Promising Practices

Updated 10/16/18

NAPE's *Program Improvement Process for Equity™* (PIPE™) is a research-based, effective professional development program designed for institutional teams to increase the participation and success of under-represented students in Career and Technical Education (CTE) and STEM (especially in nontraditional pathways). The process is built around five modules that help teams to use data to prioritize and act on program improvement to close equity gaps.

From 2015 to the Present, three cohorts of secondary, postsecondary, and STEM Hub partners have participated in PIPE in order to identify equity gaps (disproportionality) in CTE and STEM, and identify evidence- and research-based strategies to close those gaps. This Promising Practices handout outlines the lessons learned, key steps for success, suggestions to avoid pitfalls, and helpful reminders for continuous improvement. Root causes are aligned with strategies that have been effective in increasing participation, retention and/or completion in nontraditional (by gender) and other CTE and STEM programs of study. Under each module are themes that were identified through surveys and follow-up interviews, along with specific examples from institutions and regional teams. This material summarizes key outcomes that were highlighted in the Oregon PIPE Showcase on July 31, 2018.

ORGANIZE

1. What are the important issues at the program/school/regional level that need to be addressed?
2. Who are the key stakeholders, and who can speak to the dynamics most effectively?
3. Who will you be working with to address identified education equity gaps?

Recommendations: Team should have a strong leader; include administrators, instructors, and staff; and include partners from secondary, postsecondary, and community, i.e. STEM Hubs/Business and Industry. (5-8 people)

EXPLORE

1. Which equity gaps have you identified in your program, school, and/or region?
2. What issues are bubbling up from the data?
3. What data are you using to support identified equity gaps?

Recommendations: Data should be disaggregated by year and by program; and within, by gender, race and ethnicity, each special population category, and migrant status. It is important to account for the broadened definition of special populations in the Strengthening Career and Technical Education for the 21st Century Act (Perkins V); see www.napequity.org/perkinsv. Special populations now include individuals with disabilities; individuals from economically disadvantaged families, including low-income youth and adults; individuals preparing for non-traditional fields; single parents, including single pregnant women; out-of-work individuals; English learners; homeless individuals; youth who are in, or have aged out of, the foster care system; and youth with a parent who is on active duty in the armed forces. Under the new law, disaggregating data by gender, race and ethnicity, each special population category, and migrant students is required at the program level, or the cluster level if program data are not available.

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Trends from Cohorts 1-3: The Value of Data through an Equity Lens

- **Important to disaggregate by gender.**
  Clatsop Community College disaggregated their secondary graduation rates and discovered that although their population was 50% female, women were underrepresented in CTE programs, in general. In addition, the team discovered that women were leaving the automotive program at a higher rate (concerns with retention/attrition).

  At *Wilson High School* demographic data showed that since 2011 there had been a consistent decline in nontraditional graduation rates, female participants and female concentrators. In the last three years of data (2013-2016), they discovered that they started with an average of 30-35 girls but fewer than 10 completed the program.

- **Look beyond gender to include disproportionality by race/ethnicity.**
  At *Chemeketa Community College,* although the overall enrollment of Latinx (Latino/Latina/Hispanic) students was 25%, the equity gap analysis revealed that only 10% of students in CTE were Latinx.

- **Look beyond a binary gender lens; include a space for students with non-binary gender identities.**
  At *Chemeketa Community College,* from the student survey the team learned that one of the CTE students identified as gender non-conforming. The binary of male/female did not fit them, and the requirement to choose male or female on a survey could send a negative micromessage (microinequity) that could affect a student's sense of belonging. Important consideration: How to create a space for students who do not have a binary gender identity. Question: How can surveys and other instruments be inclusive?

- **Improvement of Data quality and data consistency.**
  At *Central Oregon Community College* action research revealed an inconsistency in the CIP codes that were being used for student enrollment. The CIP numbers being used for students to register in some courses were not the same numbers being used to report their enrollment in those courses. This deflated numbers relative to student enrollment. Looking at the disaggregated data provided an important insight into the way data were being reported from the college to the state.

