DISCOVERING TOOLS, METHODS & MINDSETS FOR MAKING IN THE CLASSROOM (Grades 4-6)

a thesis by

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ABSTRACT

This thesis investigates how design activities taken on by makers and designers can illuminate real-world, contemporary issues relevant to the new BC Curriculum. The recent redesign of British Columbia's K-12 Applied Design Skills and Technologies (ADST) curriculum aims to support the development of active citizens in a way that is in touch with today's rapid pace of technology development and information exchange (Ministry of Education, 2015). As a designer and maker, who is also informed by observations and work with Vancouver's maker community, Emily Smith has explored possible directions and philosophies for developing a maker education-pedagogy, informed by the maker movement, her own practices, and the Emily Carr students and faculty.

This work is an exploration of **Tools:** Including drop spindles, knitting needles, and backstrap looms; **Methods:** Including her own artistic textile and music-making practice and primary persona known as a "One-Woman Band". This persona is an application of clowning practices, as taught by David Macmurray Smith. Methods borrowed from the maker community include designed materials and facilitation in the form of "Lightning Talks", and "Zine-Making" (Appendix C&D). Finally, this thesis explores **Mindsets:** which includes constructivism and constructionism, Design-Make-Play, Head, Heart and Hand, the Maker Mindset, the work of Maryann and Gregory Bateson and cybernetics.

Guided by exploration of tools, methods and mindsets, Smith conducts a series of co-creation sessions and interviews with 15 participants (see Appendix A & B), which include Emily Carr students, local makers, faculty and educators in Vancouver. Findings provide a series of case studies which reveal that social making activities engage learners in a multiplicity of subjects, and can meaningfully address ADST's Core Competencies through making, and discussion led by a facilitator. Other insights include possibilities to inspire students through the use of "memes", through public forums, programs, and published materials. Designed materials constitute prototypes and proof of concepts for possible extensions and modules to further extend and develop the Maker Club format.

Keywords

Maker Club, Maker Education, ADST, Core Competencies, Material Practice, Research Through Design

PREFACE

"Everyone has the right to re-invent the wheel. And they should be applauded for it if they do!" - David MacMurray Smith

Saxony Spinning Wheel used for spinning raw fibres into yarn.

There is nothing particularly new or innovative about spinning, weaving, or making, and in many ways, it is an essential part of being human. Before we could buy our clothes, we had to make them in villages, communities and in our own homes. Records show that before the invention of the steam engine and factories, making cloth was considered a daily chore for women (and occasionally men), with most hours of the day spent on textile-related activities (Barber, p. 31).

Today, our cloth is produced in a globalized, multi-layered, industrialized supply chain, with consumers that have a very limited grasp of how things are made. Consumers have little to no information on who made our clothes, where the fibres were harvested, and what effect these practices have on our environment, our world, and our lives. This exploration has been an opportunity to engage with, question, and understand the process and technologies of how our things are made today.

My research methods are centred around my own material and artistic practice. Since 2009, building on childhood experiences making friendship bracelets, I have been learning to produce cloth from fibres - spinning, weaving, knitting, felting, sewing - whatever I can get my hands on. In learning new skills, applying different mindsets, and exploring new tools, I have become more deeply connected to the social and cultural aspects of learning, outside of the confines of institutional evaluation or ranking. This curiosity led me towards

a desire to build and connect with communities online and in person, and develop programming dedicated to lifelong learning.

Through my work and play with the maker and clowning communities, I have found more *permission* to explore subjects outside of my comfort zone, even if I don't have a particular aptitude for that subject. Through conversation, spectacle, interest and encouragement from others, I've extended my knowledge base and confidence to explore subjects like electronics, microbiology, chemistry, astrophysics, cooking, performance, banjo playing, and more. Subjects that I explore purely out of interest, that are way out of the realm of what was taught to me or encouraged in the classroom.

I've realized that many times, it has been social barriers, shyness, or my own attitudes, or beliefs about my abilities, that have caused me to give up or lack the confidence to work through a problem that may very well be something that I can do, but led to a block in learning. Oftentimes I was approaching a problem from a different angle than the teacher was describing it from, or seeing a problem from another side.

I thought I was bad at math until I had a teacher explain the concepts to me, and I thought I wasn't "good" at biology because I always misread questions on the computerized scantron exams. I now realize that tests were no measure for the value of exploring a new idea, or learning about the world. I often wonder. If our class took a moment to pause and reflect more on say, the cell nucleus or the mitochondria to really explore our place in the universe, I may have developed an appreciation and respect for the cell, rather than the belief that these things were just another concept that I need to memorize in a pile of flashcards that I would quickly forget once the exam was finished.

The point of this project has been to share my own learning, while listening to and empathizing with others on their own paths. I've been inviting individuals from the Emily Carr community into the process of engaging with making cloth from scratch to connect in a human-centred way. Through a series of interventions and "random acts", this project is about creating invitations to participate in the discovery of identity, to question our manufactured world, and to begin to speculate on how we might extend explorations into meaningful and relevant tools to support and empower the next generation.

GLOSSARY

(DEFINITIONS OF KEY TERMS)

Basket Weaving 101: "Used as the type of college course that is thought to be without any practical or professional value" (oxford dictionary).

Black Box: "A usually complicated electronic device whose internal mechanism is hidden from or mysterious to the user; *broadly* : anything that has mysterious or unknown internal functions or mechanisms" (Merriam-Webster)

Clown: David MacMurray Smith of *Fantastic Space* defines clown as, "an articulator of movement [...] and acts as a catalyst for change and a vehicle for adaptability at both the personal and communal level" (fantasticspace).

Craptivity: According to "Phoenix Support for Educators", a Professional and Curriculum Development support program for educators, the term "Crap"-tivity was coined by Jeanne de Clisson from "EYLF ('Early Years Learning Framework') Pirates". Craptivities refer to:

> "Crappy craft activities" -- [The term 'Craptivities'] points the finger at art and craft activities in Early Childhood Education and Care that are product oriented; hand / foot paintings made into 'art', paper plate craft, stencil activities. Any craft that looks like it's been created on a factory line of a dozen children creating the same product is under critically reflective fire."
> (Phoenix Support for Educators)

Co-Creation: A collaborative creative action, event, or artifact (Sanders & Stappers 299)

Cybernetics: Quoting American mathematician and philosopher Norbert Weiner, cybernetics is,

> The science of communications and automatic control in machines and organic systems, and the study of messages in controlling machinery in society (Sikarski p.66).

Design Thinking: According to the *UBC Okanagan Maker Day Toolkit* produced with the *Industry Training Authority*

> "Design thinking is a [human-centred] process for addressing problems and typically consists of seven steps: define, research, ideate, prototype, choose, implement, and learn. "

The toolkit states that, "A good way to incorporate design thinking in the classroom is to use it to help students intentionally find linkages between authentic learning experiences as akin to curricular enactment."

Maker Club: Maker Club is an organizational model that represents a shared connection to making between students, teachers and administrators. A Maker Club can be as small as 5 students, as large as a classroom of 30, involve the entire school or even go district-wide. Resources from a Maker Club can be used by existing programs, after-school clubs, and Tech Ed classes (Smith & Kesler 5). The first Maker Club manual was produced by Emily Smith on behalf of the *Industry Training Authority.*

Maker: Makers are enthusiasts that value the process of making things as a means to learn, innovate, connect, collaborate , and often play with technology to learn about it (Dougherty)

Maker Carts: Modelled after the format of an A/V (audio visual) cart, a Maker Cart is a portable, mobile cart to house hands-on projects for school classrooms. Many schools are creating their own carts, or there are commercial carts available as well. They generally include electronic equipment, 3d printer stands, drawers for tools, accessories, kits, and materials.

Meme: The word "Meme" was coined by Richard Dawkins, in his 1976 book, *The Selfish Gene.* According to Olivia Solon of *Wired Magazine,* a 'meme' is:

> "[...] ascribed to an idea, behaviour or style that spreads from person to person within a culture -- [and] has been reappropriated by the internet [...] via a process which, in a broad sense, can be called imitation."
> (Solon, Olivia. 2013)

Third Space (aka "*in between")* **:** Kris D. Gutiérrez, American professor of learning sciences and literacy, defines the third space of education as what's created when "teacher and student learning scripts -- the formal and informal, the official and unofficial spaces of the learning environment -- intersect, creating the potential for authentic interaction and a shift in the social organization of learning and what counts for knowledge" (Skerret p.67).

INTRODUCTION

If you can't open it, you don't really own it." - Angie Smibert

Beyond *Michaels, IKEA,* and pre-packaged do-it-yourself (DIY), there is a point at which modification begins to challenge the relationship that citizens and corporations have with tools, objects, and technologies. In the 1950s, fixing a car was a technical process, but for the most part, accessible to citizens. Although not every citizen was physically capable of or interested in such activities, the access to education and technologies was readily available and part of the social fabric of North American communities.

The objects and technologies that we consume today are becoming seductive "black boxes". According to Bruno Latour (1999), blackboxing involves making technical and scientific work invisible due to its own success. "When a machine runs efficiently, when a matter of fact is settled, one needs focus only on its inputs and outputs and not on its internal complexity. Thus, paradoxically, the more science and technology succeeds, the more opaque and obscure they become" (p. 304) Laptops and smartphones, with their sleek design and efficiencies, are attractive commodities in their day-to-day functionality, and built on closed systems. As electronic technologies shrink, so too does our understanding, relationship and ownership of these components.

Without adequate tools and education required to manipulate technology, consumers are becoming increasingly disconnected from and require more resources required to engage with, fix, and modify their things. To speculate, the public education and University system can serve a role in educating citizens on the systems of everyday consumer goods by creating integrated curriculum that empowers citizens to "open up the box" and navigate the systems of technology that we consume.

Perhaps educators, historians, and librarians can own literature that adequately documents and translates how to modify and engage with existing systems and encourage citizens to become active participants in shaping their own worlds.

This project is a call to action to participate in and engage with the "black box" of objects, technologies, and manufacturing processes that are involved with the everyday products that surround us.

CONTEXT & FRAMING

Maker Culture and Maker Faire

Makers are enthusiasts that value the process of making things as a means to learn, innovate, connect, collaborate, and often play with technology to learn about it (Dougherty). The Maker Movement is a worldwide initiative, with events and activities occuring in communities large and small and in public, private, and academic spaces. Makers congregate at Maker- or Hackerspaces, Maker Faires, and meet-up groups, which offer access to low-cost digital fabrication equipment (van Abel et al. 2011).

Maker Faires are events created by Maker Media to "celebrate arts, crafts, engineering, science and projects in the DIY mindset" (makerfaire.com). The launch of Maker Faire Bay Area in 2006 demonstrated the popularity of making with over 60,000 attendees in its first year, now climbing to over 100,000. In 2017, there were over 190 "Mini Maker Faires" throughout the world (including Vancouver and Prince George in BC), and Featured Maker Faires including Tokyo, Rome, Shenzhen, Taipei, Seoul, Paris, Berlin, Barcelona, Detroit, San Diego, Milwaukee, and Kansas City (makerfaire.com).

Vancouver's Maker Community

Photos of past Vancouver Mini Maker Faire's. Photo Credit: Emily Smith

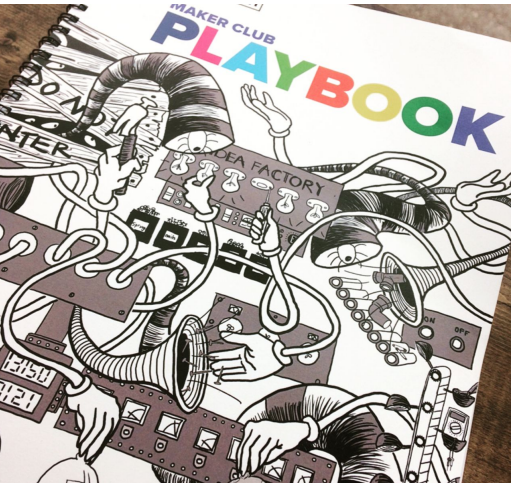
In 2011, In partnership with local non-profits *Vancouver Hack Space (VHS), eatART* and *Vancouver Community Lab,* Emily Smith co-founded the *Vancouver Mini Maker Faire.* The event grew out of community craft nights and open making events that she co-hosted at VHS. The focus of her leadership of this event was on community

development, grant writing, and making makers. The first year was hosted at the Great Northern Way industrial Campus in Vancouver, and featured the work and activities of over 120 makers and maker groups. This community-engaged event consolidated the great wealth of Vancouver's DIY community, encouraging engagement with technology and life-long learning, in a fun and family-friendly environment. Vancouver Mini Maker Faire's attendance is generally between 2500-4000 attendees per year and just completed its 7th year in 2017.

Photos of past Vancouver Mini Maker Faire's. Photo Credit: Emily Smith

ITA Maker Club

In partnership with the *Industry Training Authority (ITA)*, Emily Smith and Zee Kesler have designed, developed and hosted a series of Professional Development days for public school teachers. The *ITA* is a BC-wide organization that funds training programs for the trades. We have co-created booklets, hands-on workshops, and motivational speeches to encourage educators to introduce the maker mindset in their classroom.



Photos of ITA Maker Club Playbook published by Zee Kesler and Emily Smith on behalf of the *Industry Training Authority*

Professional Development Workshops & Hands-on Activities

Starting in September of 2017, a total of 6 Professional Development days were conducted by Kesler and Smith, to introduce educators, administrators, boy scout and Girl Guide leaders to the ITA Maker Club program. Workshops were located in Fort Nelson, Creston, Fort St. John, Richmond, Vernon, and Vancouver. Administrators and Career Educators applied for funds from the ITA for a total of $3000 to cover the cost of tools, materials, and programming fees. Each event was organized by the district, and included 10-20 educators from schools in each region. Activities included basic woodworking (sanding and cutting), electronics and soft circuits, tin can rose-making, and more. Activities were aimed at grades 4-6 with an emphasis on low-cost and often recycled materials.

Photos from ITA Maker Club Professional Development sessions

While the ITA Maker Club was a great first step towards encouraging more making in the classroom, it's clear that there are more possibilities available to develop tools, methods and resources for public schools in disciplines.

RESEARCH QUESTIONS

1) *What tools, methods and resources are effective for cultivating applied learning opportunities in post-secondary and the public school system in BC? (Grades 4-6).*

2) *How can designers and post-secondary research support curriculum and pedagogy in the public school system?*

RATIONALE

(SUPPORTING BC TEACHERS)

In order to create useful tools, methods and resources that support teachers with extra-curricular activities, it is useful to understand recent changes and challenges with the new BC curriculum.

BC's New Curriculum:

The Applied Design Skills and Technology framework (ADST), is British Columbia's new K-12 curriculum, focussed on applied, cross-curricular and self-directed learning. It was implemented in September, 2016 as a replacement for "Applied Skills" (Ministry of Education, 2015). The vision for the program includes "An experiential, hands-on program of learning through design and creation that includes skills and concepts from traditional and Aboriginal practice, from the existing disciplines of Business Education, Home Economics, Information Technology, Technology Education, and emerging fields" (Ministry of Education, 2015). The curriculum was created in response to the rapid pace of technology and information available today. The redesign aims to support the development of active citizens in a way that's in touch with the changing technological landscape.

On the following pages (12-15), is information extracted from the Ministry of Education website as the curriculum relates to grades 4-6. It outlines the guiding principles of the new curriculum, which involves a focus on "Doing (1)" in order to drive engagement with "Understanding (2)" encapsulated by "Knowing (3)". "Knowing" is guided by "Content Learning Standards" and driven by "Core Competencies" (See pages 14-15). Standard grading is removed from the curriculum, and students are instead evaluated on their ability to develop their learning related to the "Core Competencies".

Do (1) / Understand (2) / Know (3)

CURRICULAR COMPETENCIES (APPLIED DESIGN)

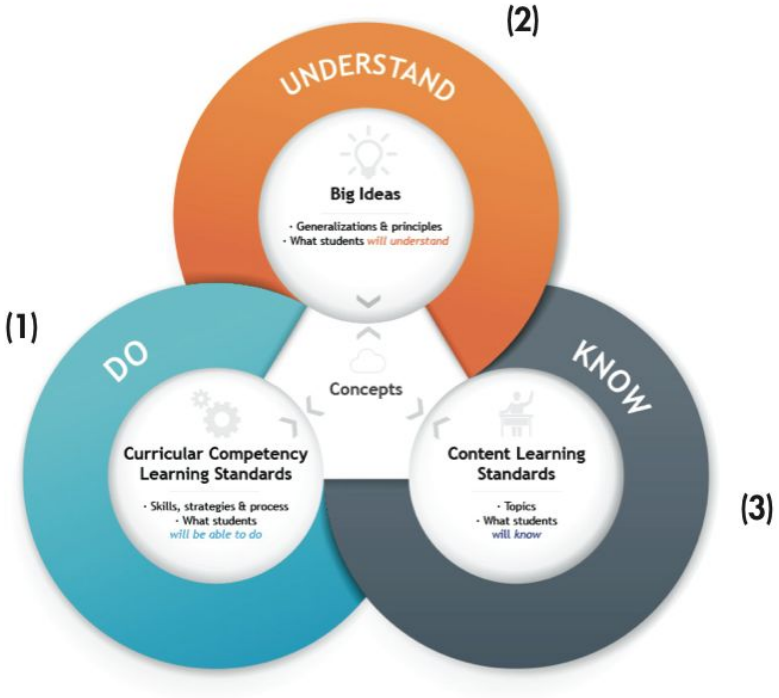
Curricular Competencies (K-5):

- Ideate
- Making
- Sharing

Curricular Competencies (Grades 6-9):

- Understanding Context
- Defining
- Ideating
- Prototyping
- Testing
- Making
- Sharing

From Doing (1) to Understanding (2):



Adapted Know / Do / Understand Model
With a focus on grades 4-6 (Applied Design Skills and Technologies, 2017)

K-5 Foundations:

Focus on "do" & "understand

Students develop skills for design thinking and maker mindset in cross-curricular contexts

Explore and play develops into practical activities with real-life focus.

Grades 6-9

Opportunities to explore specific areas of ADST, while building design thinking and foundational skills

Content from Home Economics, Information and and Communications Technology, Technology Education and emerging fields.

Opportunities for choice, modularization and a variety of delivery options.

ADST Overview
With a focus on grades 4-7 ("Applied Design Skills and Technologies", 2017)

Understand (2) : BIG IDEAS

	k-3	4-5	6-8	9-10	11-12
Applied Design	Designs grow out of natural curiosity	Designs can be improved with prototyping & testing	Design can be responsive to identified needs	Social, ethical & sustainability considerations impact design	Products can be designed for lifecycle
Applied Skills	Skills can be developed through play	Skills are developed through practice, effort & action	Complex tasks require the acquision of additional skills	Complex tasks require the sequencing of skills	Personal design interests require the evaluation & refinement of skills
Applied Technologies	Technologies are tools that extend human capabilities.	The choice of technology & tools depends on the task	Complex tasks may require multiple tools and technologies	Complex tasks require different technologies and tools at different stages	Tools & technologies can be adapted for specific purposes

ADST Overview
With a focus on grades 4-7 ("Applied Design Skills and Technologies", 2017)

Know (3) : CORE COMPETENCIES

The Core Competencies along with numeracy and literacy are the key drivers of curriculum content and guidance. According to the [BC] Ministry of Education website,

> Core competencies are evident in every area of learning; however, they manifest themselves uniquely in each discipline. In the current drafts of the redesigned curricula, competencies are embedded and evident within the learning standards ("Applied Design Skills and Technologies", 2017). Competencies come into play when students are engaged in "doing" in any area of learning. This includes activities where students use thinking, collaboration, and communication to solve problems, address issues, or make decisions. The ultimate goal is for learners to employ the core competencies every day in school and in life, and for the core competencies to be an integral part of learning in all curriculum areas ("Applied Design Skills and Technologies", 2017).

Know (3) : OUTLINING THE CORE COMPETENCIES

Communication:

the set of abilities that students use to impart and exchange information, experiences and ideas, to explore the world around them, and to understand and effectively engage in the use of digital media.

Thinking (Creative & Critical Thinking):

Encompasses the knowledge, skills and processes we associate with intellectual development. It is through their competency as thinkers that students take subject-specific concepts and content and transform them into a new understanding. Thinking competence includes specific thinking skills as well as habits of mind, and metacognitive awareness.

Personal & Social (Positive Personal and Cultural Identity; Personal Awareness & Responsibility ; Social Responsibility):

The set of abilities that relate to students' identity in the world, both as individuals and as members of their community and society. Personal and social competency encompasses the abilities students need to thrive as individuals, to understand and care about themselves and others, and to find and achieve their purposes in the world.

CRITICISMS OF THE ADST CURRICULUM

Criticisms of the new curriculum include a lack of resources [readily] available to implement self-directed methods, issues with the breadth and depth of learning opportunities, and more.

The BC Teachers Federation (BCTF) discovered 7 basic "challenge areas" including, (1) a lack of resources, (2) issues of curricular content, (3) implementation and timeframe, (4) provincial assessment and graduation requirements, (5) reporting, (6) consultation processes and (7) an understanding of the purpose of this educational reform ("British Columbia Teachers Federation" 4).

For the purpose of delimiting the research area, I focused on pitfalls in curricular content, specifically, as identified by BCTF members, (a) "the challenge of combining previously separate curricular areas", "tensions between breadth and depth in curricular content", (b) "meaningful engagement with Aboriginal ways of knowing", and (c) the "role of technology in BC's new curriculum" (BCTF 4-6).

(a) The new curriculum combines subject areas that have previously been separated and the breadth and depth of subject areas is criticized as being too vague. According to the BC Teachers Federation feedback, one member commented that, "physical education and health, two traditionally separate curricular areas are now meshed together with very little direction in terms of how to make the implementation work." Another member commented that, "without careful consideration, these subjects may end up competing for time, therefore potentially watering down both areas and ultimately leading to a less meaningful and impactful delivery of these areas" ("BCTF" 5).
Without adequate support for cross-curricular and skills-based learning (including STEM), teachers may omit important transition points between subjects, due to a lack of support, knowledge of a subject area, and a curriculum that is criticised as being overly "vague", with too little guidance.

