

# Education for the 21st Century

Tech Forward Initiative Update  
February 3, 2021

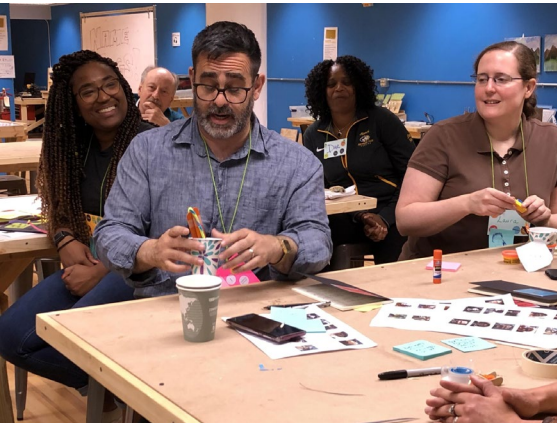
[www.mtu.edu/ideahub](http://www.mtu.edu/ideahub)

Michigan  
Technological  
University



# topics...

- ❖ accomplishments & progress to date
- ❖ next steps



# Tech Forward Conversations

**65% of today's students will have jobs that do not exist yet; how might we prepare students for their futures?**

Communication  
with uncertainty

Global perspective  
& Growth Mindset

Critical thinking  
authorship

Lifelong & deep learning  
Willingness to take  
responsible risks

Comfort

Resilience

Self-

Computational thinking

**How might we...**

- help students to develop these critical competencies?



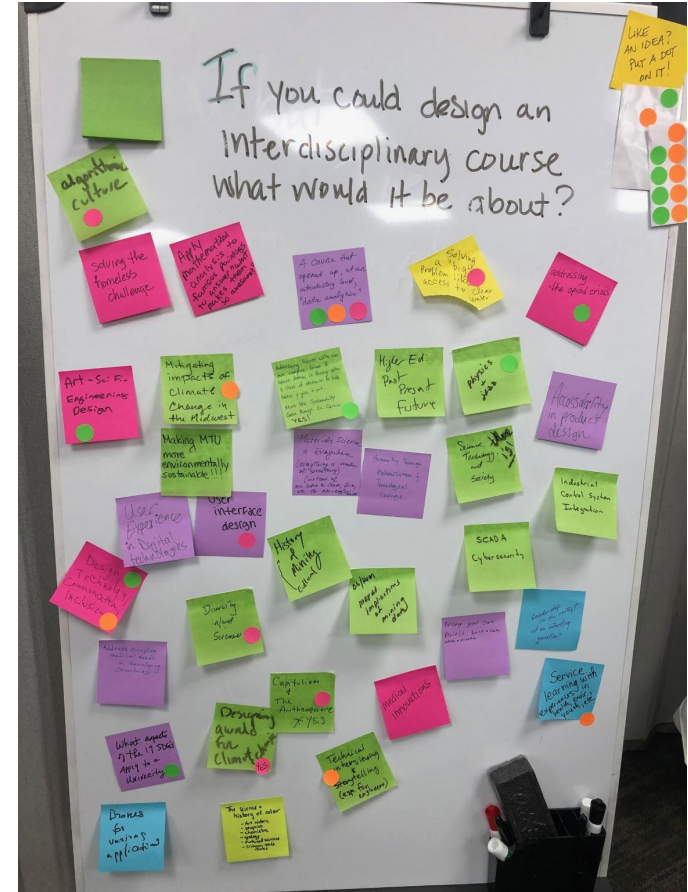




**21st Century Task Force Charge** - to advance Michigan Tech's core educational goals by developing transformative content and approaches that clearly address the needs of the 21st century workforce and incorporate key areas for student development

# Consider this...

If you could change **one** thing to help improve the teaching and/or learning experience at Michigan Tech, what would it be?





# What would it look like if...

we didn't use grades to measure students' learning?

All MTU students had a global or community engagement experience?

we used portfolios to assess learning outcomes?

we had themed pathways through the general education program?

courses were team-taught across disciplines?

health & wellness, career/life design, ethics and culture, information & computing literacy were integrated into the curriculum for all students?

faculty had more opportunities to innovate their courses?

students declared missions instead of majors?

we required students to fail at something?

we had j-terms and may-mesters?

