September 27, 2012
Open Hardware Summit, Eyebeam, NYC

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Louisa Campbell, Joe Saavedra, Liza Stark, Liz Taylor

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SCRAPYARD CHALLENGE Jr.

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Adapting an Art and Design Workshop to Support STEM to STEAM Learning Experiences

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SCRAPYARD CHALLENGE Jr. OVERVIEW

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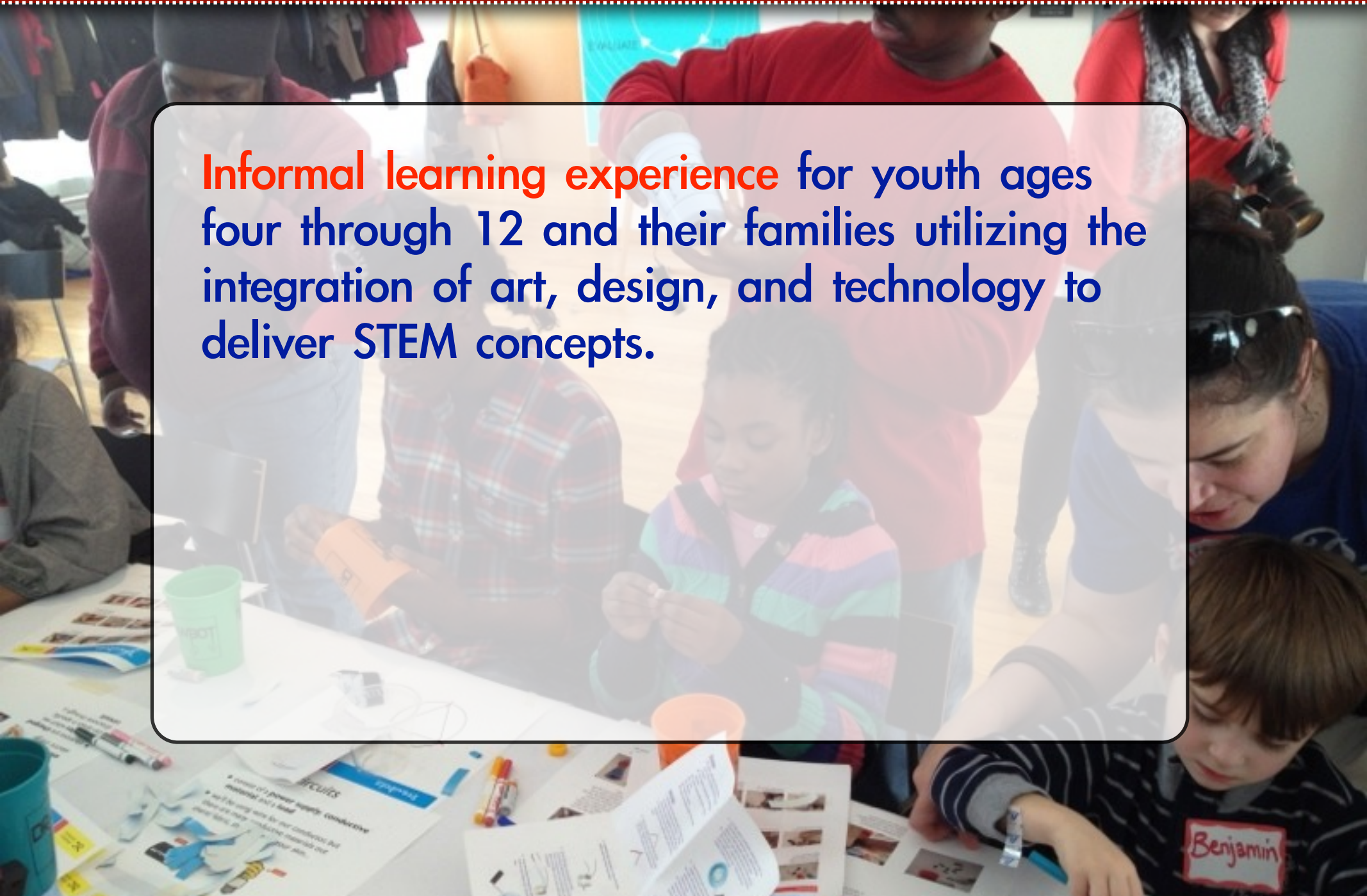

Informal learning experience for youth ages four through 12 and their families utilizing the integration of art, design, and technology to deliver STEM concepts.

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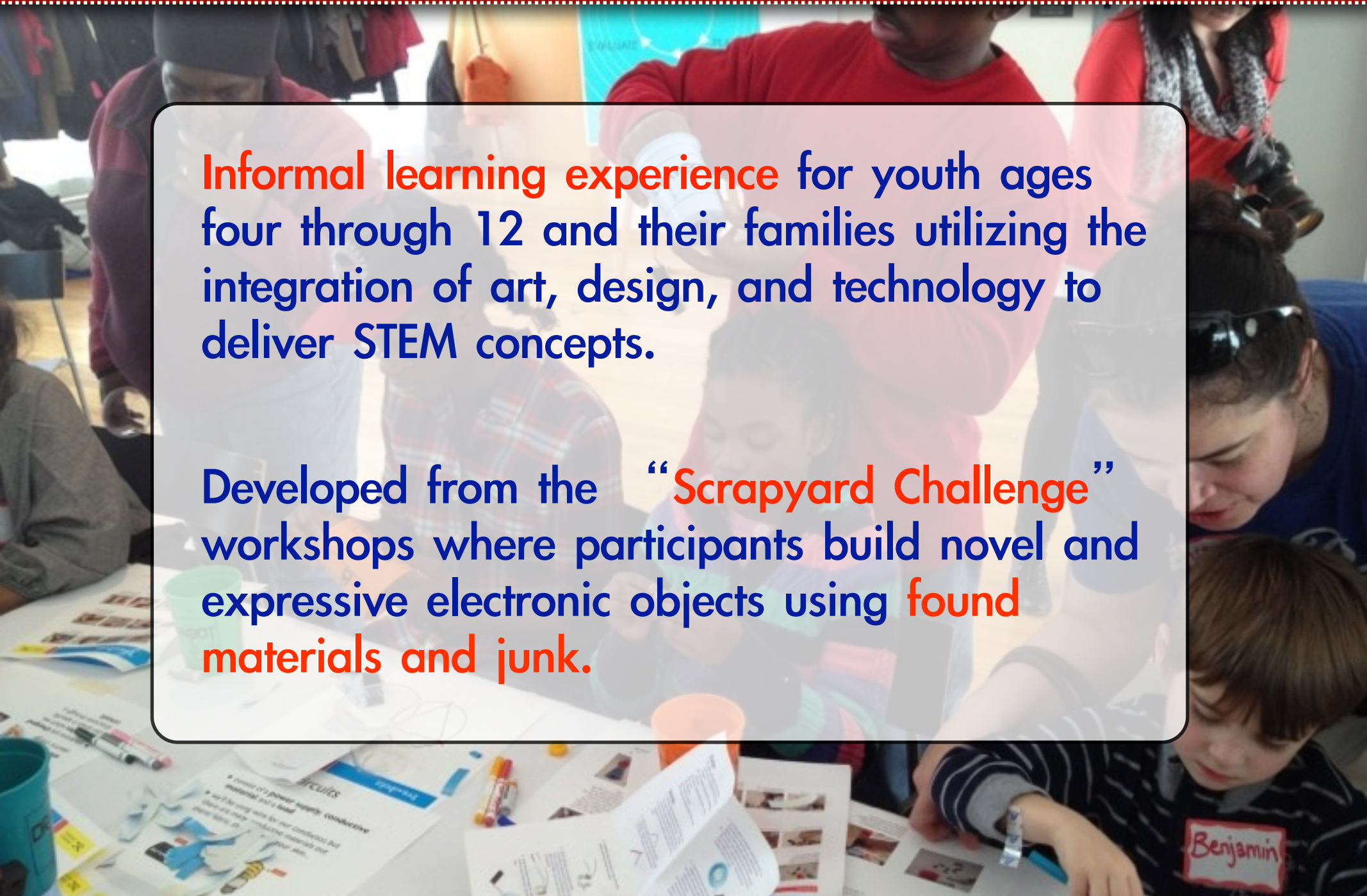

Informal learning experience for youth ages four through 12 and their families utilizing the integration of art, design, and technology to deliver STEM concepts.

Developed from the "Scrapyard Challenge" workshops where participants build novel and expressive electronic objects using found materials and junk.

BACKGROUND:
SCRAPYARD CHALLENGE WORKSHOPS

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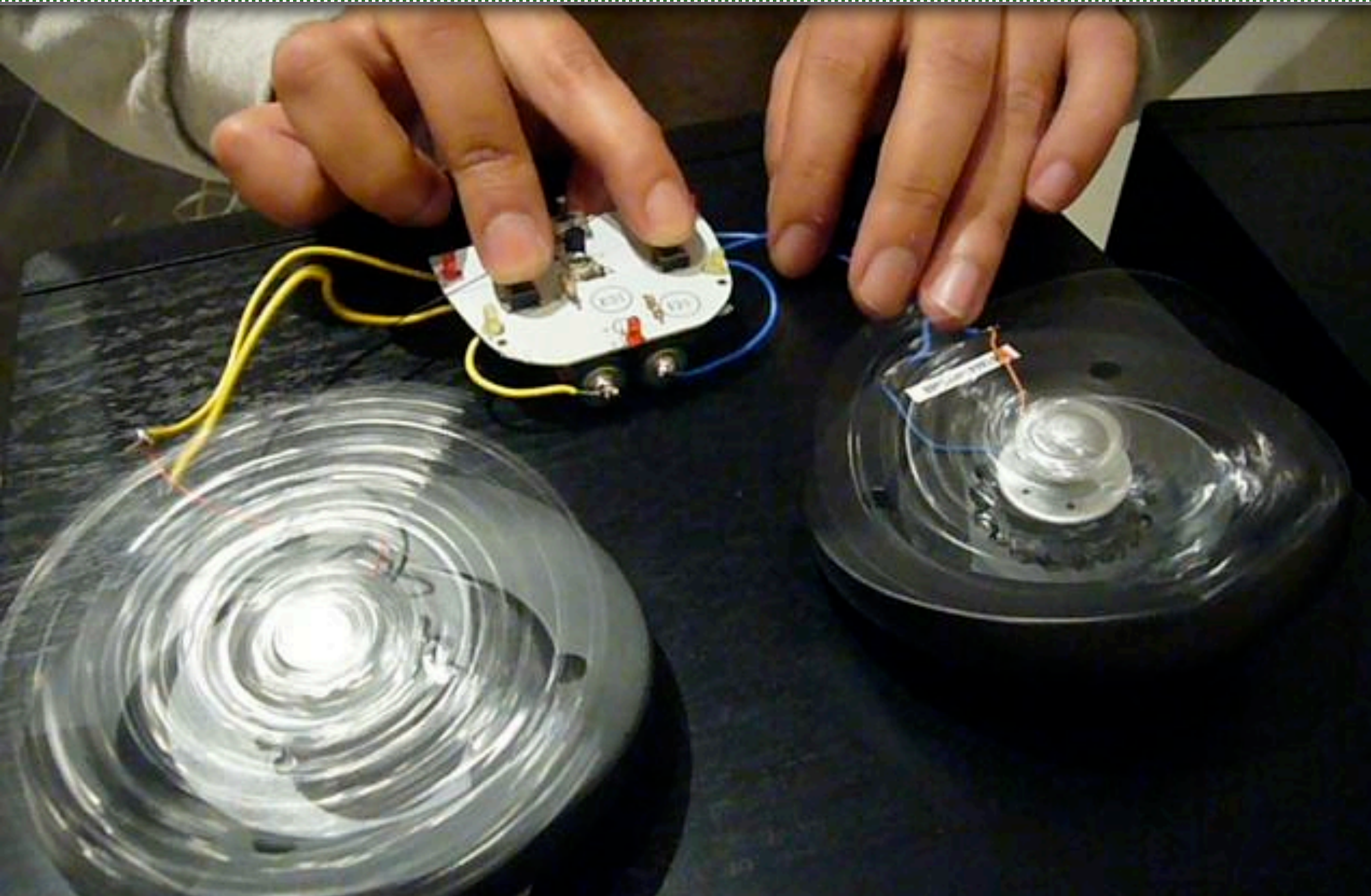
Since 2003, the Scrapyard Challenge workshops have been held 55 times in 14 countries across the 5 continents of Europe, South America, North America, Asia, and Australia.

BACKGROUND: SCRAPYARD CHALLENGE



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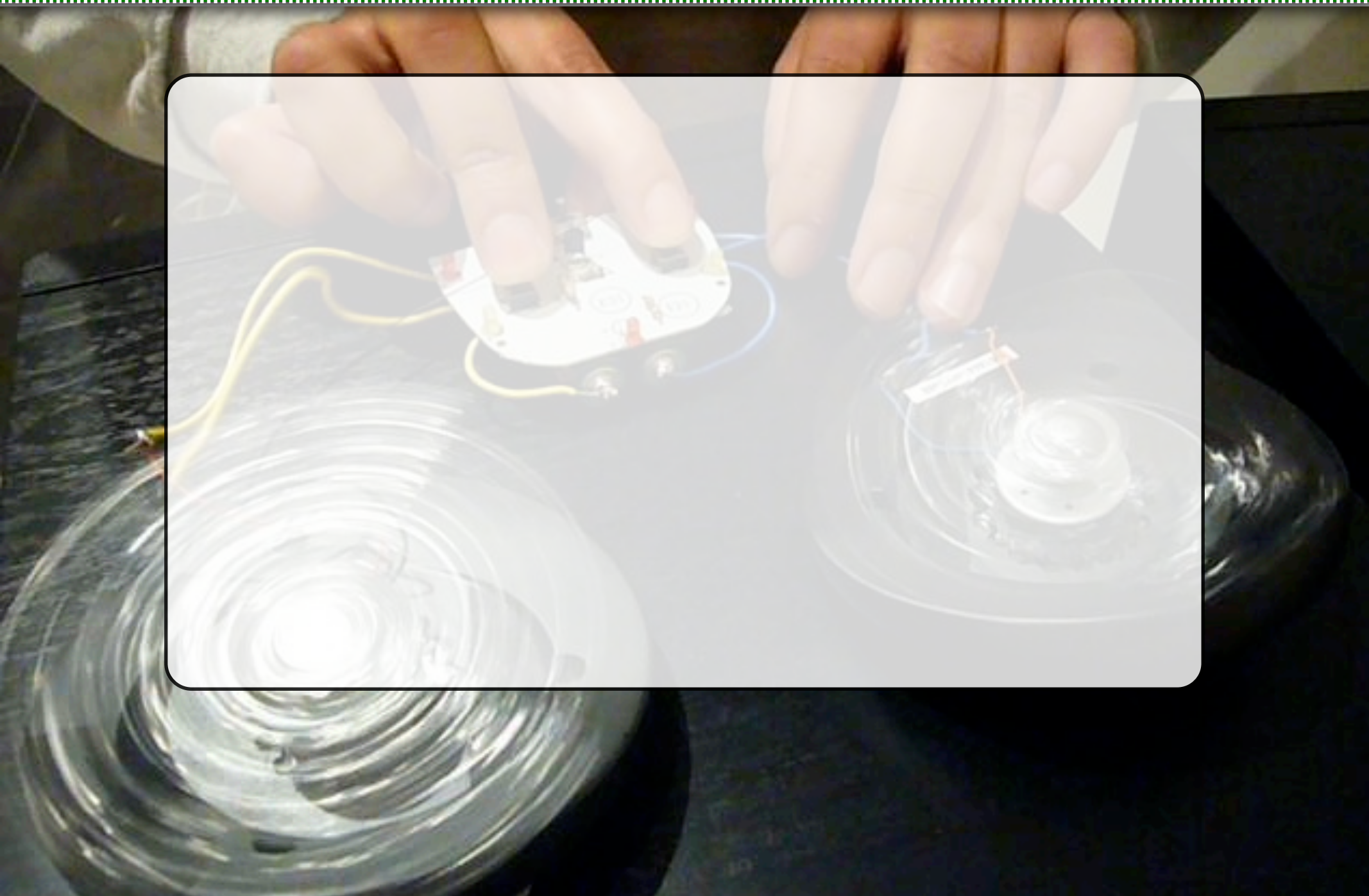

BACKGROUND: SCRAPYARD CHALLENGE

Scrapyard Challenge was created to teach basic electronic principles and interaction design to non-technical audiences.

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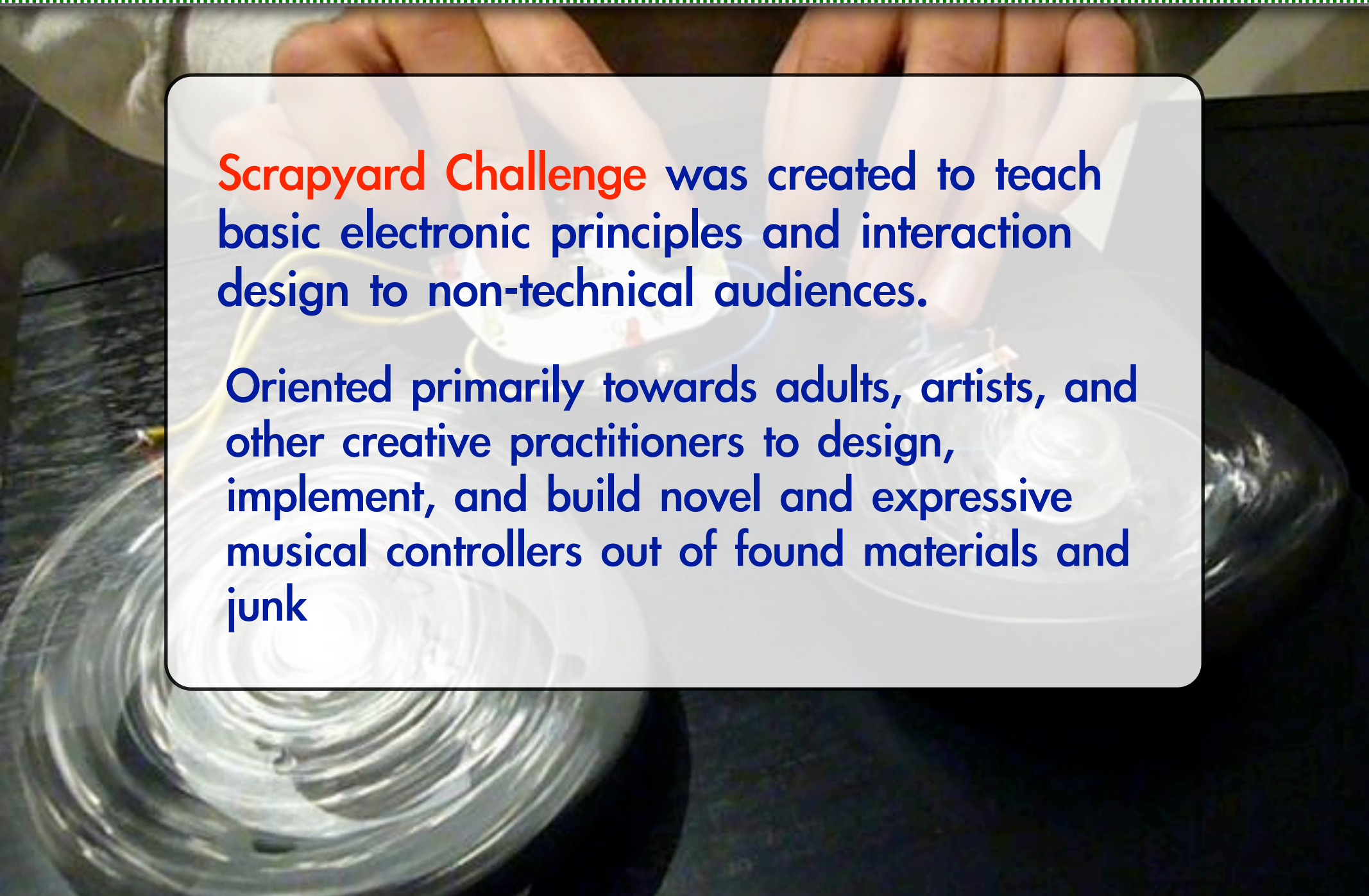

Scrapyard Challenge was created to teach basic electronic principles and interaction design to non-technical audiences.

