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UND NORTH DAKOTA.
COLLEGE OF EDUCATION & HUMAN DEVELOPMENT

Connecting Career Pathways and Student Interests in STEM Education

Slides and Resources:

https://tinyurl.com/UND-partners

Tony Perry

06/17/2025

Pages & Pathways Conference

By the end of this session…

- Explain the value of **mutually beneficial** school-industry partnerships in STEM Education

- Evaluate evidence of **strategies to create and sustain local partnerships** with industry

- **Develop an action plan** to create or strengthen partnerships for your stduents

About me

Assistant Professor, STEM Education, University of North Dakota

15+ years of experience developing and supporting innovative technology education learning experience

Research: STEM and CTE, improving systems and student pathways into emerging technology

Join the Vevox session

Go to **vevox.app**

Enter the session ID:
474-749-863

Or scan the QR code

I primarily work with...

High School Students

	0%

Middle School Students

	0%

Elementary School Students

	0%

Educators (e.g., instructional coach)

	0%

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##.##%

Middle School Students

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Which of the following have you previously participated in? (select all that apply)

Host Industry guest speakers (e.g., career day)

0%

Co-plan a project, unit, or lesson with industry

0%

Co-teach an project, unit, or lesson with industry

0%

Use instructional materials provided by industry in the classroom

0%

Take students to a real job site in your community

0%

Worked with industry professionals in an extracurricular activity

0%

Other partnership with an industry partner

0%

I have not worked with an industry partner to support teaching and learning

0%

Join at: **vevox.app**   ID: **474-749-863**

What makes a learning experience engaging for students?

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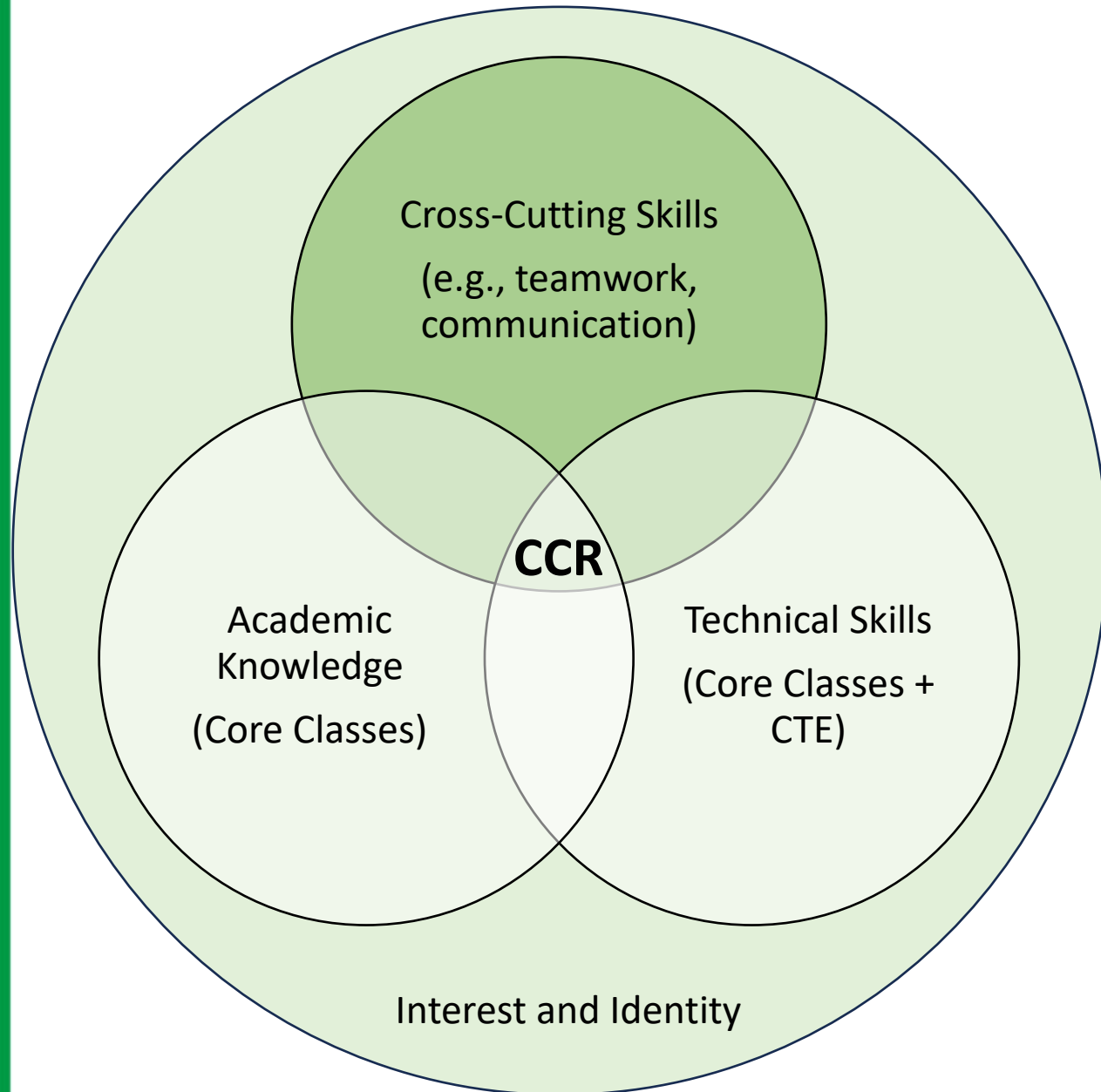Worked with industry professionals in an extracurricular activity (e.g., scouting, robotics, etc...)