# Reimagining Education for the 21st Century



# thank you!!

**Lorelle Meadows**  
**Marika Seigel**  
**Mary Raber**

## Team Leaders:

- **Brett Hamlin**
- **Heather Simpson**
- **Nancy Barr**
- **Kelly Steelman**
- **Mark Rouleau**
- **Stefka Hristova**
- **Darnishia Slade**
- **Kari Henquinet**
- **Lisa Casper**

Guy Hembroff (CC)  
Barnard (GLRC)  
Amlan Mukherjee (CEE)  
Freeman (CTL)  
Bill Endres (MEEM)  
Leinonen (SBE)  
Bre Tucker (PHC/Enterprise)  
Archer (ECE)  
Vienna Chapin (PHC/Study Abroad)  
Carl Blair (SS)  
Declerck (MEEM)  
Carlos Amador (HU)  
Watkins (CEE)  
Sarah Kuhl (Wahtera Center)  
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Romney (HU)  
Karla Kitalong (HU)  
Fiss (PHC/HU)  
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Bill Endres (MEEM)  
Declerck (CTL)  
Oren Abeles (HU)  
Honholt (Career Svcs)  
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Jon Alex Guth (Provost's Office)  
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Jim Tarun Dam (Chem)  
Alexandra Marshall (Res Life)  
Dave Mary Muncil Jennings (VPA)  
Amy Howard (CDI)  
Richelle Abraham Romney (HU)  
Leo Ureel (Computing)  
Danise Rick Berkey (PHC/Enterprise)  
Jon Sticklen (EF/CLS)  
Val Jeff Wall (COB)  
...and hundreds of interviewees

Casey  
Jessie  
Abraham  
Laura  
Paul  
Jean  
Chris  
Mike



**IDEA hub**  
Innovate | Design | Engage | Act





**“We are called to be architects of the future, not its victims.”**

**- Buckminster Fuller**

# *design thinking* provides a useful set of tools and mindsets to tackle *wicked* problems



## **Empathize**

Develop a deep understanding of the challenge



## **Define**

Articulate the problem to be solved



## **Ideate**

Brainstorm potential solutions  
(Wild ideas encouraged!)



## **Prototype**

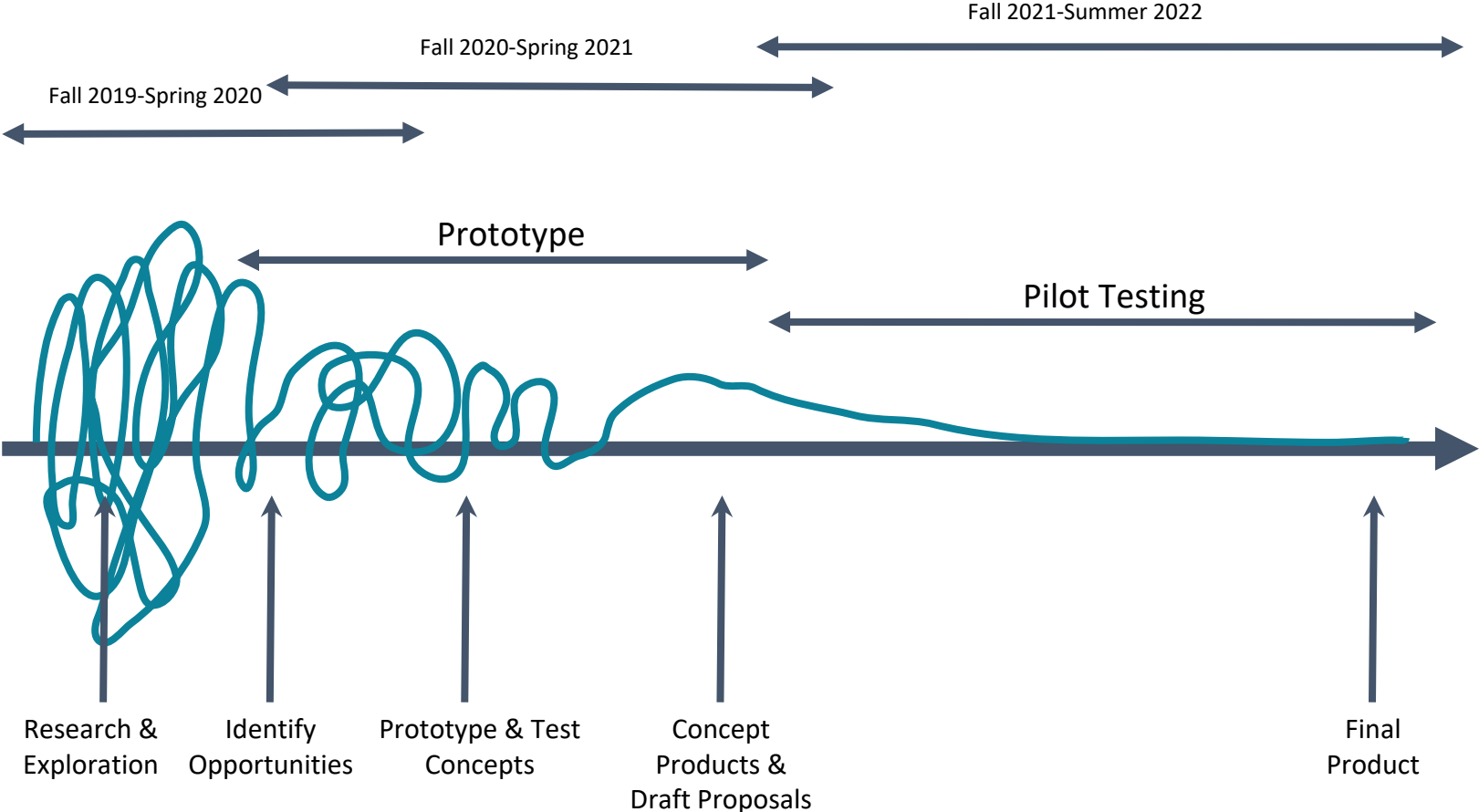
Build a representation of your ideas to present to others



