Research Report
Agreement T1461 Task AB
Summer Youth Program

2023 PACTRANS-WSDOT SUMMER HIGH SCHOOL TRANSPORTATION CAMP PROGRAM REPORT

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Prepared for
The State of Washington
Department of Transportation
Roger Millar, Secretary

September 2023

TECHNICAL REPORT STANDARD TITLE PAGE

1. REPORT NO.	2. GOVERNMENT ACCESSION NO.	3. RECIPIENT'S CATALOG NO.
4. TITLE AND SUBTITLE 2023 PACTRANS-WSDOT SUMMER HIGH SCHOOL TRANSPORTATION CAMP PROGRAM REPORT		5. REPORT DATE September 2023 6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S) Yinhai Wang, Jia Li, Lingzi Wu, Anne V. Moudon		8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS Washington State Transportation Center University of Washington, Box 359446 University Tower, 4333 Brooklyn Ave NE Seattle, Washington 98195-9446		10. WORK UNIT NO. 11. CONTRACT OR GRANT NO. Agreement T1461, Task AB
12. SPONSORING AGENCY NAME AND ADDRESS Washington State Department of Transportation Transportation Building, MS 47372 Olympia, Washington 98504-7372 14 Doug Brodin, Project Manager, 360-705-7972		13. TYPE OF REPORT AND PERIOD COVERED Research Report 14. SPONSORING AGENCY CODE
15. SUPPLEMENTARY NOTES This study was conducted in cooperation with the University of Washington.		

16. ABSTRACT

The primary objective of the PacTrans-WSDOT Summer High School Transportation Camp program is to promote an increased number of students pursuing advanced degrees and careers in STEM-related fields associated with transportation. This mission emphasizes a particular commitment to broadening the participation of women and minority groups within these fields. Ultimately, the program aims to contribute to the development of a skilled and diverse STEM workforce.

The 2023 PacTrans-WSDOT Summer High School Transportation Camp was designed as a comprehensive, six-day, five-night residential program. It took place at two prestigious institutions: Washington State University (WSU) in Pullman from July 24th to 29th and the University of Washington (UW) in Seattle from August 13th to 18th. The 2023 program was generously sponsored by PacTrans and WSDOT and was offered free of charge to all participating students. Both camps welcomed 33 students, with 25 at the UW and eight at WSU. The success of both camps was underscored by overwhelmingly positive feedback from students and parents.

17. KEY WORDS	18. DISTRIBUTION STATEMENT
STEM Education; STEM Workforce Development; Diversity in Transportation; Summer High School Camp; PacTrans-WSDOT	No restrictions. This document is available to the public through the National Technical Information Service, Springfield, VA 22616

19. SECURITY CLASSIF. (of this report)	20. SECURITY CLASSIF. (of this page)	21. NO. OF PAGES	22. PRICE
None	None		

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1. INTRODUCTION

Transportation plays a pivotal role in facilitating the movement of people and goods, making transportation systems a fundamental driver of economic development. The efficiency of these systems depends on both state-of-the-art technology and a skilled, well-trained workforce.

The importance of preparing and training the workforce that supports an efficient transportation system was emphasized by the Transportation Research Board (TRB) [1]. Specifically, their 2003 report pointed out that University Transportation Centers were promising platforms for ongoing workforce development. They also cautioned against the consequences of inaction, noting that a lack of adequate training could lead to ineffective agency operations, inefficient resource utilization, and higher costs to meet future needs. Additionally, they stressed the importance of strategic workforce planning over merely filling vacant positions, particularly in a competitive job market.

Fast forward two decades, and the need for workforce development in transportation is more critical than ever. Resources for modernizing and managing transportation systems are dwindling, while shifts in demographics, increased mobility demands, and environmental challenges necessitate investments in technology and infrastructure. The transportation workforce must be equipped to confront and resolve these pressing challenges, requiring training and education tailored to the evolving landscape.

