U.S. Department of Labor's Trade Adjustment Assistance Community College and Career Training (TAACCCT) Grant Program Round IV External Evaluation
Training for Regional Energy in North Dakota (TREND)

Funded by U.S. Department of Labor grant #TC-26460-14-60-A-38

Summative Evaluation Report:
Training for Regional Energy in North Dakota (TREND)

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September 26, 2018

Table of Contents

Executive Summary

I. TAACCCT Program/Intervention Description and Activities

This report examines the Round IV Training for Regional Energy in North Dakota (TREND) project led by Bismarck State College to provide training for adults and recent high school graduates for in-demand jobs in the state's energy sector. Under a 2014-2018 grant under the Trade Adjustment Assistance for Community Colleges and Career Training (TAACCCT) program, TREND also included three other postsecondary institutions in North Dakota, two of which are tribal colleges.

TREND supported workforce training in 25 programs of study, and grant funds supported the hiring of faculty as well as equipment purchases and purchases of software and related licensing to support learning. The grant also provided funding for career navigators, who provided intentional advising support to students in their courses as well as help in preparing for job interviews and employment. Through semi-structured interviews, site visits, and student surveys, the evaluation examined implementation of the Round IV grant, including fidelity of implementation, student attitudes toward college and toward the program, and review of key project components including the career navigators. An impact study sought to document the effect of the program for participants against comparison students who enrolled in similar programs prior to the grant.

The program primarily served recent high school graduates and adults seeking a career in the fast-growing energy sector in North Dakota, primarily in oil and gas. The vast majority of students, 73%, were white, while Native Americans represented 15%. Females accounted for 17% of students. TREND's approach was to combine job-specific training with strong advising to promote student completion and success. It built on a Round II TAACCCT grant in North Dakota that also supported the energy sector. The Round IV grant introduced enhancements to several occupational programs as well as complete implementation of the career navigator concept at the colleges.

II. Evaluation Design Summary

This rigorous evaluation examined enhancements to the energy-related programs of four colleges to determine whether TREND-funded improvements produced increased rates of student completion of programs as well as subsequent employment. Based on the program's Logic Model, the **implementation evaluation** sought to examine the degree to which colleges implemented changes such as career navigators, enhanced courses, and cutting-edge equipment for energy programs. It relied on three key elements: 1) an attitudinal survey of students after enrolling in TREND; 2) review of key documents including quarterly and annual reports; and 3) annual site visits to observe programs, interview faculty, staff, and administrators and to conduct focus groups of students at each institution. Interview protocols focused on the selection and use of materials; the ability of colleges to expand/enhance their programs; career guidance and assessments provided to students; and the commitment of project partners to program design, curriculum development, and student success. The evaluation used several factors to assess implementation, including student perceptions of their programs and the ability of faculty and staff to expand/enhance programs based on their original goals.

The TREND Round IV **impact study** seeks to answer the question, "What is the impact of TREND IV on project participants' completion of in-demand career/technical education programs and subsequent employment? To answer this question, PTB collected information from participants and compared their performance and outcomes to a comparison group of similar students enrolled prior to the first TREND grant, or from 2009 through 2012. The evaluation team produced matched groups of treatment and comparison groups through Propensity Score Matching (PSM), a process that matches intervention group members with comparison group members using propensity scores based on their characteristics. The PSM was based on a number of socio-demographic variables including age, gender, income, race, previous employment, and previous education level and achievement as co-variates in a multivariable logistic regression procedure to compare the historical sample of students to newly enrolled TREND Round IV students at Bismarck State. Three attainment variables – full v. part-time student status, Pell Grant eligibility, and having a basic skills deficiency were potential predictors of treatment assignment.

This procedure was used to select a group of comparison students from the historical sample. Analyses compared the comparison and treatment groups in terms of three outcome variables: 1) Number of credentials in the field received by a student; 2) Cumulative GPA; and 3) Retention. The study was able to answer questions on these three outcome variables. PTB used a form of PSM analysis called inverse-probability weighted regression-adjustment (IPWRA) to construct a statistically equivalent comparison group of students enrolled from 2005-2014 at Bismarck. Additionally we used a direct PSM analysis (comparing matched individuals rather than weighted aggregate samples) as a form of cross-validation, and found the same results in both analyses, indicating that findings are consistent and robust.

III. Implementation Findings

- TREND colleges implemented the Round IV TAACCCT programs with fidelity. Among other goals, they used career navigators to work with students, purchased equipment to expand offerings and build capacity, and implemented programs in line with their original grant proposal and subsequent revisions approved by US DoL in response to economic changes during 2014-2018.

- Fiscal agent Bismarck State organized regular monthly meetings of the consortium, held by conference call, to review project progress, project deliverables, and implementation of key activities and to answer questions from individual college staff. In addition, Bismarck State convened face-to-face meetings, called consortium working sessions, on a quarterly basis to observe programs, hear from expert presenters, and conduct in-depth reviews of grant-related issues and programs.

- By the end of the grant, the two public colleges (Bismarck State and Williston State) had built strong partnerships with businesses, as evidenced by participation on advisory committees, donations of equipment, and recruitment of students for internships by at least one major partner, Hess Corp. The two tribal colleges conducted outreach to employers, some of whom served advisory panels and provided curriculum input; however, the

geographic isolation of these colleges sometimes posed a challenge in attracting employer partners.

- Faculty and students expressed strong satisfaction with the program. Its strengths include new, more modern equipment that reflects industry standards and help from career navigators who helped students with career education and job searches. In response to economic changes, colleges made some changes in their programs to encourage more short-term programs and stackable credentials.

- Simulators and trainers enabled students to gain hands-on experience in commercial driving, heavy equipment operator, welding, electrical, process plant, and power plant programs. New vehicles also supported additional hands-on experience for students in lineworker and heavy equipment operator.

- A decline in energy and oil prices early in the Round IV grant affected enrollment in some petroleum-related programs. However, employers also used this period to promote automation and other workplace efficiencies, and employer partnerships helped colleges incorporate some of these changes into their programs.

- Colleges offered a variety of programs to help students gain jobs, including resume development, career assessment, and even a Career Closet at one tribal college, where students could select clothes for job interviews and obtain winter coats as well.

- About one-quarter of respondents (24.6%) responding to the TREND attitudinal survey said they were nervous about resuming their education. This figure and related findings point to the need for support services such as the career navigator functions adopted by the colleges under this grant.

- At this time, only two of the four TREND colleges expect to continue career navigator functions in some form, largely due to budget concerns and less state funds for public higher education. While it is impossible to isolate the impact of the navigators, it is clear that treatment students fared better than comparison students in areas such as completion and grade point average as well as employment (see impact / outcomes section below). Many stakeholders, including students, also give credit to the navigators in promoting their success. From mock job interviews to resume development and regular ‘nudging’ of students, this approach appeared to be a key ingredient of student success.

IV. Participant Impacts & Outcomes

- PTB used a form of PSM analysis called inverse-probability weighted regression-adjustment (IPWRA) to construct a statistically equivalent comparison group of students enrolled from 2005-2014 at Bismarck. Additionally the evaluation team used a direct PSM analysis (comparing matched individuals rather than weighted aggregate samples) as a form of cross-validation, and found the same results in both analyses, indicating that findings are consistent and robust.

- TREND participation produced mainly positive effects on educational outcomes, based on regression analysis used to calculate an Average Treatment Effect (ATE) outcome in which participation effects on students enrolled during the grant were compared to the historical students enrolled before the grant program.

- Overall, depending on the statistical model used, there was at least a 14% increase in credential attainment in the TREND treatment group compared to the comparison group, and at least an 11.71% increase in retention in the treatment group. While not consistent across models, evidence was seen of improved academic performance based on grade point average, a roughly .1 increase in grade on a 4-point scale in the treatment group.

- TREND participants were more likely than comparable, historical non-participants to attain credentials and complete their programs of study. Participants also had higher grade point averages while enrolled than comparison students.

- There was a high percentage of unavailable data for workforce participation and job incumbency in the comparison sample, and thus we were not able to conduct a meaningful impact analysis on this outcome of interest. The study did collect basic statistics on employment for treatment and comparison students. Overall, 78% of treatment students had gained employment compared with 24% of the comparison group. However, 72% of the comparison group was missing employment data.

- A look at state aggregate employment data among completers in three core TREND programs (lineworker, process plant, and power plant) showed that Round IV participants with North Dakota addresses had an employment rate of 91.9% in these programs, compared with 82.8% of in-state students who completed the programs in 2009-2012, prior to any TREND TAACCCT grant. It is not known if all of these students were working in their field of study.

- Member colleges enrolled 2,272 students during the Round IV grant, more than the 1,740 students proposed for the project. However, U.S. DoL did permit the colleges to count some students under both its Round II and Round IV TAACCCT grants, as they benefitted from the improvements supported by both federal investments. Those completing a field of study totaled 697 under the grant, which is also above the 581 proposed back in 2014.

- Students in the TREND Round IV grant earned 1,420 certificates and degrees, which was more than double the number projected for the grant. The average completer earned two certificates or degrees. Round IV students also earned more than double the number of credit hours originally projected for the grant.

- Aggregate wage data on TREND Round IV completers indicate that graduates of three core programs (lineworker, power plant, and process plant) earned more than double the living wage needed for a one-person household. These occupations also provided enough income for a family of three with two adults, including a working adult. Lineworker salaries also provided a living wage for a single parent with one child, while process plant provided a large enough wage for a single parent with a child and a family of four with two children.

Key Outcomes for TREND Participants

	Total Proposed for Grant	Years 1-4 Actual
Total Students Enrolled	1,740	2,272
Total Number Completing a Program of Study	581	697
Total Number of Earned Certificates/Degrees	695	1,420
Total Number of Credit Hours Completed	19,041	44,624

V. Conclusions

- The TREND colleges sought to provide intensive advising through career navigators who monitored student progress, helped them in adjusting to college, and worked with them to promote enrollment, success, and completion of key courses in their programs of study. Based on implementation and impact data, this intervention appeared successful in generating positive student outcomes. Those seeking to replicate TREND may want to emphasize this aspect of the intervention while still supporting purchases of new equipment and simulation technology.

- The impact study of TREND Round IV demonstrated that participating students fared better than a comparison group of non-TREND students on issues such as program completion and grade point average. Additionally, descriptive data on employment showed greater success among TREND students. Based on these successes, US DoL may want to consider funding new TAACCCT grants or launching similar initiatives that can improve the skill sets and employment prospects of dislocated workers and young adults.

- One weakness of this study is the inability to conduct a rigorous impact analysis on employment and wages of participants vs. non-TREND comparison students. Anecdotal and basic descriptive data do show TREND participants with higher employment rates; however, it was not possible to analyze this issue in the impact study as only aggregate employment data was available for specific groups of TREND students. It would be valuable for US DoL to work closely with states to promote the availability of individual-level employment and wage data for workforce training programs, as this data represents the ‘gold standard” in determining the effectiveness of federal grant programs.

- TREND operated through both booming and challenging economic times in the state’s energy industry, and these trends affected student enrollment and success. In response, the TREND colleges made strategic changes as needed, such as the incorporation of shorter-term programs to help students quickly gain job skills in high-growth areas. In addition, they redesigned some courses so students could attain technical skills they could use outside the energy sector in areas such as agricultural production plants. Those seeking to replicate TREND should recognize that flexibility and communication are keys to success as colleges and industry seek to respond to economic changes.

1. Introduction and Overview

1.1 History and Purpose of TREND

This summative evaluation report examines the implementation and impact of the 2014-2018 Training for Regional Energy in North Dakota (TREND) project, supported by a federal grant from the U.S. Department of Labor (DoL). This project involved four postsecondary institutions in North Dakota:

- Bismarck State College (BSC), Bismarck, N.D., the fiscal agent for the grant and lead college that serves 3,750 students;
- Sitting Bull College (SBC), Fort Yates, N.D., a tribal institution based at the Standing Rock Reservation with approximately 300 undergraduates;
- Turtle Mountain Community College (TMCC), Belcourt, N.D., a tribal college serving approximately 630 students; and
- Williston State College (WSC), Williston, N.D., a public college serving 1,000 students.

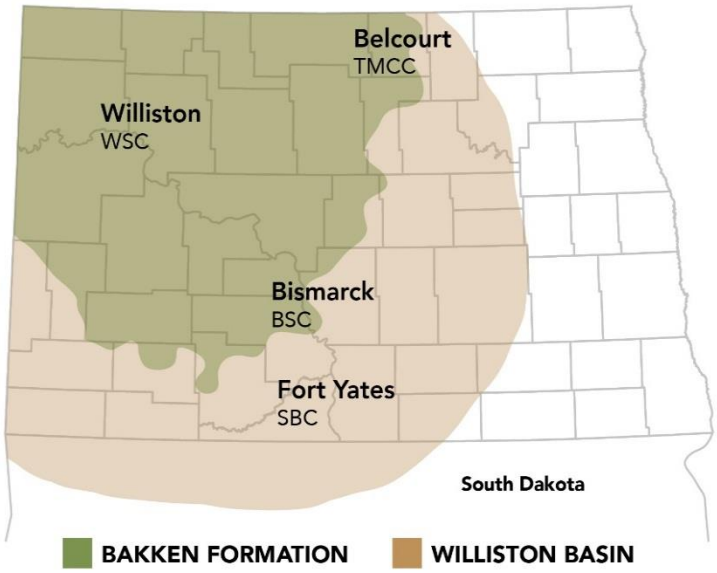
TREND was supported with a grant under DoL's Trade Adjustment Assistance for Community Colleges and Career Training (TAACCCT) program, a four-year program that provided $2 billion to help community colleges and states prepare adults for high-wage jobs in emerging career fields. The TREND consortium received two federal TAACCCT grants – one for $14.6 million running from 2012 to 2016 under Round II of the awards and a $9.9 million grant under Round IV, awarded in 2014 and ending in 2018. This summative evaluation report is for the Round IV grant operating during the past four fiscal years, ending in September 2018.

Both TAACCCT grants focused on the state's energy sector, ancillary energy sectors, and particularly oil field-related jobs. During the span of these two grants, partners formed an alliance designed to prepare workers for high-demand, high-wage, and high-skill jobs in sectors related to the oil and gas industries. In the first grant, partners used funds to develop new and enhanced curriculum and credentials; redesign program development and delivery systems; and offer enhanced support services and career navigation. The second grant, the subject of this evaluation report, was for $9.9 million to: build upon the first grant's work to create or expand

programs of study; increase enrollment; fund additional equipment purchases; and increase student success through expanded support services to students. To increase student success, colleges expanded their use of career navigators to advise and guide TREND students, providing help on everything from course schedules and sequencing to education and career planning.

The state received the grants as North Dakota was undergoing significant economic changes largely because of changes in the energy sector. The state is now recognized as the second largest oil producer in the U.S., producing 1 million barrels of oil per day and trailing only Texas in oil production.[1] The economic expansion is largely due to production in the Bakken Formation, a 200,000 square-mile region with substantial oil reserves that spreads across nearly two-thirds of North Dakota. According to the North Dakota Department of Mineral Resources, oil and gas related jobs are expected to increase to about 87,000 near the year 2030, with about 70,000 of those jobs being long term.[2]

With these projections, TREND was expected to play a significant role in educating and training a workforce to support development along the Bakken Formation. The graphic to the right has the location of TREND partner institutions, the Bakken Formation, and the larger Williston Basin, which extends from western North Dakota to eastern Montana and Saskatchewan, Canada and is known for its rich petroleum deposits.