## **Test**

Share your prototyped idea with your users for feedback

# Design Thinking Process

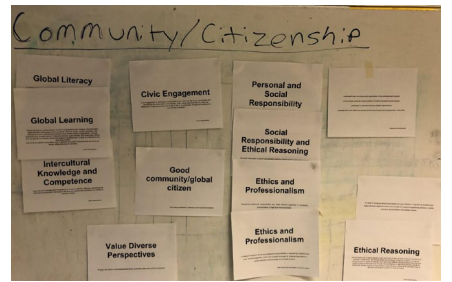




# Key Accomplishments to Date



|                             |  |   |
|-----------------------------|--|---|
| <p>Spring - Summer 2019</p> | <p>21st Century Education Task Force Design Sessions</p> | <ul style="list-style-type: none"> <li>• Friday PM Design Sessions</li> <li>• Identified key areas of focus using design process</li> <li>• Developed proposal &amp; budget for IDEAhub</li> <li>• Formed working groups</li> </ul>                       |
| <p>Fall 2019</p>            | <p>Discovery &amp; Define</p>                            | <ul style="list-style-type: none"> <li>• Hosted IDEAhub Kickoff Meeting</li> <li>• Conducted 100's of interviews</li> <li>• Researched MTU history &amp; benchmark programs</li> <li>• Stakeholder Mapping</li> <li>• Training &amp; Workshops</li> </ul> |
| <p>Spring - Summer 2020</p> | <p>Ideation &amp; Concept Development</p>                | <ul style="list-style-type: none"> <li>• Campus IDEAtion &amp; Learning Goal sessions</li> <li>• Training &amp; Workshops</li> <li>• Call for IDEAs Proposals</li> <li>• COVID-19 Pivot - Faculty Learning Sessions</li> </ul>                            |
| <p>Fall 2021</p>            | <p>Prototype Development</p>                             | <ul style="list-style-type: none"> <li>• Developed frameworks for Essential Ed &amp; First-year Experience</li> <li>• Prototype development of frameworks and concepts</li> </ul>   |
| <p>Spring 2021</p>          | <p>Prototype &amp; Testing</p>                           | <ul style="list-style-type: none"> <li>• Iterative prototype development</li> <li>• Sharing (testing) prototypes with stakeholder groups</li> <li>• Senate Proposal for Pilot Testing new GenEd concepts</li> </ul>                                       |



