

Gifts for Intertwining with Modern Nature

Jay Silver

Lifelong Kindergarten Group
MIT Media Lab
Cambridge, MA 02139 USA
silver@media.mit.edu

Eric Rosenbaum

Lifelong Kindergarten Group
MIT Media Lab
Cambridge, MA 02139 USA
ericr@media.mit.edu

ABSTRACT

Inspired by Froebel's Gifts for kindergarten, we propose a new category of gifts for modern preschools. Modern Nature Gifts are meta-manipulatives, inviting deeper exploration of and new uses for the manipulatives already in the Modern Nature environment. We define Modern Nature in terms of urban Nature and personal Nature. We situate this new type of gift among existing preschool practices, and describe four working prototypes (Glowdoodle, Twinkle, Mmmtsss, and Drawdio) as examples of Modern Nature Gifts.

Keywords

Preschool, nature, inquiry

MODERN NATURE

"One of the major characteristics of young children's play is that whatever is in their environment can be used as play materials. For example, the magazine left lying on the floor, the last bites of cereal on the high chair tray, the mud in the yard... can all become play facilitators." - from Doris Burgen's "New Technologies in Early Childhood" [2]

What is Modern Nature? We define it to include both urban Nature and personal Nature. Urban Nature includes trees that are wild as well as landscaped. As Burgen suggests, Urban Nature includes humans and bugs, fridge food and dirt, and even crayons and Legos [7]. Of course, what is modern Nature for one person may not be for another: if there are no avocados around where one child lives, then avocados are not part of that child's personal Nature. Personal Nature implies that we live in a time of many *microclimates*, where one person's Nature differs drastically from the next across small geographical distances, and the environment turns over drastically between generations. [6]

MODERN NATURE GIFTS

Froebel, the founder of "Kindergarten," recommends a three part approach:

- 1) Creative sedentary play
- 2) Healthy activity
- 3) Stimulating awareness of the natural world [8]

He offered "gifts" (manipulatives such as balls, blocks and sticks) especially for the first of these. The new category of gifts which we propose for the modern preschool is intended to cut across all three categories, not by obsoleting or replacing any of the tools in the modern preschool, but rather by focusing attention back on Modern Nature and

how to build with it, nurture it, and form an intimate relationship with it. Imagine:

- i - Painting a picture with your hand, a pine cone, a flashlight, or a Lego.
- m - Composing a song visually using a crayon, a flower, and a kitty cat, and then play it back with the wave of a hand.
- a - Inventing a musical instrument with a pencil or a T-shirt or the bathroom sink.
- n - Sampling the song of a bird, a scream from your mouth, and a ditty from the latest junky plastic toy, and mixing them together improvisationally.

We are proposing a new set of gifts, *Modern Nature Gifts*, with an architecture that directly encourages investigating, remixing, expressing yourself with, and creatively playing with Modern Nature. They raise the questions:

- "What are the properties of this Modern Nature?"
- "How can its elements be combined?"
- "How can I express myself and communicate to others by interacting with this stuff?"
- "In which ways do I share properties with Modern Nature? In Which ways am I intertwined with it? In which ways *am* I Modern Nature?"

In a sense, Modern Nature Gifts are meta-gifts in that they point back to Modern Nature, including Froebel's gifts. They are a meta-manipulative in the sense that you don't manipulate the Modern Nature Gifts so much as use them to explore Modern Nature itself.

INSPIRATIONS

We were inspired by a number of people who came before us. Here we'll focus on the inspiration we take from a few radical pioneers of the preschool environment.

According to Rudolf Steiner, founder of Waldorf Schools, "On a given morning, children might do such things as sing songs, paint with watercolors, color with beeswax crayons, cook, hear a story told with puppets, go on a nature walk, work in the garden, build with wooden blocks, or make houses using play stands and cloth." [1] We are excited imagining a day of learning spent this way, and we are often disappointed when experts in computer human interaction propose one-shot solutions to 21st century skills that don't take into account a holistic perspective of all the other important skills that are learned in this developmental stage. We feel strongly that changes in learning environments must be carefully evolved and adapted [4] to

the existing balanced learning ecosystem. So our approach doesn't recommend leapfrogging into the future, but rather integrating into the beeswax crayons, the nature walks, and the song singing that Steiner describes.

