On October 26, 2017, the National Science Board (Board, NSB) hosted a listening session at Baton Rouge Community College (BRCC) to discuss the challenges and opportunities faced by the Skilled Technical Workforce (STW) and the people that support and train the STW. Twenty-five individuals from the community participated in the listening session. Participants included faculty and students from BRCC and LSU, local activists, and government representatives. Below is an overview of the key themes discussed during the listening session.

KEY THEMES

Cultural Barriers
Participants discussed the cultural barriers that make progress in STW difficult.

- There is a deficit in the number of skilled STEM-trained math and science teachers in K-12. Participants cited the overall low regard and compensation for school teachers as a key reason for this challenge.

- The Louisiana school system has a culture that emphasizes individual achievement vs. collaboration.

- There is a tendency to favor past practices over new ones because of tradition rather than data, which can create a barrier to the implementation and incorporation of new ideas and technologies.
    - For example, teachers have a general resistance to adopting new technologies—such as distance learning technologies—that could address transportation challenges.

- There is a general resistance among teachers, students, and parents to shifting mindset about what schoolwork and workforce training looks like.

- There is a stigma associated with technical training and vocational careers—for students and parents considering STW careers and for businesses who may think community college education is inferior.
    - This preference for students with 4-year degrees is sometimes reflected in industry HR practices that create barriers for students lacking a 4-year degree.

- People tend to value 4-year degrees over other pathways post-high school.
    - High schools are evaluated based on how many students they send to college not how many they place in the workplace. School counselors continue to advise students to go to 4-year colleges.

- Students' career expectations, experiences, and cultural values vary by generation, life stage, and whether they grew up in an urban or rural environment.

- o Millennial students are different; they lack the same opportunities to tinker. They also seem less resilient—i.e., when faced with failure or a difficult problem millennials tend to move on to a different problem.
- o Community college students are different than the typical student at a 4-year college. These students are typically older, and they frequently have families, jobs, bills, etc. Some are returning to a classroom environment after years of work. Activities/interventions must account for these differences.
- o There are differences between rural and urban students and comfort with STEM. Rural students may have more opportunities to "play in the mud"—for example, operating and repairing farm equipment.

Equity

Issues of inequality were cited as barriers to education and workforce development.

- The lack of reliable transportation is a major issue in ensuring that students can participate in existing workplace and afterschool enrichment opportunities. Programs exist, but many students cannot attend due to lack of transportation.
- Youth homelessness makes it difficult for students to consistently participate in enrichment activities and programs.
- Racial segregation exists in the education system and in housing.
- Overall low resourced schools were noted as a challenge.
  - o There are major differences in the quality of education based on zip code as well as tensions between public and private charter schools.
- Due to the myriad social and economic challenges that students who enter community colleges often face, education must also focus on the well-being of the student and building their resilience.

Industry Partnerships

Participants stated that sustainable partnerships are critical to achieving long-term success and that industry partners are willing to provide funding and resources to schools and non-profits; however, sustaining these partnerships is a key challenge.

- Donors and industry partners focus on singular projects and "getting work done," not transformational philanthropy, which makes it hard to develop long-term solutions to pipeline issues.
- Industry is an eager consumer of graduates but very prescriptive in terms of what skills and competencies they want students to master while in school.
- Lack of connections/partnerships between businesses and local education institutions can create or exacerbate mismatches between students' education and training and business needs (see "Training and Education" below).

Training and Education

Participants discussed differences in the ideal goal of education. Why and how we train students emerged as major issues.

- There is a tension between training students for a specific job versus learning to learn.
- To remain employed, people will have to keep learning how to learn. Any training program must teach people how to be lifelong learners.
- Traditional K-12 subject matter does not advance at the same pace as technology.
- Students need to have hands on experiences early to stay engaged in STEM. Undergraduate research opportunities need to be more widely available to all students.
- Generational differences exist in how STEM is taught and what/how students learn.
- There is a tension between credentialing/competency/skills-based system versus college degrees.
- Industry and higher education at times have different objectives when it comes to training students; industry and education do not always communicate/collaborate
- Does industry want a trained individual or a trainable employee?
- The internet can play an important role in teaching/training the STW; however, it is not a substitute for traditional education settings, particularly given the challenges that students face.
  - Access to the internet is limited in many parts of the state of Louisiana.
  - Community college students benefit from the personal attention that faculty at their institutions can provide.

Policy Issues

Participants noted a number of city, state, and federal policy issues that impact STW.

- Teacher training and credentialing can be unnecessary and complex, discouraging people from participating.
- There is a lack of STEM teachers and challenges to attracting and retaining them over the long term.
- Quality professional development and training opportunities for teachers are critical to success.
- Teachers tend to teach for the test versus learning/work. Testing is done out of a desire to increase accountability but not necessary because it is best for students.
- More attention to how educational-career pathways programs are designed is needed.
- Vocational-technical programs can be overly rigid.
  - Participants spoke about the Jumpstart program –requires students to choose a vocational-technical pathway in 9th grade, which forces them to select too young.
- There is a need to develop new indicators of success for community colleges.
  - Current measures can negatively affect community colleges' funding, which is often tied to graduation rates, whereas many community college students go on

to jobs or 4-year institutions without receiving a degree from the community college.

- o Tracking community college students once they leave the institution is a challenge.