(b) Overall the Aboriginal ways of knowing in the new curriculum are strongly received; however, there are concerns around Aboriginal content taught as "tokenistic". Some members are concerned about cultural appropriation, as "First Nations do not want teachers teaching their culture" (BCTF 6).

(c) Finally, a lack of adequate funding available for reliable internet and technological devices is a major concern for teachers, as many schools do not have adequate access. The concern is that a lack of access to technology will "exacerbate the 'growing disparities between 'have' and 'have not'/ inner city schools with regards to access to technology" ("BCTF" 6). In addition, the integration of online technology and learning may not be accessible to all schools.

SCOPE & LIMITS

The focus of this thesis is to examine and evaluate the existing and evolving discourse around making, design and technology at Emily Carr University, and how this may inform perceived pitfalls alongside the integration of the new ADST curriculum.

While this work may speculate on possible making approaches in the classroom, it does not outline any prescribed or completed lesson plans, toolkits or tools.

MINDSETS

(THEORETICAL FRAMEWORK)

Constructivism and Constructionism

Constructivism is an educational theory founded by Jean Piaget, which focuses on the learner's personal exploration over rote memorization. This approach is based on the idea that the learner constructs knowledge based on their own experience, and through their own internal process of sense making (Martinez & Stager p. 13). Constructivists have done much to correct the "excess of test-and-drill teaching" with many positive benefits for learning, including a better understanding of material, greater enjoyment of literature, more positive attitudes towards school, better problem solving and greater motivation (Harris & Graham, 1996).

Building on the work of Piaget, Seymour Papert created "Constructionism", a means of extending meaning-making into full on making. Papert describes the integration of constructivism and ideas surrounding constructionism as follows:

> "From constructivist theories of psychology we take a view of learning as a reconstruction rather than as a transmission of knowledge. Then we extend the idea of manipulative materials to the idea that learning is most effective when part of an activity the learner experiences as constructing a meaningful product." (Papert, 1986).

Papert would agree with Piaget that learning occurs inside the student's head, and adds to the theory that this happens most reliably when the learner is "engaged in a personally meaningful activity outside of their head that makes the learning real and shareable" (Martinez & Stager, p. 32). "Questions like, 'How can my car go faster?' or 'I like the way this looks, can I make it prettier?' are treated as valid, and in fact, potentially more valid than criteria imposed by teachers" (Martinez & Stager, p. 32).

Constructionism has been lauded as a learning approach that reflects the type of learning that makers describe. As the Maker movement grows, educational institutions are adopting this ethos more and more in their programming. "While school traditionally separates art and science, theory and practice, making and tinkering is a powerful form of learning by doing" (Martinez & Stager, p. 2-3). Advocates proclaim that "children should engage in tinkering and making because they are powerful ways to learn" (Martinez & Stager, p.3)

Design - Make - Play

Margaret Honey and David E. Kanter coined *design-make-play* as a framework to encapsulate methodologies of engagement that foster learning as a creative, hands-on and passionate endeavor (Honey & Kanter 1). This approach values problem-solving over "teaching to the test", and integrates the practice of *doing* science and engineering, as opposed to learning *about* those subjects. The components of *design-make-play* are defined as follows:

> "Design- the iterative selection and arrangement of elements to form a whole by which people create artifacts, systems, and tools intended to solve a range of problems, large and small.
>
> Make- to build or adapt objects by hand, for the simple personal pleasure of figuring out how things work.
>
> Play - A fun, voluntary activity that often involves make-believe, invention, and innovation."
>
> (Honey & Kanter, p. 4).

They view *design* as a powerful vehicle for teaching STEM subjects in an integrated way, *making* as "deep engagement with content, experimentation, exploration, problem-solving, collaboration, and learning to learn", and *play* as the development of "natural inclinations to invent and explore, which are at the core of creativity" (Honey & Kanter 4).

Head, Heart and Hand: A Transformational Learning Model

The theory of transformation includes an ontological process of change in the level of being, and how individuals relate to communities, groups, and the world (Lange, 2004). Transformative learning theories have been effective with both children and adults. 'Head, Heart and Hand' is a learning approach which involves the "holistic nature of transformative experience and relates the cognitive domain (head) to critical reflection, the affective domain (heart) to relational knowing and the psychomotor domain (hands) to engagement (Singleton 2015, p. 1). Many learning environments focus on one domain or another, and rote learning and memorization is often prioritized over a more integrated approach. When students make and shape their own environment, "they affect changes within themselves;

this can lead to greater self-efficacy and more responsible behaviour in other areas as well" (Singleton p. 3).

The Maker Mindset

In Dale Dougherty's essay, *The Maker Mindset*, he discusses common characteristics of makers, as well as barriers to applying this sort of approach in schools. He believes that fostering the maker mindset in schools means cultivating the emotional, mental and physical development of another person.

In order to foster this sort of thinking in schools, he discusses the work of Carol S. Dweck, a Stanford psychology professor who describes the *growth* mindset (refer to image below). Dweck points out that "many [students that] excel academically have a fixed mindset, which limits them to exploring only the areas they were told they were good at" (Dougherty).

Applying these ideas to a maker mindset means to develop one's full potential, which often involves risk-taking, iterating over a project to improve it, and is largely a social experience where others participate in communities of makers of all ages (Dougherty).

METHODOLOGIES

(INTEGRATING TOOLS & MINDSETS)

"I was no more constitutionally inclined to focus monomaniacally on the cell nucleus than I was to be a satellite wife in a nuclear family; my attentions, like those of many women, were divided. My friend Mary Catherine Bateson, daughter of anthropologist Margaret Mead and philosopher Gregory Bateson, describes modern women as ***"peripheral visionaries". A woman must be almost octopoid in her attentions if she is to survive.*** *Holding the infant in one arm, Bateson points out, she stirs the pot with the other, while she watches the toddler.* ***These multiple pressures were not then, nor are they now, wished away by political will and feminist rhetoric."***

-Lynn Margulis
(Margulis, p. 18)

"Peripheral Visions" and "The In Between"

In her book *Peripheral Visions: Learning Along the Way,* Mary Catherine Bateson, American writer and cultural anthropologist asserts that most learning occurs outside of the spaces and institutions labelled as "educational". She states that, "Living and learning happens everywhere, and is often founded on an improvisational base" (Bateson 9). Many stories have more than one interpretation, and learning means experiencing the depth of lived experiences in a meaningful and personal way. In examining this 'peripheral vision' space, she discusses the idea of finding multiple ways of responding as individuals to "multiple patterns of meaning [...] and asks, 'what would it be like to have not only colour vision but *culture vision*, the ability to see multiple worlds of others?" (Bateson 53)

Throughout my work with *Random Acts of Making*, I have been developing a listening and awareness for material culture and conversation at Emily Carr. I have been observing social interactions, engaging in conversations with others, and observing patterns in "in between" spaces - on break, in the cafeteria, in community spaces like the university studios and resource labs , on social media, posters, in the library, in email threads, and graffiti. I have recorded conversations, taken detailed notes, and have acted as both participant and observer in various settings in both the Granville Island Campus in 2016-2017, and the Great Northern Way campus in 2017-2018.

Clown as Research Method

In response to Bateson's assertion that learning often happens on an improvisational basis, I decided to make use of my year and a half of formal clown training. I studied clown with David MacMurray-Smith of *Fantastic Space Enterprises*, and participated in a series of MacMurray-Smith's courses which are rooted in the methods of Canadian clown Richard Pochinko. MacMurray-Smith's work involves mask-making, physical and embodied exercise, "impulse work", and deep reflection that is rooted in play. In this embodied and physical practice, a clown is "one who takes delight in the experience of being Human and enjoys conversing about the experience" (MacMurray-Smith). A clown in this context is referred to as, "an articulator of movement [...] and acts as a catalyst for change and a vehicle for adaptability at both the personal and communal level" (MacMurray-Smith).

According to Sue Morrison, author of *Clown Through Mask*, and former collaborator with Pochinko, a Pochinko practice involves a synthesis of European and Indigenous clowning practices and is contrasted with the American way, where the gag, and the punctuation of that gag is the most important feature (Morrison, p. 20). The European clowning approach asserts that the character, and the personality of the clown is more important than the situation, and the Indigenous philosophy sees clown as a way of living, and that clowns are an integral member of society, often seen as a "safety valve" for a community (Morrison, p. 28).

For me, practicing this method means developing this "culture vision" discussed by Bateson. By developing 6 clay masks which were then papier-mâché'd and painted (used as tools to reflect on and create worlds with, not to perform with), the pedagogy gave me the ability to understand myself and my identity from many sides, which the approach demands. I have been actively cultivating, practicing, and extending this approach throughout the 2.5 years at Emily Carr, in order to reflect on play, learning, and educational environments.

Masks created through impulse work while at Emily Carr. Represents “Love for the universe “ (even the natural disasters) L: Clay moulded mask // R: Painted mask ..

Development of Play: Tools, Objects, and Happenings

L: Impromptu demonstration for undergraduate students (Photo by Jordache Mackenzie) // R: Cubicle space in Emily Carr Industrial Design Studio

Setting the Stage:

Reflecting, performing and interacting in this “in between space”, I have been making things on an improvisational basiS. I have sewn, mended, knit, and appliqued most of my clothing, and often have parts of a project on the go. I’ve also

made tools (6 backstrap looms and 8 drop spindles), and purchased/borrowed others: Arduinos, electronic kits, a knitting machine, warping tools, and more. Finally, I've collected a number of sound-making devices which include a tin can banjo, a ukulele, some tap shoes, as well as books and magazines that have been informing my work. Throughout the work, I have shared these experiments via social media.

L: Weaving Demonstration at the *Future of Education Event* at Emily Carr, spring of 2017 // R: Mended sweater Instagram post on social media

Weaving as Research Method

L: First tests on the lathe // M: Completed backstrap loom with warp-facing weave // R: Backstrap loom with even weave

I've been interacting with, and placing these objects around The University's undergraduate and graduate studio spaces, halls an "in between spaces" in order to facilitate and open up conversation and connect with others. My studio cubicle has been arranged as an interactive environment that I invite people into a safe space

to make, create, reflect, express, and connect. I painted the walls of the cubicle with clouds, and set up astroturf and brought blankets and carpets in in order to “soften” the space. These interventions served as the basis for connecting with others, and were a means to select participants to take part in the study.

L: Arduinos and electronic components on the table in the Industrial Design Studio // R: Homemade Loom in the cubicle of my studio space in the Industrial Design Studio Space.

My main consideration in setting up these activities, is to create making activities that are simple enough to be engaged with at a desk (they don’t require shop space or overly messy tools), but activities that may encourage students to consider visiting shops at Emily Carr.

Music as Research Method

I played the piano from the age of 5-18, and in my early 30s, I have re-visited playing, but with a completely different mindset. I originally studied piano through the *Royal Conservatory of Music* - and while I loved to play, I always felt there was something missing. Playing in stuffy concert halls with adjudicators that had more to say about my choice of footwear was discouraging, and allowed me realize that the over-emphasis on form, ranking, and competition was the wrong direction for me. It wasn’t until my adult life that I learned about the value and importance of connecting with others through play. Clown and participating with the maker movement gave me the permission to resolve the uptight, overly structured forms, and connect with others not only through my textile practice, but also through banjo, ukulele, and piano.

Persona: “One Woman Band”

In response to educational experiences, as well as this “octopoid[al] woman” described by Margulis, the primary persona that I’ve been cultivating throughout the 2 years, is a “One Woman Band” of making and doing. I have been intentionally stringing together diverse ideas, tools, and practices, ready and prepared to respond to my environment to pull out any one tool, book, project or curiosity. This improvisational persona is based on my own artistic practice, which involves the constant pursuit of knowledge, skills, and play, but extends to sharing and the everyday. I’m using my own enthusiasm and “clown” to engage with others, open up and facilitate conversations about what it means to make today.

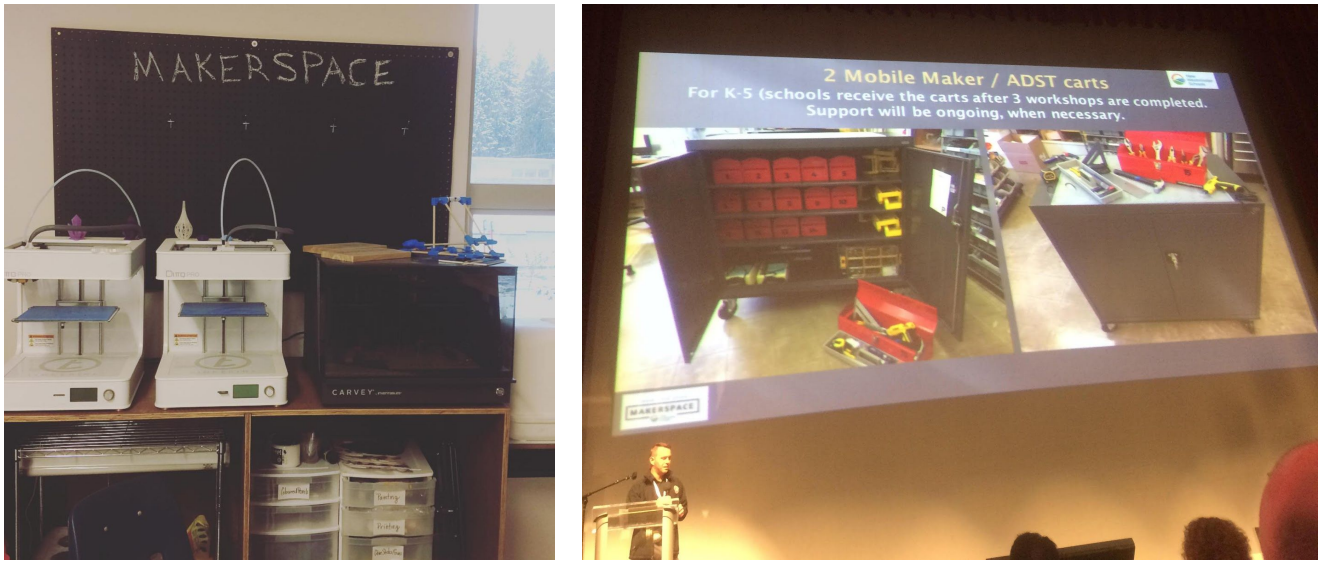
FIELD NOTES

(MANIFESTATIONS & OUTCOMES)

MANIFESTATIONS PART I:

Current Trends in BC Schools: Beyond Design Thinking and Over-Tech'ing

In order to address the "T" ("Technology) component of ADST, many schools are acquiring expensive tools to stay "up to date" with current trends, and are looking to the maker movement to define what the future of tech might be. Some administrators are purchasing tools for their district, setting up makerspaces with *Tinkerine* 3d printers, and building "Maker Carts" so that teachers can introduce students to making in earlier grades.



L: Makerspace in Creston, BC ; R: Presentation on Making in Schools at ITA Youth Day Conference

Also popular among teachers is integrating the "Design Thinking" approach to help organize and direct making activities, promoted by UBC Oakanagan's *Innovative Learning Centre.*

KEY INSIGHT:

Design thinking can be a useful structure for teachers to follow; however, neither design or making activities necessarily utilize such a prescriptive approach in practice. For example, Ray Sison, design director for *Work & Co*, a design studio that produces goods and services for Facebook, Google and Apple, believes that even designers need to "move beyond design thinking, to design doing." (Buds, 2017). He believes that design thinking separates design and thinking, where the real thinking and discoveries unfold *while* making (Buds, 2017).

Without design thinking, how else can teachers structure their making activities?

THESIS STATEMENTS

Social making activities can meaningfully engage learners in a multiplicity of subjects through the acts of making, sharing, and reflecting with others.

Designers, Makers and Post-secondary research can support deep engagement with making in Maker Clubs (grades 4-6) by sharing resources and findings through public forums, programs, and published materials.

But ... How do social making activities engage learners?

MANIFESTATIONS PART II:

Making (and Sharing) to Integrate Core Competencies

According to Yvonne Dawdyiak, *Technology Integration Mentor* and *Educator* that prepares teacher candidates at UBC, making activities are more likely to be readily integrated into the classroom through the core competencies (see pages 14-15). She states that, "If you share how specific activities can develop a competency, teachers can start to see how they can find the time to bring the activity into the classroom." She continued by stating that, "This [sort of approach] could help *integrate* the competencies, and not just introduce the core competencies to students.

I asked Yvonne how the competencies are currently being introduced, and she mentioned that teachers are struggling with how to build these core competencies into what they're teaching.

> Teachers know how to follow curriculum, but this core competency piece is different from what we've had to do in the past. And yet, the thinking [competency], for example, was always embedded into math and social studies and science in the prescribed learning outcomes, and the communication piece was all over language arts.
>
> It was always embedded there as discrete curricular objectives, but now it's kind of been removed from that [...] I don't know if teachers are thinking as they plan, 'What core competencies are helping students develop and how am I going to get my students to understand and assess them?'

KEY INSIGHT:

As the curriculum is being adopted throughout BC, Yvonne suggested that educators are seeking support on how to integrate these competencies in a meaningful way.

In order to address this need, I familiarized myself with the competencies, observed where they naturally emerged in maker activities, and made note of actions that I took in order to facilitate the conversation.

... But first, I needed to get some conversations started. So, I started to test out some ideas with Emily Carr students.

DESIGN OUTCOME: Starting the Conversation

Lightning Talk 'Zine completed in the spring of 2017. See full 'zine in Appendix D.

While reflecting on the self-directed nature of the new BC Curriculum, as well as the sometimes rigid (and sleepy) social space of the classroom at Emily Carr, I decided to create a 'zine describing the art (& craft) of lightning talks. "Lightning talks" are a common method used by makers and hackers in order to "warm up a room" and get people connected, and more comfortable to share themselves and their ideas. These quick bursts and shares allowed students to begin the process of connecting, and thus creating, in the present moment, in order to break out of more rigid, rote classroom expectations, outside of evaluative patterns of the institution.

After getting comfortable with the students, I began to share tools and methods that I thought may relate to their curiosities.

MANIFESTATIONS PART III:

Approaching New Methods: Mapping Core Competencies to a Socially-Engaged Practice

Notes on Methods:

Throughout the process of making with others, I engaged with participants in a fairly systematic way. The main activity that I conducted, was inviting students to participate in the space, and granting permission to collaborate and use the tools available to them. Once students acquired a new skill, I engaged in a series of entrance and exit questions about the activity. Their responses became key insights into their curiosities and interests, which gave me a sense of a possible "next" activity, and a sense of where their individual interests may lie. Co-creation results are transcribed from audio in Appendix A.

Core Competency: Personal & Social (Positive Cultural Identity)

Nicole Preissl (Emily Carr Undergraduate Student) Learns to Spin.

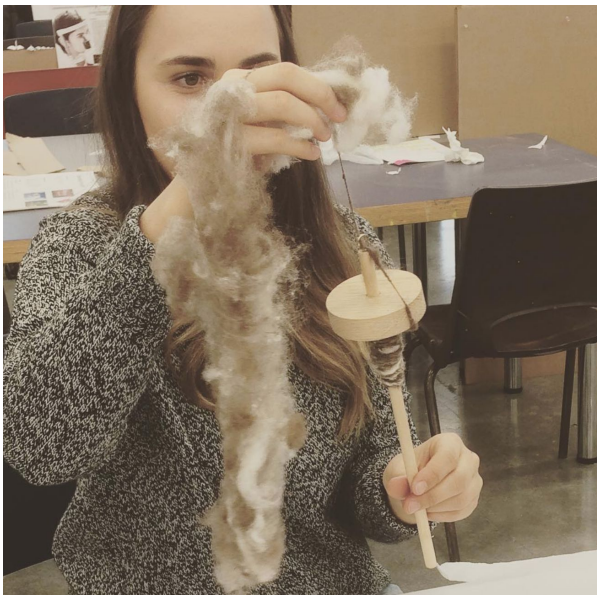
"The full process was here. It wasn't a YouTube video. It wasn't so dislocated from me. It was right here, human to human, which I think is really important." - Nicole Preissl, Undergraduate Student at Emily Carr

I first met Nicole over a sharing of skills. I was spinning wool, and she shared with me some raw Buffalo hyde that she had been experimenting with at the *Aboriginal Gathering Place* at Emily Carr. She mentioned that she was connecting with her Coast Salish ancestry through making, and expressed an interest in learning how to weave. While I don't have any knowledge or experience working with Coast Salish weaving, I expressed that I could teach her what I already knew about spinning and weaving, and I invited her to my workspace at Emily Carr, where she chose to learn how to spin by working with a drop spindle.

Engaging with this activity allowed us to connect and talk about her culture. She shared with me that her grandmother's grandmother was a cedar weaver, and she communicated that it was her exploration with textiles that gave her the means to bring up this conversation about her heritage. She began researching practices her ancestors may had practiced online, and expressed a desire to go deeper, and take on even more spinning and weaving. She had mentioned that she had always been proud of her Canadian or Austrian/Scottish side, but wasn't always sure how to explore her indigenous ancestry. She had a background of beginning to work through this at Emily Carr, and was hoping to expand her knowledge of this through making. We spent some time spinning together, and through sharing skills and stories, we were able to open up conversation regarding the development of her cultural identity.

Nicole wasn't the only Emily Carr student that expressed a desire to connect with her indigenous ancestry through making. Arhea, another participant that approached me, was also already discovering her Māori ancestry. Arhea was immediately drawn in by the handcrafting element, a means of making that she wasn't previously familiar with. Seeing the tools immediately became an opportunity to open up a conversation about her cultural heritage. Arhea and I sat down for a few sessions, and her textile practice took off through the semester. She began harvesting flax in New Zealand, and managed to get ahold of some buffalo fibre. I had some sheep fibre, and we sat down as she was carding the sheep and buffalo wool together, so that the material would spin better. While spinning, she stated,

> "Mixing together sheep and buffalo wool is kind of cool, because the buffalo wool is brown, and the sheep wool is white and I'm coming from a place of finding my cultural identity, and mixing them together -- my Maori side which is dark, and my European side which is lighter -- so this process of spinning is creating a story for me about mixing my 'other selves' together."



