

# module 4: conceptual

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conceptual

verbal diet



# conceptual



The only way people will understand--and feel comfortable with--this emerging computerized reality is if they can participate in constructing it, modifying it, and extending it. Computerized reality should not be built only by experts, with everyone else merely interacting with it.

Rather, we need to continue developing new types of construction kits, so everyone can participate in the construction of new computerized realities.



conceptual

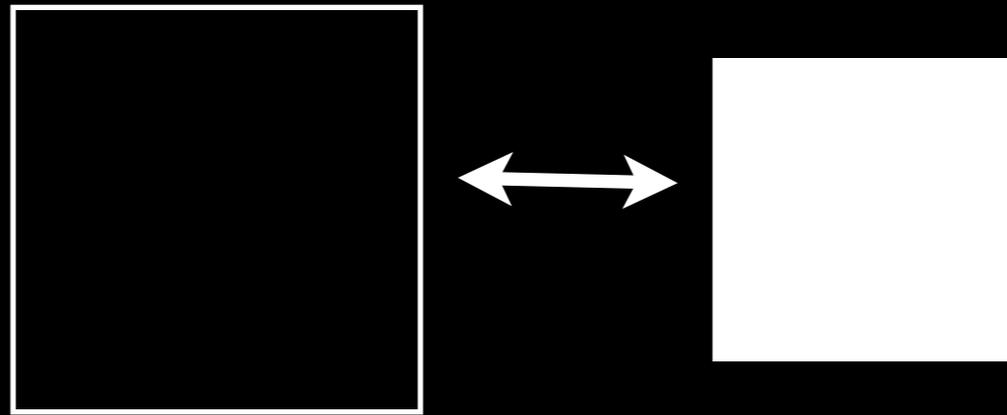
toolkits



toolkits

1. objects exist in the  
world

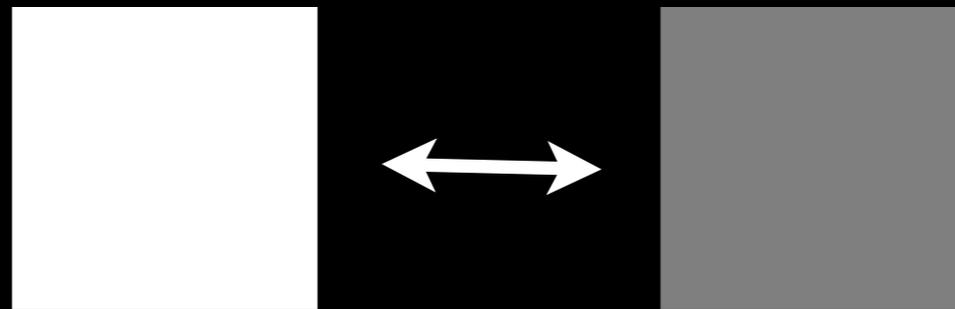
toolkits



toolkits

2. objects have different  
relationships to each  
other

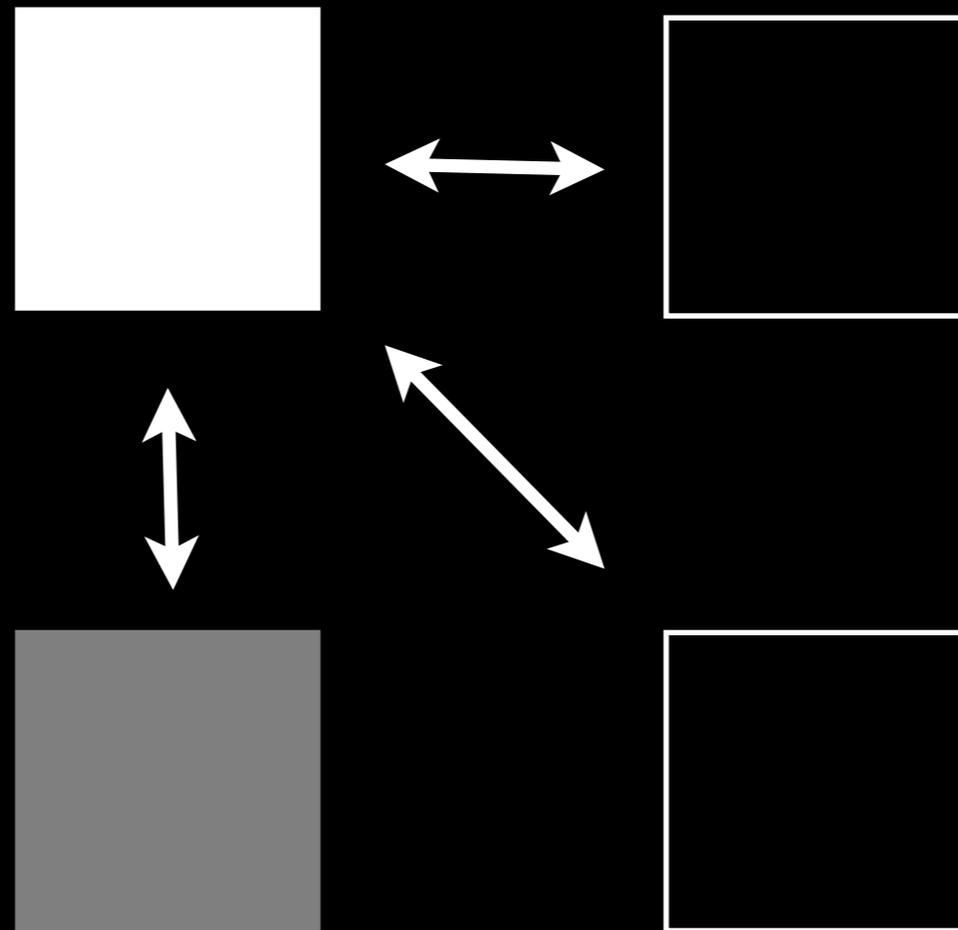