The Round IV TREND grant took place during a period of substantial upheaval in the North Dakota energy sector. World oil prices exceeded $100 a barrel in 2014 – as this grant began – but then declined to less than $50 by early 2015, sending the state's energy economy into a downturn. After oil production grew

[1] North Dakota Oil & Gas Industry, *Facts & Figures*, retrieved from: https://www.ndoil.org/resources/documents/.
[2] Spotlight on North Dakota Energy: 2017 Annual Report, retrieved from https://www.energynd.com/wp-content/uploads/2018/03/Spotlight_On_Energy_2017_Web.pdf, p. 33.

from 7 million barrels of oil a month in 2010 to more than 40 million barrels a month by 2014, production then dropped 25% through 2017 (Flynn, 2017). This change ultimately affected workers, some of whom lost jobs and returned to school to gain additional training. Yet these changes took an economic toll; average annual pay in and around Williston, N.D., -- in the heart of the Bakken – increased from $60,000 in 2010 to $90,000 in 2014 before dropping to $70,000 in 2016. However, oil price increases since late 2017 are spurring a turnaround. Overall, the state produced an average of 1.24 million barrels of oil a day in May 2018, up nearly 20% from May 2017 (Job Service North Dakota, 2018). Average daily natural gas production was at 2.3 million MCF (thousand cubic feet) in May 2018, up 25% from the previous May.

1.2 Overview of the TREND Model

The overarching goal of the TREND grant was to build capacity at the four colleges to prepare more students for employment in the North Dakota energy sector, primarily in oil and gas. The colleges used federal funding to add equipment and software, purchase classroom and lab supplies, train faculty and staff, create and/or expand training programs, and create and/or enhance advising and case management services to support students in their studies and preparation for work. They placed an emphasis on career pathways and stackable credentials while promoting a flexible, technology-enabled environment in which students participated via both in-person and online delivery platforms. Key ingredients of the TREND model are outlined in the program's Logic Model on the next page (Figure 1).

Major partners in the project were the four colleges (BSC, WSC, TMCC, and SBC), which received funding to hire faculty, add new technology and equipment to their programs, and support career navigators providing direct services to students. Other partners included Job Service North Dakota (JSND) and the State Longitudinal Data System (SLDS), through which TREND established a strong working relationship to obtain aggregate employment data on completers. As the state could not provide individual-level wage data due to privacy concerns, the ability of TREND to reach agreement with JSND on an alternative approach was important in judging program success. Yet more than 30 employers participated in TREND programs by serving on advisory councils, providing internships, providing input on curricula and equipment, and participating in job fairs and mock job interviews with students.

Fig. 1: North Dakota TREND Round IV Logic Model			
Inputs	**Activities**	**Short-Term Outcomes**	**Long-Term Outcomes**
Career navigators to assist students in developing education plans and completing programs College / industry partnerships in key energy fields Learning communities and block scheduling for industry programs Prior learning assessments where appropriate New/enhanced labs, equipment and technology Professional development for faculty and career navigators	Career Navigators work with students on career planning and preparation Colleges and employers identify industry-specific competencies Colleges offer remediation supports with regular courses Develop portfolio framework to assess prior learning where appropriate Enhancement of some online/hybrid technical education programs Colleges offer new and/or enhanced programs in areas such as pipe welding, transportation, and renewable energy Faculty workshops on online instruction Workshops for career navigators to expand coaching skills and career advisement	All TREND students have access to enhanced career navigation services Teachers in TREND areas gain competencies to offer rich online learning experiences Students accelerate completion of credentials / degrees with online/hybrid coursework, block scheduling Students, faculty, and grant staff are satisfied with TREND programming	Round IV students have higher retention and completion rates than non-Round IV participants in similar programs Round IV students have higher rates of job placements and wage increases than non-Round IV participants in similar programs Students in Round IV online-only programs have similar educational outcomes (as reflected by completion rates and credits earned) as Round IV students in similar programs delivered only in a traditional classroom

1.3 Description of TREND Offerings

TREND proposed to offer study in 25 programs across the four colleges under four main categories: transportation, welding, building/construction trades, and oil, gas, coal, and renewables. The last category included 15 of the 25 campus programs. Table 1 on the next page outlines the programs of study at colleges that received equipment enhancements and other expansion efforts under the grant.

Table 1: DOL TAACCCT Round IV – Program of Study Matrix by College

EXPANDED (X) - ENHANCED (E)

	BSC	SBC	TMCC	WSC
TRANSPORTATION				
CDL/Lineworker	E (LW)	X	X/E	
Diesel Tech				X/E
WELDING				
Welding		X	X	E
BUILDING/CONSTRUCTION TRADES				
Electrician		E		
Building & Construction Trades		E	E	
OIL, GAS, COAL, RENEWABLES				
Business Services				E
Petroleum Production Technology	E			X
Automation & Control				X/E
Oil Drilling		E		
Energy Technology – Auditing/Water		E		
Geographic Information Systems	E			
Mechanical Maintenance	E			
Process Plant	E		E	
Instrumentation & Control	E			
Power Plant	E			
Energy Services & Renewable Technician	E			
Water & Wastewater	X			
BAS Energy Management	E			
TOTAL PROGRAMS	**BSC**	**SBC**	**TMCC**	**WSC**
25	**10**	**6**	**4**	**5**

NOTE: Original plans called for creating new programs in electrical and soil/mineral management at WSC. However, US DoL approved a scope of work modification to not make these standalone programs and instead incorporate skills into existing program coursework.

Most programs offered a credential as their final point of conclusion. However, students could earn Associate of Applied Science degrees in several popular areas including process plant, power plant, instrumentation & control. Grant funding funded new equipment in many of these areas, enabling more students to attend while providing them with an enhanced educational experience with a closer link to industry standards. Throughout their programs of study, students also had the ability to earn industry credentials such as OSHA 10 (health and safety), First Aid/CPR and various Microsoft and Cisco credentials.

1.4 Population Served

Over the life of this four-year grant, the TREND member institutions enrolled 2,272 students in energy-related programs of study. This section will examine program enrollment in greater detail, including demographics, employment status, income status, and education level as students entered TREND. The majority – nearly 63% of students – attended Bismarck State College, the fiscal agent and lead institution for the TREND program (Table 2). While only one other member college, Sitting Bull College, enrolled students in Year 1, all institutions had TREND Round IV students during the grant's second, third, and fourth years. TREND's status as a TAACCCT Round II grantee and a Round IV grantee affected enrollment patterns for this Round IV grant. TREND's project director worked with a federal program officer to determine how to count students as either Round II or Round IV students for the 2014-2015 academic year, and the end result was that many occupational programs initially did not start to count students under Round IV until spring 2016. However, further federal guidance during the past year allowed TREND to count some students in both Round II and Round IV grants. The end result of these developments was reduced enrollment numbers in Year 1, and a surge in enrollment during year 2, when 810 students enrolled at one of the four institutions. Also, while Year 4 was not a full program year based on federal guidance and policy, enrollment remained strong as TREND concluded its work. The two tribal colleges in the program enrolled about 15% of all participants.

Table 2: Enrollment in TREND Round IV, Total and by College

	BSC	TMCC	WSC	SBC	Total
Year 1	283	0	0	4	287
Year 2	461	87	248	17	813
Year 3	404	82	118	34	638
Year 4	278	76	148	32	534
Total	**1,426**	**245**	**514**	**87**	**2,272**

Source: TREND program data from COMPETE database

A. Race/Ethnicity and Gender

Whites accounted for the overwhelming majority of TREND students, or 73%, across all years of the grant (Table 3). African Americans and Hispanics represented 5% and 3% of

students, respectively. With the involvement of two tribal colleges in the grant, Native American students became a significant share of students starting in Year 2 and that upswing continued through the rest of the grant. While accounting for only 1% of TREND enrollees in Year 1, the share of Native American students increased to 20% during Year 4. Overall, Native American students were 15% of total enrollment over the life of this grant.

Table 3: TREND Round IV Enrollment by Race/Ethnicity

	White		African American		Hispanic		Native American		Asian		Other	
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Year 1	262	91%	14	5%	5	2%	4	1%	0	0%	2	0%
Year 2	588	72%	52	6%	16	2%	117	14%	8	1%	32	4%
Year 3	450	71%	30	5%	14	2%	119	19%	5	1%	20	3%
Year 4	363	68%	21	4%	23	4%	109	20%	1	<1%	17	3%
Total	**1,663**	**73%**	**117**	**5%**	**58**	**3%**	**349**	**15%**	**14**	**1%**	**71**	**3%**

*Other includes Native Hawaiian or Other Pacific Islander students and students of more than one race. Unknown race is not included. Source: TREND program data from COMPETE database

Among all students in the grant, 380 or 17% were female (Table 4), yet this percentage doubled over the four years of the program. Williston State led the way in female enrollment with 223 during Years 1-4, which represented 43% of all Williston TREND enrollment. Females accounted for 18% of TREND students at Sitting Bull College, while they were approximately 8% of TREND enrollment at Bismarck State and Turtle Mountain.

Table 4: Gender in TREND Round IV Programs

All Colleges	**Male**		**Female**	
	Number	Percent	Number	Percent
Year 1	264	92%	23	8%
Year 2	628	77%	165	20%
Year 3	546	86%	92	14%
Year 4	434	81%	100	19%
Total	1,892	82%	380	17%

Source: TREND program data from COMPETE database

B. Employment Status and Full-Time / Part-Time Enrollment

A majority of TREND students – 55% – were incumbent workers who held jobs at the time of their enrollment (Table 5). However, this rate declined after Year 1 of the grant, when 74% of enrolled students were incumbent workers. In Year 4, half of new students held jobs as they enrolled in college.

Table 5: Incumbent Workers as Share of TREND Enrollment

	Year 1		Year 2		Year 3		Year 4		Total, Years 1-4	
	No.	%	No.	%	No.	%	No.	%	No.	%
Incumbent workers	213	74%	444	55%	323	51%	266	50%	1,246	55%

Source: TREND program data from COMPETE database

One quarter of all students attended their TREND programs part time over the life of the grant (Table 6), a rate that largely held steady over the four-year period. As a result, it does not appear that economic swings in the energy industry from 2014 to 2017 have affected whether students attend full- or part-time. However, the rate of full-time students varied by college (Table 7). Full-time students accounted for nearly all of those at the tribal colleges, while two-thirds of Bismarck State students attended on a full-time basis. At Williston State, full-time students accounted for more than four of every five students.

Table 6: Full-Time v. Part-Time Enrollment

All Colleges	Full-time students		Part-time students	
	Number	Percent	Number	Percent
Year 1	219	76%	68	24%
Year 2	628	77%	184	23%
Year 3	463	73%	175	27%
Year 4	397	74%	136	26%
Total	**1,306**	**75%**	**428**	**25%**

Table 7: Full-Time and Part Time Enrollment by College

Name of College	No. & % Full-Time		No. & % Part Time	
	Number	Percent	Number	Percent
Bismarck	946	66%	479	34%
Turtle Mountain	244	100%	1	0%
Williston	431	84%	82	16%
Sitting Bull	86	99%	1	1%
Total	1,707	75%	563	25%

Sources: TREND program data from COMPETE database

C. Priority Populations

The TAACCCT program gives priority to trade-impacted workers and veterans of the U.S. military[3] who would benefit from career training. So far in the grant, 6.6% of all TREND students, or 150, were veterans. Only two students in the Round IV grant – or less than 1% -- were TAA-eligible.

D. Entering Education Levels

Information on the entering education levels of students was available for 1,668 TREND participants, or 73% of all of those enrolled under the Round IV grant. Most TREND Round IV students had attempted some form of postsecondary education by the time they enrolled in a grant-funded occupational program (Table 8). Among this group, more than half – or about 58% -- had some type of prior college experience, including 22% who had at least an associate degree. Overall, 42% had a high school diploma or General Educational Development (GED) as their highest level of education at the time of program entry.

Table 8: Education Level of Students at Entry into TREND

Entering Education Level	Students Enrolled	
	Number	Percent
Less than High School	5	<1%

[3] In the event acceptance into a program needs to be prioritized, veterans take priority over all others, including TAA-eligible individuals.

High school diploma	600	36%
GED	92	6%
Some college/no certificate or degree	540	32%
College cert. or diploma	60	4%
Two-year degree	261	16%
Four-year degree	101	6%
Graduate school	9	<1%
Total	1,668	100%

Source: TREND program data from COMPETE database

Looking at individual colleges, 74% of Bismarck State students with prior data had some college experience or a college certificate/degree, the highest among the four schools (Table 9). This is consistent with site visit focus groups, in which some BSC students indicated they had some postsecondary experience. Overall, about 30% of BSC students had at least an associate's degree, while another 44% had some college or a college-related certificate. By comparison, most students at the consortium's two tribal colleges had a high school diploma or GED as their highest level of education attainment, including 92% of Turtle Mountain students and 79% of students at Sitting Bull. As only about 10% of tribal college students had some prior college experience, their student profiles were significantly different from those at Bismarck State, where three of every four students had some prior exposure to postsecondary study. About 35% of students at Williston had some prior college experience, although data for this institution should be viewed cautiously as the college only reported on the entering education level for 39% of TREND students.

Table 9: Entering Education Level by College

	BSC		**TMCC**		**WSC***		**SBC**	
	No.	%	No.	%	No.	%	No.	%
Less than High School	0	0%	1	<1%	4	2%	0	0%
High school diploma	288	24%	164	76%	105	53%	43	56%
GED	20	2%	35	16%	19	10%	18	23%
Some college–no certificate/degree	474	40%	4	2%	56	28%	6	8%

College certificate or diploma	44	4%	6	3%	7	3%	3	4%
Two-year degree	247	21%	4	2%	8	4%	2	3%
Four-year degree	95	8%	1	<1%	0	0%	5	6%
Graduate school	9	<1%	0	0%	0	0%	0	0%
Total	1,177	100%	215	100%	199	100%	77	100%

*Data on entering education level was not available for all students. Three colleges provided data for more than 80% of students; however, entering education level was available for only 199 Williston students, or 39% of its TREND enrollment. Source: TREND program data from COMPETE database

E. Pell Grant Eligibility

Across the Round IV TREND grant, 606 students, or 27%, were eligible for Pell Grants, indicating that they had significant financial need in order to afford college (Table 10). The tribal colleges had the largest share of Pell-eligible students, as 86% of Turtle Mountain students and 92% of Sitting Bull students met this criterion. As noted in Table 9, these tribal colleges had a much lower share of TREND students with previous exposure to college. These two factors combine to present a picture of tribal college students with many potential obstacles to achievement, compared to TREND students at public, non-tribal institutions. By comparison, 25% of Williston students and 13% of Bismarck State students had incomes low enough to obtain Pell Grants.

The share of Pell-eligible students doubled at Williston in Year 3, increasing to 36% from 18% before leveling off to 27% during Year 4. These year-to-year differences may be due to fluctuating levels of employment in the energy/oil sector throughout the Round IV grant period, with more individuals returning to school when they became unemployed. Williston students have access to a new regional scholarship program that may have prompted more low-income students to enroll in postsecondary study. In contrast to these trends, the Pell-eligible population at Bismarck State has remained steady over the grant period at between 10% and 15% annually. Pell eligibility rates at tribal colleges remained steady at above 80% for every year of the grant.

Table 10: Students Eligible for Pell Grants and Percent of TREND Students at Institution Eligible for Pell Grants

	BSC		WSC		TMCC		SBC		All Colleges	
	No.	%	No.	%	No.	%	No.	%	No.	%
Year 1	37	13%	N/A	N/A	N/A	N/A	0	0%	37	13%

Year 2	62	13%	45	18%	74	85%	17	100%	198	24%
Year 3	61	15%	43	36%	68	83%	31	91%	203	32%
Year 4	28	10%	40	27%	68	89%	32	100%	168	31%
Total, Years 1-4	**188**	**13%**	**128**	**25%**	**210**	**86%**	**80**	**92%**	**606**	**27%**

N/A: No enrolled students that year; Source: TREND program data from COMPETE database.