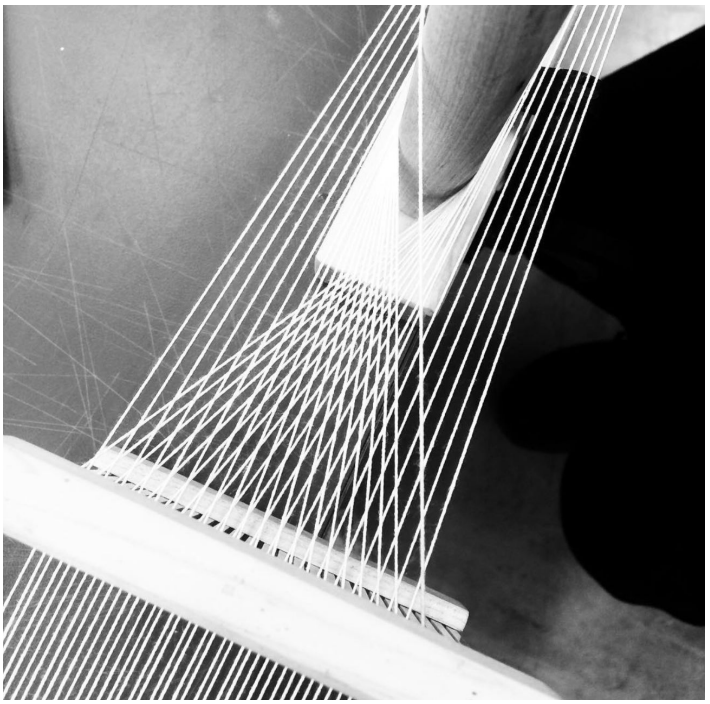
Arhea Mawhinney, Masters of Design Student, learns to spin.

Core Competency: Personal and Social (Personal Awareness and Responsibility)

Amy Walker: Facilitator, Maker & Creator of *Momentum Magazine,* conducts how & Tell" of her homemade clothing.

Another participant, Amy Walker, saw the textile work and making space through social media, and decided to bring her own made items to Emily Carr for a "Show and Tell." "I think Show & Tell is super fun way to see what other people are working on." She described that the clothing and accessories that she had made represented a negotiation of her own relationship with women's role in society. "I think having clothing self-sufficiency is an idea that's powerful and comforting. It's taking care of yourself, and a livelihood, people are always going to need socks and hats. If I know how to make those things, I can contribute to society." In this case, the broader conversation around the making environment and activities taking place were a means to open up conversation, through which Amy came forward to express her own relationship to clothing, cloth, and making.

Core Competency: Thinking (Creative & Critical):



Jordache Mackenzie, Masters of Design Student at Emily Carr, reflects on “Warping”, the first step of the weaving process.

Jordache, another student present in the Emily Carr studio space, expressed a curiosity with the tools presented. He made it clear that he had no interest in weaving at any point in his life, but that this activity was an opportunity to “play with materials and try a tool that he had never used before.” The activity that he chose to participate in, was warping thread to attach to a loom. When I asked him what this activity reminded him of, he answered, “Warping is a science fiction term. When you’re warping, you’re bending the fabric of space time to move really fast.” In this case, Jordache was thinking creatively about fabrics, and threads, through conversation and storytelling.

Core Competency: Communication

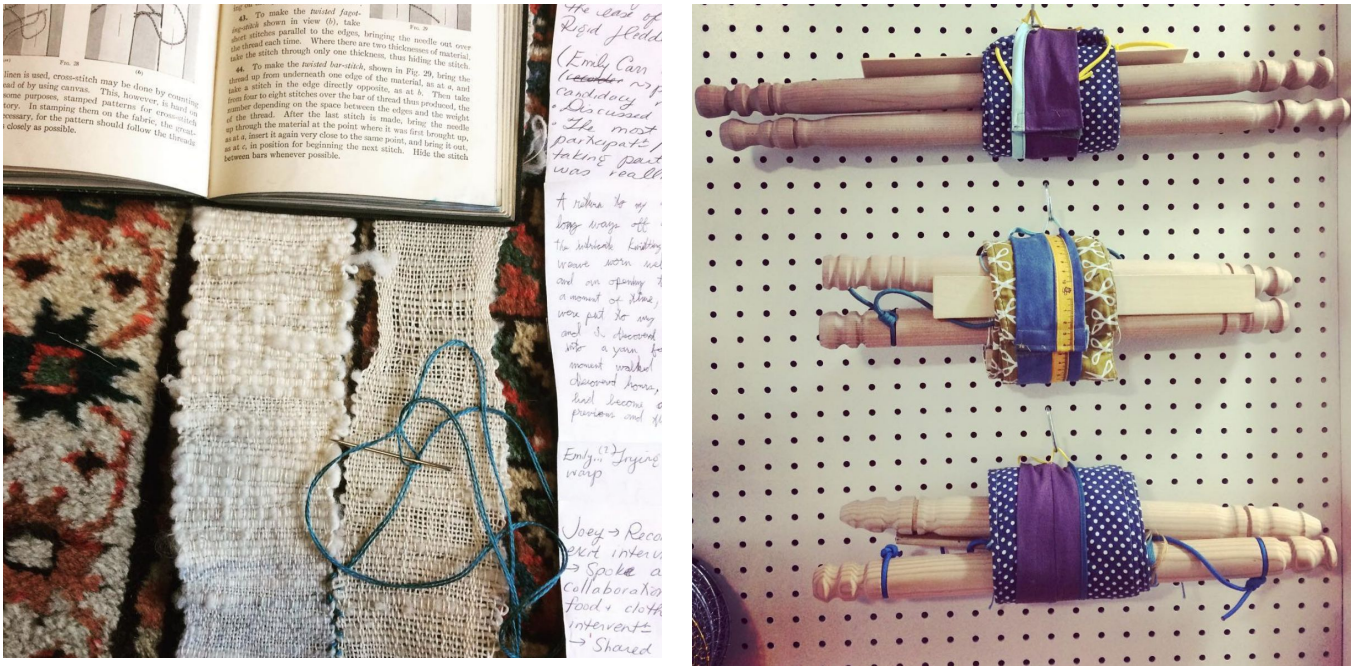
While many of these activities emerged through conversation which required quite a bit of my personal time (a challenge for teachers in the classroom), there were some consistent patterns that I followed, which were repeated and exchanged among participants. For example, once a student learned a new skill, there was generally an interest in sharing that skill with other students, or a participant expressed an interest in helping build kits and tools for these activities. The nature

of building a “maker club” in schools can be an inherently social activity, with the development of communication skills underlying most interactions.

From these interactions, it’s clear that simple hand tools and kits allowed an opportunity for students to interact with making, and begin discussing their own personal curiosities and interests that can extend into other learning activities.

So ... How might this look in the classroom?

DESIGN OUTCOME: Lending Library of Things



L: Results of Co-Creation Session: Journal entries and woven cloth. // R: Loom kits

As a result of key conversations surrounding co-creation sessions and interviews, a “Lending Library of Things” may be an interesting way of extending and deepening dialogue between students and educators, or as a tool to understand a student’s individual learning process. Reflections collected throughout this process served as a sort of “analogue social media platform”, which participants shared with others, or reflect on their own process. In this library, “How to” guides and contextual documents can be created. These items can be created by students, or catalogued with books and other resources.

OK, that's great. People are making and sharing. How do you work with students to *develop* their competencies and go deeper? And, how do you communicate to parents and administrators the nature and value of what you're doing?

MANIFESTATIONS PART IV:

Negotiating Breadth and Depth: Digging Deeper

While an essential component of bringing making into the classroom includes beginning with making, there is a concern from educators that these activities may exist as "one off" or "craptivities". Without adequate resources to nurture students towards deeper engagement, making activities may fall flat. I spoke with Patrick Gauley-Gale, a Home Economics Teacher in Victoria, who expressed the following,

> When I talk to teachers and educators about [cultural practices and making], it's really exciting, but in actual practice with my students, they'd much rather be baking muffins than learn about first nations and traditional practice, or food security. I think maybe it takes patience to bring value to that kind of knowledge to students over time.

KEY INSIGHT:

While bringing making into the classroom can open up conversations related to the core competencies, resources and tools are needed in order to further develop a student's thinking with the competencies as they make.

MANIFESTATIONS PART V:

Addressing the 'D' (Design) in ADST

In order to reconcile breadth and depth of thinking with making activities, I interviewed researchers at Emily Carr. While making activities can motivate some students to begin to reflect, and with the right social support, gain confidence and willingness to participate, a bridge still needs to be made to nurture learning into other areas. Similar to students making muffins, Garnet Hertz, Canada Research Chair at Emily Carr stated the following about the maker movement:

> In a space like a hackerspace, you're given the freedom to do a whimsical project and no one's going to hassle you for it – and hackerspaces are an important space for that. But there is a lot that can be learned from a field like design or art. Art has a strong culture of critique and history where things like gender and politics are clearly discussed. Fields like informatics or industrial design present opportunities where we can discuss how biases can

> unknowingly be designed into artefacts and how that impacts how people behave. [...] Hackerspaces are spaces where one can learn how to solder or how to make an LED blink with an Arduino, but after you do that, questions come up, like "What project are you going to make?". That's a more difficult problem than getting an Arduino to run a chunk of code: you end up with much more of a personal and social quest that enters the terrain that design and art have been walking for centuries. The history of art and technology and the discipline of design are really useful tools to bring into a place like a hackerspace.

KEY INSIGHT:

In the same way, making activities in the classroom (grades 4-6) can benefit from design resources (beyond design thinking), through tools, frameworks, disciplines, and knowledge that exist at Emily Carr.

Culture, Making & Memes

The "Culture vision" developed throughout the making practice (see pages 22-23), provided a means to begin tackling the deeper questions that arose through making. Sandor Katz, author of *The Art of Fermentation,* sees culture as a participatory process that is developed through making and sharing. He states,

> In contrast with the realm of biological reproduction, where information is coded and copied as genes, in the cultural realm, **information is encoded as memes.** Memes are transmitted through words, concepts, images, processes, abstractions -- stories, pictures, books, films, photographs, computer programs, ledgers. Secret family recipes. Life lessons, like learning to identify edible plants, learning to garden, learning to cook, learning to fish, learning to procure, use and preserve precious food resources. Fermentation. (Art of Fermentation 6).

KEY INSIGHT:

It seems that it's through the conversation *about* making that can promote deeper engagement. For example, "basket weaving 101" is a common term for discussing easy courses; however, according to this definition of memes, the stories presented about basket weaving by the instructor can shape how information is transmitted. Basket weaving can connect learners to cultural stories, discussions about technology, or even the manufacturing process.

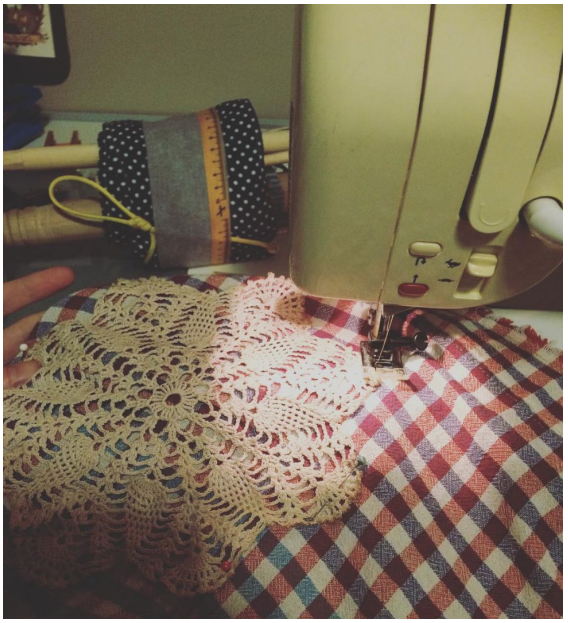
DESIGN OUTCOME: Meme-Making at Emily Carr

As a result of these insights and development of an understanding of culture and education, I have created a series of activities, or “memes”, which operate at the level of culture. These items can be mutually developed with teachers, educators, and students, and in many ways, posters and learning tools are part of the everyday classroom (see “maker carts”). Some further explorations related to food and cloth include:

1) Clothing:

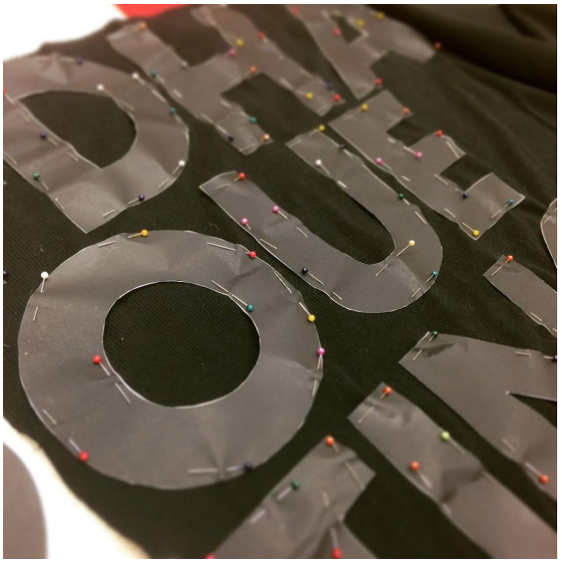
Throughout the research process, I created and mended clothing in order to provoke conversations around making and re-use.

A sample of handmade and mended items. L: Fingerless gloves made from alpaca wool // M: Patch made by maker Paul Nosa and sewn on a skirt // R: Visibly mended cashmere sweater (was my grandma’s)



L: hand-dyed, thrifted jacket // Bottom R: Sewing a doily on a shirt

2) Banner:



Handmade banner stating, “The Future of Education is Hands-on” L: Hanging the Banner // R: Cutting and sewing pieces together. This story was told via social media.

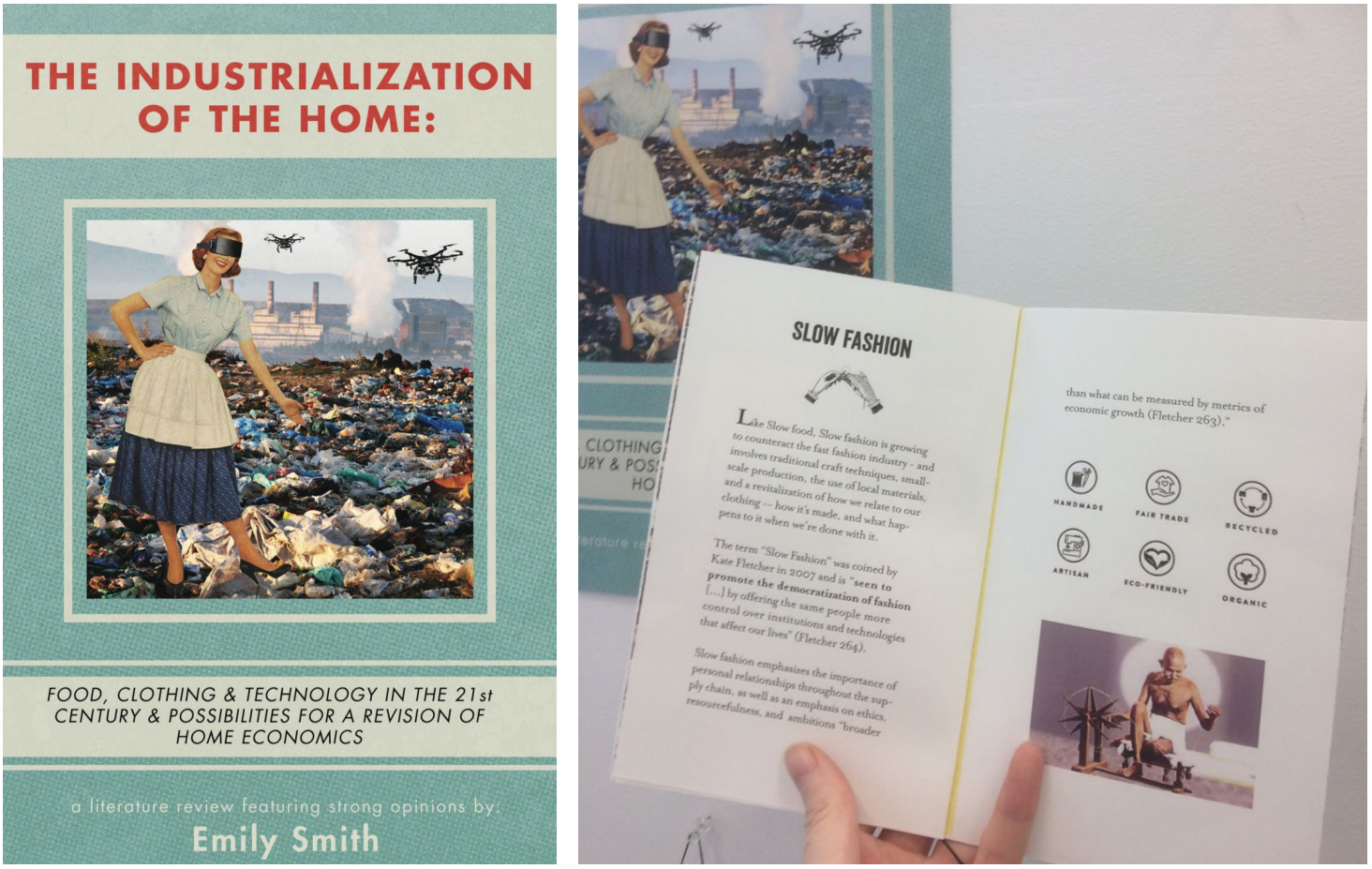
3) Curiosity Boxes:

Top L: Cotton box with Pakucho and Pima cotton samples, with artwork from the Middle Ages. // Top M: Various silk samples (Muga, bombyx, circula, tussa) // Top R: 5 total cigar boxes // Bottom L: Close-up of wild silk samples // Bottom R: Close-up of commercial silk

Curiosity boxes made from old cigar boxes. These boxes include raw textile fibres in order to tell the history and technical details of various fibres. The velvet fabric in the background is from an old dress from a friend, and silk and cotton samples were sourced locally from a local silk studio and “Vegan Yarns”. Future iterations will include bast fibres, synthetic fibres, and more.

‘Zine:

(See more photos in Appendix D).



L: ‘Zine cover // R: Sample imagery from the booklet

This ‘zine consolidates research and opinions surrounding new possibilities for Home Economics. Imagery is collaged and borrowed from magazines, and online sources. The intention of this ‘zine is to provoke questions around women’s roles in society, and create new possibilities for meaningful work and responsible consumption in the domestic realm.

CONCLUSIONS

Through the act of listening, making, and co-creating with others, I've discovered that social making activities can meaningfully engage learners in the core competencies, relevant to BC's new ADST Curriculum. In order to dive deeper into subjects and encourage critical thinking, there's an opportunity for new design methods to shape how we think about what we make through "memes", and meaningful discussions about making. These activities can be shared through public forums, programs, and published materials, and can extend the *ITA Maker Club* program.

The foundation of this work is built on a diverse range of mindsets, tools and methods. I believe that it's the breadth of these explorations that gives rise to meaningful and rich learning experiences. While not all teachers need possess all of this knowledge, or behave as a "one woman band", perhaps these personas can extend into meaningful learning modules that are extensions of the *Maker Club* format.

In order to extend existing curriculum into meaningful activities, I would like to develop *Maker Club* as a compliment to Home Economics and Tech Ed Curriculum with designed materials, which are mapped to the core competencies and lead students to discover life skills critical thinking, sustainability, STE(A)M, history, etc. through a maker-based approach. For the next phase of this project, I would like to dig deeper into cybernetics and Human-Computer Interaction, in order to continue to develop a human-centred method for engaging with technology through making, sharing, and story-telling.

In addition to building curriculum and learning materials, design research and ethnography, events, conferences, and published materials will increase the public awareness towards this human-centred philosophy of technology.

In order to carry this out, local researchers must come together to share, to conduct more focussed research on students in grades 4-6 to develop further modules in accordance to different learning styles and classroom needs. Finally, this work could be developed in partnership with faculty at Emily Carr linking Post-Secondary making to the new BC Curriculum in a meaningful way.

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Official website for the Vancouver Mini Maker Faire. Includes event information on presenters, past exhibitors, and contextualizes the maker movement in a worldwide context (Links to makerfaire.com and Mini Maker Faire's all over the world).

Applied Design Skills and Technologies. BC's New Curriculum, Government of BC website. Retrieved from: https://curriculum.gov.bc.ca/curriculum/applied-design-skills-and-technologies/introduction

This government website is dedicated to describing the curriculum overview and goals and rationale for BC's new K-12 ADST curriculum, published in 2016.

Barber, Elizabeth Wayland. Women's Work: The First 20,000 Years | Women, Cloth and Society in Early Times. New York: W. W. Norton & Co.

Basket Weaving (n.d). In *Oxford University Press*. Retrieved from: https://en.oxforddictionaries.com/definition/us/basket-weaving

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Bateson reflects on her own experiences as an anthropologist and lifelong learner. She proposes that learning involves a willingness to improvise and continue to learn new ways of seeing, as opposed to "old, safe patterns" of interpreting experiences. She believes that this way of thinking can be applied to everything from multiculturalism to personal relations. She looks at 3 main experiences from her own life, including her time spent in Iran, Israel, and the Philippines, to illustrate these points.

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A discussion paper which summarizes member feedback received by the BCTF, intended to foster discussions on curriculum change and shape ongoing research on education conducted from 2016-2020.