##.##%

Other partnership with an industry partner

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I have not worked with an industry partner to support teaching and learning in my school

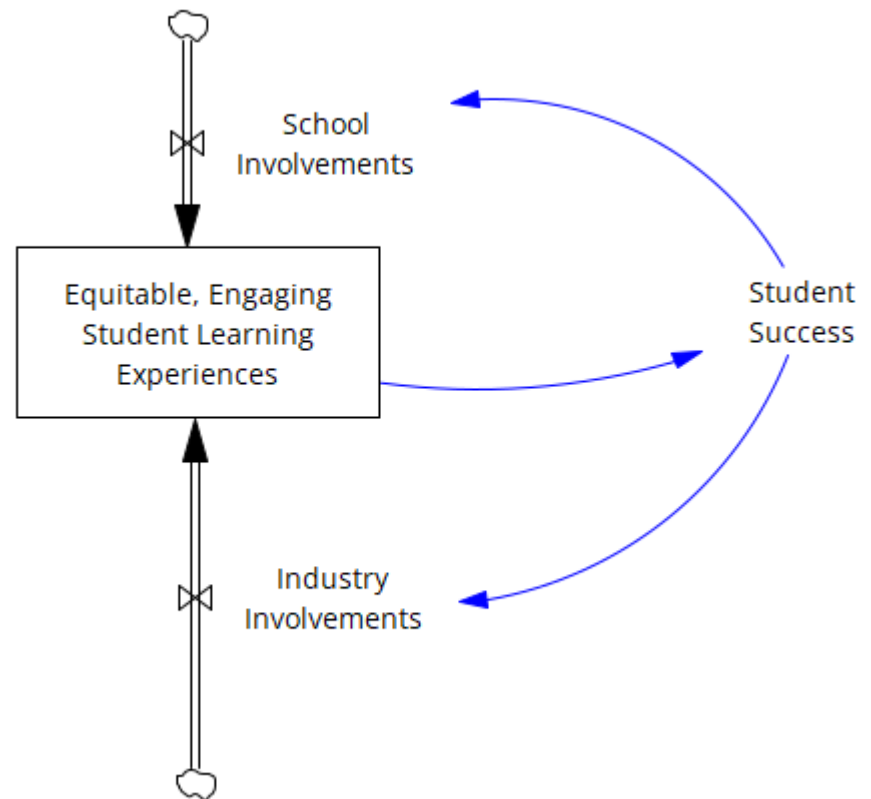##.##%

What Industry Partnerships can do for your students?