DISCOVER

1. What are the key barriers to students' access and success in CTE and STEM programs of study?
2. What root causes are contributing to the educational inequities identified through your equity gap analysis?
3. Is your educational equity focus measurable?
4. Is this something you can actually do something about (within spheres of control and influence)?

Recommendations: It is critical to conduct action research through surveys/interviews/focus groups and other means to validate hypotheses. Are you on the right track? Are there other issues that need to be considered?

See resources focused on Root Causes & Strategies at www.napequity.org/root

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Key Take Aways:

Student, teacher, and counselor surveys are a critical means to gather input on people's perceptions of CTE, career pathways, and students' experiences in the classroom. Focus groups and exit interviews provide an important and powerful means to hear about students' experiences. An equity audit can help a team to examine the contextual micromessages in the educational environment so to identify changes that could increase student access and self-efficacy in programs.

Results from Action Research - Trends from Cohort 1-3:
Lack of Awareness of CTE: Most students do not know about CTE Programs and what they have to offer

- At *Clatsop Community College,* a counselor survey showed that 1/7 counselors knew about CTE. About 42% of their students did not know about CTE offerings and were not provided information about CTE from a teacher or counselor.
- In *Douglas Educational Service District,* middle school-aged children were only familiar with the career/position of their parents, and ultimately focused on those careers for themselves. It is important for parents to be advised and introduced to high-skill, high-wage, and in-demand careers[1], and to be equipped with tools for them to have conversations with their children about the Career and Technical Educational pathways that lead to those jobs/careers. (New Resource: NAPE Career Guidebooks: https://www.napequity.org/products/career-guidebooks/)
- At *Sprague High School,* 20% of staff recommended CTE programs to students; 80% of teachers recommended "college track" students to take courses in CTE programs (opportunity); 83% of staff believed CTE is a benefit to all students; however, results showed staff did not understand what CTE is (*this is an important opportunity to educate staff about CTE in 2018*). The parent surveys found that 73% of parents wanted their student to attend 4-year institutions; and 90% were unaware of CTE. Education for key stakeholders, including students, parents, teachers, and staff was identified as a key strategy.
- At *Wilson High School* counselors had a limited understanding of CTE/STEM programs and were having unbalanced recruitment conversations with prospective students. Student survey confirmed that students did not know about the CTE/STEM programs and courses available.
- At *Roseburg High School* they surveyed their student population for CTE interest and discovered more girls than they had anticipated were interested in the Automotive Program. This led them to include Automotive in their CTE exploration during homeroom period for the 2018-19 academic year.

Importance of an Equitable Classroom Environment

- In *Douglas Educational Service District* environmental surveys showed that male students tended to over-help their female peers, thus unintentionally invalidating and interrupting their learning process.

The Power of Contextual Micromessages

- There were only four girls in the Welding Program at *Roseburg High School (in Douglas ESD)*. The team discovered through an equity audit that all the Welding equipment was size large. This affected the self-efficacy of smaller people, many of whom were girls. The equipment did not fit, so they could not realize

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[1] "High-demand" careers is used in Perkins IV, and now "in-demand" is found throughout Perkins V, which was signed into law July 31, 2018.

their greatest potential in the program. (Key strategy: buy equipment that fits all body types: Small, Medium, Large, Extra Large).

- At *Roseburg High School* very few boys enrolled in the Early Childhood Education Program. Through an additional equity audit, the team discovered that all of the chairs were children's chairs – too small for many tall people. (Strategy: Ensure that there are chairs that can accommodate all body types in the classroom and lab.)
- At *Klamath Community College*, the core team included the institutional researcher and two deans, who looked at the educational materials used in class through an equity lens. Key questions they asked: What were the contextual micromessages being sent to students through those materials? Who saw their experiences validated and who did not?

SELECT & ACT

1. What strategies will you be implementing to address your problem statement?
2. How will you document what works? What doesn't work?
3. How will you integrate this continuous improvement process in your region?
4. How can you maximize success by implementing multiple supporting strategies?