Budds, Diana (2017). Want to be a Great Designer? Ban Post-It Notes. Co.Design. Retrieved from: https://www.fastcodesign.com/90147380/want-to-be-a-great-designer-ban-post-it-notes

This article critiques "Design Thinking" strategies and proposes that [even professional designers] need to think beyond Post-it notes.

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Maker Day Tool Kit: A program produced with UBC Oakanagan, and the *Industry Training Authority.* The program involves teaching teachers design thinking and making strategies in order to facilitate making in the classroom.

Coburn, V. & Morrison, S. (2013). Clown Through Mask. Chicago, Il: The University of Chicago Press.

A summary of methods and philosophical underpinnings of Richard Pochinko's Canadian Clowning Method.

Dougherty, D. (n.d.) The Maker Mindset. Retrieved from https://llk.media.mit.edu/courses/readings/maker-mindset.pdf

In this article, Dale Dougherty discusses makers, the Maker Mindset, the Maker Movement, as well as the challenges and opportunities available when making is applied to education. He proclaims that, "We are all makers", and discusses the agency of students, and the impact that technology such as 3d Printing, Arduinos and tools that facilitate rapid prototyping, have on the Maker Movement. He advocates for fostering a Maker- and a "growth mindset", and encourages students to play and explore in Maker Clubs and spaces in schools.

Honey, M. & Kanter, D. (2013). Design | Make | Play: Growing the Next Generation of Stem Innovators. Routledge.

A series of case studies and papers on classroom making activities in the US, based on the *National Research Council's* new Framework for Science Education. Design, Make, Play are presented as learning methods that inspire students to discover STEM fields.

Graham, S., & Harris, K.R. (1994). The effects of whole language on children's writing: A review of the literature. Educational Psychologist, 29, 187-192.

This review explores the effects that “whole language”, a constructivist approach, had on learning to write.The primary discovery found was that “students in whole-language classes held a meaning-based view of writing; whereas their peers in conventional classes viewed writing from a skills perspective.”

Harris, K.R., & Graham, S. (1996). Memo to constructivist: Skills count too. Educational Leadership, 53 (5), pp. 26-29

This article includes criticism of Constructivists’ over reliance on open learning activities, and advocates for rote learning in addition to self-directed learning. They explore a “whole language/progressive education school” with no workbooks that was focused on self-directed learning. They found that skill development was a problem for some students, and that many students who face challenges in learning behaviour and development, have an especially difficult time with skill mastery. The article advocates for “integrated constructivist curriculums [that includes skill building] in authentic learning environments.”

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Professional website for clown courses taken by the researcher. (Includes "Creative Character Development and Personal Transformation through Clown", "Deep Clown" and "Extensions"). Also includes insights and core clown philosophies developed by David.

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Company website for World Maker Faire website. Describes what a Maker Faire is, how to create one, and how to get involved. Published by Make Media.

Margulis, Lynn (1999). Symbiotic Planet. Amherst, Massachusetts: Basic Books, A Member of Perseus Books Group.

In this book, Margulis lays out her evolutionary theory, Symbiogenesis, which refers to the process of symbiotic organisms (bacteria) that interact to create novel evolutionary changes, beyond random mutation. She also discusses sex as a failed attempt at cannibalisms resulting in repeated mergers of bacteria, and how Gaia theory is symbiosis as seen from space. She also reflects on her personal experiences being a mother and scientist, educational experiences, and outlines a less hierarchical ("5 Kingdom Hand") categorization of speciation than what Linnaeus proposed.

Martinez, S.L & Stager, G. (2013). Invent to Learn. Torrance, CA: Constructing Modern Knowledge Press.

In Invent to Learn, Sylvia Libow Martinez and Gary Stager feature the pedagogical underpinnings for why and how making can take place in schools. The book starts with a (brief) history of making -- from da Vinci to Piaget, to Dewey and Papart. They look at the Reggio Emilia approach, Montessori and others, and provide tips and tools for teachers to bring a Maker Mindset into their classrooms.

Sanders, E.B., & Stappers, P J (2012). Convivial Toolbox: Generative Research for the Front End of Design. BIS Publishers, Amsterdam, The Netherlands.

A resource on generative research through design. Includes human-centred products, systems, services, and environments.

van Abel, B., L. Evers, R. Klaasen, and P. Troxler. 2011. Open Design Now: Why Design Cannot Remain Exclusive. Amsterdam: BIS

This book looks at co-creative design and how technology is changing the landscape of how we design today. It explores copyright, open source culture, business models, social critique and sustainability.

Papart, Seymour (1986). Constructionism: A New Opportunity for Elementary Science Education. Massachusetts Institute of Technology, Media Laboratory, Epistemology and Learning Group: National Science Foundation. Division of Research on Learning in Formal and Informal Settings.

Papart describes constructionism as a "reconstruction rather than a transmission of knowledge", involving self-directed learning and building a meaningful product. He suggests a design of new materials for the public school system that "pay attention to the role of affective, cultural and gender-related facets of learning science."

Phoenix Support for Educators (n.d). Craptivity or Craftivity? It's all in the delivery. You decide. Queensland, Australia. Retrieved From: http://www.phoenix-support.com.au/blog/creative-craft-activity-or-craptivity/

Phoenix Support for Educators is a Professional Development program based in Australia, that supports curriculum development through meaningful play, curiosity and wonder.

Smith, E. & Kesler, Z. Maker Club Toolkit (2017). Produced by ITA BC (Self-Published), 2016. Retrieved from: https://www.magictroutimaginarium.com/maker-club-manual

Maker Club Toolkit which contains Teacher's guide and projects to be applied to Maker Clubs in British Columbia.

Sikarskie, Amanda G. Textile Selections: Preservation, Access, Curation, and Interpretation in the Digital Age. Published by Rowman and Middlefield, 2016.

This book explores how collections of traditional textiles can be accessed by curators and interpreters. Working with museums and sites throughout the US, the author explores: the nature of digital material culture, the role of audience participation vs curatorial authority online, audience-friendly collections, metadata and cataloging, the legality of ownership, access of museum collections online, and gender equity in museums and archives. I referenced a quotation in chapter 2 of this book, which looks at "women as cyborgs", and discusses cybernetics, cyborgs and automata in relation to the role of women.

Singleton, J (2015). Head, Heart and Hands Model for Transformative Learning: Place as Context for Changing Sustainability Values. Journal of Sustainability Education.

Singleton reviews the Head, Heart and Hands model for transformational learning and how a connection to place can provide an “Authentic context for meaning and engagement” and a connectedness to nature. She includes research on transformation, and reflects on the ways that the Head, Heart and Hand model can facilitate a “Re-evaluation of our beliefs and values from critical reflections which are constructed by our place in the world and the relationships we build with others”.

Skerrett, A. (2010). Lolita, Facebook, and the Third Space of Literacy Teacher Education. *American Educational Studies Association, 46: 67-84*. DOI: 10.1080/0013194093480233.

Solon, Olivia. Richard Dawkins on the internet’s hijacking of the word ‘meme’”. Wired Magazine, 2013. Retrieved from: http://www.wired.co.uk/article/richard-dawkins-memes

This article announces a musical performance that includes his speech in an auto-tuned song about internet memes with the goal of becoming an internet meme. It outlines a bit about his work and includes an interview with videos as well.

- APPENDIX A -

CO-CREATION SESSIONS

Session 1: Arhea MaWhinney

These sessions were conducted on the Emily Carr campus, in a consistent physical space setup by the research (see page 24 for more information on the methodology). Results from the sessions were recorded in audio clips, and transcribed in the appendix below. Each session included a standardized set of questions, consistent between participants. In all cases, participants approached the researcher in search of technical support and/or intrigue to extend their own material practice. Points of intrigue are included in bold fonts below:

ENTRANCE QUESTIONS:

Emily: What's your interest in textiles?

Arhea: My interest in textiles is all things textiles. I love bedding (linen) that's where my inspiration comes from. People always laugh when I talk about it. But I love bedding and interior design and the feeling that I get from it. I worked in a linen store back home and it's really luxury and nice. That's a big part of textiles because I want to understand how it's made. I also grew up in a family where there was sewing and knitting and I've always been surrounded by fabrics. Whether I knew it was influencing me at the time, I'm not sure but it's where I'm at now. I want it to be a big part of my life.

Emily: Do you have any previous experience working with textiles?

Arhea: If you count doing fabrics in high school... I had to make a garment so I made pyjamas which were a fluorescent tartan pattern ... flannel but a hideous green tartan. So I made pyjamas out of those. It was really cheap fabric from a fabric store. It was probably the first thing that I remember making. I would have been 13.

Emily: What do you know about the tools that we're working with?

Arhea: **Right now, I'm using the drop spindle and I'm fairly new to this wool. I was taught by you last year which was the first time I had even seen one. I had a thought that I wanted to learn how to spin, and you were like, "Oh! Come to my studio right now and we can do it!" and I was so amazed that this was even a thing. Because when I first thought of textiles I was thinking about big production - I was really oblivious to the handcraft side of it. When you called me over, I was like, "Whoa!"**

I've used the drop spindle a couple of times and it's only been when you've been around. When I need help, I ask you.

Emily: Are there any stories that you tell yourself about this activity?

Arhea: As I'm spinning, I'm reflecting myself, trying to make sense of story. Thinking about the feeling of the wool I'm using, how that connects. I think it all tells a story. It brings me back to thinking about how our ancestors would have created patterns, or worked with these tools.

Emily: When you saw the hand tools, how did that change your perception of textiles?

Arhea: **I think it showed me that there's alot more to it, and having the skills of handcrafting is much more of a connection than on a machine. A connection to everything. The tools, the fibres, thinking back to people in the past. How they used them.**

Emily: Is there anything about this activity that pulled you in?

Arhea: Well, you sort of pulled us in to do the warping of your loom, but I decided to sit on the side and observe and as you guys were doing it, I thought, "Oh! I'm going to go get the carders and spin some wool!" So, yeah.

Time spent spinning (material practice): ~1 hour

EXIT QUESTIONS:

Emily: What did you learn as a result of this exercise?

Arhea: **The whole structure of doing it, I found quite difficult. How I hold my hands, my arms get really sore. I also learned that it's really cool seeing it all come together besides the doing. I was really excited when the fibres came together and it became a yarn - so from A to B.**

Emily: Is there anything that you're curious about?

Arhea: I'm curious about everything of what's to come. What I'm going to do with it, how I'm going to use it. I'm curious to carry on and learn more. Because I have the basics of it. I want to see how I progress as a spinner.

Emily: You were saying something about mixing the two colours together (Buffalo with sheep)

Arhea: **I got a big bag of buffalo fur from a friend and I was really excited when I was washing and teasing it to spin it - and when I had to spin it, the hair was too short so I had to mix the fibre with some sheep, and I was a little bit reluctant because it wasn't pure and I thought I was taking away the meaning and quality of the yarn I was doing.**

But when I actually started doing it - I mean, it's not perfect - but that's

the thing about natural fibres, is that they're unpredictable. But mixing them together is kind of cool and the buffalo wool is brown and the sheep wool is white and I'm coming from a place of finding my cultural identity, and mixing (I guess because I have 2 tones of skin colour) - my maori side which is dark, and my European side which is lighter - so telling a story about mixing my other selves together.

The time went by really fast because I was really enjoying it. I'd like to do more.

Emily: **What would you like to do next?**

Arhea: I want to carry on spinning so I can use the yarn in my weaving in my loom. So I've been working with looms a little bit and I want to teach myself ways of knowing through my culture and traditional knowledge ... so I want to incorporate what I'm spinning now into it somehow.

Emily: Where do you think weaving or fibre arts exists today?

Arhea: **Everywhere. Just everywhere. Everywhere you look, there's weaving and fibres. Outside, plants are fibres. What you can create. Plants are being stripped all the time to make new fibres, and it's just really exciting.**

Emily: Do you think engaging with these mediums is valuable/relevant in today's society?

Arhea: Definitely. Like I said before, my project is going towards finding cultural identity and how I'm doing that is through these hand techniques of weaving and spinning and working with these fibres, because it's a big part of my cultural survival, and so. It's been lost a little bit with colonization and keeping these practices alive .. people need it in order to sustain what's coming.

Thank you for teaching me and showing me ways. I've always been really excited about it because I'm really excited about it.

CO-CREATION SESSIONS

Session 2: Eugenie Cheonne

ENTRANCE QUESTIONS

Emily: What's your interest in this activity, and why would you like to learn more about it? Spinning/plying/coming over here.

Eugenie: **Initially, I wanted to come over because I needed alternative ways for making soft mediums for research. I know you as a knitter/weaver, so I came to you, and the first thing that caught my eye was this tool**

[points to drop spindle]. It was more so an intuitive process than something really intentional. I saw it, I liked it and decided to work with it.

Emily: Do you have any previous experience working with textiles?

Eugenie: When I was young, in pre-school, I made some things. I've done traditional knitting and then crochet. But I never made anything out of it - it was just patterns. And it never became an object. I didn't know the beginning and end.

Emily: What do you know about the tools we're working with?

Eugenie: At this moment, none. Just the brush and the drop spindle.

Emily: What stories do you tell yourself as a result of these activities?

Eugenie: **This in particular, not much, because it's very new for me. But in general when thinking aobut knitting, I used to do it as a kid. I have a memory with my grandmother when we went for a trip with all of her friends - and I was the only kid with all of these grandmas. We got on the train to see the Snowflake Festival on the mountain sides, and I brought my knitting kit with me, and my grandmother was like, "You're the youngest - a *kid*- with us, a bunch of old grandma's and you're the only one that brought a knitting kit. What is wrong with you? That is so boring!" I thought it was a neat thing to do on a long train ride. I thought my grandmother would be more encouraging and know more about knitting, but she didn't. I thought I'd learn something, or they'd have some input in the process - but totally the opposite happened. They said, "Go put that thing away, we're going to go and eat some food." Whenever I look at knitted things, I remember that.**

Time spent spinning (material practice): ~1 hour

EXIT QUESTIONS:

Emily: What did you learn as a result of this exercise?

Eugenie: **I learned that it's pretty easy. Follow my instinct. Let it find it's place. If I want to go deep, then I could talk about the artist/creator's hand. Alot of the times when we're making, sometimes our hand doesn't have to be too involved for it to manifest itself. That's what I meant by saying simple, intuitive and easy.**

Emily: Is there anything you're curious about as a result of this exercise?

I asked you right after I was spinning, how to ply and extend, connect and make more. And how to use them later on. To make it a material. To be a component of something else to be determined. I don't know it if will be an object or another piece of material - but one of the elements for that. A component for something else.

Emily: Where do you think weaving/fibre arts exists today?

Eugenie: "Fibre arts?!" when you put in "Arts", it's pretty limited. But if you think about it in everyday life, textile is everywhere. When you say art, I naturally think of it as a craft. A group of people - intimately together, hand-woven and hand-knit. It's dispersed. It's either end of the spectrum. Either mass-produced, or limited quality, handmade craft textiles.

Emily: Do you think engaging with these hand tools is relevant in today's society? What do you think the place is for these things?

Eugenie: **Personally? Or generally? I think personally, I want to keep on doing it, just because I like using my hands to create new things - that's my personal inclination and a talent that I came with. For other people with no background in art/design may not see any relevance and may not know where to start. Most of my friends would try to find a function for it and once they started, they would be afraid to fail. I've been trying to get my friends outside of the arts community to start an activity like this as a hobby, and they'll be like, "Oh, I'm not talented. It's so difficult". And they don't even start. When they do, they immediately go to, "What is this even for? Will it have a function in the end?" and that's the extent of their thought.**

Emily: Would you say it's a lack of curiosity?

Eugenie: **A lack of curiosity, accessibility, more being aware of possibilities outside of simple making of a scarf. There's not much value placed on these activities. But if you really know about it, there's so much other tangible value in the act of making. For me, it's very meditative. Having your hands active. I don't think many people are aware of that kind of quality of making.**

Emily: Do you find that in specific neighbourhoods?

Eugenie: Just thinking in terms of my social group.

CO-CREATION SESSIONS

Session 3: Jordache Mackenzie

ENTRANCE QUESTIONS:

Emily:	What's your interest in weaving and why would you like to learn more about it?
Jordache:	I never really had an interest in weaving.
Emily:	What made you want to do this activity?
Jordache:	To get a chance to play with the materials and try a tool that I've never used before.
Emily:	Have you ever worked with textiles before?
Jordache:	Not really. I knitted a scarf. I wouldn't call that working with textiles.
Emily:	What is that?
Jordache:	It's really basic.
Emily:	Is it?
Jordache:	Of knitting, it's very basic, because it's just a scarf. Straight knit.
Emily:	Who taught you?
Jordache:	My mom
Arhea:	You learned knitting?
Emily:	How old?
Jordache:	Maybe 10 or 11. Pretty young.
Emily:	What do you know about the tools we're working with?
Jordache:	I don't know anything. I can picture what it's going to look like.
Emily:	In what way?
Jordache:	The way the threads are being laid out and my knowledge of weaving, you can see that it's going to be a long sheet.
Emily:	Do you have any stories that you tell yourself about the tools we're working with and textiles?Warping?
Jordache:	"Warping" is a science fiction term. Do you know much about warping? It's like. When you're warping, you're bending the fabric of space of time to

move really fast.

Emily: Is that what we're doing right now?

Jordache: Maybe. Like the slow version. I guess we are bending the fabric of space and time in a way.

Emily: Are there any other stories? We were talking about sheep earlier. When you see these materials, do you have a thought or feeling?

Jordache: I have been paying alot of attention to this little section here, and how it reminds me of piano strings or wire on bridges and all the tensile wires.

Emily: It's architectural

Jordache: And it's kind of therapeutic just laying the strings out, perfectly spaced.

Time spent warping (material practice): ~1 hour

EXIT QUESTIONS:

Emily: What did you learn as a result of this exercise?

Jordache: I learned how to warp. Is it warp a loom? Warp some thread. I developed some tacit ways of manipulating the thread to make it work better. Yep.

Emily What were those?

Jordache**:** Certain ways I would flick my hands around to make sure the thread stayed in line and supported as you pulled it through so it wouldn't knot.

Emily: Is there anything you're curious about as a result of this exercise?

Jordache: Umm I'd like to see how big the size or scale of a looming thing could be. Can it get really big? Wall sized?

Emily: Any other curiosities?

Jordache: I'm interested in how this loom was made and put together. Who came up with these tools that you can use to do this? What other tools are there that do it differently?

Emily: Time: 1 hour. Are there any parts of this that you want to do next?

Jordache: I want to do the next stage now. Because I've got this loom warped thing already and I'm like, "What do I do now?"

Emily: Where do you think weaving/fibre arts exist today in the world?

Jordache: The global south. It's a term for my research. Non-western countries. Indigenous cultures, places where they don't go into the shop and buy something. Completely made. It refers to all non-western countries.

Emily: Do you think weaving/fibre arts exist everywhere else?

Jordache: It exists everywhere. But in western culture it's seen as more of an older lady female thing. Of course it's not because I used to knit when I was a child.

Emily: So it's in the hands of old ladies. Do you think engaging with these mediums is valuable or relevant in today's society?

Jordache: Yeah. I think it's important to develop hand and craft skills. You don't want to lose that connection to being able to work with materials yourself. If you just have a computer and AI machines doing everything for you, what if the power goes off one day and you don't know how to interact with the world?

Emily: Is there anything else you want to say?

Jordache: It was a fun activity. Thanks for inviting me.

CO-CREATION SESSIONS

Session 4: Nicole Preissl

ENTRANCE QUESTIONS:

Emily: What's your interest in weaving and why would you like to learn more about it?

Nicole: **It definitely comes from wanting to re-connect with my culture. Squamish are known for weaving and coming from a family that's disconnected from our culture, it's really important to learn and grow and become connected again, because I think it's a huge part of reconciliation, personal growth, and learning where I'm from. I spent my entire childhood being really proud of being Austrian and Canadian, but never knowing anything about the other side.**

I also think it's a really amazing practice in itself. I really have an appreciation for more natural ways. Our society is running towards technology everything and to go back and explore older practices and ways of making is really interesting to me. I think we're really going to need that, because in a few generations, if people aren't paying attention to the older practices of making, those things might disappear.

For myself, getting back and looking at indigenous ways of weaving, weaving in general, and natural dyes is really important.

Emily: Do you have any previous experience with textiles?

Nicole: Yes. **Before this, I was in Helene's class, a textile-based design class. In that, Jen from the soft shop taught us a little bit of weaving.**

Before that, **when I was younger, I was in a program called "Aboriginal Circle" and it's a way to connect kids to their culture and keep the practices alive, through the education system.**

So they come in once a month-ish, and do workshops for half a day. There's storytelling, teaching, art projects, etc. In that, we did a little bit of weaving. Not alot, but I think we made a coaster. I did like it, I think any kid likes to make with their hands. **There are definitely people in the world that are makers, and how they figure out the world around them is through their hands or body. For me, I was that kind of kid**. Anything artistic was up my alley, but in particular, that weaving one, I definitely loved.

Years after, I got away from it and when I took that class with Helene, I thought, "This is really cool." I started integrating it into my work. I did a weavable chair and it was a big tube that you could weave into it and you could weave the tube into the chair. **It was kind of like me connecting to my culture in this very small, minute way. It's not a direct, "Oh this is definitely Coast Salish", but to me, it was using something in my body that's coming out. I definitely liked that experience.**

It was always on my mind after that, and in the past half a year since Keith's class, I started to get into some different areas, and that's when weaving was really there for me and I wanted to keep going at it.

Emily: What do you know about any of the tools used for textiles? (drop spindles, carders, etc).

Nicole: I would say I don't know enough. I feel like I only know about hand looms (when you have the actual spool of yarn, and when you're actually weaving). I know about a drop spindle and I looked up a bit more about it. **You had shown us in Keith's class for a few minutes, and I was really interested in it. Over the summer, I looked up on YouTube how to do it, and then it also kind of left mind**. And then, I started getting more into it this past semester when I decided, "OK. I'm really interested in getting into natural dyeing, weaving, learning that" and then I went to a Coast Salish weaving demo and he showed us some of the tools they used, but I didn't know the exact uses for them. I think that's a really important part. **Because you could be talking about weaving, and then it gets to a point to do with tools or something technical and I lose some of the instruction. I think it would be good to learn more about the tools.** I know very little, so I'll say that.