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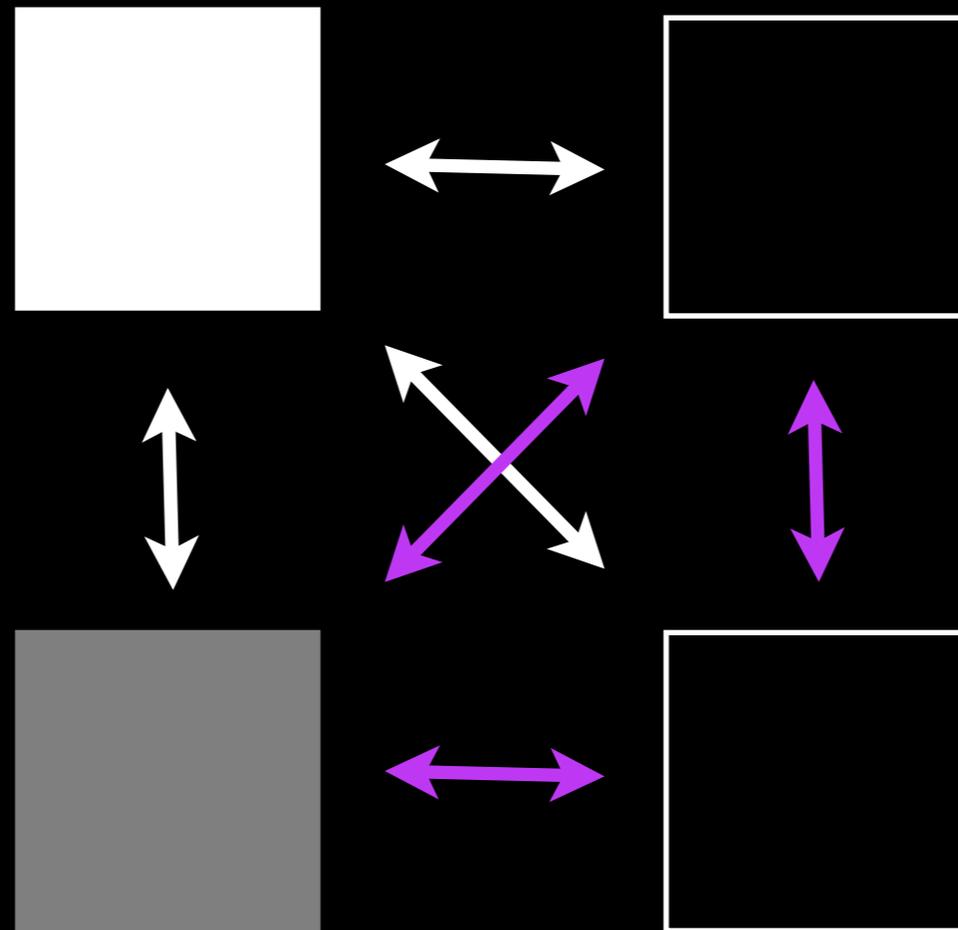
toolkits

3. objects interact with  
each other to form an  
environment

toolkits



# toolkits



toolkits

what does this have  
to do with learning?

toolkits

a brief  
history

# fröbel's gifts

Friedrich Fröbel, early 1800s



the child to use  
his (or her)  
environment as  
an educational  
aid

# fröbel's gifts

Friedrich Fröbel, early 1800s



the child to use  
his (or her)  
environment as  
an educational  
aid

that they will give  
the child an  
indication of the  
connection  
between human  
life and life in  
nature

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nature

that they will  
create a bond  
between the  
adult and the  
child who play  
with them

