

North Dakota Higher Education STEM Asset Map Project

Presented by Project Management Consultants
Dr. Kathy Froelich and Dr. Loren Intolubbe-Chmil
ND EPSCoR Annual Conference
October 21, 2025



Table of Contents

Introductions

Project Overview and Timeline

Institutional Profiles

Case Use

Next Steps

Introductions

Dr. Kathy Froelich
North Dakota In Region Consultant

Dr. Loren Intolubbe-Chmil
Project Management Consultant

Dashboard Development Team

Diana Jimenez



Angel Nunez



Daniel Intolubbe-Chmil



Collective expertise in qualitative & quantitative economic methods, data visualization & geospatial analysis, socio-economic, education & public policy research, and digital technology strategy & geospatial analysis

Project Overview

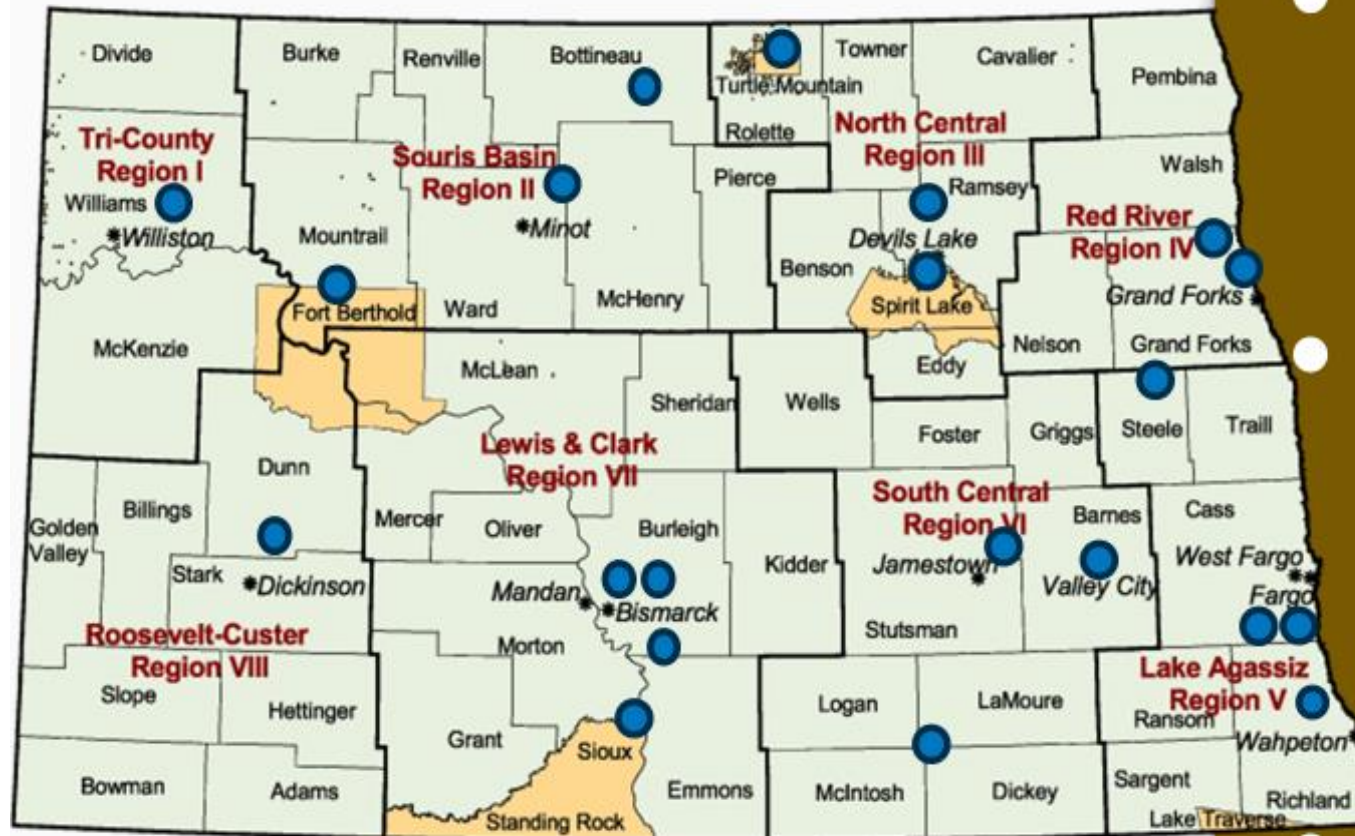
All North Dakota higher education institutions and Tribal colleges are invited to participate in this project. The objective of this asset mapping project is to produce a clear, data-driven understanding of the research and education assets within the higher education sector across the state. The information gathered will be used to:

- Identify existing strengths in research capabilities, research administration, and infrastructure.
- Identify educational programs, areas of expertise, and interdisciplinary initiatives.
- Identify workforce development programs and industry partnerships aimed at skill-building and employment readiness.
- Assist in ND EPSCoR efforts for creating strategic partnerships.