Emily: What stories do you tell yourself about weaving or textiles?

Nicole: A connection to culture is huge for me**. I was talking with my grandma a few months ago and she told me that her Grandma's were really amazing cedar weavers and that's what they were known for in their community.** I think that's really cool because when I was talking with you in Keith's class, **I kept feeling my ancestors around me - not in a literal sense, but through the practice and through the making**. [After my grandma told me that], I realized that I think it was actually a really true feeling - because they were cedar weavers, and we do very similar techniques. **Knowing that my ancestors actually *were* doing that, and *were weavers,* is really cool. I would not have known that my ancestors were weavers had I not done that spinning, and had I not told my grandmother about it. That was something that never came up (I'm 23), had I not mentioned that to her.**

You can bring up old stories that your parents have, that they then pass on to you.

Emily: What is it about weaving that pulled you in? A conversation, thought or perhaps a memory?

Nicole: I would definitely say you were definitely helpful. **You're very patient - so that's helpful. When I talk a mile a minute and have all these thoughts come out, you were able to sit there, really listen, and when you have conversations with other makers or artists, it puts a seed in your mind.** It was definitely **planted in Helene's class, and I think maybe you were the water or sun to sprout it, and there were all of these other factors that have helped it grow into what my interest is now, it's a lot more condensed.** Now I'm really interested in this specific area - in weaving, natural dyeing and all of that. That was definitely a helpful thing to have teachers and people like you that were helping **nurture that thought, rather than just thinking it was weird to weave.**

You all had your own stories: You had mentioned you know how to weave and use a drop spindle and then I would look it up on youtube and be like, "oh my gosh! That's so cool".

Emily: Is there anything else that you make?

Nicole: I've been getting into carving. I'm not good in any sense, I don't even think my family was really known for that, but I think it's a really awesome thing to do with your hands. I also make drums. I love to make drums. I think the process of making from start to finish is really interesting to me. I don't like to just grab a bunch of lumber from the woodshop and then cut it and glue it. To me, that's ok, I love doing that- but it's not as exciting as when you can see something from a raw material and go from there. Even when I'm getting into things like drum making or weaving, I have all of these thoughts like, "Oh, I want to tan my own hyde." "I want to get it from here, **I don't want it to just be delivered to me. I want to do the full process. I don't know the process, but I want to learn. How does wool go from**

sheep to yarn? What is that process, and what is the full one? Because I get very into that. It's a goal that I'm interested in getting towards. It's interesting to me with making to get into the *full* process."

I might go to a workshop to tan hydes, so attending a workshop that tells me how to take it from skin into the next step... **There's so much behind the scenes that we don't know in our lives.** Like with backpacks, or food, or whatever. There are all these steps leading up to it.

Emily: Is there anything else you want to say?

Nicole: I would just say that I really appreciate having this integrated into our education here at Emily Carr. **It means something when teachers or people like you go out of their way to recognize different ways of learning, growing and teaching - because I don't believe there's just one narrow way to learn - like with reading and then you have to be tested on it.** Indigenizing education. But not even just that. Opening it up to different ways of learning. It's not like just about textiles, it could also be about sewing with thread with a machine. NO! It could be weaving, this, that, etc.

That's really cool about this school. There are teachers care about not being in a box as far as how to learn.

Time spent spinning & carding (material practice): ~30 mins

EXIT QUESTIONS:

Emily: What did you learn as a result of this exercise?

Nicole: I learned how to card wool, and how to drop spindle, which was really helpful.

This was a really awesome experience because it was a different kind of learning for me, not just a traditional, sitting in a desk-kind-of-learning.

I learned one-on-one in this interesting atmosphere [Emily's cubicle] with this interesting backdrop with the blankets, the wool hanging there, and the masks... it just felt more natural to me, because it's more of a traditional way of learning. When I say that, it's going back many, many years. I feel like this is how people used to learn before the classroom was put in place.

The full process was here. It wasn't like a youtube. It wasn't so dislocated from me. It was right here, human to human, which I think is really important. Because that kind of learning needs to be more integrated. Not just a lecture or a video, or a how-to reading. It was person to person. You were able to tell me what I was doing wrong, or if I was

doing something right, etc.

This different atmosphere. Taken out of the context of a classroom. Even though we're in a classroom - or a studio - but it doesn't feel like a studio. This makes it feel like your house. It's a different, more warm and cozy feeling to face inwards. You talked to me about this amazing backstrap loom and all of the intricacies that go into it. Even though it looks simple, and when you started talking about it, it started to look alot more complex. Which isn't a bad thing. **I just didn't know about all of these things.**

Emily: Is there anything you're curious about as a result of this exercise?

Nicole: Yeah. One thing that's coming to mind is, ***how did my people spin?*** Because ... how do they take it from the animal, and then make it into the yarn that they were using? That was a huge thing. I wonder how they did. **You said that Jen has the round .. drum carder. And all of that. It made me wonder how other people around the world were doing this. Because weaving happens in cultures all around the world, right? So, I wonder what they used to do.** And I'm wondering about certain techniques. I want to go and start practicing. I'm curious about how to get my hands on cat combs [to card the wool]

I'm curious about going out and trying more because now **you've helped me get to a place where I feel a little bit less uncomfortable with this [gestures to carders] and so now I'm interested in going out and making more.**

Emily: Do you have any ideas of what you want to work on next with textiles, fibre, etc.?

Nicole: What my goal is, I want to learn how to make a somewhat good piece of yarn. Do you call it yarn? I want to learn that as my next step. To get better at it and to learn more.

Eventually I want to weave a blanket. I know that's *so* ambitious. But that's my middle name. Ambitious. I want to learn this [gestures to drop spindle]. **Also, there's a particular thickness to Coast Salish yarn that's very thick, and I want to learn more about that, and maybe learn how to make that.**

Emily: I think they use **really big drop spindles.** We could probably look into how Coast Salish people spin.

Nicole: Yes, yeah! So, **I'm going to do that. And then, yeah. Dye the fibre and the yarn. And then I want to weave. Even if it's a small blanket, a corner of that size - or a tea cozy, whatever. I want to start weaving.** I want to really get into using the loom. That's my next goal. To see where I can bring that.

- APPENDIX B -

INTERVIEWS

All interviews were recorded in audio format and transcribed below. Original audio is available by visiting soundcloud.com/randomactsofmaking. Some text is edited from the original audio clips for clarity.

Session 1: Dr. Garnet Hertz - Canada Research Chair in Design and Media Arts and Associate Professor in the Faculty of Design and Dynamic Media at Emily Carr University

I

nterview URL: soundcloud.com/randomactsofmaking/garnet-hertz-critical-making

Emily: What does maker culture mean to you?

Garnet: The way that I usually describe [maker culture] is I see making and maker culture as driven by alot of things, and I tend to think in terms of physical objects than a specific social structure. **Making I see is primarily driven by a community and series of practices that have grown up and been catalyzed by 3d printing and Arduino. I think if it wasn't for those 2 things, it would have evolved quite differently. *The maker scene*. That's not to say that everybody that's making is doing Arduino or 3d printing, but those are 2 really big catalysts in the scene that differentiate it from craft and art.**

Emily: What is it about 3d printers and Arduino that caused that shift?

Garnet: It's also driven by people getting tired of talking about projects and interested in making projects. The "Do-ocracy" is a bit like that. I think that those 2 things brought communities together that ended up evolving into hackerspaces where people started pooling resources, knowledge, information, practices, gear, to figure out how to work with this stuff. That evolved into what's known as maker culture. **I think making is also a more "family friendly" version of "hacking". That's how Dale Dougherty had described it. He had proposed initially that it would be called "Hacks" magazine and his daughter said, "That's dumb, Why don't you call it make 'making' because everybody loves making?" and it's true. It takes a lot of the practices from hacker culture. It softens them in good ways and I think in bad ways. It de-politicizes it a bit and de-controversializes it which I see is partially negative, but then it is more *inclusive*, and the term**

hacker is really male-dominated, and macho-nerdness that can also be more destructive. I see it definitely related to hacking. So I see those two as really linked.

Emily: Have you introduced making in your classroom?

Garnet: Sure, it also depends on how you define "making". **I assume that every art class has what you would call "making". Whether it's making foam core prototypes or sketches... i**n the O'Reilly press maker brand of making, I've used Arduino and stuff like that. I was using basic stamp [a pre-Arduino Arduino by Parallax] before the Arduino came out, and alot of people were doing that stuff with electronic circuits and stuff like that, but it was a bit more complicated. I had been doing work like that in classrooms for a while now. I use Arduino and I use things like Instructables in my classes. I have my students document their projects on Github, open source their ideas, and try to get feedback from the community and use additive manufacturing and stuff like that as well.

Emily: What challenges do you face in the classroom when you're getting students going between talking about the made world vs. really engaging with making?

Garnet: **I think it takes a while for students to understand how to use electronics. For example, How can I use an Arduino to make an interesting project? It takes a while for students to understand the physical computing aspects: It's the thing that lives inside your microwave, or the thing that lives inside your phone. It's kind of a scaled-down version of that and there's lots of interesting things that you can do with that. The other struggle that I have that takes a considerable amount of time is to get students to think programmatically. To be able to think in terms of a logic tree or flowchart that you would need to use to make a piece of electronics, or prototype or piece of code to run. Because it's not obvious and it's not the way that humans generally think.** We tend to be more organic and it makes people need to slow down and understand, "Ok if this happens do I want this or that to happen " ... and then we have to wait ... **it takes time for people to slow down and be a bit more reflective of that and also more rigid in structuring what they want to build as a physical prototype or interactive object and how that translates to code and that's a big jump for a lot of people.**

Emily: So the structure of coding.

Garnet:

Yeah, thinking as a computer.

Yeah, **the leap from using a computer to understanding how it actually works and talking to the computer.**

Emily: How has it been received? From students? Are there students that are more comfortable with it? More willing to experiment? Are there trends? What challenges do you face in terms of engagement, and how have students engaged? Do students walk away feeling empowered?

Garnet: I think so. I think the key things are... **teaching people to solder for example, people get a rush out of just watching 2 metal things join together like with welding or something, where they click in and there's this Oooh! Ok! and there's a slight sense of danger because you're dealing with molten metal. Also, if they can make a light blink in some sort of pattern, there's this, "Oh ok!" or make a sound play after you press a button - some sort of interactivity. As soon as they see that, they get more engaged after they've had some hands-on experience.**

Emily: So, getting a students to do a thing or make something happen is what gets students more engaged?

Garnet: Oh yeah. Definitely. **You can't just sit up there and talk about it. I mean you can to get them excited, but it's something that you really need to get them to practice. It takes physical practice.**

Emily: And trying things out.

Garnet: Yeah.

Emily: Where did you get started with Critical making, what can you speak about in terms of that work? How do you describe what you've done in the academic context of making and how do you see your role in that world?

Garnet: I'm interested in the maker community and there's alot of good energy coming out of that scene, but I've also been doing similar type works and familiar with alot of projects with people doing it before the Arduino has come out. Doing "Maker" type work - hobby DIY electronics rapid prototyping work driven by their own interests and not their jobs - and most of the people that I've been in contact with put it into an art context. That's just as a result of me going to university in an art program and getting to know people that were doing it in that world. **I see that the maker community has alot of energy and has alot of fantastic studio structures with hackerspaces and it's really, really innovative and inspiring, but at the same time, some of the projects are just really dumb projects, right? I mean, I think that's part of it - is that in a space like a hackerspace, you're given the freedom that you can do a really dumb project and no one's going to hassle you and**

there's an important space for that. But there's also an important history and things to learn from a field like design or art, or whatever. Art has a good peer review, critique, history and stuff like this, of things like gender, or fields like computer science have alot of things that can be learned about how biases can be unknowingly designed into artefacts and how that impacts how people behave. Anyways, my take on the maker scene and why I had done the critical making project was to say, **"Ok, this maker scene is great. It can be even better if it brings in these other projects that have been churning along sort of in parallel or before, after and during this whole maker stuff came up and can really help inform and make more interesting projects. People can learn how to solder and people can learn how to make an LED blink, but after you do that, these questions come up about about ok, what project are you going to make? And that's a more difficult problem than getting an Arduino to compile a chunk of code. You end up with much more of a personal and social quest.**

Emily: It's almost like it starts to become a medium at that point. Like a paintbrush, or canvas, or a tool, like. Just like anything, it's like, ok. "What are you going to say?"

Garnet: **There's nothing wrong with people that want to paint paintings of their dog or their cat all their life. And it's ok if you have something in your home that you want customized to be for yourself. That's a really super important part of the maker scene. Customization and the bespoke, ridiculous thing that only you want. But after you built those things, you end up with this problem of, *"What are you doing? Why are you doing it?"* It's nice to not having to answer to people but eventually, you run into that problem.**

Emily: So, in terms of the work that you've done, what would you say you've discovered as a maker or someone in that world using the critical making conversation ... have you gotten closer to knowing what you're doing or being more conscious

Garnet: The short version of that is that **the history of art and technology and the discipline of design really are useful tools in bringing into a place like a hackerspace. We don't want to make that place a school.** Or a business. But, hackerspaces and individuals go through a process where they are probably, if they're continuing to do it, they're going to start up a kickstarter, or they're going to release a product on their own, or do an exhibition ... People reach crossroads where they come into a problem of how to do something full-time. If they're going to do it full-time, how they can do that. What's the value of this thing? What I wanted to add is that **there is this field of experimental design and media art or whatever you want to call it that is an avenue that people can pursue that has a history and a**

community around it. That should be something that people that are making in hackerspaces can access.

Emily: So, would you say your work is about bringing those two things together? Have you made objects in that space as well? Does any of your work speak to that cross-section?

Garnet: I've been primarily pursuing that through publishing. Through releasing texts and trying to bring those things together in the *Disobedient Electronics* thing for example. Taking an issue like protest and saying, "OK there are several different avenues that you can take to try and bring about political change". Some of it comes from the maker scene, hackerspace scene, art scene, some of it comes from design - more formal industrial design. Some of it comes from products and advertising. There's a whole range of approaches that you can take, but when you bring those things together, they're actually almost identical projects so part of it is bringing that together and saying ok these are actually quite different disciplines but the projects are actually quite similar. To kind of bring them into discussion with each other by grouping them.

Emily: Who's your work inspired or influenced by?

Garnet: Inspirations to me were a few groups like when I was a kid in my parent's basement, I learned about groups like *Survival Research Labs* that build large-scale robotics things, a group like *Experiments in art and Technology* which formed in the '60s as a group that partnered engineers and scientists with artists that built a match-making service to have people work on projects together. Those 2 organizations were pivotal for me in going, . for me, those were key. There's other designers like Natalie Jeremijenko and interesting projects in the 1990s. I would say those 3.

Emily: What's next?

Garnet: I'm trying to combine people that are teaching in this area and make a compiled collection of teaching materials and activity guides that instructors can use and share with each other to make a practical approach to people that are teaching this stuff and try to ---

Emily: By this stuff you mean critical making?

Garnet: Yeah. It could be called Critical technical practice, Experimental HCI, or Experimental Industrial Design, Science and Technology sties, Electronic art, hackerspace art work ... It could be alot of those different lables. But to get activities and workshop templates and handouts and collect them from alot of different people and distribute it across that same group of contributors and see if it evolves into some kind of book project or teaching resources that people can share. **I'm working on a book that traces out a history of electronic art and uses it to pull out a number of different themes within**

that type of work as showing different motivations to why people go ahead with DIY projects and what are trends and motivations and advantages of doing stuff that way? What are some disadvantages of working as an amateur in that area?

Session 2: Yvonne Dawdiak - Technology Integration Mentor / Teacher Educator, UBC

Audio Recording:

soundcloud.com/randomactsofmaking/yvonne-dawdiak-technology-integration-mentor-teacher-educator-ubc

Emily: What do you teach?

Yvonne: I *did* teach elementary school, k-7 and now I teach in the faculty of Education at UBC, preparing teacher candidates, and currently I'm the technology integration mentor in the faculty. I'm no longer *teaching* in the faculty, but I'm helping instructors and students integrate technologies into their practice. I facilitate workshops and teach them with faculty members and instructors, but I'm not responsible for a classroom of students anymore, but I don't teach a *course.*

Emily: Do you make anything?

Yvonne: I have made pottery. I don't currently. I do photography. When it comes to making, I make examples and models of different things that I would engage our students in. I do alot of hands-on work with students, so I'll often play with that thing myself to get a sense of the possibilities, and then I'll engage my students in that *play* themselves, as opposed to sharing my example always, I'll usually get them involved with the play.I make websites.

In the classroom, I do everything from simple robotics - very simple. Coding, currently dipping my toe into augmented and virtual realities. I do pop-up makerspace opportunities where in September for example, every teacher candidate in the program's instructor brought them to a popup makerspace in the library, so I worked with teacher librarians on introducing what a library *can be* as a resource space - and that included a hands-on place to make. So I helped the librarians develop a VR scavenger hunt tour and then I facilitated 6 activities - things like making buttons, weaving, robots that they could learn to code, Kiva brick planks which are like Rube Goldberg machines... they had magnets, squishy circuits, unplugged coding, computational thinking activities. If they came from a certain grade level, I tried to gear some of the stations.

I try to mix it up a bit. For example, a second year biology candidate may have an assumption that they're going to be teaching biology; but I help them understand that they're going to be a teacher, because they may be asked to teach other subjects and they may choose to teach other subjects. So that's where the integrated approach - where they suspend their subject area beliefs. And within each of the

pop-up maker spaces, I try to look at them from subject areas. 700 odd teachers got exposed to the idea of making and the invitation for them to pop-in, to take some kits to take into their own teaching and sign out the kits, etc. THey can ask me questions at any time and we can work together.

I also make websites with students. Anything to do with digital technologies. At UBC, the BEd is 11 months. After their undergrad, they do a bachelor of education.

<Discussion RE: Technology and her role integrating that in the classroom>

Emily: Are there any barriers to administrators seeing for example, weaving as a technology?

Not really. Because the new curriculum is more inquiry-based and clearly honouring all of that, particularly with the indigenous pedagogies that we're all supposed to be integrating - learning through our shared experiences and connections with others. **I don't see alot of push-back and in 25 years of classroom teaching, I never saw any push-back, even though the curriculum was very different - around teaching a hnads-on approach to learning. We've always known that this was an effective approach - it's more about finding the *time* to allow students to learn in their own way. Like the slow food movement - it takes more time. Not just filling their head with time.** That's up to the teacher - which is one of the benefits - we have autonomy of the ways in which we teach the prescribed curriculum. The prescribed curriculum is very open now, and so my autonomy allows me to go more broadly and hopefully many teachers take up **the opportunity to do that in a way that's more engaged with hands-on learning. Not everyone will.**

Emily: What are some of the challenge points you see for people rolling out the new curriculum?

Yvonne: That's tricky. Teachers have started to integrate the revised curriculum (we don't call it the "new curriculum") - the *revised*, or *redesigned* curriculum. ADST is a brand new curriculum. **There's a whole new curriculum, and the ADST is one curricular area within all of the different curricular areas**. In elementary school, one teacher teaches all of the subject areas. Grade 6, 7, 8 they may have discrete area specialists, and even within elementary school, teachers may co-teach, but it's far more common to integrate the curriculum. If I'm exploring something in social studies for example - let's say "exploration" - I may look at the science curriculum and see if there are any intersections. I may look at the math curriculum and see if there's something about compasses or directions at my grade level and so I would draw that in - **it's this integrated way. Which is the thing with ADST. It's intended to be an integrated curriculum, not a stand-alone curriculum. It's bringing the applied design in to support other curricular learning. It's not a discrete curriculum. It can be brought in at any points for all of the curriculum. At grades 8-9 it's probably going to look different because of the subject specialist areas. My sense - and I'm not an expert in this because I haven't been out in elementary schools in the last 2 years - they've been developing courses within that curriculum. I was talking to a former teacher candidate of ours, who has been asked to teach an adst course on coding and computational thinking at the grade 8 level. So they are developing some discrete courses.** What I think is

exciting, is if what happens from that, and what I try to get my students to start thinking about is, **"Imagine if you're at a school that is developing an ADST course and you have a gift or an interest in weaving for example, could you not have an ADST course that involves weaving? When you think about all of the math, science and anthropological areas, it could be a truly integrated course.** You could create a beautiful cross-curricular course. I haven't seen that happen yet - but it takes a completely different way of thinking than teachers do"

Emily: I'm interested in creating support for teachers so that they can draw on that. As soon as I got into textiles, I started thinking about math and coding, and I started to see it all come together.

Yvonne: And wouldn't that be exciting for a student to experience a whole course that way?

Emily: I'm thinking about taking skills from the playground and integrating those things into the classroom. Like for example, with friendship bracelets.

Yvonne: **When you mention friendship bracelets, I start to think about personal and social development. One of the areas of intersection beyond the ADST curriculum - when you make those curricular connections, what about the core competencies? I think that's a really natural entry point to have an applied design maker activity, and figure out how that activity can be implemented in a classroom in such a way that it develops one or more of the core competencies. If you can share with teachers how *this* helps develop *this,* I think they could see the ways that they could find the time to start bringing it in. Because teachers need to integrate those core competencies - the *teaching* of them - not assessment. Because it's about self-assessment. They need to help students understand what the core competencies are. You have to have them understand what the core competencies are, and then help them develop those core competencies to assess their progress, right?**

Emily: **How are those being introduced?**

Various ways. They can be integrated into say, group work. You might raise awareness to them, that ... *actually as we do this work, we are learning to do a, b c, d*

Yvonne: **When I see the <core competencies listed in our ITA booklet>, I think, okay, "personal social" ... my question is, "How?" "What?" So that's the only thing to me that's not pulled out. Because I think we could look at any activity and say that you're building your communication/social skills. But within thinking, there's critical thinking, problem solving and all of that. Is there something that lends itself most to? And that's what teachers are struggling with. How to build these core competencies in, explicitly to what they're teaching. So, some teachers start with a learning target, where they'll have their curricular learning target, but they'll also state that they want students to reflect on how they're developing their core competency and they'll do a reflection at the end of the day/week. Teachers know how to follow curriculum. But this core competency piece is different from what we had in the past. And yet, the thinking for example, was always embedded into math and social studies and science in the prescribed learning outcomes, and the communication piece**

was all over language arts. It was always embedded there as discrete curricular objectives, but now it's been kind of removed from that, in order to make the curriculum one page. Because each curriculum used to be 6-7 pages of learning outcomes which is impossible and overwhelming. They've got it down to this one page of big ideas and curricular content.