Oriented primarily towards adults, artists, and other creative practitioners to design, implement, and build novel and expressive musical controllers out of found materials and junk

SCRAPYARD CHALLENGE: MOTIVATION

Typical Workshop Table

Amsterdam, 2006

SCRAPYARD CHALLENGE: MOTIVATION

DEMOCRATIZATION OF TECHNOLOGY

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DEMOCRATIZATION OF TECHNOLOGY

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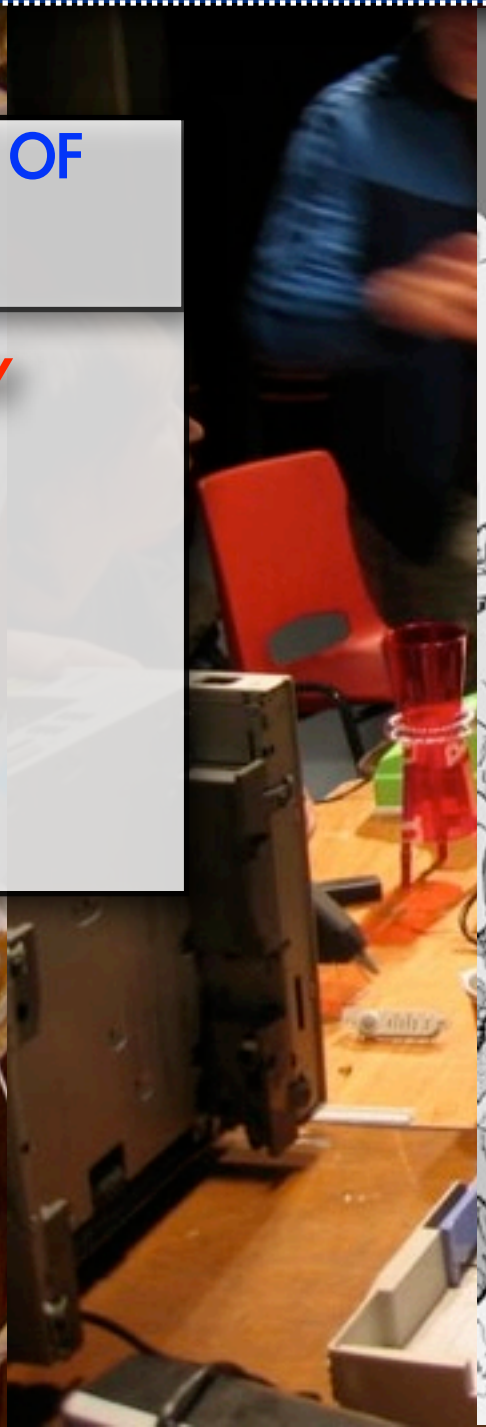

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DEMOCRATIZATION OF TECHNOLOGY

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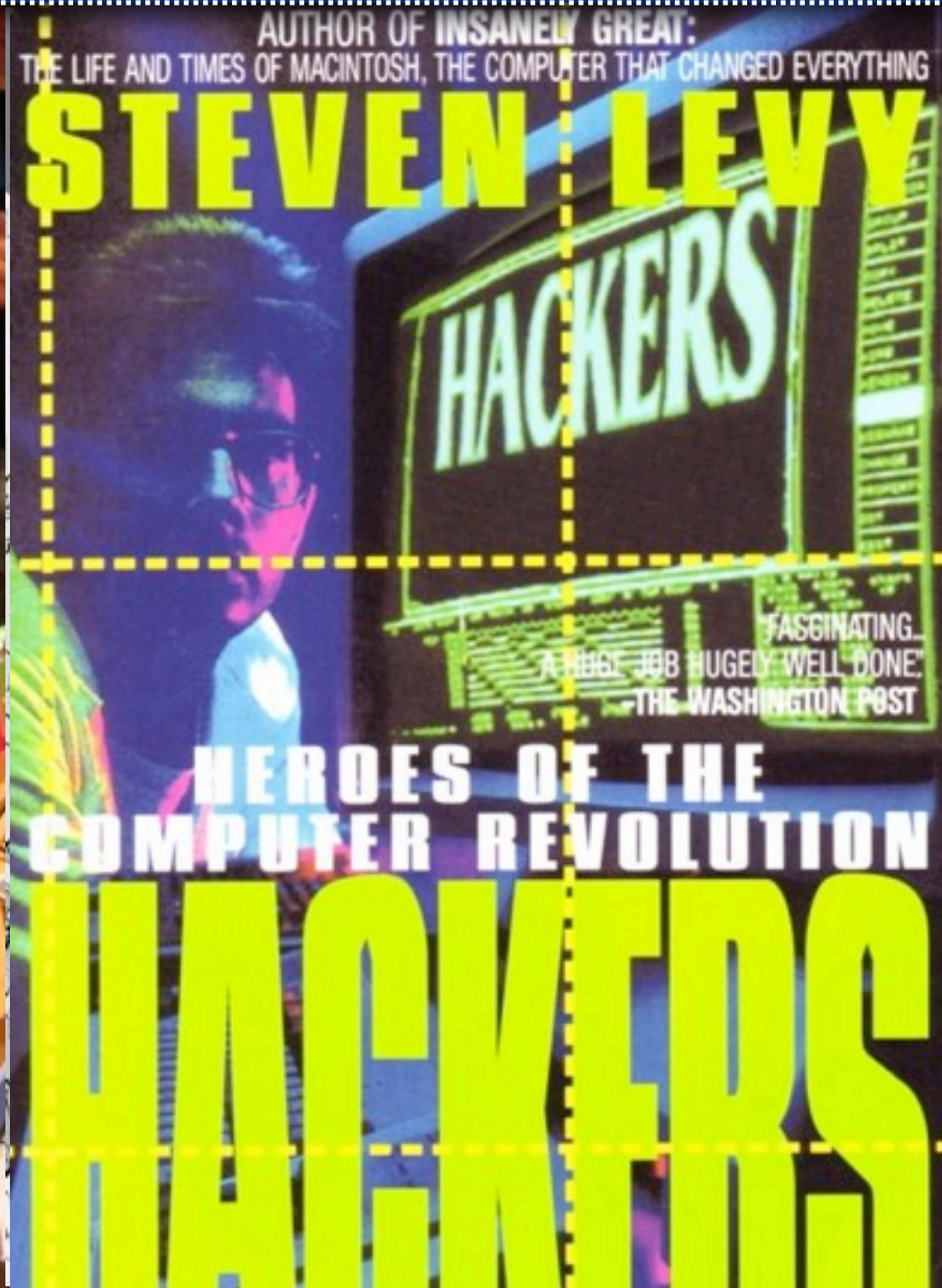
HACKING



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DEMOCRATIZATION OF TECHNOLOGY

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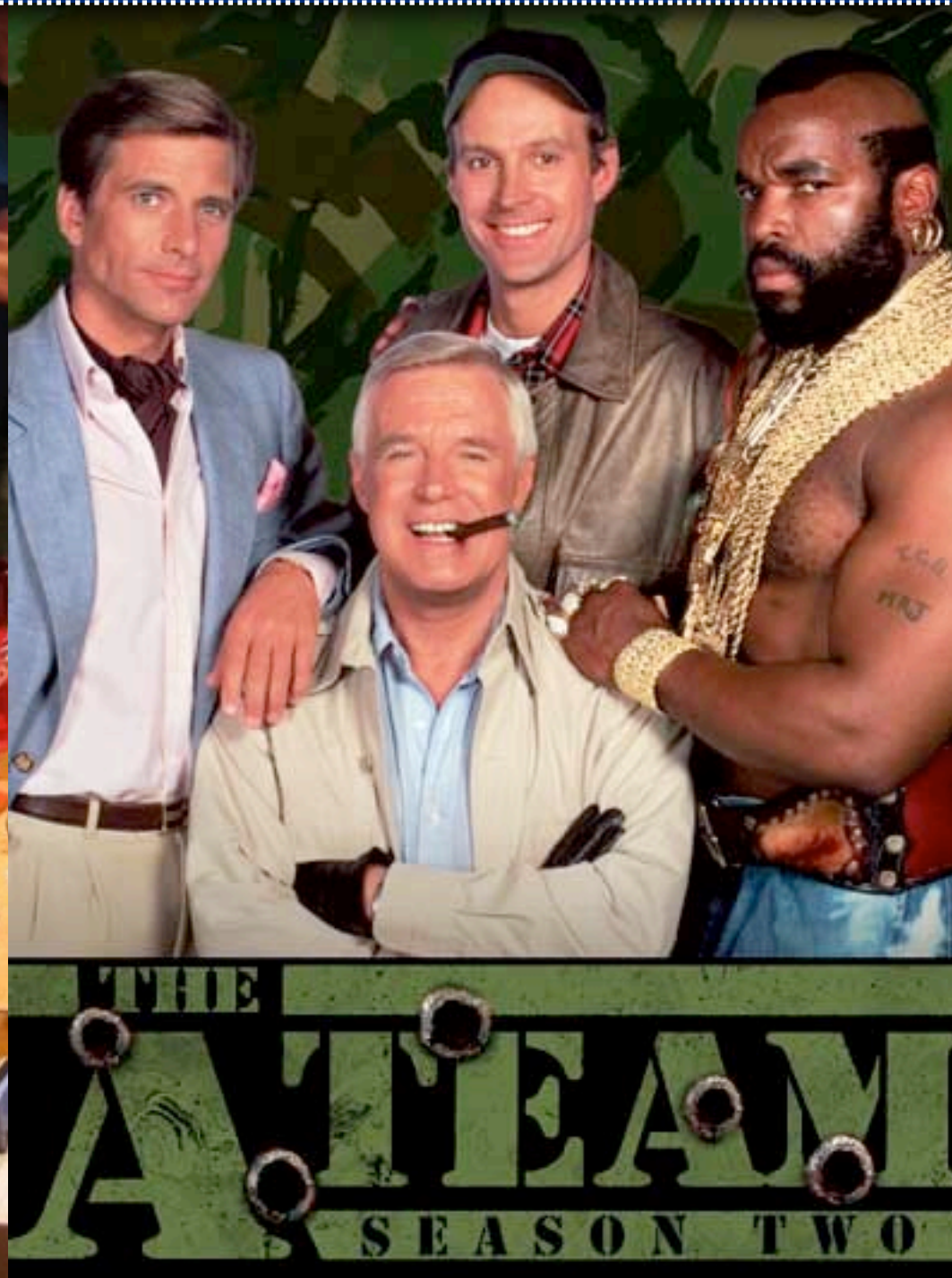
HACKING

POPULAR CULTURE



SCRAPYARD CHALLENGE: MOTIVATION

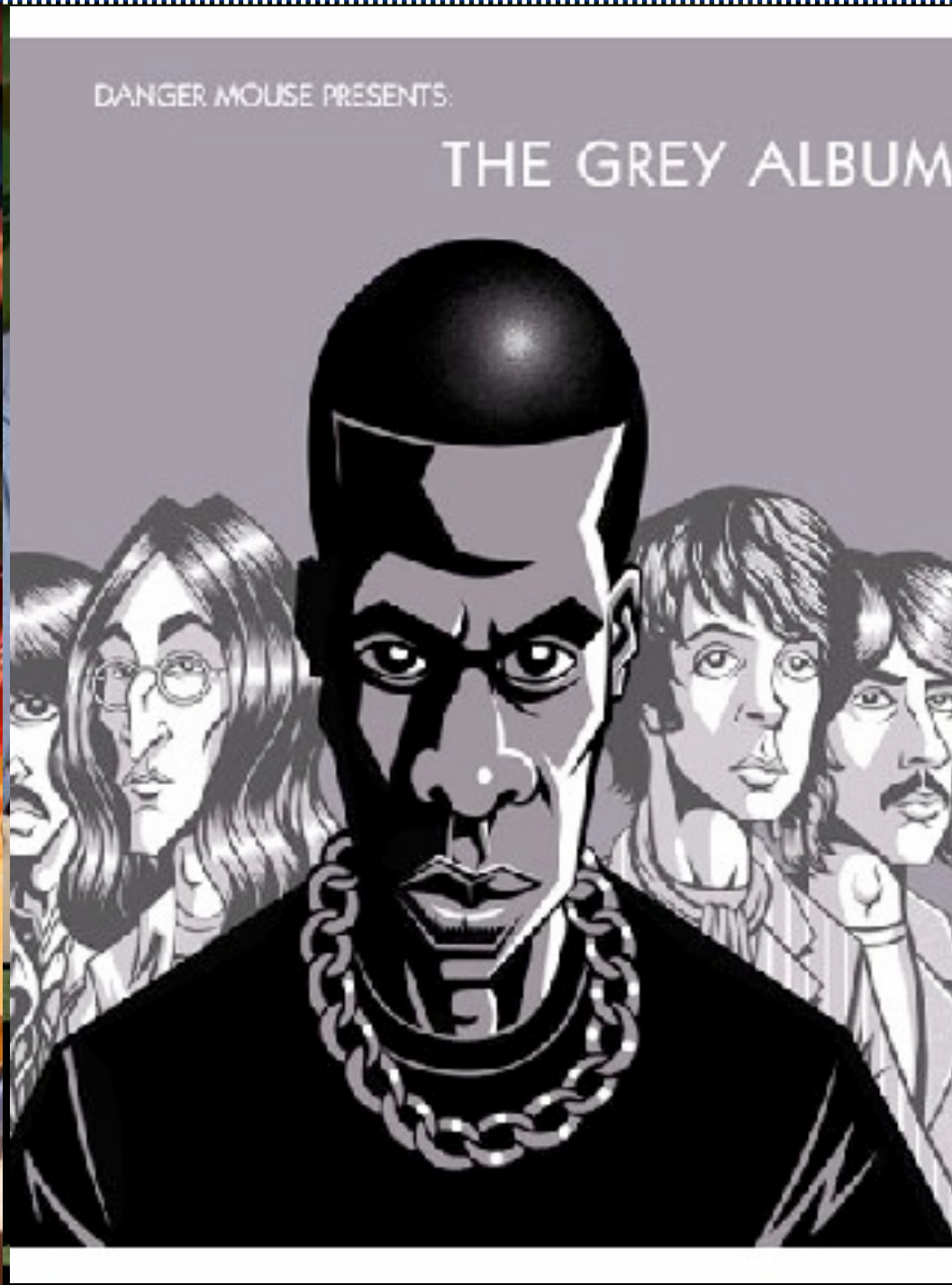
DEMOCRATIZATION OF TECHNOLOGY

DO IT YOURSELF: DIY

HACKING

POPULAR CULTURE

REMIX CULTURE



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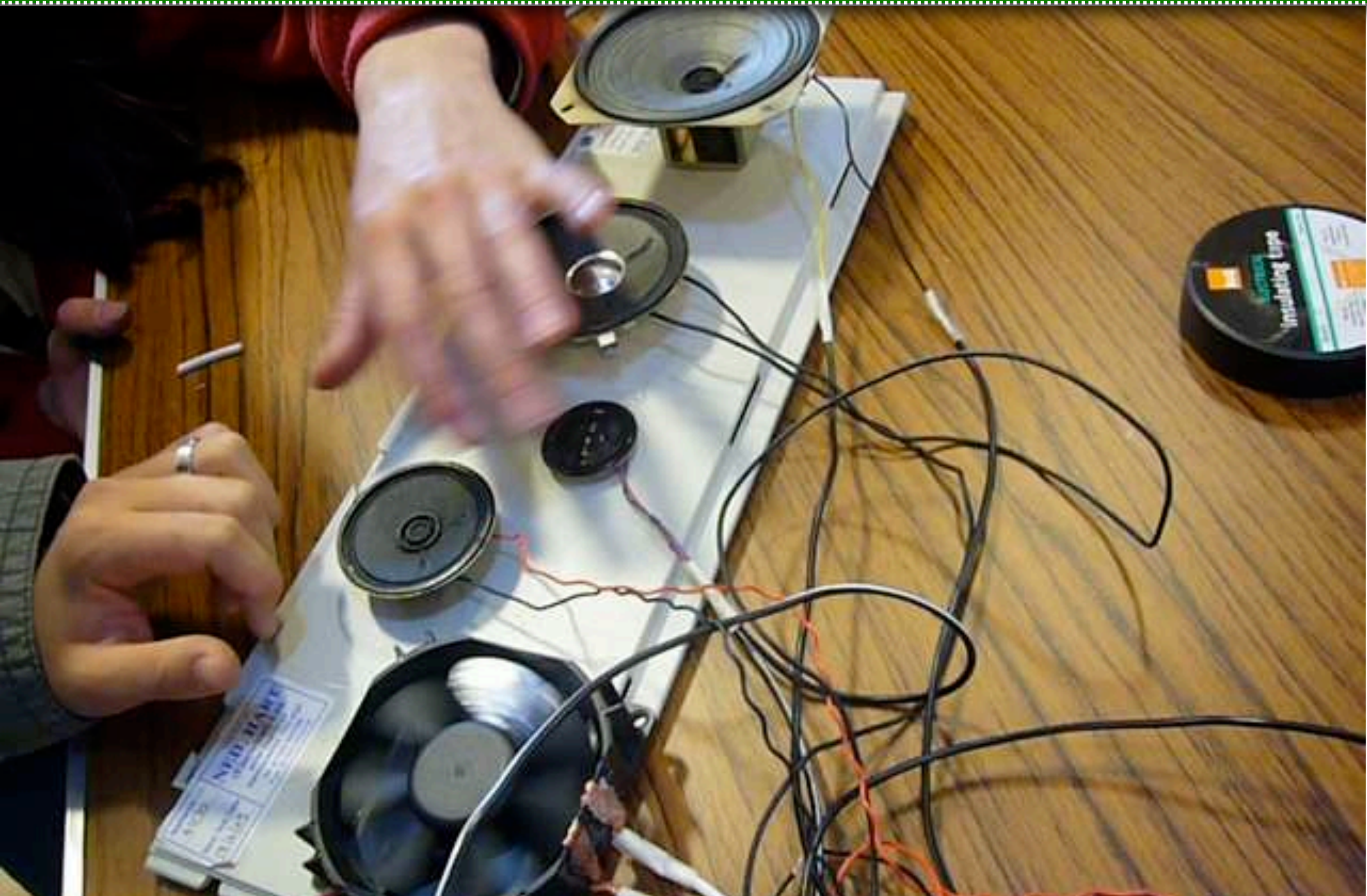

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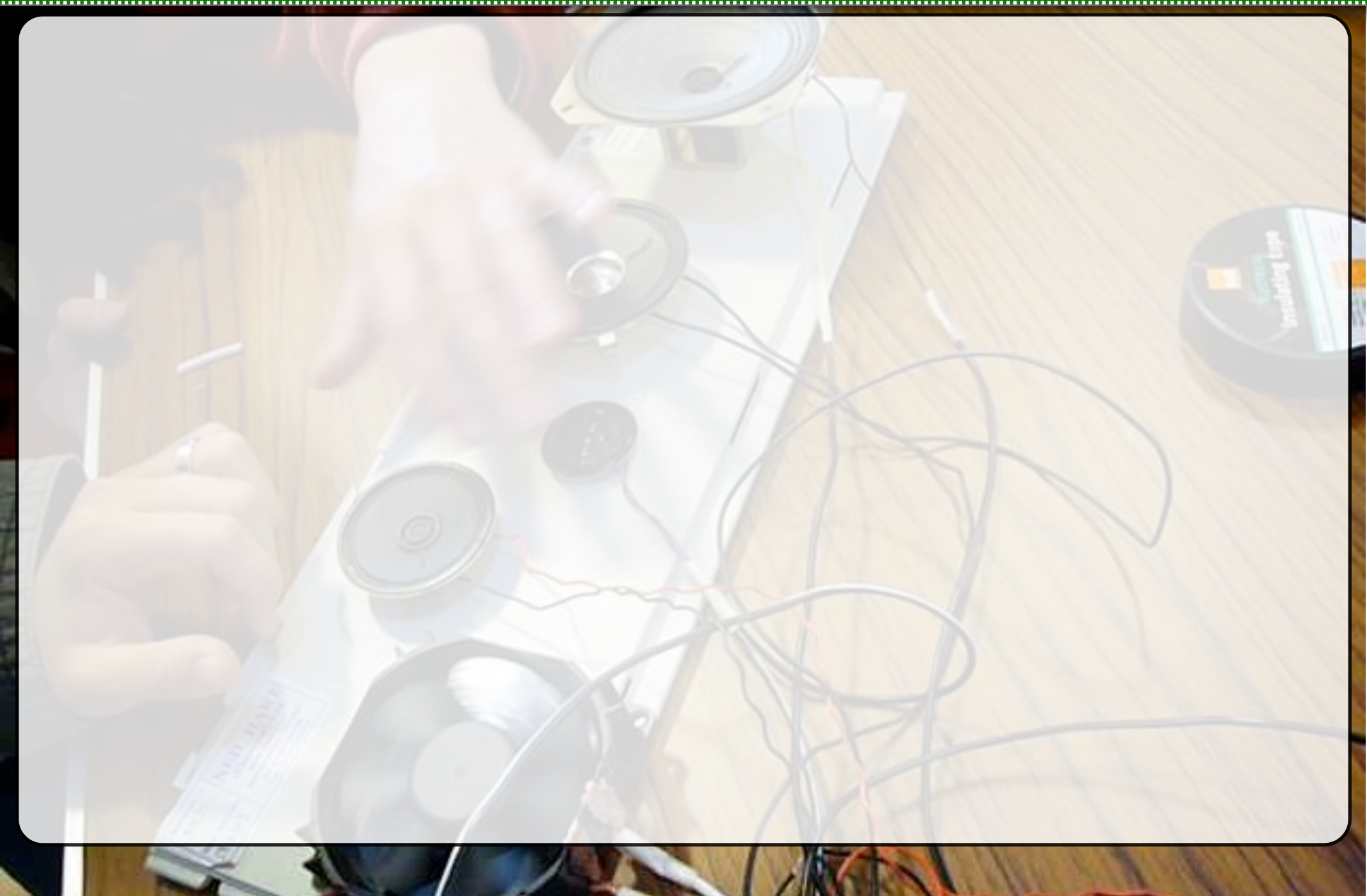

BACKGROUND: SCRAPYARD CHALLENGE

LIMITED TIME FRAME

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urgency,

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urgency, improvisation,

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urgency, improvisation, shared experience

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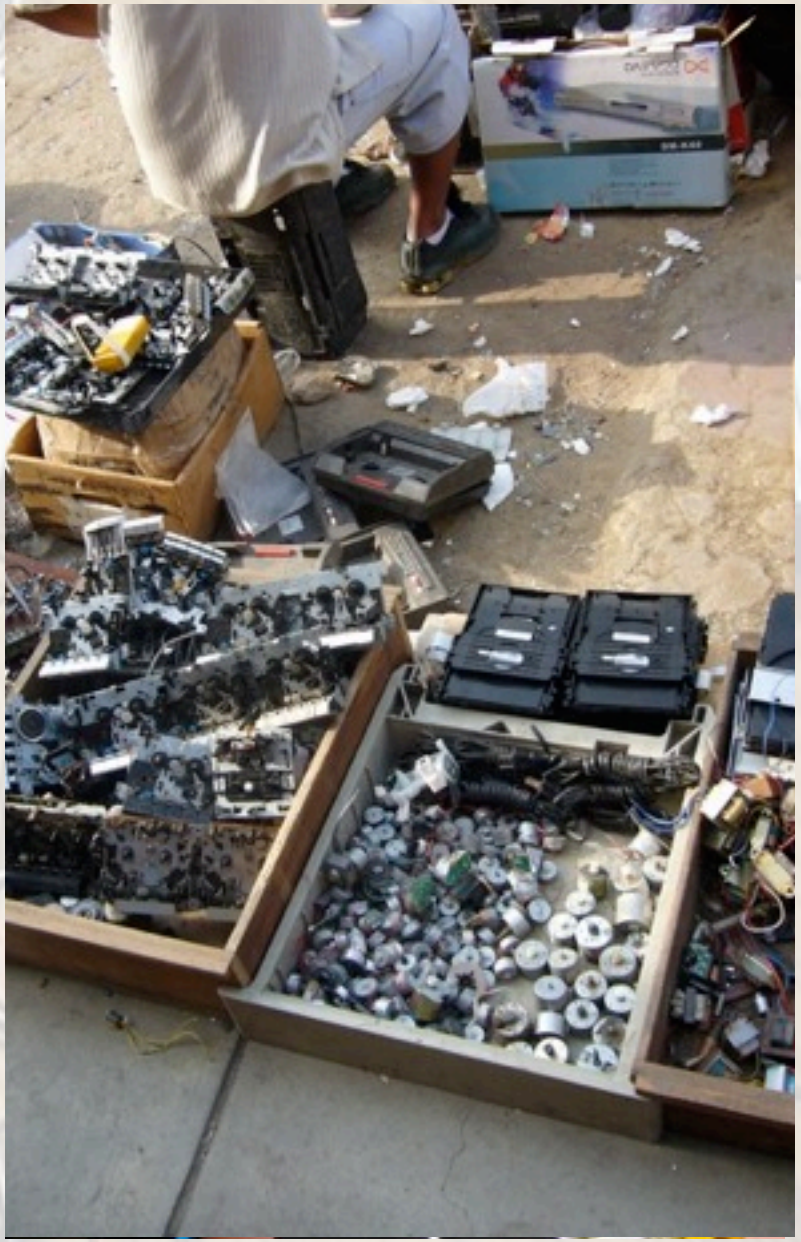
UNPREDICTABLE MATERIALS



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cheap sources!