Goal

Development of a robust, dynamic ND Higher Education STEM focused platform that amplifies assets and promotes capacity enhancement across ND institutions and regions

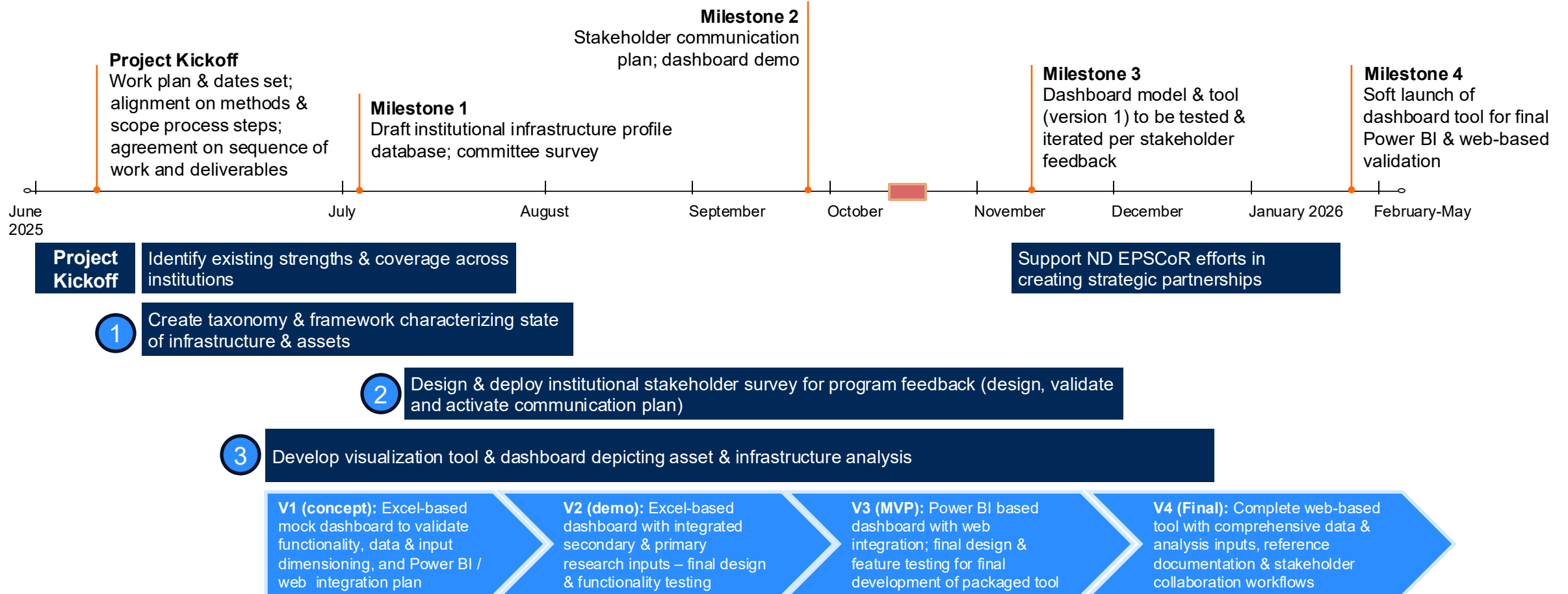




CONTEXT

- North Dakota Higher Education Landscape
- North Dakota Department of Commerce Ecosystems
- North Dakota EPSCoR Science & Technology Plan

Project Timeline



Asset Mapping Framework & Process

Layer 1 | Asset Segments

Layer 2 | Asset Categories

Layer 3 | Composite Metrics & Indices

Asset Mapping Taxonomy & Framework



Categorical Metrics



Each of the asset categories will be assessed across target institutions, prioritization EPSCoR specified metrics

