

The Making of Making at ISB

Submitted by

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and

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At the start of 2015, ISB is kickstarting the exciting process of building a Makerspace at the school. This campaign is designed to augment the Maker culture that is already present at ISB, as evidenced by the school's inspiring vision, materials, and educators, but even more importantly, as driven by the natural impulse to explore, play, and create that is shared by all children, and certainly the students at ISB.

In close collaboration with LEGO Foundation and LEGO Education, as well as with institutions such as [Harvard](#) (Project Zero), [Tufts](#) (CEEEO), and [MIT](#) (Lifelong Kindergarten Group), the ISB community was eager to pioneer a makerspace process that also reflects Danish education standards and celebrates the IB curriculum and culture.

The following plan will articulate the launch of the Makerspace process over the next few months, providing a brief description of making and noting its alignment with the IB.

Key Players

The following list includes names of individuals who are currently involved in this process:

ISB

<i>Camilla Uhre Fog</i>	Head of School
<i>Sue Oates</i>	Head of Academic Programme
<i>Kathy Jo Bilgrav</i>	Head of Administration
<i>Bent Meldgaard Pedersen</i>	Caretaker
<i>Mike Sullivan</i>	Primary Teacher
<i>Laura Constance</i>	Primary Teacher Assistant
<i>Sidsel Overgaard</i>	Communications Manager

LEGO Foundation

<i>Bo Stjerne Thomsen</i>	Director of Research and Learning
<i>Amos Blanton</i>	Research Officer

The lead program team for the Makerspace process at ISB is currently comprised of, but not limited to:

- Amos Blanton* ("consultant" role)
- Mike Sullivan* ("coordinator" role)
- Laura Constance* ("teacher" role).

Potential outside sources include:

Francois Albouy (LEGO Education)

Filippa Malmegård (LEGO)

Steve Davee (Maker Education Initiative)

Riley Meehan (MIT and Cambridge Friends School)

Making and the IB

Making refers to hands-on, creative, project-based activities driven by the interests of the creator. As such, Making has occurred “from the time humans first began making and using tools,” but at the moment, Making is a very popular and powerful trend as an educational, technological, and entrepreneurial concept (Resnick & Rosenbaum). Though makerspaces are relatively new arrivals in educational settings, two of the important models that are worth following throughout this process are:

- 1) a school model: [High Tech High](#), a K-12 high school in San Diego, CA
- 2) a community model: [Parts And Crafts](#), a non-profit workshop run by “thinkers, teachers, and tinkerers” that provides educational opportunities for children and adults in Boston, MA.

Mitch Resnick, LEGO Papert Professor of Learning Research and director of the Lifelong Kindergarten Group at MIT Media Lab, argues that for young people to thrive in the 21st century, they require educational settings that foster creative thinking and adaptive problem-solving. Making provides an outstanding opportunity for young people to play and learn in this way, practicing how to think and not what to think. Making may feature digital and high-tech tools, or it may involve experiential learning in the sandbox, the forest, the kitchen, the woodshop, or the music studio — all open-ended educational environments which help children to think in creative and collaborative ways.

Making happens every day at the ISB -- in the design class, in LEGO Education Innovation studios, and throughout the Unit of Inquiry, a benchmark of the IB. The current goal is to augment Making at ISB with both new technologies and new approaches to learning and facilitation.

Making is often described as “Design-based Learning.” In *Designing for Tinkerability*, Resnick and Rosenbaum articulate a definition of Making that harmonizes aspects of learning-through-play with themes familiar throughout the IB:

Many people see play as a form of entertainment or fun, but we see it somewhat differently. To us, play is a style of engaging with the world, a process of testing the boundaries and experimenting with new possibilities.

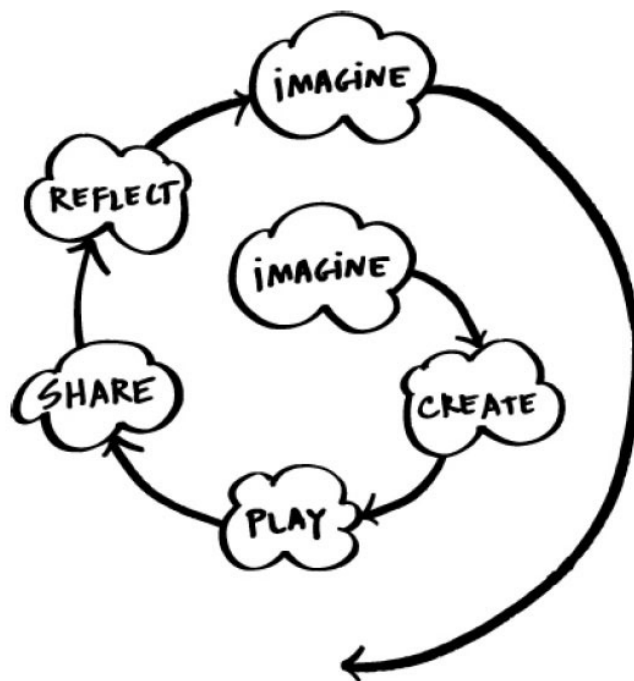
We see tinkering as a playful style of designing and making, where you constantly experiment, explore, and try out new ideas in the process of creating something. Tinkering can be hard work, and sometimes it might not seem like play. But there is always a playful spirit underlying the tinkering process.

