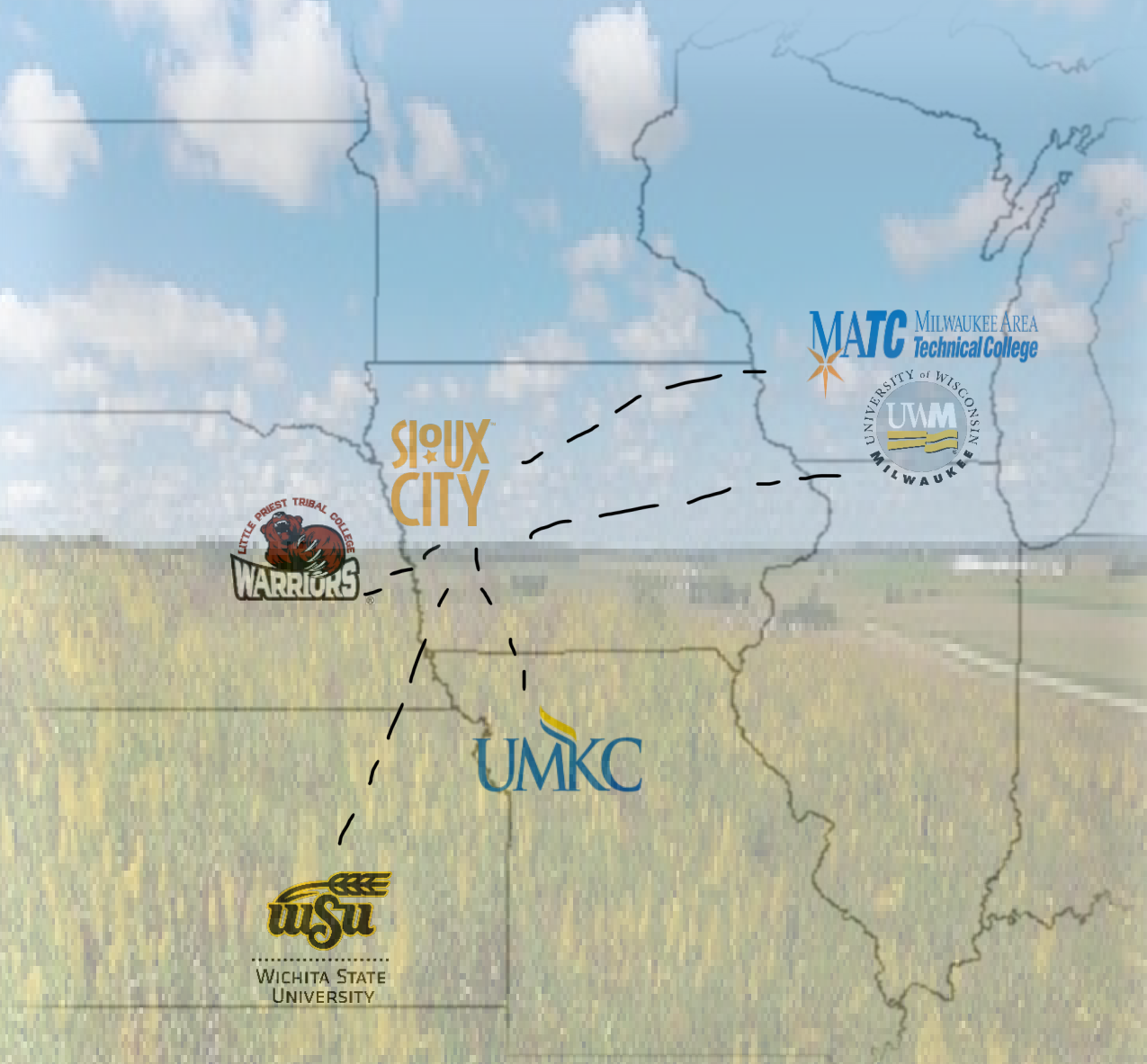


Cultivating STEM in the Midwest Mosaic
TAPDINTO-STEM Midwest Hub Convening



21-22 April 2024
Sioux City, IA
Winnebago, NE



Convening Proceedings: Cultivating STEM in the Midwest Mosaic



The NSF Eddie Bernice Johnson INCLUDES Initiative: TAPDINTO-STEM Alliance Midwest Hub Convening, Cultivating STEM in the Midwest Mosaic, was the Midwest Hub's first in-person convening held from 21 April-22 April at the Warrior Hotel in Sioux City, Iowa. The convening brought together 21 alliance members, including students, campus leaders, faculty mentors, and supporting personnel that represented all five of the institutions in the MW Hub and a diverse range of majors, roles, and disciplines.

Organized with support from the National Science Foundation, Cultivating STEM in the Midwest Mosaic focused on collective impact and collaboration that empowered students with disabilities to share their common experiences, heighten cultural and academic awareness, develop connections with fellow peers and faculty, and foster self-advocacy skills to navigate through challenges effectively. Sessions featured a range of topics including STEM storytelling; the history and cultural significance of Little Priest Tribal College (LPTC), the HoChunk tribe, and Indigenous and holistic nutrition; and student-led lightning talks on their research.

Convening Topics

Related to the goals of the TAPDINTO-STEM Alliance, convening topics included:

- Celebrate and recognize student achievements
- Empower and strengthen student and faculty engagement
- Identify what makes our Hub campuses unique
- Learn about how STEM impacts Midwestern community development

Individual Goals and Learning Outcomes

As a result of engaging in the Midwest Convening, participants can:

- Identify their purpose in the MW Hub collective.
- Effectively network in social and professional contexts
- Develop agency of their unique STEM journey
- Build understanding of other campus cultures, traditions, and identities.

Team Goals and Learning Outcomes

As a result of engaging in the Midwest Convening, participants can:

- Build collaboration using student voices in future campus programming.
- Enthusiastically participate in TAPDINTO-STEM Alliance data collection
- Identify how each campus fits into the broader Midwest community and STEM.

Sunday, April 21st, Warrior Hotel in Sioux City, IA.