Criteria & Traits Assessed Across 21 Identified Institutions

PUI, Rural & Tribal Engagement

- ✓ Directly designed for underserved communities
- ✓ Inclusive recruiting or indirect benefits
- ✓ No mention

Collaboration & Workforce Alignment

- ✓ 3+ institutions + industry/tribal/government + internship track
- ✓ Single partner or no clear industry tie-in
- ✓ Internal only

Education & Credential Pathways

- ✓ Transferable credit or formal academic link
- ✓ Enrichment/course-based only
- ✓ No pathway info

Strategic Fit & Recency

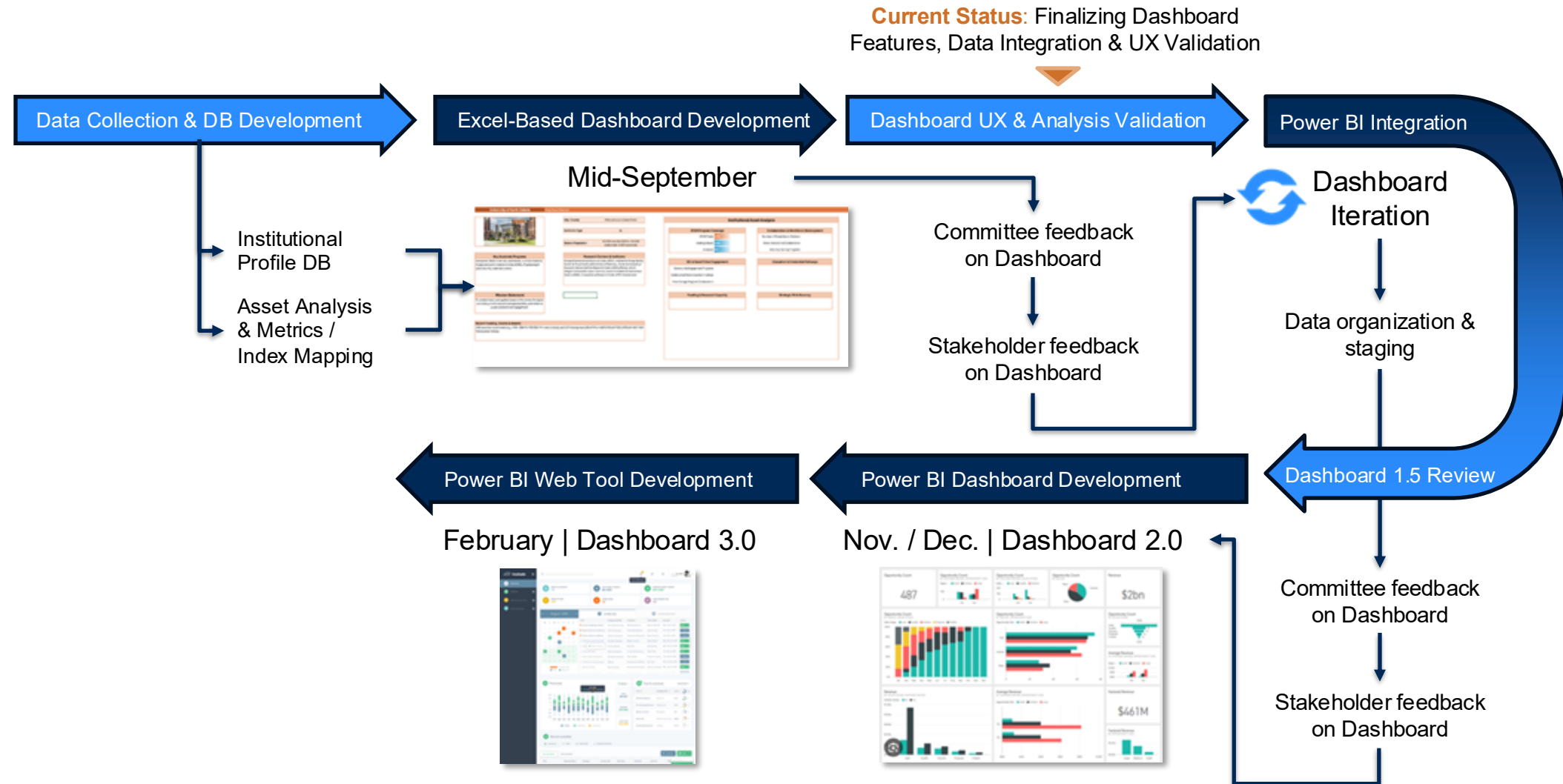
- ✓ General STEM relevance & active in past 3 years
- ✓ Weak alignment or status unclear
- ✓ Inactive