# Prototype USLGs & Assessment

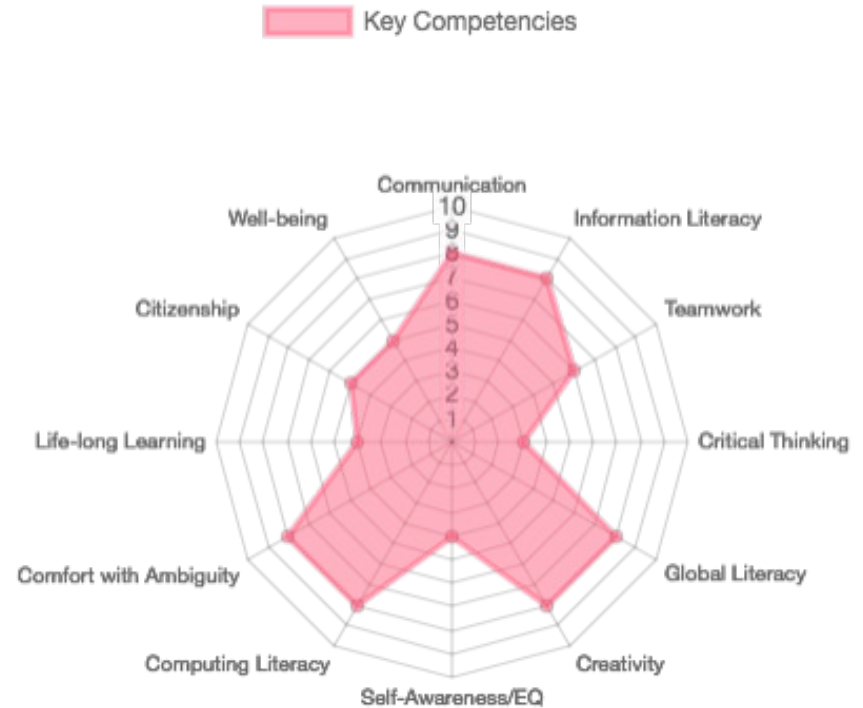
Aspirational learning goals:  
upon graduation, Michigan Tech  
students will be able to...

- creatively and collaboratively recognize and develop innovative solutions to transdisciplinary problems/opportunities
- function both independently and collaboratively in a rapidly changing global and technological society

**An Assessment Process that is...**

- Holistic
- Student -centered, reflection based
- Uses e-portfolios to capture signature works
- fosters badging & mini -credentialing
- Allows for use of co - and extra -curricular experiences to demonstrate competency development

## Competency Based Assessment



# prototype essential education model

## Integrated Signature Experience

Signature project experience (undergrad research, enterprise, global/community engagement, leadership, EML...)

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## Exploration/Breadth Courses (includes co-curriculars)

Experiential + Reflective learning, co-ops, co-curriculars, study away...

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Themed Pathway  
(Health & Wellness, H-STEM)

Themed Pathway  
(Sustainability)

Themed Pathway  
(Digital World)

Themed Pathway  
(TBD)

Themed  
Pathway

Themed  
Pathway

Themed-based pathways through general education (Humanities, Social Sciences, VPA, Core STEM)