During Sunday evening, students and faculty participated in a STEM Storytelling Workshop led by storyteller Asia Starr from *The Story Beast* magazine. As a result of the workshop, *The Story Beast* will partner with the TAPDINTO-STEM Midwest Hub to release an article in the 2024 Fall issue on STEM storytelling, featuring student stories of their journey in TAPDINTO-STEM.

Following the workshop, the Midwest Hub convening guests had dinner and enjoyed bowling, billiards, and fellowship at the War Eagle Lanes located inside the Warrior Hotel.

STEM Storytelling | Asia Starr

Asia Starr is a professional storyteller in the Kansas City area and the Head of Design & Layout for [The Story Beast](#), an online magazine publication. During the convening, she hosted an interactive, hands-on workshop, “How to Craft and Tell Your STEM Story”. The workshop was prepared with accessibility and sensory needs in mind. In her presentation, Asia included space for participants to draw, write, and talk amongst each other in small groups to accommodate everyone’s learning and processing needs, and practice telling their stories.



Figure 1 Convening participants working on their STEM Stories.

Students with disabilities do not always have the opportunity or space to express themselves freely. This workshop was designed to help students feel confident, find their voice, and be empowered to share their experiences in a safe, supportive environment. In the session, Asia emphasized the importance of organizing ideas that translate into meaningful storytelling segments, how storytelling can help us connect to one another, build relationships with others, and advocate for oneself.

Asia used a guided storytelling tool kit which helped structure the session and provided time to refine and practice telling their stories. The toolkit includes writing prompts and space to draw for visual thinkers that help students find their voice. Asia discussed the importance of storyboarding ideas, finding tricks to overcome stage fright, and staying enthusiastic about telling your individual story to others.

Asia stayed for the entire Midwest Convening helping students outside of the workshop. She answered general questions for students as they worked to develop and define ideas, and about prepare their publication submissions. During the end of the convening Monday evening, three students shared their stories with the larger group.

