines

# TWO MINDSETS

CAROL S. DWECK, Ph.D.

**Fixed Mindset**  
Intelligence is static



Leads to a desire to look smart and therefore a tendency to...

**Growth Mindset**  
Intelligence can be developed



Leads to a desire to learn and therefore a tendency to...

## CHALLENGES

...avoid challenges

...embrace challenges

## OBSTACLES

...give up easily

...persist in the face of setbacks

## EFFORT

...see effort as fruitless or worse

...see effort as the path to mastery

## CRITICISM

...ignore useful negative feedback

...learn from criticism

## SUCCESS OF OTHERS

...feel threatened by the success of others

...find lessons and inspiration in the success of others

**As a result,** they may plateau early and achieve less than their full potential.

All this confirms a **deterministic view of the world.**

**As a result,** they reach ever-higher levels of achievement.

All this gives them a **greater sense of free will.**

Graphic by Nigel Holmes

# Session 5: Self-theories

*October 7*

How do our self-conceptions influence learning?

## Before class

### *Reading*

- Kohn, A. (2015). The perils of “Growth Mindset” education.
- Kohn, A. (2014). The myth of the spoiled child (Chapter 8).
- Dweck, C. (2000). Self-theories: Their role in motivation, personality, and development (Chapters 1-4, 16).

### *Making*

- Prepare project abstract and timeline

### *Reflecting*

- Respond to reflection questions on course site

## During class

### *Part 1*

- Readings exploration

### *Part 2*

- Discussing project abstracts and timelines

### *Part 3*

- Conversation with Alfie Kohn



# Session 6: Remix culture

*October 14*

What do we learn from building on others' work?

## Before class

### *Reading*

- Benjamin, W. (1969). The work of art in the age of mechanical reproduction.
- Lessig, L. (2008). Remix: Marking art and commerce thrive in the hybrid economy (Chapters 1, 4).

### *Making*

- Create a remix

### *Reflecting*

- Respond to reflection questions on course site

## During class

### *Part 1*

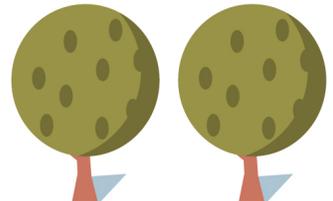
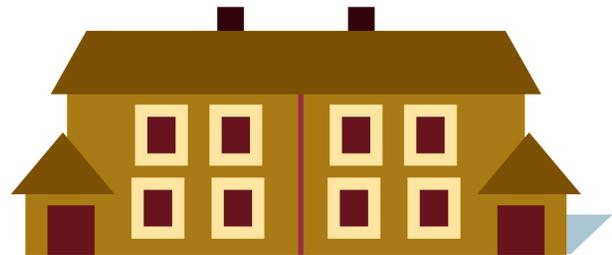
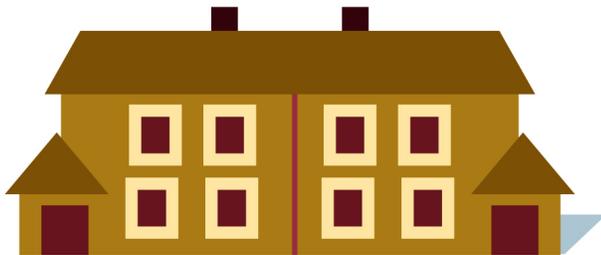
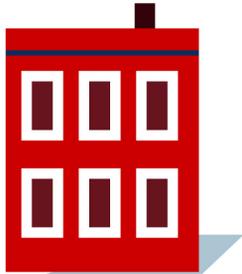
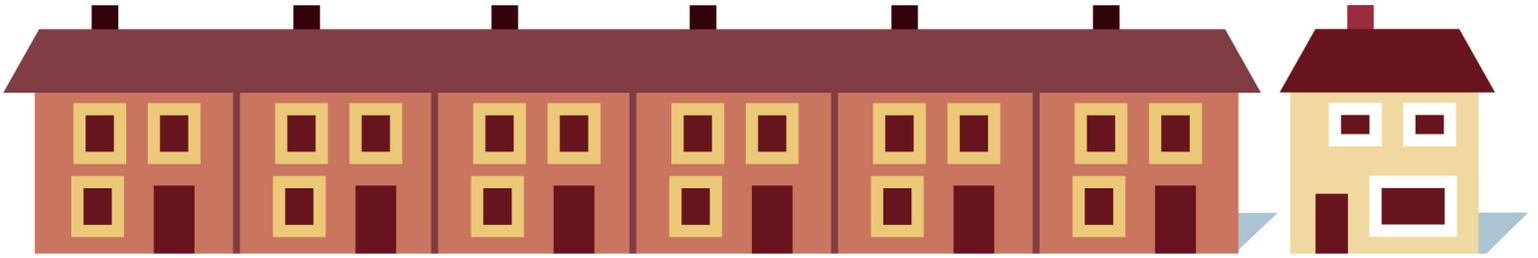
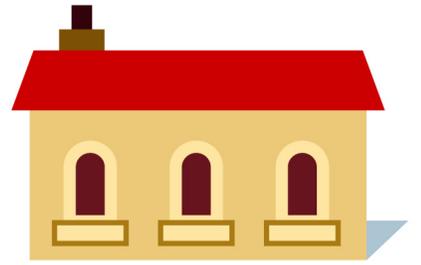
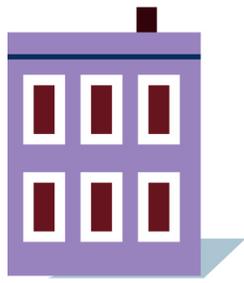
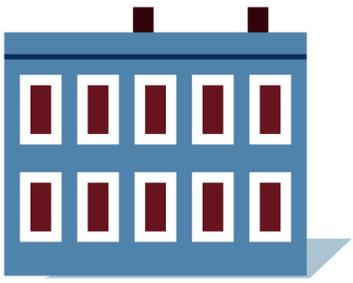
- Readings exploration