Aligned with TF Initiatives

Certificate & Badging options

Competency development focused

Portfolio-based Assessment

HIP Learning opportunities

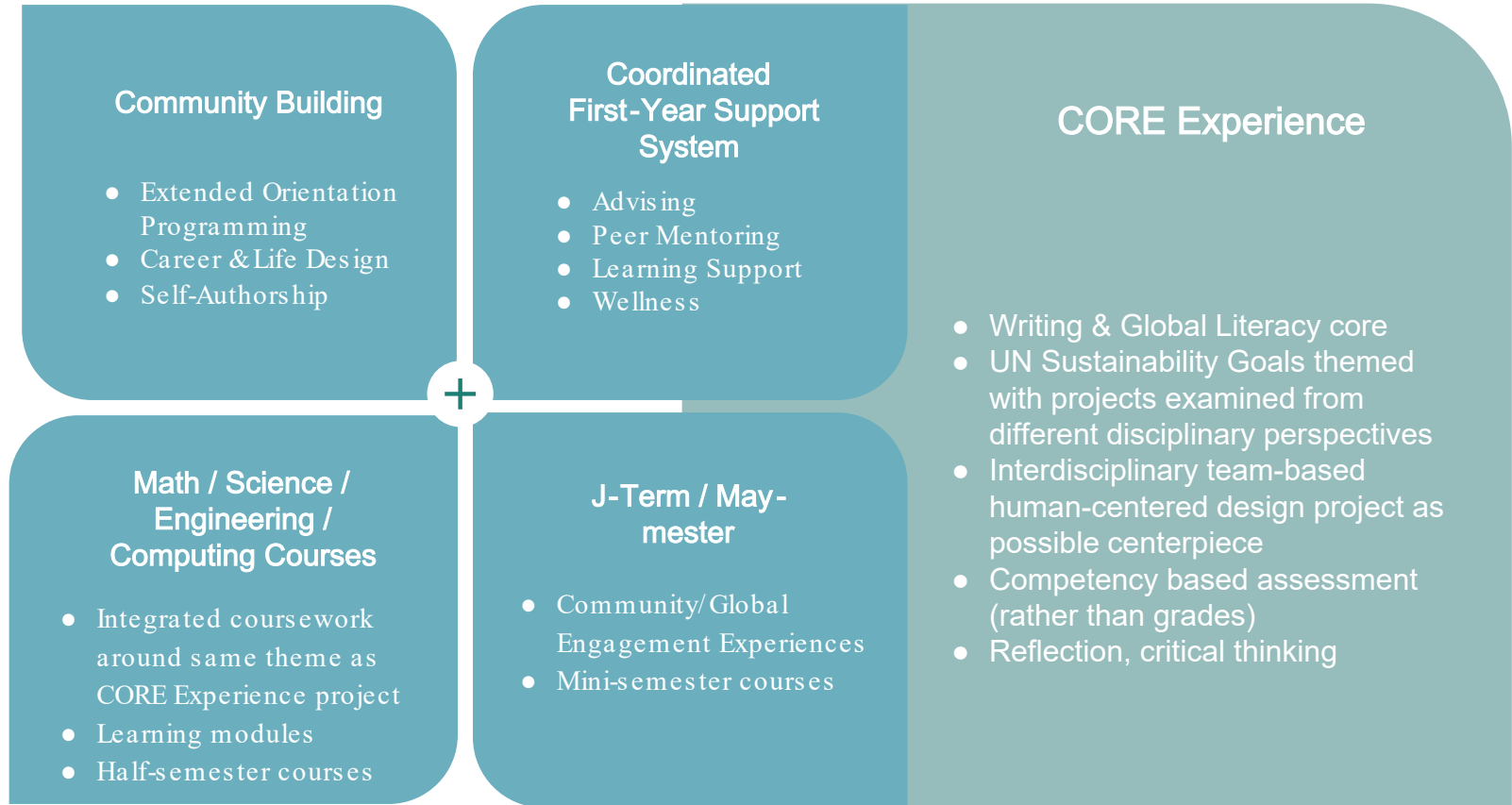
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## First-Year Core Experience

Interdisciplinary team-based design project, exploring majors, EML, health & wellness, ethics, DEI, cultural awareness, composition



