Design, Making and Creativity
(or please pass the polymaths)

Mark D Gross
ATLAS Institute
University of Colorado Boulder
cleverness, genius, imagination, imaginativeness, ingenuity, inspiration, inventiveness, originality, resourcefulness, talent, vision
**MAKE**

Transitive verb

1. a: obsolete. BEHAVE, ACT
   
2. a: to cause to happen to or be experienced by someone. <made trouble for us>

**CREATE**

Transitive verb

1. a: to bring into existence <God created the heaven and the earth — Genesis 1:1 (Authorized Version)>
   
2. a: to invest with a new form, office, or rank <was created a lieutenant>

Intransitive verb

1. to make or bring into existence something new

2. to set up a scoring opportunity in basketball <create off the dribble>

See create defined for English-language learners »
See create defined for kids »
to make is to create

(learning) to make is (learning) to create

so: can we learn creativity by learning to make?
We have noticed the growing communication among intellectual disciplines that takes place around the computer.

We have welcomed it, because it has brought us into contact with new worlds of knowledge—has helped us combat our own multiple-cultures isolation.

This breakdown of old disciplinary boundaries has been much commented upon, and its connection with computers and the information sciences often noted.

Herb Simon
(Science of Design)
Sciences of the Artificial 1969
The ability to communicate across fields—the common ground—comes from the fact that all who use computers in complex ways are using computers to design or to participate in the process of design.

Consequently we as designers, or as designers of design processes, have had to be explicit as never before about what is involved in creating a design and what takes place while the creation is going on.
DIGITAL FABRICATION

Blending new and old methods of manufacture, students in this course used a laser cutter, plastic casting and molding, 3-D printing, and a machine shop in a series of eight exercises and a term project that explored the design space of new ways of making things.

top row; Color-changing LED lamp—Grace Whang; Perforated sculptures — Sam Espada

second row: Handmade zoetrope — Michelle Lopez; Metal Construction Kit — Adam Lackett

third row: Laser-cut paper hoop skirt — Lea Albaugh; Plastic/magnet construction kit—John Thornton; Laser cut wood gear toy — Stephanie Fonticoba

bottom row: Paper lamp — Jeff Bourke; Undulating surface — John Thornton
MAKING THINGS INTERACT(ive)

An interdisciplinary project course at CMU attracts students from diverse disciplines from first-year undergraduates to PhD candidates. Students learn basic analog electronics, microcontroller programming, simple mechanical design. They exercise these skills through a series of assignments, followed by an open-ended term project that results in a working physical prototype.

top row: Air Chair senses body temperature and cools when needed — Mark Manzke (Architecture); Rideable Hexabot robot — Rich Pantaleo (Mechanical Engineering)

second row: Talking Playroom Floor; — Ronit Slyper (Computer Science); Energy kitchen wall shows energy use with color — Andrea Irwin (Design); WireSpy handheld house energy monitor — Ethan Goldman (Civil Engg)

third row: BoomBox color cube seating connects to iPod — Jesse Chorgn and Paul Castellana (Architecture); Sonic Bookshelf as musical instrument — Beste Nazilli & Imran Sobh (Design); E-book reader — Nadeem Haidary (Design)

bottom row: ColorFields GPS goggles color the scene based on location in the city — Tiago Rorke (Design)
things matter
things are no longer just things

things are programmable
the good news ...

people make *amazing* things
choreobots
Charles Doomany, Luke Kambic
the problem:

making “things that think” is harder than it needs to be
construction kits
abstract out the hard stuff
& focus on the important stuff
Hack your kitchen!

the kitsch instrument

with Jiffer Harriman & Michael Theodore
creating computational percussion with Hyunjoo Oh, Abhisheik Narula, Jiffer Harriman
paper mechatronics
with Hyunjoo Oh, Sherry Hsi, Mike Eisenberg
Build Your Own Paper Mechatronics Invention

digital divas @ digital youth network (chicago)
Hyunjoo Oh, Corey Morales, Kris Klipfel, Nicole Pinkard
The most exciting opportunities and powerful insights belong to polymaths who defy conventional disciplinary boundaries and apply expertise developed in one discipline to another.
the robot is the program
ATLAS Institute

ATLAS is an interdisciplinary institute for radical creativity and invention. We inspire research, experimentation and critical thinking that turns ingenious ideas into reality.
ATLAS Institute
University of Colorado Boulder

• Lab for Playful Computation
• Innovative Robotics and Novel Technologies Lab
• Blow Things Up Lab
• National Center Women & Information Technology
• Black Box Experimental Studio

• BS, MS, PhD programs
thank you
come visit
atlas.colorado.edu