Funding & Research Capacity

- ✓ Federally funded and has a research center or shared lab
- ✓ Internal funding only; partner lab and/or online STEM platform (digital lab)
- ✓ No funding or infrastructure

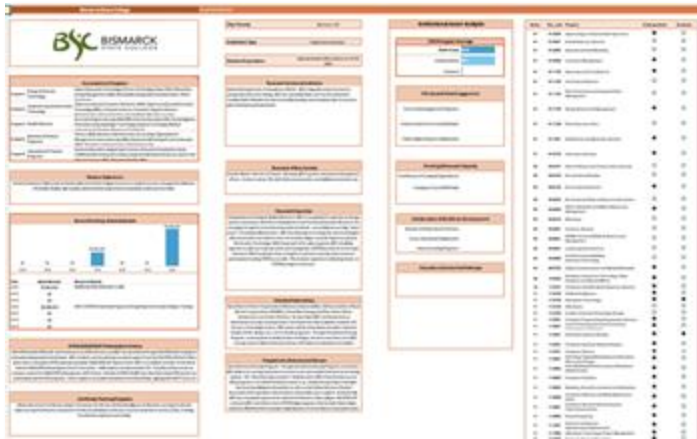
Criteria are in initial state of development and will change and expand with additional research – illustrative, not exhaustive

Dashboard Overview & Timeline



Dashboard Development Roadmap

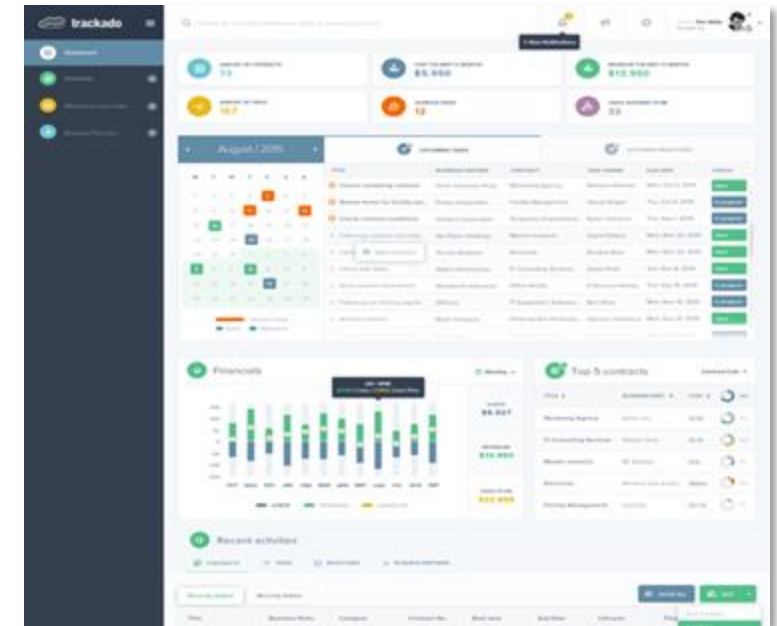
Dashboard 1.0



Dashboard 2.0



Dashboard 3.0



KEY FEATURES

1. State-wide exploratory institutional database
2. Institution program comparison & resource mapping
3. Collaborative opportunity identification & strategic guidance
4. *Living*, interactive data inputs for institutional stakeholder configuration & updates

Padlet Exercise | Collaborative Opportunity & Persona-Based Mapping

Scan code to submit feedback

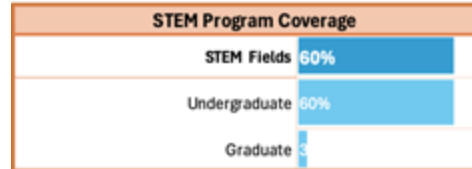


Institutional Profiles | Bismarck State College

Live Dashboard demo still in development, will be distributed to institutional stakeholders & committee members upon completion



City / County	Bismarck, ND
Institution Type	Polytechnic Institution
Student Population	~4,200 students (Fall 2024)



Certificate/Training Programs
Medical Assistant Certificate, Dialysis Technician Certificate, Artificial Intelligence & Machine Learning Certificate, Cybersecurity Certificates, Lineworker Certificate, Welding Certificate, Commercial Driver's License (CDL) Training, Certified Nursing Assistant (CNA)