Dinner and Fellowship | War Eagle Lanes

During the first night of the Midwest Convening, students, faculty, staff, and Hub partners enjoyed dinner and several games of bowling, pool, and darts at War Eagle Lanes right in the Warrior Hotel in Sioux City, IA. It was an opportunity for participants to socialize, form friendships, and compete in a friendly and accepting environment. Every student and most faculty and staff joined a bowling team. This activity was later singled out as a great way to bring everyone together and by all accounts was a highlight of the Convening.

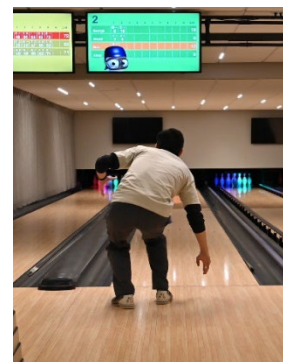


Figure 2. Dr. Sun bowling at the War Eagle Lanes. Warrior Hotel, Sioux City, IA.

Monday, April 22, Little Priest Tribal College, Winnebago, NE

The Midwest Hub Convening attendees traveled together by bus to Little Priest Tribal College (LPTC) in Winnebago, NE, which was about 40 minutes west of Sioux City, IA. LPTC agreed to host the Convening where the agenda blended STEM presentations and activities that celebrated indigenous culture generally and the origins and history of LPTC specifically. Sessions included a welcome and presentation of the history of LPTC from Keynote Speaker, President Manoj Patil, an archery demonstration with Stuart Fischer, and a campus tour. Participants also engaged in a presentation on Indigenous food with Chef, Anthony Warrior. During the afternoon, four students and one campus lead faculty presented lightning talks about their current STEM research projects. Before leaving LPTC, history faculty member, Alexandra Walker presented on HoChunk tribe migration history that led to settling Winnebago, NE. The Midwest Hub Convening concluded by traveling back to the Warrior Hotel for dinner and reflection led by Midwest Hub Lead, Jeff Traiger.

Celebrating 25 Years: How it Came to Be | President Manoj Patil, LPTC

President Manoj Patil spoke about the history, milestones, and positive changes of the college, and its importance of being connected to the Winnebago Tribe and HoChunk peoples. President Patil also discussed the Tribal College national network and the history with Nebraska Indian College.

Little Priest Tribal College celebrated its 25th anniversary on Friday, Sept. 15, 2023. After more than 20 years of serving roughly 120 students annually, LPTC achieved an enrollment milestone of 210 students this academic year. Named after Chief Little Priest, the last war chief of the Winnebago Tribe, Little Priest Tribal College was chartered by the Winnebago Tribe of Nebraska in 1996. The college was

declared a land-grant institution in June 1998 and accredited by the North Central Association of Colleges and schools in August 1998.

Tribal colleges and universities (TCU's) provide dynamic higher education opportunities, most on or near reservation lands. To be a TCU, the student population must be 51% Native American. Although Little Priest Tribal College is a TCU, its student population is not exclusively Native American. In recent years, the student body has been 78% Native American and 22% non-native.

During President Manoj Patil's presentation, he discussed how LPTC is supporting students with disabilities. Culturally, Native Americans tend not to ask for help, but rather accept and help each other as a community. President Patil highlighted the recent adoption of a disability services office lead by Darby Young, LPTC's 504 Compliance/ADA Specialist. With help from UMKC and because of being part of the NSF TAPDINTO-STEM program, Darby has created a service that has a strong relationship with many students with disabilities on campus. The disability services office has assisted students' academic success and remains an important way for the College to support their students.

President Patil explained that since receiving federal COVID relief funds in the summer of 2020, tuition has been free for all LPTC students. Unlike other area schools offering "free tuition," LPTC has no additional fees and their students do not use Pell grants and other scholarships for tuition charges, leaving those funds available to students for textbooks, laptops, dorm rent, and living expenses. The College is also part of the Nebraska Transfer Initiative. This initiative collaborates with associate and baccalaureate institutions to help students have an easier transfer experience with fewer delays in accessing necessary program requirements. The College also has transfer agreements with other private Nebraska colleges and universities.

