



I-WIN

Illinois Work-Based Learning
Innovation Network

Student Insights: Math Badging Micro-Internship

May 20, 2024



EdSystems

EDUCATION SYSTEMS CENTER *at*
NORTHERN ILLINOIS UNIVERSITY



Today's Discussion

12:05 **Introductions**

12:10 **IMBI Overview**

12:15 **Micro-internship Overview**

12:25 **Student Insights**

12:50 **Reflections**

Our Mission

Shape and strengthen education and workforce systems to advance racial equity and prepare more learners for productive careers and lives in a global economy.

Focus Areas



Bridges to Postsecondary



College & Career Pathways



Data Impact & Leadership

Geographic Focus



Statewide



Community Networks



Explore the [I-WIN Resource Hub](#)
and [subscribe to the newsletter](#)



Highlight and explore
innovative models for
work-based learning



Engage in conversations
on creating sustainable,
high-quality models
that provide broader
and more equitable
access, focusing on
building social capital
for historically
marginalized students



Build connections
among communities to
share best practices,
learnings and resources



Identify needs for state
policy changes or
support systems



Illinois Math Badging Initiative (IMBI) Overview



What Are Math Badges?

An Alternative Credentialing Mechanism

- Aligned to:
 - Illinois Learning Standards (incorporating CCSS)
 - Transitional math competencies
- Stackable
- Translate into credit for:
 - Transitional math
 - High school math courses
 - Early college credit





How Do Math Badges Work?

Students can certify learning from a broad range of sources:

- Coursework
- Independent study
- Summer school
- Work-based learning, etc.





Why Math Badges?

Improve math outcomes and advance racial equity through:

- Stronger **alignment** to math needed for secondary, postsecondary, and career success
- Students **demonstrate knowledge** not captured by grades
- Opportunities to **develop and reinforce** math knowledge and skills
- **Validate learning** outside of the classroom through work-based and other applied learning.
- **Customization** engages students with math directly related to college and career interests





It's Not Just About Badges!

Badges are a **tool** to:

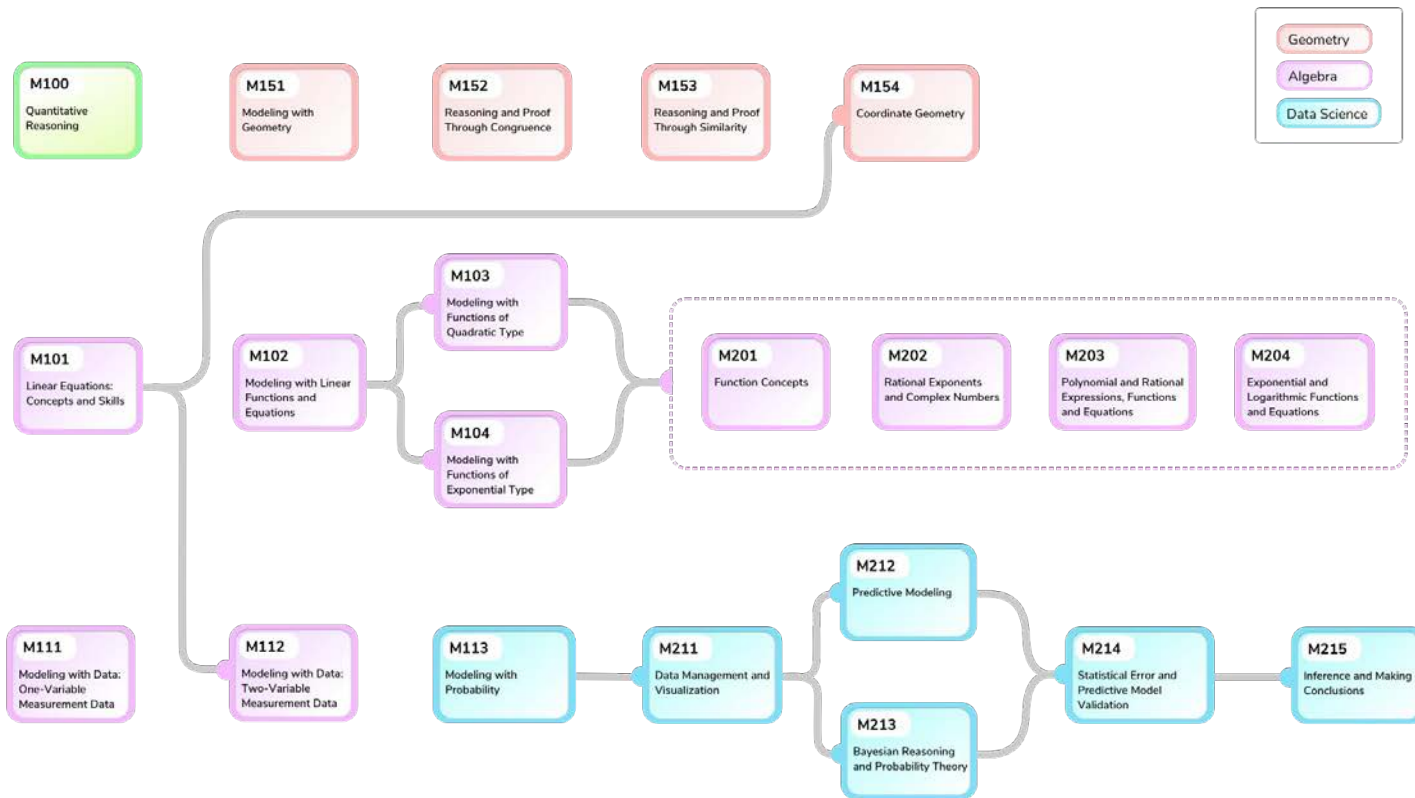
- Solve a problem
- Rework a system
- Change a structure
- Transform teaching
- Focus on learning



