Michigan State University, Regional Economic Innovation: Student-Led Faculty-Guided Technical Assistance Project

Makerspace Prototype Exploration for Local Micro-Business Incubator:

Prototyping a process with students to develop community member making and crafting skills in order to empower local individuals to explore niche market opportunities in the Keweenaw artisan sector

Husky Innovate

New Power Tour, Inc.

the alley

Michigan Technological University

Introductions -

Lisa Casper, PI
Husky Innovate Program Manager
Michigan Technological University
&
Melissa Davis, Co-PI
New Power Tour, Inc.
Executive Director

Background -

- 2018 per income capita for the Keweenaw peninsula $23,362
- Pockets of generational poverty
- Husky Innovate and NPT are key I&E stakeholders
- Few local businesses exist in the hand-crafted wood furniture business space

Objective

Our objective was to provide an experiential learning opportunity for students to learn the relationship between making and entrepreneurship by piloting a process to support and grow the local economy.

Project Timeline

Fall 2020

Scoped the problem
REI proposal submitted

New Power Tour, Inc. approaches Husky Innovate to discuss collaboration

Winter 2020

Proposal accepted, planning begins

Collaborators meet regularly to discuss steps and involve students with the process.

Spring 2021

Enroll in the I-Corps Program as a team

Meetings with students begin.
Late spring, funding is approved

Spring 2021

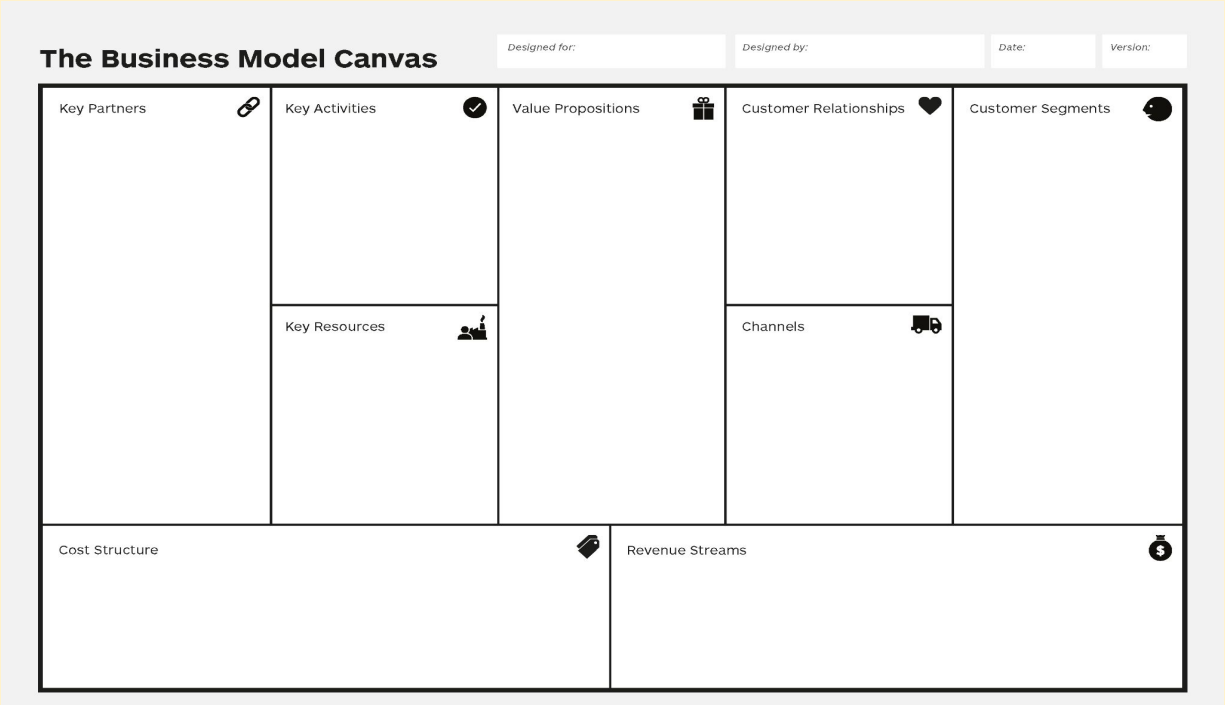
Prototypes!

We hire an industrial arts consultant, buy materials, students plan prototyping event and prototype.

Process

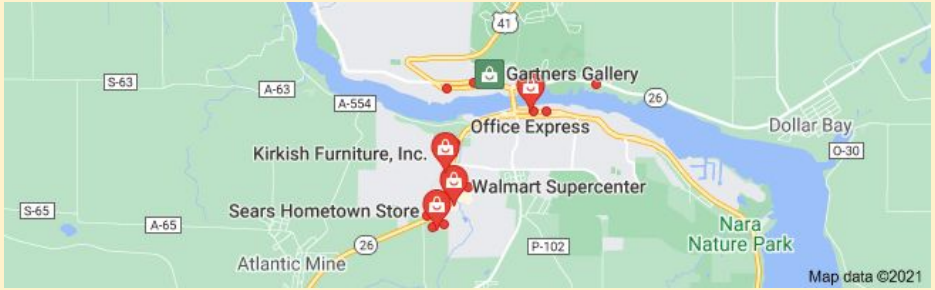
1	I-Corps	2	Met with students to select products & plan the prototyping event	3	Build
• Identify key hypotheses • Test value proposition & customer segment assumptions		• HHNHS students & Michigan Tech Alley Makerspace Students provided input on the prototypes • Alley Makerspace Student Interns planned the prototyping event		• Reverse engineer prototype selections • Develop plans • Purchase material • Build • Iterate	