President Patil concluded his presentation discussing campus expansion. These building projects were active during our visit and include a 12,000-square foot science lab building for technology and vocational degrees as well as refurbishing the school's auditorium space during the summer of 2024.

Archery Demonstration | Stuart Fischer, LPTC Outreach Education Coordinator

Stuart Fischer gave a live demonstration and historical overview of how Archery is an important cultural activity to Native peoples. Little Priest Tribal College is a part of the American Indian Higher Education Consortium (AIHEC). Since the first AIHEC Student Conference in 1980, this annual event has grown from a few dozen participants to over 1,000 students, faculty, and staff coming together each spring to compete in academic, cultural, and artistic exercises including archery; share stories and campus best practices; attend workshops and plenary sessions; and celebrate the Tribal College movement.



Figure 3 President Patil receiving a commemorative plaque as a thank you from the TAPDINTO-STEM Midwest Hub.



Figure 4 Stuart Fischer demonstrating how to use the bow to shoot an arrow.



Figure 5 A Midwest Hub student drawing back a bow to shoot an arrow at a target.

In Native American tradition, the bow and arrow play an important role in spirituality and hunting practices. As part of Stuart’s presentation, he explained different types of bows, including the traditional longbow, recurve and compound bows, and a crossbow. The crossbow on exhibit was specifically designed for individuals with mobility needs, containing a mount that secures to the wheelchair. At the end of the demonstration, Stuart provided a tutorial on techniques to safely handle a bow and arrow and five participants volunteered to shoot the recurve bow.

Indigenous Foods of North America: Keeping the Cultural Connection | Chef Anthony Warrior

Chef Anthony L. Warrior, also known as Ma-te-yi-mape-to, is an active member of the Little Axe Little River Ceremonial ground of the Shawnee. He has been in the Food and Beverage industry for 25 years and is a self-taught chef.

Chef Warrior’s experiences working for Tribal nations includes studying and acquiring local and traditional recipes, stories, and historical methods in food preparation and preservation. His approach to cultural nutrition is interconnected with feeding the body and spirit in holistic balance necessary to differentiate the total health needs of everyone. Anthony’s lifelong quest for education fuels his passion for learning and preparing traditional sustenance that stimulates cultural retention and community healing.



Figure 6 Chef Anthony Warrior presenting at the Midwest Hub Convening at the LPTC.



Figure 7 Native food Chef Anthony Warrior prepared for lunch.

Chef Warrior’s presentation highlighted that the land we stand on is a living being and that the respect for nature and shared systems is what brings us together. The connection to the earth is central to Indigenous culture – what we take should be given back for succeeding generations. Chef Warrior also discussed the significance of our food’s origins and how modern engineering has created processed food packed full of preservatives, water, and sugar, and as an unsustainable source for nutrition. Chef Warrior accompanied his presentation by preparing a locally sourced buffalo brisket, native bean and corn dishes, and berry juice for lunch.

HoChunk History | Alexandra Walker, Assistant Professor of Native American Studies, LPTC

Little Priest Tribal College Assistant Professor Alexandra Walker presented the lineage and history of the HoChunk Tribe of Nebraska, and the significance to war chief Little Priest. Professor Walker explained that the HoChunk tribe has had a complicated identity. Formally called the Winnebago, the HoChunk were members of the Siouan-speaking tribe originally from the Green Bay, Wisconsin area.