In partnership with XQ Institute



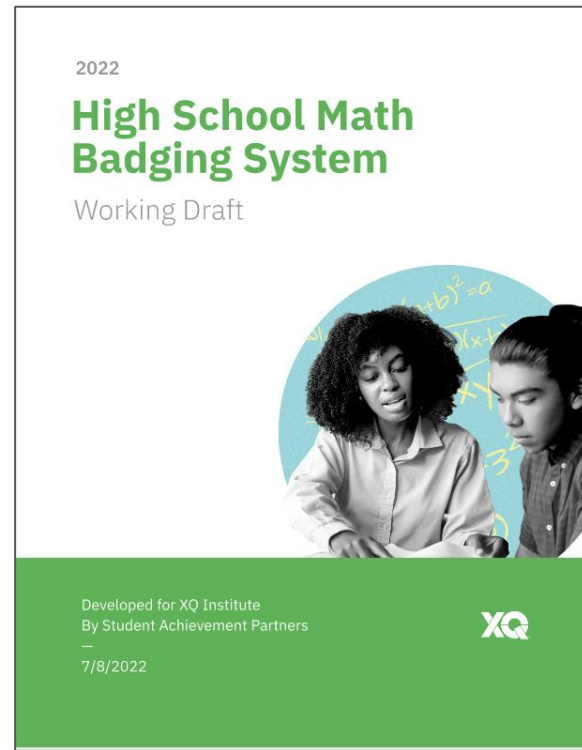
Alignment to Illinois Transitional & Dual Credit Coursework



What's in a Badge?

Each math badge includes:

- Mathematical content and practice expectations
- Learning principles
- Examples of rich problems
- Evidence of learning (assessments)



>> [High School Math Badging System: Working Draft](#)

(Three Types of) Evidence of Learning

Portfolio of Evidence

A set of artifacts students collect throughout their work on a badge

Concept and Skills Assessment

A short, online traditional assessment

Performance Assessment (Modeling Badges Only)

An opportunity for students to demonstrate their learning by doing





For More Information

If you are interested in learning more about math badging,
please contact:

Dania Ibrahim
dibrahim@niu.edu



Micro-Internship Overview



Internship Goals

- Identify real-world situations that involve mathematical concepts
 - Apply appropriate investigative methods to better understand these scenarios.
- Gather information on how math is applied in school activities outside of a traditional math classroom, as well as in various fields/ industries.
- Determine opportunities for learning aligned to badges out of traditional courses
- Develop recommendations for schools to capture math learning outside of the classroom.



Intern Goals

- **Develop research skills** to explore and gather information on how math is applied in school activities outside of a traditional math classroom.
- **Develop strong reflection** skills by critically analyzing researched concepts, and synthesizing insights into a coherent narrative.
- **Enhance ability to communicate mathematical concepts** effectively by presenting insights and reflections in a clear, organized manner and engaging with peers.

Internship Structure

Who: 11 high school students from Charleston High School, Illinois Math and Science Academy, and Ridgewood High School.

What: 6 week, 30 hour, paid, virtual micro-internship.