Michigan Tech I-Corps NSF Site Program



Opportunity Recognition -1

1. There are 2 designated furniture stores
2. Quality furniture products have a high price point
3. Cheaper ones are poorly built and require assembly
4. Consuming products made elsewhere adds to the carbon footprint

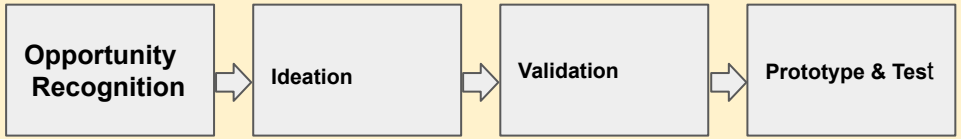


Opportunity Recognition -2

1. Few to no local training programs to train woodworkers
2. High unemployment rate
3. One business incubator
4. One community makerspace
5. Cottage industries are an important source of employment in rural areas

Our strategy

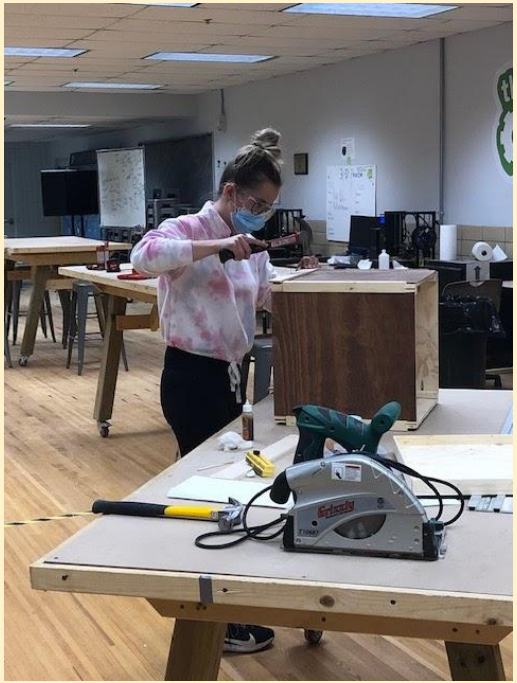
Pilot an early phase micro-incubator

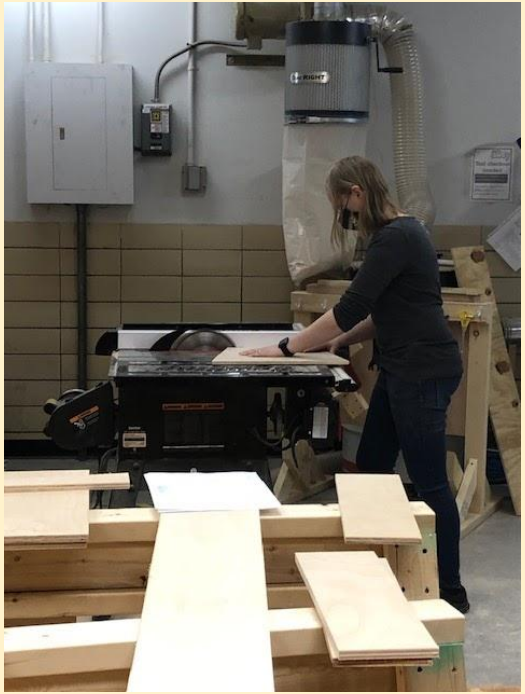


Prototype simple wooden furniture with market potential

Students organized and ran a campuswide prototyping event

Alley Makerspace makers





Results

1	Alley Makerspace 2 week prototyping event*	2	Piloted a micro-incubator process	3	Student experiential learning
• ~14 students made and kept a prototype • Delivered to NPT 2 beach sling chairs, one storage cube, one computer desk, and four LED cube lights		• Hacking, making and building are different • Students went through four early phases of innovation		• Customer discovery informed choices • Students tracked costs • Students developed individual unit labor and cost information	

Prototype material, equipment and labor

Prototype Project	Equipment and tools used	Labor hours*	CNC hours (per unit)	Material cost total (per unit)**
Wooden, acrylic layered LED cube light	Orbital sander, CNC router	1	4	$30.00
Folding beach sling chair	Table saw, orbital sander, disc sander, sewing machine, miter saw	4	na	$30.00
Storage cube and seating	Table saw, orbital sander, miter saw	4	na	$40.00
Upright ergonomic desk	Orbital sander, CNC router	2	1.5	$22.00

*Assumes that the maker is proficient with equipment, process and able to batch runs when this is an option.

**Wood costs are very high due to supply shortages

Student feedback

Student maker #1:

“I think, more than anything, the prototyping project helped me with organizing events in general. “

“A lot of the marks really enjoyed getting to build something guided that they could take home.”

“In the future, I’d suggest that we focus more on teaching the fundamentals of prototyping and problem solving …”

Student maker #2:

“I really began to appreciate how important R&D is to making cost-effective products for any actual production purposes.”

“As a maker I learned several new techniques involving woodworking and a few neat tips and tricks using the CNC router…”

“I was introduced to a few new bits of hardware, etc. used in woodworking which I had never seen before and which will definitely help me in my future projects.”

Key takeaways

- Working with students through the prototype selection process helped them to understand the trade-offs between value proposition and costs
- Hacking, making and building are different, be careful with messaging for future events
- Most students enjoyed the scripted build and found it foundational for them
- We had two customer segments and two value propositions: green customer and individuals wanting to develop skills. Validating product market fit for both wasn’t possible at this stage.
- This experiential learning opportunity was empowering for our students!

We are grateful for the support from the Center for Regional Economic Innovation at MSU. Thank you for this opportunity!

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