1.5 Evaluation Design

A. Purposes and Goals of the Evaluation

TREND hired PTB & Associates (PTB) as the external evaluator to provide both formative and summative evaluations of the Round IV grant program. The formative evaluation focused on program implementation, with findings contained in annual formative reports to the consortium that described implementation and provided recommendations on improvements. The summative evaluation report, provided here, examines both implementation and outcomes from the program, particularly the educational and career success of participants as compared with similar non-participants via a quasi-experimental study. The evaluation team worked with colleges, primarily BSC, to analyze completion and employment rates for TREND Round IV participants and compare this data to a comparison group of former BSC students prior to receipt of the TREND Round II grant, or approximately in the period from 2009 through 2012. Many of the treatment and comparison students were enrolled in the largest energy-related programs common to both time periods, including lineworker, process plant, and power plant. PTB outlined its plan in detail in an Evaluation Plan presented to TREND colleges and approved by DoL in fall 2015.

B. Implementation Study Design

For Years 1-4, the evaluation team focused on implementation of a maturing grant program and its ability to deliver key activities and services. This final report continues that work by providing an overview of program implementation that is guided by several core research questions:

- *What are the characteristics and needs of participants?*
- *What is their view of education and their capacity to succeed in postsecondary study?*
- *What progress has been made on proposed grant activities?*

- *How has TREND built capacity at member institutions?*
- *Did the project meet key grant targets outlined in its application to US DoL?*
- *What are the perceptions of students and staff about activities supported by the TREND Round IV grant?*
- *What support services and other services were available, and what services do students believe would be most effective?*

The primary methods for implementation evaluation were: 1) annual site visits to colleges to observe programs, conduct interviews with staff, and conduct focus groups with students; 2) an attitudinal survey early in the students' TREND program of study to obtain valuable information on their early perceptions of the program, their education and career goals, and their attitudes and beliefs toward education; and 3) biweekly calls with the TREND Project Director and other staff to review project progress; and 4) document review including quarterly and annual reports provided to US DoL. The evaluation team developed protocols for site visits that sought to answer the implementation research questions, including the ability of colleges to build capacity under the grant. Overall, PTB conducted interviews and focus groups attended by 170 individuals over the life of the grant (Table 11).

Table 11: Site Visit Participants in Focus Groups / Interviews

	Students	Faculty	Administrators/Staff	Employers
2016 Site Visit	24	14	16	0
2017 Site Visit	24	20	16	1
2018 Site Visit	19	15	16	5
Totals*	**67**	**49**	**48**	**6**

*These may include some duplicate counts, as PTB typically interviewed the same administrators/staff and faculty every year. Efforts were made to provide different students each year.

In addition, quarterly and annual reports filed by TREND with U.S. DoL were used to assess progress in building capacity, as these report findings – including budget allotments for equipment and technology – were aggregated over time to assess overall consortium progress. Interviews with faculty were particularly useful in determining the extent to which colleges built capacity, since these decisions affected the timing and rollout of program expansions. PTB provides answers to these questions under Chapter 3, Implementation Findings.

C. Impact Study Design and Methodology

In addition to this emphasis on implementation, the final Summative Evaluation Report includes the results of a rigorous impact study designed to capture the extent to which the TREND Round IV grant has had a significant impact on students. The key questions for the impact study are:

What is the impact of TREND IV on project participants in regard to completion of in-demand career/technical education programs?

What is the impact of TREND IV on project participants in regard to subsequent employment after completing a program of study?

To answer these questions, PTB collected information on TREND Round IV participants and compared their performance and outcomes to a comparison group of students in the same programs enrolled prior to the first TREND grant, or from 2009 through 2012. PTB produced matched groups of treatment and comparison groups through Propensity Score Matching (PSM), a process that matches intervention group members with comparison group members using propensity scores based on their characteristics (Guo & Fraser, 2010). This analysis included student socio-demographic information, credits earned, grade point averages, and credentials received. PTB's design did not include students from 2012-2014 as the colleges operated another TAACCCT grant during this period and the goal was to compare TREND Round IV to a business-as-usual approach prior to federal support. In addition, US DoL permitted TREND to count some students under both TAACCCT grants, making it difficult to isolate gains that may be attributed to the earlier grant as opposed to the 2014-2018 grant.

This impact study applied a rigorous comparative methodology to isolate grant program effects on student outcomes. Sufficient data was not available on employment for comparison students; as a result, PTB conducted an outcomes analysis on the issues of employment and wages. This report also contains findings from PTB's review of aggregate employment and wage data provided by the state of North Dakota on Round IV TREND completers. The state's main employment agency could not provide individual-level employment and wage data due to privacy concerns. However, it has worked with BSC to provide aggregate employment data on those who completed energy-related programs before and during the TREND grants. In addition,

the outcomes analysis examines the progress of TREND in achieving its enrollment and other numerical goals outlined in the grant proposal. These include the nine U.S. DoL measures provided in Annual Performance Report for TAACCCT grantees.

D. Data and Data Reliability

For both the implementation and impact studies, this evaluation utilized PTB's COMPETE database for the entering and aggregation of TREND grant data. Through COMPETE, colleges reported detailed information on students, including demographics, Pell Grant status, full-/part-time status and other factors. BSC also provided information for the impact study on comparison students by uploading Excel files that were fully integrated into COMPETE for analysis. PTB's database staff cleaned all data and identified missing data; PTB then gave colleges additional opportunities to add such data for this final report.

In this report, the evaluation team relies mainly on data that colleges have entered into the COMPETE database. PTB designed COMPETE so colleges easily can report and have available annual and summary data on key U.S. Department of Labor benchmarks. Bismarck State houses final data on employment, as it tabulates this information in partnership with Job Service North Dakota (JSND). Data from attitudinal surveys are entered directly into Survey Monkey, which is used to aggregate the responses. Exit surveys and exit data are done by various means. For example, Bismarck State relies on two instruments it developed prior to the Round IV grant. Turtle Mountain is utilizing an instrument developed by PTB.

For the impact study, the evaluation team was able to obtain sufficient individual-level data to conduct a rigorous quasi-experimental study comparing treatment and comparison students on measures related to program of study completion, grade point average, and credits earned. The colleges could not provide sufficient individual-level data to conduct a quasi-experimental analysis between treatment and comparison students on the issue of employment. For this key question, the evaluation team used basic bi-variate statistics from treatment and comparison groups; it also analyzed aggregate employment and wage data for treatment and pre-treatment students available through a partnership between TREND and JSND. However, this data provides only general trends for groups of students who graduated in several popular

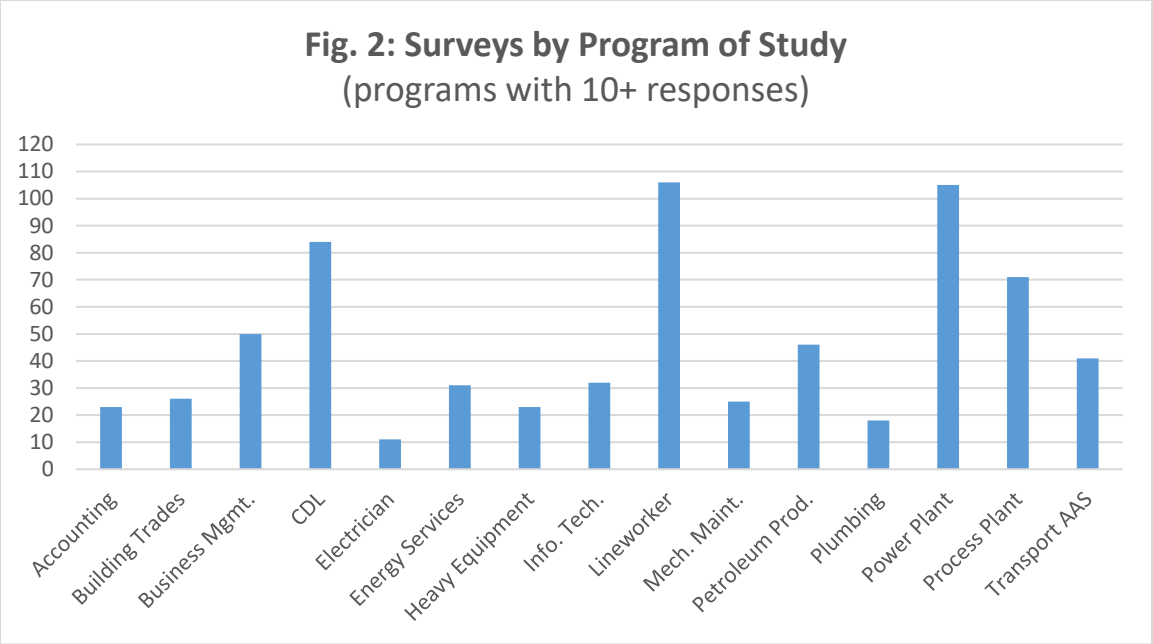
energy-related programs of study. Nonetheless, it provides valuable context in assessing TREND efforts in comparison with pre-TREND data.

2. Analysis of Attitudinal Surveys

2.1 Survey Overview and Administration

This section examines the attitudinal surveys that newly enrolled TREND students completed throughout Years 1 to 4. Developed by PTB & Associates with input from Bismarck State and other TREND colleges, the survey includes 19 questions on students' career goals, their views toward education and work, and satisfaction with the program. These surveys were critical in gaining knowledge about the program and about students as they began enrollment in TREND programs. Most students complete a paper survey which was then inputted into Survey Monkey by the colleges. So far, 818 students have submitted survey responses. Bismarck State, the grant's fiscal agent and the college with the most TREND students, had the largest number of responses at 350. Among the other schools, Williston State College had 242 students complete the survey while Turtle Mountain Community College and Sitting Bull College had 151 and 69 students, respectively. While Bismarck State had the largest number of students taking the survey, the 350 represented only 25% of all BSC students in TREND programs during the grant. This rate is likely due to two major factors: 1) Bismarck enrolled nearly all TREND students in Year 1 of the project, and the new student survey was not approved and implemented until Year 2; and 2) BSC has many online students who do not come on campus, and while the survey is strongly encouraged it is not required. Response rates for other colleges included 79% at Sitting Bull, 62% at Turtle Mountain, and 47% at Williston.

By occupational area, lineworker had the most survey responses with 106, closely followed by power plant with 105 surveys and welding with 103 (Fig. 2). Others with 50 or more responses were business management, commercial driving, and process plant. Occupations with fewer than 10 responses included GIS, water and wastewater, and instrumentation and control. Across all occupational areas, 78% of respondents said their main goal for enrolling in a TREND program was to start a career.



2.2 Student Attitudes about College

In focus groups conducted in Years 2-4, some students said that they had past experiences in postsecondary education but that these experiences were often not positive, particularly in traditional liberal arts programs. The survey included questions to elicit responses from most students about whether they were nervous about entering their TREND program or believed they would need help to complete their occupational program.

Overall, 24.6% of survey respondents indicated they were nervous about enrolling in college (Table 12). Another 47% said they were not nervous about college, and the remaining 28.4% were not sure. These figures have remained largely the same since early in the grant, regardless of the condition of the local economy. Broken out by campus, with numbers and percentages, students at Williston State were most likely to say they were nervous about enrolling, as 32% said they agreed or strongly agreed with this statement. Turtle Mountain was next at 29%, with Sitting Bull at 23%. The lowest rate was among students at Bismarck State, where 19% agreed with the statement.

Table 12: Agree/Disagree – I'm Nervous about Enrolling in College, by Campus

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
BSC	46 (13%)	131 (37%)	108 (31%)	58 (17%)	7 (2%)

WSC	43 (18%)	65 (27%)	53 (22%)	62 (26%)	14 (6%)
TMCC	26 (17%)	37 (25%)	44 (29%)	31 (21%)	12 (8%)
SBC	11 (16%)	18 (27%)	23 (34%)	13 (19%)	3 (4%)
Total*	127 (15.7%)	254 (31.3%)	230 (28.4%)	164 (20.2%)	36 (4.4%)

Source: TREND attitudinal surveys; *Includes students who chose not to list their college of attendance.

2.3 Students Needing Assistance

As some adult students may be enrolling in college for the first time or enrolling after a long break form postsecondary education, the survey sought to determine whether TREND participants thought they needed some help to be ready for college. In this subsection, the evaluation team looks not only at the results in the aggregate and by campus but also by major academic program. Overall, nearly one in four students, or 24%, said they believed they would need some help to be ready for college while 38% disagreed (Table 13). Another 38% percent did not agree or disagree.

By campus, students from the tribal colleges were most likely to believe they need assistance. Among students at Sitting Bull, 35% believe they need assistance, while the rate at Turtle Mountain was 33%. About one in five students at both Bismarck and Williston answered affirmatively.

Table 13: Agree/Disagree – I Need Some Help to be Ready for College, Data by Campus

	Strongly Disagree	**Disagree**	**Neither**	**Agree**	**Strongly Agree**
BSC	35 (10%)	117 (33%)	131 (38%)	62 (18%)	5 (1%)
WSC	22 (9%)	74 (31%)	96 (39%)	45 (19%)	4 (2%)
TMCC	14 (9%)	35 (23%)	52 (35%)	36 (24%)	14 (9%)
SBC	3 (4%)	12 (17%)	30 (44%)	19 (28%)	5 (7%)
Total*	74 (9%)	241 (29%)	310 (38%)	163 (20%)	29 (4%)

Source: TREND attitudinal surveys; *Includes students who chose not to list their college of attendance.

Looking at this issue by occupational field, students in plumbing, petroleum production technology, water/wastewater, energy services, and commercial driving were most likely to say they need assistance. Among three of the largest TREND programs, the rates of those saying

they needed assistance were 25.3% in process plant, 19.1% in power plant and 13.2% in lineworker (Table 14).

Table 14: I Need Some Help to Be Ready for College, by Key Programs of Study

Program	No. and % in field who Agree/ Strongly Agree		Program	No. and % in field who Agree/ Strongly Agree
Lineworker	14 (13.2%)		Business Management	10 (20.0%)
Petroleum Production Technician	18 (39.2%)		Information Technology	4 (12.5%)
Geographic Information Systems	2 (22.2%)		Building & Construction Trades	3 (11.5%)
Process Plant	18 (25.3%)		Plumbing	10 (56%)
Power Plant	20 (19.1%)		Electrician	2 (18.2%)
Energy Services	11 (36%)		Commercial Driving	29 (34.6%)
Water and Wastewater	2 (66.7%)		Heavy Equipment Operator	6 (26%)
Transportation AAS	7 (17.5%)		Accounting	3 (13.0%)
Welding	20 (19.4%)		Mechanical Maintenance	4 (16%)

Source: TREND attitudinal surveys

There were some differences by campus in how students answered the questions of whether they were nervous about resuming their education and whether they need help to be ready for college (Table 15). For example, 32% of Williston students said they were nervous about enrolling but just 21% said they need help to be ready for college. The difference at Sitting Bull was 12 percentage points, as 35% believed they need help for college and 23% were nervous about enrolling. Differences were evident as well at Turtle Mountain, while there were no differences among Bismarck State students. In thinking about the question of needing help, students may focus on the academic challenges they expect to face, while being nervous about college enrollment may encompass a range of issues, from academics to financial concerns and whether they can juggle school with work and/or family demands.