The authors go on to discuss Making and tinkering in ways that further echo aspects of the IB. Additional notes are quoted and paraphrased below [italics added]:

1. Makers/tinkerers engage in “a conversation with the material,” where *questions* are valued even more highly than answers.
2. The “bottom-up approach” in tinkering celebrates *curiosity, creativity, and open-ended, student-driven* learning experiences rather than a traditional “top-down” approach with a single educational goal for all participants.
3. Do-it-yourself (DIY) and do-it-together (DIT) models in makerspaces foster student agency, *self-confidence*, and playful *perseverance*, as well as provide ample opportunity to *share* and collaborate with *other people, ideas, and materials*.
4. Makers/tinkerers are as comfortable with taking *risks* and “diving in” to the material and the design process as they are with “stepping back” and engaging in “*reflection*” about the process.
5. Tinkering is contrasted with “planning” and encourages students and teachers alike to “let go” and embrace a more serendipitous and *inquisitive* approach to learning and teaching.

And just as IB schools take great care to fill their physical spaces with aspects of the learning and inquiry process -- literally documenting the dynamics of the educational setting -- Resnick and Rosenbaum also support new ways of thinking about “space” as a critical player in the way in which making, tinkering, and learning occurs. Multiple ideas and iterations abound in the IB classroom as well as in makerspaces.

A centerpiece of Resnick’s work at the Lifelong Kindergarten at MIT is manifested in a simple but powerful image. The diagram below depicts how a healthy creative process can flow through a cycle of “imagine → create → play → share → reflect → imagine → ...”



In this cycle, one imagines a design project or solution that inspires a creation. One plays and toys with that creation, at which point others can provide feedback and additional ideas, which then influence one's own thoughts on the design, resulting in changes to the design and the next iteration.

Given that the mission of the IB is to nurture “young people” to be “inquiring” and “knowledgeable,” while also “active” and “lifelong” learners, it is clear why Making is a new priority at ISB. Though the experience of Making stimulates and celebrates critical requirements throughout the IB, certain aspects resonate even more powerfully than others and are highlighted below:

KEY CONCEPTS

Connection “How is it connected to other things?”

Causation “Why is it like it is?”

Function “How does it work?”

Reflection “How do we know?”

LEARNER PROFILE

Inquirer

“They develop their natural curiosity. They acquire the skills necessary to conduct inquiry and research and show independence in learning. They actively enjoy learning and this love of learning will be sustained throughout their lives.”

Communicator

“They understand and express ideas and information confidently and creatively in more than one language and in a variety of modes of communication. They work effectively and willingly in collaboration with others.”

Reflective

“They give thoughtful consideration to their own learning and experience. They are able to assess and understand their strengths and limitations in order to support their learning and personal development.”

Risk-taker

“They approach unfamiliar situations and uncertainty with courage and forethought, and have the independence of spirit to explore new roles, ideas and strategies. They are brave and articulate in defending their beliefs.”

PYP ATTITUDES

Curiosity

“Being curious about the nature of learning, about the world, its people and cultures.”

Creativity

“Being creative and imaginative in their thinking and in their approach to problems and dilemmas.”

Independence

“Thinking and acting independently, making their own judgments based on reasoned argument, and being able to defend their judgments”.

Confidence

“Feeling confident in their ability as learners, having the courage to take risks, applying what they have learned and making appropriate decisions and choices.”

Commitment

“Committed to their own learning, persevering and showing self-discipline”

TRANSDISCIPLINARY SKILLS

Social Skills

Cooperating

Adopting a variety of roles

Communication Skills

Listening

Speaking

Non-Verbal Communication

Research Skills

Formulating questions

Observing

Interpreting Data

Thinking Skills

Acquisition of knowledge

Application

Analysis

Self-Management Skills

Fine motor skills

Organization

TRANSDISCIPLINARY THEMES

How we express ourselves

“an inquiry into ways in which we discover and express ideas, feelings, nature, culture, beliefs and values; the ways in which we reflect on, extend and enjoy our creativity; our appreciation of the aesthetic.”

How the world works

“an inquiry into the natural world and its laws; the interaction between the natural world (physical and biological) and human societies; how humans use their understanding of scientific principles; the impact of scientific and technological advances on society and on the environment.”

Goals for Maker Activities at ISB in 2015:

1. Define and develop Maker Culture among ISB students and staff

Makers are curious, take initiative, and are willing to try things that have a high likelihood of failure. Developing these traits requires a culture of acceptance and encouragement so that Makers have the time and support to try all sorts of ideas, even ones that seem impractical. Staff and teachers can help support this environment by being open to possibilities suggested by children, and cultivating an attitude that says: “Let’s try it.”