I don't know if teachers are thinking as they plan, "What core competencies are we helping students develop, and how am I going to get my students to understand and assess them?"

Emily: That's my next question - about assessment. [discusses background with Pro-D days]

One of the things I've heard from some of the teacher's I've talked to from teachers - one teacher said it was really challenging to discuss the importance of play and joy of making as a valuable activity.

Yvonne: Really? And what grade level? I find that surprising. My context is limited - every principle is different. It does surprise me to hear that though, at an elementary school. There are people that have a bias or belief that when children just learn on their own given the right materials ... and what emerged from that is "centre time" with kids playing at stations, and there were principles that would walk in and see time wasting, in particular when they saw teachers doing prep at their desk, rather than engaging with the students. T**o me, the movement towards the maker activity/culture in the classroom is adding purpose to the play, but it's the students' own ideas/purpose that end up getting introduced/supported in the classroom.** I'd expect that there'd be less bias about that, but it also depends on how the teacher is rolling it out.

Emily: So the other piece was around assessment. So how students are going about assessing themselves.

Yvonne: There is no marking of the core competencies. It's a self-assessment. THe reporting varies right now and the new reporting document came out last spring and I'm less involved with that right now - but as I understand it,

(Joe Tong - Helping teacher of reporting in Surrey School District - also a Home Ec teacher in High School, fully knowledgeable about this, and has some understanding of digital tech integration. He's a pretty engaged person. He'd be able to give you some specific examples about how teachers are enacting this. Teachers are helping students to self-assess. I'm not sure how reporting is happening - I believe it's through a portfolio. The *student* would share, as opposed to the teacher. It's supposed to be understood that this is a continuum of grade levels.

It's more about developing - *where am I and how can I improve or continue to recognize/develop my ability to ...* Teacher's providing activities that help students to see this idea of for example, identity, can explore cultural activity and make those connections, and then have students say to themselves, "now think about *your cultural identity,* the gifts you bring, and then we'd start to look at how they could raise their awareness." Everybody's struggling with that right now.

Now they're trying to add resources to help teachers make sense of the curriculum. The only draft curriculum that I know of is 10-12. K-9 is now "The Curriculum". Not the new curriculum. All of them are in or past their implementation year. ADST might be in an optional implementation year. Joe would know. Do you know Zale? He did alot of work in Professional development with elementary schools so he has developed ideas on how to integrate.

Emily: You were talking about the squishy circuits earlier - mapping afterwards...

Yvonne: Right, that was working with students on the importance of play and learning. I started with a play doh activity where I had them use some play doh, and think about creating a physical representation of how they were feeling - a metaphor, something tangible, etc. It could be deep or not deep. And then I introduced the non-conductive dough and squishy circuit elements and had them play and learn how to develop a simple circuit and share their background knowledge as they played.

I worked with them to see not just play, but design thinking and iterative process, trial and error, and something less kinesthetic, like say a writing workshop, where you have students developing story, or developing a play, or a game from scratch. I wanted them to see the connection between those activities, and what I modelled was something that you wouldn't do all at once with your grade 4 class. You might do this simple play and then bring in additional materials to add to the critical thinking and problem solving - and from there, you could take what we've learned about the process of our learning, and now apply it to something else. Which is how we've always done it. From the concrete to the symbolic to abstract.

When we think about early learning, we tend to go right to the concrete. I would advocate that that early learner means any learner learning something new. We should begin with the concrete. I'm sure there's research to back that up .... I'm teaching universities in the BEd year - this idea of becoming a professional teacher is *new to them*. For them, I start with the concrete to engage them, and then move to the symbollic and abstract, if I can. That's the movement in the intermediate and secondary - we've removed some of that. That's where this new curriculum and ADST approaches can bring that back in. It's already been brought back with math. And Tech Ed in high schools. In the visual arts. It's existed strongly with sciences with experimentation. It hasn't existed everywhere.

Emly: The reason I built those looms was because, I've been trying to weave and I had this giant floor loom and I couldn't warp it, it was really intense, and so I got rid of that loom, and I chose this kind of loom because you can learn to warp with it but it's small and compact.

Yvonne: I wish we had time that I could learn to warp that loom while we were talking.

Emily: So much of it's about getting hands-on and making things super accessible the way the Arduino does - making it portable. Which is like what you're talking about when making things concrete. And so with these activities, I don't see them competing with the soft shop in any way, because this is where the community space exists. **They**

can get interested. And then they can get into the machines. And that requires a tech. Where I've noticed with alot of the hackerspaces, the social side of it was the magic. Maker Faire and all of these things started happening because we felt like we were actually *doing something.* Which is so hard to replicate in the classroom.

Yvonne: It is. It can often feel artificial once we bring it into the classroom. That's one of the worries about maker ed - is that education will zap some of the community-minded fun out of it and it can become too systematic and it can become very step-by-step crafty and that's a little bit of a worry for me. I see the value of learning to follow steps, but more ... our steps should be involved with learning to use materials and tools and implement processes, and the not-steps should be what you create. You might need to do something step by step in order to get somewhere, although I'm not sure about that. I think you can teach someone to use a soldering iron to make a flashing button - but it shouldn't be a matter of 2 or 3 other projects where they make a punched thing, where 30 other people are creating the same thing. That's the worry, I think

Emily: That's some of the thoughts I have with what I'm doing - it's a start, it's about the mindset, the culture and the social side, and giving people access to playing iwth it. We've been facilitating it like a "Stitch and Bitch"

Yvonne: And that's great! They can have conversation while they're playing. **That's what I try to do with our teacher candidates.** When I'm doing a workshop with the students, that's what it looks like. I might introduce something, and then we get hands-on. That's when the ideas emerge, and i can do some prompting and probing and I can throw out an idea of my own that they can riff on. I do these Gearing up sessions as they're leading up to practicum, they want help developing lessons and unit plans. So my piece there, is I pull the librarians in and myself, and we consult on resourcing or lesson plans. We act as someone to bounce ideas off of and help propel the thinking forward - and play with the ideas.

Session 3: Amy Walker - Maker, Facilitator & Cycling Advocate

Audio Recording:

soundcloud.com/randomactsofmaking/amy-walker-clothing-maker-esp-felt-hats-cycling-advocate-creative-director

Show & Tell Video:

instagram.com/BaaK_6uFgIZ/?taken-by=randomactsofmaking

Emily: You were just mentioning about having an interactive model of different people's process and what they're contributing to the project and having a collaborative 'show and tell' as a way of participating in this. Can you speak more about this?

Amy: **Alot of my inclinations are very kindergarten-oriented. It's like kindergarten for grown-ups, basically. I operate on that level.**

I don't feel like I teach anybody anything. I go and set up supplies and keep it orderly and clean it up so people can play. I think Show & Tell is super fun to see what other people are working on. Adults don't get to do that stuff. When you have little people and create a nice space ..... Everyone deserves that [safe space].

I like to have outfits with pockets and smock dresses. I think about it as the kindergarten teacher outfit, because it's "no muss no fuss"

Emily: Yes! Granny/Toddler/Art Teacher hybrid.

Amy: I think that's a really nice space to be. **I think being a woman in this world can be weird and over-sexualized, so granny-toddler existence is a little more soft and warm and comfortable - especially all of those recent discussions.**

Maybe don't wear high heels because they're really uncomfortable....

The state of being a woman in fashionable women's clothing doesn't necessarily serve you. I know there's alot of truth to people being able to wear whatever they want without being molested, absolutely! But I also think that we have to make a choice to create the world that we want, and not try to please - specifically men - because I don't think women are wearing super high heels and hoochy mama outfits for pleasing other women. That's a tangent.

But it just occured to me last night - I was watching a show last night about how high heels damage women's feet - or people's feet, because sometimes men wear high heels too.

It's not comfortable.

Emily: I think there's something about dressing up nicely and having both and having agency. Can you say a bit more about what you were saying with choice. How do you think making feeds into that?

Amy: To bring it back to making, it's hard to think to one other than just the relationship that you have with your clothing. Everyone wears clothing. The fashion industry is a huge polluter and a huge danger to the planet and that's the thing I think about all the time. Where are your clothes coming from? Do people realize where?

Also just that clothes are so great when they work! When something works well and you love it and that's a big part of your life when you have a pair of shoes that keep your feet dry if you have a good pair of boots can be the best thing in the world. But we live in a world where there's all kind of shit produced and people have to put up with all of this garbage.

Emily: Taking on making in this full way opened up opportunities for dialogue and connecting with people. I don't think you and I would have connected had you not made felt hats and we shared a desire to make together.

Amy: **I think having clothing self-sufficiency is an idea that's powerful and comforting.** If you know that you can have warm socks and a hat to keep the rain off and you know how to make that, I feel powerful that I'm not relying on some random shit.

It's taking care of yourself, and a livelihood, people are always going to need socks and hats. If I know how to make those things, I can contribute to society. Even if it's just people I know. Making sure they have warm feet and heads. If I know how to make scarves. It's self-sufficiency. And if you think of a world where you don't have a store to go to, maybe that makes a difference. Even though we have all of those options of going and buying things, we can choose to make it ourselves. It's very similar to biking when you live in a world of cars. **You choose to take this method - which is unconventional, maybe, but it speaks to you, and it gives you agency and freedom to make a scarf whatever colour you want it to be or however thick you want it to be. And that's empowering.**

Session 4: Haig Armen - Educator, Jazz Musician, and Interaction Designer

Audio Recording: soundcloud.com/randomactsofmaking/haig_1

Emily: What does 'random acts of making' mean to you?

Haig: An example of something that started as 'random making' was some of my students working with Arduinos to get them to talk wirelessly to a Mac. We weren't sure why we were doing it initially, but realized, "Oh if we hook that Arduino up to a hand sanitizer, as soon as someone uses it, it indicates its use to this mac and the mac can do a visualization ... " that turned into a really awesome project ...

It's a project I did with the health design lab maybe 5 years ago now, and I just recently spoke about it this summer because a company in Calgary is building an actual production version of this hand sanitizer with electronics embedded into it so it's something that I worked with 3 students on as an intervention. We started with a "Problem space" and that material exploration of, "What can you do with smart electronics", had already been done in the class, so we knew how to pull that over.

What I'm saying is that you want to do both of those things. Right now you're doing a whole bunch of materialization with a whole variety of media - and that's awesome, but then ... like ... having a library of raw materials - not even just raw materials, they go beyond that, but, as I described, we took an arduino and connected to a mac. You can implement that process in a variety of different ways. Knowing the recipe of how to do that is like having a cookbook on your shelf. Describing these recipes for electronics - and there are cookbooks for Arudino - and one of the problems with those is that they're big, thick textbooks and can be a bit challenging when you want to make something right now. They kind of work - but that would be a whole other research project, which is, how do you make those books more meaningful? Instructables is a better example of this. Those are all recipes, people made things, sometimes they don't have a specific use, it can be, "Ooh I made blinky lights!" But those blinky lights can then turn into being in the VGH main lobby like this thing that we made - and it goes beyond getting people's attention because it's blinky lights. It includes a visualization that explains how the usage of the hand sanitizers ebbs and flows throughout the day. You see peaks and valleys of the usage. That was interesting to look at as a communal art project. It went from 2/11 people using hand sanitizers to about ½.

The more interesting thing that I noticed, is that I saved some of the data from the hand sanitizers and I started sharing that with some of the executives. I noticed patterns, like on Fridays, no one washed their hands. We started calling it "Dirty Fridays" - and considered having a campaign around it.

These larger usage patterns are fascinating - and knowing about it makes you

think about how to start solving that problem.

That all started with a random material exploration as well as that knowledge of how to connect things until we're ready to use it somewhere. I think that's what you're doing. Building a pattern library.

There's a professor here named Charles Dobson who taught in Communication design and he used to have his students make a book at the end of their 4th year called, "General Solutions", which is his phrase for "Pattern library". You gather those things that you're really good at - it may just be a photoshop technique or something you figured out.

I can then pass that on to someone else, they can put their own content onto it and it becomes its own thing.

To me, the more successful patterns are the ones that you can "Mash up" together with other patterns to make something totally new.

If you were to take all of these random acts and put them into a cook book of some sort.

OK. So I'm building this area around musical instruments right now. Hot rodding your ukulele, etc. I have a book that I just got, "Junkyard Jam Band". A recipe book of everything from turning your desk into a drum set using contact mics, to building your own ukulele - a whole bunch of things.... Etc.

What's cool is it'll go, "Here's a way that you can sit down with your 14 year old and build an instrument by the end of the weekend. Here's the next step - it doesn't stop there.

Emily: That's the space I'm in right now. How can I start connecting projects and subjects together in a way that's meaningful, and is also a "choose your own adventure" style to it.

Haig: That might be a better way of putting it than, "Solving a Problem" - which might trigger people... Solving problems are a big part of what design is. I stay clear of that argument, because it's a bit semantic.

Emily: You mentioned earlier that improv has a set of rules. I'm curious about how to create subjects that have rules, but then add agency to choose (aka self-directed learning).

I'm looking at making in the university space, and this as a site for interaction - and asking myself how we can take learning from Emily Carr and applying it to the new ADST curriculum in schools (Grades 4-6). Teachers are implementing this new self-directed curriculum, but they're not trained in how to do that. So, I want to make some recipe books for them.

Haig: **So. You're a musician. You know that underneath music is some underlying structure, which to people that don't play music, is magic. *IE: How does she know that Bach Fugue and it seems like there are 4 voices all***

simultaneously but she only has 2 hands? **So, there's an amazing amount of math and structure underneath that. And so, I've studied classical music and my main thing is jazz, which is all about improvisation.**

Some people look at jazz and they say, ok. There's for 4 people up on the stage, playing different songs. But if you listen very carefully, there are interactions going on between the players - and every single one of them has these weird relationships. I've had teachers tell me, *just listen to the bass player - and how he's relating to the drummer right now. They have an interesting way of grooving together, and then intentionally causing tension by changing their feel.* All of those things are this dynamic that if you're not listening for them, it may just sound like 4 different people playing 4 different songs. I've had to explain to people to listen to these little nuances. So, the first thing I explain, is in any song in jazz, you can hum the melody of the song they're playing because they're following the structure of that song. There's this chord progression that they're following, and that's the underlying structure. You can't always pinpoint exactly where they are - but most listeners that have a really good ear can tell that. But that's the unwritten rule. You've heard, "rules of play", right? Improvising, jazz musicians have these different styles, keys, and then that's enough information for me to connect with musicians I've never met before and for us to create something. There's this unspoken information about how you *might* play it, and then it will be different each time you play the song. But we still agree that the one thing that's not up for grabs is that underlying structure.

Emily: How did you go about learning that structure?

Haig: **Yep. That takes many many years. It's like learning a language. And, if you just read music of people playing, "My favourite things", you'd never get to the improvising part.**

Emily: That's where I'm at with my music!

Haig: So, that's really common with anyone that is classically trained. **The whole thing is to nail down the score. Every nuance and dynamic marking is important. With jazz, it's about throwing the paper away once you've learned the song and memorized it.**

So if we're playing autumn leaves. It has a melody that most people can hum. Play that melody all the way through - the whole form - and then play it a whole different key, and then another key ... most people play that melody in every key - all 12 keys. So you know it not just in that one key - so if a singer wanted to feel comfortable singing it in a different key, you'll be able to switch it to another key. **It's about knowing the song in multiple keys, which means ... is a whole different thing.**

Emily: It's interesting because in Royal Conservatory, I remember learning all that theory, but I never made the connection that I could apply the theory to playing these songs. That's one of the big things that I'm looking at that was missing from so much of my education from so many different places - and I wonder whether you can teach that kind of loose improv style at an earlier point. How do you create structures for that kind of learning? I never had that language, and I never

had access to that language, and I wonder if I can integrate that into structures for people to learn.

Haig: **To me, it's about learning how to jam.**

Jamming has a couple of really simple rules.

The main one is, "Yes, and".

Me and Eugenie use it all the time now. Because sometimes if we're in a stressed mood we'll start saying, "no, BUT". and switch back to "yes and" ... which is a really powerful metaphor for anything in the world.

So, my daughter, who's learning to play ukulele and the piano ... her teacher is teaching her how to play piano like you know how - "here's the music and you play"> The way that I'm teaching her, is to play a bass line, and then she makes up something over top of it. It's really hard to go wrong because you have to listen to the other person and make stuff up on the fly.

All jamming is, is setting some simple rules and then starting to listen to the other person.

When I do this, you do that ... and it becomes a conversation.

My daughter's been doing that since she was about 6. Kids have it in them at a really early age to have that kind of conversation. In fact, the more outrageous you make it, the more fun it is. It's that exploration, once you've got the safety net of someone holding down the rhythm - the structure ... and the other unwritten rule is that another gets to improvise and you go back and forth.

It's a bit like a conversation.

At one point, you're going to say something that might take us out on a limb, and then I'll go, back and forth in a push and pull thing.

Emily: What kind of space / environment is conducive to improv/jamming?

Haig: There's a guy that teaches Marimba at Britannia Centre. My daughter's learning to map what she's learned from marimba class to piano. The class ranges from 40 to 15 year olds, in a circle. It's *so* magical. Normally I drop my kids off to a lesson and go for a coffee, but with this class, I'm just watching ... because you can see ... **setting up space, they're facing each other, and it reminds me that that's the format that lal bands play in. Everyone looks together, you're in a tight space ... I finished reading the David Byrne, *How Music Works* this summer, which talks about our relationship with spaces and how our relationship with spaces produce a certain kind of music. So if it wasn't for the dark, jazz cellars in New York, we wouldn't have that kind of sound of jazz. Or. Moller. Was it Moller? So he doubled the size of an orchestra - twice as many contrabasses in ... and his music was so big that they needed to build a new music hall for his music. So, pre-nazi Germany, they built these huge colossal halls to contain his music.**

So anyways. Space, and the amount of space needed to appreciate the music was bigger. There are examples in the book of when Miles Davis went to Paris, he was used to playing in Jazz clubs in NY and the french people that love jazz put him in these big concert halls and in the first couple of weeks of those recordings, there's some tension because the band members are so far apart and all of the sudden they're across the room.

So, they made a circle of marimbas and everyone else supports you. It goes around, around, and around. My kids love that format, so we just take that and do it at home - we do it with pianos and guitars and ukuleles instead of marimbas. It's a good structure.

It makes me think that music is just a game. You set some rules up, set up a space, and even within that, you can purposely break the rules.**There's tension, release, etc.**

Emily: That's interesting what you're saying about tension and release. In clowning we call it imminence and dynamic relaxation, being able to be in front of an audience and at the same time relaxed. You might be acting out a stressful scenario, but your own strength of being willing to go off into another key - that confidence - is a big part of it.

Haig: The thing you're referring to in clowning is definitely something that jazz musicians tap into. It's not about what notes you're going to play. It's all about what kind of tension and resolution that you make. So, jazz comes from blues, which is all about call and response. That's the conversation part. Improv is also structured on the same call and response pattern. The "Yes, and" thing. I build off that action ... we go back and forth. If we have enough trust and confidence, we can take it back to an intense moment, and then we land the plane ... and everyone claps. That happens in clowning, music.

Oh I walked this documentary recently called *Dying Laughing* about comedians. It's sort of dark as you would imagine. Comedians can be pretty dark. It's really about exploring that tension. They talk about moments when they're totally bombing on stage and they know it. One guy said in a full auditorium of 1500 people and he heard a guy in the back row go "sdpfa" ... *How do I turn that around?*

There's a risk and reward thing going on.

Where does that fit into making? If there's a problem space and a resolution to that problem space, there's this tension and resolution. **When it's just fully random, it's like, "Where's the tension in that?" To me, there is tension in interventions, which are not necessarily about solving problems, but pointing out where there are problems in the world.**

Emily: **One of the tensions that I see in the maker world is the "Blinky lights". One of the things that I felt in the maker community was, ok, what problems are we solving locally? How are makers making a difference? How can we make a more livable society? How can we overcome natural disasters or**

work together? There are all kinds of problems that we can be looking at, and it's almost like, as a movement, there's a whole lot of tension, and alot of people looking for resolution.

Haig: **I just thought of this recently. When I was realizing that design goes beyond design for screens and I was working for partners at the time, making alot of websites, and I was trying to convince them to get Arduinos for our studio and explore (about 15 years ago). The guy that I was partnered with was like, "Haig, nothing useful's ever come out of an Arduino". And I said, "I'm going to make you eat those words one day." So that tension. He said it for a reason. He's not just being judgemental. I've seen lots of people make *stuff* - but in maker culture - alot of it's kind of useful. You and I are ok with seeing it as useless, because it's a building block. Or a raw material. And so, I was trying to explain to him that design is not a fixed format. It's about new formats and finding new canvases. That emerging new canvas is electronics. Yes we can be totally creative there. We're not sure what we're solving yet. Let's build up some building blocks there, and then once the problems come up, we can start to apply those skills. Design, really, is the act of re-combining.**

Emily: Those are the things that have motivated so much for me. Someone challenged me that it wasn't an intellectual activity. I know there's so much in there! And it's a language and a whole world, and I think it's also something new.

Haig: So where's the tension and resolution in knitting? There's a meditation to it ... sometimes we do stuff without knowing why, yet.

