Evolving Connections: Community-Driven Learning Ecosystems in the Library

Laurie Alexander
Associate University Librarian for Learning and Teaching

Meghan Sitar
Director, Connected Scholarship

Learning & Teaching Goals

Grand Challenges & Wicked Hard Problems

Engage with campus learning priorities, applying our expertise in traditional and emerging modes, partnering effectively, offering possibilities and creating solutions.

Pathways for Immersive & Interactive Learning

Explore, define, create, and make visible engagement with learning as an interactive, intentional and transformative experience.

Literacy & Learning Competencies

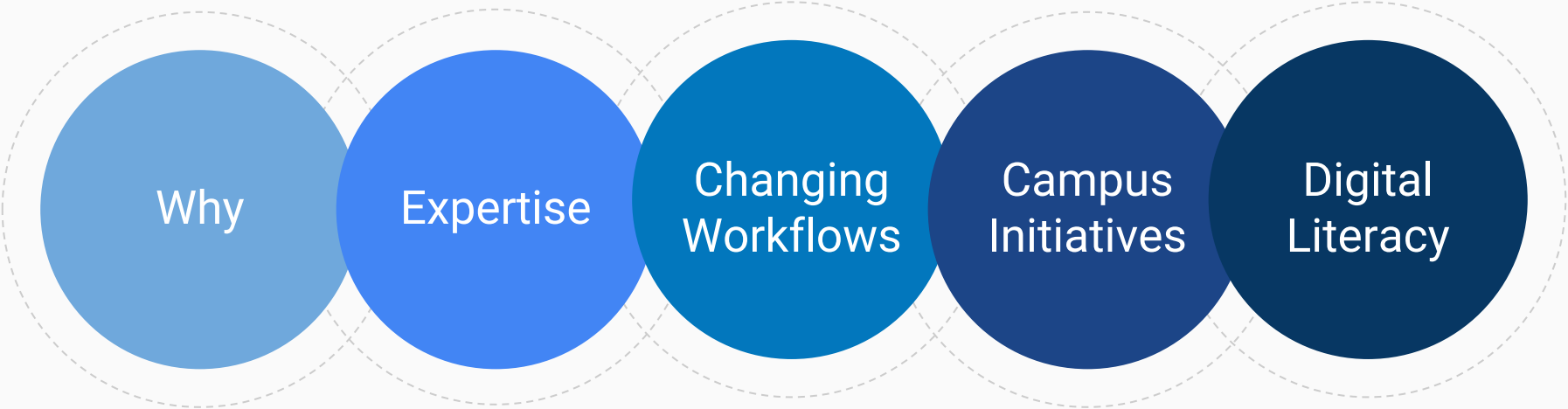
Integrate information literacy with core campus missions and initiatives to further promote a literate campus.

Established Service Models

Faculty Exploratory

Tech Deck

Imagine Again



Habits of thought

Creativity

Problem solving

Community/citizens

Intercultural competence

Self-reflection

Life-long learning


Learners
Library
Technology
Pedagogy

Connected Scholarship

- Community-driven learning environments
- Consultation and access to expertise
- Collaboration with partners

Connecting Communities

Design Lab 1

Duderstadt Center

Makerspace with an emphasis on aesthetics for collaboration and exploration of new tools, technologies, and processes

Design Lab 3

Duderstadt Center

Ideation space with modular furniture, whiteboards, sketchpads, and workstations with data visualization and modeling software

Connecting Communities

Shapiro Design Lab

Shapiro

Focus on creating engaged learning opportunities and experiences across research, artistic, and teaching projects

ScholarSpace

Hatcher

Collaboration and consultation around exploration, application, and extension of learning technologies.
Redesign in progress!

Connecting Expertise and Partners

Accessibility

Learning Design

Learning Technologies

DETROIT: A COLLECTION OF STUDENT PHOTO ESSAYS

LLOYD HALL SCHOLAR'S PROGRAM (LHSP) 125:
What You See Is What You Get: Exploring Image and Identity

https://seelio.com/w/29rd/lead_to_pixels-shakespeare

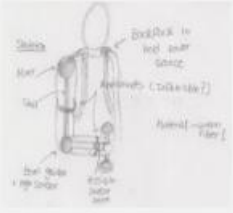
Aluminum Prototype of Right Arm Exoskeleton
Strength Augmenting Robotic Exoskeletons (STARX)

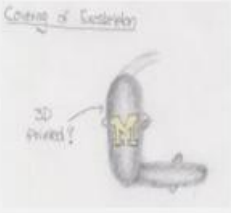
INTRODUCTION

Currently there are few exoskeletons that are outside of research and military applications. STARX works toward building practical strength augmenting exoskeletons that can be used in an everyday setting. Over the course of the Fall 2015 and Winter 2016 semester, we designed, manufactured, and instrumented our first aluminum arm prototype. The goal for our arm exoskeleton was to lift 10-15 lbs more than a person is capable of. With the intention of making this technology mainstream, we have made our progress open source.