Cross-Cutting Skills (e.g., teamwork, communication)

CCR

Academic Knowledge (Core Classes)

Technical Skills (Core Classes + CTE)

Interest and Identity

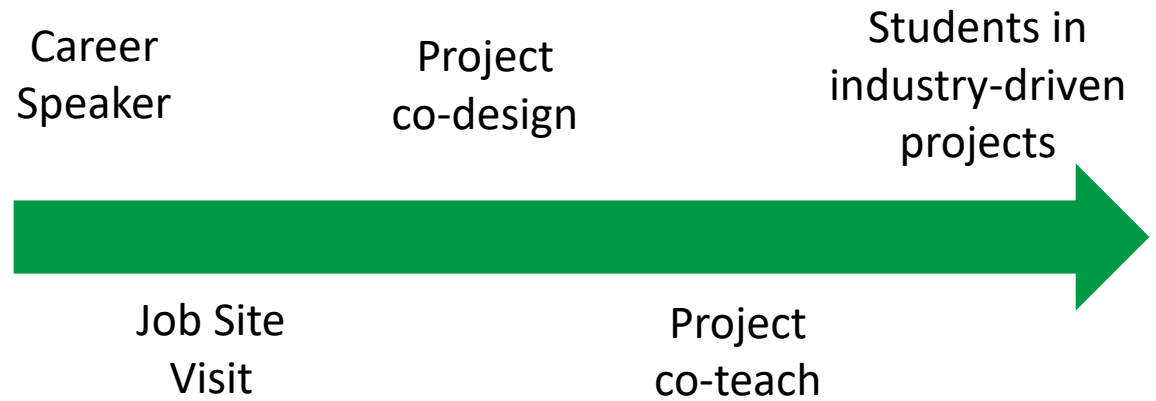# Complementary Assets: Schools and Industry

Classroom Teachers

- Instructional Design and Delivery

- Positive Youth Development

- Student Relationships

- Content knowledge expert

Industry Professionals

- Caring, adult role models in the community

- Authentic learning environment, content knowledge, and skills

School Involvements

Equitable, Engaging Student Learning Experiences

Student Success

Industry Involvements

Mutually Beneficial Partnerships on the WBL Continuum

Career Speaker

Project co-design

Students in industry-driven projects

Job Site Visit

Project co-teach

Where do we start building partnerships?

Example: NIHF STEM School, Akron, OH

(25+ years)

Career Exploration	Skills Development	Capstone Project

Career Exploration

Partner-driven PrBL

Common design framework across curriculum, start in MS

"Flex Friday"

PL for educators w/industry partner

Skills Development

Three career academies

Student project showcase nights

Engineer on "loan"

Capstone Project

Student-driven PrBL w/industry mentors

Example: Zoo Enrichment PrBL (Grade 5)

Who

- Veterinarian staff at the zoo
- Goodyear Engineers taught the design process
- Senior volunteers helped with the build

Where

- Zoo staff visit the school
- Students visit Zoo 2x
- Engineers and volunteers visit the school

https://www.akronzoo.org/blog/if-you-build-it-they-will-come

List all of the reasons you could not do something like this in your school or community (submit multiple responses)

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Barriers to partnership

- Most partnerships are **one-sided** (Strobel & Sun, 2020)

- Barriers to partnership (Rios et al., 2014)
    - Structural
    - Cultural
    - Procedural
    - Motivational

- Educators are trained as instructional leaders, not cross-sector organizers (Epstein, 2018)

Existence Proofs

	Mid-America STEM	Northeast Rural	Innovative STEM
Student Experience	PrBL	2 days/week offsite WBL	"Flipped" Internship
Locale	Urban	Rural	Suburban
Region	Midwest	Northeast	New England
Type	Career Academy	"alternative" school	School-within-a-school
Size	~300	~60	~120
Population	2/3 male, otherwise matches district	~1/2 from Tribal Lands	More URM than student population

Common Design Elements

- **Explicit trust-building**

- Signals of institutional credibility

- (Striving for) robust systems

- Aligning instructional subsystems with industry practices

Explicit trust-building

"[students] light up when another person totally outside of the education system, **or at least outside of the education system they know**, has an adult conversation with them."