Emily: **I'm in the middle of reading about the self-sufficiency movement with Gandhi, and spinning and weaving was a huge part of what he cultivated in India, - self-sufficiency for women making their own cloth and he was really a critique of the capitalist, mechanization that happens, and I think that we're in such an extreme version of that now with more and more automation. I'm not anti-machinery, but I'm curious about how we can work *with it* in a way that gives access to understanding the tools. So, that's becoming the resolution space for me. It was being in the design industry that it was going through not finding any mentors, and then meeting my neighbours, learning to spin from my neighbours, and I had this huge support network. Like sitting in a circle, spinning - like what you did with instruments - but with yarn. This is a conversation. So, now I see people on the bus and I'm able to identify handmade toques, and I may know a bit about the pattern. You can read the material.**

Haig: **I'm trying to embed a certain value system in my kids right now. I think people are using lego in the wrong way. When you were a kid, you didn't get instructions. You got a bucket of lego. Here's a bunch of pieces. Make whatever you want. I'm tyring to get my kids to see the value in ... ok so you made that car ... how do you re-combine it to make a custom car?**

It's like what we do with jazz. Where you know a song inside out, and *then* you play the chords, but you don't play the melody. Or you improvise and you imply the melody. So you're making something new out of this old

structure - and so it's a re-combination of things.

Emily: **It's so interesting just thinking about that around, I'm realizing in my 30s that I'm going back to all the things I was doing as a kid - but it's so different now because I have a different brain.**

Now I understand the time period, the composer, and I have a richer sense of the context, so I may play or think about the piece in a new way.

And it's the same thing with sewing. Back then, I really needed those patterns, and they were really important at one point, and then you can start to move away from it when you have that frame of understanding. I think that whole improv thing has actually switched for me - I just haven't applied it to music yet.

Haig: You should! I've heard you play. You know how to play. The proficiency is still there.

Emily: It's interesting to hear about lego, making and this whole combination of skills. I struggle in talking about it sometimes, because alot of people are like, 'Is it random?' ... it is ... it's both. It's taking the randomness and applying it with this underlying structure.

The improvising is happening over unwritten rules.

Haig: **For my daughter, lego is a starting point ... and then I introduce her to little bits, which connect with the Lego, and so she made that Draw bot - did you see that? That's a re-combination. So how do we get the robot to inch itself forward? You get these two motors that turn on and off - and if you get one wheel going faster than the other, it starts drawing circles. If I get one wheel to stop more often it makes a more squiggly line. So she's thinking through the problem. I can see that she's like, 'oh i need another piece of lego for this wheel and so there's the lego part that she knew and then started learning electronics on the fly'**

It's so smart that Little bits was like, "Let's just make stuff that connects to Lego." It's so simple. That's like how the internet works. You make open source things that connect to each other. It's inherently modular.

Imagine if all toys, like Nerf guns, or little bits, etc. all had some common sockets, or something - you could hot rod your nerf gun to tweet while you're shooting or whatever. That's what I imagine one day.

Knowing the existing context now, what can we do to make people's lives better. I realize my whole career is about mashing things up.

Emily: These are all things that I'm combining (home economics, Lynn Margulis, food security) - how can we bring, science, math or storytelling through Home Economics. I'm using Home Ec as a communication design platform .. but how can we bring actual scientific thought into the home? How can we bring in information about food security, botany, and learn about cells, and chemistry

and all these things - from the home? That's an interesting space where citizens can have an understanding of scientific thought and that mindset of being able to contribute to a scientific dialogue? And it's challenging because you sometimes get these anti-vaxers ... how do you become a responsible steward for that knowledge? That's why I'm back in a university - because ... how do you steer knowledge? Because it's confusing times. I think people like librarians have such a huge opportunity in this space. They're like the real open source - original ... how do we combine/re-contextualize these things?

Haig: **I hear, teaching science in a way that is not that traditional, non-playful way of learning about science The way I learned about science in high school, was that they couldn't have made something so interesting, more boring. I don't know how they did it. I love science now ... but I have to re-teach myself that there are amazing things in this world. It was taught in such a non-creative, non-playful way.**

What we've been talking about, is that it's all about rules of play. So. A good reference is the book *Game Storming* by Dave Grey, who spent 5 years going around the world asking creative teams about what creative activities they do and compiled into a book. Typical card sorting exercises, general solutions and activities that all of these have been passed down from one studio to another.

By studying that book I'm able to have an endless supply of what to do. OK we're going to try this activity, but add this problem space to it. Or this user study into it.

So ... how do we connect all of those things together? You connect them through the game. By taking science and bringing it into your home, you're keeping it playful. So, to me, whenever you're looking at any recipe that you want to pass along to these teachers, keep the play aspect there and make it front and centre. What I've noticed with all of the examples that we've shared, is that play is at the forefront, and the exploration just happens naturally - but you set those rules of play up.

People don't make games linear anymore, they setup a world. You can be wherever you want, you set up some general rules, and that leads to any kind of exploration.

Emily: Have you read anything about the new ADST Curriculum? Alot of the elements that we're discussing are present in the new curriculum. It's self-directed, play-based, and they're pairing subjects together. It sounds *amazing* - all these things we're talking about it.

Haig: You and I could teach that, but I wonder how regular teachers are dealing with that. It's almost too abstract. **That would be like getting a classical piano player to play a jazz tune without knowing those rules.**

Emily: That's the other side of that. How can the humanities / designers start to create opportunities for teachers/educators to be trained on those skills.

Haig: **So, thinking about this [gestures to home ec text] - it's very prescriptive. '*So, if you want to be a good wife, the peas have to have a little bit of sugar in them*' ...and there's no room for improvisation or creativity. It's all - this is the etiquette, this is how you put the forks and knives on the table .. so the part that makes me chuckle inside, is that we're going to be teaching these old school teachers how to let go a little bit, and we're going to be really prescriptive about it. That's the only way they know how to get beyond they know - is through instruction.**

Emily: Yes - so creating that platform - that's what I'm hoping to end up with - is a combination of these things. I'm doing these Pro D days now and I'm still getting in the head of teachers and understanding what they need, how they learn. The thing I'm realizing is that they're exhausted, over-worked, and dealing with 30 students so most of their time is spent keeping the classroom together.

<< Shows Haig weaving >>

Haig: **I have this uncle who's an engineer and every time i see him [he lives in Greece] - he tries to get me drunk and asks, "Tell me about how music was a mistake in your life". After drinking, I get to like all the things that music has led me to. It's been how I relate to other people, even if they're non-musical, it's that underlying structure - how I see the world is .. I have musician's eyes or ears - it's my way of relating to other people when I'm in a creative situation. I relate it to my very first creative experiences which are a bunch of people in a basement, trying to come up with music.**

When I heard about *yes, and* as a concept for improvisers, I thought, "I kind of know that, intuitively from playing music for so many years ... The part that we didn't talk about was that social aspect.

It's easy to make those *recipes* ... but you can't say, "You, work with this person, and have some chemistry". How do you make that chemistry? How do you create that social part in schools, while you're thinking about flow. Fl**ow is how you think about individual's experiences, their abilities, and then what I see with that weave is that you have your level of comfortable ability with weaving and then you bring a friend in and you're teaching them on the fly, and you see their journey in the weave, and then you're asking people to reflect on that in a way, right?** I don't know where you take that, but it's about adding new challenges.

For me, having kids has helped me be a teacher, because I'm starting to see the world through their eyes -- everything's a challenge around them. Climbing a tree, finding a piece of wood, turning it into an instrument ... It's kind of like an internal game for them. *IE: I'm in an empty room, how do I turn this into a game space?*

Emily: Yeah, and how do we introduce those ideas to teachers.

Haig: **So it's almost like the students need to teach the teachers how to be playful. Because they already know it intuitively, and adults have taught themselves not to be playful.**

Session 5: Patrick Gauley-Gale - Home Economics Teacher, British Columbia

Audio Recording:

https://soundcloud.com/randomactsofmaking/patrick-gauley-gale-home-economics-teacher-bc

Emily: What do you teach?

Patrick: I teach grades 9-12 home ec. This semester, I have 3 blocks of food and nutrition and a block of textiles, and next semester I have food and environmental studies.

Emily: Have you had to make any changes as a result of the new curriculum?

Patrick: We're working on bringing that in and I'm also doing my masters in Curriculum Leadership at UVic and I find with implementation, there's always a lag, so at my level, they postpone things another year so we don't have to fully implement until 2018-2019. There are going to be some pretty broad-stroke changes - 2 things teachers are trying to get their heads around are: **authentic self-assessment, and integration of aboriginal/first nation work across the board.** For me, I'm already doing alot of that stuff so I don't have to change much.

Emily: I've heard alot of teacher's are looking for more creative ways of integrating self-assessment. Do you do any self-assessment in your classes right now?

Patrick: The 2 main things teachers are doing is - there's a couple of generative questions/comments about what we've been working on and students self-assess as far as how things went working together, how their final products turned out, etc. on a little feedback form. I try to do it more often, but once a term, I do an interview with each student and we do the same thing, but talk about how they find the class, how they find the teaching, what could be more engaging, what they're struggling with, etc. **It's pretty un-structured.**

Emily: Do you teach any hands-on activities in your classroom?

Patrick: **Everything we do is hands-on. We've covered embroidery, cedar weaving, knitting, basic machine sewing, and a bit of applique and tye dye. We visited a barn yesterday to talk about wool and natural fibres, and small scale vs. industrial scale agricultural, natural and synthetic fibres, heritage breeds vs. modern livestock production, and then next week we have an ethnobotanist coming in and we're going to do some more weaving for natural products and some natural dyeing as well. So, lots of neat stuff.**

Emily: That's awesome.

Patrick: **It's interesting, though. When I talk to teachers' and educators about that stuff, it's really exciting, but in actual practice with my students, they'd**

much rather be baking muffins than learn about first nations traditional practice. For me, it's the opposite obviously. I think maybe it takes patience to bring value to that kind of knowledge to students over time will shift the culture a bit.

Emily: Are there any tools or things that you use to hook students into conversations or "light bulb moments"?

Patrick: No it's something I continually struggle with. We go over everything from "show & tell" (something they've made or find interesting) - and I do some too. So we talked about how in this region, first nations people before the introduction of wool from sheep had a special breed of dog they were raising for making blankets and that sort of thing - which some of them thought was pretty interesting. There are some sound byte learning things which gets them thinking about things they may not have otherwise been exposed to in little snippets before we delve deeper into the subject. I don't have any "silver bullet" to get kids interested in things, I don't know what that is.

Emily: Yeah, it's a big question, I don't know if there's an answer

Patrick: The other challenge too is this idea of more self-direction and autonomy. I love it and as a student, I went to alternative schools and I had alot of that drive day to day and thrived. But the students haven't really experienced that, and presenting those opportunities first, they don't know what to do with themselves. They look to me and ask me what I want from them and then I ask, "No, what do you want to learn?"

Emily: I'm looking at how to create structures for students when they get stuck. Because I know for me in my undergrad, we had these super open-ended classes and I didn't know what to grab onto and sometimes getting a simple project or kit to grab onto, the wheels started turning and things started to flow from there. I can see that that's probably a big thing that comes up with teachers in general and the whole self-directed learning approach.

Patrick: I think trying to build collaborative skills for students is a big deficit. Teachers often ask that of their students but don't really have a structure in place to do that. So, particularly in textiles where I don't have the personal background as much as I do in food, I like to get kids to work together and get more experienced kids to partner with less experienced, etc. Mentorship.

Emily: Are there any more major challenges in the classrooms?

Patrick: **All sorts of behavioural stuff. For mainstream teachers, there's a bit of a reluctance to teach home ec because managing budgets and materials and classroom cleanliness and all of those things are additional challenges that you may not fact in math and science so much.** When you go into a department head meeting and ask for money to buy cedar and groceries, someone else will say, "Well we need 30 new laptops." **Learning is often seen as modern technology.**

Emily: The whole "technology" - "literacy and numeracy" concept and interacting with technology - textiles are a form of technology. **We can create more cases for**

the importance of these more traditional skills because they're more hands-on and they're also important ways of thinking and approaching a subject.

Emily: Are there any resources that you use?

Patrick: YouTube. I can't show a video more than 5 minutes in length. Alot of teachers use those document cameras, so you can see what people are doing with their hands. The modern overhead projector. You can put a book under it or you can do handiwork and see the projection on the wall. The cost on those has come way down, so they're a bit more accessible. My wife has her MFA in textiles, so I ask her. Supply-wise, whenever I have a trip to Vancouver, I go to Maiwa and Dressew.

Emily: What are you learning/reading about right now?

Patrick: On the theory side, I've been reading Gregory Bateson, *Ecology of the Mind* and the idea that individual things don't exist; it's 100% the relationships between things.

The stuff that they do in Montessori programs. So much further ahead than what we see in the public school system. The blocks that they play with in pre-school explains high school math. It's not too much of a stretch for them to apply pythagorean theorem after learning about the blocks. Some schools are cool about you going in and watching a class. None of the students are working on the same thing, but they're all working. What a concept.

Oh and *Wisdom of the Elders*, David Suzuki - based on where western modern science and traditional aboriginal knowledge crosses over.

Session 6: Jen Hiebert - Soft Shop Technician / Maker

Emily: What do you teach?

Jen: I teach Photoshop, Illustrator and InDesign for Continuing Studies and I also don't just teach the programs; I teach people how to access the programs and how to get past their fear of them and break down those giant seeming things into smaller manageable parts that have context in their real lives.

As a technician, I teach students how to approach whatever they're making through a textile focus. So, looking at a problem, object or challenge and how the different textile techniques can be applied in different ways. So, thinking about an end result or looking at a material and seeing what kinds of ideas it can generate.

Emily: Do you currently teach any hands-on activities in the classroom? If so, what and how do you go about it?

Jen: Yes I do. I teach sewing skills specifically as a technician and those hands-on skills are both hand sewing, manipulating and moving fabric around, how to lay fabric flat, how to put pattern pieces down and trace around them, so it's working with tools and also with materials and how those can work together. Using sewing machines, sergers; cutting fabric, drawing and manipulating fabric too.

Emily: Do you make anything yourself?

Jen: Yes!

I have challenges around identifying as an artist, a teacher or those kinds of things for a variety of reasons - both personal and professional and as a technician, my job is actually not a teacher. I am teaching, but I can't call myself a teacher, because there are teachers that are called teachers.

I sew clothing, garments, bags for myself, I weave tapestry, I have a weaving practice, I study textiles and make textiles as well.

I did a series of tapestries of classic cars. That was my artwork for several years and I had a number of shows and was involved with doing that. **Coming out of the textile program at Cap, I really floundered because I work well with structure and so when I was in school, I had these projects that I had to complete, with parameters around them ... there was structure to help me make decisions around my choices, then when I got out of school, I was in a studio and I could do whatever I wanted and I found that *kind of scary*. So I decided, ok, what I want to do, what do I like, I like tapestry, I was really drawn to tapestry** immediately when I started working with it - I had a very visceral connection to it ... I like tapestry, and I also like old cars. So why don't I do tapestries of old cars? I'll try that! And I had a really interesting response from the public as I started to show some of these smaller pieces - everybody had a story about hold cars. Their uncle's old car. Or they travelled across the country in this old car... So I wanted to continue this, so I did a whole series of that. **I also loved for me personally, the challenge of trying to represent hard, smooth, reflective surfaces with wool. The challenge of that, and also the challenge of working with a stereotypical male subject matter and the stereotypical female process ... in this day and age... In other times in history, weaving has been very male-driven. But, those contradictions have always been at play for me.**

I actually have a whole series I've just started working on again with tapestry... I haven't done anything for a while, and I'm going to do a whole series of new tapestries so I'm excited about that.

Can I say one more thing about tapestry?

So, a couple of things come up often when I'm talking about my work, and **one is, the reason I love tapestry - and different than loom weaving - is that with tapestry, you have a plan - a cartoon or line drawing which you're intending your final image to be like - but you can't actually implement the details specifically. You use that as a guideline and you're tracing or**

drawing on top of it, and when you're tapestry weaving, you're constantly decision-making. Do I go up here? To the left? To the right? Do I wrap around this warp thread? Or do I wrap around the next warp thread? That's going to influence how curves and lines and angles go. With tapestry, you build it like a brick wall from the bottom up, and you can do a section over to the left and then another section to the right, and it's very fluid in that way... whereas I find that with weaving fabric on a loom, for me the fun part is the planning. Figuring out the math, figuring out what that thing is going to look like, doing some testing to see if that structure works. *If it doesn't want do we have to do here, playing with those structures?* **When I get to the actual weaving, I get bored. It's like, oh, 'I'm doing the same thing over and over and over again.' Yeahhh it's meditative. It's nice. There's some things I've done that I thoroughly enjoy ... I looove weaving ... but, I find the constant decision-making and involvement that I have in the design process with tapestry when my fingers are moving ... I really enjoy that and I respond really well to that. It engages me in a really great way. So that's one thing I really like about tapestry.**

Most of my weaving projects have been about the structure of weaving. Formal, visual elements as well, but I love taking structure and then subverting it. For one of my weaving pieces at Cap, I had a drawing and I wanted to represent a picture in a weaving. So I used a rug weaving technique called called waia?, Scandinavian loop weaving technique. So I did that and by varying the length and density of the loops, I was able to get a grey scale and I got a face put into a 6"x12" weaving. It was plain weaved with all of these loops coming up and I was able to get that.

Emily: So, problem solving is a huge part of your work

Jen: And my life! And my job. Those are the things that I love about being a technician, is that I never know what my next question is going to be. My favourite question that came up last year was, "OK! I want to make a sculpture of a toilet out of fabric that's not stuffed, but in a puddle on the floor." *That is amazing. Ok. Here's what we do! Let's think about this and that ... here are some considerations ...* Looking at the form, how can it be attached together and made in a way that reads as a toilet when it's stuffed, but also when it's flopped on the ground. So that problem solving? Love it.

Emily: Is there anything else you want to say about that?

Jen: Oh! **Most of my life, I've been afraid of colour. Things in school and further on have been about structure, so I've done it either in natural fibres or in black and white. I did a couple of pieces in colour, didn't really like where things were going ... but all my tapestries are in colour. But I'm going from photographs. So there's' an existing colour palette to choose from, and then it's problem-solving around, OK, how do I represent that colour in this way, not coming up with a colour. So, yeah, that's something that comes up often.**

Emily: What gets students interested or inspired in your classroom or after school when they're working in the lab?

Jen: **One thing that I see often, is achievement! It's not necessarily completed achievement, but a step along the way. So, for someone that haven't sewn anything before, they go to a sewing machine, sew 2 pieces of fabric together through the machine, they do 2-3 lines of stitching, and then pull it out and it's a 3 dimensional thing, an object they can relate to, and it's different than it was before. It may not be totally finished or exactly what they were wanting to do, and I don't know if they're seeing the potential in there, or that their ability to manipulate and create something new wasn't there before. So I think that's a big part of it. I see that alot. That, "Oh! I can *do* this!" Kind of moment.**

Emily: What are the biggest barriers to students?

Jen: Fear.

Whether it's a fear of the industrial sewing machines, or they have historical experiences and fear around the idea of sewing, or expectations around sewing, whether it's cultural, gender, or they know people that are really good at it and they don't feel like they are as good, or, just the overwhelm of, "Oh, I have this idea of what I want it to look like, and I'm here holding a pile of fabric. I don't know the steps to get to the end." I'd say those are the biggest barriers. Overwhelm, and fear of ...

Maybe it's not being good enough, or not knowing what the next step is, or of the unknown...

When we were talking before about the weaving and you were saying how people were more likely to try it out if they were to see samples, so it's giving them some context, and that ability to foresee a possible successful outcome.

People want to make something good, and alot of time, that's in their way.

You know Kim Werker. Yeah. So her book is amazing. And the whole concept around what she's doing is amazing. I've recommended it to a number of students who have been either starting in wanting to get into a creative career - I have alot of students in continuing studies who are wanting to get into graphic design, change their career, or try something new, one of the things as somebody new to this field, you might be feeling like you're the only one who's scared.

NO WAY.

They need to know that it's normal, AND there are things that you can do to work through that. I definitely love the way that she approaches that.

Emily: Are there any educational resources that you love? Or that you think are needed or missing?

Yes, absolutely. I have my favourite sewing books that I recommend to everybody. The one that I love is the Reader's Digest Guide to sewing and it's been around since the '40's and they re-published it every year and the copy I have in the Soft Shop is from the '70s and they have illustrations of all of the steps and processes, as opposed to photographs, so people can see more clearly what they're supposed to look at; whereas, I find with photos, sometimes it's a little confused or muddy. With an illustration, it's very specified. It's also just really clear and concise.

I send alot of students links to different blog posts or websites that have tutorials, but the thing that I find super interesting working in the soft shop is, alot of design students are looking for very specific direction, and so alot of them haven't necessarily googled things or looked things up beforehand.

Vast generalization. But, **alot of the visual art students can sometimes be more self-directed, because the approach in that program is a more self-directed way of learning; whereas with Industrial Design, Communication Design and Interaction as well, they're learning about the design process, so it's a lot more about the different steps needed. Whereas in the Visual Arts, it's about, "OK! Make a sculpture, think about this, this, this ... but there isn't a specified way to approach it, so, therefore they have to figure it out themselves."**

I haven't really thought about that specifically, but yeah. And it's a very different approach, which is fascinating to watch when you have multiple students from multiple areas in the shop, and I think students gain alot from that as well. Because, students in one area or the other might not know that there's this other way to work, so being able to see that, and see that approach, can definitely help.

Emily: Tell me about your high school experience

Jen: So, I went to Centennial High School in Coquitlam, which was a very big school, 2000 students for 2 grades ... **we didn't have any bells, we had our class structure in blocks and we had to deal with it on our own, and keep track of our own time. Our motto was, "Freedom with Responsibility", which was amazing. There was alot of freedom, partially because it was such a large school**.