DESIGN PROCESS

For our design process, we first brainstormed factors that we considered most important to our design. Those factors included safety, weight, adjustability, ease of movement, practicality, and longevity. After deciding on the main considerations and reviewing existing exoskeleton designs, we were able to generate sketches (Fig.1,2). Once sketches were complete, we were able to proceed with creating our mechanical design.





B. SHOULDER DESIGN

For the shoulder, the biggest factor was that the exoskeleton should move naturally with the user's arm. The shoulder has three degrees of freedom and we attempted to achieve that by using a pivoting hinge system.

C. ELBOW DESIGN

The key features that we wanted for the elbow was adjustability, comfort, and safety. To investigate designs that would fit this criteria, we looked at elbow braces, specifically the Bledsoe elbow brace(Fig 3). This brace was adjustable in length and had malleable cuffs with padding, which targeted a wide range of people. Below, you can compare our design (Fig. 4) to the Bledsoe. The main safety concern we had was the risk of hyperextending the elbow if there was a misread of control signals. To resolve this, a small stop was put to prevent the elbow from extending more than 90°.

Figure 3. Bledsoe extender arm post-op elbow brace that inspired our

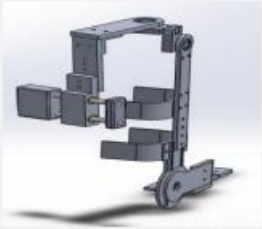


Figure 4. Complete CAD model of our arm exoskeleton. We mimicked the

ELECTRICAL DESIGN

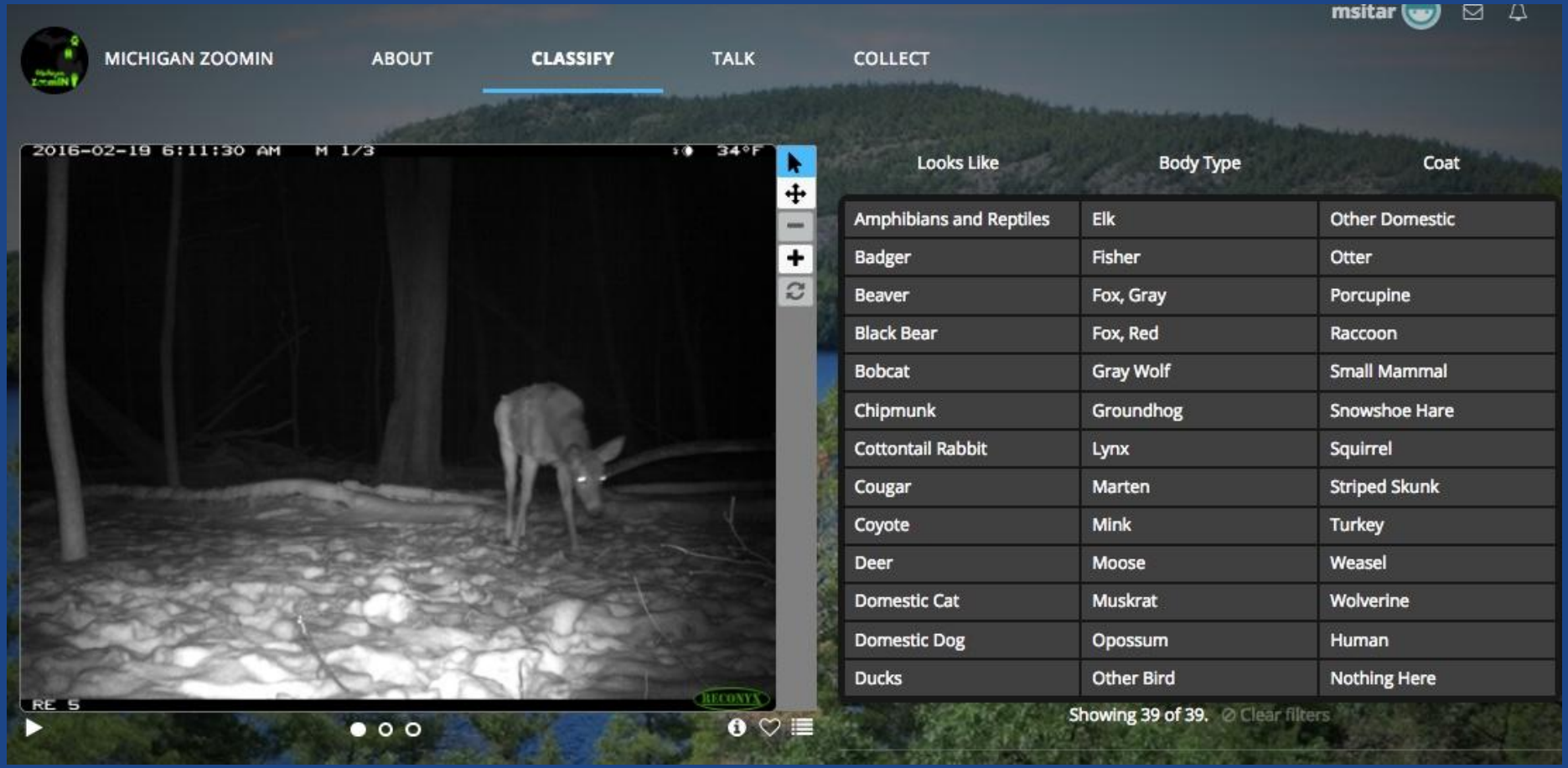
For the electrical design, we had to focus on three areas: sensors, control algorithm, and motor control. For sensors, our system relies on two surface electrode EMG sensors, two pressure sensors, and an angle sensor. These allow for direct control of the exoskeleton based on arm movements alone.