# prototype first-year experience model



# Call for IDEAs Prototype S



**IDEA hub**  
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**Michigan  
Technological  
University**  
1885

# IDEAHub Prototypes 2020 | 2021

|   |   |   |   |  |  |  |  |  |
|---|---|---|---|--|--|--|--|--|
|  <p><b>College of Computing Community Building</b><br/>Themed gatherings, introducing students to support services, building community, coordinated approach to advising</p> <p><b>Project leads</b><br/>Kay Oliver<br/>Denise Landsberg</p> |  <p><b>Study Away Student Ambassador Program</b><br/>Grow global (off-campus) Programs, promote integrative learning, project-based learning</p> <p><b>Project lead</b><br/>Carl Blair</p>                             |  <p><b>Information Literacy Modules</b><br/>develop a series of "plug-and-play" Canvas modules instructing students in a variety of information literacy concepts: Stackable credentials, flexible integration of core concepts</p> <p><b>Project leads</b><br/>Nancy Barr<br/>Jenn Sams</p> |  <p><b>Essential Ed Pathways &amp; Integrative Experience</b><br/>Develop pathway of "Sustainable Communities"; project-based, integrative, interdisciplinary approach to general education</p> <p><b>Project lead</b><br/>Stefka Hristova</p> |  <p><b>Living laboratory for sustainability and resilience</b><br/>Provide students with information about how to live more efficiently, sustainably, and comfortably in residence halls. Sustainability pathway, self authorship</p> <p><b>Project lead</b><br/>Chelsea Schelley</p> |  <p><b>Flip Calculus into Scientific Modeling</b><br/>Re-imagine the calculus courses for the internet age: change the student experience of calculus into a flipped classroom where scientific modeling is primary</p> <p><b>Project lead</b><br/>David Olson</p>  |  <p><b>Reflection Protocol for Gen Ed Courses</b><br/>Modular reflection protocol for use in essential ed courses. Holistic assessment; testing new learning goals; integrating curricular, co-curricular, and extra-curricular experiences</p> <p><b>Project leads</b><br/>Maria Bergstrom,<br/>Laura Fiss</p> |  <p><b>GivePulse Platform for Community Engagement Connections</b><br/>Centralized list of community partner opportunities; facilitating engagement with community partners</p> <p><b>Project leads</b><br/>Kari Henquinet<br/>Dar Slade<br/>Jessie Stapleton</p> |  <p><b>Local Literacy Teaching &amp; Learning at Michigan Tech</b><br/>Module focused on local literacy that is inclusive of the significance of place and people here at Michigan Tech.</p> <p><b>Project leads</b><br/>Val Gagnon<br/>Erika Vye</p>               |
|  <p><b>Programming Skills in Engineering Fundamentals</b><br/>Flexible, modularized approach to delivering core science/math concepts, algorithmic thinking</p> <p><b>Project leads</b><br/>Briana Bettin<br/>Michelle Jarvie-Eggart</p>     |  <p><b>Nature Psychology Course with Health and Wellness Outcomes</b><br/>Interdisciplinary education, team teaching, project-based learning, sustainability pathway</p> <p><b>Project lead</b><br/>Samantha Smith</p> |  <p><b>Humanistic Practical Engineering</b><br/>Teaching connections between humanities &amp; engineering through challenge that is based on real world issues and concerns</p> <p><b>Project lead</b><br/>Chris Middlebrook</p>   |  <p><b>Interdisciplinary Environmental Issues Course</b><br/>Team teaching around a theme, interdisciplinary education, holistic assessment</p> <p><b>Project lead</b><br/>Scott Marratto</p>  |  <p><b>Critical Ethics for Enterprise</b><br/>Accessible but ethically sophisticated units to teach critical philosophical ethics to students in Enterprise:</p> <p><b>Project lead</b><br/>Alexandra Morrison</p>  |  <p><b>Cohorted &amp; Coordinated First-Year Courses</b><br/>Coordinating themes, assignments, projects in Global Issues, Comp, Engineering Fundamentals, and other 1st-year courses, sustainability pathway</p> <p><b>Project leads</b><br/>AJ Hamlin<br/>Brett Hamlin<br/>Abraham Romney<br/>Mark Rouleau</p> |  <p><b>"Pop-Up" Advising and Learning Center Coaching</b><br/>Coordinated advising/coaching that meets students where they are</p> <p><b>Project leads</b><br/>Brett Hamlin<br/>Heather Simpson</p>   |  <p><b>Interdisciplinary Human Factors Task Force</b><br/>Developing templates for interdisciplinary programs such as certificates and minors</p> <p><b>Project leads</b><br/>Kelly Steelman<br/>Jason Wall</p>   |  <p><b>Humanities in the Disciplines (HID)</b><br/>National Endowment for the Humanities implementation grant proposal: connect humanistic and engineering education through experiential learning</p> <p><b>Project leads</b><br/>Mary Raber<br/>Marika Seigel</p> |
| FIRST-YEAR EXPERIENCE (FYE)   |   | ESSENTIAL EDUCATION (EE)  |   | INTERDISCIPLINARY EDUCATION (IE)   |  | GLOBAL AND COMMUNITY ENGAGEMENT (GCE)  |  |  |





### PAW Prototype Team

- Maria Bergstrom
- Katrina Black
- Dayna Browning
- Laura Fiss
- Jenn Sams

Photo by [Fox Grom](#)

## Husky PAWs: Reflective Practices

Welcome to our Canvas resource course on reflective practices. These resources and sample assignments for reflection are made available to help promote integrated learning in your classes. You can import assignments into your own Canvas courses directly from this course and adapt them for your own use. We hope you will also choose to add your own versions of the assignments back into this resource course to share with others.