Moreover, workforce development initiatives face two new challenges. Firstly, many transportation agencies are witnessing a significant turnover in staff as a large cohort of employees hired in the past approach retirement. This presents an opportunity to integrate a new generation of trained professionals. Secondly, public agencies, including transportation departments, must compete with private sector companies to attract top talent.

Therefore, the demand for transportation-related workforce development programs has never been greater. To strategically address contemporary challenges in technology, environmental sustainability, and human resources, a comprehensive approach is necessary, starting with the exposure and education of pre-college students.

1.1 Program Goals and Objectives

The overarching goal of the PacTrans-WSDOT summer high school transportation camp program is to increase the number of students pursuing advanced degrees and careers in science, technology, engineering, and math (STEM) fields related to transportation, with a particular emphasis on broadening participation among women and minority groups. Over time, the program aims to contribute to the development of a STEM-capable workforce. To achieve these goals, the program has the following objectives:

- Reach out to minority youth, young women, and disadvantaged individuals to introduce them to the opportunities within transportation-related STEM fields.
- Increase awareness among high school students about the diverse and rewarding careers available in the transportation industry.
- Encourage and inspire high school students from diverse backgrounds to consider pursuing a vocation in transportation.

1.2 Broader Impacts

The PacTrans-WSDOT summer high school transportation camp program's impact extends far beyond its immediate participants. By increasing the number of students pursuing advanced degrees and careers in STEM fields related to transportation, the program not only fosters individual growth but also contributes to the overall vitality and innovation of the transportation industry. Furthermore, our commitment to broadening the participation of underrepresented groups, including women and minorities, enriches the industry's diversity and inclusivity, leading to more comprehensive solutions and a workforce that reflects the society it serves. Over time, our dedication to delivering a STEM-capable workforce will ensure that the transportation sector remains at the forefront of technological advancements, sustainability, and resilience. Through outreach, awareness-building, and encouragement, our program actively shapes a brighter future for both aspiring young talent and the transportation field as a whole.

2. PROGRAM OVERVIEW

2.1 Camp Locations and Dates

The 2023 PacTrans-WSDOT Summer High School Transportation Camp took place at two distinguished institutions: Washington State University (WSU) in Pullman from July 24th to 29th and the University of Washington (UW) in Seattle from August 13th to 18th.

2.2 Organizational Structure and Key Personnel

The planning, development, and successful execution of this program were led by key personnel from the UW, with valuable coordination and collaboration from the Washington State Department of Transportation (WSDOT) and WSU. The UW led the efforts in proposal writing, program planning, program development, and final report preparation. Meanwhile, the schedule development, logistics, and execution of each camp were managed by dedicated teams from the UW and WSU. Table 2.1 lists all key personnel involved in the 2023 PacTrans-WSDOT Summer High School Transportation Camp project.

Table 2.1. Key Personnel and Their Responsibilities

Name	Organization	Role	Responsibilities
Yinhai Wang	UW	Program Supervisor	Oversee program planning, development and administration; provide strategic directions.
Pamela Vasudeva	WSDOT	Consultant	Provide guidance and support in the planning, development, and administration of programs
Doug Brodin	WSDOT	Consultant	Provide guidance and support in the planning, development, and administration of programs
Anne V. Moudon	UW	Consultant	Provide guidance and support in the planning, development, and administration of programs
Lingzi Wu	UW	UW Camp Director and Host	Lead all UW Camp planning, development, and execution; Support WSU Camp planning and development
Sam Ricord	UW	UW Camp Coordinator	Assist with UW Camp planning and development
Ruyi Chen	UW	UW Camp Coordinator	Website and online application form development
Ollie Wiesner	UW	Residential Counselor	Support the Camp Host to create a welcoming and safe environment; Assist with any emergencies or issues that may arise during the camp; Supervise and support camp participants
Annie Davis	NA	Residential Counselor	Support the Camp Host to create a welcoming and safe environment; Assist with any emergencies or issues that may arise during the camp; Supervise and support camp participants
Melanie Paredes	PacTrans/UW	Financial Coordinator	Process payments and administrative support