Recommendations: Important to provide technical assistance at the group and team level to help with troubleshooting, maintaining momentum, and building sustainability.

Below are some examples of effective strategies to address the root causes each team identified as barriers to students' access to, and success in, CTE and STEM programs of focus (especially those leading to nontraditional occupations based on gender).

Root Causes	Strategies/Interventions
Admissions/Recruitment and academic advisors and school counselors do not understand CTE courses and programs, and the careers those programs lead to in this day and age (secondary and community college).	**Professional Development and Training for Admissions and Academic Advising Staff and School Counselors.** By using the "Am I a fair counselor" survey" (www.napequity.org/pipe-training), the *Chemeketa Community College* team was able to have open conversations with Advising and Enrollment Management staff about their perceptions of CTE and the programs offered at the college. This led to a greater understanding of the functions of those offices, and an opportunity to share what the team had learned from PIPE relative to low enrollment of women in nontraditional programs. In addition, the team plans to survey students to learn about the sources of information they most often use for career and academic planning. This will help the team to focus their efforts on the most effective means of communicating with students in the 2018-2019 academic year. By creating their own Counselor Survey, *Wilson High School* was able to identify specific components of their counselors' practices that were negatively affecting the recruitment of girls into nontraditional pathways in CTE/STEM. From the findings, they created an Action Plan that encouraged collaboration between the CTE content experts and counselors. As a result, counselors have revamped their conversations for recruitment of new students. This improved counselors' ability to engage in

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	conversations with potential students rather than misjudging which students to have conversations with.
Students do not understand CTE courses and programs, and the careers those programs lead to.	**Mandatory Advising by Faculty:** *Klamath Community College* introduced the practice of mandatory advising where the CTE faculty members, many of whom had worked in industry, became the advisors for students. Who better to discuss the programs and specifics about the courses and careers than the in-house experts, who were able to provide their personal experience along with information about the program. **A Centralized Place to Learn about Careers and the Programs that Lead to Them:** *At Chemeketa Community College,* the creation of the Trade Information Center (TIC) allowed for a centralized place for individuals to learn more about CTE programs and training for jobs. Current students were provided academic planning resources, along with information about apprenticeships. A current student was made available to assist with simple advising (peer role modeling). To date, the TIC events have provided access to approximately 500 students ranging from 4th to 12th grades. **"Freshmen Cruise".** *Roseburg High School* implemented a highly successful Freshmen Cruise class. Over a two-week period, during homeroom class students rotated to each of the CTE programs at the high school without the option to "opt out". Students attended course/lab areas and engaged in hands-on activities and conversations about the program and career opportunities. At *Sprague High School*, the "Tools For Schools Events" promoted exposure to CTE with the mindset: "The right student in the right program for the right reason." For this event they had an assembly and CTE Showcase for all 8th graders in January and an 8th grade parent night at the CTE & Industry Summit.
Recruitment efforts for many CTE programs are not effective in attracting underrepresented students.	**Use recruitment strategies that are personal and intentional:** *Wilson High School* went further with their recruitment strategy by creating additional opportunities to expose students to CTE/STEM programs. One strategy was an interdepartmental collaboration in which the math and science departments and their instructors used forecasting numbers to identify students who were performing well in these subjects. Understanding that academic performance in these two subjects is correlated to interest, participation and success in computer science programs and courses, once students were identified, students were given a personalized invitation from the instructor to learn more about CTE programs. The primary focus was on females, but not exclusively.
The master schedule may become a barrier to access.	Additionally, to improve exposure of female students to CTE/STEM programs, *Wilson High School* reviewed their "wait list data". Any female student who indicated a 2nd or 3rd choice for a CTE course was given preference when a student withdrew from the course.