Key Academic Programs		
Program 1	Energy & Process Technology	Power Generation Technology, Process Technology, Power Plant Operations, Energy Management (BAS), Renewable Energy, Industrial Operations, Water Treatment
Program 2	Cybersecurity & Information Technology	Cybersecurity and Computer Networks (AAS), Cybersecurity and Information Technology (BAS), Computer Science, Computer Support, Network Administration, Information Security, Intelligent Machine Learning
Program 3	Health Sciences	Associate Degree Nursing (ADN/RN), Practical Nursing (LPN), Dental Hygiene, Dental Assisting, Radiologic Technology, Surgical Technology, Medical Laboratory Technology, Pharmacy Technician
Program 4	Business & Finance Programs	Finance (BAS), Business Administration, Accounting, Organizational Management and Leadership (BAS), Integrated Marketing & Communication (BAS), Strategic Communication, Entrepreneurship
Program 5	Liberal Arts & Transfer Programs	General Liberal Arts, Engineering Transfer, Education Foundations (Early Childhood, Elementary, Secondary), Integrated Behavioral Sciences, Sports and Exercise Science (BAS), Behavioral Health (BAS)

Mission Statement

As North Dakota's Polytechnic Institution, Bismarck State College focuses on student success through the delivery of affordable, flexible, high-quality, experiential learning enhanced by public-private partnerships.

Research Centers & Institutes

National Energy Center of Excellence (NECE): BSC's flagship center focused on energy education and training. BSC has specialized labs such as the Lineworker Training Field in Mandan (for electrical utility training) and simulation labs for process plant and power grid operations

Research Office Contact

Annette Martel – Director of Grants. She leads BSC's grants and sponsored programs efforts. Contact: phone 701-224-2410, email annette.martel@bismarckstate.edu

Recent Funding, Grants & Awards

		Award Amount					
		2019	2020	2021	2022	2023	2024
		\$0	\$0	\$0	\$2,968,264	\$0	\$0
Year	Award Amount	Research Awards					
2025	\$7,960,000	SPARK-ND NSF EPSCoR E-CORE					
2024	\$0						
2023	\$0						
2022	\$2,968,264	NSF S-STEM Scholarship Program; Strengthening Community Colleges Training Grant					
2021	\$0						
2020	\$0						
2019	\$0						

EPSCoR/NSF/NIH Participation History

NSF EPSCoR (ND EPSCoR): North Dakota is an EPSCoR state, and BSC has benefited through ND EPSCoR's funding for primarily undergraduate institutions. BSC students and faculty have received support from the ND EPSCoR State Office, which aims to broaden STEM capacity statewide, NASA EPSCoR / Space Grant: BSC is an affiliate member of the North Dakota NASA EPSCoR and Space Grant Consortium. A BSC physics faculty member (Dr. Tony Musumba) serves as campus contact for NASA EPSCoR programs, NSF Grants: Outside of EPSCoR, BSC has directly received NSF grants (as noted above, via the ATE program).

Research Expertise

- Energy Industry Training & Applied Research:** BSC is recognized for expertise in energy systems operations,
- Workforce Development and Technical Education Research:** An emerging strength is in technical education methods – essentially researching "what works" in training skilled workers.
- Cybersecurity and Information Technology:** With the growth of its cyber program, BSC is building expertise in cybersecurity education and training labs,
- STEM Education & Community Outreach:** BSC faculty also have strengths in outreach and education research, particularly in making STEM accessible. This includes expertise in delivering hands-on STEM learning in rural areas.

Industry Partnerships

Basin Electric Power Cooperative & Montana-Dakota Utilities, ND Association of Rural Electric Cooperatives (NDAREC), Great River Energy and Other Power Plants, Harvestone Low Carbon Partners: As described, BSC and Harvestone (a biofuels/processing company) have a formal partnership to pipeline students into Process Technology careers. BSC works with local hospitals and clinics (Sanford Health, CHI St. Alexius, etc.) for its health programs. Through the Dakota Nursing Program, rural hospitals in Ashley, Hazen, Hettinger, Garrison and others host BSC nursing cohorts, Bobcat/Doosan, Infosys, ND Cybersecurity Industry Coalition