Name	Organization	Role	Responsibilities
Jia Li	WSU	WSU Camp Director and Host	Lead all WSU Camp planning, development, and execution
Mary Aina	WSU	WSU Camp Coordinator	Assist with WSU Camp planning and operation
Erin Rapone	WSU	WSU Camp Coordinator	Assist with Camp transportation & logistics
Randall Bennett	WSU	WSU Camp Coordinator	Assist with Camp lodging and dining

2.3 Participants' Demographics

The UW camp accepted 27 students. Pie charts and a map of the accepted participants' demographics are presented in Figure 2.1.

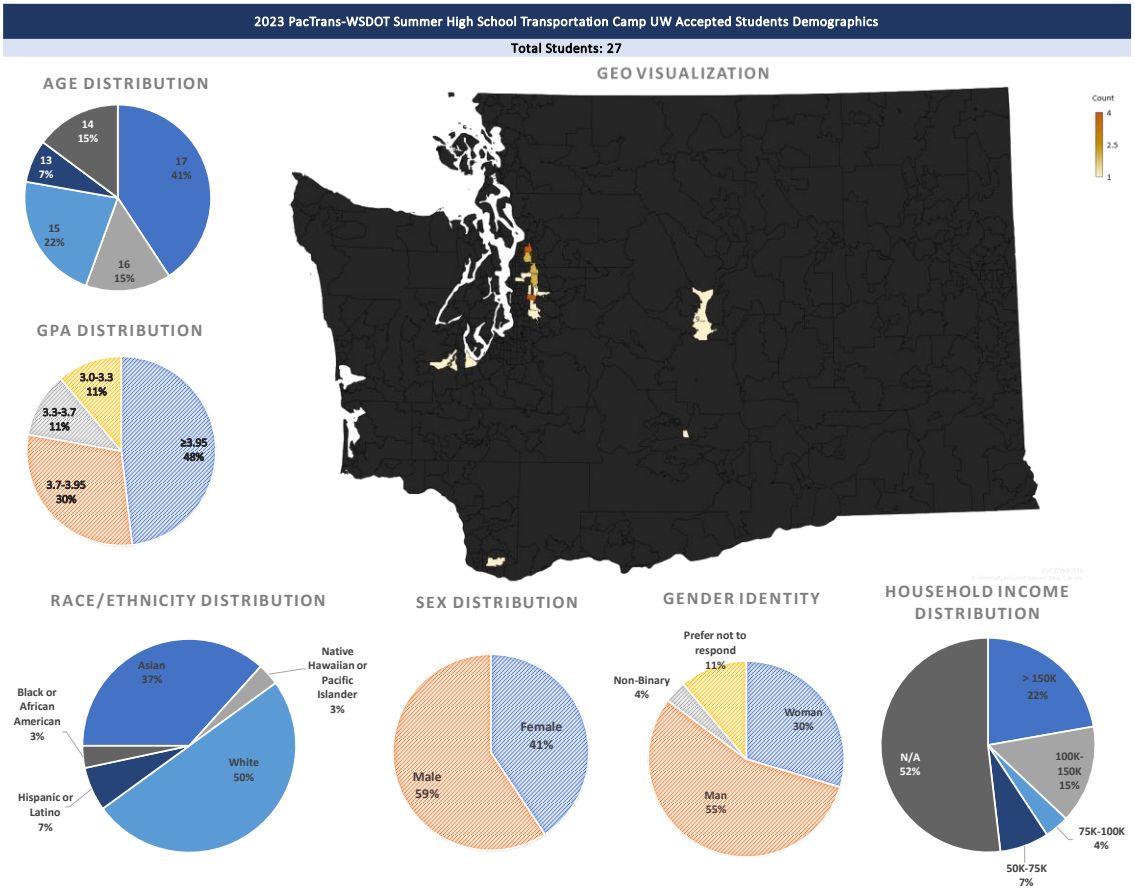


Figure 2.1. Accepted UW Participants' Demographics

The WSU camp received 16 applications and accepted eight students. Figure 2.2 shows the geographical locations of applications.