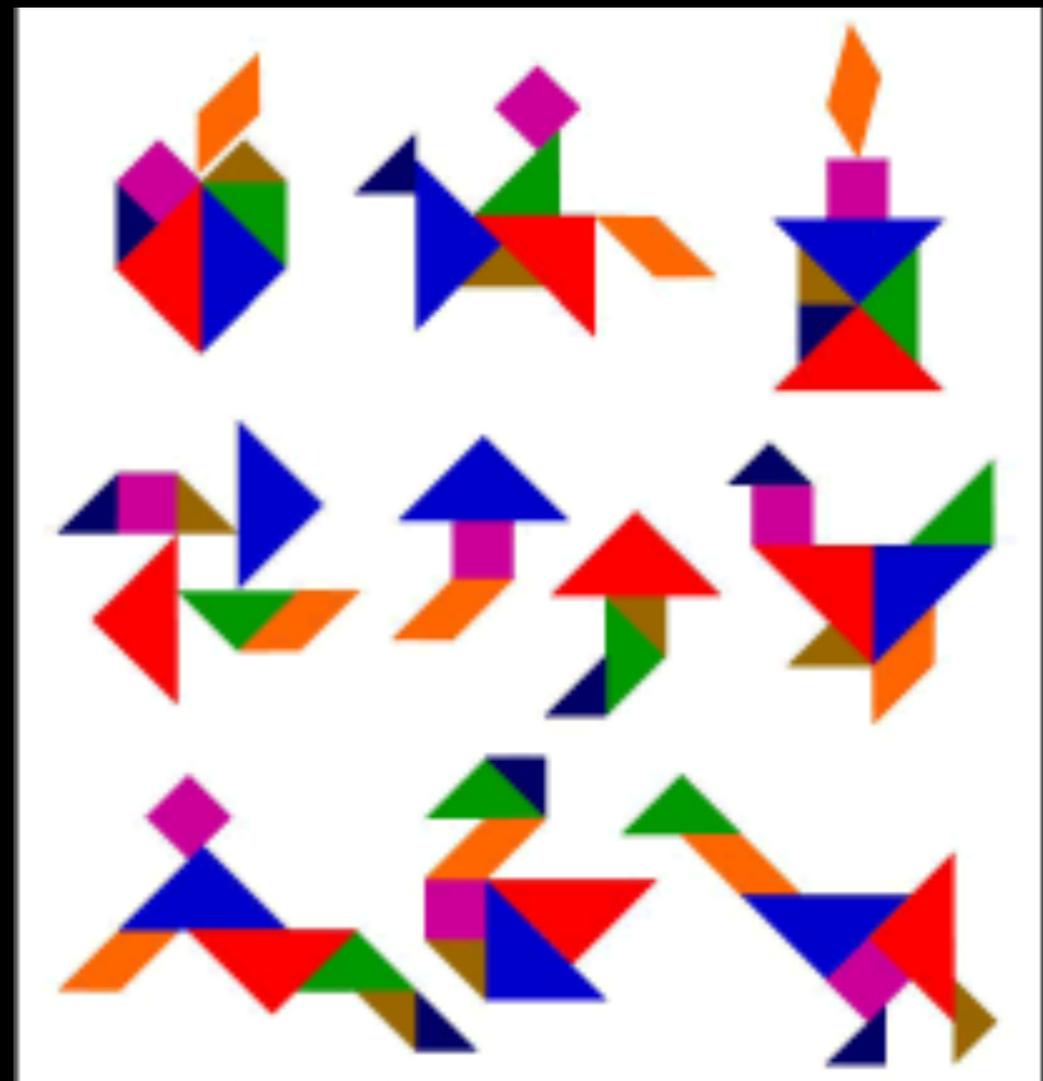
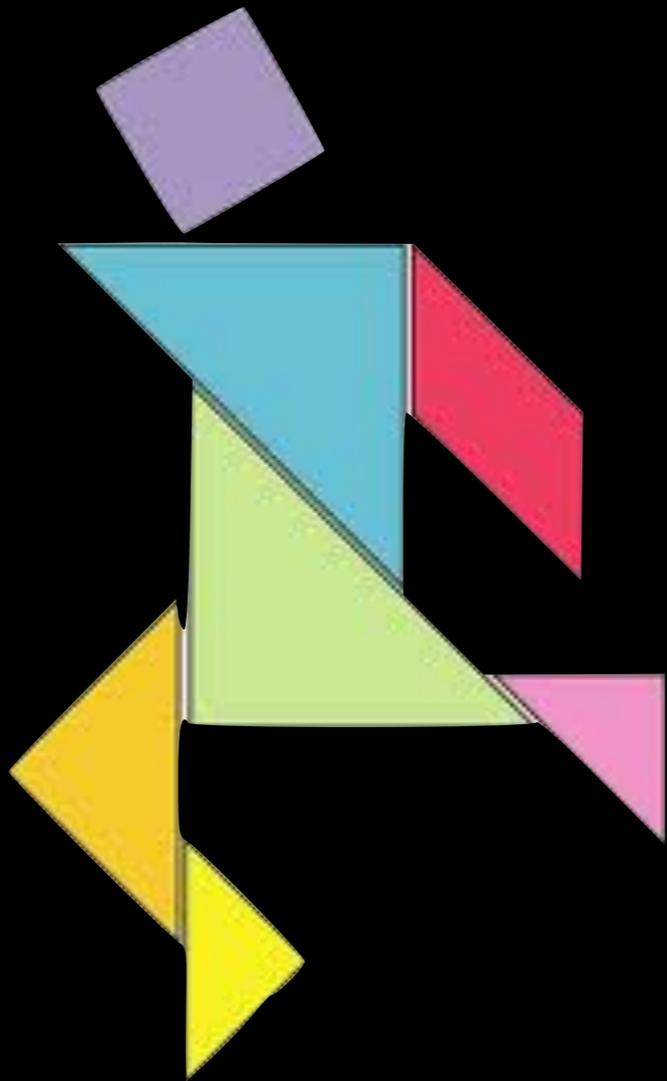
# tangrams