Figure 9 Midwest Hub members visiting Veterans Memorial Park, Winnebago, NE

Winnebago translates to “People of the smelly water”, which indicates a likely origination near coastal waters. Later, the name was changed to HoChunk Nation to better recognize the Siouan lineage. The HoChunk were involved in the Black Hawk War of 1832, which resulted in the U.S Government’s relocation to Nebraska and Iowa in 1865, and later to Missouri and South Dakota. Little Priest was a signer of the Green Bay, WI treaties of 1832 and was the last war chief of the HoChunk Nation. Locally, the Winnebago Tribe in Nebraska hold an annual celebration commemorating Chief Little Priest with festival in Veterans Memorial Park. To learn more about the history of the HoChunk people, and their journey of sovereignty and citizenship, Alexandra suggested [Citizens of a Stolen Land: A Ho-Chunk History of the Nineteenth-Century United States](#) (Kantrowitz, 2023).

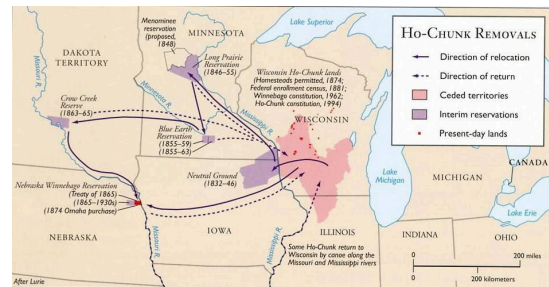


Figure 8 Map showing removal and relocation of the HoChunk tribe.

Lightning Talks | Dr. John Berges and students Donald Melton, Z Kemp, William Barnes, and Sophia Baugher

University of Wisconsin-Milwaukee STEM faculty campus leader, Dr. John Berges presented his thoughts on the relatability between biology and students with disabilities. His research investigates how to help survival of organisms outside of nature. He posed recommendations from his research to increasing equity in educating all students.

TAPDINTO-STEM student, Donald Melton shared his research from a recent study abroad trip to San Salvador Island. His research covered the study of boulder movement after Hurricane Joaquin, one of the strongest known hurricanes to hit the Bahamas since the mid 1800’s. During the trip, he used drones to capture and identify aerial storm damage and boulder movement between December 30, 2014-October 12, 2015. His team’s research



Figure 10 Donald Melton presenting on his coastal erosion research from San Salvador Island.

concluded that coastal erosion is an indicator of storm patterns and activity, which can be used to map the coastal development at San Salvado Island and elsewhere in the Bahamas.

Z Kemp presented their research on burned soil and Kaolin slurries, specifically on the applications of post wildfire debris flow. They explored two research questions: How does sediment concentration affect rheological properties and behavior of post wildfire debris flow? And how does burn intensity impact hydrophobicity of soil? They found that debris flow is a hazard to human life and infrastructure. Their goal of the project was to better understand flow behavior of suspensions (slurries, mixture of water and soil/sediment), to measure how fire impacts soil.

William Barnes discussed his research on the changes of summer urban heat island in Kansas City from 2000 to 2023 using remote sensing technology. Remote sensing uses satellite to detect physical characteristics of an area to collect distinguishing data. His findings showed that differences were not conclusive, but there were slight increases in overall higher temperatures since 2010 that lengthen the detrimental impact of the urban heat island effect.



Figure 11 Sophia Baugher's 3D Model of an Urban Heat Island.

Sophia Baugher also presented her research on the Urban Heat Island by sharing the 3-D model she created using recycled and natural materials of different colors to replicate an urban neighborhood. A heat lamp and thermometer showed the differences in material temperatures. In preparation, she replicated an urban heat island using black tarp on her family's farm, then using a thermal camera, recorded morning, and afternoon temperatures of the black tarp, as well as temperatures of pool water. Her findings showed the morning temperature on the black tarp was 144 degrees. Comparably, the pool water was 132 degrees. The highest temperature recorded was from the black tarp during the afternoon at 150 degrees.

Convening Reflection | Dr. Jeff Traiger

The Midwest Hub Convening, *Cultivating STEM in the Midwest Mosaic* built in time for group reflection and evaluation using Mentimeter, a digital presentation platform access by individual cell phones that allows for anonymous real-time feedback. Each question related to the activities and presentations during the Convening and logged at least 19 of 21 possible responses.