Loris Malaguzzi, pioneer of the Reggio Emilia preschools, whose "thinking reflects a social constructivism drawing from Dewey, Piaget, Vygotsky..." says that children speak "hundreds of languages" (expressive, communicative, and cognitive)—words, movement, drawing, painting, building, sculpture, shadow play, collage, dramatic play, music, to name a few—that they systemically explore and combine [1]. Building on the foundation of constructionist ideas from Seymour Papert [5], we are trying to support the construction of and expression of these hundred languages using Modern Nature Gifts.

FOUR MODERN NATURE GIFTS

Glowdoodle

What if children could draw and paint not just with crayons and brushes, but with anything in their environment? Glowdoodle is a new light painting system we have developed that opens up these possibilities. Just move an object around in the air and it leaves a trail of light in the projected image you see in front of you. In a dark room, you can use a glowing object to draw a picture or a pattern. In the light, you can paint with your face or hands. You can take any object and paint with it (see examples in figure 1). A few Legos snapped together becomes a rainbow colored brush. In playrooms or outdoors, full body painting becomes a collaborative kinesthetic activity. Unlike a Nintendo Wii, for example, there is no controller to hold in your hand or attach to your body: you just paint with your body itself and the existing elements of your own Modern Nature.

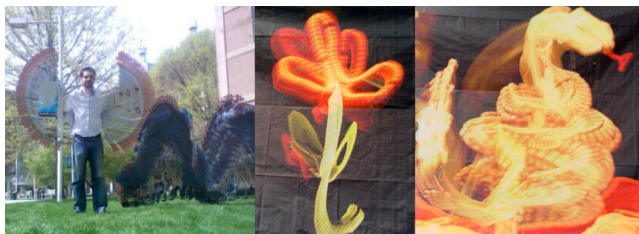


Figure 1: Glowdoodles: a drawing made with body movement, a flower painted using a flower as a brush, a snake drawn with hands

We imagine that children could use this system in a way that combines with and enriches the existing environment of their schoolroom. A nose, a sneaker, a strawberry, or a toy horse could all become unique new paintbrushes. In this way, glowdoodle encourages experimentation with the materials at hand. The current version of glowdoodle can be downloaded from <http://glowdoodle.com>, where you can also see over 1,500 glowdoodles created by children and adults. We are currently working with collaborators to install it in a children's museum for ages 3-10.

Twinkle

What if children could make melodies using the colors in a crayon drawing, the striped patterns on a cat, or the palette of the sunset sky? With Twinkle, children can draw a musical score with markers on paper, with each note represented by a different color, and then play it back by moving a special color-sensing wand over it. Children can also build songs using Legos, play the melody on a striped T-shirt, or listen to the complex musical patterns in an autumn leaf.



Currently twinkle is a working prototype system and has not been tested in the wild. See the video in the annex for a demonstration that begins to show the possibilities.

Figure 2: The song "Twinkle, Twinkle, Little Star" drawn with markers and playable using Twinkle

MmmTsss

What if children could create music using any sound they could make or find? MmmTsss is an interactive musical improvisation system we are developing to explore this possibility. Its name comes from the sound you make with your body to imitate a dance beat: a bass drum in your throat (mmm) and a hi-hat on your teeth (tsss). In MmmTsss you can record a sound into a loop, hear it repeat, and then record more sounds in layers on top of it. The sound is visualized as colored blobs around a circle, with each new sound layer in a new concentric ring. The interface consists simply of a large button to record. MmmTsss encourages an exploration of mouth noises and other sounds you can make with your body or with the Modern Nature around you, so that everything becomes a musical instrument. Our collaborators in a children's museum have installed a kiosk where thousands of children have tried out a version of mmmTsss.



Figure 3: MmmTsss

Drawdio

What if teachers could work with children to transform everyday objects into musical instruments? Drawdio is a circuit crafting kit we developed that makes this possible. For starters a teacher might make a musical pencil, simply by thumb tacking the Drawdio circuit onto a normal pencil (or marker or paintbrush). You make a drawing in graphite on a regular sheet of paper with a regular pencil, and touch it with your finger to play it. You've got to see the main video at <http://drawdio.com> to believe it. Drawdio transforms the electrical resistance of the drawing into a musical note. The drawing becomes a musical instrument

you can play. Then Drawdio can come off the pencil and any object can be transformed into a musical instrument. You can make music with a dish of macaroni, a tree, or even the bathroom sink or a hose. Children can explore the world, connecting Drawdio to a wide variety of objects to see what sounds they can make. Teachers can help invent more complex instruments that can then be explored deeply by children. Drawdio is currently available as a kit and thousands have been sold.