China, brought to Europe in the early 1800s



# tangrams

China, brought to Europe in the early 1800s





# legos

Denmark, 1940s



# lego mindstorms

Seymour Papert



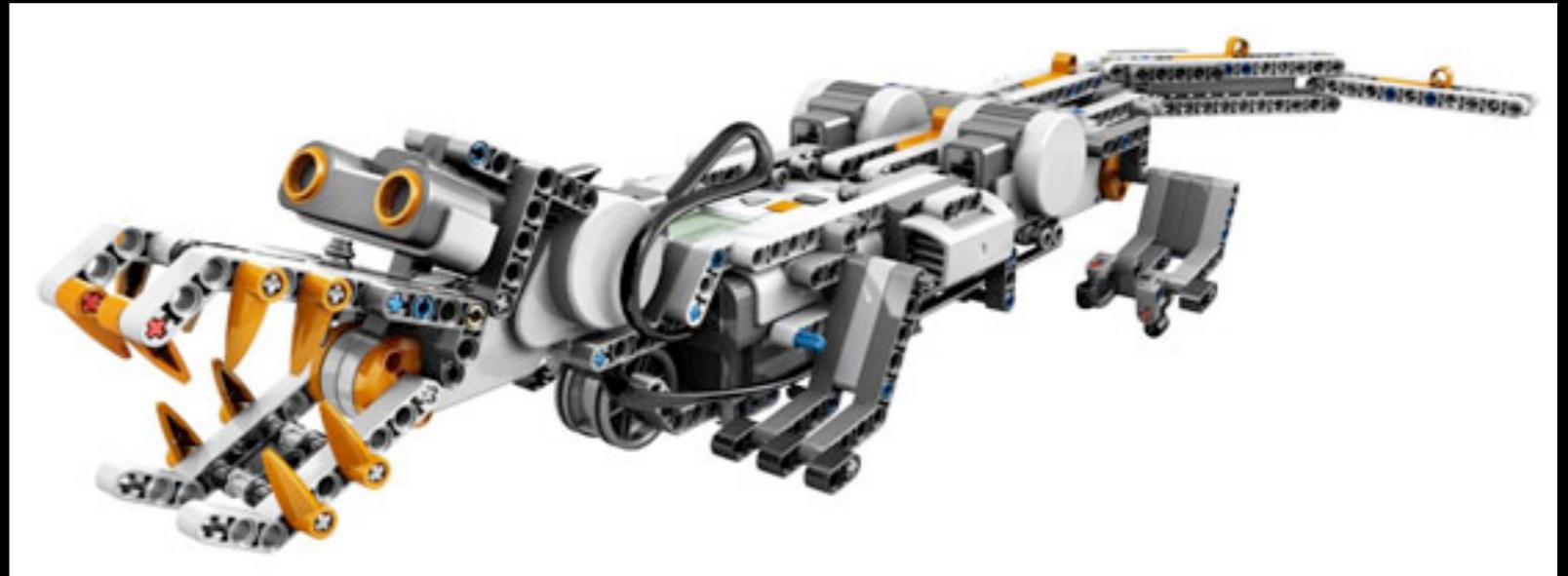
# lego mindstorms

Seymour Papert



# lego mindstorms

Seymour Papert



# scratch

Mitchel Resnick



# cubelets

Eric Schweikardt



Eric Schweikardt and Mark D. Gross, "Learning about Complexity with Modular Robots," in Proceedings of the 2008 Second IEEE International Conference on Digital Game and Intelligent Toy Enhanced Learning (presented at the DIGITEL '08, Washington, DC: IEEE, 2008), 116-123.