A. CONTROL ALGORITHM

The control algorithm idealy consists of two control loops, one for free movement without EMG signals and one for movement under load. Free movement uses a PI controller with the force sensors, while the load controller relies on EMG signals from the user's bicep and tricep.

B. MOTOR CONTROL

For our motor, we chose to use a Milwaukee Brushless power drill. The reason behind this choice is the many convenient functions of the drill that suited our application. The drill has the proper torque and speed with its gearbox, a slip clutch to prevent stalling, and all associated electronics for controlling it. To control it, we e[illegible]ly controlled the speed and direction using signal inputs fr[illegible] microcontroller while keeping the internal workings as a b[illegible] box.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Chipmunk
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Cougar
Coyote
Deer
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Elk
Fisher
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Gray Wolf
Groundhog
Lynx
Marten
Mink
Moose
Muskrat
Opossum
Other Bird
Other Domestic
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Porcupine
Raccoon
Small Mammal
Snowshoe Hare
Squirrel
Striped Skunk
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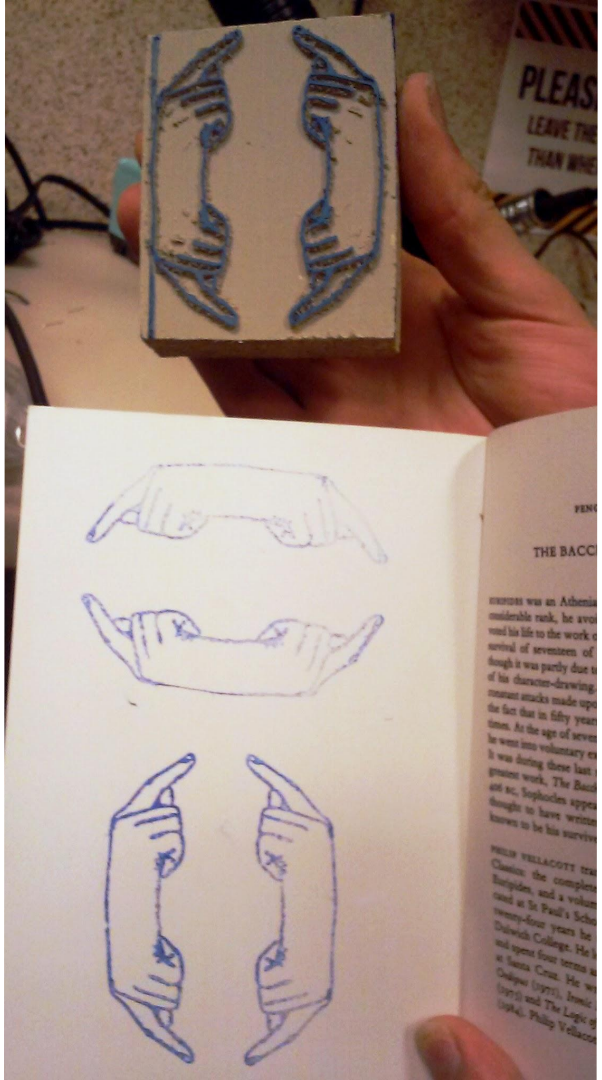
New Possibilities