Table 15: Concerns about Enrolling in TREND Programs, by College

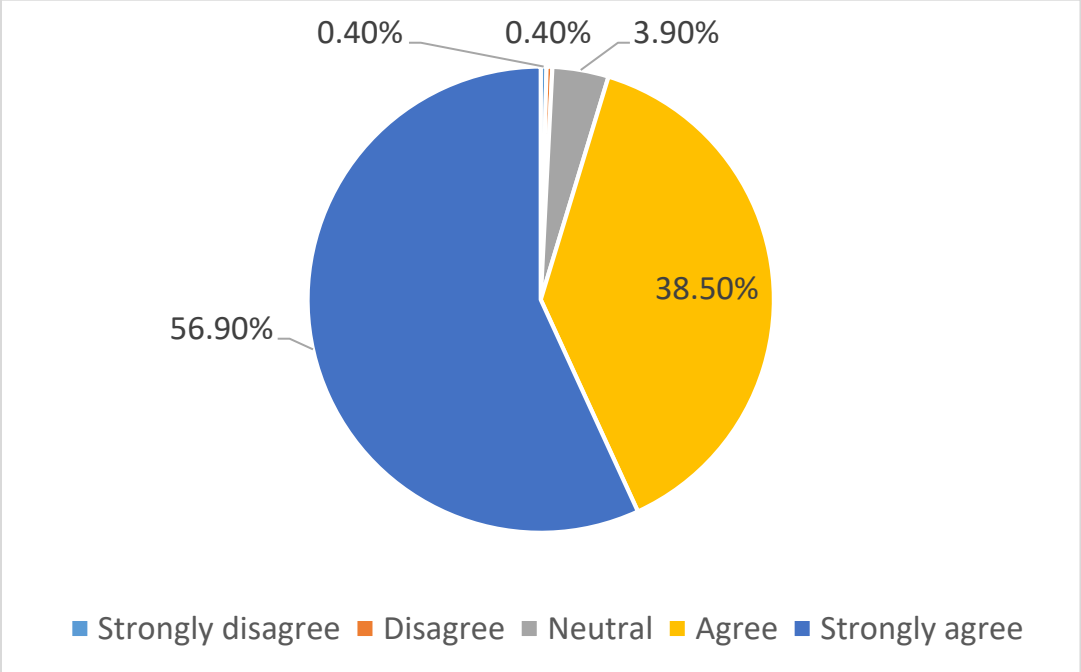
College	Nervous about enrolling in college	Need help to be ready for college
Bismarck State College	60 (19%)	67 (19%)
Williston State College	76 (32%)	49 (21%)

Turtle Mountain	29 (29%)	50 (33%)
Sitting Bull College	15 (23%)	24 (35%)
Total*	**180 (22%)**	**190 (23%)**

Source: TREND surveys based on those answering "Agree" or "Strongly Agree."
*For respondents who indicated a college of attendance.

Despite some students who had concerns about enrolling, the overwhelming majority of students – nearly 95% -- agreed with the statement that "I will complete" the TREND program, including 56.9% who "strongly agreed" (Fig. 3). Similarly, more than 90% believed they will have better job prospects after completing the program.

Fig. 3: Survey Question – I Will Complete My Program of Study



2.4 Support Services Desired

Asked to identify support services that might be most valuable, students were most likely to cite scholarships as their most significant need. Overall, 67.9% identified a need for scholarships or other financial aid; the second most popular answer was tutoring, selected by 25.6% of respondents (Fig. 4). Seven percent listed counseling.

Fig. 4: What Student Support Options Would Be Most Valuable to Help You Succeed?*

ANSWER CHOICES	RESPONSES	
Tutoring	25.6%	204
Counseling	7.2%	57
Scholarships	67.9%	541
Day care	2.8%	22
Study groups	2.1%	17
ESL program	0.1%	1
Academic advising	3.6%	29
Other	7.8%	62
Total Respondents: 797		

*Students could select multiple support services.

Broken out by campus, Turtle Mountain students were most likely to cite scholarships, with 78% in agreement, but they were least likely to want tutoring (Table 16). Bismarck students were most likely to cite tutoring, closely followed by Williston State. Sitting Bull students were the likeliest to cite needs for day care, study groups and academic advising, while the other colleges trailed on those issues. Briefed on these trends, some college leaders were surprised that few students identified day care as a need; however, the male/female demographic may have impacted how this question was answered. Another factor may be that students are not as worried about day care as college officials may believe.

Table 16: What Student Support Options Would Be Most Valuable? (By campus)

	Tutoring	Counseling	Scholarships	Day Care	Study groups	Academic advising
BSC	30%	7%	64%	2%	<1%	<1%
WSC	27%	11%	68%	3%	3%	4%
TMCC	15%	3%	78%	1%	1%	5%
SBC	25%	6%	67%	10%	12%	16%
Total	**26%**	**7%**	**68%**	**3%**	**2%**	**4%**

Source: TREND attitudinal surveys. Students could select multiple support services.

2.5 Student Satisfaction

Data from the surveys indicated that students were satisfied with their occupational programs during their first semester of study. Overall, 87% agreed or strongly agreed that they

were personally satisfied with their program (Table 17). All colleges had high rates of satisfaction, led by Turtle Mountain and Sitting Bull, each with more than 90%.

Table 17: Agree/Disagree – Are You Satisfied with Your Program of Study?

College	Agree	Strongly Agree
Bismarck State College	159 (46%)	142 (41%)
Williston State College	124 (52%)	75 (32%)
Turtle Mountain	66 (44%)	73 (48%)
Sitting Bull College	29 (42%)	35 (51%)
All students	**381 (47%)**	**327 (40%)**

Source: TREND attitudinal surveys

In addition, the overwhelming majority of students expect to improve job readiness after completion (Table 18). Notably, a large majority indicated that TREND participation may position them well to pursue additional education as well as jobs in the future. They also were highly likely to recommend the program to others.

Table 18: Student Views on Importance of TREND Education

Statement	Agree	Strongly Agree
I will obtain technical skills that will help me in gaining future jobs	354 (44%)	418 (52%)
This program will enable me to pursue additional education to improve my skills	389 (48%)	359 (44%)
I will have better job prospects after completing this program	403 (50%)	354(44%)
I will get a better job after I finish the program than I had before I enrolled	322 (40%)	396 (49%)
I would recommend the program to others	357 (44%)	380 (47%)
If I had the chance to decide again, I would enroll in the program	325 (40%)	381 (47%)

Source: TREND attitudinal surveys

3. Implementation Findings

Beginning in fall 2014, PTB began a study of TREND to determine the fidelity of implementation and to collect information to assess the status of the program. The implementation evaluation consisted primarily of annual site visits, regular phone calls with project staff, and review of project documents, including quarterly reports sent to U.S. DoL. The evaluation team presented annual formative evaluation reports annually in Years 1-3 of the project. Those reports found that the TREND colleges had implemented the program with fidelity, and the research team included some recommendations for future enhancements in the program. In this summative report, PTB provides final findings on the implementation of the grant, including Year 4 evaluation activities, including the final site visit to the TREND colleges.

3.1 Building Institutional Capacity

TREND colleges used federal grant funds to build institutional capacity in a variety of ways, although two strategies stand out as most significant: 1) The hiring and full rollout of career navigators, who played a pivotal role in helping students stay on track for completion of their programs; and 2) Support for new equipment and technology, along with related faculty training and support.

Career navigators: The TREND colleges used Round IV funds to expand their use of career navigators, or trained advisors who link students to wraparound support services, provide intentional advising, and help prepare them for entry into the workforce. Having career navigators allowed TREND staff to customize services for students. “Every student has different needs,” one career navigator said. Some may need outreach to help stay in school, while others need guidance about financial aid or stackable credentials. Some common activities included:

- Ensuring that new students received assessments of students on basic skills, job readiness, and career exploration through sites such as RUReadyND.gov, https://secure.ruready.nd.gov/
- Receiving early alerts about students missing class or struggling with their studies
- Providing extra coaching to those students entering with low high school grade point averages
- Linking students to tutoring or other services as needed and

- Conducting career-oriented activities such as resume writing workshops, job search skills, and mock interviews.

At one college, navigators typically reached out to students a week or two before the start of registration for the next semester. They also would reach out if they had reports of students missing class or struggling with their studies.

"I often feel like the school 'mom' for the students. It's important to keep up with the students," one said. This navigator not only worked with students while they were enrolled but stayed in touch after program completion. The navigator said this was particularly important given the cyclical nature of some TREND-related occupations. For example, commercial driving and heavy equipment operators may be laid off during the winter months, and this navigator will check with students in the spring to see if they are working again.

The TREND grant supported two career navigators at Bismarck State, and the college funds a third who focuses on energy-related occupations not covered by the grant. The three cover for each other as needed, to help answer student questions. "It's a fluid process. We're not siloed by occupational program," one navigator said. While students have faculty advisors, the navigators say they are familiar with requirements for all occupational programs.

Flexibility and persistence are other key attributes for navigators on this campus. As staff indicated for fall 2017, only 37% of BSC TREND students are on campus, with the remainder primarily taking courses online – including many who live out of state.

BSC placed career navigators in a critical role as it tried to reduce the number of students who fail occupational classes. Armed with early alert data about struggling students, navigators would encourage students to withdraw from a class before the deadline rather than take Ds or Fs on their report cards. For this work, navigators relied on Starfish data showing students who have frequently missed class or failed to complete assignments. Through this effort, failure rates among students have dropped by 15 percent. The navigators educate students about graduation requirements, including the 2.0 minimum grade point average required to earn a degree and the implications that a D or F grade can have on meeting this target GPA. Prior to Starfish, a strong relationship existed between a student's past grade point average and performance during a particular semester. But the college's institutional research analyst found a weaker connection

beginning in 2016, with a small increase in the number of withdrawals and a decrease in the number of course failures. “Students with a poor academic history are doing better,” the analyst said. A navigator added that this in-depth contact engages many TREND participants. Said one navigator, “More students are asking questions now, and lots more are dropping in to talk.”

Across most TREND campuses, career navigators are providing job readiness instruction either via a class or through individual counseling or group workshops. At Turtle Mountain, the career navigator has conducted a job readiness class on Fridays covering topics that include resumes and mock interviews. The navigator researches job openings and maintains contact with instructors about local job opportunities. She also has had faculty members review student resumes to provide suggestions. Following up with absent students is another priority across the colleges. “If a student misses two days in a row, [the career navigator] gets on them,” one campus administrator said.

At Sitting Bull College, staff expanded its TREND job skills class in the past year to include an online/hybrid option for students who have less availability on campus due to work/family obligations or transportation challenges. The college has continued to offer an in-person class. Since adding the online/hybrid options, staff report that more students are completing the class, and more students overall are enrolling and continuing in TREND programs. Sitting Bull describes its approach as providing wraparound support for students, including support services and access to career and job fairs.

Equipment and technology: TREND colleges expanded the breadth and depth of their offerings through substantial grant investments in new technology and equipment. Overall, colleges committed 17.7% of grant funds to equipment purchases above $5,000 – or $1.7 million from a total grant budget of $9.9 million (Table 19). These included many simulators and trucks for commercial driving/heavy equipment operator programs as well as training technology for lineworker, electrical, and welding programs. Closely related to equipment was the purchase of software, licensing and simulation technologies for use in TREND programs.

Table 19: TREND Equipment, Supplies & Software

College	Total Equipment Purchases of $5,000+	Supply Purchases (Fuel, Consumables, etc.)	Software, Licensing, and Simulations	Total Budget
BSC	$575,495.90	$337,924.50	$281,150.00	$4,204,124
WSC	$379,783.63	$71,721.89	$18,004.15	$1,893,478
TMCC	$504,501.00	$138,678.70	$0	$2,128,197
SBC	$304,145.50	$143,737.76	$0	$1,700,611
Total	**$1,763,925.03**	**$692,062.85**	**$299,154.15**	**$9,926,410**

Source: BSC data provided to the evaluation team

Colleges would procure these items by evaluating classroom and lab needs to best meet participant outcomes. Then they would obtain quotes from vendors through a competitive bid process. In some cases, equipment or consumables may support the addition of new programs. At TMCC, administrators used the Round IV equipment and consumable budget to add a pipe certification to its welding program. The college also expanded its driving programs to include heavy equipment operator, supported by the purchase of new heavy-duty trucks for classroom use, while the grant also supported creation and set-up of a plumbing lab for a new short-term TREND program. In addition, simulators purchased by colleges helped introduce students to key principles in commercial driving and welding programs in low-stress environments. (For a partial list of major equipment purchases by college, see Table 20)

College	Table 20: Partial List of Major Equipment Purchases
BSC	Bucket truck for lineworker program, $120,000 Wind tower 30 feet off the ground for safety training and emergency descent training for working at heights, $80,000 2 Programmable Logic Control trainers for renewable generation program, $90,000
SBC	Forklift truck to use inside or on rough outdoor surfaces, used for welding, electrical, and building trade programs, $40,000 Passenger bus ($80,000) and semi-truck ($100,000) for commercial driving program, Welding stations for new welding program, $24,000
TMCC	Motor grader for heavy equipment operator program, $159,000 Simulators including hydraulic excavator, dozer, and loader for heavy equipment program, $34,000

WSC	Hydraulic trainer for petroleum production, $35,000 Diagnostic certification training system for transportation, $55,000 2 welding booths and 6 welding simulators for welding program, $66,000

Source: College data provided to the evaluation team

Closely related to equipment purchases was faculty training on new equipment and technology, including simulators. The colleges typically purchased training equipment so that faculty had access to the most up-to-date framework for learning new technologies. To further enhance faculty skills, TREND colleges also supported professional development related to conflict resolution, management of career and technical education programs, alignment of courses with stackable credentials.

TREND colleges also supported faculty by using grant funds to cover some of their salaries among the new / expanded programs. As a result, colleges were able to support new programs in heavy equipment operator, plumbing, welding and electrical. Colleges have committed to pick up the costs of these new faculty positions after the end of the grant, an indication that institutions will consolidate the gains made during the grant period.

3.2 Creation and Administration of the Program

The basic structure of the TREND grant was already in place in fall 2014 when the coalition received a second grant under the TAACCCT program. Partner colleges, led by BSC, created this structure with the start of the first TAACCCT grant in 2012. As a result, the Round IV grant was able to leverage existing policies and approaches to begin implementation quickly. The Round IV Grant Director, Emily Cash, began her work during the Round II grant and administered both grants to their conclusion (Round II in 2016 and Round IV in 2018). She instituted a regular schedule of communication across stakeholders including:

- Biweekly calls of consortium members to review project progress, deliverables, and implementation of key activities;
- Biweekly calls with PTB, the external evaluator for the Round IV grant to discuss evaluation planning, annual site visits, data collection/reporting issues, and formative/summative evaluation; and

- Quarterly in-person meetings of consortium members held at the individual member colleges. In addition to reviewing grant progress, these meetings provided a forum to observe programs, hear from expert presenters, and conduct in-depth reviews of grant-related issues and programs. At least twice a year, these meetings included a working luncheon or other forum with employers to foster cross-communication about employment trends and TREND activities.

In addition to these policies, Director Cash and the program's fiscal specialist conducted regular visits to colleges, at least on an annual basis, to review programming and fiscal compliance by individual colleges. All of the other member colleges had a TREND point of contact responsible for administering the program on their campus. These contacts administered the college's part of TREND, often with help from a data person and a career navigator. In one case, the campus administrator for TREND also served as the career navigator. This level of contact was critical at several points in the program, when economic downturns in the oil and gas industry prompted a re-thinking of some career and technical education programs. Working with Cash's office, one college changed plans to offer new programs, while others sought to provide shorter-term training options. The TREND Director contacted the federal program officer as needed to obtain approvals for amendments to TREND programs. One example was at WSC, where the college pulled back on plans to offer new programs in electrical and soil/mineral management. Instead, US DoL approved a scope of work modification so that WSC did not have to make these standalone programs.

During interviews at the annual site visits, most college staff found the TREND management system effective in maintaining communication throughout the consortium. Member colleges said BSC and Director Cash were quick to provide answers to questions as they arose. BSC and project administrators at all colleges also worked with PTB to design site visits so that the evaluator could speak with students and faculty as well as staff.

3.3 Partnerships

Consortium members forged strong relationships with employers that led to curricular enhancements and, in some cases, internships and co-op opportunities for students. These partnerships in turn led to positive outcomes for students as they completed cutting-edge training

and had opportunities to gain employment in their desired fields. In addition, TREND also established an effective partnership with the state to address many challenges in accessing employment and wage data for completers.

