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# EXPANDING THE TALENT POOL: TRACKS TO THE FUTURE PROGRAM FOR HIGH SCHOOL STUDENTS

## SUMMARY

The Federal Railroad Administration (FRA) sponsored Michigan Technological University (Michigan Tech), in collaboration with Pennsylvania State University Altoona (Penn State Altoona) and University of Illinois, Urbana-Champaign (UIUC), to expand an existing summer youth program into the ***Tracks to the Future Railroad Transportation and Engineering*** summer program for students entering grades 9-12. Phase 2 expanded the program to a total of six universities, adding University of South Carolina, University of New Mexico, and California State University-Fresno.

FRA funded the course development and provided the program fees for students, including meals, housing, and industry field visit expenses at the host site. Rail industry companies provided limited travel support for students in need. The program garnered wide interest and participation from across the nation: a total of 171 students from 24 states participated in the program between Phases 1 and 2. The majority of students were rising 11th or 12th graders and almost one third of the students represented minorities, including 20 female students.

Phase 1 included both a traditional, on campus program at Michigan Tech and a week-long hybrid option that combined remote sessions with on campus visits at the three originally participating universities. In the hybrid program, students spent their first two days remotely, participating in live sessions via Zoom, and completed online and tabletop hands-on activities. These same students then traveled to

one of the host campuses for two days of on-campus activities and field visits.

In Phase 2, all students participated in the hybrid option, and the program was expanded to a total of six universities. Phase 1 and Phase 2 included approximately 60 and 120 student participants, respectively.

Feedback from students and parents was positive, even for the hybrid home-study portions of the program. Further, before/after assessments demonstrated improvements in railroad knowledge among students in both Phase 1 and Phase 2. Program improvements were made in Phase 2, modifying some of the online activities and adjusting the program schedule. Additional improvements are planned in program coordination, registration, and teaching as part of Phase 3 in 2024. Phase 3 will again use the hybrid approach and expand the program to a maximum of 200 students across the nation. It will also introduce four more university hosts, making the program available in 10 locations nationwide. University partners include:

- Michigan Tech
- Penn State Altoona
- University of Illinois Champaign
- University of South Carolina
- University of New Mexico
- California State University Fresno
- University of the District of Columbia
- University of Nebraska Lincoln
- North Dakota State University
- Oregon State University



## BACKGROUND

The rail industry has acknowledged its aging workforce and the challenge to effectively recruit K-12 students into the new hire pipeline, as discussed in FRA's 2011 Railroad Industry Modal Profile (FRA, 2011) and the 2016 update to the report (FRA, 2016). Students who choose to participate in higher education often arrive at universities and colleges with a predefined career in mind. Therefore, it is critical that the industry develop a pre-college program with a nationwide focus that can introduce students to the modern side of the railroad industry, including critical safety aspects and the many high-tech applications and jobs that are available.

Most pre-college experiences in railroading are sponsored by railroad museums or scenic railroads and focus on rail history. Although there is nationwide interest among today's K-12 students in rail transportation, it is still a niche area. This makes it challenging to attract large groups of participants that share a specific geographic location to pre-college programs. To increase access, the hybrid program developed in this project combined virtual learning in rail transportation with a site-specific campus visit featuring hands-on activities and field trips.

## OBJECTIVES

The goal of this project was to transform a successful on-campus program at Michigan Tech to a hybrid format including both virtual and face-to-face components. The Phase 1 curriculum was implemented in both fully on-campus and hybrid (online combined with on-campus) formats. This allowed comparisons between the outcomes of each cohort through educational research that is still underway. For the next phase, the team will both refine the program and expand it to a maximum of 200 students and 10 host universities, increasing geographic coverage to reduce travel requirements for student participants. The full project will reach a total of 400 students over three years without major escalation in required expertise and human resources

## METHODS

Students were recruited using a variety of methods, including rail industry magazine calendars, university contact lists, and industry forums. Altogether, the marketing effort reached over 50,000 individuals annually.

The traditional program at Michigan Tech focused on using as much hands-on work as possible, with limited interactive lectures to offer background on the topics.