# electronic blocks

Peta Wyeth



# sifteo

David Merrill and Jeevan Kalanithi



smart

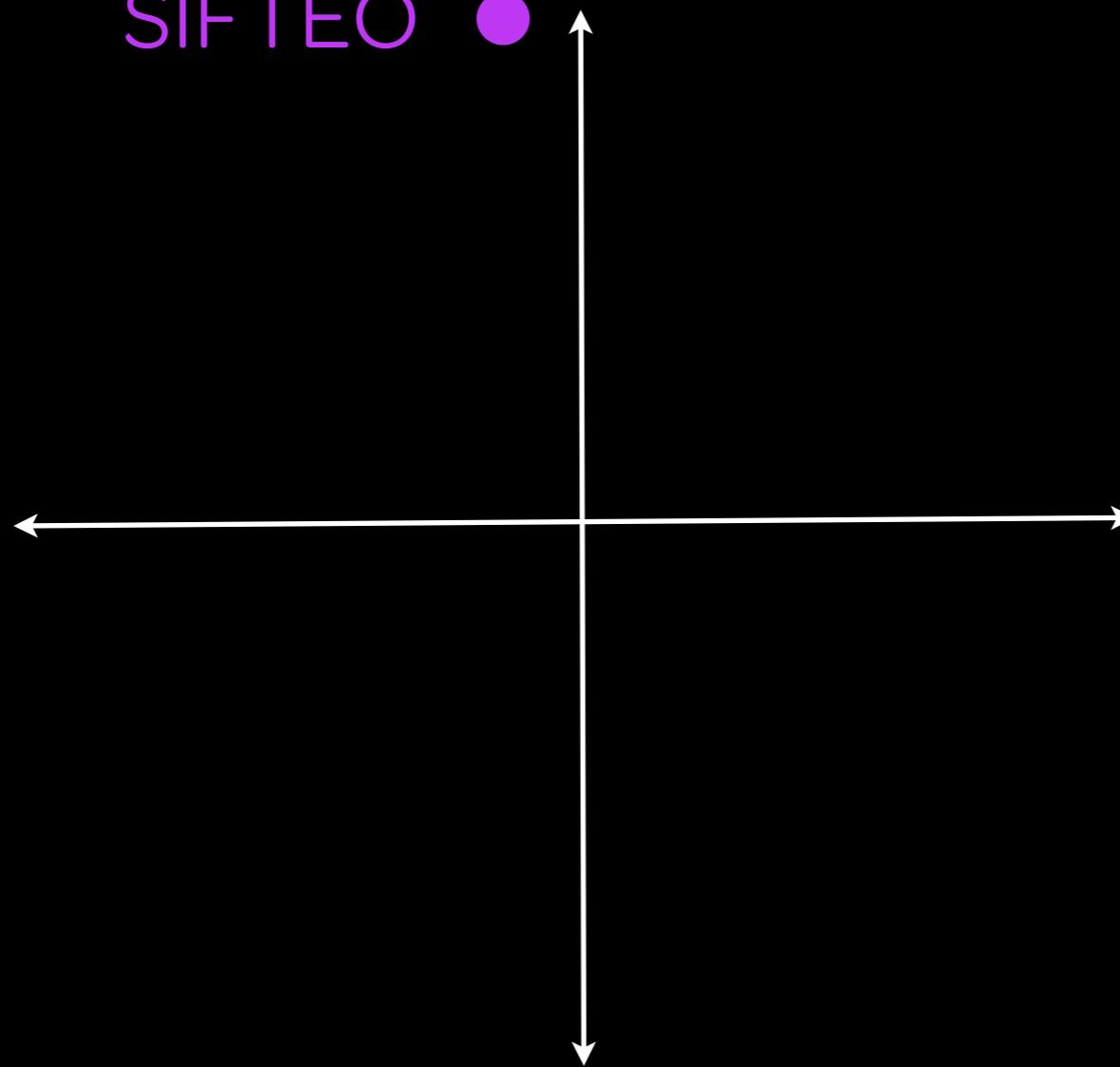
SIFTEO



physical

digital

passive



smart

MINDSTORMS

SCRATCH

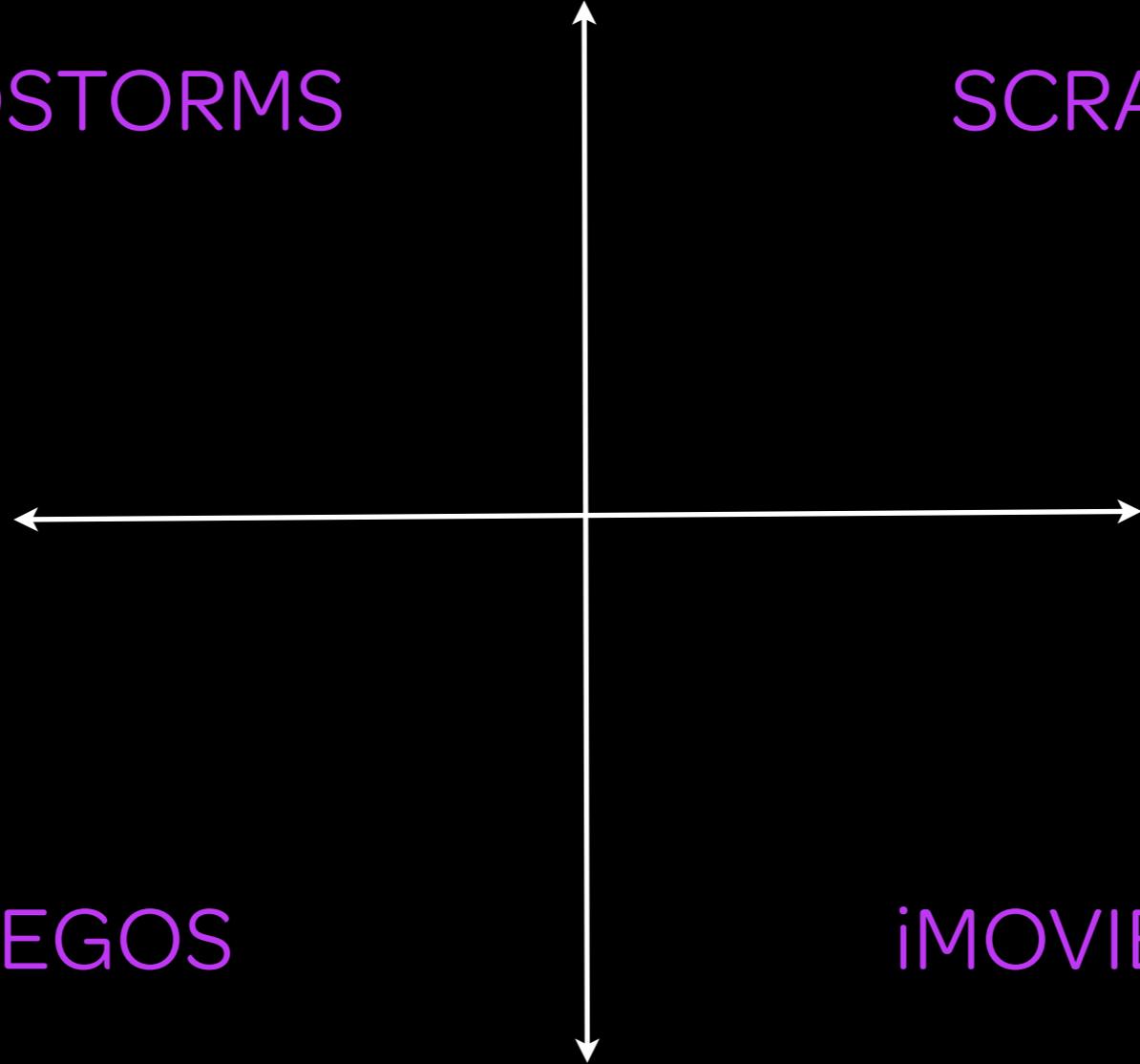
physical

digital

LEGOS

iMOVIE

passive

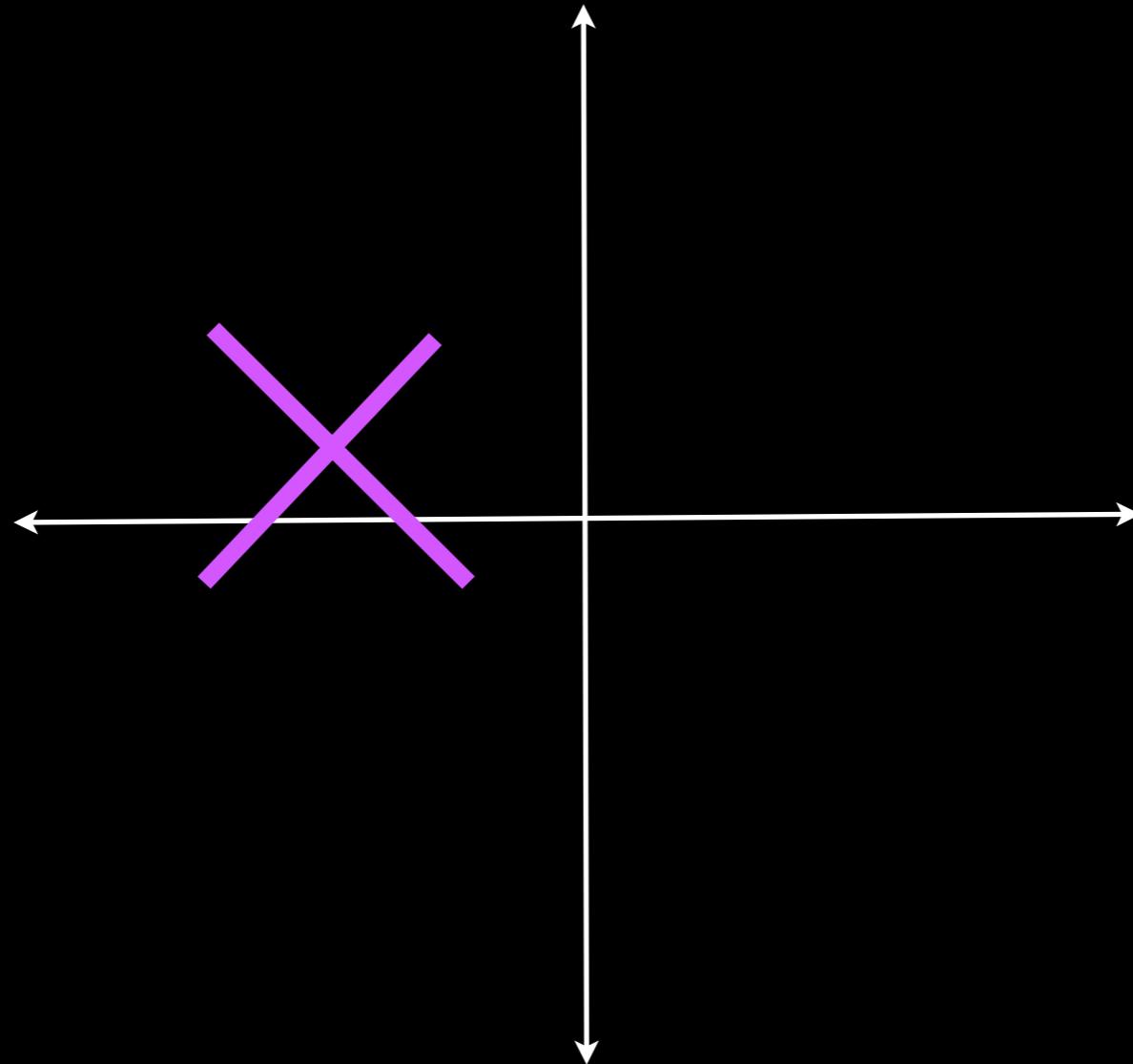


smart

physical

digital

passive



# toolkits



# toolkits



Mitchel Resnick and Brian Silverman, "Some Reflections on Designing Construction Kits for Kids," in Proceedings of Conference on Interaction Design and Children (presented at the Interaction Design and Children, Boulder, Colorado: ACM Press, 2005), 117-122.

Image Source: <http://aboutus.lego.com/en-us/pressroom/ProductNews.aspx?y=276303&l=200071&n=317031>

# question

APPLICATION

how much can you reveal  
and still stimulate  
emergent, creative  
problem-solving?