# Welcome to Local Literacy Experiences

*"Experiencing Landscapes"*

<https://sites.google.com/view/localliteracyexperiences>

For those who have access to Canvas Commons, these modules [are also available for download](#) and import into your existing courses, simply search "Local Literacy."

Project team: Erika Vye, Valoree Gagnon (team leads); Sarah Green, Kathy Halvorsen, Chelsea Schelly

# Husky Living Lab for Sustainability

Sustainable Campus Systems Videos

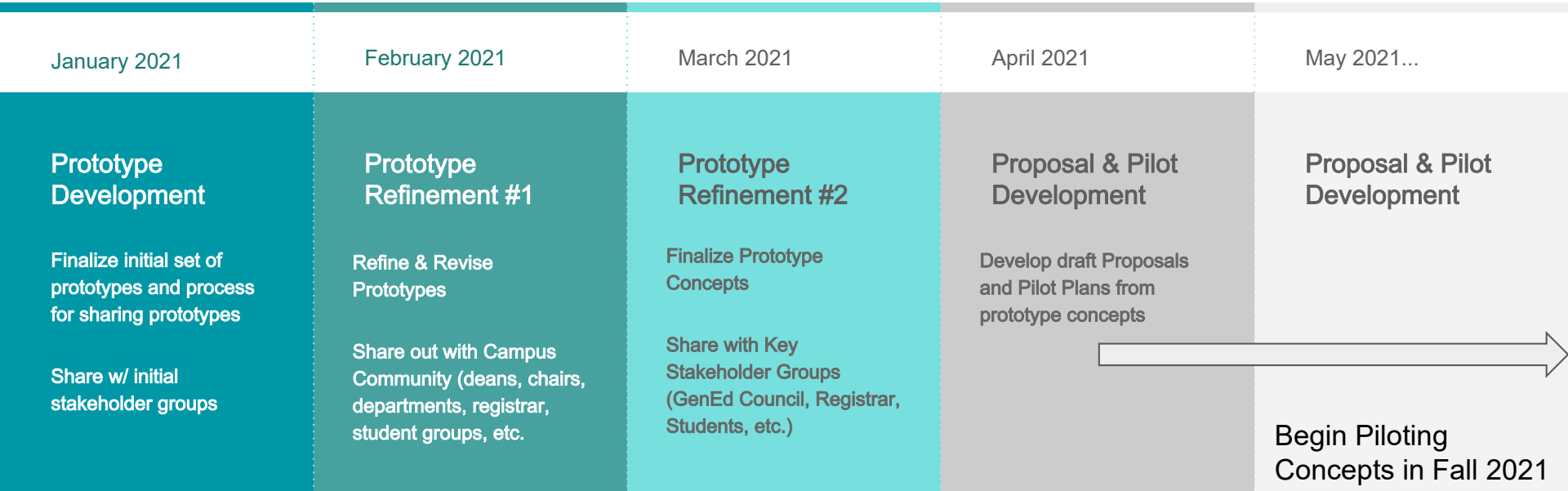
Team Lead: Chelsea Shelly

**Do You know  
where our heat  
comes from?**

**Do You know  
where our water  
comes from?**



# Essential Ed & First-Year Experience Prototype & Pilot Planning





# What does success look like?

By the end of Summer 2021, we plan to have...

- ❖ Essential and First-year Experience frameworks and components designed and ready for piloting in Fall 2021
- ❖ draft senate proposals developed and circulated for review & feedback

Ultimately, we expect to improve the student experience through...

- ❖ Funding support (gift & grant) to allow IDEAhub to continue to provide space for conversations and innovations across campus
- ❖ A more flexible, connected and agile general education program
- ❖ A simplified set of University learning goals and assessment program built around competency development
- ❖ A more holistic first-year experience that emphasizes the major as a way to achieve the students' mission, health & well-being, and community
- ❖ Positive impact to recruiting & retention, and life/career success post-graduation

# Questions?

# Want to get involved?

For more info on the 21st Century  
Education Tech Forward Initiative,  
contact:

Mary Raber, [mraber@mtu.edu](mailto:mraber@mtu.edu)  
Marika Seigel, [maseigel@mtu.edu](mailto:maseigel@mtu.edu)



[www.mtu.edu/ideahub](http://www.mtu.edu/ideahub)