TREND member colleges have established in-depth relationships with many employers, with these partnerships leading to equipment donations, curricula improvements, and work experiences for students. Throughout the consortium, employers have participated in semi-annual advisory council meetings as well as attending job fairs, judging student projects, and providing field trip opportunities. Some have offered job shadowing, internships, and co-op work opportunities. Most occupational programs have their own advisory councils where employers provide input on curriculum, credentials, and equipment while briefing faculty on new developments in the field. Said one employer about Williston State College:

> *They keep industry engaged about what's going on. The advisory group will brainstorm about curriculum approaches, changes in the industry and recent trends. We'll go through the curriculum and the reasons why courses are offered and in what order.*

Williston State actively worked with employers to obtain both formal and informal feedback on its offerings. In welding, the college added blueprint reading and fabrication training based on industry input. Based on recommendations for employers, it built a crosswalk between its petroleum and information technology (IT) programs to meet labor market demands. This policy enabled students in Petroleum Automation and Control to enroll in Networking Fundamentals to learn more about IT, while IT students took basic Automation courses. Employers recommended this adaptation so that completers have a varied skill set that can better help them gain jobs. Such work was important as a downturn in the oil market during the grant prompted companies to increase efficiencies and automation so that they can make a profit at a lower per-barrel price. Said one faculty member in an interview, "They used to need $50 a barrel to break even, but it will be $33 in the future," and companies are eager for students to have knowledge of automation technologies to help meet such targets.

In interviews and focus groups with employers during Years 3 and 4 of the project, employers said they look for TREND students with strong basic skills, an interest in hands-on work and a strong attention to detail. Most also say TREND programs are making a valuable contribution:

We [employers] don't want to train them from the start – we want them to learn in a safer environment, such as on campus.

Turtle Mountain Community College recently began a Heavy Equipment Operator (HEO) program as another option in its array of commercial driving options. The college signed a memoranda of understanding with the local tribal transportation department in which students gain hands-on experience by working actual jobs as part of their HEO certification. The tribal road department has a contract with the federal government to provide maintenance on local roads, and TREND students gain important work experience. "Our students work side by side with the tribal road department," one official noted.

Bismarck State has undertaken a variety of employer outreach strategies. One of the most far-reaching is an innovative partnership with Hess Corp. through which students gain paid work experience as they take online classes. Bismarck State students can apply to join the Hess Corp. Job Experience Training (JET) program if they have completed at least one semester in power plant, process plant or petroleum production with a minimum grade point average of 3.0. Applicants must have a valid driver's license, pass a drug/alcohol test and obtain health approvals to meet physical requirements for jobs. If selected, students maintain their full-time student status while spending a year on location at Hess.

A typical day in JET runs from 7 a.m. – 5 p.m. Monday through Friday and includes skill lab training, field rotations and experience, job shadowing and competency assessments, with most training focused on pipeline operations. They also can earn special status that allows a minimum of two job shadow assignments per month. After graduation, students may receive an offer for a Hess job or join an apprenticeship that rotates among mechanical maintenance, logistics, gas plant and gas gathering. Said one BSC official: "We want our students to be job ready out of the gate." Said an employer, "After one year of college, they're getting work experience."

The college has a page on its web site describing the program (https://bismarckstate.edu/energy/jobs/HESSJET/). Included are links to the Hess JET application. Faculty cite this program among other initiatives in promoting job readiness. In addition, Bismarck has a Job Seekers Network online that is open to all students and alumni. The network provides links to local, regional and national companies. Students are encouraged to

start their job searches at least one semester before they are scheduled to complete their programs. In addition to Hess, other employers participating in evaluator interviews or cited in quarterly TREND reports include Oasis Petroleum, Statoil, Fusion Fabrication, Charley's Pipe and Salvage, Gooseneck, Dakota Tractor, Worthington, Jelliston, Hertz, Rockwell Automation, Turtle Mountain Transportation/Transit Department, Border States Industries, and Andeavor.

In an interview with PTB, one BSC industry partner noted how he reaches out to faculty and staff regarding internships. This partner has spoken to Mechanical Maintenance classes and participated in mock interviews with TREND students.

> *BSC has gone way beyond the traditional company / college relationship. Faculty have strong skills and significant experience.*

Employer partners say they look for students with technical as well as soft skills, plus an interest in real-world applications of what they learn in the classroom. Said one executive, "The key question is, 'Can students apply what they've learned?'" One employer stated that her company interviewed more than 30 BSC students for summer internships with many placements that were expected to continue into the fall. These employers said they have a strong need for mechanics, instrumentation and automation staff, and those with a process plant background. BSC's petroleum technology program is new within the past six years, and Hess provided input on its operation through an employee representative.

At a recent BSC career fair, 100 students participated in mock interviews conducted by industry partners. BSC also organized an event with employers to better understand upcoming workforce trends and likely changes in the worker pipeline, and employers provided advice on sustaining TREND-funded programs.

New for the Round IV grant, a Lineworker Rodeo program at BSC is an opportunity for students to showcase their skills for employers as well as family members. The event has been a major success not only as a way for students to get jobs but also as a recruiting tool to build interest in the community. Faculty believe it is one reason why the lineworker program is generally filled to capacity year to year.

For their part, employers said they reaped other benefits from having a close relationship. For example, one said that, based on employer input, BSC is now teaching introduction to

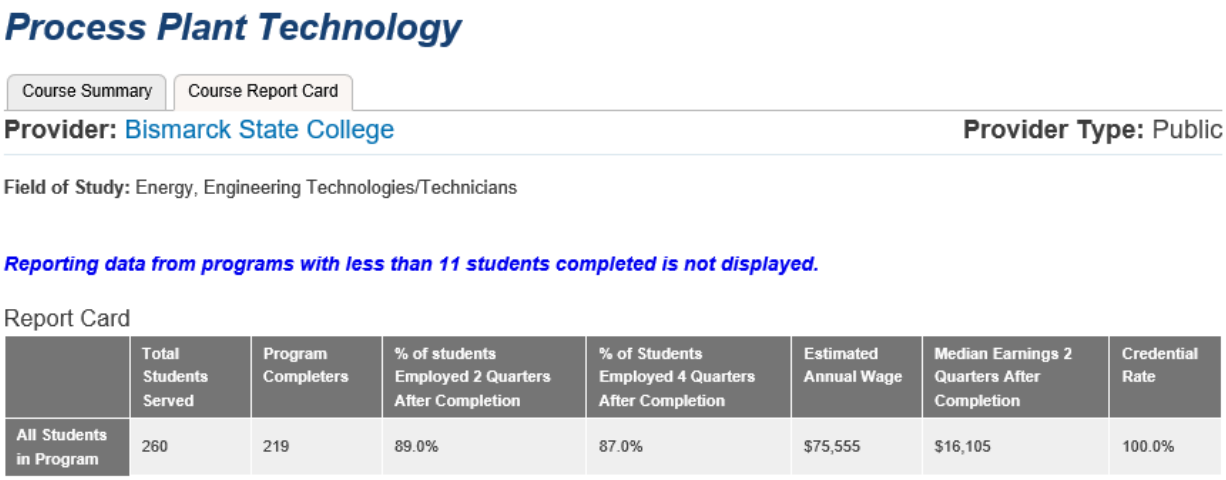
networking rather than introduction to computers. While some employers participated in mock interviews, they said that career navigators conduct these types of interviews and work with students to develop and refine their resumes. Employers say they regularly talk with faculty about job openings, while company HR departments also reach out to a career navigator with hiring information. As another employer noted, "BSC is an invaluable resource for us. It is by far world class."

TREND-related partnerships also are evident its growing relationship with Job Service North Dakota (JSND), the state agency responsible for workforce development. TREND and JSND found common ground in which JSND agreed to provide aggregate employment data on students who completed a Round IV grant-supported program through the State Longitudinal Data System (SLDS). It also agreed to provide average wage data for students graduating within specific time periods in specific programs of study. Given that state policy does not allow for the release of individual-level employment and wage data, these agreements offered valuable information and are a credit to the dedicated efforts of TREND leadership.

In addition, TREND and JSND partnered on adoption of an Employment Results Scorecard that aligns with state workforce policies. As a state TAACCCT grantee, TREND had two options at the end of the Round IV grant: to develop an online Employment Results Scorecard or to submit an Employment Results Scorecard Continuous Improvement Plan. After much discussion, TREND chose the latter option so the colleges could align with JSND's required Workforce Innovation and Opportunity Act (WIOA) scorecard.

Under the WIOA scorecard, JSND established a process to receive data regularly from eligible training service providers – including the TREND consortium colleges – and then match this information with state longitudinal data to create an online scorecard system. Already, the state is able to display clear employment outcomes for TREND program participants in many high-demand career categories. An example is below in Fig. 5 for Bismarck's Process Plant Technology program, a TREND offering:

Fig. 5: Scorecard Example



Process Plant Technology

Course Summary | Course Report Card

Provider: Bismarck State College **Provider Type:** Public

Field of Study: Energy, Engineering Technologies/Technicians

Reporting data from programs with less than 11 students completed is not displayed.

Report Card

	Total Students Served	Program Completers	% of students Employed 2 Quarters After Completion	% of Students Employed 4 Quarters After Completion	Estimated Annual Wage	Median Earnings 2 Quarters After Completion	Credential Rate
All Students in Program	260	219	89.0%	87.0%	$75,555	$16,105	100.0%

By selecting the Continuous Improvement Plan, the TREND Consortium can continue to collaborate with JSND long after the TAACCCT grant has closed and sustain this valuable tool. This option was welcomed by the consortium in order not to "reinvent the wheel" but rather put its efforts toward partnering with the existing statewide system and use this critical data for recruitment and career exploration with current and prospective participants.

In addition to accessing SLDS data for TAACCCT grant reporting, the colleges share data with JSND so that the colleges can be included among JSND's Workforce Innovation and Opportunity Act (WIOA) scorecard and eligible training providers list.

JSND, along with the Governor's Workforce Development Council, has established an in-demand occupations list with input from stakeholders, including TREND colleges. The list helps to populate the online JSND scorecard and includes occupations determined to have a current or potential impact on the state's economy. Commenting on the evolving TREND/state relationship, one administrator stated, "We would never have had that relationship without the grant."

3.4 Implementation with Fidelity to the Original Design

The first full year of the Round IV TREND project was a developmental year as member colleges purchased equipment, interviewed and hired new staff, and began to implement the specific activities planned under the new TAACCCT grant. The colleges concurrently operated their Round II TREND grant during this period. For the new grant, all

colleges began the process of hiring and integrating career navigators into their programs. Only two colleges, Bismarck State and Sitting Bull, enrolled Round IV students in Year 1. During Year 2, all four colleges enrolled Round IV students and had adopted the foundational aspects of the Round IV grant, including: full use of career navigators with students; procurement and installation of new equipment and technologies; and expanded outreach to employers through advisory boards, face-to-face meetings, and establishment of internship programs.

Since Round IV's inception, the colleges have dealt with a fluid energy market that has featured lower-than-expected oil prices. This trend affected both student enrollment and program offerings, as member colleges adapted to this changing environment by making some changes to their original approaches. For example, TREND faculty also developed new curricula approaches that could translate beyond oil-related occupations. Overall, TREND used federal funding to increase training and credentialing in oil and gas as well as utilities, transportation, and construction.

The Round IV grant's design emphasized stackable credentials with various entry and exit points, a structure that proved useful given the ups and downs of the state's energy sector. The program successfully offered certificates in areas such as pipe welding; commercial driving, welding, building/construction trades, lineworker, mechanical maintenance, petroleum production, and business management. Some members also provided Associate of Applied Science degrees in process plant, power plant, petroleum production, instrumentation and control, lineworker, business management, and diesel technology. As Round IV evolved, colleges also added more stackable credentials; for example, TMCC added a heavy equipment operator certificate to its basic CDL program, with most students enrolling long enough to complete both programs.

To implement with fidelity, TREND also had to demonstrate progress on all of the activities stated in its Round IV grant proposal. As of early September 2018, TREND had completed 21 of its 23 grant activities. With completion and submission of this summative evaluation report, it will have completed the final two activities, both of which are related to completion of the final external evaluation. As a result, it is apparent that TREND has

completed all of its intended activities under the Round IV grant. Typical of this work is the consortium's efforts to accomplish Activity 4, identifying industry credentials to help students gain additional certifications for the workplace. Based on quarterly reports as well as interviews with staff, TREND member colleges offered a variety of industry credentials including certifications in First Aid/CPR, National Center for Construction Education & Research (NCCER) American Welding Society, Snap-On Industrial, heavy duty transportation, and IT certificates in Microsoft and Cisco. In a summer commercial driving program at TMCC, all students had a chance to obtain six industry-recognized credentials in addition to a college certificate, and officials reported that all graduates got jobs.

In addition to activities related to industry credentials, the consortium completed strategies and activities to:

- Map and expand education and career pathways;
- Identify and validate competencies with business and industry;
- Review, revise, and develop new policies and procedures related to curriculum;
- Assess and offer credit for prior learning;
- Establish transfer and articulation agreements both within the consortium and with other institutions;
- Offer credit for non-credit courses;
- Accelerate degree completion through block schedules and flexible delivery;
- Improve distance delivery and technology-enabled learning options;
- Enhance basic skills and computer literacy of students;
- Promote blended learning;
- Enhance work-related cohorts where appropriate to address retention;
- Expand career navigator functions to work with specific populations;
- Enhance relationships with state and tribal employment agencies;
- Strengthen business and industry commitments;
- Improve data collection systems to track employment and retention;
- Incorporate best practices from other TAACCCT grantees; and
- Expand use of best practices from cohort models in occupational programs.

3.5 Strengths and Weaknesses of the Program

A. Program Strengths

Career navigators: From review of documents as well as site visits and interviews, the use of career navigators was a noted strength of the program. Whether students took courses in person or online, these navigators provided important advising and monitoring roles to help keep students on the path to completion. By linking students to assessments, the navigators helped identify student strengths and weaknesses for their programs. As nearly one-fourth of students responding to PTB attitudinal surveys indicated they were nervous about going to college or returning to school, these services played a particularly important role with these students. Navigators also conducted a variety of activities such as mock interviews, resume development, and job search assistance to help students with employment.

Communication: The framework developed by Director Cash to maintain contact among the colleges allowed many opportunities for institutions to learn from each other and implement effective practices to meet project goals. In interviews, several officials said this framework was particularly important for the two tribal colleges that lacked certain infrastructure for career/technical education and enrolled a substantial majority of low-income students. Continued partnership among these colleges after the end of the grant would seem to hold promise for continued development of effective career/technical education programs in the state.

Equipment and technology: TREND-related equipment purchases have member institutions poised to continue expansion. The $1.7 million in purchases of equipment above $5,000 has enabled college to expand and enhance key energy sector occupational programs. In addition, most of the purchases will have a lifespan of 10 to 20 years, meaning that they can continue to support future students in their workforce training programs.

Employer support: By the end of the grant, the two public colleges (Bismarck State and Williston State) had built strong partnerships with businesses, as evidenced by participation on advisory committees, donations of equipment, and recruitment of students for internships by several employers, particularly Hess Corp. Employer input also contributed to the offering of more industry credentials and more cross-training of students to build their skill sets for employment in both up and down economies. Given their geographic isolation, TMCC and SBC

cited less employer support, although officials said they learned new information from TREND employer forums.

State partnerships: The growing relationship between TREND colleges and JSND, the state's workforce agency, is a contributor to the project's success. This partnership began as colleges sought employment information on TREND program of study graduates. While the state could not supply student-level data due to privacy protections, it did agree to provide aggregate information on the employment of TREND graduates, by year and program. This work enabled TREND to obtain more comprehensive information that is available from students, who were asked to complete post-program surveys but often failed to do so.

B. Potential Weaknesses

Limited access to data on graduates: This issue remains a weakness in many TAACCCT programs, as privacy laws at the state level often prevent colleges from obtaining detailed information on the employment and earnings of graduates. To its credit, TREND did work with JSND and SLDS to develop a framework to collect aggregate employment and earnings data on graduates. However, individual-level data remains the 'gold standard' in demonstrating the effectiveness of grant-funded workforce training programs, and access to this information could build statewide support for such initiatives. By taking a more active role on this issue, US DoL could help advance this issue so that programs such as TREND gain access to more robust and potentially powerful data.