"I think [STEM professionals] get inspired by my students. They always come away being excited with how mature and professional and creative the kids are. **they're not like what they expected**"
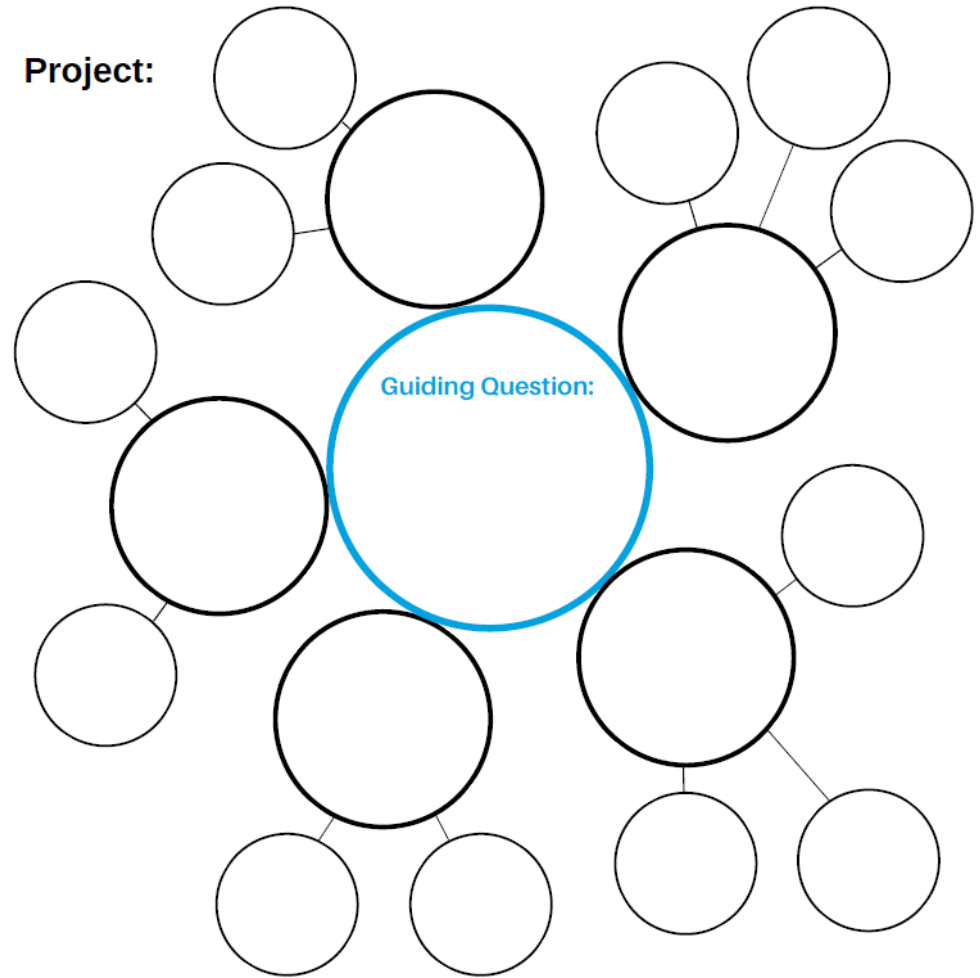
-Mid-America STEM Classroom Teacher

Asset Mapping

Identify an existing program or project where you want to grow existing partners

Big Circles: Themes

Small Circles: specific companies/people

Project:

Guiding Question:

https://workforce.education.asu.edu/wp-content/uploads/2024/07/Community-educator-asset-map-v1.pdf