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	Intermountain Educational Service District (ESD) identified that the master schedule was creating major barriers to CTE students being able to take courses in sequence. The district offered a workshop to help administrators and counselors build more effective schedules so that students who wanted to continue in sequence could. This was particularly important for students in nontraditional occupational pathways, who might be facing other barriers to access. As a precursor, CTE instructors clarified their program sequences, thus improving communication with students and the adults advising them.
Lack of Role Models and Mentors for students considering and pursuing nontraditional pathways and programs.	**Peer Role Models:** In the Freshmen Cruise class at *Roseburg High School* (outlined above – Freshmen Cruise), the four girls in the Welding Program were put front and center, and they mentored other students, especially girls, about Welding techniques and talked with them about their experiences. This same strategy was used with the Community Open House ("Pride Night"), which exposed family and community members to CTE programs of study at the high school. *Klamath Community College* utilized the power of student clubs and organizations as a way for potential students to learn about their CTE programs from current students. With student participation in these student clubs and with involvement in student government, the students were on campus longer and this increased opportunities for them to interact and engage further with their peers and faculty. This helped with persistence and retention. Students were further engaged in campus life through CTE BBQ's. (*Klamath Community College*)
Women in nontraditional pathways are not completing their programs because of challenges balancing school, work, and life	**Scholarship for Women in Nontraditional Programs to assist with Retention:** Through review of the participation and completion data, *Clatsop Community College* noticed a pattern of women in nontraditional programs not completing. Through student surveys, Clatsop Community College learned that many women were not persisting because of challenges with balancing school, work, and life. In response, they developed a unique scholarship opportunity through interdepartmental collaboration (Financial Aid, Student Services and Admissions). The Automotive Scholarship, which will begin in Fall 2018, is designed to assist women in the Automotive Program who have completed their first year to complete their second year.
Students are not pursuing nontraditional CTE and STEM programs of study because of unexamined biases in the classroom and educational environment.	As part of their multi-pronged strategies, *Douglas ESD/Roseburg High School* provided internal professional learning using NAPE's Toolkits (https://www.napequity.org/products/toolkit/) to help educators to identify and mitigate how implicit biases can create barriers to students' access to and success in nontraditional CTE programs of study. Educators utilized lesson plans within the *Explore Nontraditional Careers* and *Realizing Potential with Mindset* toolkits to facilitate conversations in small groups, in order to identify ways they could build students' self-efficacy in their classroom and in the educational environment, in general.

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	Through funding from Oregon Department of Education, *Intermountain ESD* was able to provide NAPE professional development focused on micromessaging, which had a huge regional impact. This training was "perfectly timed" with conversation about Equity and Title IX in the region.
Students are not pursuing nontraditional programs of study because of low self-efficacy and understanding of tools in those programs and labs.	**Provide safe way for students to be oriented to equipment without being embarrassed or singled out.** At *Intermountain ESD*, the Manufacturing Program focused on the course "*Beginning Welding*" to assess retention of female students. They discovered that there was some fear about using the welding equipment, so they purchased virtual welders. This allowed students to practice before using the equipment, which reduced their fears and increased their self-efficacy. Instructors also reported that involving students in the remodeling and reorganization of their shop spaces increased their interest in pursuing advanced courses.
Students are not pursuing nontraditional programs of study because of parents' perceptions (lack of knowledge and/or bias against the careers)	At *Intermountain ESD*, the "Made in Eastern Oregon: Introduction to Manufacturing" video series and companion instructional resources were created in collaboration with the Eastern Oregon Workforce Board and The Ford Family Foundation to provide access and information about manufacturing, engineering, and their industries to entire families. Videos showed students exploring the various CTE pathways that lead to careers with industry partners within their region. This made programs more accessible and relevant within the local context. The Made in Eastern Oregon videos can be accessed from YouTube: https://www.youtube.com/watch?v=a3eRYinHMjY&t=27s
Students are not pursing nontraditional CTE and STEM programs of study because of lack of collaboration between schools within districts, and because of lack of collaboration between formal and informal education.	**Marketing and Messaging:** At *Clatsop Community College*, A STEM Hub representative was included on the collaborative team. They provided helpful feedback and input on marketing strategies which were used to reach out to prospective students for nontraditional program pathways. This led to the creation of new marketing materials which included images of both women and men in CTE programs of study (including those leading to nontraditional occupations). In addition, events were organized to share information about nontraditional training and careers, including outreach to middle and high school students. Many of the regional teams were comprised of representatives from secondary and postsecondary institutions, and some included STEM Hub Representatives. Participating in the PIPE process together increased knowledge of each other's programs and services, it increased collaboration, and it provided new ways for coordination of efforts to educate students and other stakeholders about opportunities for high-skill, high-wage, and in-demand careers in the region (many of which are nontraditional based on gender). For example, in the *InterMountain ESD* region the PIPE team's work spread across multiple districts and related content areas through their CTE Consortium's regional communities of practice.