The hybrid version used extensive interactive learning during the virtual portion, making use of Kahoot, breakout rooms, tabletop activities (Figure 1) and other learning tools to keep students engaged. All virtual materials and sessions were organized in the Canvas learning system. The on-campus sessions focused on hands-on activities (Figure 2) for one day and the second day featured field visits to local rail industry sites (Figure 3).



Figure 1 – Contents of tabletop activity package mailed to hybrid students



Figure 2 - Students at Penn State Altoona, 2022



Figure 3 – Michigan Tech student cohort in industry field visit

### RESULTS

Overall, the summer programs hosted 171 students from 24 states. Table 1 lists demographics for students from each cohort, and Figure 4 graphically shows the distribution of home states represented in Phase 1 and 2.

Table 1 – Demographics of Phase 1 and 2

	Tech	PSU	UIUC	USC	UNM	Fresno	Total
Total Students	41	45	39	14	6	26	171
12th Grade	12	12	15	5	1	13	58
11th Grade	16	16	15	5	3	6	61
10th Grade	8	13	3	1	2	5	32
9th Grade	5	4	6	3	0	2	20
Male	40	43	17	25	4	21	150
Female	2	2	4	1	2	5	16
Other	0	0	5	0	0	0	5
Minority	15	20	11	6	2	23	77

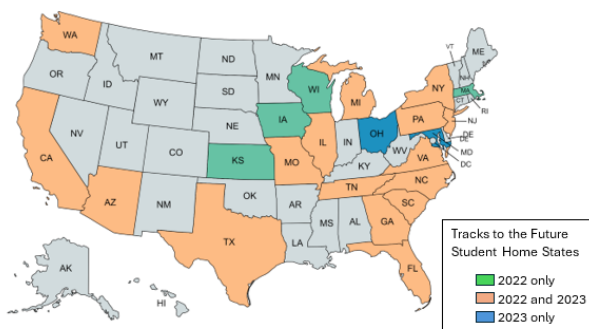


Figure 4 – Students Home States, Phase 1 and 2 Combined

Students received both hands-on instruction and valuable field trip experiences. Both students and parents commented favorably about the experience. Parents were particularly impressed with how the virtual portion of the program held their students' interest and kept them engaged in the process.

### CONCLUSIONS

Phases 1 and 2 of the program received wide interest across the nation and was considered a remarkable success. In all, 171 students from 24 states participated in the program.

Based on the feedback, the course content was considered appropriate, and the delivery methods kept students interested. Feedback from students and their parents was positive and even the virtual portions of the hybrid course maintained student interest and engagement with the topic. Improvements were seen in railroad knowledge among students in both formats when comparing before/after assessments.

Even though two years of the program have been completed, there is room for improvement in program coordination, registration, and teaching (especially the hybrid portion). Team members plan to implement improvements as part of Phase 3 in the summer of 2024.

### FUTURE ACTION

Phase 3 will take place during the summer of 2024. The program will expand to 10 university locations with up to 20 students at each (total of 200 students). The host universities include:

- Michigan Tech
- Penn State Altoona
- University of Illinois Champaign
- University of South Carolina
- University of New Mexico
- California State University Fresno
- University of the District of Columbia
- University of Nebraska Lincoln
- North Dakota State University
- Oregon State University



## REFERENCES

Federal Railroad Administration (2011). [Railroad Industry Modal Profile, An Outline of the Railroad Industry Workforce Trends, Challenges, and Opportunities.](#)

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Michigan Technological University. [Tracks to the Future Web site.](#)

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## CONTACT

**Jason Wornoff, Ph.D.**  
Engineering Psychologist  
Federal Railroad Administration  
(202) 744-6057  
[jason.wornoff@dot.gov](mailto:jason.wornoff@dot.gov)

**Pasi Lautala, Ph.D., P.E.**  
Professor  
Director, Rail Transportation Program  
Michigan Technological University  
Dept. of Civil, Env., and Geospatial Engineering  
1400 Townsend Drive  
Houghton, MI 49931  
(906) 487-3547  
[ptlautal@mtu.edu](mailto:ptlautal@mtu.edu)

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