Potential gaps in sustainability: For fall semester 2018, the first full semester following the end of grant services, staff at member colleges said they will continue new programs funded under the grant. However, only two of the four TREND colleges – BSC and TMCC – expressly plan to continue the use of career navigation services with students, despite the positive views of this service among staff, administrators, and students. BSC will continue these positions with non-federal funds, while TMCC is incorporating the navigator's job duties into success coaches who will be deployed across the institution. At the other two colleges, officials cite budget constraints for an inability to continue a fully dedicated career navigation position. However, elements of the career navigator function will be incorporated into other positions. At Sitting Bull, the Career and Tech Counselor will continue working with students on job and internship possibilities, and at Williston career-based mentoring occurs with instructors in their regular

classrooms. Given the positive impact data generated by this project, as outlined in the Impact and Outcomes section (outlined in Chapter 4), this is an issue that warrants additional study by the colleges and the consortium.

4. Participant Impact and Outcomes

4.1 Impact Study of TREND

PTB conducted an impact evaluation of TREND throughout the grant period, from 2014 to 2018. The evaluation design is based on comparisons of newly enrolled TREND students beginning in Fall of 2014 to students enrolled in the previous programs during the nine years prior to the grant at Bismarck, from 2005-2014. Bismarck had available data on student demographics, employment, educational experience, and performance that are directly relevant to creating propensity scores for use in matching. PSM analysis was employed, based on a number of socio-demographic variables including age, gender, income, race, previous employment, and previous education level and achievement as co-variates in a multivariable logistic regression procedure to compare the historical sample of 2005-2014 students to the newly enrolled Bismarck students (Guo & Fraser, 2010). This procedure was used to select a comparable group of comparison students from the historical sample. As recommended by Shadish and colleagues (2002) and by Pearl (2000), a form of PSM (described below) was used to determine the subset of the historical sample that was statistically independent (un-confounded) based on comparison of co-variates between the TAACCT Round IV participants at Bismarck and the historical sample. The resulting sub-set from 2005-2014 represented the comparison sample for subsequent comparison to TREND student outcomes.

Primary outcomes of interest were 1) academic achievement, 2) program completion, and 3) attainment of appropriate employment suited to TREND training. TREND participants at Bismarck were compared to students in the comparable credential programs (welding, renewables, coal, and oil/gas) at Bismarck who were enrolled prior to receipt of the Round IV TAACCCT grant during the period from 2005-2014. These included some students who participated during the Round II TAACCCT grant held by the TREND consortium that began in 2012. These students were handled separately in the analysis, as described below. The other

three colleges, Sitting Bull, Turtle Mountain, and Williston, were not included in the impact analysis due to lack of historical comparison group data for comparable programs from those institutions.

PTB began the impact evaluation study in 2014. Key variables first were identified for analysis from datasets that described student socio-demographic information, courses taken, grades given, credentials received, and TREND programs attended. The evaluation team received student data from Bismarck and merged these data (based on college and an ID number for each student generated by the PTB database system, COMPETE, used to manage the data) and reshaped it so each student would have one observation with variables defining relevant outcome data.

PTB then identified students as being in the treatment or comparison group, determined by whether they were enrolled in any grant program year (from fall 2014 onwards). This split, described in methodological detail below, resulted in 1,066 students being assigned to the control and 1,094 to the treatment group (n=2,160), where the treatment group was defined as students who started in the TREND intervention after the Round IV grant was deemed to be fully operational after fall 2014.This resulted in a full sample of 2,160 for the impact study. PTB conducted descriptive analysis on the socio-demographic, educational attainment, and skill variables considered for a propensity score model.

From that point, PTB constructed a propensity score, using enrolled age, race, gender, three educational attainment variables (full vs. part time student status, Pell Grant eligibility, and having a basic skills deficiency) as potential predictors of treatment assignment. Covariate balance was examined and performance of regression models with three potential outcomes (employment after graduation, credits earned, GPA) by examining standardized differences and variance ratios in the raw and matched analysis. Several PS methods were evaluated, including PSM and PS Inverse Probability Weighting (IPW). The PS IPW was most effective in balancing covariates and contending with noted differences in group size (Guo & Fraser, 2010).

The following provides a detailed technical overview of the impact evaluation analysis and results to date. Note that at the time of this writing, student-level wage data were not available for analysis. Also, note that employment data were largely missing from the comparison group, and so PTB was unable to conduct an impact analysis of the effects of

TREND participation on employment status post-program. The current results reflect available educational and employment outcomes data including the specific variables and outcomes described earlier.

A. Methods

Overall, the analysis was designed to compare students participating in the TREND program at Bismarck State College during the TAACCCT grant period from 2014-2018 to a group of students who attended BSC during the years immediately prior to the intervention (comparison group). Descriptive analyses were completed in order to assess the overall sample. Next, multivariate analyses employed Inverse Probability Weighting (IPW) to control for the differences between the TAACCCT intervention and comparison groups. PSM also was used to cross-validate the findings. Both approaches rely on the propensity score described below.

Outcome variables: Analyses compared the comparison and intervention groups in terms of three outcome variables:

1) Number of credentials in the field received by a student;
2) Cumulative GPA; and
3) Retention.

The total number of credentials was derived by summing up the number of credentials received by each student across data fields indicating credentials for each of the academic terms in which a student was enrolled.

Cumulative GPA was calculated by first multiplying the reported GPA for each academic term by the number of credits for that term. The products for each term were then summed across all the terms during which a student was enrolled. Finally, the sum of products was divided by the total number of credits earned by each student.

Retention was assessed by flagging any entry other than a blank in the "Reason for unsuccessful completion" field across the fields for each of the academic term. Thus, an entry of any reason for unsuccessful completion was coded as 1 indicating that a student did not successfully complete a program.

Propensity score: Propensity score was derived through a regression logistic model predicting membership in TREND intervention (treatment) group. The variables (Table 21) selected as predictors met the following criteria:

1) Have valid values at least 90% of participants in each group;
2) Theoretically related to the academic outcomes of the intervention; and
3) Differ between intervention and comparison group participants.

Table 21. Variables used in the Propensity Score Analysis

High school education	Received high school diploma at the beginning of the program
More than high school education	Attended any educational institution beyond high school at the beginning of the program
White vs. other recode	Caucasian non-Hispanic versus all other
Pell Grant eligibility	Eligible for Pell Grant at the beginning of the program
Incumbent worker	Works in energy field as indicated by either eligibility for the program or employment field
COMPASS Reading Taken	Taken COMPASS reading score
Compass Math Taken	Taken COMPASS math score
Fulltime student	Full time student at the beginning of the program

SPSS Statistics version 25 was used to run the logistic regression. The procedure excludes participants with incomplete data. A propensity score is generated by the logistic regression procedure for each participant included in the analysis. It is best interpreted as the probability of being classified into the intervention group.

Inverse probability weights: An inverse probability weight (IPW) for each participant was calculated using standardized formulas. For the intervention group IPW is the propensity score over 1 (IPC=1/ps). For the comparison group, the IPW is defined as differenced of 1 minus the propensity score over 1 (1/(1-ps). IPW were included in the models analyzing outcome variables that did not rely on a matching approach.

Propensity Score Matching: SPSS version 25 was used to match intervention group with comparison group based on the propensity score. In this analysis, SPSS applies 'nearest neighbor matching', meaning that the algorithm tries to create a matched pair based on closest values of the propensity score. The tolerance or caliper value (degree of precision) was set at .05. This value is defined in units of standard deviations of the logit of the estimated propensity score and represents the largest difference between the matched propensity scores that may quality for a match.

IPW regressions: Two-step linear regressions were used to analyze the effect of the treatment group on the number of credentials and cumulative GPA. Control variables were entered in the first step and treatment group indicator was entered in the second step. The identical approach was used to specify a logistic regression model to analyze the effects of the treatment group on retention. The data were weighted by the Inverse Probability (IPW) Score as defined above.

Matched group comparisons: As a validity check on the results of IPW analyses, the number of credentials and GPA scores for matched pairs were analyzed with dependent group t-test. Wilcoxon Signed Ranks Test was used to compare retention between matched groups.

Table 22 on the next page summarizes results of the outcome analyses. Three versions of these outcome models were run: 1) the IPW model accounting for the demographic variables noted above in Table 21; 2) a bi-variate comparison with IPW, excluding the demographic variables; and 3) a bi-variate model using the matched group comparisons. In each of these cases, the same historical comparison sample was used in the analysis.

GPA was found to have increased in the multivariate IPW model, with an Average Treatment Effect (ATE) of TREND enrollment of (coefficient 0.094, $p < .0.001$) for treatment participants compared to historical comparison. However, there is no significant change in GPA in the other two models.

There was a positive ATE for credential attainment. TREND participants had higher total credentials on average in the multivariate model (coefficient .390, $p < .0.001$), and had 14% more credentials completed in the IPW model and 38% more in the matched group model (both $p < .0.001$). Retention was also consistently higher in the TREND participant group in each model. In the multivariate model, ATE was positive for TREND participants, meaning that they

Table 22: Summary of TREND Treatment Effects on Selected Outcomes

Summary of Treatment Effects	Multivariate Analyses with IPW			Bivariate analyses with IPW			Matched Bivariate Analyses		
	Treatment Effect (coefficient)	**Mean Level/ Proportion**	P	Treatment Effect (difference in weighted means or proportions)	**Mean Level/ Proportion**	P	Treatment Effect (difference in means or proportions)	**Mean Level/ Proportion**	P
GPA	.094	2.97	<.001	NS	2.97	NS	NS	2.99	NS
Accreditation	.390	2.28	<.001	1.14	2.28	<.001	1.38	2.55	<.001
Retention	.827	13.85%	<.001	11.71%	13.85%	<.001	13.21%	10.26%	<.001

NS = not significant

stayed in the program longer (coefficient .827, $p < .0.001$). This was reflected in 11.71% longer retention in the bivariate IPW model and 13.21% in the matched group model. These findings are robust and consistent across the 3 versions of the model.

B. Summary

Overall, TREND participation produced mainly positive effects on educational outcomes, based on this comparative analysis before and after the grant program. Specifically, there was at least a 14% increase in credential attainment in the TREND treatment group compared to the comparison group, and at least an 11.71% increase in retention in the treatment group. While not consistent across models, evidence was seen of improved academic performance in terms of GPA, a roughly .1 increase in grade on a 4-point scale in the treatment group. Also, while we do not have the ability to compare employment outcomes in the impact evaluation due to lack of data, there is descriptive analysis on employment outcomes presented later in the report.

It is important to note that there were substantial changes in the economy during the 2014-2018 period, and prior, which may have affected educational and workforce participation and opportunities for students. While this evaluation was not designed to answer the question of what effects those changes had (*e.g.*, the surge in shale gas and oil production leading up to 2015, and then steep drop in prices leading to reductions in production after that point), it raises the question of whether other events in the local area, job market, or catchment group for program enrollment at the TREND colleges may explain observed outcomes. For example, the availability, or lack of availability, of jobs for program completers could lead some students to remain enrolled and be more likely to obtain credentials rather than seek employment. However, there are no data available to use on this topic in the impact analysis.

Appendix D provides a technical summary of the propensity scores (IPWRA) for each of the variables used to create the treatment and comparison groups.

C. Impact Study Limitations

PTB relied primarily on BSC students for the comparison group in this study, as this was the primary college that offered core TREND programs during the 2009-2012 period. The impact study also compared 2009-2012 with 2014-2017 because the 2012-2014 period was covered by another federal TAACCCT grant and the primary goal was to examine TREND Round IV students against "business as usual" at the college prior to an infusion of federal funding. US DoL also allowed TREND to count some students under both TAACCCT grants, another reason why the evaluation team did not explore comparisons during the 2012-2014 period. Both of these factors are potential limitations in the impact study.

In addition, individual-level employment data through third-party sources were not available for either the treatment or comparison groups. PTB did collect self-reported employment data for treatment and comparison students through the impact study, but a rigorous review was not possible due to the extensive missing data among those in the comparison group. TREND did collect aggregate employment data on treatment and comparison students and PTB has analyzed this data. However, the lack of individual-level data made it impossible to include in the impact study. An outcomes analysis of this data is in Section 4.2.B under Outcomes Achieved.

4.2 Outcomes Achieved

This section will assess the progress of TREND in meeting its original numerical goals related to U.S. DoL measures in the TAACCCT program. It also will examine aggregate and self-reported data on employment as well as exit surveys from one institution that utilized a PTB-designed exit survey. Information for this section is based on TREND program data in the COMPETE database, findings from interviews with program staff, and a review of TREND quarterly reports to U.S. DoL. For U.S. DoL measures, employment data was gathered by Bismarck State College through Job Service North Dakota and the State Longitudinal Data System.

A. Progress on US DoL Measures

As outlined earlier in the report, TREND enrolled more than 2,200 students from 2014-2018, which is a substantial 30% above the target enrollment of 1,740 for the grant. One factor contributing to the total enrollment figure is the U.S. DoL decision to allow TREND to count some students under both their Round II and Round IV TAACCCT grants. COMPETE database figures show that 490[4] students fit into this category. Nonetheless, TREND Round IV continued to enroll students at a healthy rate throughout the grant.

The chart below (Table 23) includes projected and actual Year 1-4 totals for many other key U.S. DoL measures such as number of completers, number of earned credentials, number employed, and other core benchmarks of success. Data include projections from the TREND grant proposal and actual data gathered from colleges during Years 1-4.

Table 23: TAACCCT Target Goals and Year 1-4 Outcomes

	Total Proposed for Grant	Years 1-4 Actual
Total Students Enrolled	1,740	2,272
Total Number Completing a Program of Study	581	697
Total Incumbent Workers Completing Program of Study	231	411
Total Number of Earned Certificates/Degrees	695	1,420

[4] Non-duplicated enrollment excluding these student was 1,710.

Total Number Earning Certificates, Less Than One Year	382	286
Total Number Earning Certificates, More Than One Year	58	17
Total Number Earning Degrees	385	434
Total Number of Credit Hours Completed	19,041	44,624
Total Number Employed after Completion	397	85*/563**
Total Number Retained in Employment after Completion	337	30*/439**
Total Receiving Wage Increase after Enrollment	172	470

Sources: TREND Round IV grant proposal and program data in COMPETE and employment data from Job Service North Dakota (JSND). *JSND aggregate data on non-incumbent program completers; **JSND aggregate data on all completers, including incumbent workers.

As the table illustrates, TREND has met many of its four-year numerical goals regarding student enrollment and completion. Because Bismarck serves a large number of incumbent workers, they also requested aggregate data from JSND and SLDS to determine employment results on all completers, including incumbent workers. Some of the more noteworthy accomplishments include:

- TREND exceeded its target number of program completers by 20%, as 697 students had completed a program of study by March 31, 2018. Among its 2,272 students, many also remained in the pipeline in their educational programs at the end of the grant period. The number of incumbent workers completing their programs of study was nearly double the original grant target.
- The typical completer, on average, earned two certificates/degrees during their time in the program. These may have included examples such as Turtle Mountain students who earned a certificate in commercial driving and an additional certificate in heavy equipment operator. This finding illustrates the degree to which many students were able to achieve stackable credentials that can help them in both strong and weak labor markets.
- Students completed more than double the number of credit hours that were expected when the grant was under development. Overall, the average student completed 19.6 credit hours – nearly double the 10.9 average anticipated prior to the start of the grant.

This finding may reflect economic trends, as a downturn in the job market during the grant prompted some to pursue longer programs or obtain additional training to increase their skill sets and employment options. A higher-than-expected number of students completing degrees (434 actual v. 385 projected) illustrates the point that some students sought longer programs and added training that could make them more marketable across a variety of industries.