Weekly activities:

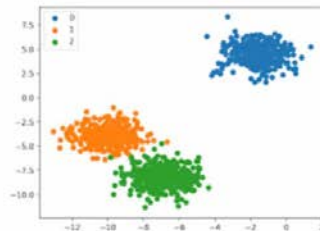
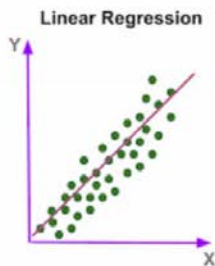
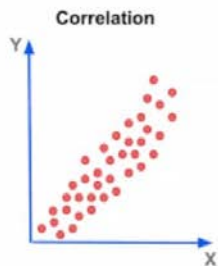
- Pick a [topic](#) to explore each week.
- Gather information from your various source to reflect on how math concepts and skills are utilized in your topic of interest in a digital [journal](#).
- Synthesize insights on 1 slide and give a 5 minute presentation at weekly meetings.

Example topic

Math in School Activities

Reflect on the math involved in school activities outside of math class. This could include sports statistics, budgeting for school events, or analyzing data for a science project. How does math play a role in these activities?

Weekly Presentations



Scalar

(11)

Vector

[1, 2, 3]

Matrix

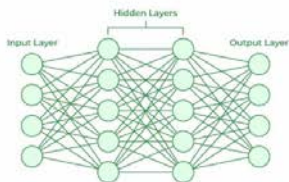
$\begin{bmatrix} 1, & 2, & 3 \\ 4, & 5, & 6 \\ 7, & 8, & 9 \end{bmatrix}$

Tensor

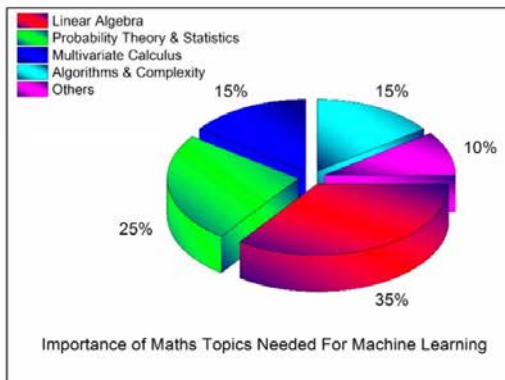
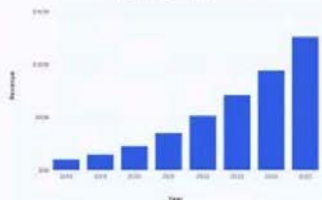


Shape 2

Shape n



Global artificial intelligence software market revenue



Guest Speakers

The screenshot displays the AFT Fathom software interface. The main workspace shows a detailed hydraulic system model with multiple pumps (P1 through P10) and connecting pipes. Each pump is labeled with its type (e.g., Diff Small Pump), flow rate (Q), head (H), and other parameters. The interface includes a toolbar on the left, a menu bar at the top, and a status bar at the bottom. The status bar indicates the current scenario is 'Diff Small Pump: diff small pump no control valve'.



Internship Structure

Final project:

- Synthesize the insights you've gathered about math outside of the traditional classroom.
 - Use examples from your journaling activities to illustrate your points.
 - Choose a [math badge](#) or badges that most relate to your final project topics.
- Reflect on internship objectives and your experience with the internship.

Example [final paper](#)

Example badges

Quantitative Reasoning

Linear Equations:
Concepts and Skills

Modeling with Linear
Functions and Equations

Function Concepts

Coordinate Geometry

Inference and Making
Conclusions

Internship Challenges

Time of year: Spring is already a busy time for students.

Weekly timing: Students across schools had conflicting schedules.

Content:

- *Assignment Flexibility:* While many students appreciated the open-ended nature of the tasks and enjoyed learning new content from one another, they sometimes found it challenging to strike the right balance of explanation and to understand each other's content.
- *Explanation of Math Badges:* We decided to delay tying students' work to math badging. However, earlier explanations of badging and the greater context of student work would have benefited the interns.

Student Feedback

"I enjoyed doing weekly journals about different math topics and found it interesting how the further into the internship I got I started realizing how all my topics correlated together whenever it seems like the topics have nothing in common."

"I feel my mindset has shifted from only being able to see math used in the classroom to start being able to see connections with math in the real world. I feel stronger about being able to identify scenarios that use math and solve those scenarios."

"It's easy to say, 'I use math every day!' but during this internship, we went more in depth on how our hobbies, our work, and other daily things really use math. I can apply all these things I've learned and researched when I take a photo, when I cook, or when I plan to travel again!"

"After the internship, my primary improvement would likely be my expository skills to an audience not already familiar with many of the math terminology or concepts I am familiar with."