For the STEM Storytelling, the visit to Little Priest Tribal College, and student-led research talks, participants were asked to rate a series of questions on a scale of 1-5 (1 being strongly disagree, 5 being strongly agree) related to the learning outcome of the activity. In addition, they were asked to identify words that came to mind when thinking back on the activity, which are displayed in a Word Cloud pictured next to each section. Larger words represent more common responses.

Storytelling

Three questions were asked related to the STEM Storytelling workshop learning outcomes.

When thinking back to the storytelling activity...

- 1) *I understand the elements that go into creating my STEM story – 4.7 of 5*
- 2) *I understand how my STEM story is unique to me – 4.7 of 5*
- 3) *I feel more confident in telling my STEM story – 4.4 of 5*

The average rating of the first two questions showed that participants found the writing and storytelling tools they learned during the workshop to be helpful and personally meaningful. The first two responses also show that the workshop helped them celebrate their unique experiences in STEM. The responses from the third question showed that most people felt more confident in telling their stories but to a lesser degree than understanding the elements of their story or how it is personally meaningful.

When looking back on the storytelling workshop, the top three words that came to mind were: Emotional, Empowering, and Success. Participants stated that they felt deeply moved while writing and sharing their stories because it gave them an outlet to discuss their choice to study STEM and reflect on why it is personally significant to them. Additionally, the workshop gave people space to reflect on their unique history by encouraging them to write about overcoming personal challenges and how that has helped them in their present success and positive outlook for their future.



Figure 12 Participants created this word cloud about their experience during the storytelling workshop.

Little Priest Tribal College Visit

Looking back on their visit to LPTC, respondents rated their experience to be highly enjoyable.

In thinking back to our visit to Little Priest Tribal College, I enjoyed...

- 1) *Learning about the origins of LPTC - 4.8 of 5*
- 2) *The archery demonstration - 4.3 of 5*
- 3) *Learning about the importance of preserving native food culture – 4.9 of 5*
- 4) *Learning about HoChunk history – 4.5 of 5*

Respondents rated extremely high their learning about the origins of Little Priest Tribal College and the history and significance of Tribal Colleges in Nebraska, and across the U.S. from President Patil. Also, rated extremely high was Chef Anthony Warrior's presentation about the importance of preserving native food culture. Although rated a little lower, attendees found that learning about HoChunk history and the cultural significance of archery as highly enjoyable.

This was the first time visiting a Tribal College for most of us, and many stated that this experience provided them a deeper understanding, appreciation, and awareness of the significance of Native culture in STEM education.

The Word Cloud below reflects many memorable impressions. For example, it was very windy during the archery demonstration which likely affected the rating of the activity. Even though it was rated highly, fewer people volunteered to shoot the bow and arrow in cold wind. Chef Anthony Warrior’s presentation was said to be personally inspiring, engaging, and informative. He provided an understanding of the cultural significance of Native food, and the deep connection it has on our current agricultural ecosystem, sustainability, and way of life. Attendees enjoyed eating a traditionally prepared Native meal and that helped be more mindful and appreciative of where food comes from.

Alexandra Walker’s presentation on HoChunk history was impactful for because described additional insight into the traditions, lived experiences, and challenges the HoChunk people faced throughout the last two centuries. Professor Walke also described how the HoChunk people played an important role in the origins of Little Priest Tribal College.



Figure 13 Participants created this word cloud to represent their experience at LPTC.

Student Research Lightning Talks

Attendees were asked to rate each of the student lightning talk presentations on the STEM research:

In thinking about the student Lightning Talks, I enjoyed learning about...

- 1) *Urban heat islands – 4.8 of 5*
- 2) *San Salvador boulder survey – 4.8 of 5*
- 3) *Wildfire debris flow – 5 of 5*

Of all the activities during the Convening, the student lightning talks received the highest satisfaction ratings. These presentations highlighted TAPDINTO-STEM students’ undergraduate and graduate research. Students prepared and presented slides to share their research for roughly 15 minutes and several students from LPTC joined the audience.