Figure 4: Clockwise from top left, using drawdio to make music with a sink, a bicycle, a tree, and a circle of friends

DISCUSSION

We have presented 4 working examples of what is just the beginning of a new type of design space that is especially appropriate for learning in the preschool situation. We propose these Modern Nature Gifts not as a replacement for the modern preschool environment, but an enhancement of the types of languages that children can “speak” and a special sort of constructionist “magnifying glass” that lets children build and express themselves with the Modern Nature they already know. We look forward to exploring more points in this design space. Also, since the designs are already working, inexpensive, and easily transferable, we look forward to testing the current designs in more preschool situations over longer periods of time.

WHO WE ARE

Jay Silver

Jay Silver has always been interested in education and facilitated his first workshop as a recurring Creative Course called “vine twirling” at Sunwood Academy when he was 8 years old. He first learned about Nature where he grew up in Cocoa Beach through surfing and by playing in the mangroves on the islands of the Banana River. Jay studied electrical engineering at Georgia Tech and Computer Speech and Internet Technology at Cambridge University under the tenure of a Gates Cambridge Scholarship for a Masters of Philosophy degree. Jay has now studied at MIT for 5 years: First, under the tenure of a National Science Foundation Fellowship at the laboratory for Computer Science and Artificial Intelligence, and then as a member of the Lifelong Kindergarten group at MIT’s Media lab,

where he attained a Master’s in Tools for Urban Nature Awareness and is currently a PhD candidate. Jay has run dozens of workshops in half a dozen countries using new media technologies and toolkits of all sorts, and he has exhibited at museums as diverse as the Boston Museum of Science, the National Taiwan Museum of Fine Arts, and the San Francisco Exploratorium. He is the co-founder of Joy Labs with his wife Jodi Silver, a preschool teacher.

Eric Rosenbaum

Eric is a Master's student in the Lifelong Kindergarten group at MIT Media Lab. His research interests include developing tools to cultivate reflective learning, and new media for expressive inquiry with light and sound. Currently he is developing the Jots system for reflective learning in the Scratch programming environment. His recent projects have included Scratch for Second Life, an easier way to program in virtual worlds, and the Shake and Play building blocks for experimenting with colored light, sound and motion. Before coming to MIT he developed animations for music education, augmented reality games for science education, and simulations for experimenting with atoms and molecules. He holds an undergraduate degree in psychology and Mind/Brain/Behavior and a Master's degree in Technology in Education, both from Harvard University.

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We are heavily steeped in our group, Lifelong Kindergarten (LLK), and the flavor of LLK's influence is certainly tastable in this paper.

REFERENCES

1. Edwards, Carolyn Pope. Three Approaches from Europe: Waldorf, Montessori, and Reggio Emilia. Spring 2002, Volume 4 Number 1. ECRP: Early Childhood Research and Practice.
2. Burgen, Doris. New Technologies in Early Childhood, Partners in Play? In Saracho, O.N. and Spodek, B. Contemporary Perspectives on Science and Technology in Early Childhood Education. 2008.
3. Carr, Margaret. Technological Affordance, Social Practice and Learning Narratives in an Early Childhood Setting. International Journal of Technology and Design Education 10, 61–79, 2000.
4. Liedeloff, Jean. The Continuum Concept: In Search of Happiness Lost. Da Capo Press, 1986.
5. Papert, S. & Harel, I. Constructionism. Ablex. (1991)
6. Silver, Jay. Nature as Interface: MacGyvering Interactivity with Trees, Pencils, Grandpa, Even the Kitchen Sink. Submitted to Creativity and Cognition 2009.
7. Silver, Jay. Toward a Toolkit for Urban Exploration (MIT master's thesis, 2008)
8. <http://www.froebelweb.org>, retrieved April 29, 2009