### *Part 2*

- Readings exploration

### *Part 3*

- Sharing remixes



# Session 7: Learning communities

*October 21*

How is learning supported by access to others?

## Before class

### *Reading*

- Illich, I. (1971). Deschooling society (Chapter 6).
- Vygotsky, L.S. (1978). Mind in society: Development of higher psychological processes (14th ed.) (Chapter 6).

### *Making*

- Prepare project update, round 1

### *Reflecting*

- Respond to reflection questions on course site

## During class

### *Part 1*

- Sharing project progress

### *Part 2*

- Readings exploration

### *Part 3*

- Conversation with L2T2L

My cat is sad  
because I drew a  
picture of him  
and he wants to  
give his real  
opinion of it  
without crushing  
my feelings.

[https://twitter.com/  
MYSADCAT/status/  
503213873910931457](https://twitter.com/MYSADCAT/status/503213873910931457)



# Session 8: Critique

*October 28*

How do we think critically about our own and others' creations?

## Before class

### *Reading*

- Schön, D.A. (1983). The reflective practitioner: How professionals think in action (pp. 49-69, 275-283).
- Schön, D.A. (1987). Educating the reflective practitioner (Chapters 1, 5).
- Arida, S. (2010). More seeing in learning (Excerpts).

### *Making*

- Prepare project update, round 2

### *Reflecting*

- Respond to reflection questions on course site

## During class

### *Part 1*

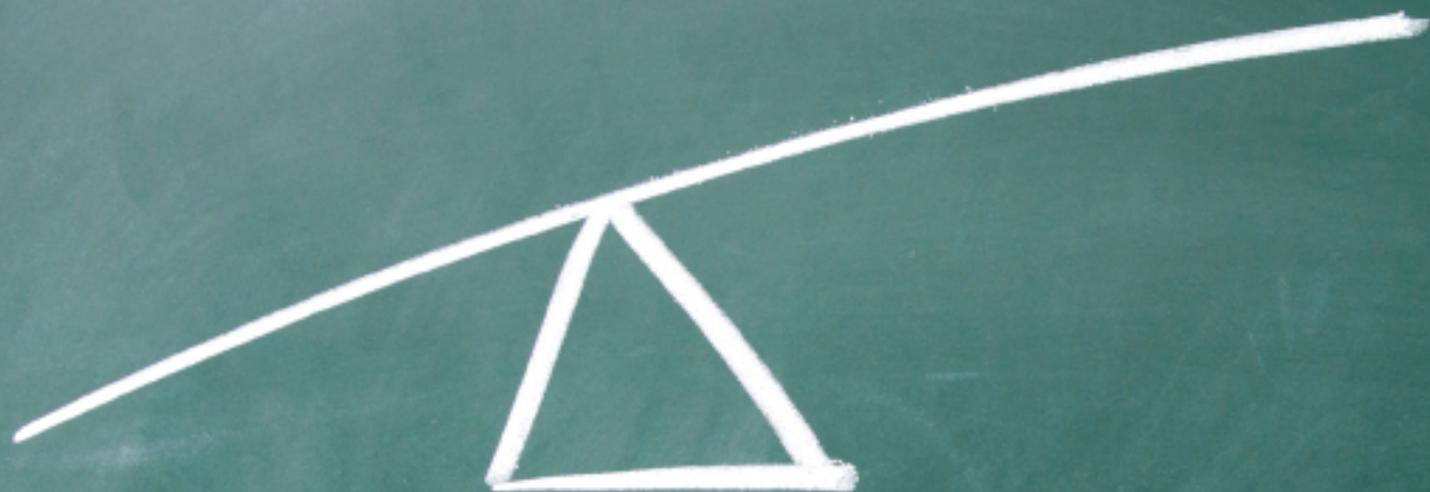
- Sharing project progress

### *Part 2*

- Readings exploration

### *Part 3*

- Conversation with Saeed Arida, NuVu Studio



# Session 9: Metacognition

*November 4*

How do we think about our own thinking?

## Before class

### *Reading*

- Schoenfeld, A.H. (1987). What's all the fuss about metacognition?
- Singer, D., & Revenson, T. (1996). A Piaget primer: How a child thinks (Chapter 1).
- Duckworth, E. (1972). The having of wonderful ideas.