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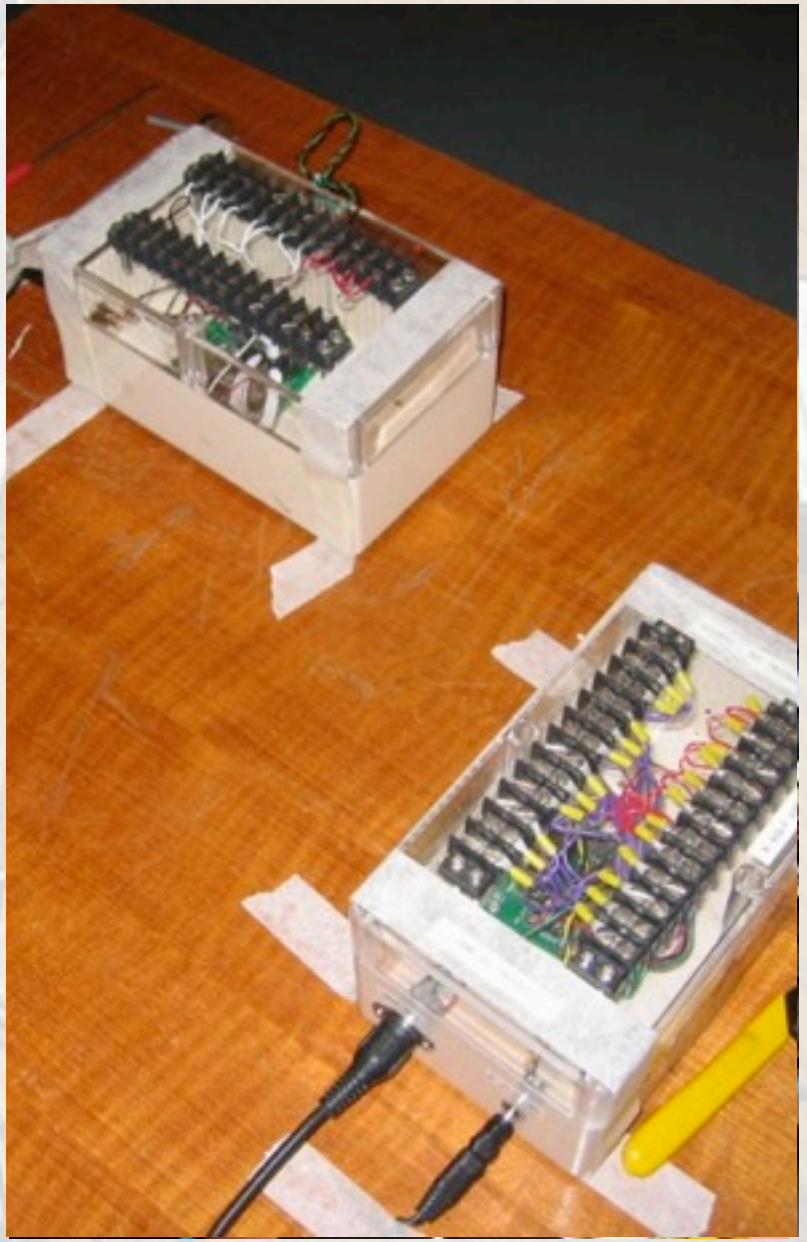
SIMPLE INPUT/OUTPUT



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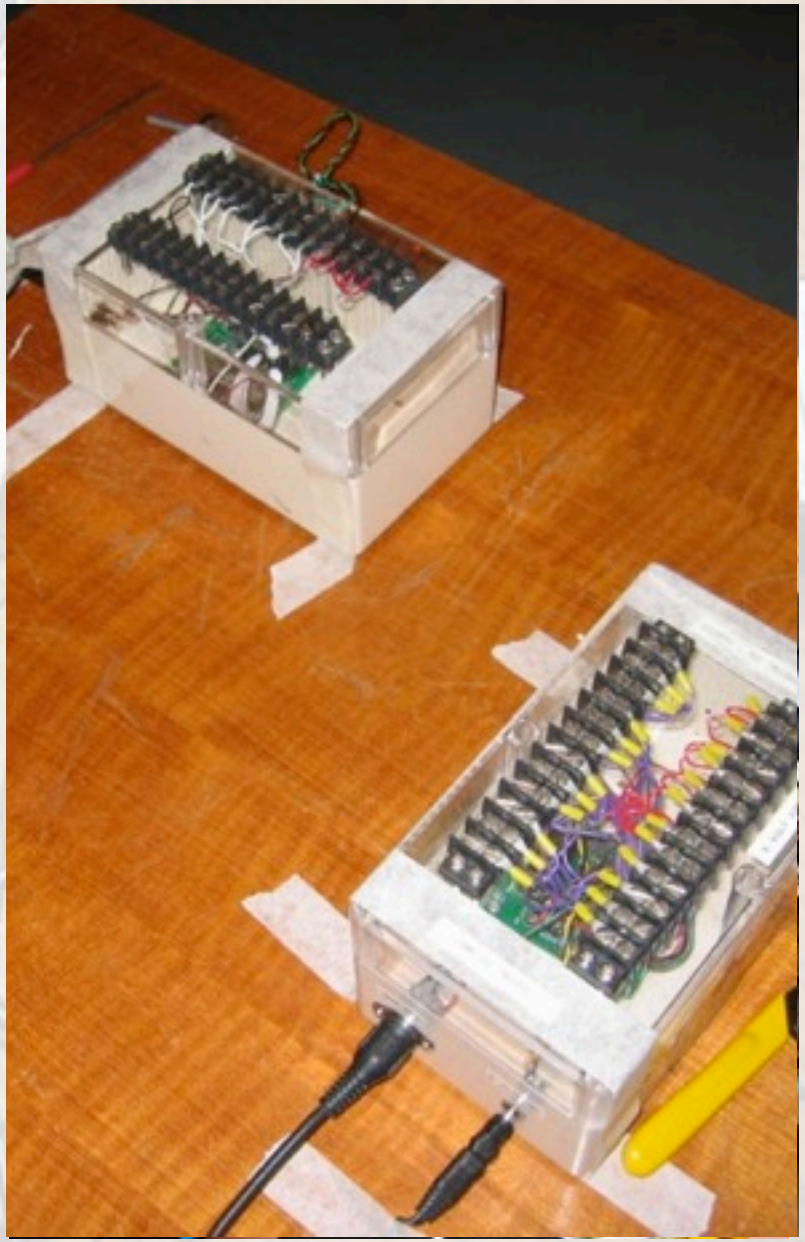
SIMPLE INPUT/OUTPUT

microcontrollers & MIDI,



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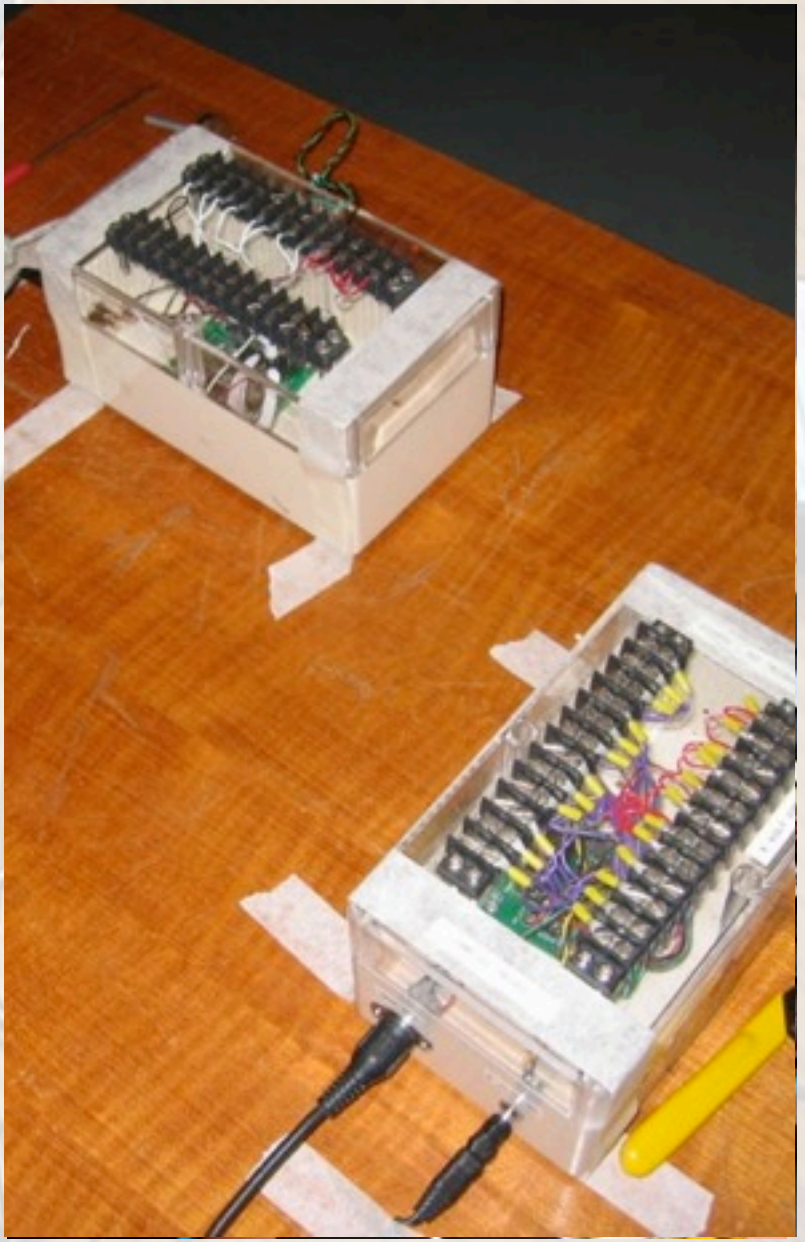

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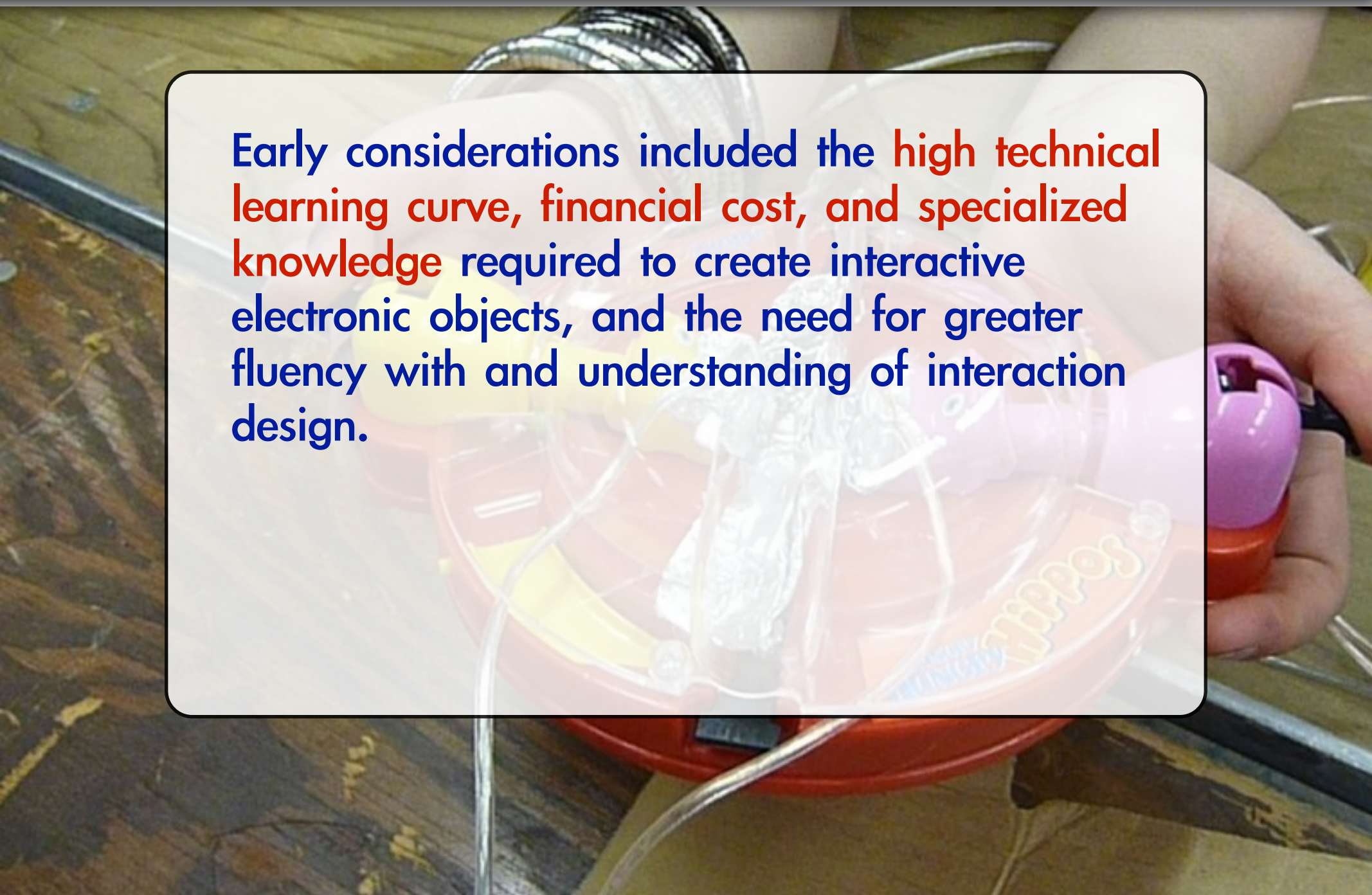

Early considerations included the high technical learning curve, financial cost, and specialized knowledge required to create interactive electronic objects, and the need for greater fluency with and understanding of interaction design.

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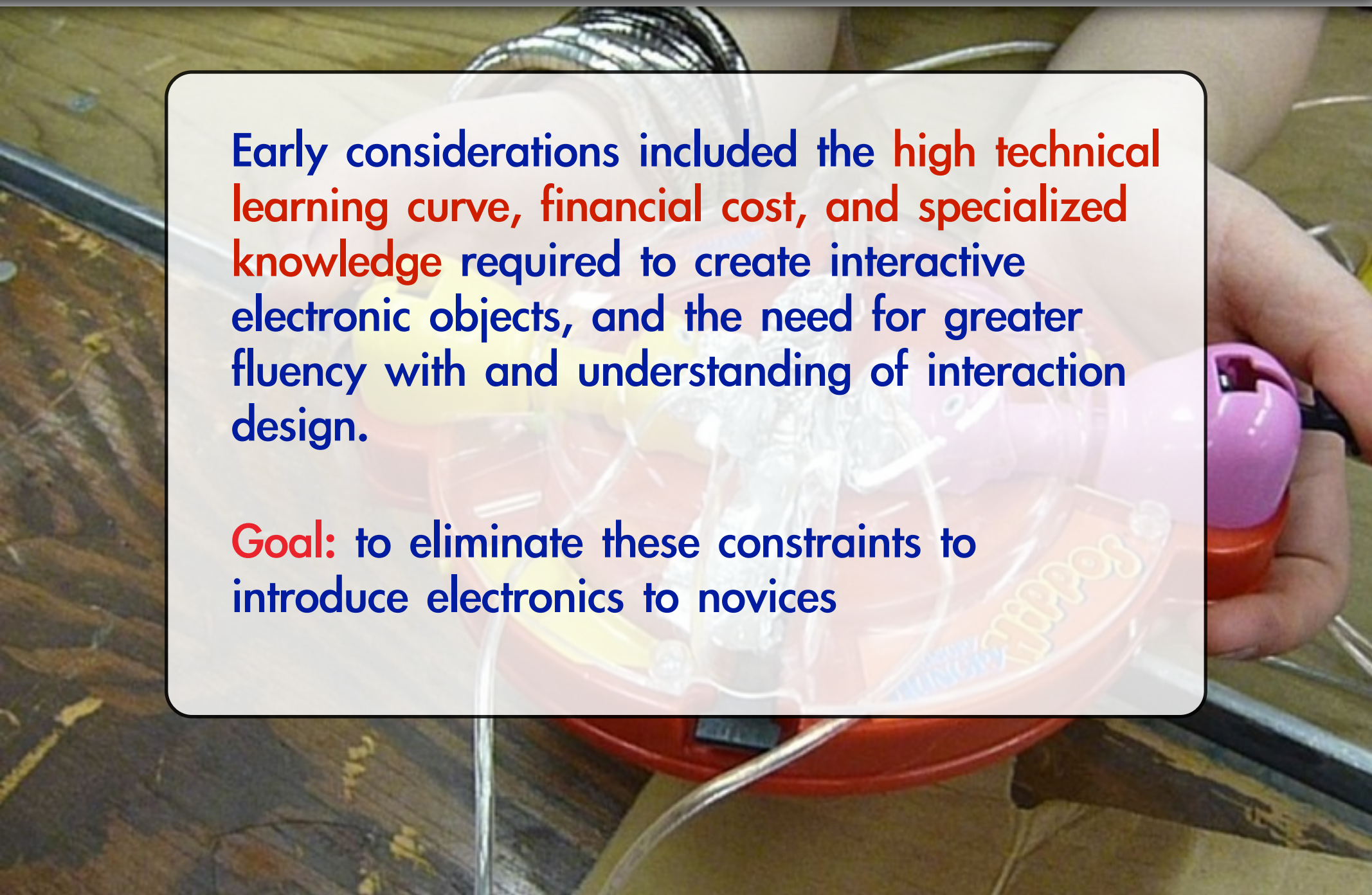

Early considerations included the high technical learning curve, financial cost, and specialized knowledge required to create interactive electronic objects, and the need for greater fluency with and understanding of interaction design.

Goal: to eliminate these constraints to introduce electronics to novices


ATE
PLAN
CREATE
whirlwind

SCRAPYARD CHALLENGE Jr. !

SCRAPYARD CHALLENGE Jr. INTRODUCTION

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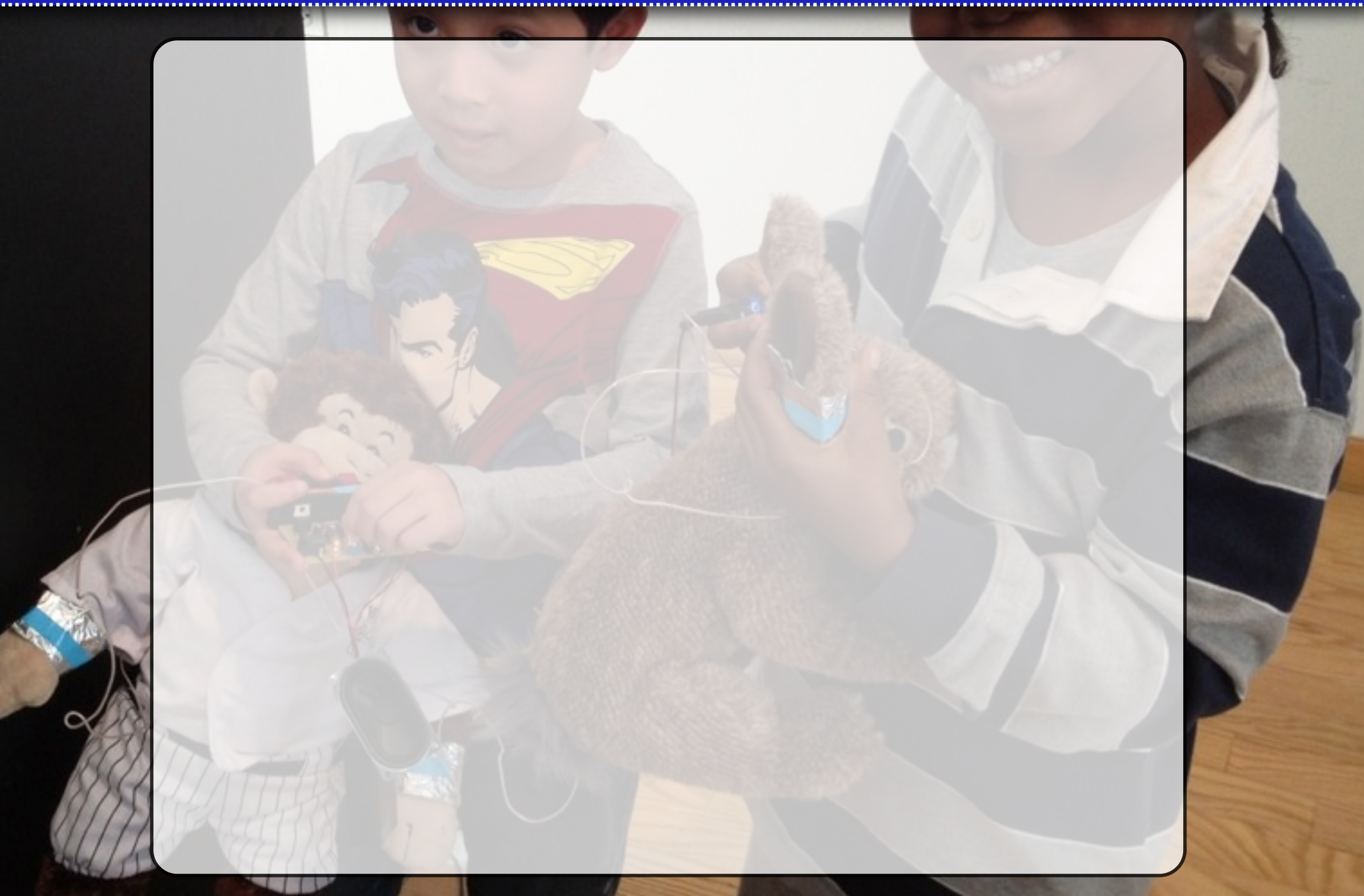

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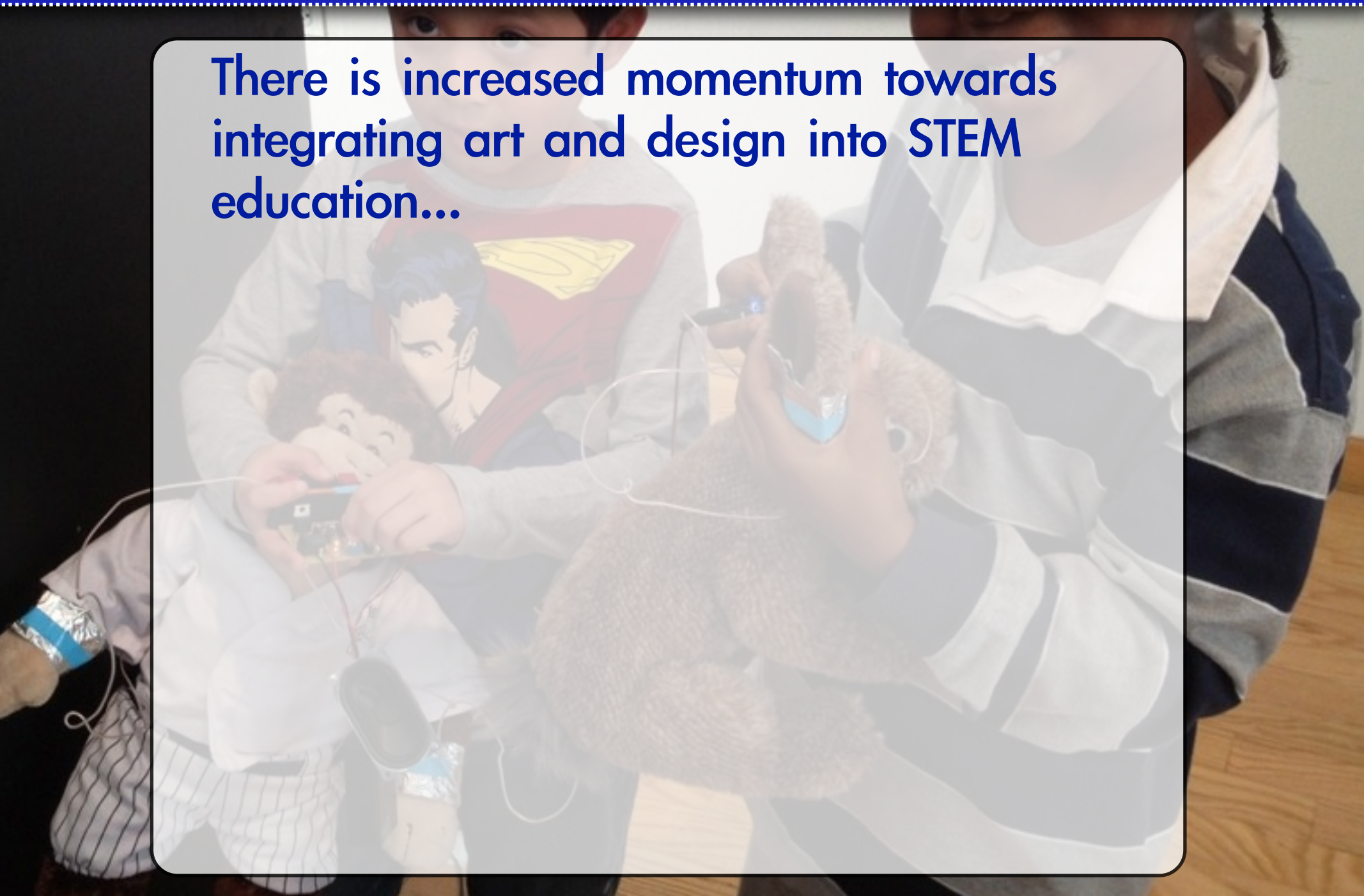

There is increased momentum towards integrating art and design into STEM education...