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Asset Mapping

Identify an existing program or project where you want to grow existing partners

Big Circles: Themes

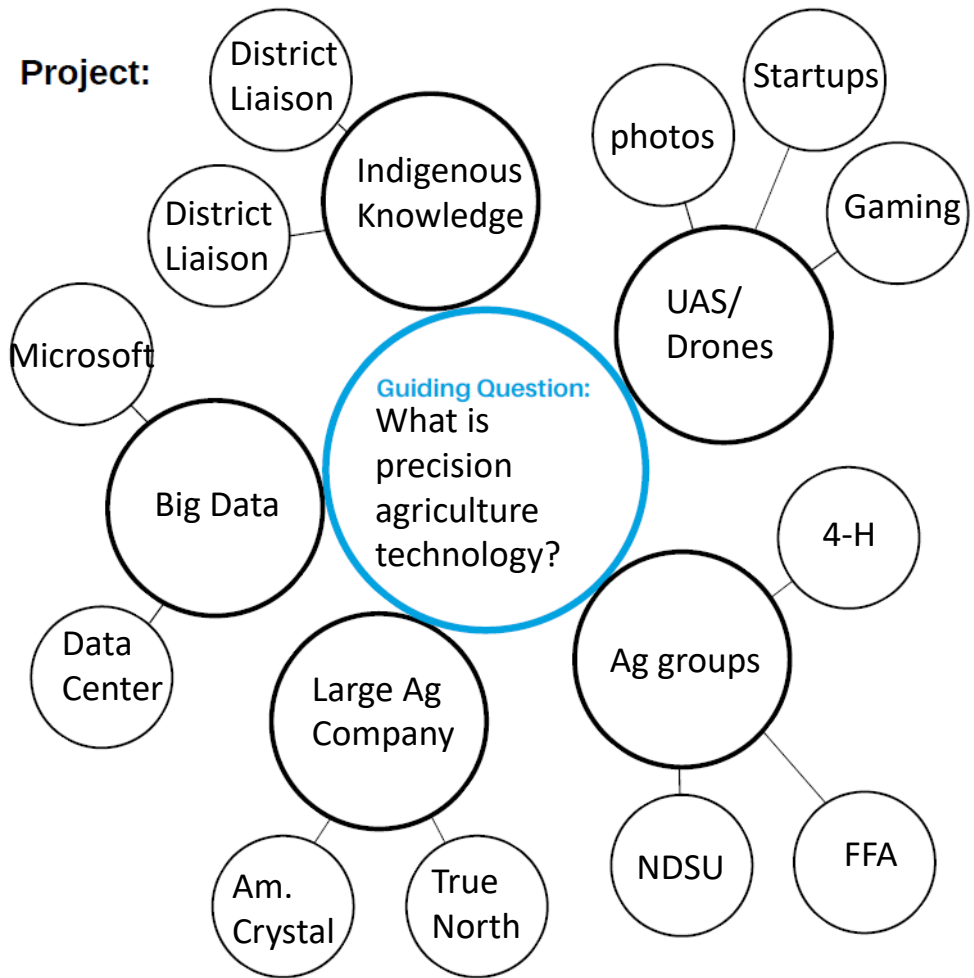Small Circles: specific companies/people

Project:

Guiding Question: What is precision agriculture technology?

- District Liaison
- Indigenous Knowledge
- District Liaison
- Microsoft
- Big Data
- Data Center
- photos
- Startups
- Gaming
- UAS/Drones
- Large Ag Company
- Am. Crystal
- True North
- Ag groups
- 4-H
- NDSU
- FFA

https://workforce.education.asu.edu/wp-content/uploads/2024/07/Community-educator-asset-map-v1.pdf

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Next Steps to Growth

Guiding Questions

1) How can I put students and potential partners in the same space?

2) Describe the student experience

3) Industry partner assets?

4) Teacher assets?

5) What is our plan to reconnect?

Discussion

"…I believe in that effort, that interface, the one-on-one contact, that's the difference-maker relationship."

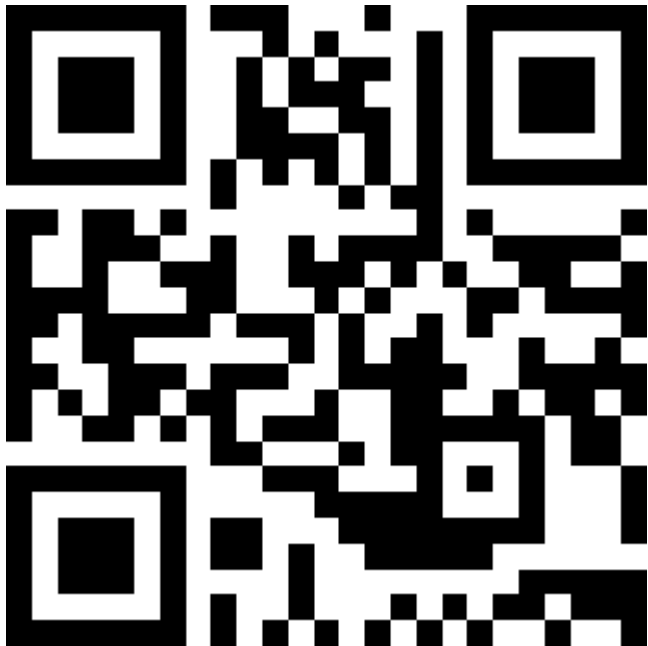*Manufacturing Plant Manager w/Mid-America STEM*