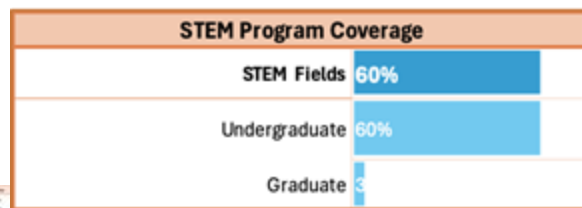
NSF EPSCoR
ADVANCING GEOGRAPHIC DIVERSITY IN STEM



STEM Program Coverage | Bismarck State College

215 STEM fields assessed across undergraduate & graduate programs for each institution

**BSC
Example**

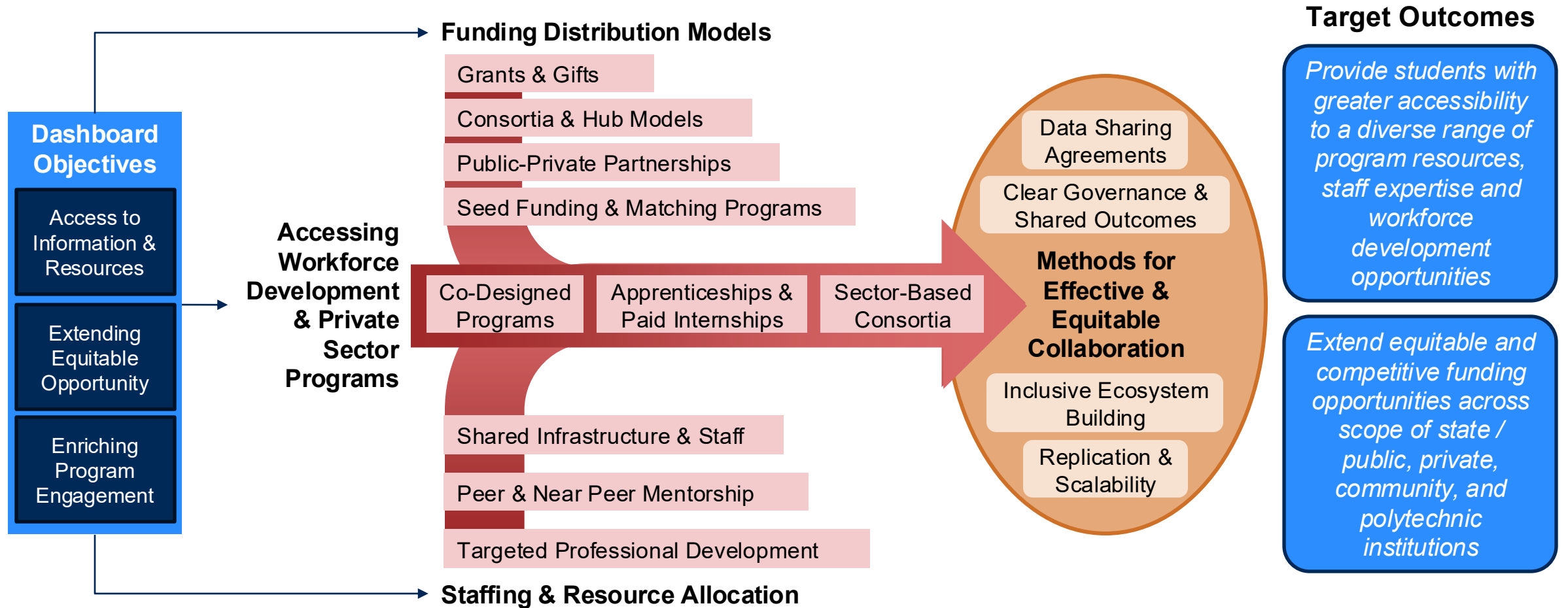


Series	Cip_code	Program	Undergraduate	Graduate
40	40.0299	Astronomy and Astrophysics, Other.	☒	☐
40	40.0400	Atmospheric Sciences and Meteorology.	☐	☐
40	40.0500	Chemistry.	☒	☐
40	40.0600	Geological and Earth Sciences/Geosciences.	☐	☐
40	40.0800	Physics.	☒	☐
40	40.1000	Materials Sciences.	☐	☐
40	41.0000	Science Technologies/Technicians, General.	☐	☐
41	41.0101	Biology/Biotechnology Technology/Technician.	☒	☐
41	41.0299	Nuclear and Industrial Radiologic Technologies/Technicians, Other.	☒	☐
41	41.0303	Chemical Process Technology.	☒	☐
41	41.9999	Science Technologies/Technicians, Other.	☐	☐
42	42.2799	Research and Experimental Psychology, Other.	☒	☐
43	45.0102	Social Sciences, Research Methodology and Quantitative Methods.	☐	☐
45	45.0301	Archaeology.	☐	☐
45	45.0501	Demography and Population Studies.	☒	☐
45	45.0603	Econometrics and Quantitative Economics.	☐	☐
45	45.0702	Geographic Information Science and Cartography.	☒	☐
45	49.0101	Aeronautics/Aviation/Aerospace Science and Technology, General.	☒	☐
49	51.1002	Cytotechnology/Cytotechnologist.	☒	☐
51	51.1005	Clinical Laboratory Science/Medical Technology/Technologist.	☒	☐
51	51.1401	Medical Science/Scientist.	☒	☐
51	51.2003	Pharmaceutics and Drug Design.	☒	☐
51	51.2004	Medicinal and Pharmaceutical Chemistry.	☒	☐
51	51.2005	Natural Products Chemistry and Pharmacokinetics.	☒	☐
51	51.2006	Clinical and Industrial Drug Development.	☐	☐
51	51.2007	Pharmacoeconomics/Pharmaceutical Economics.	☐	☐
51	51.2009	Industrial and Physical Pharmacy and Pharmaceutical Sciences.	☐	☐
51	51.2010	Pharmaceutical Sciences.	☒	☐
51	51.2202	Environmental Health.	☒	☐
51	51.2205	Health/Medical Physics.	☒	☐
51	51.2706	Medical Informatics.	☐	☐
51	52.1301	Management Science.	☒	☐
52	52.1302	Business Statistics.	☐	☐
52	52.1304	Actuarial Science.	☐	☐
52	52.1399	Management Sciences and Quantitative Methods, Other.	☒	☒