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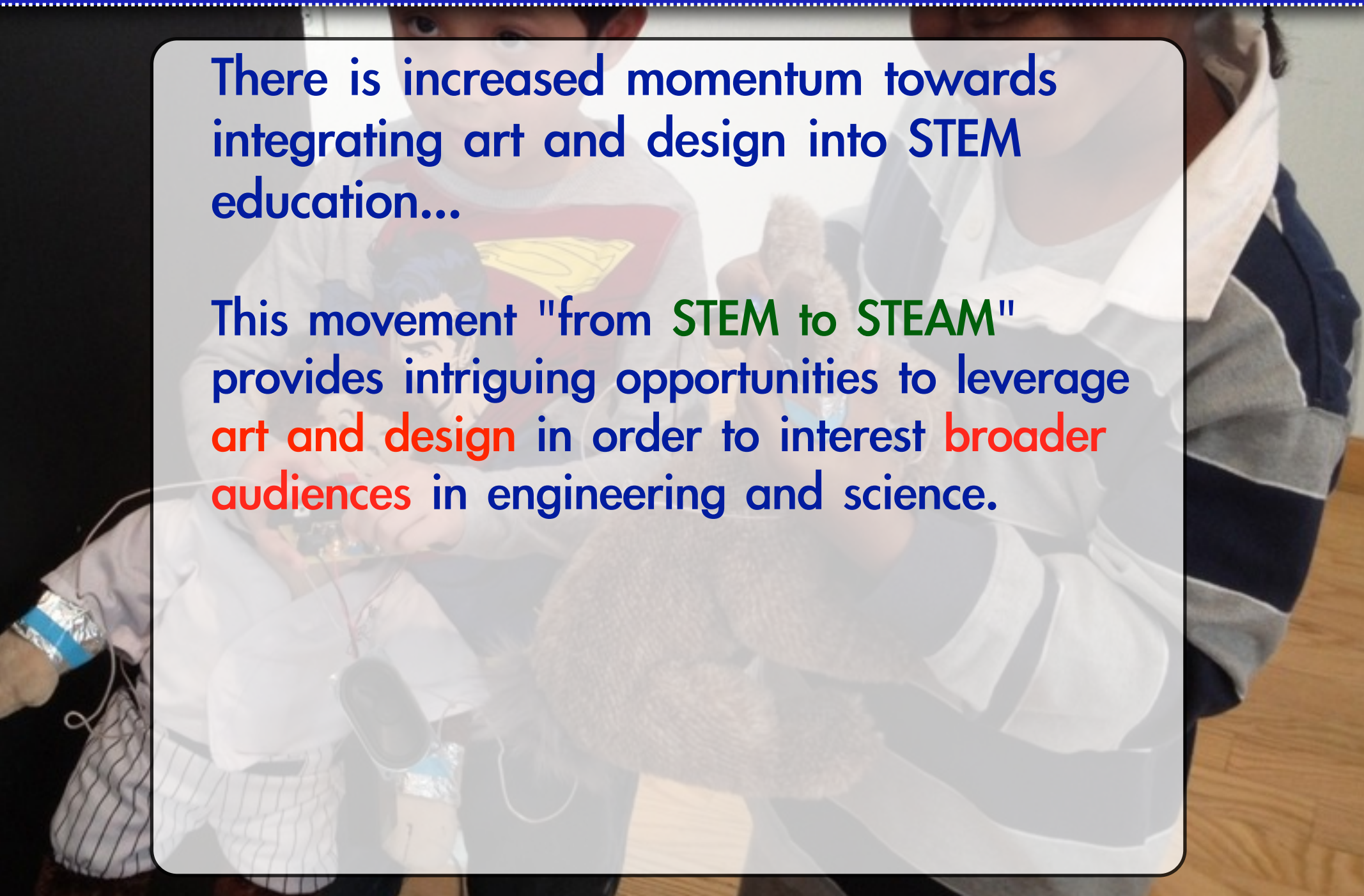

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This movement "from STEM to STEAM" provides intriguing opportunities to leverage art and design in order to interest broader audiences in engineering and science.

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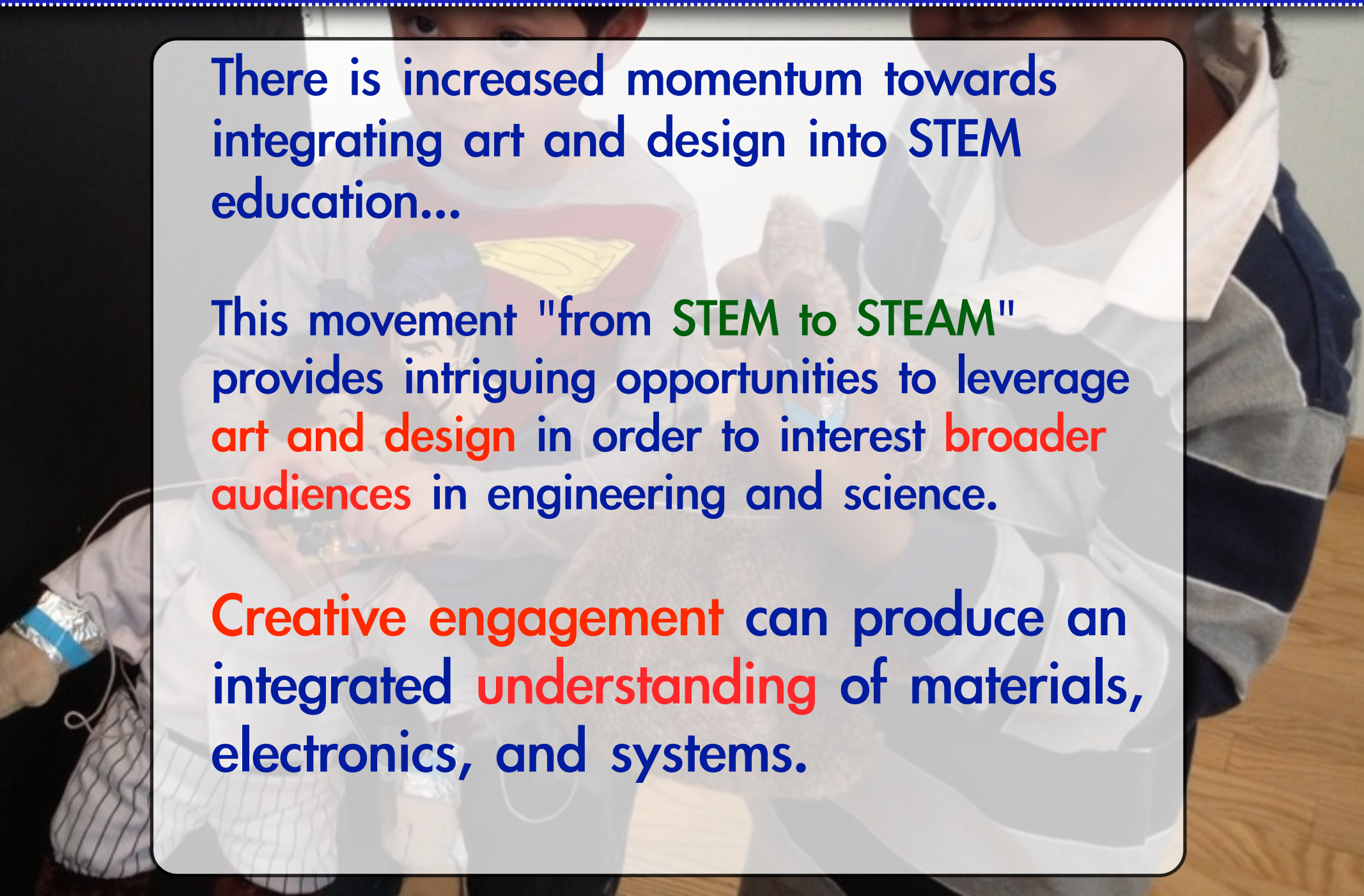

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This movement "from STEM to STEAM" provides intriguing opportunities to leverage art and design in order to interest broader audiences in engineering and science.

Creative engagement can produce an integrated understanding of materials, electronics, and systems.

SCRAPYARD CHALLENGE Jr. WORKSHOP

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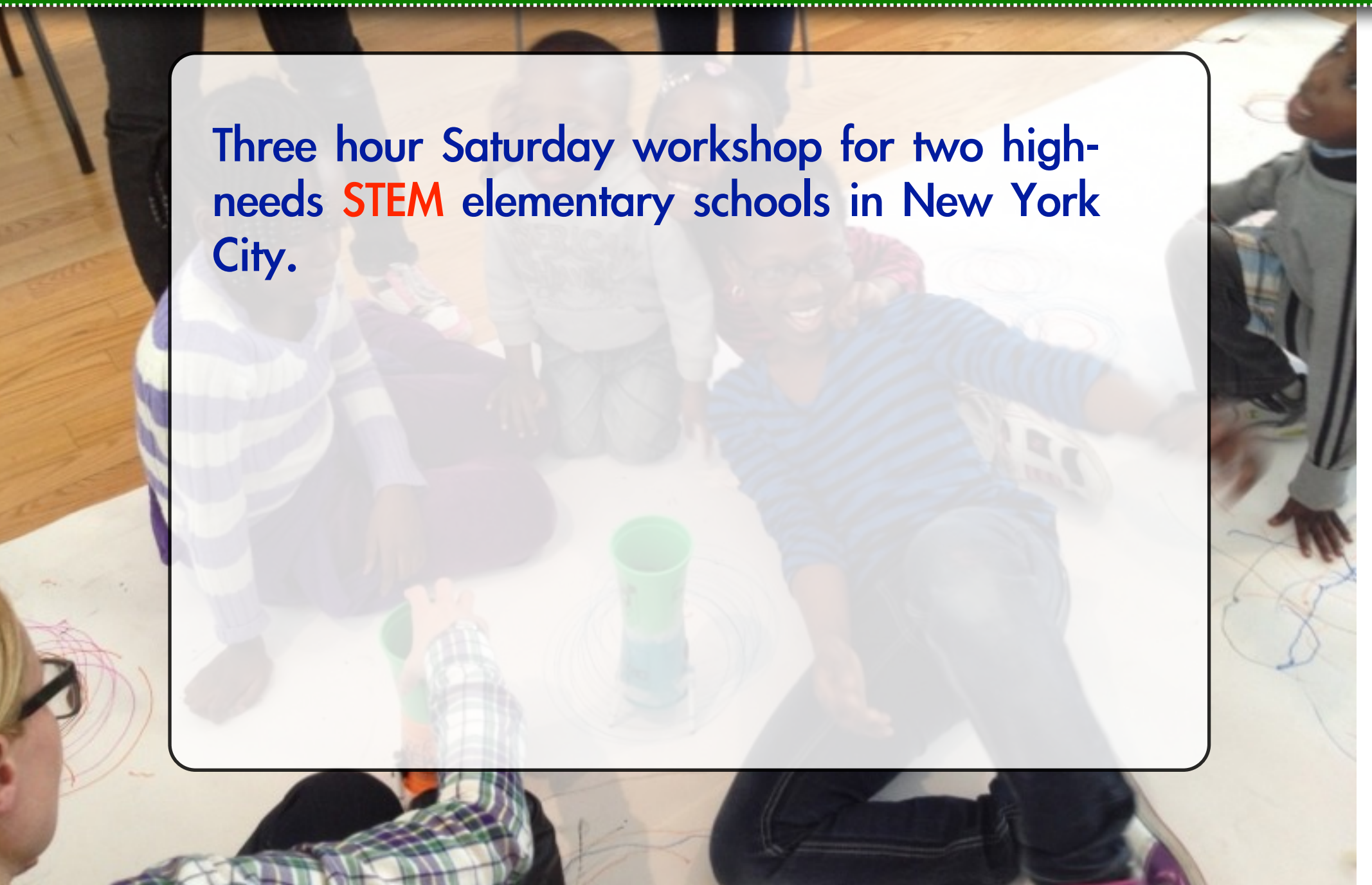

Three hour Saturday workshop for two high-needs STEM elementary schools in New York City.

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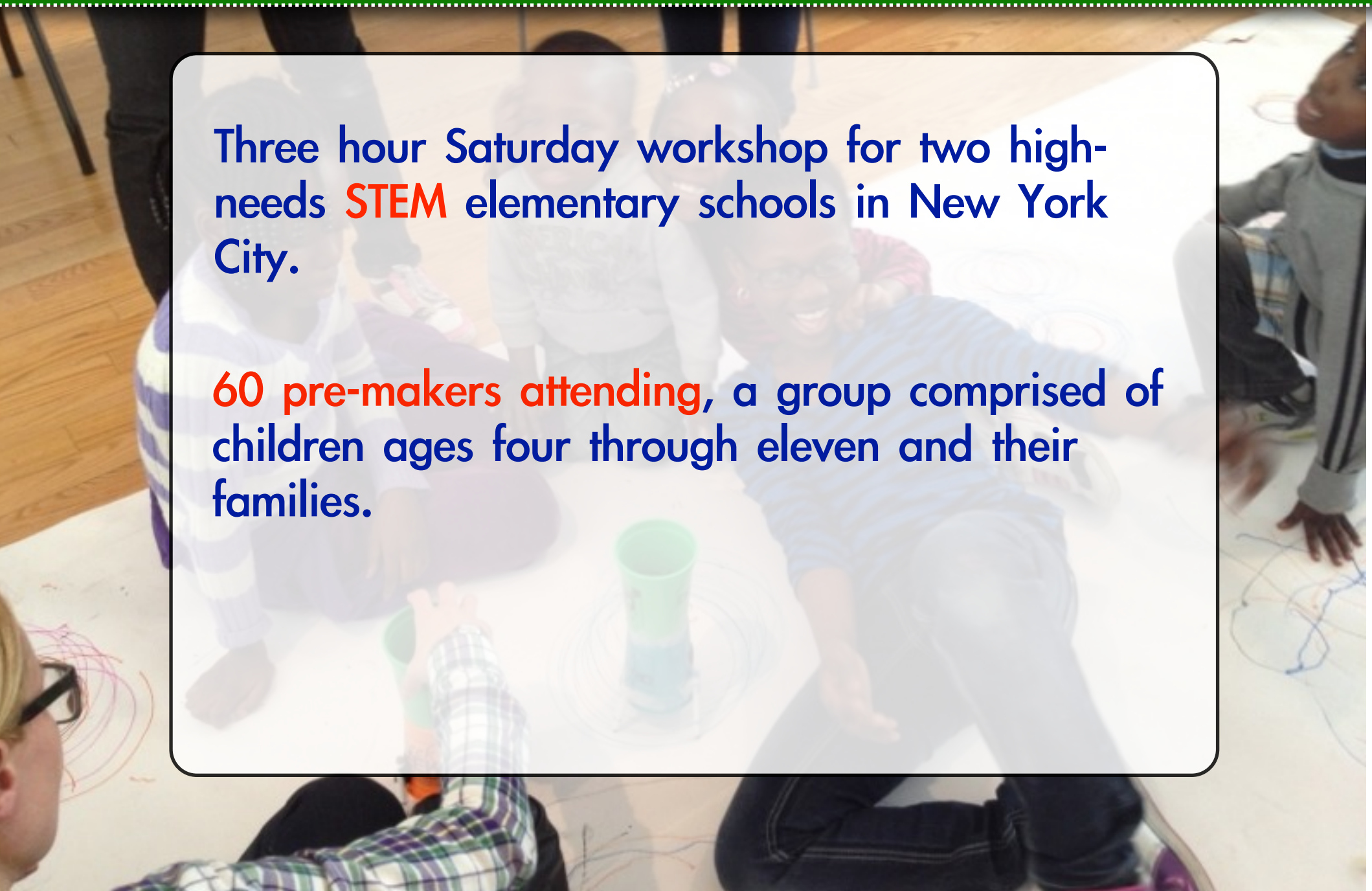

Three hour Saturday workshop for two high-needs STEM elementary schools in New York City.

60 pre-makers attending, a group comprised of children ages four through eleven and their families.

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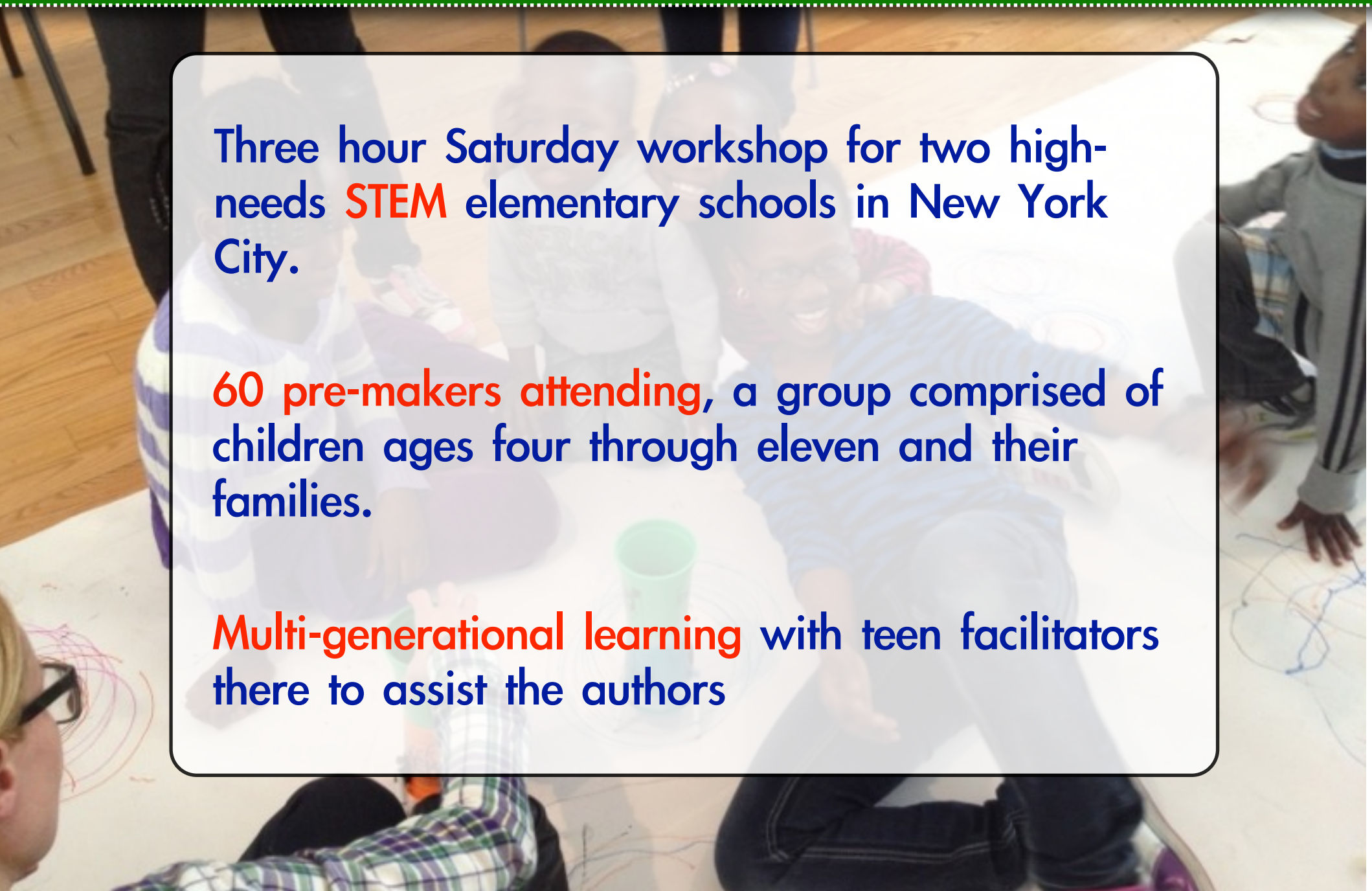

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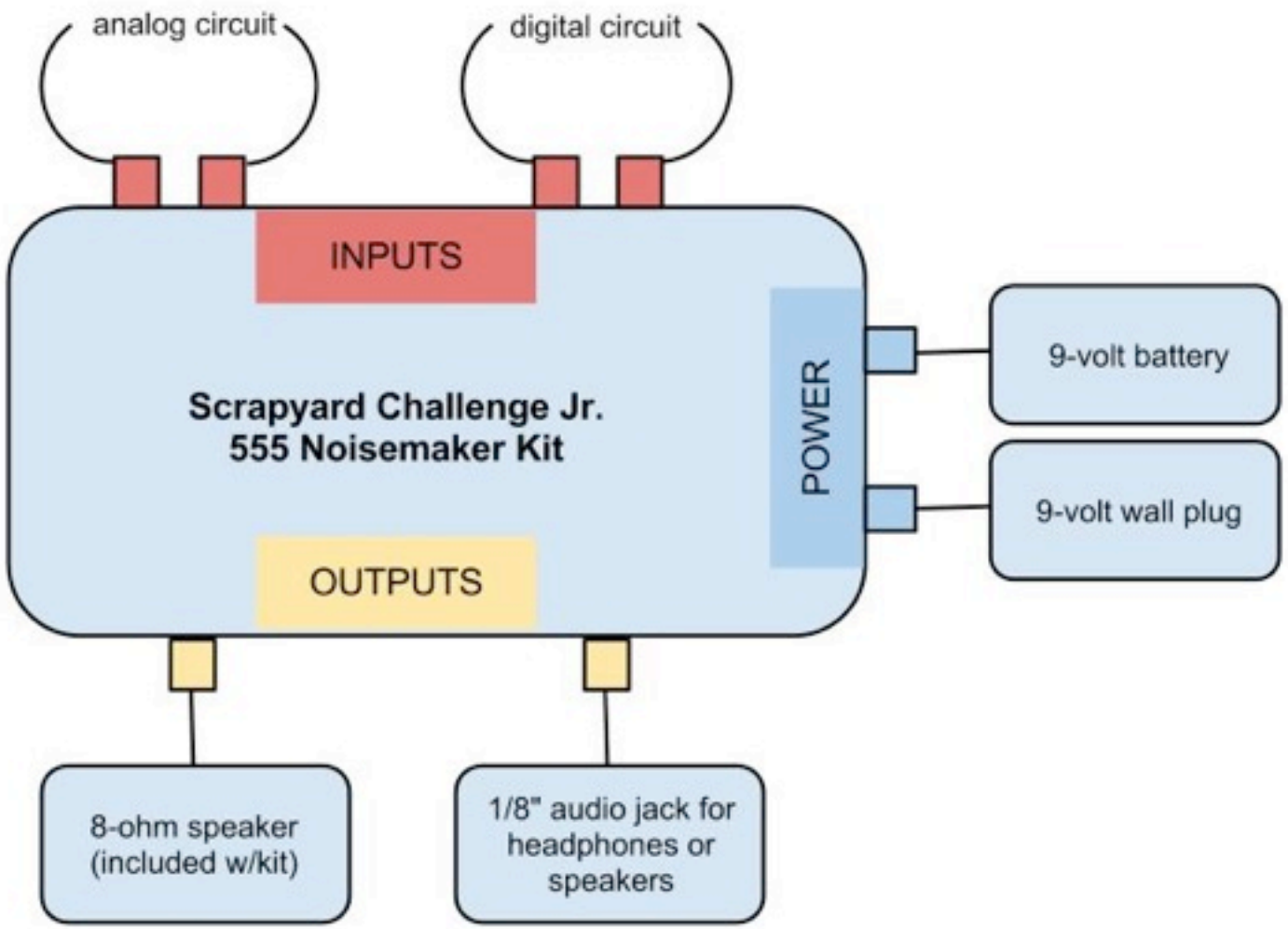
60 pre-makers attending, a group comprised of children ages four through eleven and their families.