- Fewer students than expected earned certificates during the grant period. This is surprising given that the program exceeded its goals in total number of certificates/degrees awarded. It is likely that those who completed earned more than one credential, supporting the view of program stakeholders that many students had attained stackable credentials that promote employment.
- The grant enrolled more than 500 additional students than originally projected. However, this data may be viewed with some caution as BSC and US DoL agreed that the project could count some students under both its Round II and Round IV TAACCCT grants, as these students benefitted from interventions supported by both grants. It is possible that this policy contributed to some inflation in the number of Round IV TREND students.

The data on employment requires more detailed analysis given the multiple sources available. The COMPETE database collected information students self-reported to the colleges upon exit. However, many students likely did not report even if they had found employment. The unbiased source of information on employment is from Job Service North Dakota's SLDS but it provides only aggregate data on completers by the academic year in which students graduated due to privacy concerns as well as, in some cases, by occupational program. The JSND data show that TREND was short of its goals in the number of students employed after graduation and subsequently retained in employment. Bismarck serves a large number of incumbent workers, with students working part-time jobs in retail or food service while they attend school, or full-time employees in industry that are seeking to climb the ladder, shift to management, or retool for a different career. Because of the large number of incumbents, Bismarck requested aggregate data from SLDS on all completers, including incumbents, of which results are also shared in the above table. Including incumbent workers, at least 80% of TREND program completers found or continued employment in the state after leaving their college and 63% have

maintained their employment in the months after graduation. Indicative of the high amount of incumbents, the consortium exceeded its goal of wage increases post enrollment.

B. Student Progress in Employment: State Data

Along with program completion, the employment rate for students who finish their programs is of paramount interest to U.S. DoL and TREND colleges. However, obtaining independent, student-level employment data is a challenge for many TAACCCT programs, and TREND has been no exception. The state of North Dakota has a policy that will not allow it to provide individual-level employment data to TREND colleges or the evaluation team due to privacy concerns. However, BSC has forged a strong relationship with Job Service North Dakota, the state's primary workforce agency, to obtain aggregate data on the employment of TREND students who completed their program of study. This agreement has proven helpful for TREND as it takes stock of its impact on the state, and this data provide valuable information on the program's long-term effects.

In this sub-section, the evaluation team analyzes this aggregate employment data in detail by major program of study and by periods defined as pre-TREND grant (2009-2012) and TREND Round IV grant (2014-2018). For this data, BSC prepared for the state lists of students who completed programs of study in three key programs – process plant, power plant, and lineworker – and compared the rates of graduates obtaining employment within North Dakota. BSC provided Job Service North Dakota with this data by year and by program so that the state agency could provide as much longitudinal data as possible. PTB worked with Bismarck in preparing these files for JSND and later removed all students who did not have North Dakota addresses at the time they enrolled in their programs. The following sub-section contains the evaluation team's detailed analysis of the state's employment data, including a longitudinal review of employment data by individual program and across all three programs combined.

Overall, 91.9% of Round IV TREND with North Dakota addresses and who completed these programs from fall 2014 to summer 2017 found employment in the state after leaving the college (Table 24). This rate compared favorably with the 82.8% employment rate for similar completers from 2009 to 2012, prior to receipt of any federal TREND grant. Data for each of the three major programs of study show higher employment rates for North Dakota residents who

were enrolled during the TREND Round IV period. Employment in this analysis is defined as those working in North Dakota during the "quarter after the quarter of completion" for each semester. For example, December 2010 graduates must have had wage data from January to March 2011 to qualify as employed.

Table 24: Program Completers by Major Field of Study: TREND v. Pre-TREND

	2009-2012 Completion Rate	2015-2017 Completion Rate
Lineworker	82.3%	90.8%
Process Plant	85.3%	93.6%
Power Plant	81.4%	91.5%
Total	82.8%	91.9%

Source: Job Service North Dakota aggregate data

In aggregate form, JSND provided wage data for these completers from both time periods. This data should be viewed with some caution as we would expect wages to increase from the earliest part of this analysis (2009) to the last part (summer 2017). Nonetheless, the data show wage growth particularly during periods of steady growth in the state's energy sector.

In power plant, the average quarterly wage increased by 36.4% from 2009 to 2017 (Table 25). By 2017, a graduate in power plant earned $11,140 per quarter, or $44,560 per year.

Table 25: Power Plant – Average Quarterly Wages for Completers

Status	Completion Year	Average Quarterly Wage
Pre-TREND	Fall 2009-Summer 2010	$7,084
Pre-TREND	Fall 2010-Summer 2011	$7,833
Pre-TREND	Fall 2011-Summer 2012	$9,553
TREND Rd. IV Grant	Fall 2015-Summer 2016	$10,445
TREND Rd. IV Grant	Fall 2016-Summer 2017	$11,140

In process plant, the average quarterly wage more than doubled from 2009 to 2017, with all of this increase occurring before summer 2016 (Table 26). The following year, the average wage for graduates declined slightly. Overall by 2017, a process plant graduate earned $14,416 per quarter, or $57,664 per year.

Table 26: Process Plant – Average Quarterly Wages for Completers

Status	Completion Year	Average Quarterly Wage
Pre-TREND	Fall 2009-Summer 2010	$6,470
Pre-TREND	Fall 2010-Summer 2011	$8,295
Pre-TREND	Fall 2011-Summer 2012	$9,088
TREND Rd. IV Grant	Fall 2015-Summer 2016	$15,774
TREND Rd. IV Grant	Fall 2016-Summer 2017	$14,416

The average quarterly wage in lineworker increased by 29.9% from fall 2009 to summer 2017 (Table 27). By 2017, the average quarterly wage was $12,449, or nearly $50,000 annually.

Table 27: Lineworker – Average Quarterly Wages for Completers

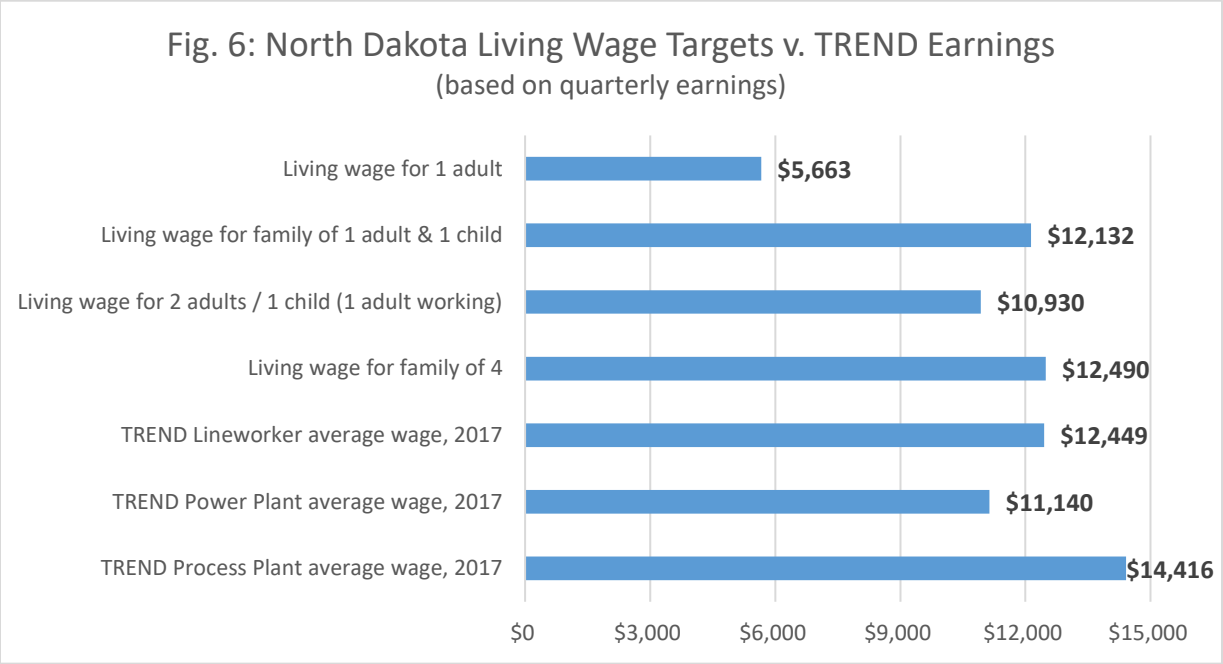
Status	Completion Year	Average Quarterly Wage
Pre-TREND	Fall 2009-Summer 2010	$9,581
Pre-TREND	Fall 2010-Summer 2011	$9,931
Pre-TREND	Fall 2011-Summer 2012	$9,260
TREND Rd. IV Grant	Fall 2015-Summer 2016	$11,460
TREND Rd. IV Grant	Fall 2016-Summer 2017	$12,449

While salary increases are expected over time, the evaluation team also examined this data to determine whether these key TREND programs can help graduates earn a family-sustaining wage. For this analysis, we relied on the living wage state targets determined by the Massachusetts Institute of Technology's (MIT) *Living Wage Calculator*. This instrument identifies the wage level needed in each state, including North Dakota, to provide a living wage for single persons, single parents with a child or children, and two-adult families with children.

As illustrated in Fig. 6, graduates from all of these programs who had wage data in 2017 earned a sufficient income to support a living wage for one adult and for families of two adults/one child, where one adult was employed. In fact, graduates of these three core TREND programs earned more than twice as much of the $5,663 quarterly wage needed to support one adult in the state.

With an average quarterly wage of $14,416, process plant graduates produced a sufficient income to support a family of four ($12,490 in required quarterly income) and for a family

consisting of a single parent and one child ($12,132 in required quarterly income). The lineworker average income was at a sufficiently high rate to support most family types, falling just short of meeting the needs for a family of four. The average income for a power plant graduate was enough to support a family of two adults and one child with one working parent. Overall, this data show that process plant graduates earned an income high enough to support typical North Dakota households, while graduates of lineworker and power plant earned at a level sufficient to support many, though not all, North Dakota households.



Sources: Job Service North Dakota aggregate data on TREND completers and MIT Living Wage Calculator for North Dakota, downloaded from: http://livingwage.mit.edu/states/38.
Notes: MIT uses hourly rates for its living wage data. This data were aggregated on quarterly basis to match JSND data. Family of four consists of 2 adults and 2 children, with 1 adult working.

C. Student Progress in Employment: Self-Reported Data

A second source of information was available to the evaluation team regarding employment. In the TREND impact study, PTB collected self-reported data on employment after program of study completion for both the treatment group and a pre-grant comparison group. As noted earlier, there was insufficient employment data from the comparison group to include this information on the rigorous impact study. However, it is possible to do a descriptive review of this data, and this sub-section examines these outcomes.

Overall, 78.1% of Round IV TREND participants indicated they were employed after completing their programs of study, compared with 23.9% of the 2009-2012 comparison group. While significant, this data should be viewed cautiously as most comparison students – 72.4% -- had an unknown employment status after leaving their programs. This may not be surprising as these students had departed prior to the start of the Round IV grant, and college officials indicated there would be considerable missing data from these college student records. Since TREND received a Round II grant under TAACCCT from 2012-2016, PTB's Round IV evaluation collected data only on Round IV participants and students served prior to the first TREND grant.

Given the higher share of students employed after program of study completion, it is not surprising that more TREND participants indicated they were employed in jobs related to their program of study. Overall, 32.1% of TREND students indicated they were employed in their field, compared with 13.8% from the comparison group.

This data, coupled with the Job Service North Dakota data cited in Section 4.2.B, appear to indicate that TREND Round IV students had greater success in employment than non-TREND students in previous years. From higher employment rates to higher wages and a greater likelihood to be employed in their field of study, these data support the view of TREND college staff that the program has had a positive effect on students' subsequent employment.

D. TMCC Exit Surveys

By the start of the TREND Round IV grant, with previous TAACCCT funding still in place, most member colleges had developed their own policies to collect data from departing students. However, one consortium member, Turtle Mountain Community College, expressed interest in having PTB develop an exit survey it could use to collect additional information on students at the time they left their programs. This sub-section provides brief highlights of these exit surveys, which examined student attitudes toward their programs of study, their future goals/outlook, and their immediate career plans. As is common on exit surveys, those completing the instrument all were students who had completed their TREND programs of study. The survey had 48 respondents, or 45% of TMCC's 107 completers during the Round IV grant.

Respondents had an overwhelmingly positive view of their TREND programs of study, as all students agreed or strongly agreed that they learned a lot in their courses (Table 28). Eighty-eight percent believed they have better job prospects after completing the program, while 98% were satisfied with the program and would recommend it to others. Students indicated they believed the courses were appropriately challenging, although one in five (21%) said their courses were too easy.

Table 28: TMCC Student Satisfaction at Program Completion

	Strongly Disagree or Disagree	Neutral / Not Apply	Agree	Strongly Agree
I learned a lot in the courses I took	0%	0%	35%	65%
The courses were too difficult	79%	13%	4%	4%
The courses were too easy	76%	4%	17%	4%
I have better job prospects after completing the program	2%	10%	42%	46%
I am personally satisfied with the program	0%	2%	42%	56%
I would recommend the program to others	0%	2%	35%	63%

About one-quarter of students said they had a job at completion while 12.5% had a job offer. Among these students, 56% indicated their job offer was in their TREND field of study. These students cited a variety of employers in TREND program areas such as concrete, construction, plumbing, power center, and trucking. Others cited employment in retail, farming, and casino businesses. Asked about where they expect to be in five years, more than 90% believed they would still be in the same occupational area and likely with the same company.

5. Conclusions and Recommendations

5.1. Conclusions

By many standards, the TREND Round IV grant was a success:

- It exceeded its projections in terms of enrollment, the number of credits earned, and the number earning a credential or degree.

- TREND participation produced mainly positive effects on educational outcomes, based on regression analysis used to calculate an Average Treatment Effect (ATE) outcome in which participation effects on students enrolled during the grant were compared to the historical students enrolled before the grant program.
- TREND participants were more likely than comparable, historical non-participants to attain credentials and complete their programs of study.
- TREND participants had higher GPAs while enrolled than comparison students.
- Because there was a high percentage of unavailable data for workforce participation and job incumbency in the comparison sample, the evaluation team was not able to conduct a meaningful impact analysis on this outcome.
- Colleges strengthened their career and technical education programs, with some that can be viewed as exemplary.
- Many participants in the three major TREND initiatives at Bismarck State earned a quarterly wage that was sufficient to support a family based on a living wage index for North Dakota.
- Most students surveyed (87%) said they were satisfied with the program and 91% agreed or strongly agreed that they would recommend the TREND program to others.
- Colleges hired faculty through the grant who will continue at their institutions with non-grant funding after the end of TREND.
- The colleges indicate they plan to continue most of the new occupational programs and to strengthen their programs further.
- Students frequently earned multiple credentials, which should be helpful in finding employment.
- With the submission of this evaluation report, TREND will have completed all 23 of the grant activities outlined in its 2014 application to US DoL.

- Partnering with local businesses has increased at some of the colleges.

As explained earlier, the lack of individual student-level data on employment hindered a comprehensive impact analysis, and wage data was available only on an aggregate basis. This situation made it challenging to assess whether the program met its goals regarding employment and retention in employment. Nonetheless, descriptive data showed that at least 80% of participants who completed TREND programs found or continued in employment, and 63% were retained in employment for a period after exit.

In TREND attitudinal surveys, 22% of respondents said they were nervous about enrolling in college and 24% believed they needed help to be ready for college. Asked to identify needed support services, respondents were most likely to cite scholarships and tutoring.

5.2 Recommendations and Implications for Future Research

This subsection is divided into three parts – recommendations for TREND-member institutions going forward and recommendations for colleges that may consider a TREND-type program in the future. The recommendations for other colleges reflect both the successes as well as lessons learned from this grant.

Recommendations for the Consortium:

Colleges should continue to partner with each other. One outcome in TREND is that colleges established strong working relationships with each other in support of common educational and employment goals. With that in mind, one recommendation is for the colleges to continue to partner and learn from each other's programs. For example, Turtle Mountain adopted a hybrid version of BSC's power/process plant program, with input from BSC faculty. Given the boom/bust nature of the oil and gas industries, the close working relationships among the colleges should be sustained so that colleges can respond to economic challenges quickly and in a coordinated way.