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# short circuit

WORKSHOP 1 = RAGING FAILURE

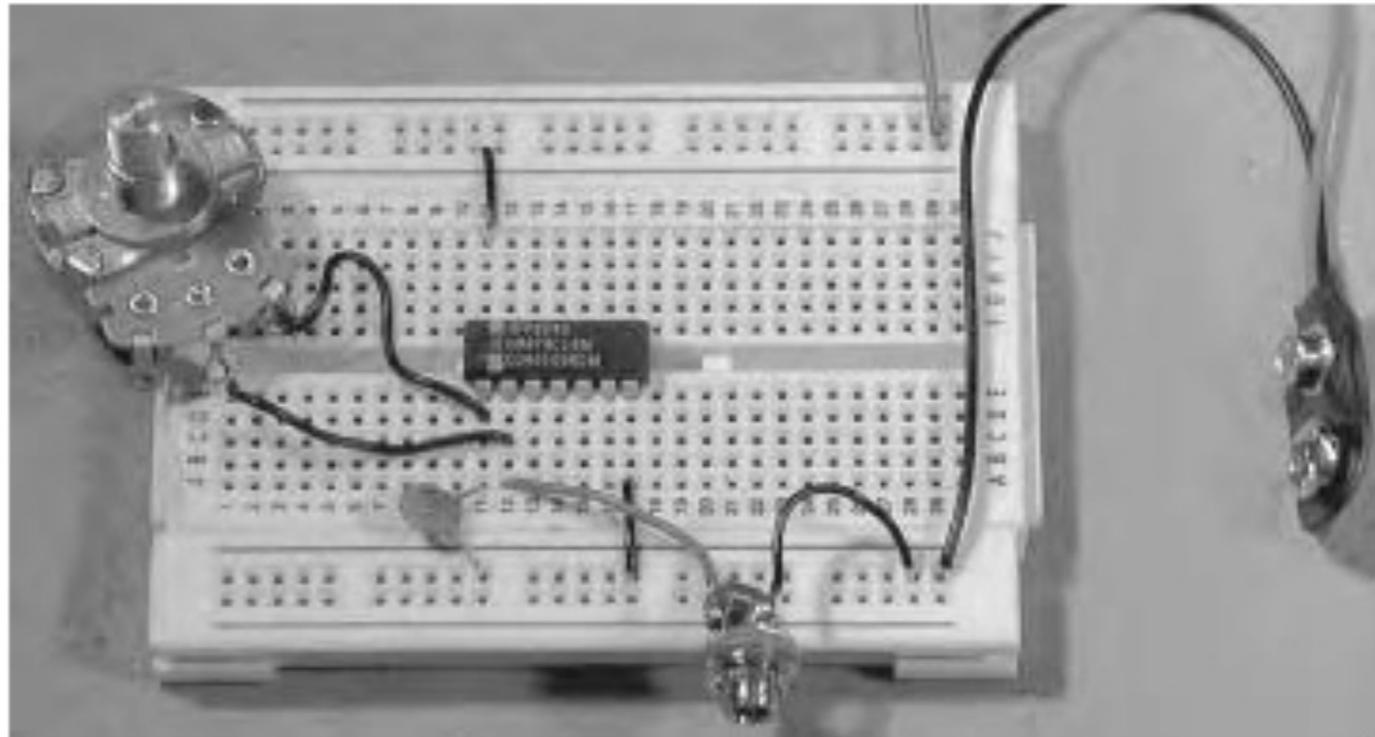
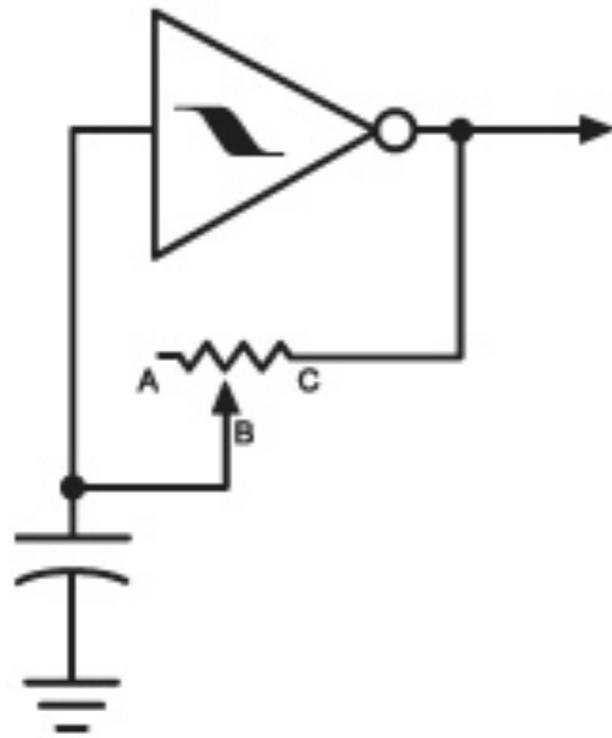
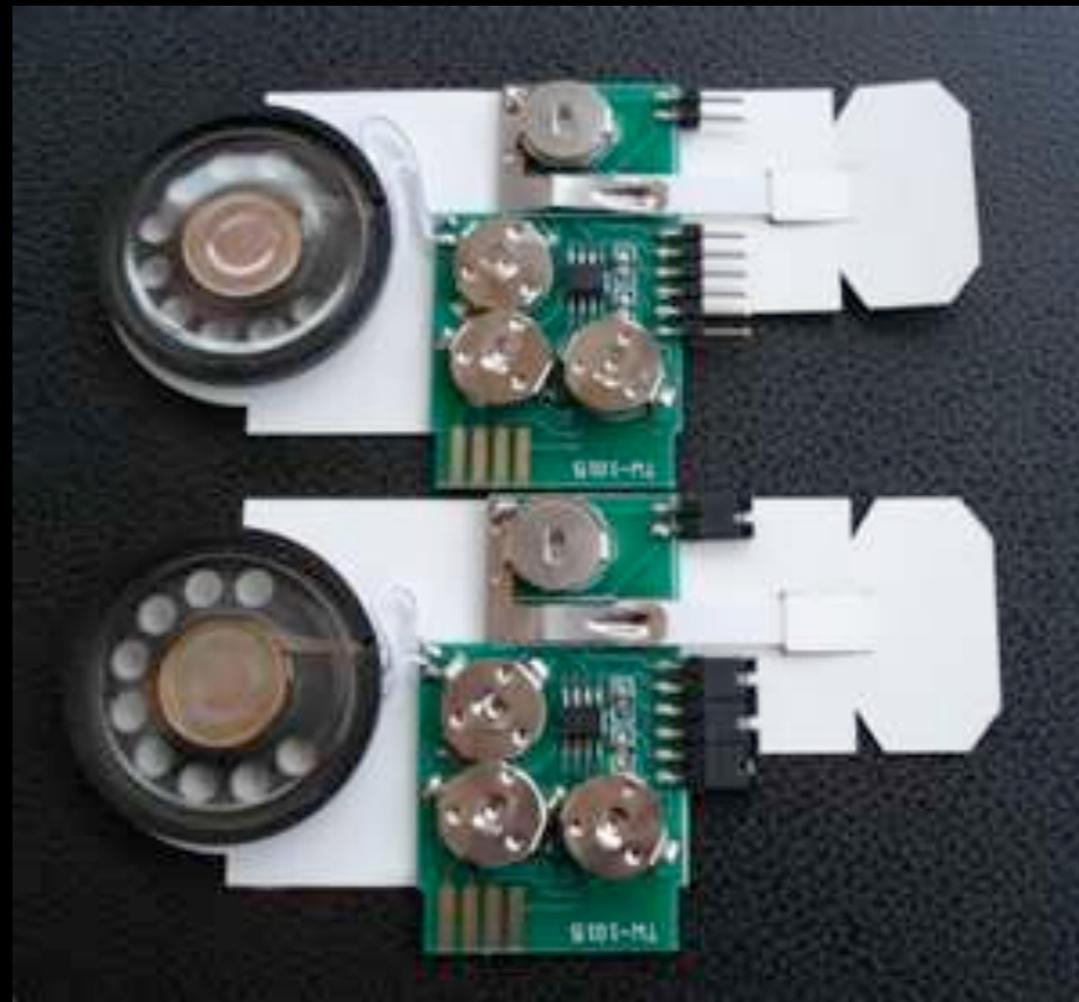


Figure 18.9 Potentiometer-controlled oscillator: schematic and photo.

# short circuit

WORKSHOP 2 = RAGING SUCCESS



# toolkits

““

This type of activity might qualify as “hands-on learning” or “learning-by-doing,” but it is not what we mean by “learning-through-designing.” Our goal is to develop technologies that not only engage kids in constructing things, but also encourage (and support) them to explore the ideas underlying their constructions.

””

# short circuit

WORKSHOP 2 = RAGING SUCCESS



conceptual

“powerful idea” of toolkits

lessonstaken

“powerful idea” of toolkits

emergence

lessonstaken

there is a fine line between  
too much and too little  
structure

lessonstaken

the white  
box

so what?

thank you!