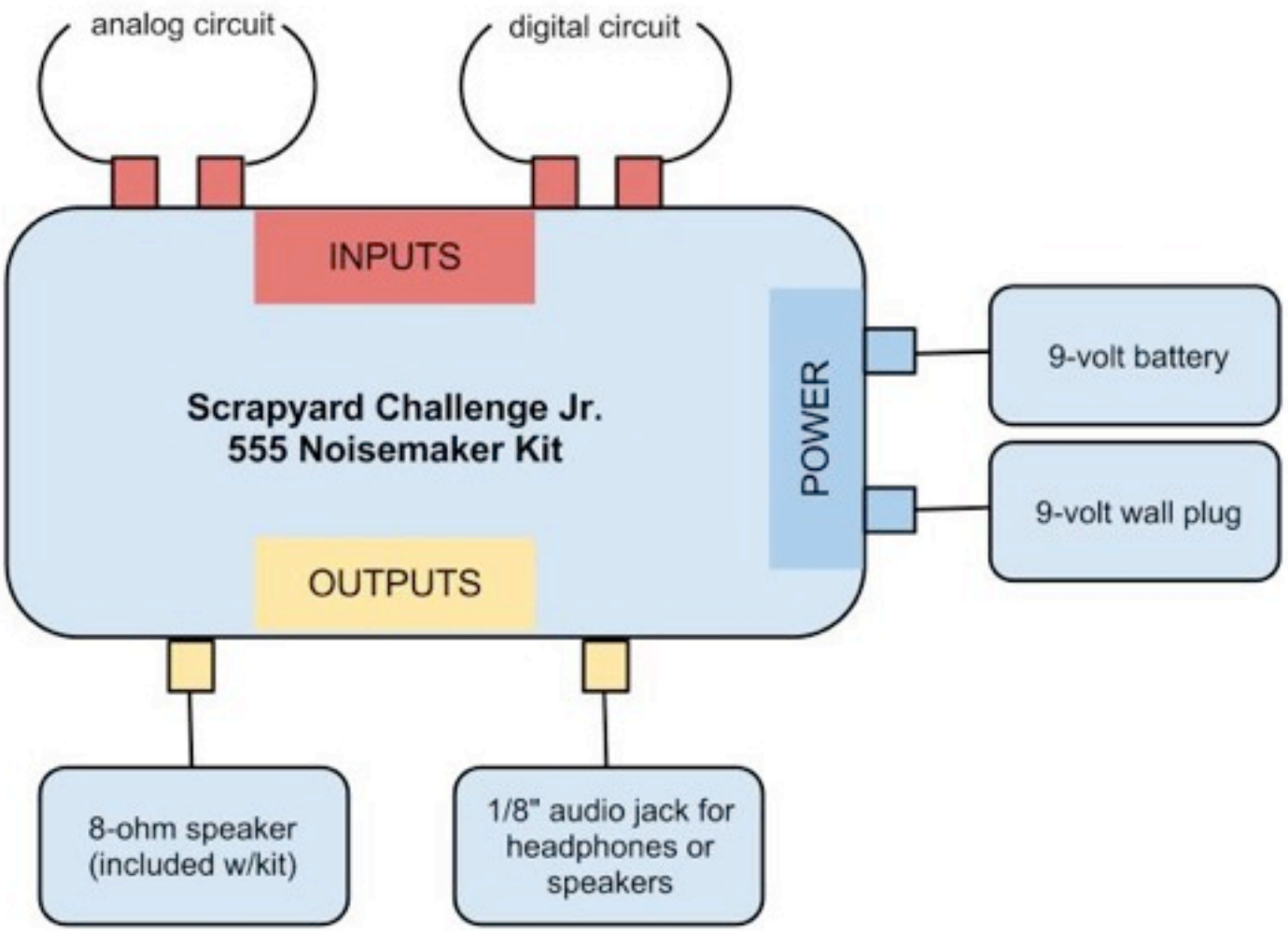
Multi-generational learning with teen facilitators there to assist the authors

SCRAPYARD CHALLENGE Jr. BOARDS



SCRAPYARD CHALLENGE Jr. BOARDS

NoiseMaker Board



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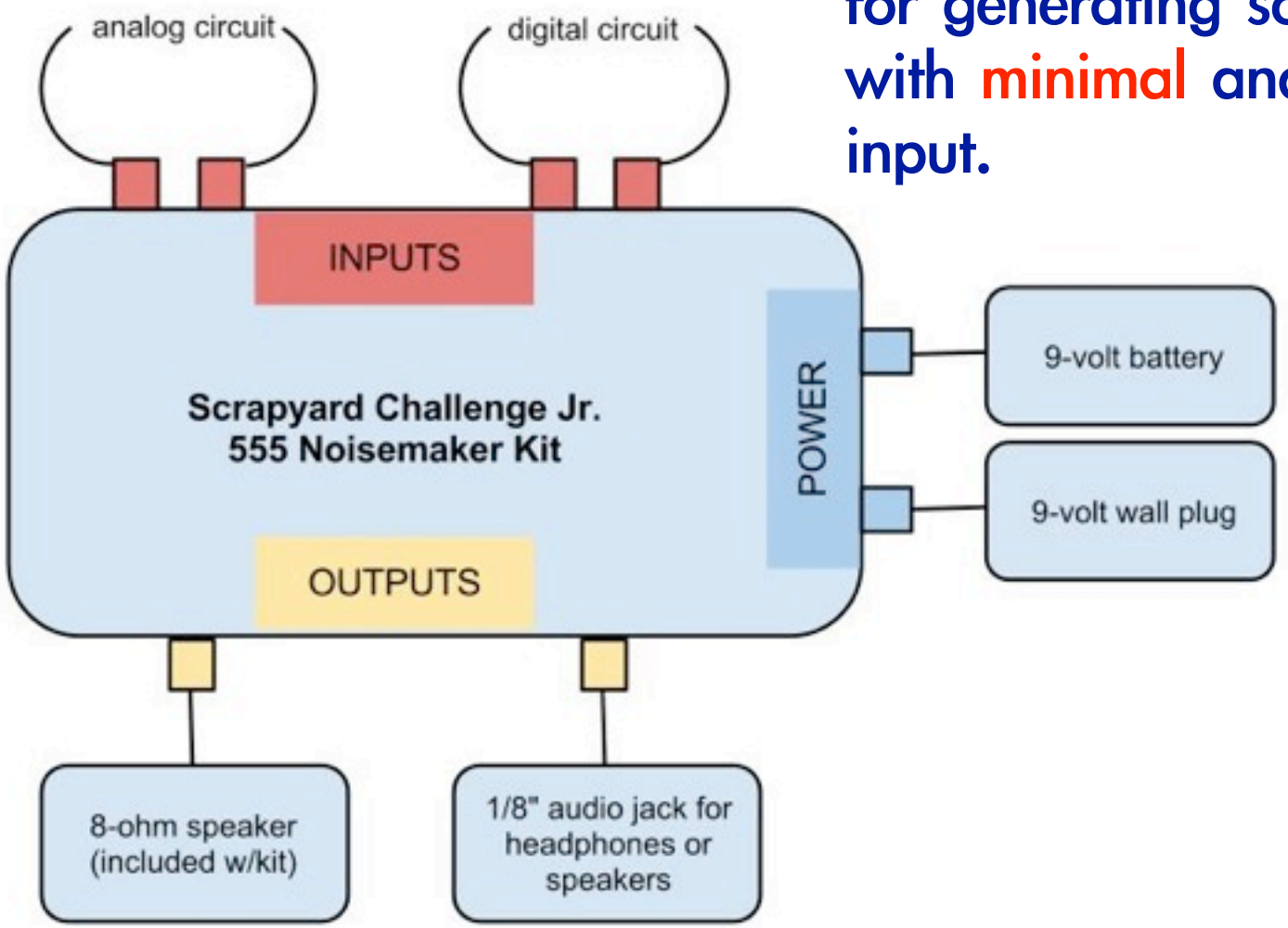

Kit designed as a simple tool for generating sonic output with minimal and modular input.

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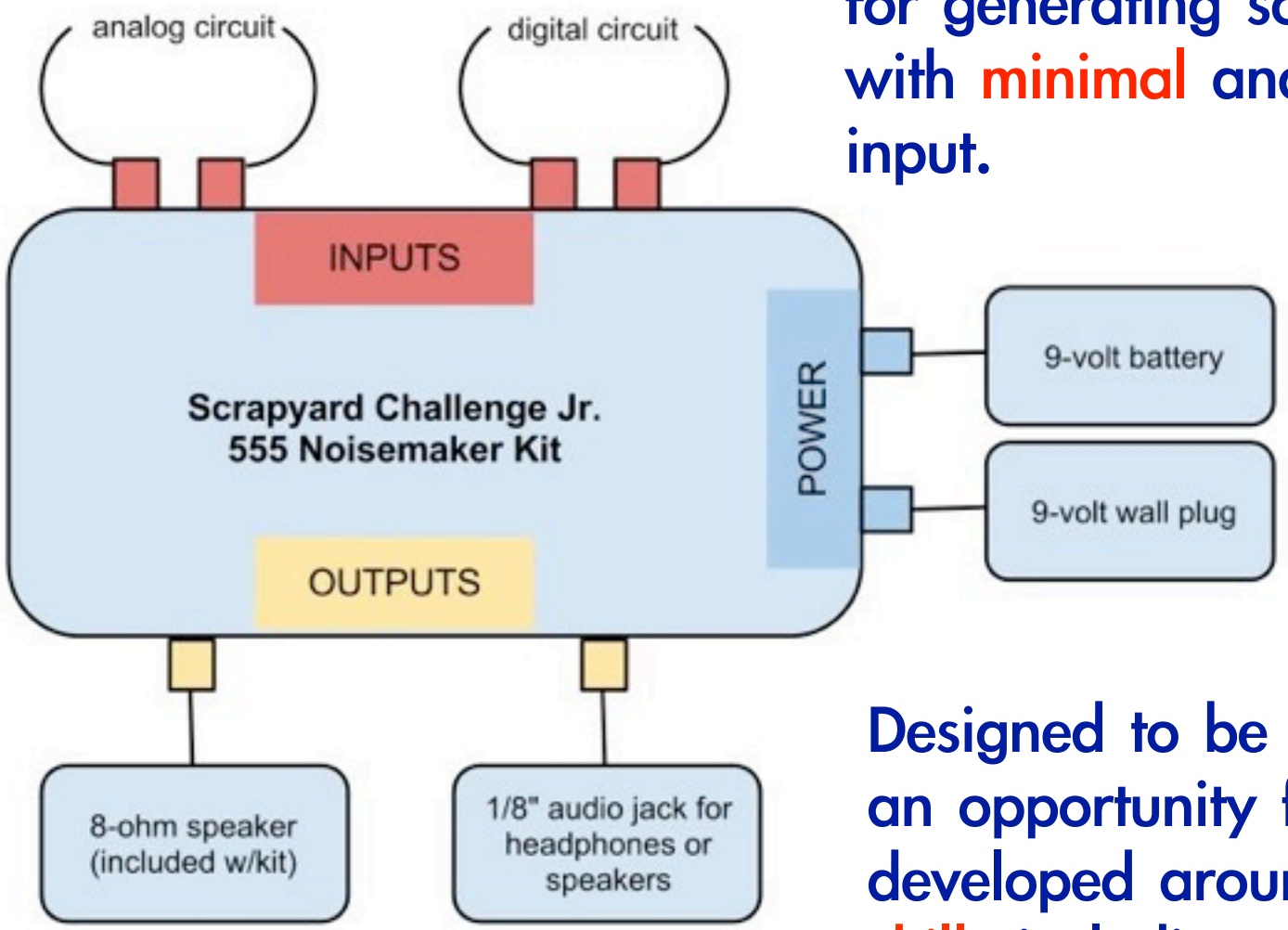

Kit designed as a simple tool for generating sonic output with minimal and modular input.

Designed to be low-cost, creating an opportunity for curriculum to be developed around basic fabrication skills including soldering, circuit design, and enclosure prototyping

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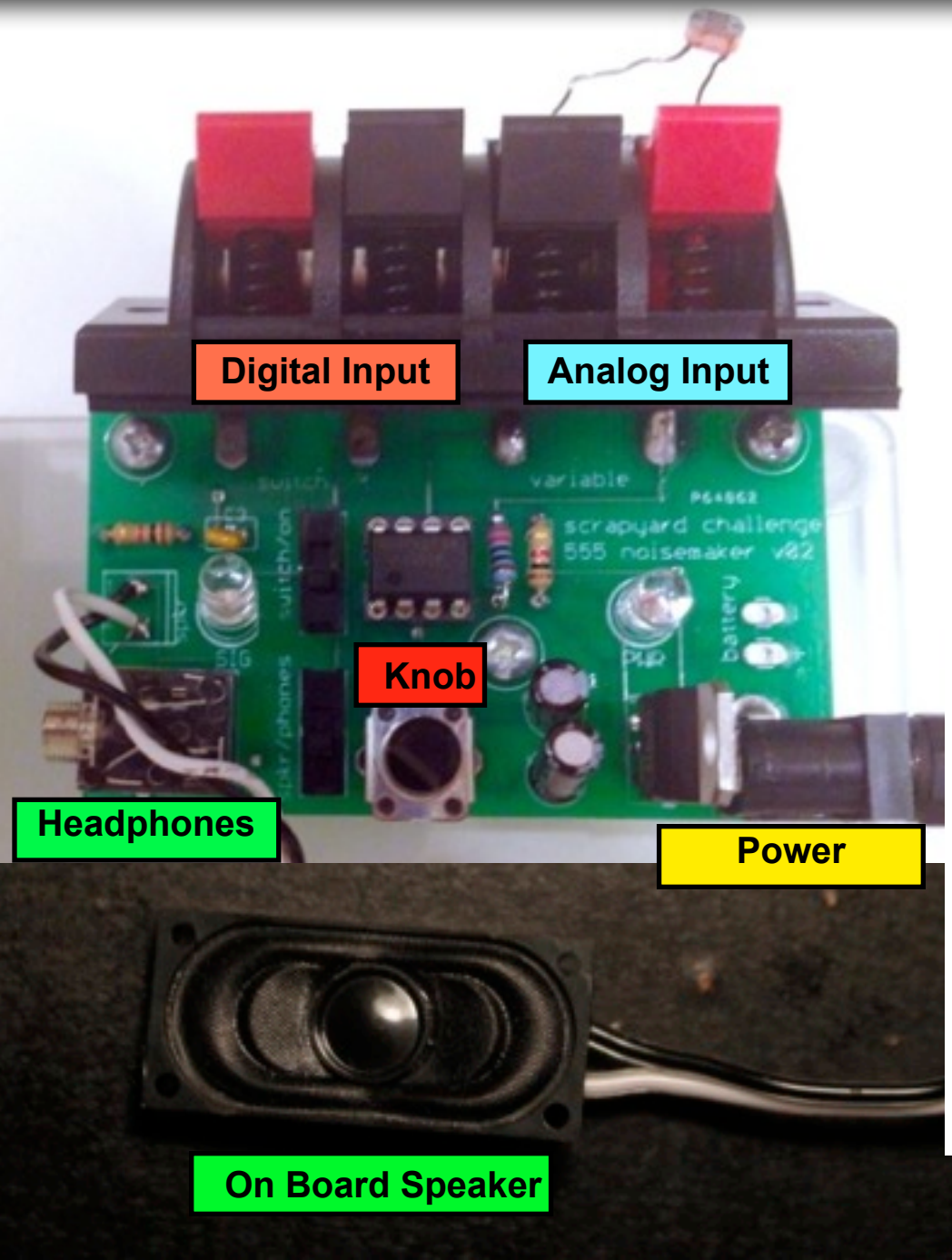

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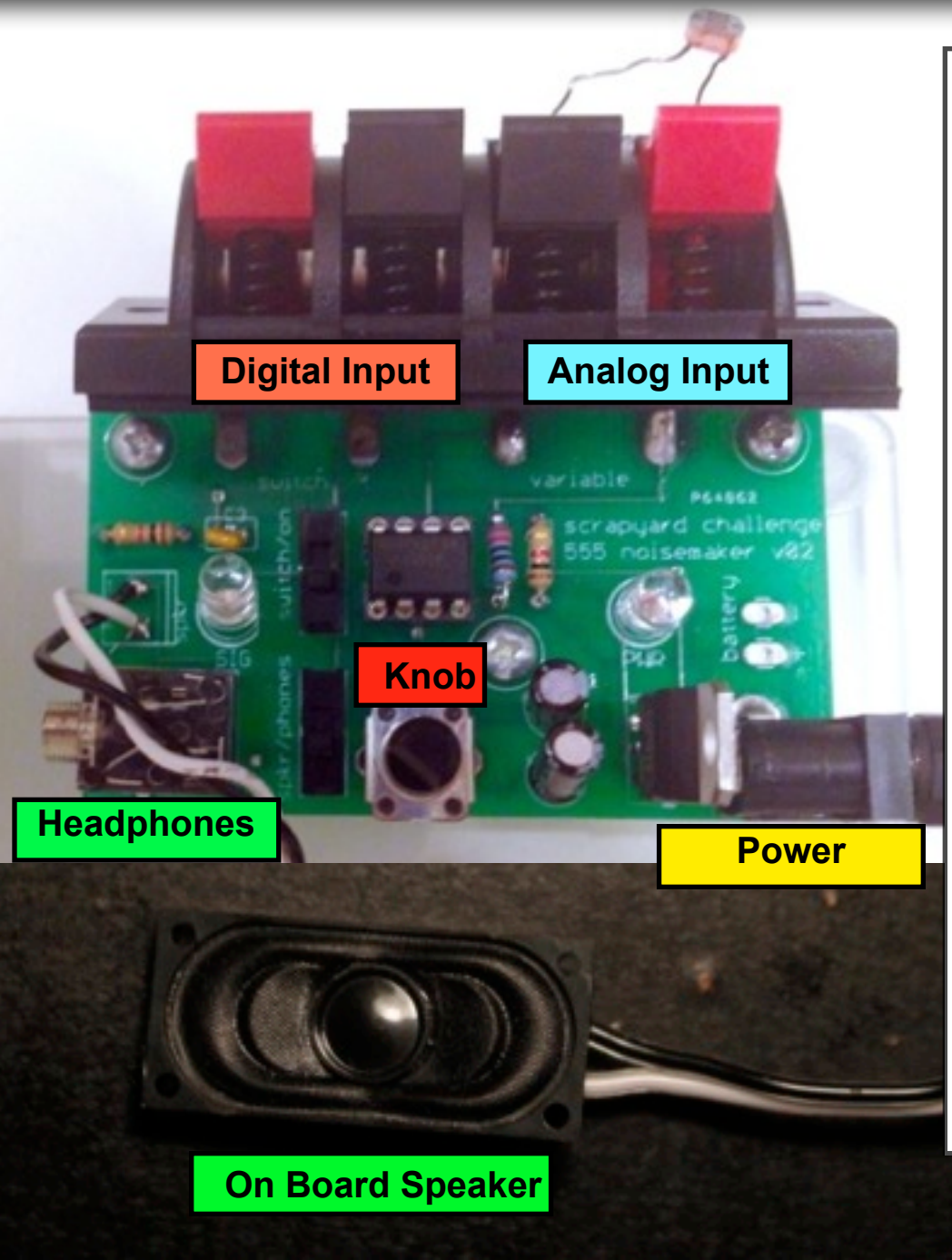

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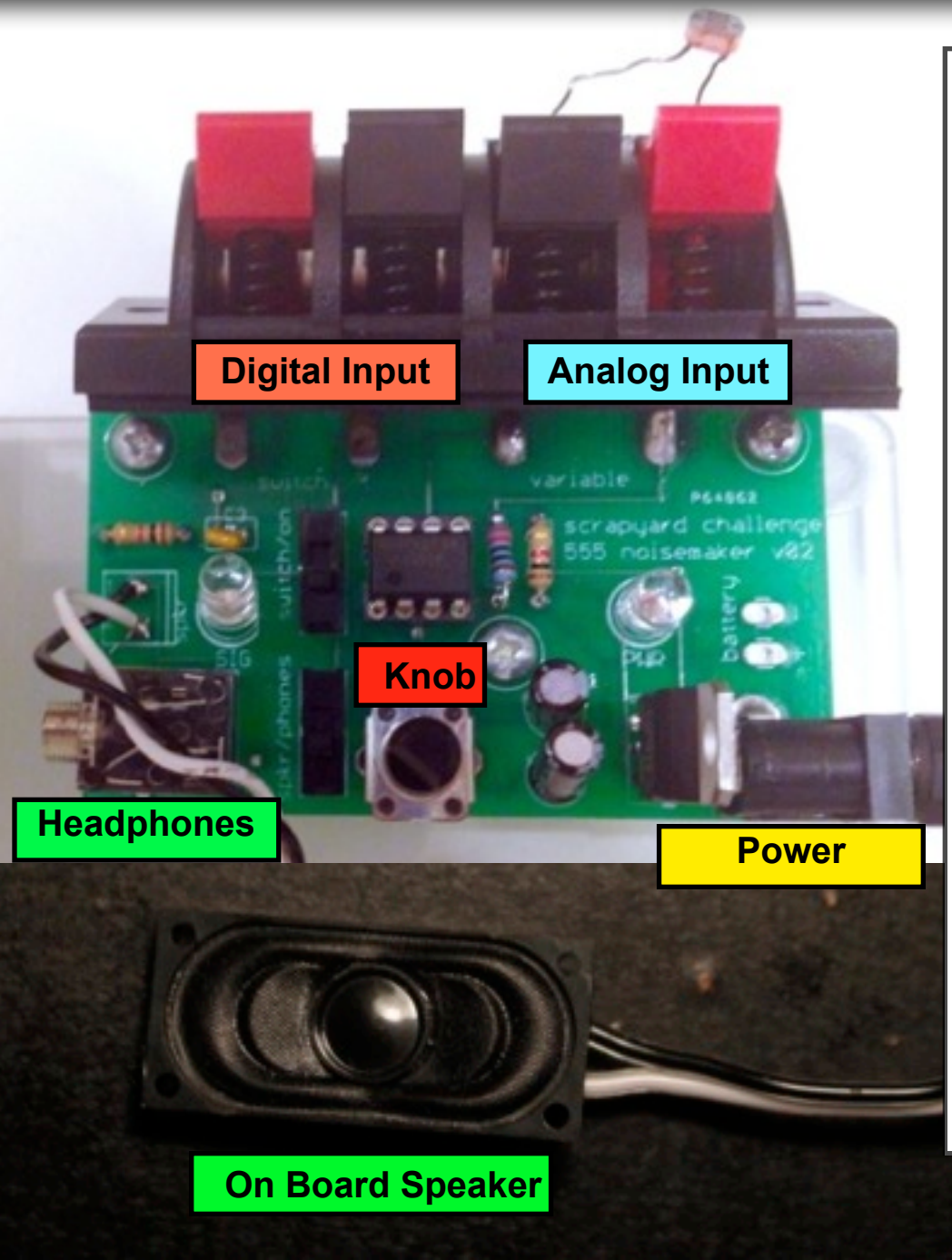