Explicit trust-building

student-school-industry connections

Acknowledgements

Dick Larson, MIT IDSS

"Never let reality stand in the way of what is possible."

https://tinyurl.com/UND-partners

anthony.m.perry@UND.edu

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(Striving for) Robust Systems
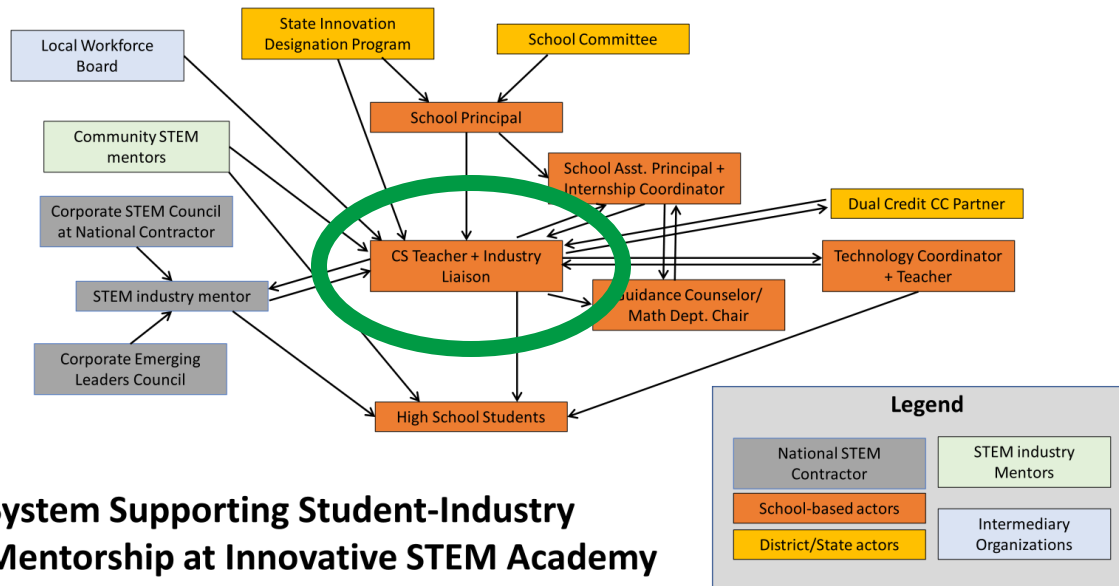
System Supporting Student-Industry
Mentorship at Innovative STEM Academy
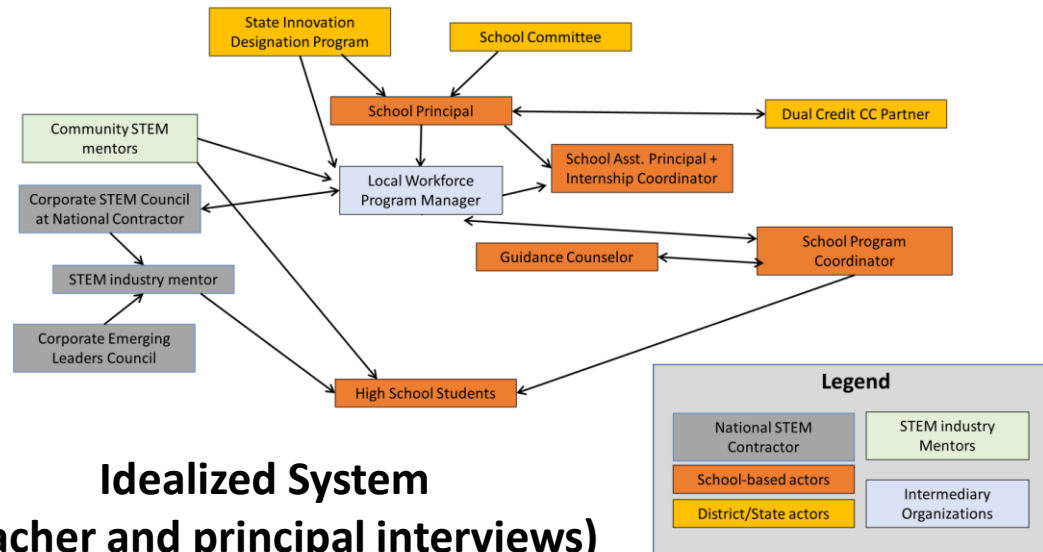
Idealized System
(teacher and principal interviews)