Consider maintaining most/all career navigator positions: At this time, only two of the four TREND colleges expect to continue career navigator functions in some form, largely due to budget issues. While it is impossible to isolate the impact of the navigators, it is clear that treatment students fared better than comparison students in areas such as completion and grade

point average (via the rigorous impact study) as well as employment (via outcome analysis). Many stakeholders, including students, give credit to the navigators in promoting their success. From mock job interviews to resume development and regular 'nudging' of students, this advising approach appeared to be a key ingredient of student success. As TREND student attitudinal surveys showed that 23% of students believed they would need help to be ready for college, there remains a compelling need for services provided by these navigators.

Encourage and expand employer participation. Interviews with employers in years 3 and 4 of the program revealed a strong industry interest in the success of TREND oil and gas programs. While some staff cautioned that employers may have only limited time to advise or review TREND programs, several employers said they want more involvement given the fast-changing technologies in these programs. In the future, it may be valuable for employers or employer groups to review, rate, and/or endorse key occupational programs in the Bakken region. This has worked in areas such as Alabama and Florida, where the Gulf Coast Industry Alliance conducts independent reviews of technical programs, many of them supported or created by TAACCCT grants.

Recommendations for Colleges Considering a TREND-Like Program:

Maintain Flexibility: The TREND program operated through both booming and challenging economic times in the state's energy industry, and these trends affected student enrollment and success. In response, the TREND colleges made strategic changes as needed, such as the incorporation of shorter-term programs to help students quickly gain job skills in high-growth areas. In addition, they redesigned some courses so students could attain technical skills they could use outside the energy sector in areas such as agricultural production plants. TREND's project director did not hesitate to incorporate new approaches and seek approval from TREND's federal program officer.

Promote Intentional Advising: Officials at the TREND colleges sought to provide intensive advising through career navigators who monitored student progress, helped them in adjusting to college, and worked with them to promote enrollment, success, and completion of key courses in their programs of study. As students neared completion, these navigators would help students

through mock job interviews, resume development, and outreach to employers. College officials and students viewed this support as a contributing factor to success.

Support Rigorous Evaluation: While TAACCCT grants required external evaluation, there are many steps in the evaluation process that can be of value in helping colleges collect feedback and make improvements. One important element is to collect solid baseline data on students and their completion rates to document the impact of any changes. Another key step is collecting input from faculty and employers. As one of several "consumers" of college technical programs, employers can offer targeted feedback on the quality of instruction and the employability of program completers.

Recommendations for the US Department of Labor and Future Research:

Consider funding additional initiatives: The impact study of TREND demonstrated that participating students fared better than a comparison group of non-TREND students on issues such as program completion and grade point average. Additionally, descriptive data on employment showed greater success among TREND students. These positively reinforce findings from other independent studies of TAACCCT programs. Based on these successes, US DoL may want to consider funding new TAACCCT grants or launching similar initiatives[5] that can improve the skill sets and employment prospects of dislocated workers and young adults seeking high-wage jobs.

Support partnerships to gather employment data: One weakness of this study is the inability to conduct a rigorous impact analysis of the program on employment and wages of participants vs. non-TREND comparison students. Anecdotal and basic descriptive data show TREND participants with higher employment rates; however, it was not possible to analyze this issue in the impact study as the state of North Dakota provided only aggregate data on employment for specific groups of TREND students. It would be valuable for US DoL to work closely with states to promote the availability of individual-level employment and wage data for participants in TREND and other programs, as this data represents the 'gold standard" in determining the effectiveness of federal grant programs.

[5] It is noted that the US DoL recently announced a new competition focused on developing and enhancing apprenticeships. Continuation of such efforts is encouraged and recommended by the evaluators.

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Appendix A: Site Visit Protocols

TREND Spring 2018 Interview Protocol
TREND Site Directors / Administrators

Interviewer Guidelines:

- Briefly discuss the purpose of the interview: *As external evaluator for the TREND Round IV grant, PTB, LLC is looking to better understand strategies that grantees and partners use to meet program goals. Your contribution to the evaluation effort is extremely valuable and will give you the opportunity to share your perspective on the successes, benefits, and challenges in implementing the program. As an independent, external evaluator, PTB is seeking input that will help understand the program.*
- Convey to interview participant our confidentiality policy: *(1) the interview is voluntary; (2) you can decline to answer any questions, or you can stop the interview at any time; (3) the information will be held in confidence by the evaluation team who have signed confidentiality agreements ensuring the protection of data; and (4) interview data will be maintained in secure areas.*
- Inform the interviewee that your main focus is on the TREND Round IV grant.
- Ask if they have any questions for you before you begin. *Explain that the interview should take approximately 45 minutes.*

Note to interviewer: Italicized questions are to be used as probes to encourage respondents to expand upon their responses. Consider prior responses to customize the inclusion, order, and language of questions as appropriate.

Interview Questions

1) Please briefly describe your role in TREND.
    a. *What is a typical day/week in your TREND work?*
    b. *Who else at your campus works on the TREND project? What are their responsibilities? How would you describe their level of commitment to the project?*
    c. *What is your role in working with faculty?*
    d. *What is your role in working with other TREND-member colleges?*

2) How would you describe implementation of the program on this campus?
    a. *What are your major TREND programs?*
    b. *What are the new activities / services / programs for the Round IV grant compared with the Round II TREND grant?*
    c. *How far along did you expect to be at this point in implementing the Round IV grant program? How far along are you now?*
    d. *What factors have hindered implementation? How have you addressed these challenges?*

e. *What factors have facilitated TREND implementation this year?*
f. *Are student enrollment levels reaching expectations? Why or why not?*
g. *What unexpected issues have you encountered? How have you overcome them?*

3) What is the status of TREND Round IV activities/courses this year?
   a. *Has delivery of courses changed due to TREND? If so, how? Prompt for: blended/online learning.*
   b. *Is all TREND related equipment installed and in use? What other budget modifications are you seeking?*
   c. *What support services are available to TREND students? Prompt for: career navigator activities and services. What is your perception of these services?*
   d. *How do you interact with faculty about TREND programming?*

4) What data have you collected on TREND participants so far?
   Probe for: *Grades, attendance, competencies*
   a. *What challenges have you faced in collecting data? In entering data?*
   b. *What data have you entered into the TREND database?*
   c. *Have you faced any challenges in using the TREND database?*
   d. *What is the status of post-program data collection on students?*

5) Have many TREND students completed their programs of study? What factors are facilitating or hindering student success?

6) How would you assess the grant's success in promoting course completion, program completion, degree/certificate attainment, and job placement (if applicable) to date?

7) What major changes have you seen in activities / programs / services between the Round II grant and Round IV grant of the TREND program? To date, how effective do you believe the Round IV improvements are to date?

8) What lessons learned or best practices have you encountered in the project to date?
   a. *What do you think are the project's greatest achievements?*
   b. *Do you believe there are best practices in instruction? In use of technology? In student services?*
   c. *What lasting impact do you believe grant-supported activities or services will have after the grant ends?*
   d. *What gaps do you still see (if any) in TREND curricula or services?*

9) What other comments do you have?

This concludes our discussion. Thank you so much for your ideas and your time.

TREND Spring 2018 Site Visit:
Interview Protocol for TREND Faculty/Instructors
(All colleges)

Interviewer Guidelines:

- Briefly discuss the purpose of the interview: *Explain that PTB, LLC is the external evaluator for TREND, a federally funded strategy to help veterans and trade-displaced workers gain well-paying employment. Explain that students in their classes are part of the TREND program. Please know that PTB is an independent, external evaluator. We expect this interview to take approximately 30 minutes.*
- Convey to each interview/focus group participant our confidentiality policy: *(1) the interview is voluntary; (2) you can decline to answer any questions, or you can stop participating in the interview/focus group at any time; (3) information will be held in confidence by the evaluation team who have signed confidentiality agreements ensuring the protection of data; and (4) interview/focus group data will be maintained in secure areas.*
- Ask if they have any questions for you before you begin.
  - Inform the interviewee that your main focus is on the TREND Round IV grant.
- Note to facilitator: Italicized questions are to be used as probes to encourage respondents to expand upon their responses.

First, I would like to begin by gathering some background information on you.

1. Please tell me your first name, how long you have been working at this college, and how long you have been an instructor.

   Probe for: full-time / part-time status; expertise in technical training field; subjects taught

2. Tell us about your course(s) – including the schedule, syllabus, learning objectives.
   a. *How often does the class meet? What is the format (lecture, lab, combination)?*
   b. *How is technology used in the course?*
   c. *What skills do your students typically possess at the start of the course? How do you deal with differences in basic skills / technical skills?*
   d. *What are the key student objectives? How do students meet these objectives (test / formal assessment / work product)?*

3. What are your students' greatest challenges in mastering the course content?
   a. *Is attendance strong? What components do students master easily…or find most difficult? What is your attrition rate?*
   b. *Who are your students (traditional college age / non-traditional / incumbent worker / online students)? What are their goals and needs?*
   c. *What support services has TREND made available to students at this college?*

4. What suggestions would you have to improve this course of study?
   Probe for: technology improvements, materials, employer input

5. The TREND project has supported the purchase of equipment used by students. What equipment has the grant purchased in your program, if any? How are you utilizing it? What challenges, if any, have you had in procuring / setting up / maintaining the equipment?

6. How else have you utilized the TREND grant to support / enhance instruction (probe for blended/online learning, student assessment)?

7. Are you aware of any TREND-provided support services to students? If so, what are your perceptions of these services and their effectiveness? *Probe for use of career navigator activities*

8. Have you participated in department/campuswide meetings related to TREND? If so, what have you participated in? *Probe for interaction with career navigators, data staff, etc. as well as level of interaction and perceived effectiveness of interaction.*

9. How would you describe the job market for your major TREND occupations? How are employers involved in the TREND program on this campus?
   a. *What do employers look for from those who complete your program?*
   b. *What specialties will be in particularly strong demand in the future?*

10. How interested do you believe your students are in pursuing further education after they complete this program?

11. Do you have any additional comments?

That concludes the interview. Thanks so much for your ideas and your time.

TREND Spring 2018 Site Visit:
Student Focus Group Guide

Facilitator Guidelines:

- Introduce yourself and/or leaders of the focus group as representatives of PTB, LLC and describe your roles in supporting the meeting (i.e., facilitator, note taker).
- Briefly discuss the purpose of the focus group: *Explain to students that that they are part of TREND, a federally funded consortia to prepare adult workers for high-growth jobs. Explain that PTB, as external evaluator for TREND, is interested in students' experience with courses, technologies, and support services this semester. Explain that this is not an evaluation of the college or its instructors. The purpose of this focus group is getting variety of views about the program, so that we can gather information to help plan for the future. People can agree or disagree with comments. The session will take 30-45 minutes.*
- Convey to each focus group participant our confidentiality policy: *(1) the interview/focus group is voluntary; (2) you can decline to answer any questions, or you can stop participating at any time; (3) the information will be held in confidence by the evaluation team who have signed confidentiality agreements ensuring the protection of data; (4) interview/focus group data will be maintained in secure areas; and (5) please respect others' privacy by not sharing any information outside of the focus group.*
- Ask if they have any questions for you before you begin.

Materials
Index cards and pen for each participant.

Time	Opening Questions	Aspects to be covered	Facilitator's Activity
2 min	**INTRODUCTION** Please introduce yourself, your name and have others introduce themselves.		
5 min	**PARTICIPANT BACKGROUND** We would like to know why you enrolled in your course of study. What are you hoping to accomplish?	○ Past education and employment ○ Education plan for the future	Look for commonalities in experiences and backgrounds
5 min	**EXPERIENCE WITH COURSES** We would like to know the range of experiences you had in TREND. What did you do? When did you do it? If you need assistance, who do you talk to?	○ When ○ Nature of activity ○ Content covered	Query about use of technology and prior learning assessments.

5 min	**LEARNING / ATTITUDE CHANGE** Take an index card in front of you. Write down things you learned from these courses and activities. Write as many as possible. (Note: Use list of activities created in the previous discussion). (after 2 min) I'd like each of you to select the most valuable learning experience from your list. Please share with the group and talk about why you selected it. Ask if others in the group agree.	○ Change in attitude ○ Change in knowledge	List ideas shared. Discuss how different ideas may be related.
5 min	**EFFECTIVENESS** We would like you to tell us what is "working well" and what issues we might want to look at to improve for the future. Turn over the card in front of you and write down your thoughts.	○ Implementation issues ○ Student learning ○ Outcome (change in attitude, views, knowledge)	If possible, use chart paper to list students' ideas. Prompt for advising, mentoring, technology, and other areas.
5 min	**SOURCES OF INFORMATION** We would like to explore where information and knowledge about local jobs are coming from. Could you list where you learn about career options? Please list as much as you can think of.	○ Formal (school, college) ○ Informal (friends, family, media) ○ Visiting business leaders	Probe for how students use information from college / employers.
3 min	**STUDENT SUGGESTIONS** Do you have any suggestions to improve your program of study? Possible follow up questions to their ideas: "Why is that important?" "How will it change the way you learn?"	○ Implementation issues ○ Content ○ Delivery ○ Resources ○ Where students are in their learning	List and group responses.
2 min	**CLOSING** Is there anything else we should know about your program of study?		
	Thank you very much for your time.		

North Dakota TREND Evaluation

Adult Interview and Student Focus Group Consent Form

Two public colleges and two tribal colleges in North Dakota are participating in a federal grant to help individuals gain high-wage jobs in the energy field. The grant's fiscal agent, Bismarck State College, has contracted with PTB & Associates to conduct a comprehensive evaluation of this Training for Regional Energy in North Dakota (TREND) grant program to better understand strategies that colleges use to meet program goals. As part of this important research, you are being asked to participate in an individual or small group interview (college staff) or a focus group with up to 7 other students (TREND students) that should take approximately 45 minutes. These discussions will include questions about your opinions and experiences with the TREND program. Please consider the details below prior to deciding to participate in this interview:

• **Confidentiality**: The session will not be recorded and will be summarized solely through written notes. Data will be stored in a secure area accessible only to the researchers. Your answers to these questions will be kept confidential. Please keep in mind that what individuals talk about during the focus group is private and you should not discuss it with anyone after the session is finished.

• **Risks**: The study presents minimal risk to you. You will not be required to answer any questions that you do not wish to answer and memos / reports will not identify you by name. If at any time you feel uncomfortable while answering questions or want to talk with someone after the discussion, please let the interviewer know. While we will ask all focus group participants to not discuss any of the information after the session is finished, we cannot guarantee that focus group participants will keep information private. We have worked with your college to establish an appropriate time and place for the focus group.

• **Benefits**: Study participation helps build knowledge nationally about how to help students gain skills to make an effective transition to the workplace. Where appropriate, colleges and universities can use the information learned to adjust their TREND programming.

• **Voluntary Participation**: Your participation is voluntary meaning that you do not have to participate in this focus group if you do not want to; you can stop participating at any time. We hope you will participate, but you do not have to share information that makes you feel uncomfortable. Your decision to participate or withdraw from the session at any time, will not affect you at the college. By answering questions, you are consenting to participate.

You are indicating your consent to this focus group by participating in today's focus group session. You may take this form with you if you wish. If you have any questions at a later time, please contact W. Douglas Evans, Principal Investigator, at devans@paultbucci.com.

Appendix B – PSM Analysis

Earned Credentials – Summary Data				
Group	Mean	N	Standard Deviation	Median
Comparison Group	1.1717	1066	0.48020	1.0000
Round 4 Participants	2.2907	1094	1.84375	1.0000
Total	1.7384	2160	1.46555	1.0000

Cumulative Grade Point Average – Summary Data				
Group	Mean	N	Standard Deviation	Median
Comparison Group	2.9518	1040	0.88520	3.0000
Round 4 Participants	3.0170	1048	0.83643	3.1700
Total	2.9845	2088	0.86148	3.0711