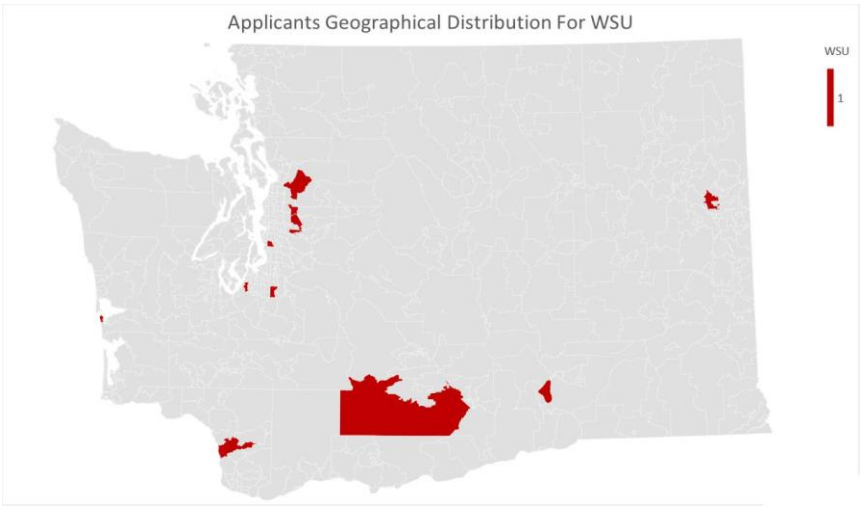


Figure 2.2. Accepted WSU Participants' Zip Codes

3. PROGRAM PLANNING

3.1 Efforts to Ensure and Increase Diversity, Equity, and Inclusion

During the program planning and development phase, our team placed special emphasis on strategies intended to attract a diverse group of young individuals to engage in STEM fields related to transportation. Some of the key strategies we adopted included the following:

1) *Targeted Outreach and Recruitment*: We directly engaged with several high schools that serve underrepresented students to provide them with program information and encourage their participation.
2) *Scholarships and Financial Support*: We made the entire six-day, five-night camp free for all students. Additionally, we developed plans to offer financial support to students who might require assistance with travel expenses from their hometowns to the camp locations.
3) *Inclusive Program Curriculum Development*: Our planning and development team comprised experts in civil engineering, transportation engineering, urban design and planning, and construction management. This diverse expertise allowed us to create a curriculum that incorporated a wide range of perspectives and experiences.
4) *Data Collection and Analysis*: We implemented a systematic approach to collect demographic data about program participants. These data served as a valuable tool for measuring the effectiveness of our diversity, equity, and inclusion (DEI) efforts. We analyzed these data to identify areas for improvement and to make necessary adjustments to our strategies.

These strategies collectively reflected our commitment to fostering DEI in our program, ensuring that all young individuals have the opportunity to explore and thrive in STEM fields related to transportation.

3.2 Program Website

We created and launched a website (https://pactranssucamp.online/) as a platform to promote the PacTrans-WSDOT Summer High School Transportation Camp. The

website will be consistently maintained and is expected to support future events. Table 3.1 provides a summary of the website statistics since its launch.