NoiseMaker Board Version 2.0

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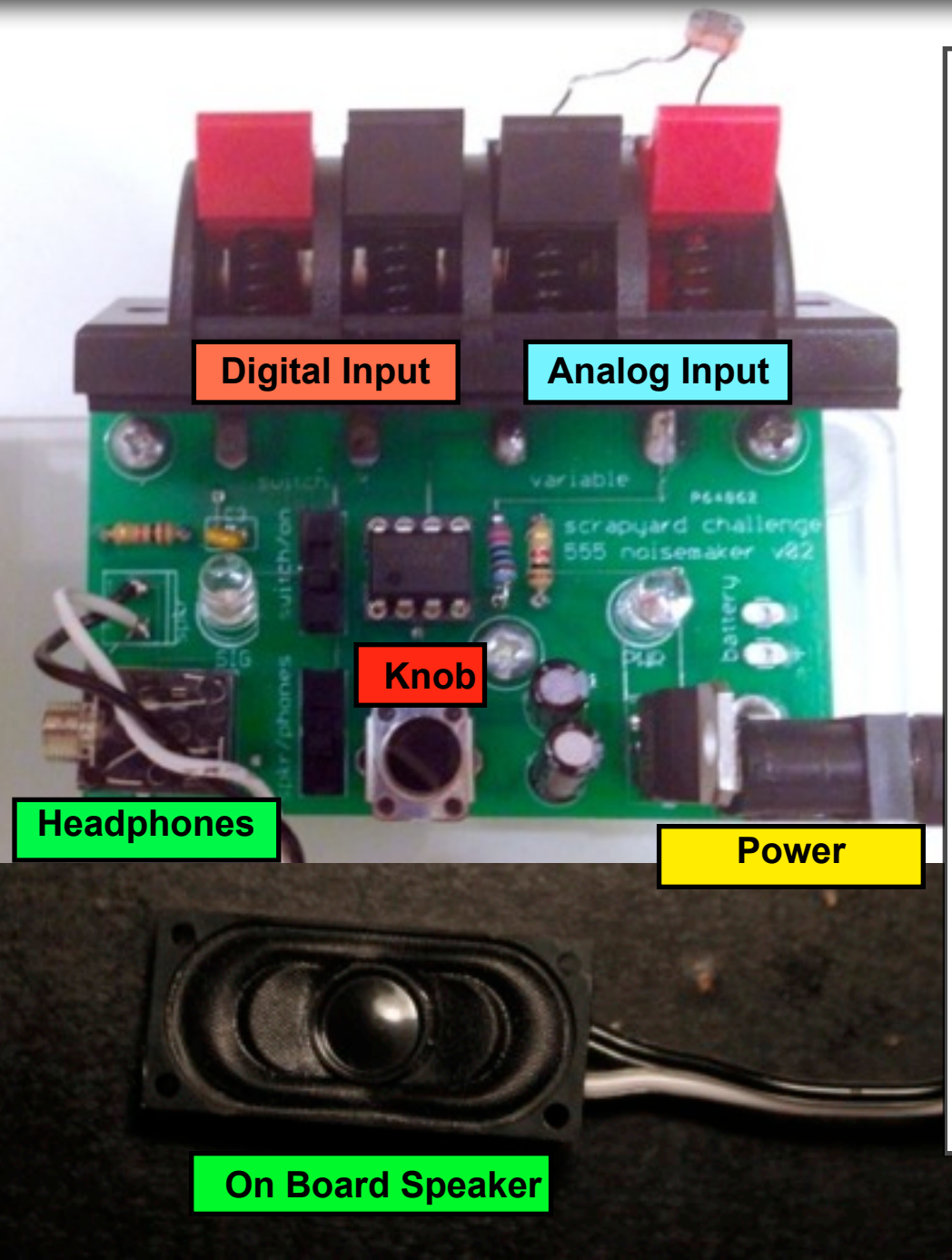

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Modified feature set specifically designed for young children and their families

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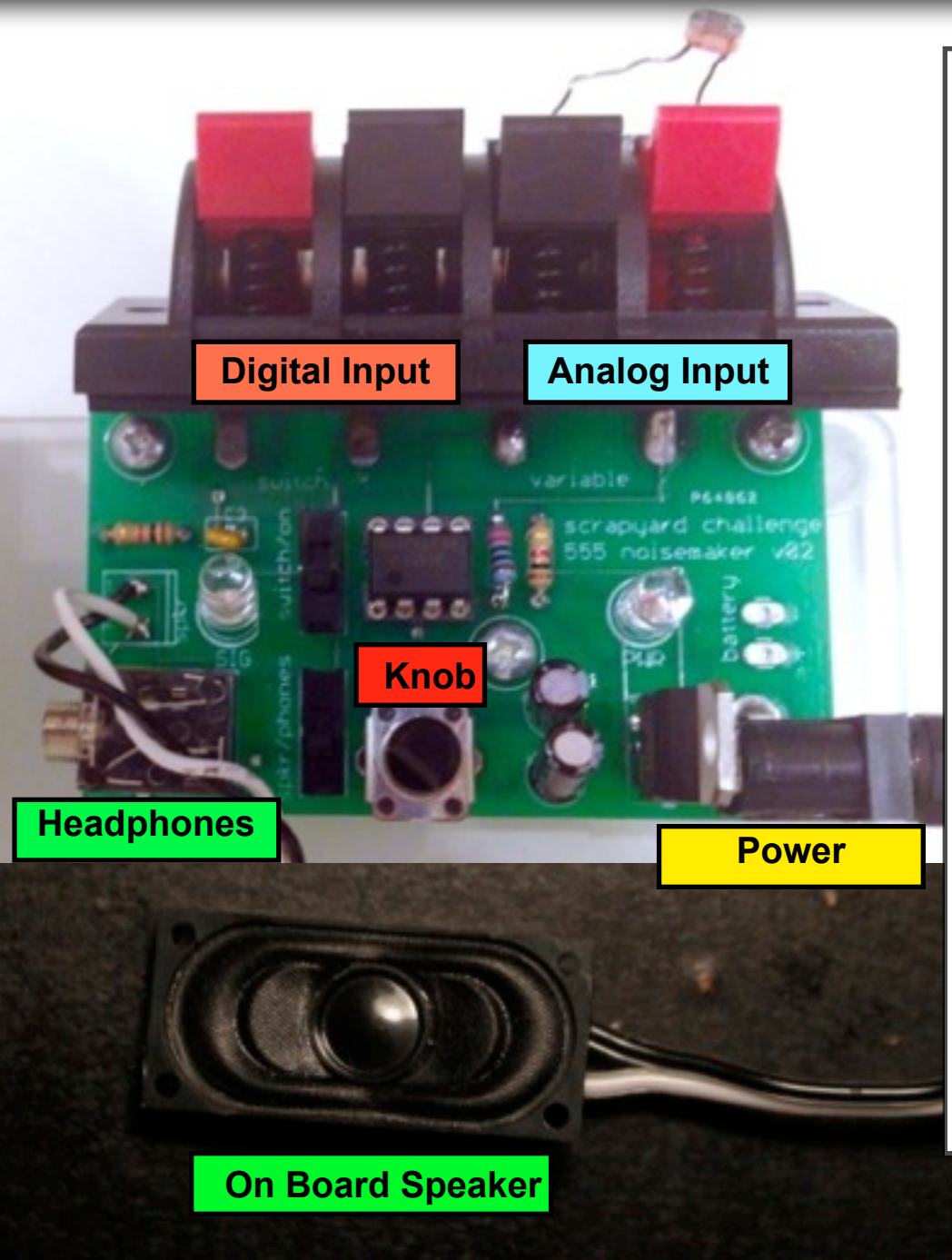

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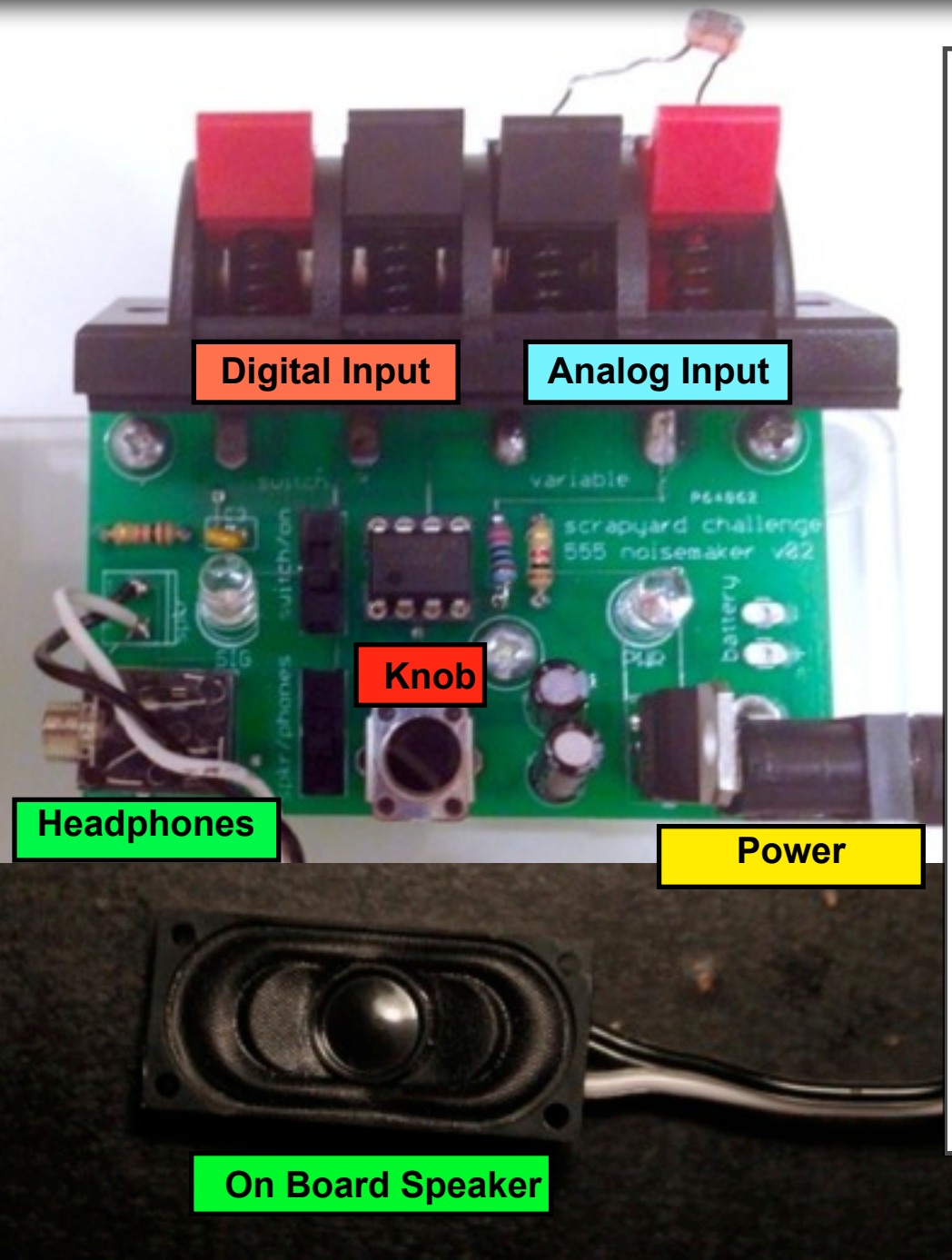

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- Variable tones with knob

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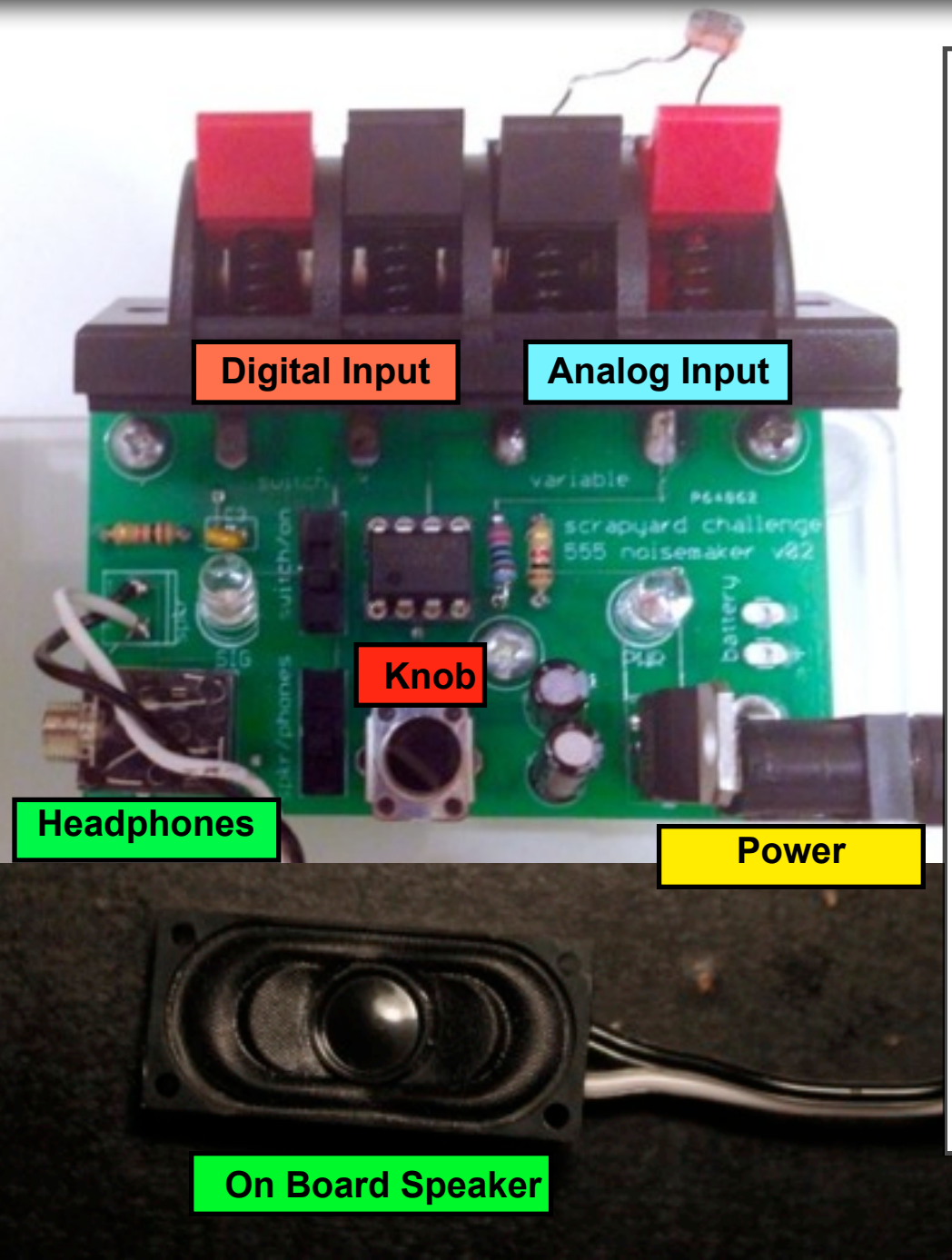

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- 1 Digital Input, 1 Analog
- Variable tones with knob
- On board speaker

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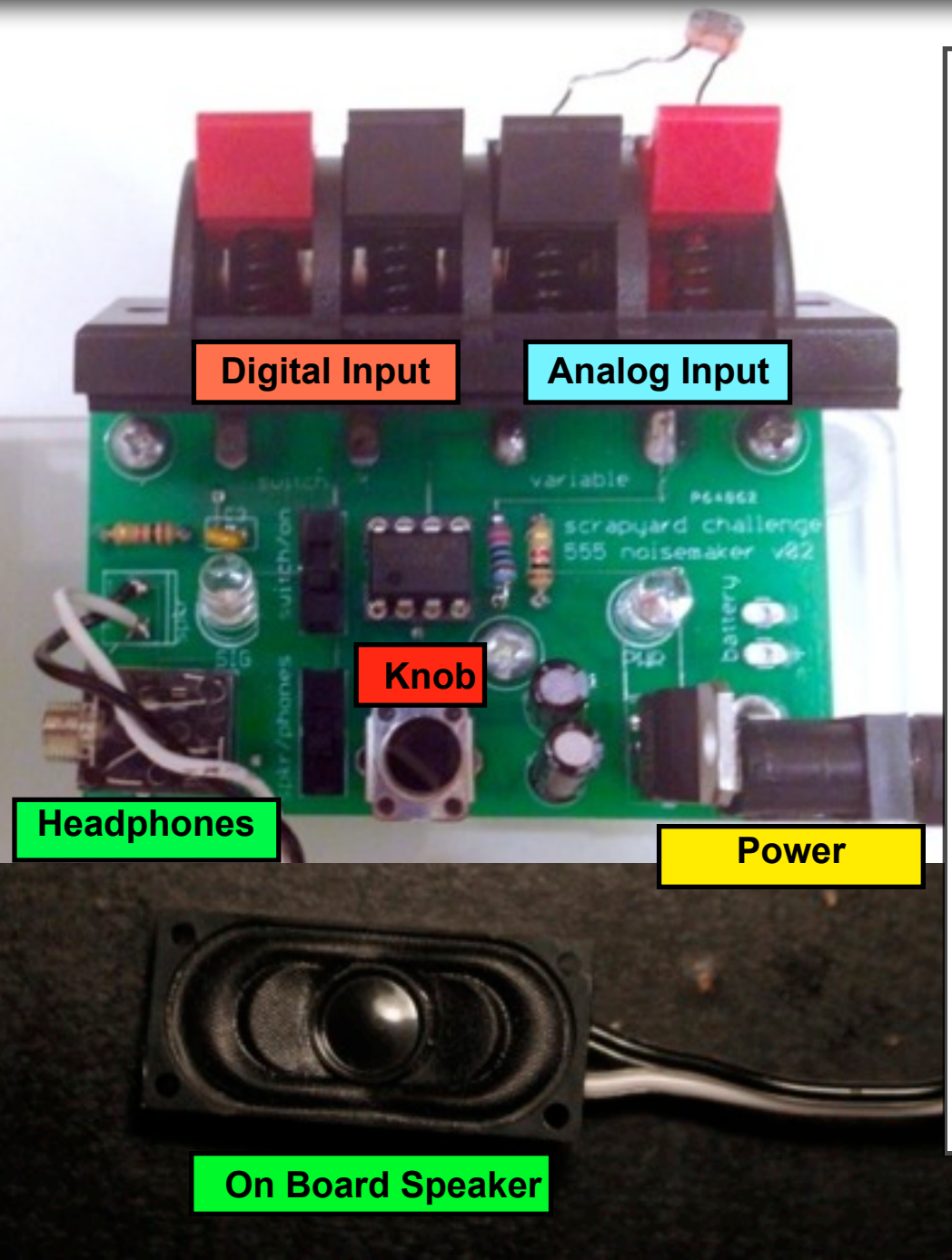

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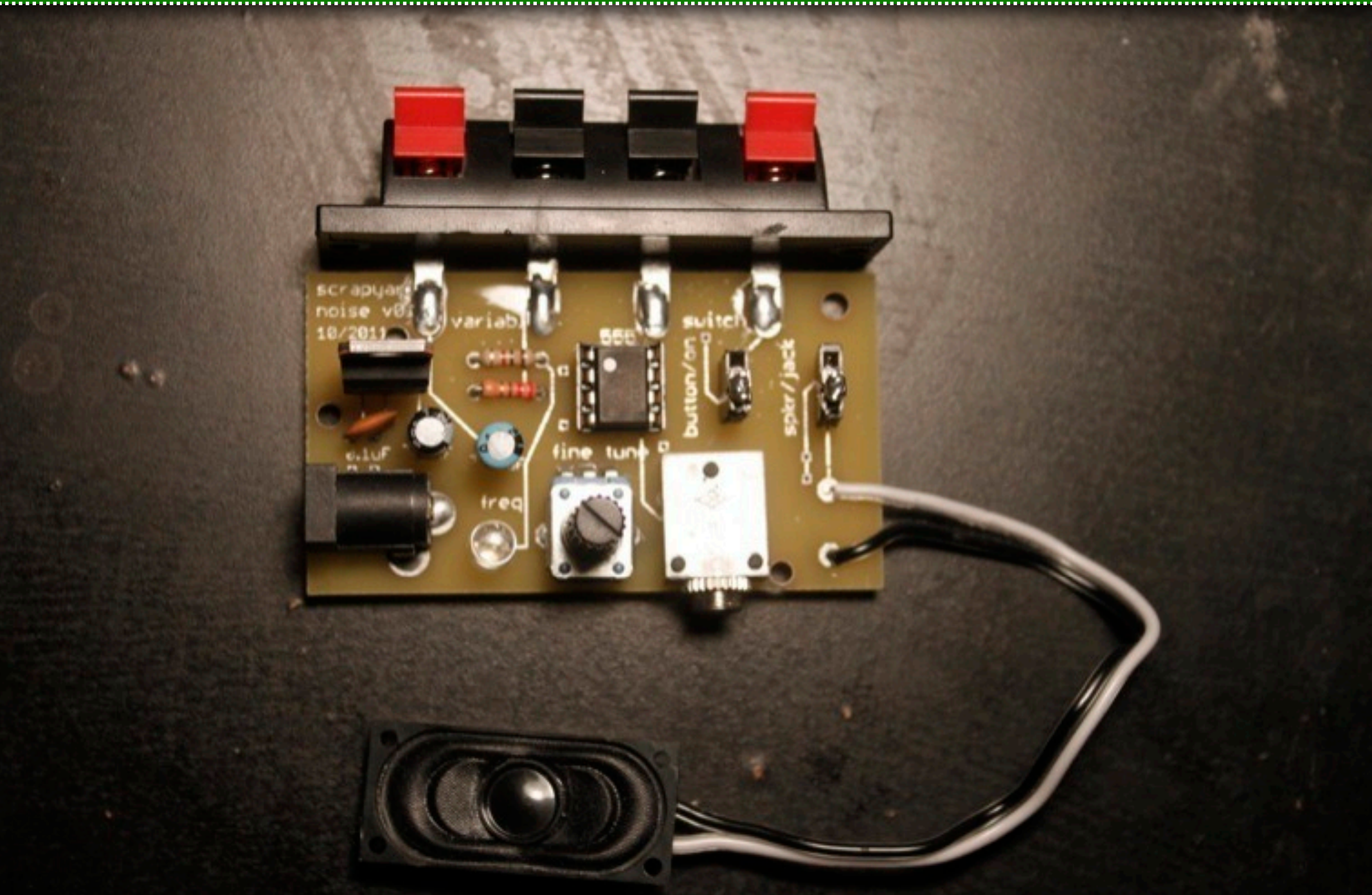
- On board speaker
- External amplifier / headphone jack

SCRAPYARD CHALLENGE Jr. WORKSHOP



SCRAPYARD CHALLENGE Jr. WORKSHOP

NOISEMAKER BOARD LEARNING OUTCOMES

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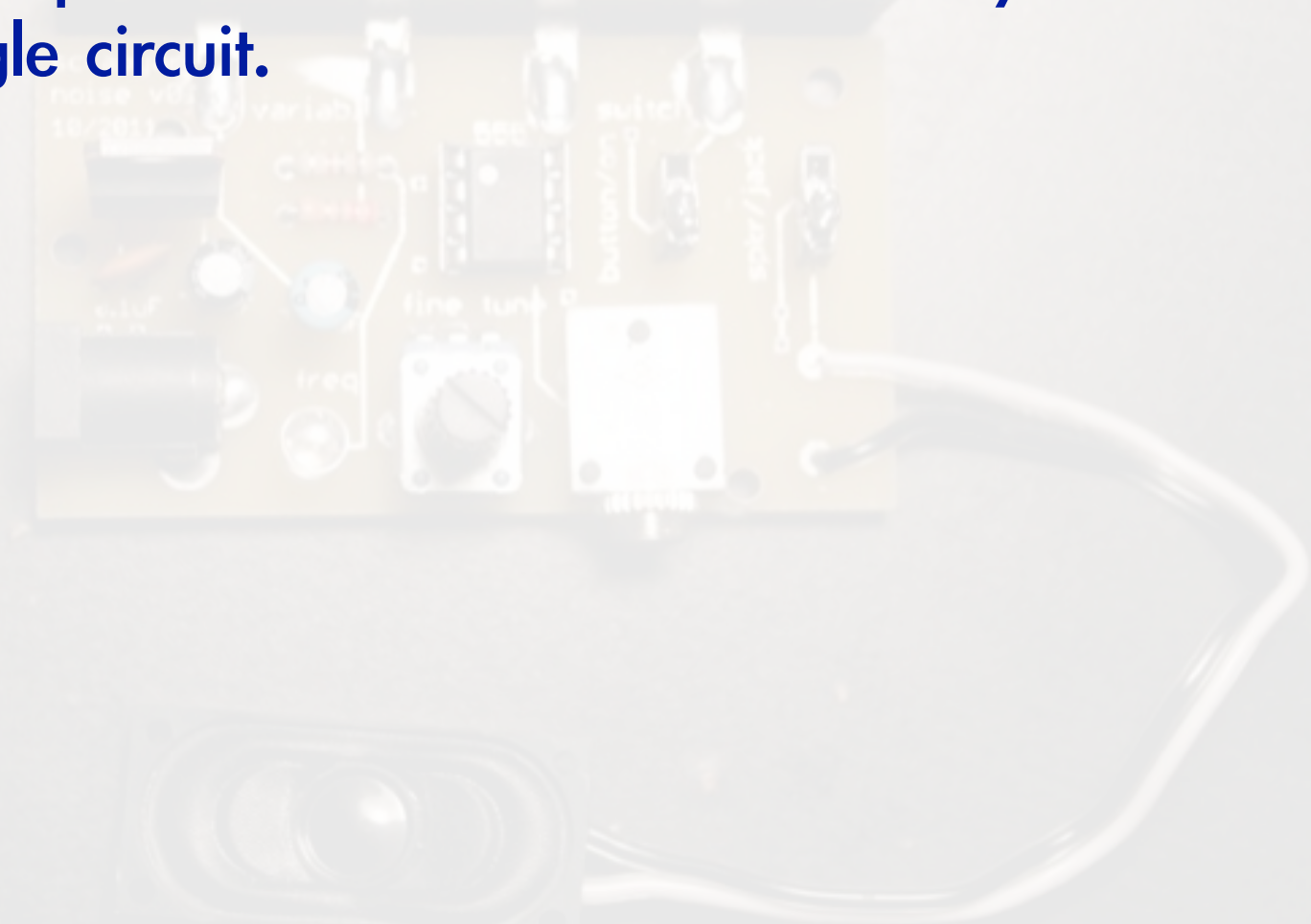
ANALOG: The analog input demonstrates the concepts of resistance and conductivity within a single circuit.