Emily: How did that go? Did people abuse it?

Jen: **People abused it for sure! It was a high school. That happens in college, too. But, I think, for me it was great. Being in such large numbers, there were very strong cliques.**

So, I was in the group of freaks, we were the grunge kids, 1990 weirdos. Which was great. Because, there were 25 of us, as opposed to 1 or 2. To that same degree, it was such a movie in that way.

I was in this one class, and one guy from the hip hop group, and me, this '90s grunge girl, sat in the back corner where everyone else was jocks and

popular kids. The two of us sat in the back corner, and made fun of people. We did our work and it was fine, and we had a really fun time! One day he missed class and I saw him in the hall, and I wanted to tell him that there was a quiz that he missed. When I went up to talk to the group of friends, they all just stared at me and one of them said, "Why are you talking to him?" I was walking up to these hip hop boys with a plaid shirt and band tshirts and that kind of things - and it was very much like a movie. Very segmented, very distinct cliques, with very little interaction between them. Which was weird. But again, that's high school!

For a larger school, that's common, but having that larger school allowed us to have a wider variety of subjects. We had graphics classes, **I did textiles for the first time there, there was drawing and painting, and it wasn't just art, there were all of these more specified courses, and so that was a real benefit for us to focus a bit more there. I got to do textiles for the first time there, and make fun projects just because I wanted to, and I worked after school and in the hallways, and spread out my giant projects and worked there and people were fine with that. There was definitely alot less regulations around that. Granted, I was a fairly good student, and I didn't get in alot of trouble, so I didn't get hassled. I'm sure there were other students that did ... I was responsible, and I was nice! So therefore, I got away with alot, in terms of being left alone. I could work in the hallway for hours, painting my giant batique, with an electric frying pan filled with hot wax. That would not necessarily be done these days because it's not safe, and it would probably be squashed, whereas it was totally fine and what I did.**

Having those opportunities and be able to play with that was really fun. I still had tons of challenges -- we were talking earlier about fear and those hesitations. I did alot of projects, but I didn't finish alot of them, because I left them to the last minute, because I was too worried about getting them right from the beginning, so I didn't give myself enough time to explore, learn, and have that sense of exploration before a finished product.

Emily: So, when did you start finishing projects and what kinds of structures did you have to complete those and how did you get graded?

Jen: It was fairly standard. We would have a project that we had to do. For instance, **our first textile project was an embroidery project, and we had to do embroidery on burlap. I chose this super elaborate tree branch and I used all of these different colours to make the texture of the tree branch, but I took on such a huge project and I couldn't finish it in time, and so I handed it in, and I lost marks because it wasn't finished. I was ambitious, and I had alot of fear around starting. I had these ideas and I wanted to do stuff, but I was afraid of not getting it right. Not being good enough.**

I still deal with this everyday. And it's something that I try to help students with everyday. With sewing, you can try something, and you can take it apart if it's not good enough and if it is good enough, that's great! This one will be like this, and the next time, you'll be one step further.

Allowing for imperfection can be really important, which I have perfectionist tendencies, and at that age, I didn't know what that was, or how to acknowledge that.

Emily: So, was there any conversation around that? Was there any support?

Not at all. And I see that conversation happening more. **Students talking about anxiety, and students talking about depression or being uncomfortable, and being able to actually discuss and there are alot more discussions around that, which for me, I think would have been really helpful.**

As technicians, we're involved with an early warning system, if students are having challenges, we can send an email which flags the councellor and student services, and I've used that before. Because we see students and work with them and potential challenges, we're able to work with those systems. I wish that had been around when I was in college, because my first couple of bouts of depression when I was 18/19 years old were brutal. I didn't know what was going on! So, being able to see some of those warning signs.

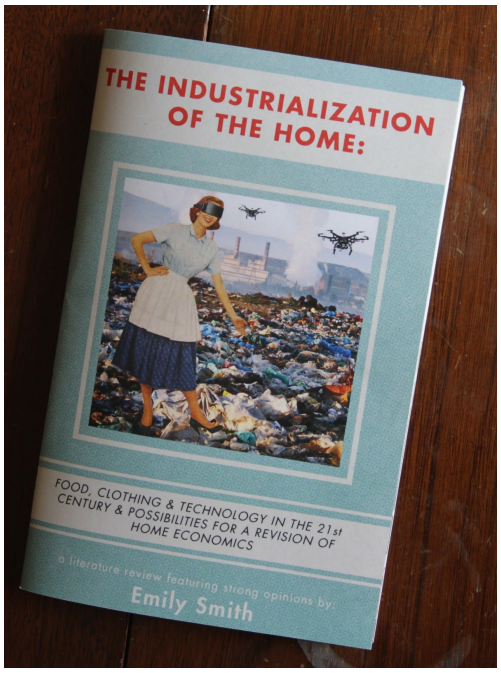
Emily: So, balancing achievement-oriented and the satisfaction of finishing thing, and then becoming overly attached to that as well.

Jen: I think it's a really important skill to learn. I think making can really help with that. I wanted to tie that in.

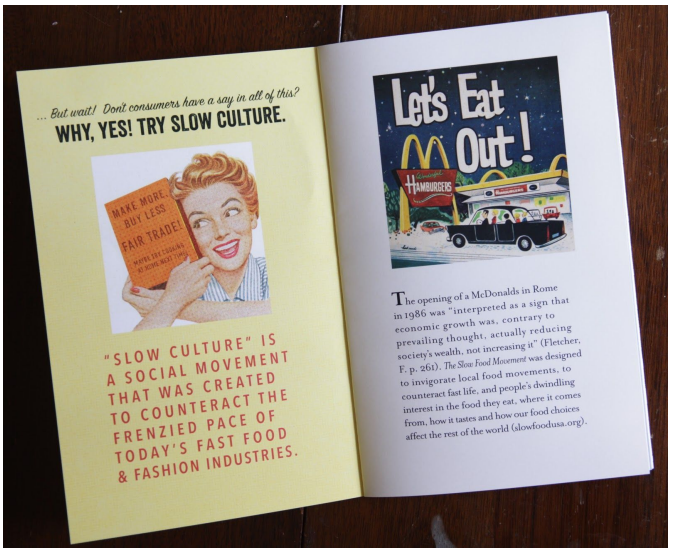
I had this thought the other day. Something on the internet triggered this. A venn diagram of "Perfect" and "Really fucking awesome." There may be a bit of overlap, but those are not on top of each other. "Perfect" and "Really fucking awesome" don't have to interact.

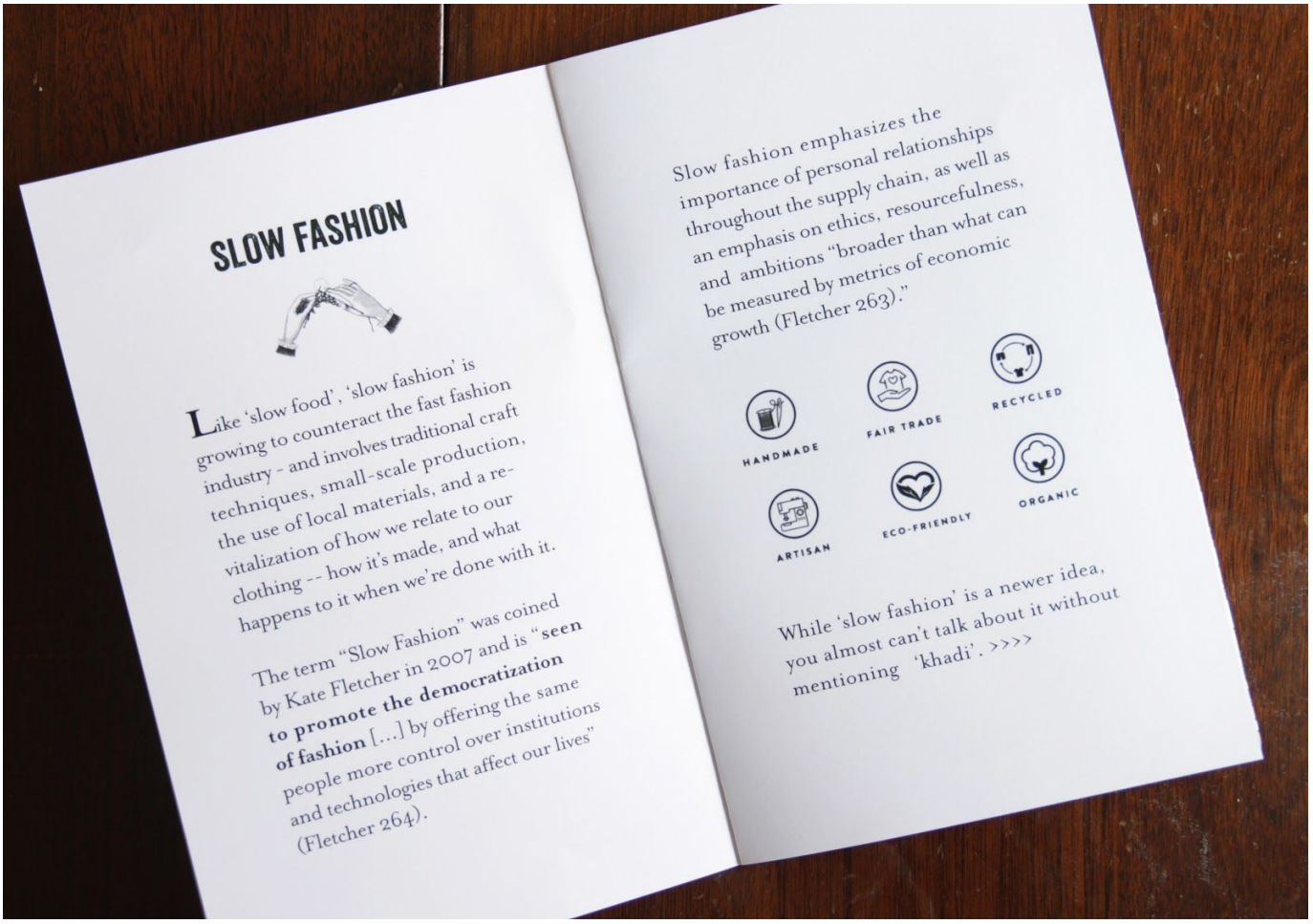
- APPENDIX C -

'ZINE: 'THE INDUSTRIALIZATION OF THE HOME'



'ZINE: 'THE INDUSTRIALIZATION OF THE HOME'





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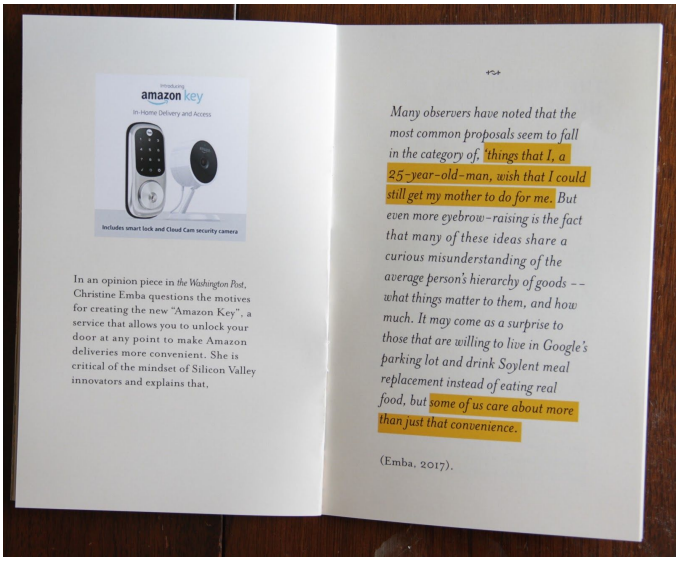


'ZINE: 'THE INDUSTRIALIZATION OF THE HOME'

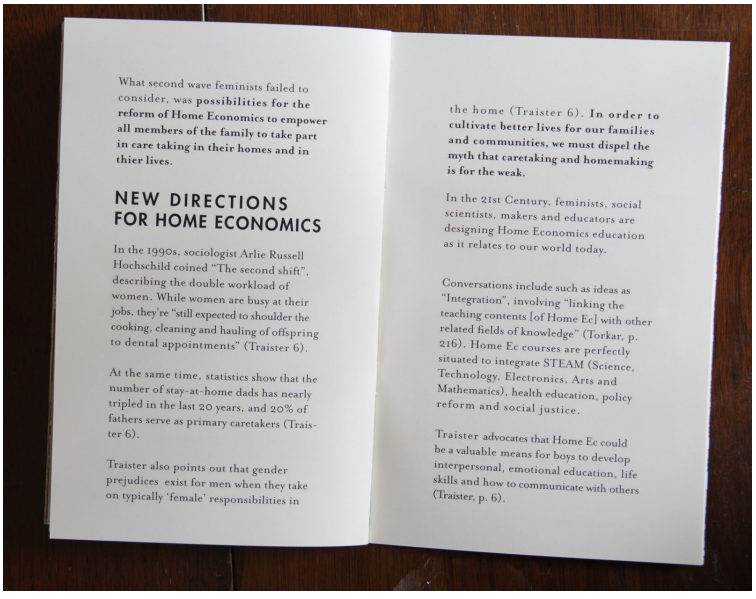
THE DECLINE OF HOME ECONOMICS

In the 1970s, many second wave feminists reacted against Home Economics (or "Home Ec") programs in support of women's rights. Rebecca Traister, author of *Kitchen Controversial: Why Feminists should Embrace Home Economics*, points out that things shifted when activist Robin Morgan "**believed that Home Ec had turned women into a 'limp, gibberish mass of jelly waiting for marriage**' and urged educators to inform female students that a home-centred life is central to "the economic bigotry against women'" (Traister, p.5).

While perhaps Home Ec was in need of reform, the extreme rejection of the homemaker held by second wave feminists was perhaps, hasty.

The implementation of Home Ec programs varies between teachers, regions and institutions, the focus, unlike what Morgan asserted, has not always been on creating obedient housewives. Home Economics **started in the 1800s and is defined as,** "a field of study and a profession, situated in the human sciences that draws from a range of disciplines to achieve optimal and sustainable living for individuals, families and communities" (International Federation for Home Economics, p.1).

It evolved in the 1900s as a program to educate young men and women to become resourceful and knowledge-able consumers and to encourage self-sufficiency (Brosdahl, p. 15-16).



What second wave feminists failed to consider, was **possibilities for the reform of Home Economics to empower all members of the family to take part in care taking in their homes and in thier lives.**

NEW DIRECTIONS FOR HOME ECONOMICS

In the 1990s, sociologist Arlie Russell Hochschild coined "The second shift", describing the double workload of women. While women are busy at their jobs, they're "still expected to shoulder the cooking, cleaning and hauling of offspring to dental appointments" (Traister 6).

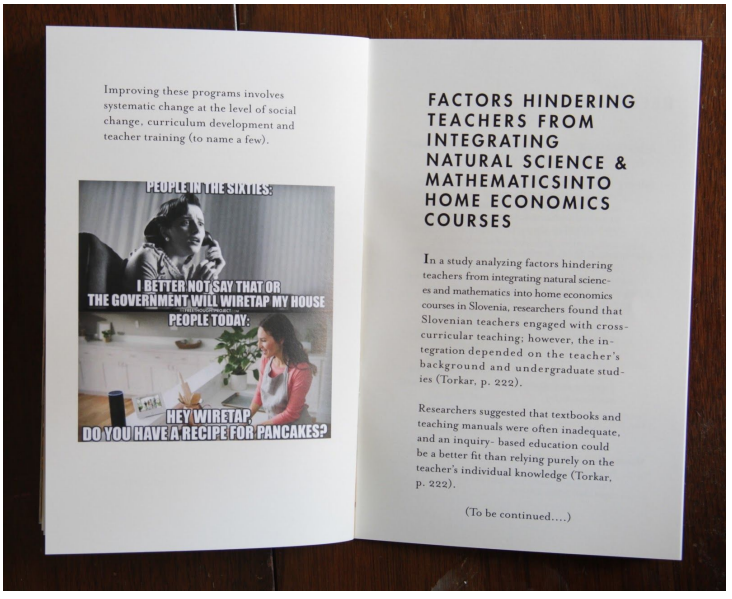
At the same time, statistics show that the number of stay-at-home dads has nearly tripled in the last 20 years, and 20% of fathers serve as primary caretakers (Traister 6).

Traister also points out that gender prejudices exist for men when they take on typically 'female' responsibilities in the home (Traister 6). **In order to cultivate better lives for our families and communities, we must dispel the myth that caretaking and homemaking is for the weak.**

In the 21st Century, feminists, social scientists, makers and educators are designing Home Economics education as it relates to our world today.

Conversations include such as ideas as "Integration", involving "linking the teaching contents [of Home Ec] with other related fields of knowledge" (Torkar, p. 216). Home Ec courses are perfectly situated to integrate STEAM (Science, Technology, Electronics, Arts and Mathematics), health education, policy reform and social justice.

Traister advocates that Home Ec could be a valuable means for boys to develop interpersonal, emotional education, life skills and how to communicate with others (Traister, p. 6).



Improving these programs involves systematic change at the level of social change, curriculum development and teacher training (to name a few).

FACTORS HINDERING TEACHERS FROM INTEGRATING NATURAL SCIENCE & MATHEMATICSINTO HOME ECONOMICS COURSES

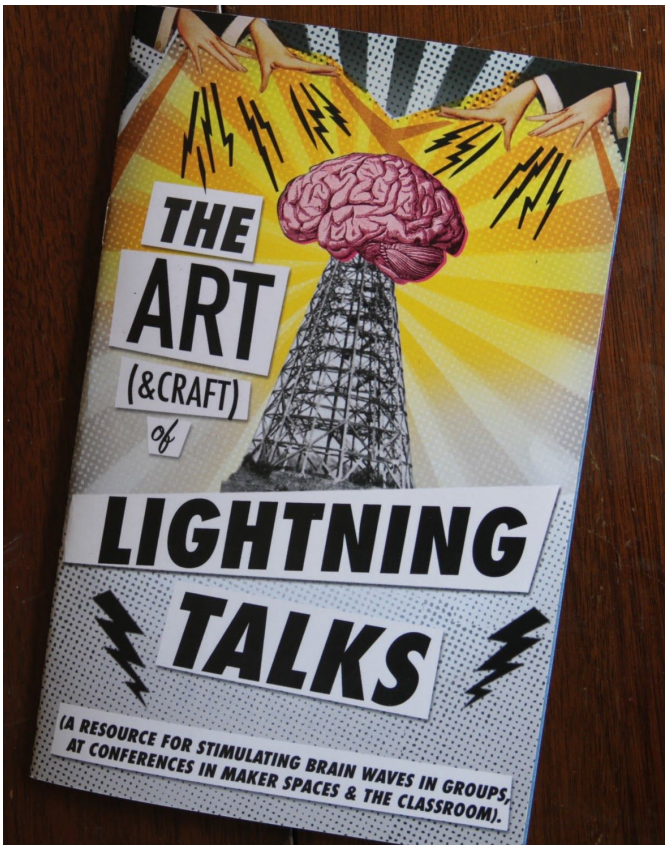
In a study analyzing factors hindering teachers from integrating natural sciences and mathematics into home economics courses in Slovenia, researchers found that Slovenian teachers engaged with cross-curricular teaching; however, the integration depended on the teacher's background and undergraduate studies (Torkar, p. 222).

Researchers suggested that textbooks and teaching manuals were often inadequate, and an inquiry- based education could be a better fit than relying purely on the teacher's individual knowledge (Torkar, p. 222).

(To be continued....)

- APPENDIX D -

'ZINE: 'THE ART (AND CRAFT) OF LIGHTNING TALKS



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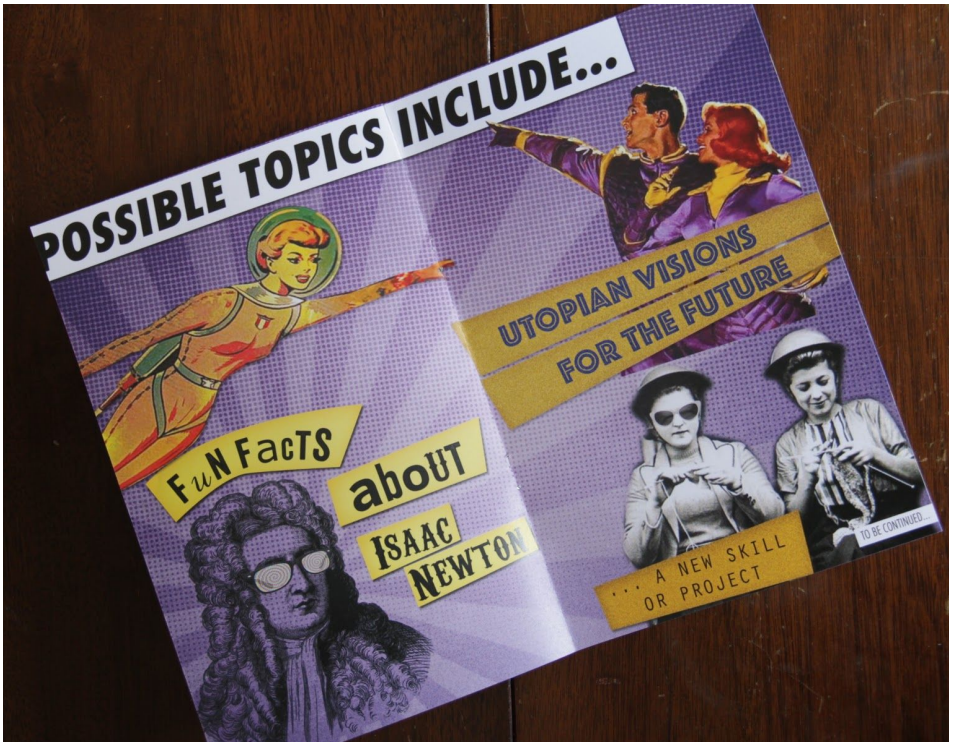


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