ScholarSpace

ScholarSpace

Design Lab 1



Innovate Blue

Process Gallery
Design-o-Matic 4000
Design Library

Prototyping Cart
Whiteboards
Lynda.com

Shapiro Design Lab

Workshop

Winberg Presentation Practice Room

Perlstein Editing Room

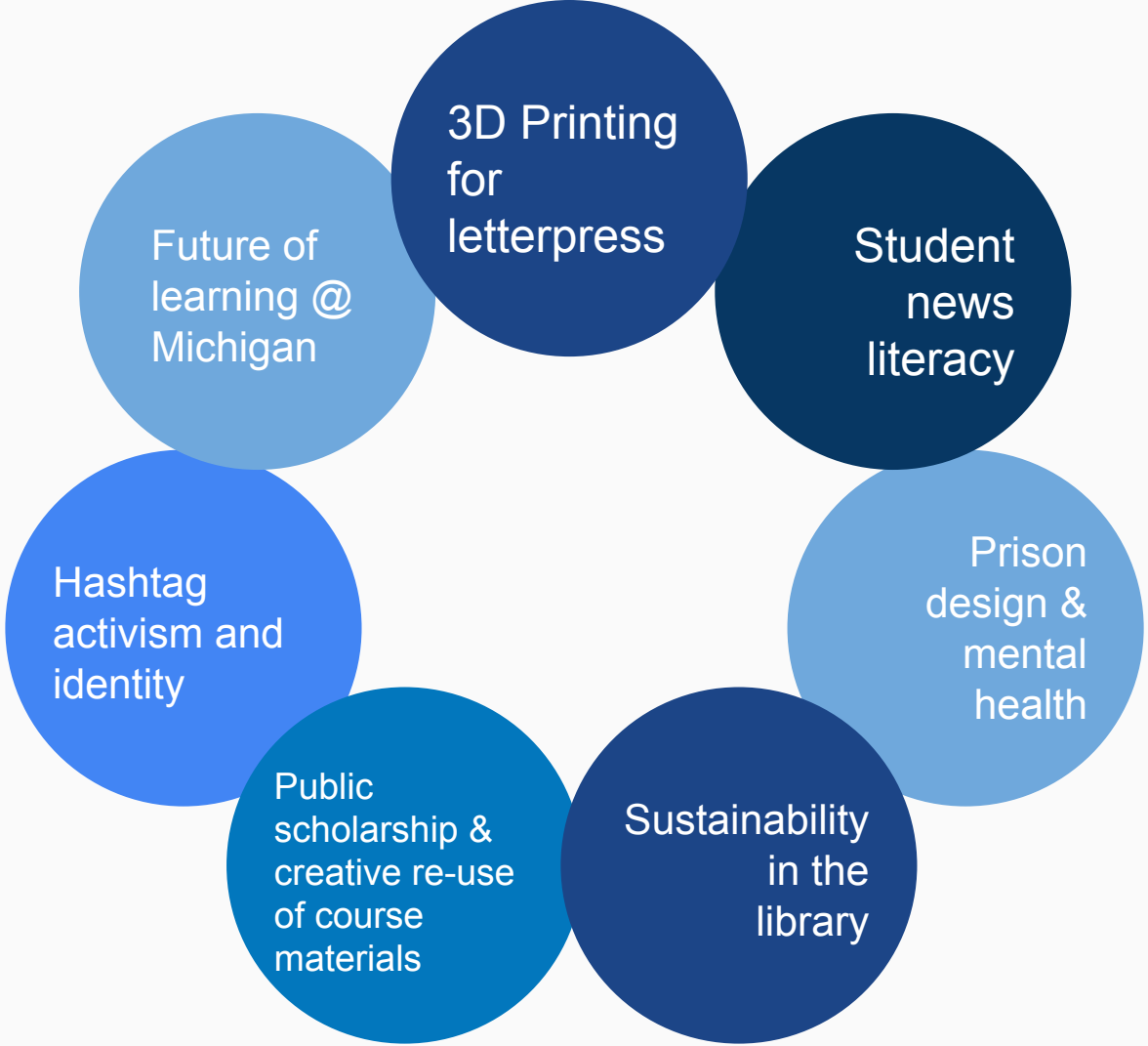
Study Tables


Prototyping Cart
Design-o-Matic
4000
DESIGN
LAB


HP260 Q Mini
If you can't share
it, you can't post it

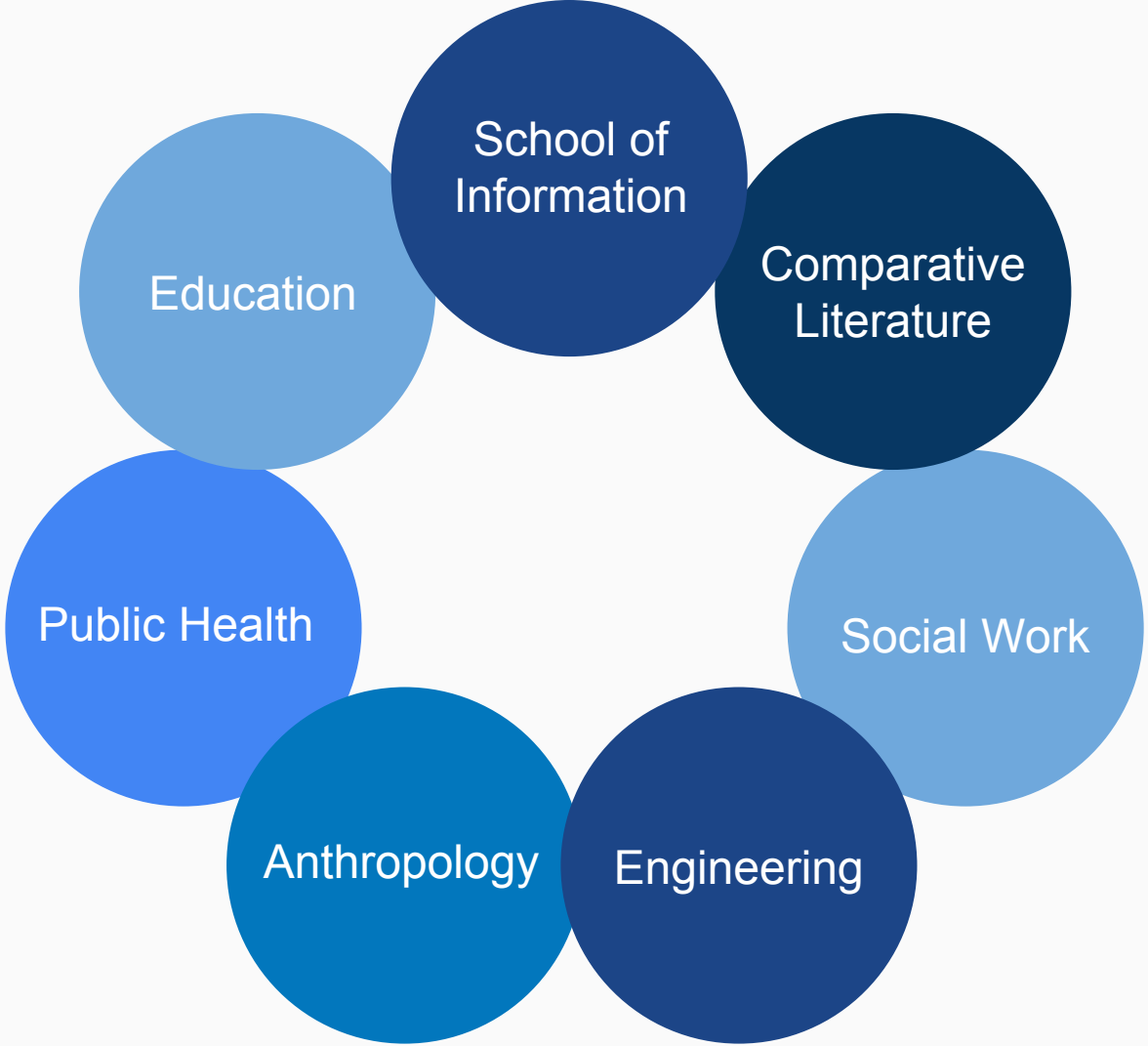
Changing Impact:

Shapiro Design Lab Residents



Changing Impact:

Shapiro Design Lab Residents



LibLearnEx Research Framework

1

How do we **[know]** the **student experience**

scholarship

L & T Services

2

How does our **design process**

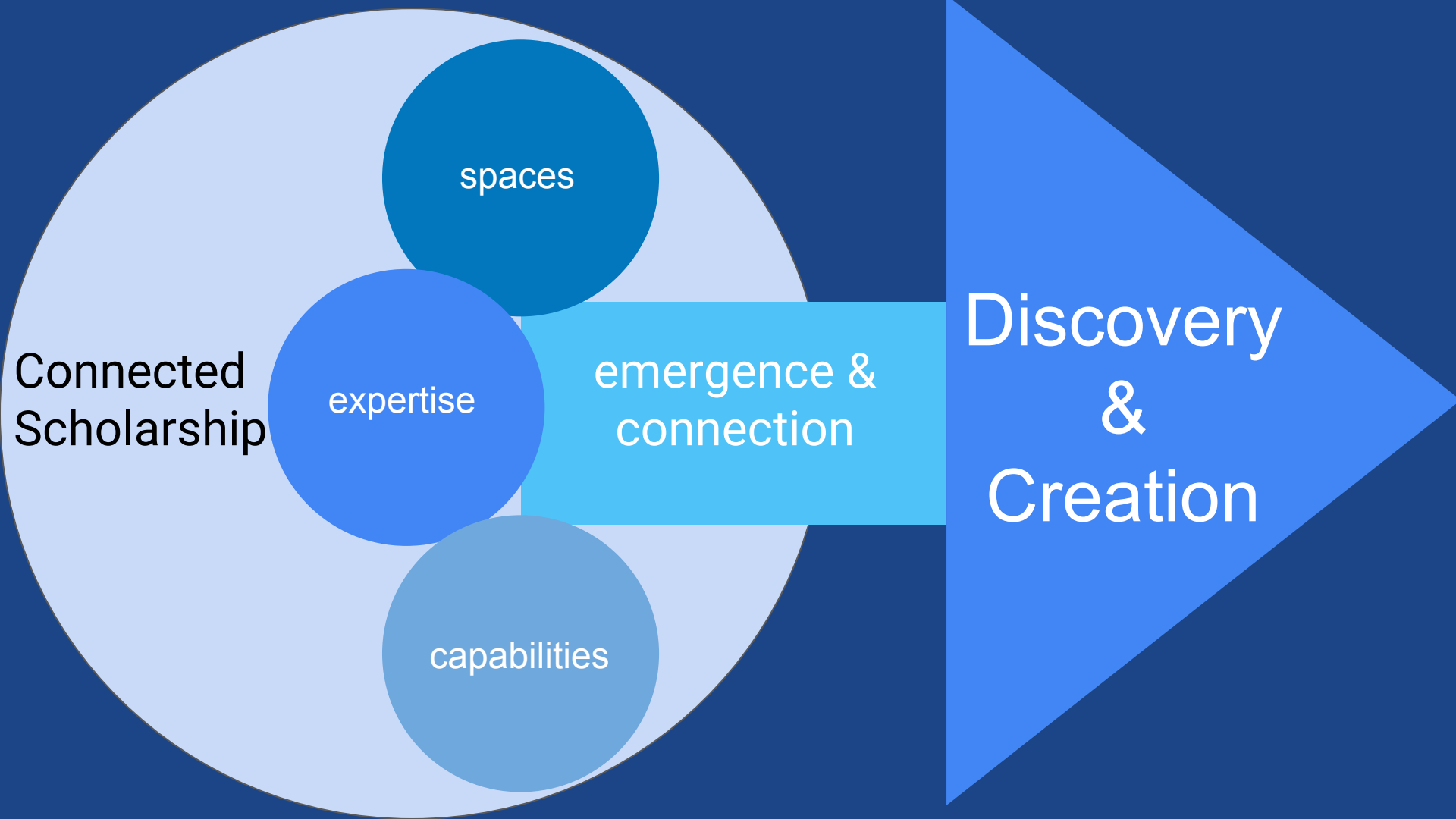
[reflect] our role

as/in a

public research library

LibLearnEx investigations are mixed-method studies to inform innovation in Learning & Teaching programs and services.

Studying Impact


Connected Scholarship
spaces
expertise
capabilities
emergence & connection
Discovery & Creation

Q&A