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The amount of resistance passing through their circle instantly affects the pitch of the sounds heard

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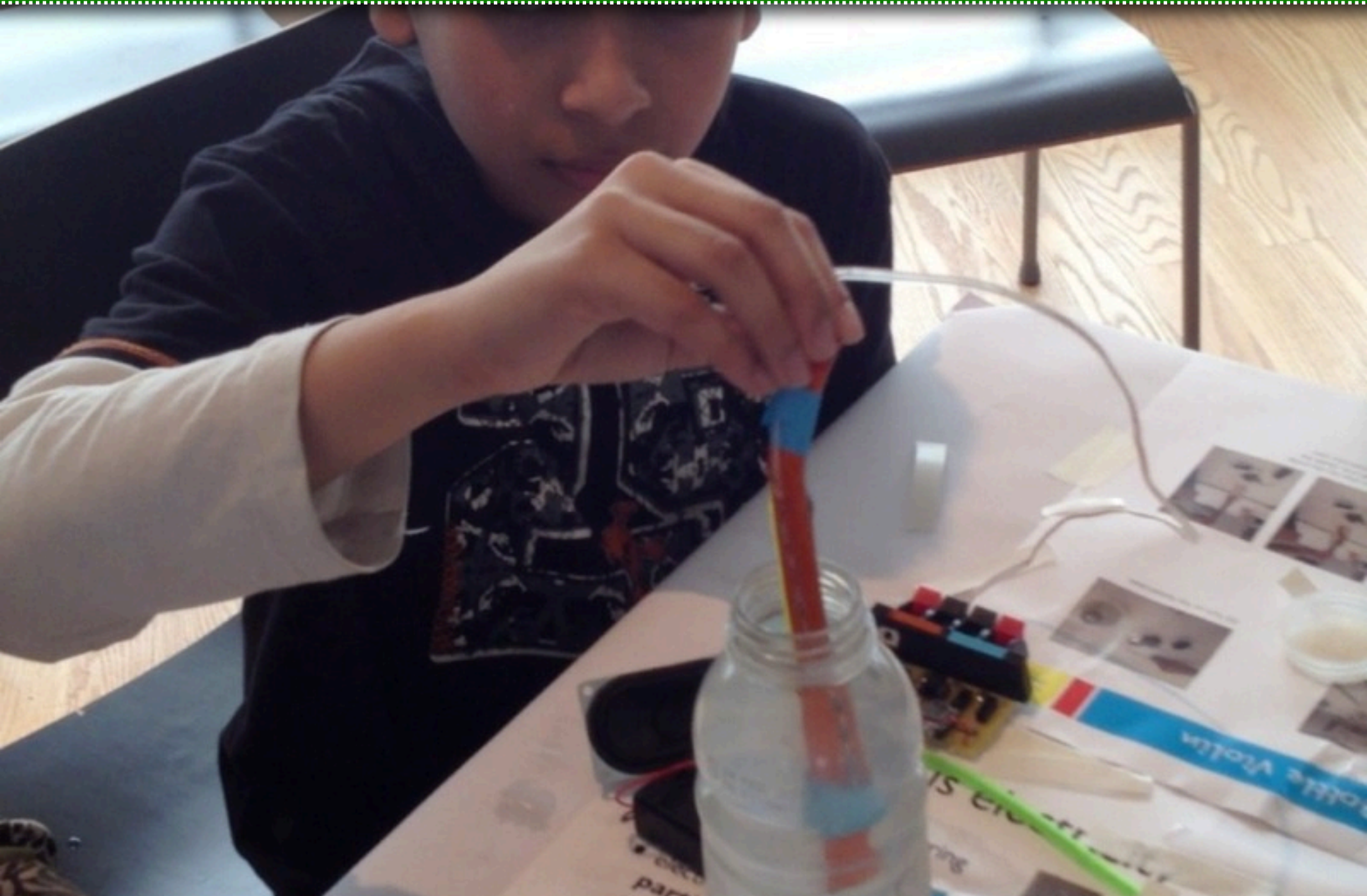
NOISEMAKER BOARD LEARNING OUTCOMES

ANALOG: The analog input demonstrates the concepts of resistance and conductivity within a single circuit.

The amount of resistance passing through their circle instantly affects the pitch of the sounds heard

DIGITAL: The digital input illustrates a closed versus open circuit. When a connection is made between the two poles, as simple as clapping two bands of aluminum foil together in the noisy stuffed animal project, sound is emitted.

SCRAPYARD CHALLENGE Jr. ACTIVITIES



SCRAPYARD CHALLENGE Jr. ACTIVITIES

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BOTTLE VIOLIN

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Comprised of a pre-made resistor chain, wires, tape, cardboard, and one 20 oz bottle of saltwater.

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Comprised of a pre-made resistor chain, wires, tape, cardboard, and one 20 oz bottle of saltwater.

Makers connect the chain to the analog input of the Noisemaker Board and dip the chain into the salt water to create a chain of changing sounds

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BOTTLE VIOLIN

Comprised of a pre-made resistor chain, wires, tape, cardboard, and one 20 oz bottle of saltwater.

Makers connect the chain to the analog input of the Noisemaker Board and dip the chain into the salt water to create a chain of changing sounds

Learning: activity emphasizes that electricity (or a current) always takes the path of least resistance, while also showing that electrical energy can be transformed into sound.

BOTTLE VIOLIN

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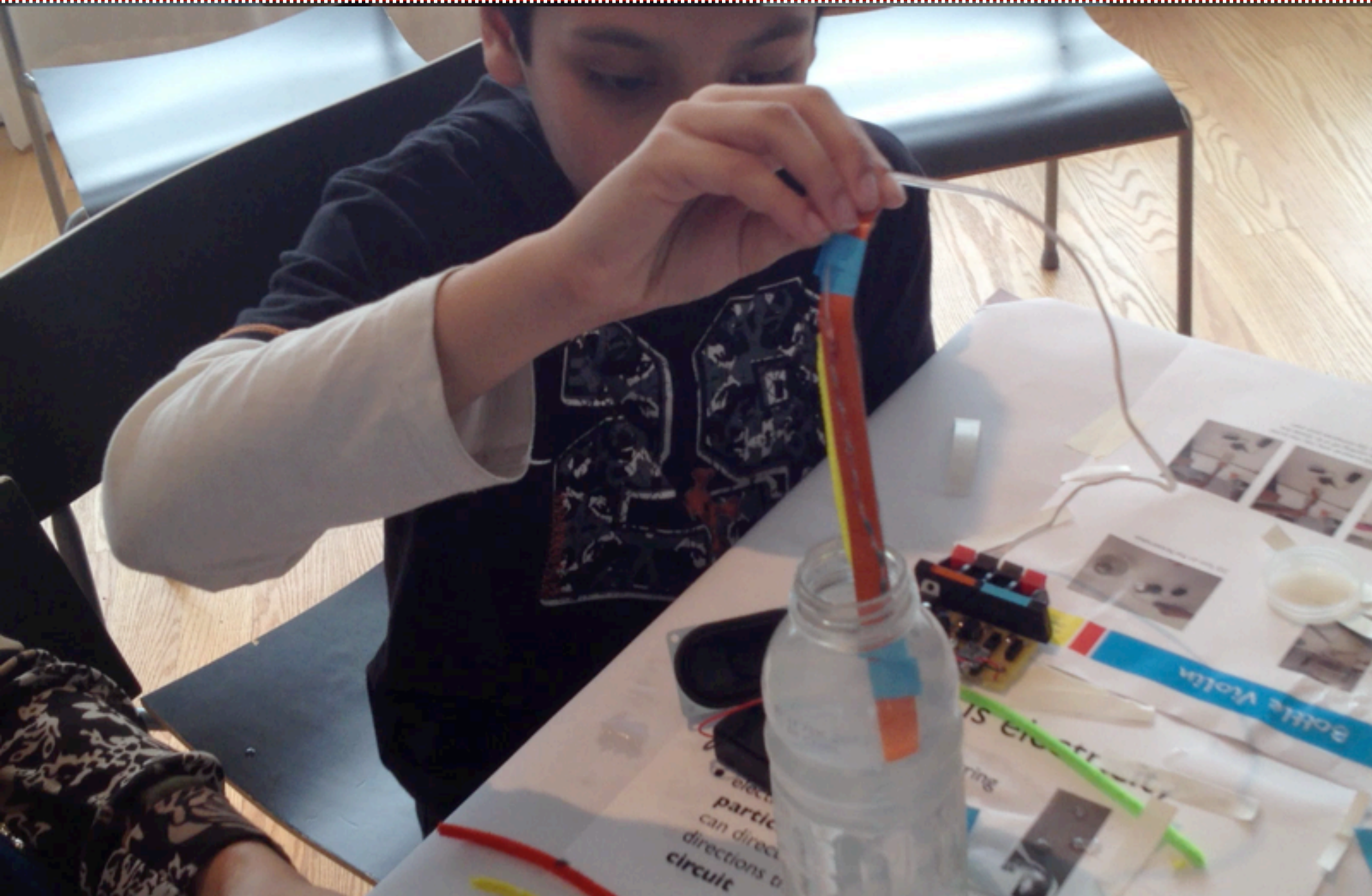

SCRAPYARD CHALLENGE Jr. ACTIVITIES

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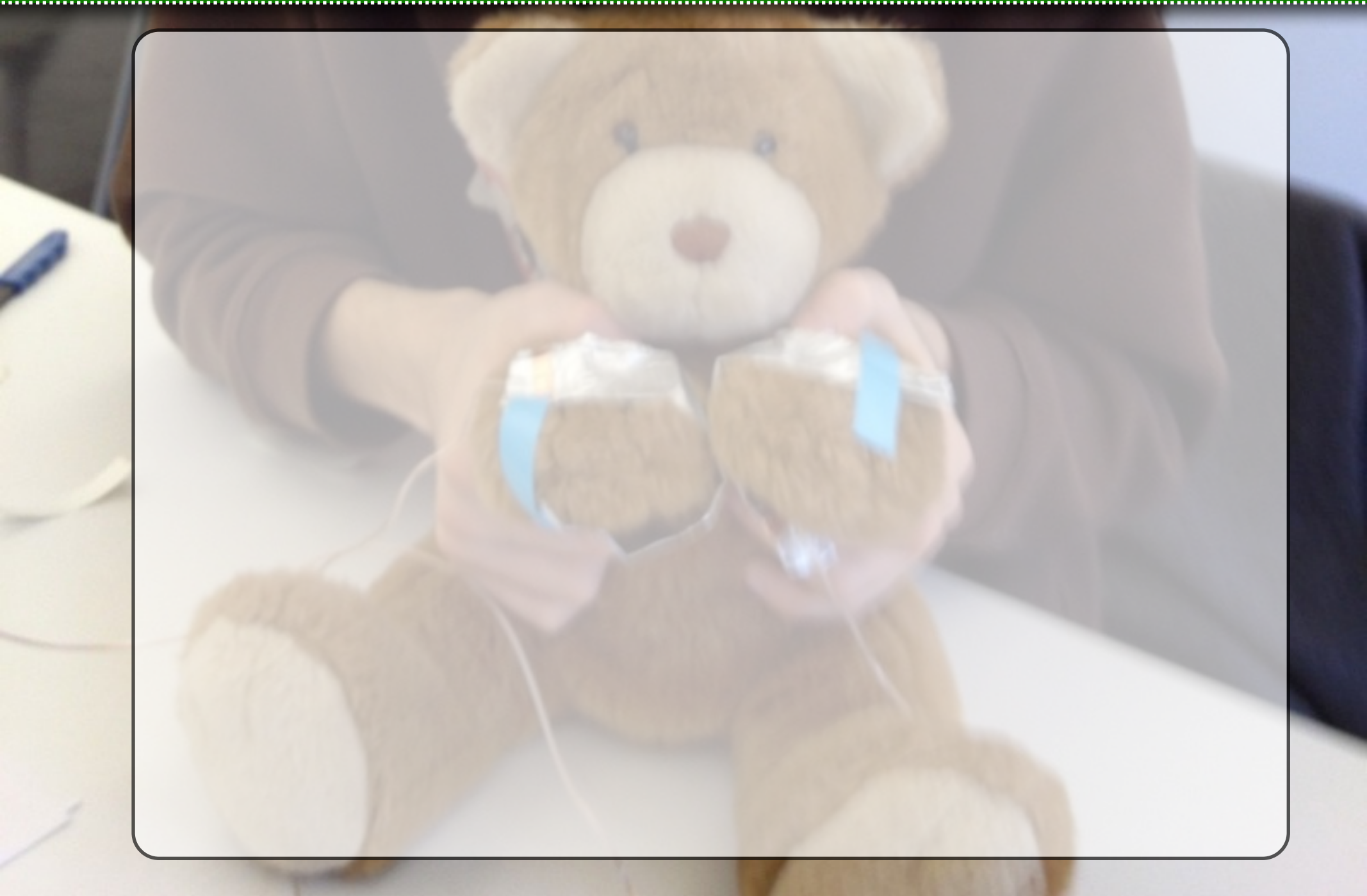

SCRAPYARD CHALLENGE Jr. ACTIVITIES

STUFFED ANIMAL DRUMS

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2 strips of aluminum foil, wires, copper conductive tape (used instead of solder for younger kids), stuffed animal

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STUFFED ANIMAL DRUMS

2 strips of aluminum foil, wires, copper conductive tape (used instead of solder for younger kids), stuffed animal

Aluminium foil is banded around the limbs of the animal and serve as switches connect to the digital inputs of the board - so that when a child claps the arms together they close the switch and create sound

STUFFED ANIMAL DRUMS

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SCRAPYARD CHALLENGE Jr. WORKSHOPS

SCRAPYARD CHALLENGE Jr. WORKSHOPS

Scrapyard Challenge Jr., Parsons School of Design, New York, NY, January 28, 2012, 12 to 4 p.m.
Kids 4 to 6 year olds

SCRAPYARD CHALLENGE Jr. WORKSHOPS

SCRAPYARD CHALLENGE Jr. WORKSHOPS

Scrapyard Challenge Jr., Ridgecrest Intermediate School, Palos Verdes, CA, February 28, 2012.
Middle schoolers - 7 & 8th grade

SCRAPYARD CHALLENGE Jr. WORKSHOPS

SCRAPYARD CHALLENGE Jr. WORKSHOPS

Scrapyard Challenge Jr., USA Science and Engineering Festival 2012, With the National Academy of Sciences, Washington Convention Center, Washington, D.C., April 28-29, 2012, Kids 6 to 8 year olds.

SCRAPYARD CHALLENGE Jr. EVALUATION

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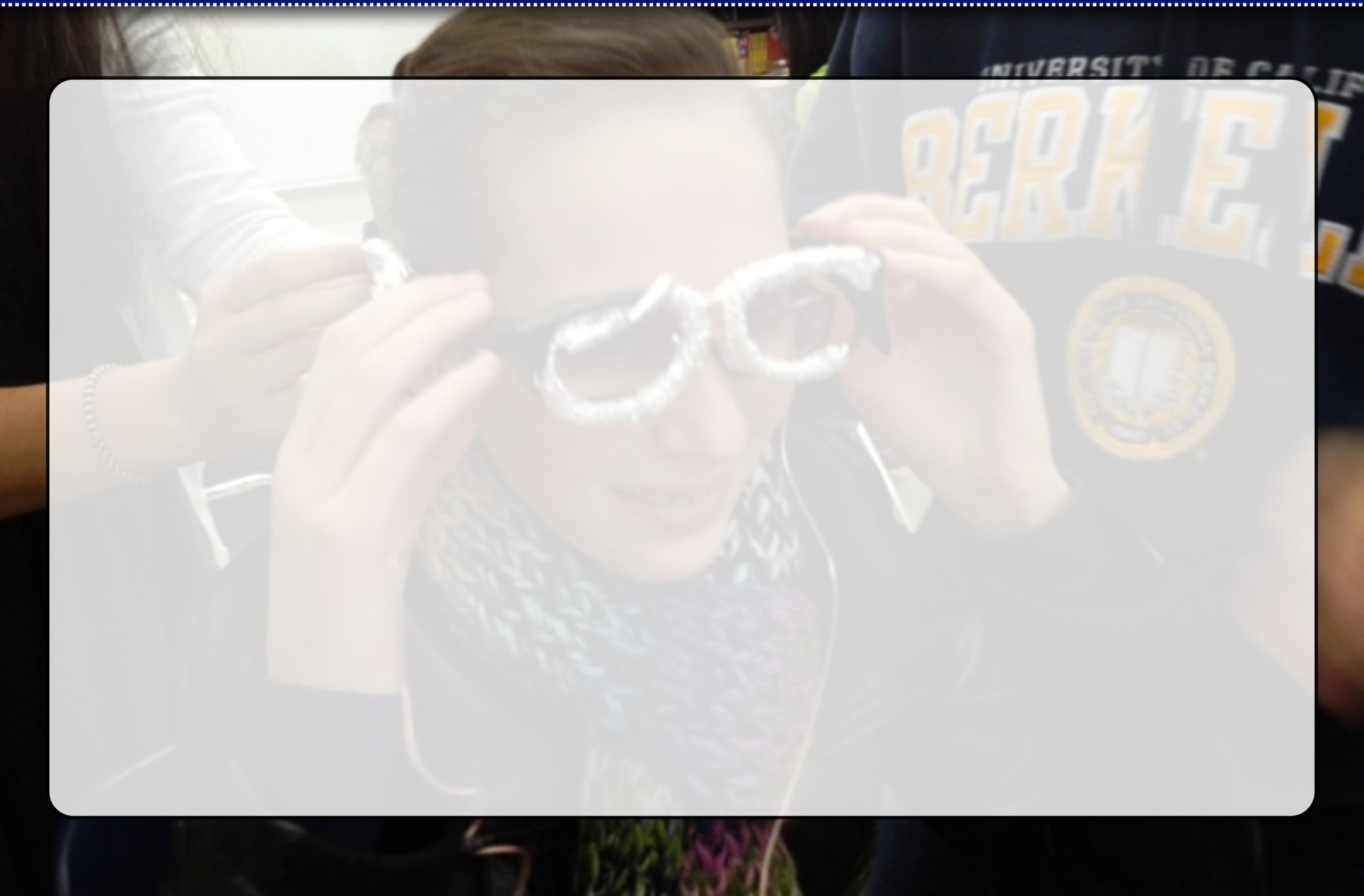

SCRAPYARD CHALLENGE Jr. EVALUATION

SCRAPYARD CHALLENGE Jr. as an informal learning experience with roots in hacker and maker spaces and the remix cultures surrounding them.

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Learning spaces: outside classrooms and other formal settings

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SCRAPYARD CHALLENGE Jr. as an informal learning experience with roots in hacker and maker spaces and the remix cultures surrounding them.

Learning spaces: outside classrooms and other formal settings

We emphasize participant-driven learning and application of more theoretical concepts through the creative making process

SCRAPYARD CHALLENGE Jr. FRAMEWORK

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WE FOCUS ON 4 POINTS OF EVALUATION

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Excitement and interest levels in learning about how the physical world works

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Engagement in scientific practices

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WE FOCUS ON 4 POINTS OF EVALUATION

Excitement and interest levels in learning about how the physical world works

The nature of scientific enterprise

Engagement in scientific practices

The degree to which participants self-identify as science learners.