### *Making*

- Prepare project update, round 3

### *Reflecting*

- Respond to reflection questions on course site

## During class

### *Part 1*

- Sharing project progress

### *Part 2*

- Readings exploration

### *Part 3*

- TBA



# Session 10: Looking back

*November 18*

What have we learned?

What questions are still to be explored

## **Before class**

### *Reading*

- Dewey, J. (1938). Experience and education (Chapter 5).

### *Making*

- Revisit personal learning essay from first week

### *Reflecting*

- Respond to reflection questions on course site

## **During class**

### *Part 1*

- Reflecting

### *Part 2*

- Reflecting

### *Part 3*

- Reflecting



# Session 11: Celebrating

*December 2*

What have we learned?

What do we want to share with others?

## Before class

*Reading*

- N/A

*Making*

- Develop a short presentation about your project

*Reflecting*

- N/A

## During class

*Part 1*

- Presenting final projects

*Part 2*

- Presenting final projects

*Part 3*

- Presenting final projects



# Credits

## **Pages 1, 25**

Source: Projects from the Scratch online community

## **Pages 3, 5, 21, 27, 41, 45**

Source: Photos by Michelle Chung

## **Page 13**

Source: [http://sethgodin.typepad.com/seths\\_blog/2014/01/how-to-draw-an-owl.html](http://sethgodin.typepad.com/seths_blog/2014/01/how-to-draw-an-owl.html)

## **Page 18**

Source: <http://www.viruscomix.com/page523.html>

## **Page 23**

Source: Photo by anonymous, quote from Friedensrich Hundertwasser

## **Page 29**

Source: Reproduction of sketch by research participant

## **Page 31**

Source: <http://nigelholmes.com/graphic/two-mindsets-stanford-magazine/>

## **Page 33**

Source: Creative Commons logo

## **Pages 35, 39**

Source: istockphoto

## **Page 37**

Source: <https://twitter.com/MYSADCAT/status/503213873910931457>

## **Page 43**

Source: Photo by Lisa Hiton from T-550 2013