Reflecting on the student lightning talks, the top three impressions for were: informative, passionate, and interesting. As part of the discussions about the lightening talks, the consensus was that the students provided interesting topics, methodologies, and knowledge, and were passionate about their research areas. Some comments included that they were “wowed”, the presentations were “dynamic”, and “engaging”. This feedback shows the significance and importance of supporting student STEM research throughout our hub.



Figure 14 Participants created this word cloud about their thoughts about each of the student lightning talks.

What Excites Students and Faculty About Studying STEM

Convening attendees were asked to respond to an open-ended question about what excites them most about studying STEM.

In a few words, what excites you most about studying STEM?

- *“Studying something meaningful.”*
- *“The engaging and exciting content along with the variability of topics.”*
- *“Understanding more about the phenomenon in your everyday life.”*
- *“The ability to collaborate with people from all over the country and world.”*
- *“The opportunity to learn new things on my own.”*

These statements highlight the positive aspects of engaging in educational or intellectual activities. They emphasize the value of learning STEM, whether through formal education, personal study, or collaborative activities. Specifically, they point to:

1. **Meaningfulness:** Finding purpose and relevance in what one is studying.
2. **Engagement and Excitement:** The dynamic and varied nature of the content that keeps learners interested.
3. **Practical Understanding:** Applying learned concepts to everyday life and gaining a deeper comprehension of the world.
4. **Collaboration:** Working with others as a mentor and a mentee, which enriches the learning experience for everyone.
5. **Autonomy in Learning:** The freedom to explore and discover new information independently.

These factors collectively underscore the enriching and fulfilling nature of STEM mentoring that the TAPDINTO-STEM project supports.

Convening Evaluation | Dr. Jeff Traiger

The Convening evaluation captured how attendees found the activities personally meaningful, satisfying, varied, reinforcing of their fit in STEM education, and provided a better understanding of how they and their institution fit into the Midwest Hub. Each of the six questions were rated on a scale of 1-5 (1 being strongly disagree, 5 being strongly agree) related to the learning outcome of the activity. The results of these questions were not shared with the larger group. This Mentimeter evaluation collected 19 of a possible 21 responses.

Thinking back on the Midwest Hub Convening...

- 1) *I found the activities personally meaningful – 4.6 of 5*
- 2) *I was satisfied with the variety of activities – 4.8 of 5*
- 3) *I learned to discuss my STEM story with others – 4.5 of 5*
- 4) *I was able to effectively network with other people from other institutions – 4.7 of 5*
- 5) *I better understand how my institution fits into our hub – 4.7 of 5*
- 6) *I better understand how I fit as part of the hub – 4.6 of 5*

Overall, the results show that satisfaction with the Convening activities was very high. This finding suggests that the variety and diversity of activities were well received. This also suggests that the activities facilitated a personal connection to STEM and the TAPDINTO-STEM Midwest Hub, increased

cultural awareness, and curiosity for learning. For example, the STEM storytelling workshop and visit to LPTC were shown to be powerful experiences where most people were able to develop and communicate their unique STEM story at the same time better understand the cultural significance of American Tribal Colleges. The evening activities provided opportunities for participants to build connections and foster relationships with others who share their interest in STEM.

The evaluation results also provide insight into how our Midwest Hub continues to improve its support to students with disabilities in STEM degree programs and contributes to our collective impact goals. For example, the convening provided attendees with multiple ways to feel more engaged and supported. Moving forward as a hub, we will continue to build on this momentum by providing additional resources, accountability, and engagement opportunities to ensure we maintain and improve our understanding of how each member of the Midwest Hub fits into the TAPDINTO-STEM Alliance.

Convening Participants

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Eddie Bernice Johnson INCLUDES Initiative: The Alliance of Students with Disabilities for Inclusion, Networking, and Transition Opportunities in Science, Technology, Engineering, and Mathematics (TAPDINTO-STEM) is supported by the National Science Foundation under NSF Award 2119902. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect those of the National Science Foundation.