Table 3.1. Summary of Website Statistics by Month

Month	Unique Visitors	Page Views
April	500	8201
May	2295	4303
June	1285	2292
July	780	1092
August	1514	2057
September (Till 13th)	174	208
Total Views		18153

3.3 Program Promotion

The program team finalized the design of 2023 camp flyers by the end of April and promptly initiated the program's promotion. The planning and development team distributed program information to various school boards, organizations, and tribal communities, such as the Seattle Public School Board, Rainier Scholars, and the Northwest Tribal Technical Assistance Program Center. Additionally, key personnel shared program flyers on social media platforms such as LinkedIn. Our successful promotion efforts are evident in Table 3.1, which shows that the highest number of unique website visitors since its launch occurred in May.

3.4 Student Evaluation Criteria

To establish a comprehensive set of student evaluation criteria, we drew from recommendations provided in the *National Summer Transportation Institute Program Desk Reference*, a publication by the U.S. Department of Transportation (USDOT) and the Federal Highway Administration (FHWA) [2]. Their suggested criteria included factors such as ages ranging from 7th to 12th grade, completion of basic algebra or qualification for enrollment in algebra for the upcoming school year, desire for a STEM education, and a minimum cumulative grade point average of 2.0 or higher on a 4.0 scale.

On the basis of these guidelines, our planning and development team devised a two-level evaluation system of prequalification and evaluation criteria. To be eligible for the program, participants had to meet the following requirements:

- Be a Washington resident
- Be enrolled in a Washington high school in the fall of 2023 (9th to 12th grade)
- Be able to attend the entire duration of the camp in person
- Have a 2.0 GPA or higher.

The evaluation criteria included the following six categories:

1) *Interest in Transportation:* We prioritized students who exhibited a genuine interest in transportation engineering or related fields, such as planning, logistics, or geography.
2) *Performance*: We considered students with a fairly strong academic track record in math, science, and engineering-related courses, as they demonstrated the capability to engage with the camp's curriculum effectively.
3) *Diversity, Equity, and Inclusion (DEI)*: We aimed to foster a diverse learning environment by selecting students from various backgrounds and experiences, promoting inclusivity and collaboration.
4) *Service Experience*: We looked for students who had demonstrated strong teamwork skills. This could be evaluated through their participation in team projects, group activities, or community service.
5) *Communication Skills*: We looked for students who had strong communication skills, as well as an ability to work in groups and present their ideas. This could be evaluated through their written and oral communication.
6) *Leadership Potential*: We considered students who had exhibited leadership potential in school or community activities, indicating their capacity to take initiative, work independently, and inspire others.

Our holistic approach to evaluating students encompassed these six criteria, ensuring a well-rounded and diverse group of participants who could benefit from and contribute to the program's objectives. Table 3.2 outlines the proposed weight distribution for each criterion and the supporting application materials associated with it.

Table 3.2. Applicants' Evaluation Criteria

Criteria	Weight (100%)	Score (1-100)	Supporting Materials
1. Interest in transportation	30%	1-30	• Personal Statement • Introduction Video

Criteria	Weight (100%)	Score (1-100)	Supporting Materials
			• Letter of Recommendation • Career Interest
2. Performance	30%	1-30	• GPA • Transcript • Letter of Recommendation • Recent Math and Science Class
3. DEI			• Geographic Location • Race/Ethnicity • Sex • Gender Identity • Household Income • Grade/Age
4. Service experience	15%	1-15	• Personal Statement • Letter of Recommendation • Awards/Achievements/Organization Memberships and Other Extracurricular Activities
5. Communication skills	15%	1-15	• Personal Statement • Letter of Recommendation • Introduction Video
6. Leadership potential	10%	1-10	• Personal Statement • Letter of Recommendation • Awards/Achievements/Organization Memberships and Other Extracurricular Activities
Overall	100%	100	

3.5 Application Review (UW and WSU)

By the published priority deadline of May 31, 2023, we had received 57 applications for the UW camp. The application review process commenced immediately for the UW camp, as we had reached our optimal applicant pool size. By the deadline of June 15th, we had received 14 applications for WSU (two late applications were received and considered after the deadline).