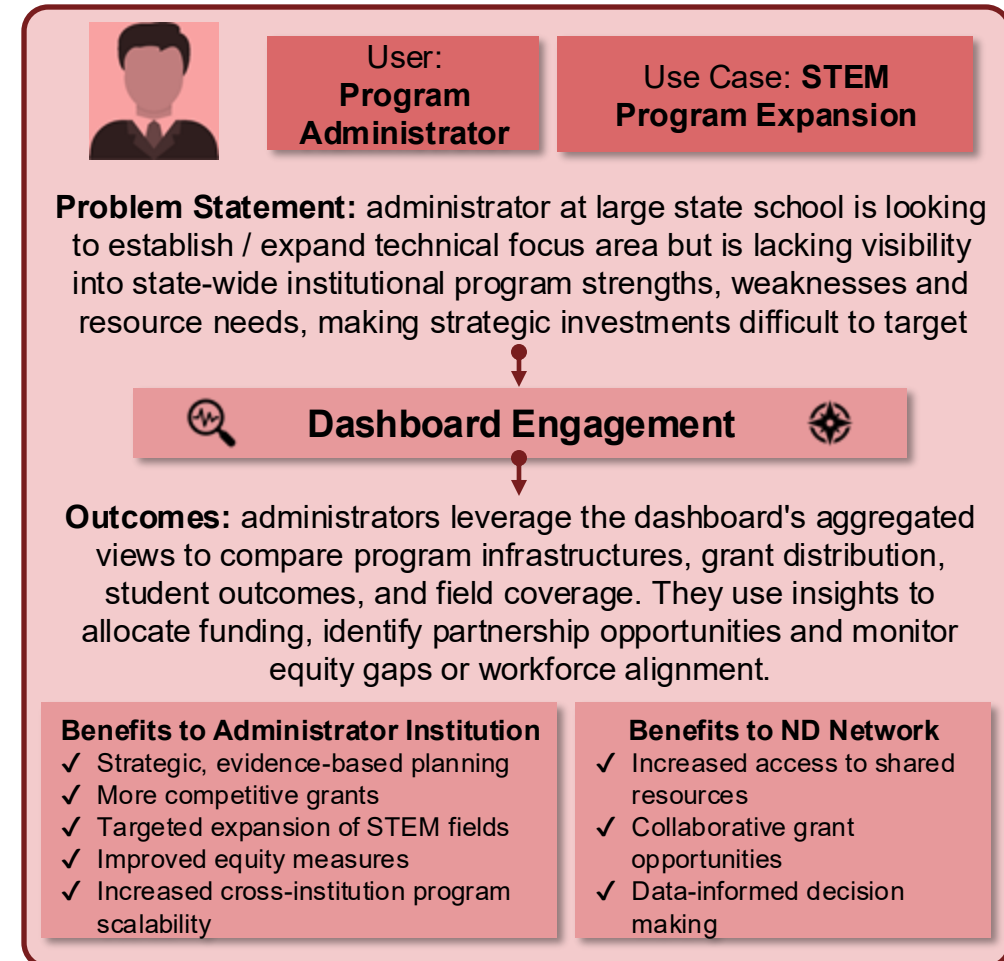
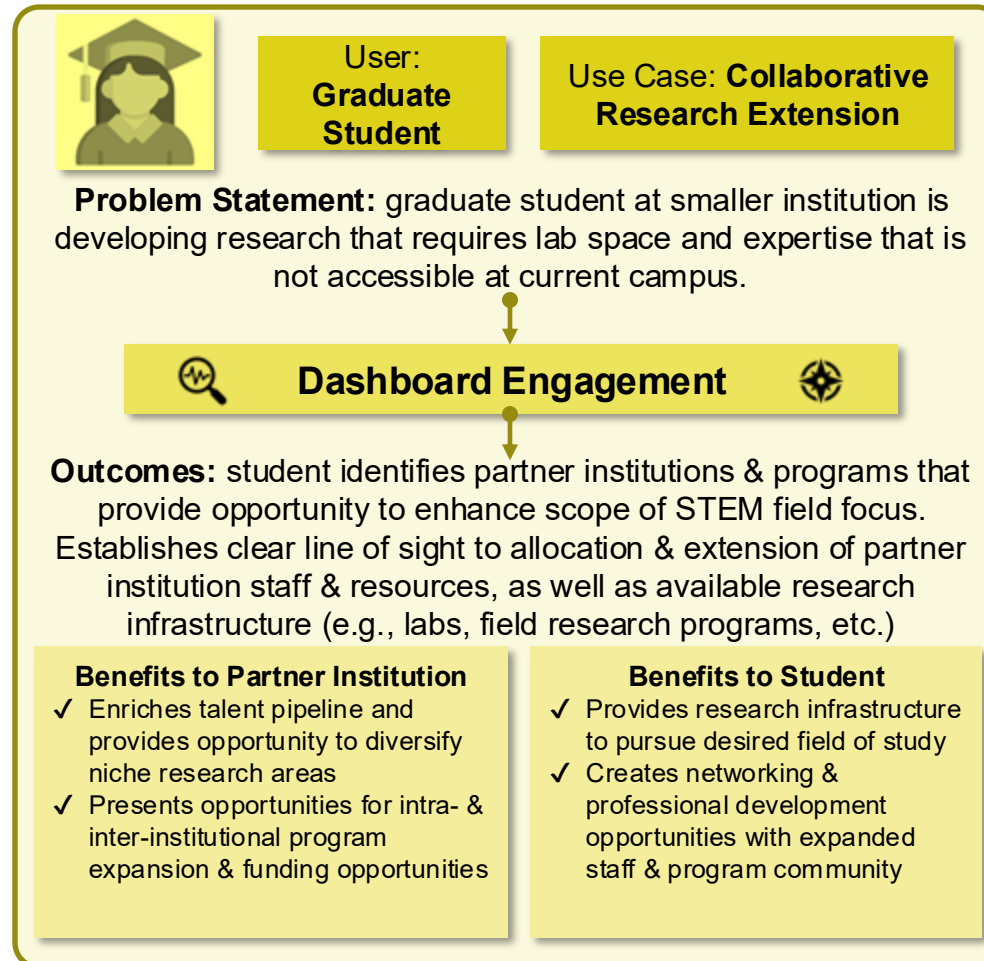
Stakeholder Survey Overview & Methods

- Survey to committee members summer 2025
- Feedback from stakeholders on profiles
- Responses from Padlet exercise
- Generate survey items for function of dashboard

Facilitating Cross-Institutional Collaboration



Dashboard Use Cases | Promoting Value-Added Collaboration Opportunities



Next Steps

- Dashboard Development
 - Continue to enrich and validate source data feeding dashboard
 - Ongoing profile reviews □ output informs data enrichment for dashboard
 - Power BI Integration – translate excel-based data, features and functions into interactive visualization tool
 - **Early November:** Distribute Power BI dashboard to core stakeholders
- Stakeholder Communication
 - Finalize & disseminate survey to collect data from institutional stakeholders
 - Schedule additional information sessions

Open Q&A