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Aligning Instructional Subsystems with Industry

Mid-America	Northeast	Innovative STEM
Flexible Friday for collaboration	Fund student transportation	"Flipped Model" with lunch-time synchronous
Engineer on loan for one school year	Backward map WBL -> learning outcomes	Curriculum co-development w/industry partner
Hosting teacher PD at industry site	Create student opportunities on-site to fill in gaps	

Signals of Institutional Credibility

"…I call it our **torches and pitchforks phase** when like people are coming out and questioning our integrity and I'll start sorts of things. And I needed people that had been through it to say, No, this is this is the process stick."

- Northeast Academy School Leader
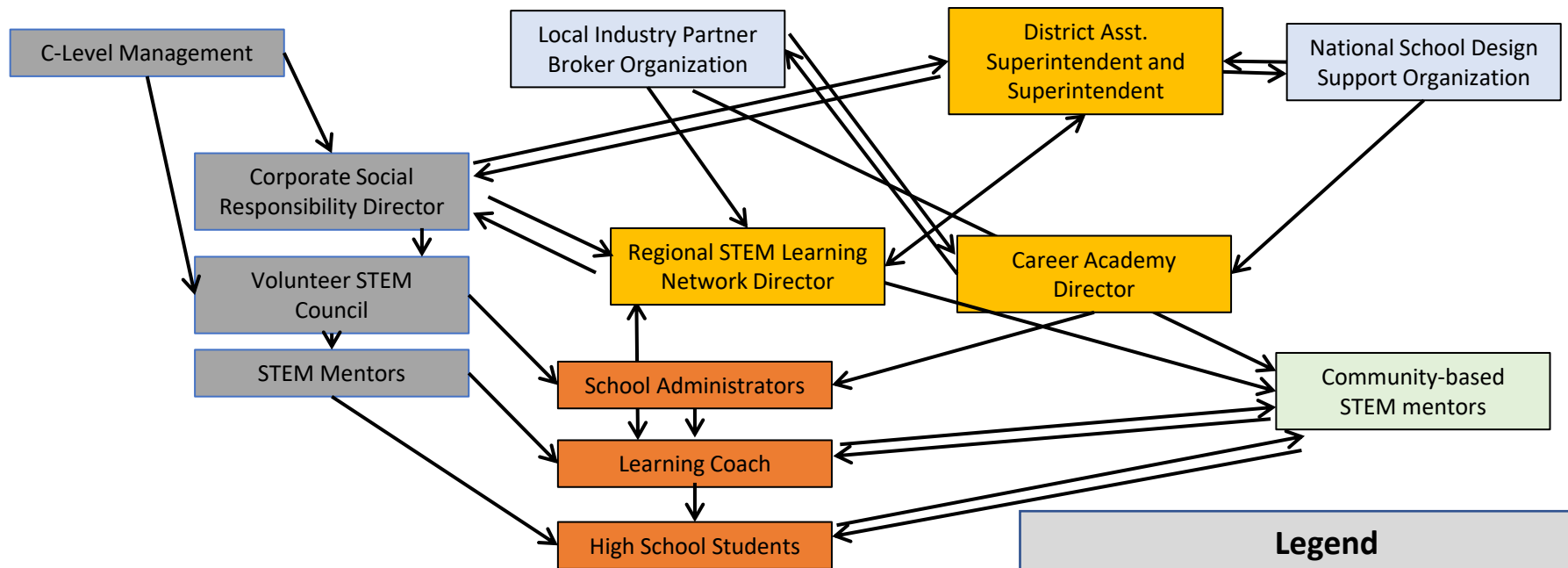
System Supporting STEM Industry Partnerships with Mid-America STEM HS

Legend
- Major, named STEM industry partner
- School-based actors
- District-level actors
- Lesser STEM industry partners
- Intermediary Organizations

System Supporting Student-Industry Partnership at Northeast Rural High School