SCRAPYARD CHALLENGE Jr. OBSERVATIONS

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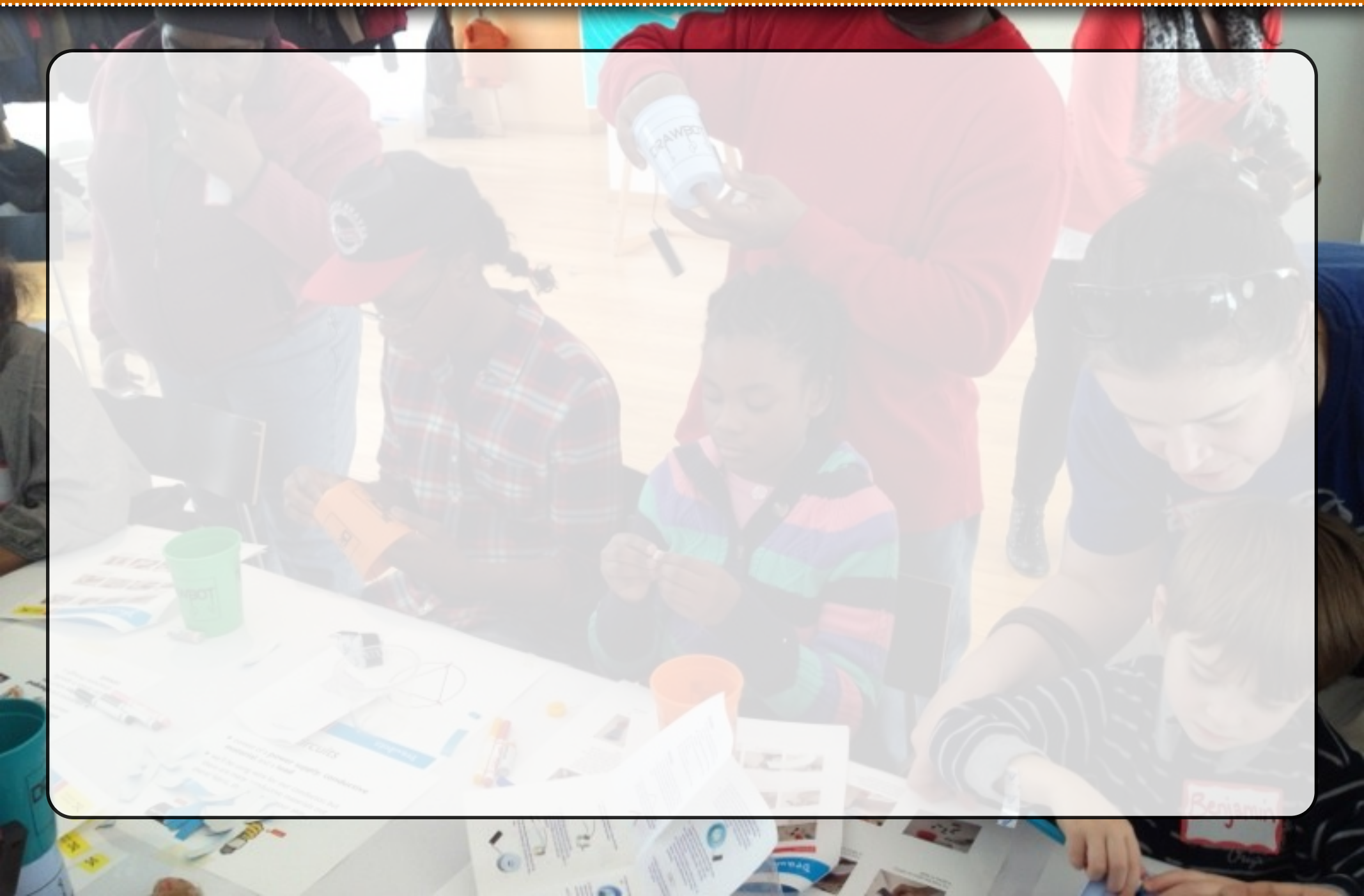

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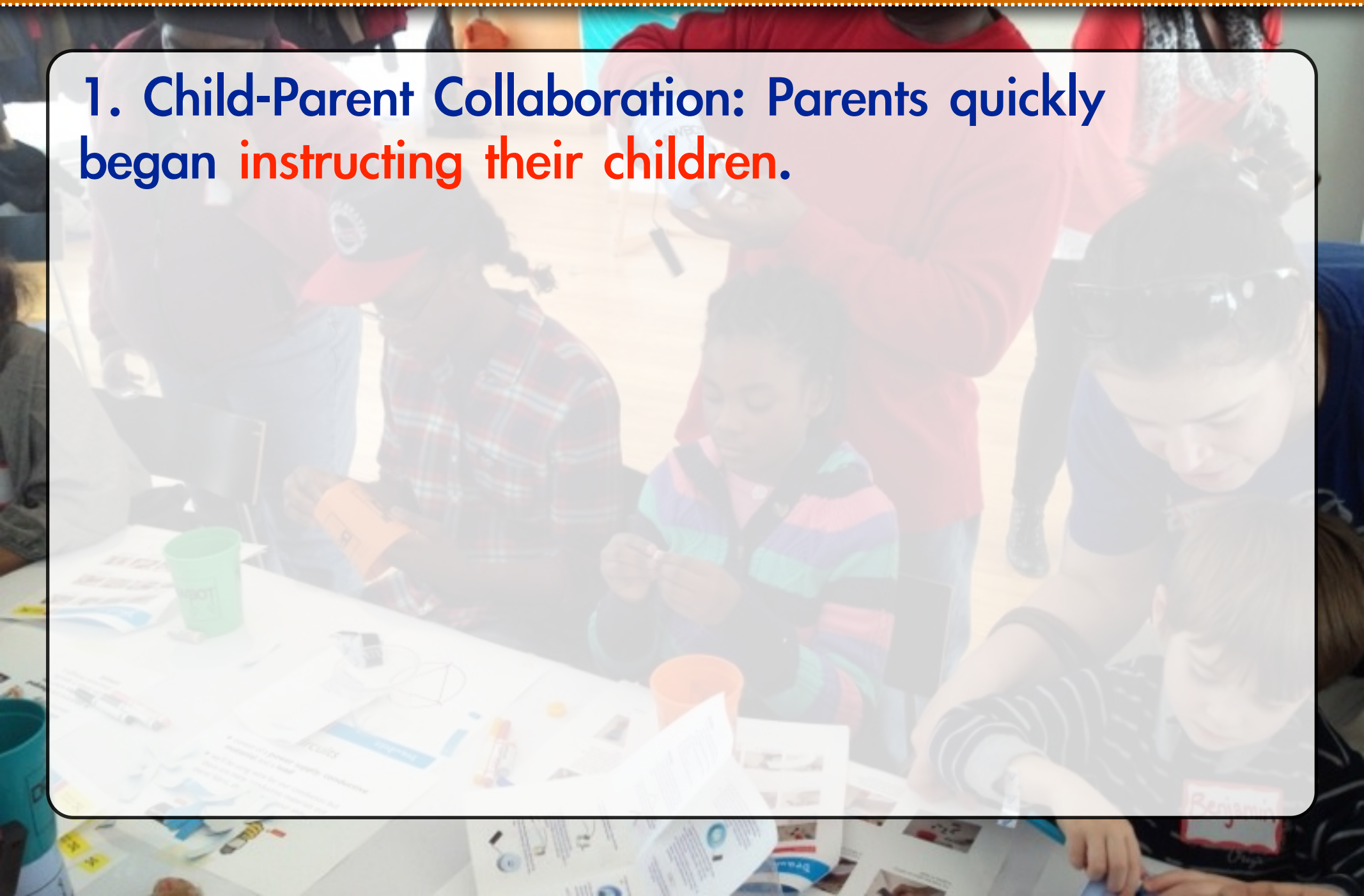
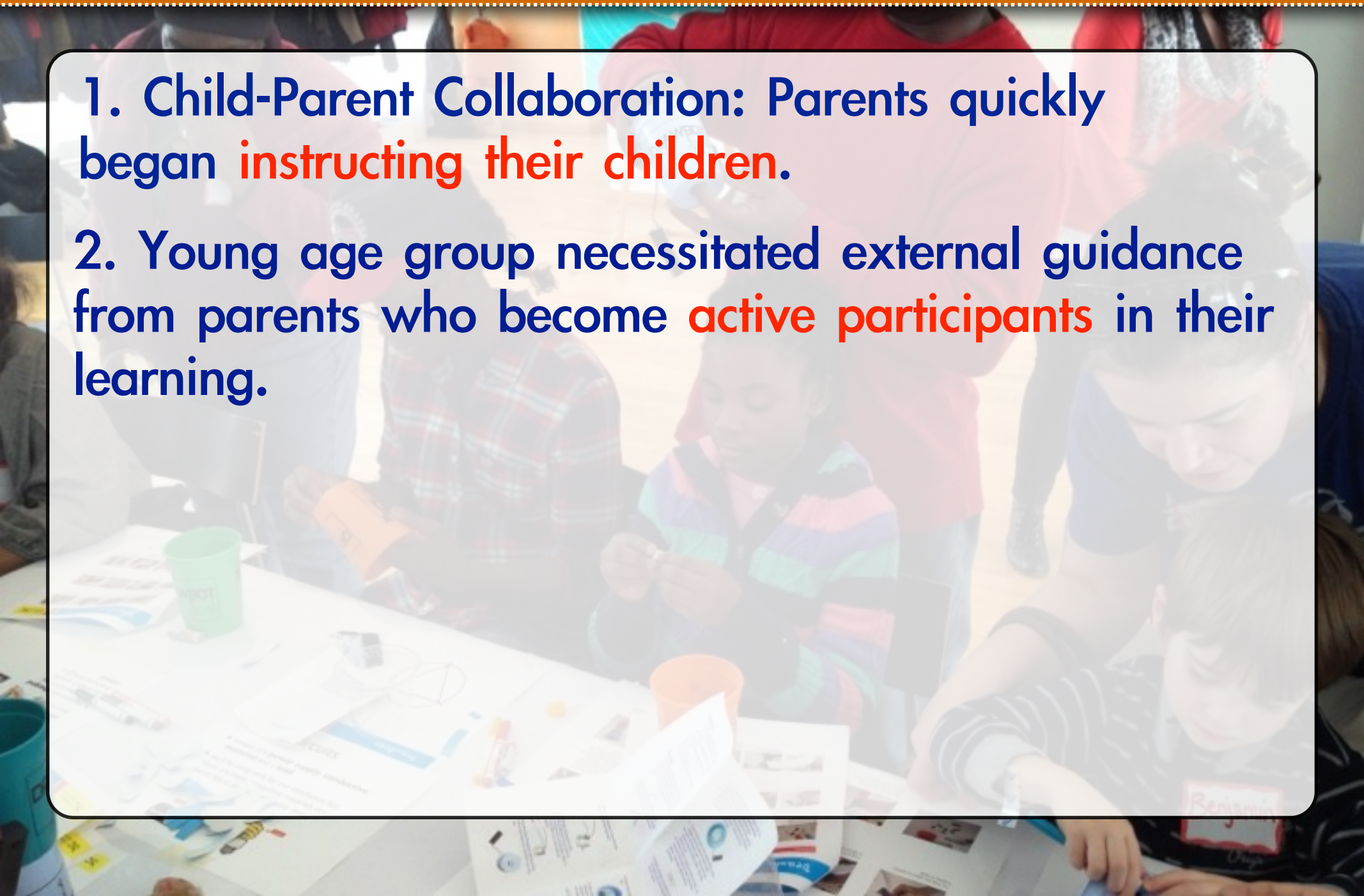


1. Child-Parent Collaboration: Parents quickly began instructing their children.

SCRAPYARD CHALLENGE Jr. OBSERVATIONS



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1. Child-Parent Collaboration: Parents quickly began instructing their children.

2. Young age group necessitated external guidance from parents who become active participants in their learning.

3. An unexpected outcome of the workshop was the level of engagement exhibited by the parents.

4. Parents saw the workshop as a venue for shared learning, along with the reinforcement of school curriculum.

SCRAPYARD CHALLENGE Jr. DISCUSSION

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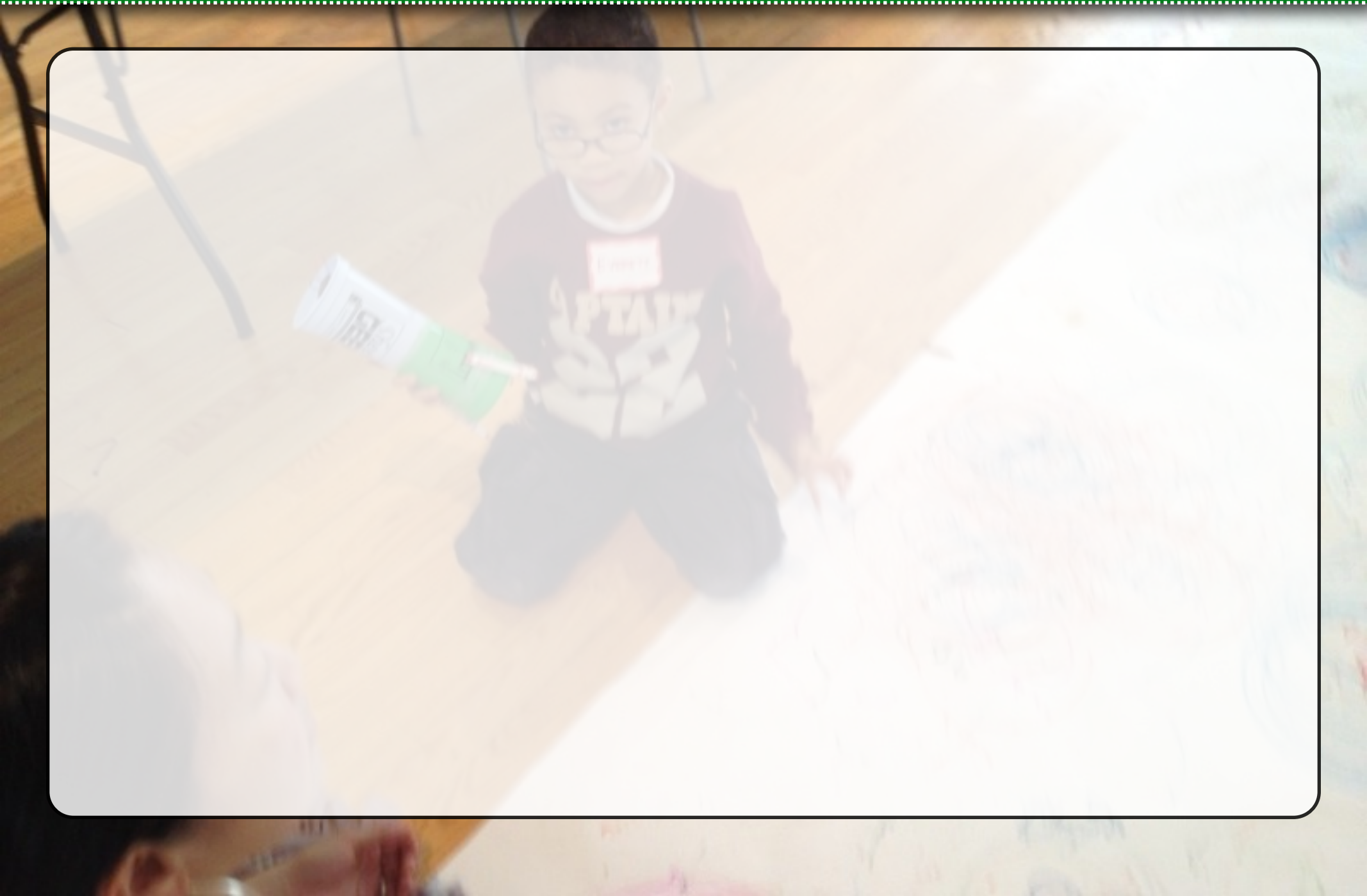
1. STEAMD approach to informal science learning nurtures multigenerational learning by virtue of its scalability, both in concepts learned and personal interest.

2. Element of choice intrinsic to workshop activities: not only did participants choose the stations that interested them most, they also chose how to approach each project.

3. Teen facilitators made connections between their own background in art and design; parents guided students through different activity steps and learned new concepts in the process

SCRAPYARD CHALLENGE Jr. DISCUSSION



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By confronting challenges such as faulty circuits or loose connections, participants were forced to solve problems that only manifest through the process of building.

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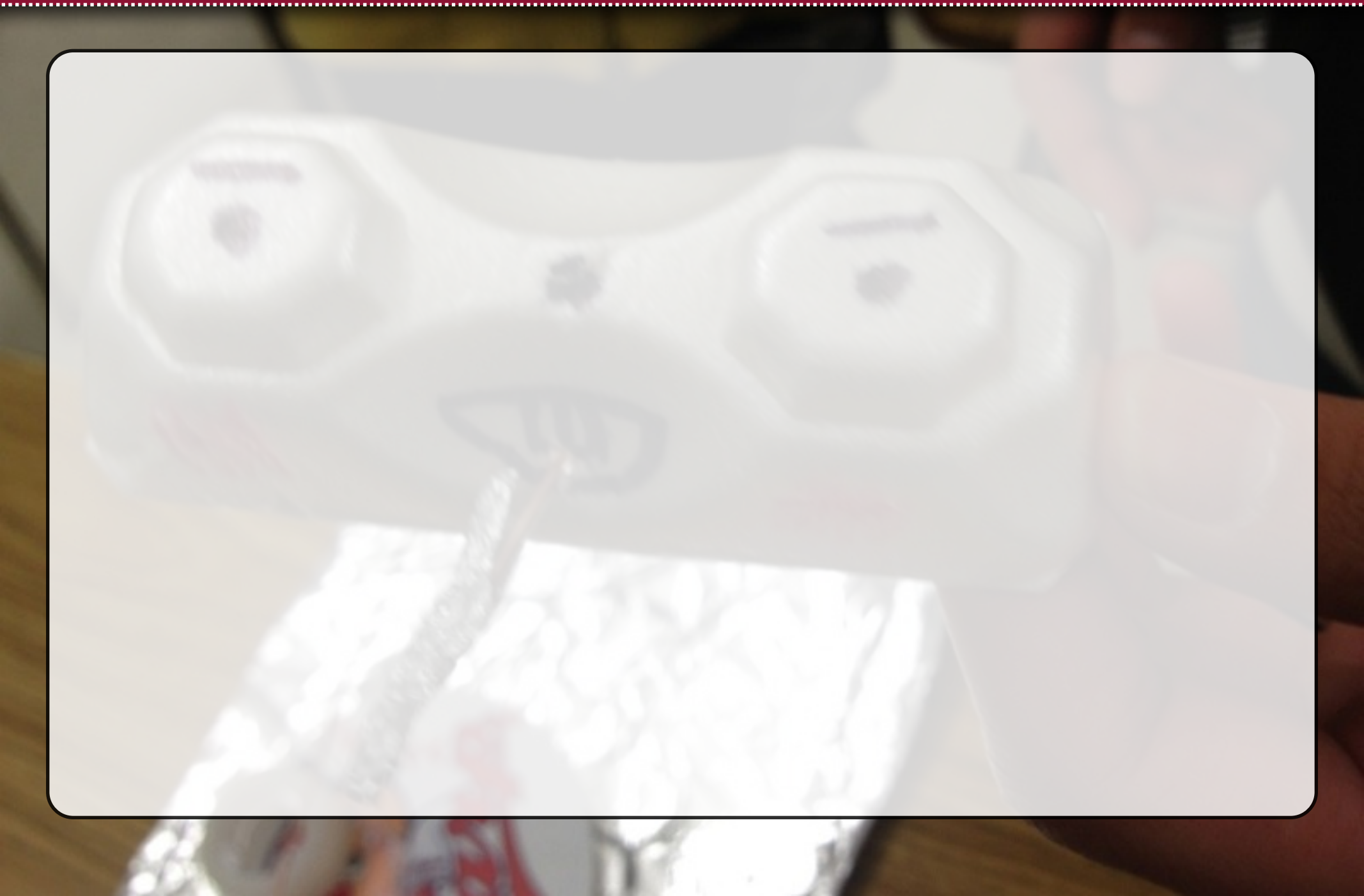
As educators, artists, and designers who work comfortably within the iterative design process, we recognize and embrace the emergent learning that arises

By confronting challenges such as faulty circuits or loose connections, participants were forced to solve problems that only manifest through the process of building.

We designed experiences that offer a constructive challenge to participants.

SCRAPYARD CHALLENGE Jr. NEXT STEPS



SCRAPYARD CHALLENGE Jr. NEXT STEPS

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Future versions will primarily target tweens.

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Already designed the next generation Noisemaker.

Could evolve to include simple lessons around basic concepts of audio wave forms and audio theory

Jonah Brucker-Cohen, Katherine Moriwaki,
Louisa Campbell, Joe Saavedra, Liza Stark, Liz Taylor

School of Art, Media and Technology
Parsons, the New School for Design, New York, NY

MFA +

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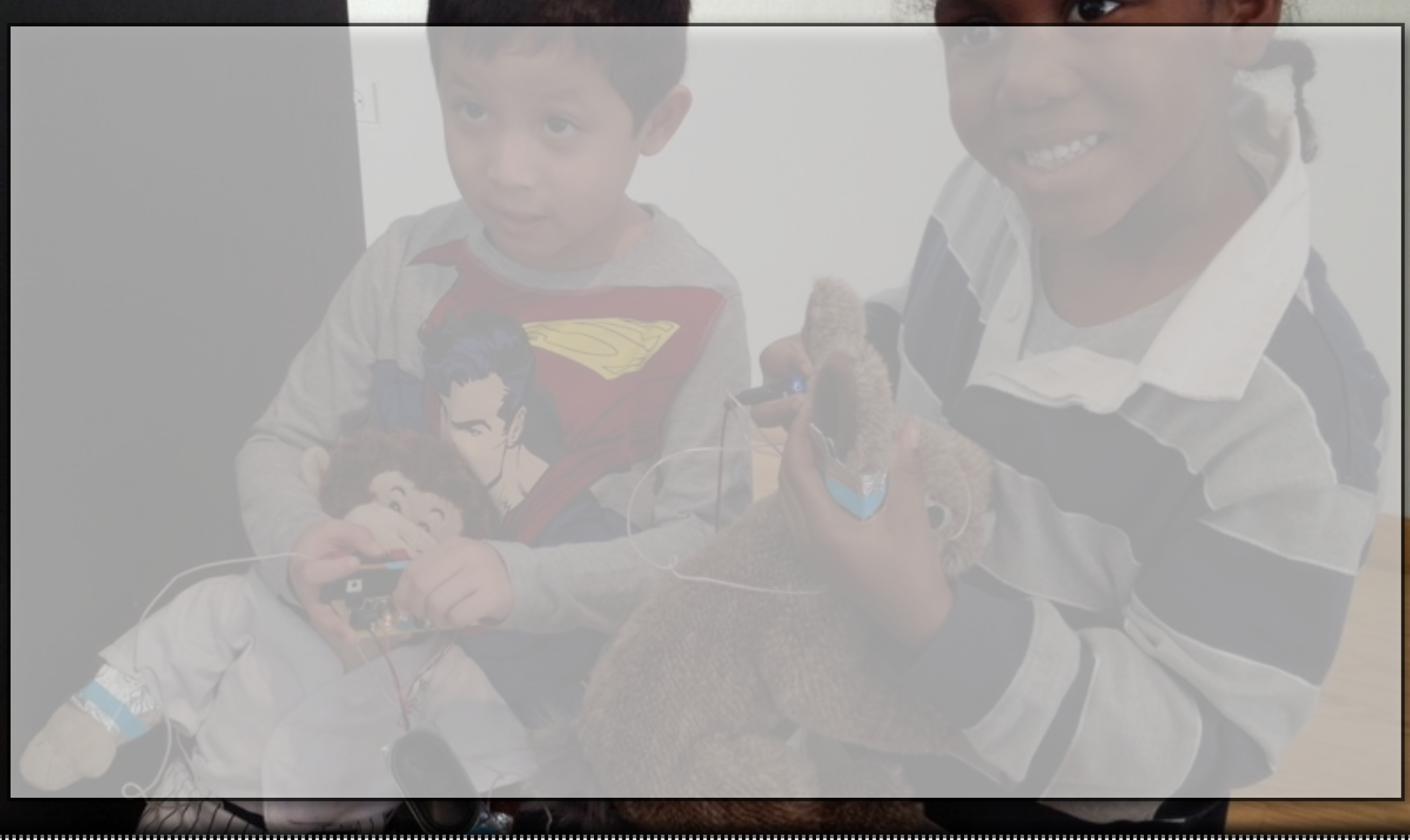

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THANKS!

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MFA + D

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THANKS!

Twitter: @scrapchall

jr.scrapyardchallenge.com

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QUESTIONS? COMMENTS?

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