2. Help teachers connect Making to existing practices and the IB at ISB

Design classes are a natural fit for Making, but hands-on, interest driven activities can be part of every class at ISB. We need to demonstrate the pedagogical value of Making to teachers, and help them imagine ways to connect it with their classroom goals. This will help teachers to define the needs that the Makerspace at ISB should be designed to fulfill.

3. Develop a strategy for documenting Making at ISB

Identify Maker activities already at ISB to increase familiarity and confidence with the concept. Work with communications manager, teachers and students to develop ways to document creativity among the student body, and to share it with other students, teachers, and the outside world through social media and any other means appropriate.

4. Connect ISB with outside resources related to Making

Amos Blanton can facilitate connections with Tufts, Maker Education, and other organizations with useful resources and ideas for ISB.

Roles and Tasks:

Amos Blanton and Mike Sullivan (along with Laura Constance when available) will collaborate on the following action items.

1. Assist teachers at ISB with creating Maker activities

Collaborate with teachers to develop and pilot Maker activities for students at ISB as part of the after school program. We want to increase the knowledge and comfort with technologies and design based thinking in the ISB teacher community.

2. Co-Develop and run a Workshop for Teachers at ISB on Making

The goals of the workshop are to:

- Define what Making is, its pedagogical value, and the learning behind it.
- Coach teachers in noticing, supporting, and documenting their students as Makers and clarify teachers' roles in the Making process
- Engage teachers in a conversation about Making, and how it can augment learning in their classroom.

3. Additional possibilities:

Amos Blanton could host a bi-weekly reading / tinkering group for teachers who are interested and want to opt-in. The goal would be to read a little theory and discuss it (along with other models, examples, and case studies) but mostly to play with various tools and Maker activities to see how they fit.

Calendar

Currently, the designated Makerspace sessions are scheduled as follows:

Mondays 14:30 - 16:15 (mostly for P1/P2)
Wednesdays 14:30 - 16:15 (mostly for P3/4/5)
Fridays 14:30 - 15:30 (open)

At these times, activities and materials will be available for those who choose to participate. Like other after-school sessions, it is optional for all students. Many of the specific Maker activities and projects will be decided with and by the students, but below is the general timeline for how certain materials will be introduced.

Week 9 - 13 [Squishy Circuits](#)

Week 14 - 18 [Sewn Circuits](#)

Week 19 - 22 [Makey Makey](#)

Week 23 - 26 [Bristle Bots](#), [Sky Parade](#), [Solar cars](#) (optics), and other small motors

Ongoing: “Demystifying Technology” opportunities will be offered to take apart everyday tools to see what is inside, how they work, and how/why they are made a certain way.

An initial purchase has been made to facilitate the activities above. Bent Pedersen is closely involved in the process of identifying and purchasing other tools, supplies, and machines that will be needed for the larger “build-out” of the Makerspace this summer (2015). Upon approval of this initial development plan, additional purchases of tools, cabinets, saws, drills, a laser cutter, and a 3D printer, etc. will be informed (and scheduled) by the Making process underway at ISB.

Concerns

It seems like teachers at ISB already have a great deal to do / handle. Despite their potential interest, they aren’t likely to opt-in to learn something new / extra, or have a lot of time to think about integrating Making into their curricula if they are tired and stressed. Much of the responsibility to embed and align Making at ISB (build a Maker culture) lies with the lead program team, but if there was a way to free up time for this effort by reducing other aspects of their load from time to time, it might be worth considering.

Also, for the ISB Makerspace to flourish in a meaningful way, the Maker culture must grow, but as noted above, it must do so from the “bottom-up” so that students and teachers and other stakeholders can contribute to creating a community of Making and tinkering that is unique to ISB. And for this to be real and genuine, it will take some time. Models for Maker programs and activities are available, helpful, and crucial to this process but rushing into a “top-down” regime of instructional classes in

order to show action and progress on the Makerspace will be detrimental to the creation of meaning and to the opportunity for self-expression that is the essence of Making.

Making can be considered *yessy, messy, and processy*. Embracing a “yes, let’s try” approach to everything (with safety in mind, of course) results in wonderful failures, accidents, mistakes, and *messes*, which are critical to the ongoing learning *process* of Making. With the understanding that Making can occur in a variety of places at ISB, the design room is the current homebase for Making at the school, but the lead program team is curious about not only how these messy activities will literally fit into the design room in the next few months, but also how much an ongoing “under construction” mindset will be embraced by the school community in the new Maker wing opening in August.

Questions

1. Who is specifically responsible for managing the creation / launch of the Makerspace (ordering parts / preparing for launch / deciding what’s in it?)
2. What does ISB want the Makerspace to be / symbolize / do for them?
 - a. What does ISB wish to call this space? FabLab and TechShop are well-known names for Maker spaces, while Exploratorium and Thinkery are science museums that feature Making experiences, but many schools and libraries simply refer to theirs as makerspaces. Should it be named now or should the name grow/appear from the community in the coming months?
 - i. Creator Lab
 - ii. Maker Lab
 - iii. Maker Wing
 - iv. Creator Space
 - v. X Space
 - vi. X Wing
 - vii. Maker Lab
 - viii. Makery
 - ix. _____ ?
 - x. Maker space [directory](#)