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Example of the Impact of Multiple Supporting Strategies:

At *Roseburg High School* (*Douglas Educational Service District*), the equity gap analysis revealed that there were only four girls in the Welding Program, although there were excellent opportunities for jobs in the community. The team suspected that the root causes were (1) lack of knowledge of CTE programs and nontraditional occupations; (2) lack of role models and mentors; and (3) biases in the educational environment. Through student and teacher surveys with both middle and high school students, the team discovered that students felt they were being treated differentially, and through an equity audit it was revealed that all of the Welding Equipment was size Large. The strategies they implemented to address these issues and to increase the participation of girls in Welding were highly effective because they built on one another, and supported each other.

1. **Welding Instructor Buy-In**. The team was able to engage the Welding instructor with their full support.
2. **Welding Equipment of All Sizes**. Helmets, gloves, and jackets were purchased in all sizes (S, M, L, XL) so to fit all body types.
3. **Freshmen Cruise**. Over a two-week period, first year high school students were exposed to all CTE programs without the option to opt-out, The four girls in the Welding Program demonstrated techniques and mentored other girls learning about Welding. This helped to increase those students' self-efficacy and comfort with the equipment (**Peer Role Models**).
4. **Pride Night/Community Open House**. All CTE programs were highlighted for students' families and community members, and the four girls in the Welding Program were put front and center to demonstrate Welding techniques. This helped to normalize girls in the Welding Program.
5. **Professional learning focused on understanding the impact of educator implicit biases.** Teams of educators engaged through professional learning communities in activities and lessons from NAPE's Toolkits, including *Explore Nontraditional Careers* and *Realizing Potential with Mindset*. This increased awareness, understanding and action focused on mitigating how unexamined biases can create barriers to students' access to and success in nontraditional programs of study.

The Results. Whereas in fall 2015, there were four girls in the Welding Program, following the implementation of the multi-pronged strategy outlined above **38 girls enrolled in the Welding Program (an 800% increase)!** Over the last two years, the school has been able to maintain that level of enrollment and commitment from female and male students.

Benefits of PIPE: Equity Conversations (Awareness and Action) PIPE had a direct benefit for participants.

"The biggest impact on me personally was the fact that I became more aware of the impact of written and oral communication in regard to equity, i.e. advertising and gender roles. We have had some interesting conversations around equity because of the PIPE process. It has helped guide specific recruiting actions in CTE in our building and I am eager to see the results. Giving out surveys to students/counselors/teachers and using the results has been very rewarding." " (A secondary participant in the first cohort)

"We have been able to engage in conversation with Admin on down in the building about CTE and what it has to offer. What we have found is that students don't know about the opportunities in CTE as not only do they not know what's offered, but neither do the staff. Even if they know what CTE programs exist they don't understand the outcomes from the programs. We have set up a time during staff meetings to showcase each program. We feel that if teachers are aware of programs they may be more inclined to suggest a program to a student who has an interest or passion despite demographics." (A secondary participant in the third cohort)

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Oregon PIPE Promising Practices was compiled and written by Ben Williams, PhD, NAPE CEO and Annissa Langworthy, NAPE Consultant based on surveys and follow-up interviews in spring 2018. This final version was revised with additional examples shared at the Oregon PIPE Showcase on July 31, 2018.

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