The UW evaluation committee comprised the following key personnel: Prof. Yinhai Wang, Prof. Lingzi Wu, Prof. Anne Moudon, Pamela Vasudeva, and Sam Ricord. To mitigate unconscious bias, all applicant names were anonymized for the evaluation team. Each member of the evaluation committee individually assessed all applicants. Subsequently, all evaluations were compiled and summarized on the basis of the number

of “accept” ratings each student received from every evaluation committee member. The results are presented in Table 3.3.

Table 3.3. UW Applicants’ Evaluation Results

Number of “Accept” from the Evaluation Committee	Number of Students
5	7
4	10
3	12
2	9
1	11
0	8

The WSU evaluation committee comprised the following key personnel: Prof. Jia Li, Pamlea Vasudeva, Prof. Anne Moudon, and Prof. Lingzi Wu. To mitigate unconscious bias, all applicant names were anonymized for the evaluation team. Each member of the evaluation committee individually assessed all applicants and gave a “recommend” or “not recommend” evaluation along with detailed comments. Students were accepted if they received more than two recommendations. Subsequently, 13 of the 16 applicants were offered acceptance to the WSU camp.

4. PROGRAM ORGANIZATION AND IMPLEMENTATION (UW, WSU)

4.1 Schedule Development (UW)

The development of the UW camp schedule followed a structured process involving the following key steps:

Step 1: Concept Design - The UW planning team, led by Professors Wang and Wu, determined the main activity groups for the camp. These groups included

- Student-led projects
- Participatory lectures
- Field trips/site tours/lab visits
- Evening activities.

Step 2: Brainstorming - Multiple brainstorming sessions were conducted to generate ideas and examples for each of the activity groups outlined in Step 1.

Step 3: Theme Development - Building on the brainstormed activities, the UW planning team identified five main themes for the camp:

- Introduction to Transportation
- Transportation Safety and Equity
- Active Transportation, Public Transit, and Sustainability
- Integrated Transportation System, Supply Chain, and Logistics
- Transportation Technology.

These themes served as the foundation for organizing the participatory lectures, field trips/site tours, and lab visits.

Step 4: Schedule Logic Development - The five themes from Step 3 were logically assigned to each day of the week (Monday through Friday) based on the progression from foundational knowledge to more advanced topics. Once daily themes had been established, participatory lectures, field trips/site tours/lab visits, and project work times were allocated to each day. The planned distribution was approximately 40 percent for participatory lectures, 30 percent for field trips/site tours/lab visits, and 30 percent for project work time.

Step 5: Student-Led Project Design - A student-led project was designed to align with the camp schedule, allowing students to apply what they learned each day. The

chosen project focused on designing a multimodal complete street section, selected from various project ideas.

Step 6: Speaker and Presenter Coordination - The UW planning team reached out to potential speakers, presenters, and tour guides to finalize locations and dates for the camp activities.

Step 7: Evening Activities Development - The UW planning team concluded by finalizing the evening activities to complement the daily curriculum.

A high-level view of the final schedule, including the distribution of activity groups, is presented in Figure 4.1. 'Note that 1) only major activities (longer than 45 minutes) are listed here, while activities such as daily debriefing or bio breaks are not broken out; and 2) the time allocated for tours includes travel time.

Day	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
Date	8/13/23	8/14/23	8/15/23	8/16/23	8/17/23	8/18/23
Theme		Introduction to Transportation	Transportation Safety and Equity	Active Transportation, Public Transit and Sustainability	ITS, Supply Chain and Logistics	Transportation Technology and Project Presentation
8:00 - 9:00		Breakfast	Breakfast	Breakfast	Breakfast	
9:00 - 10:00		Introduction and Pre-Survey	Transportation Safety - Hollyanna Littlebull	Equity - Angela Kitali	ITS - Wei Sun	
10:00 - 11:00		Transportation Opportunities and Challenges - Allison Camden & Pam Vasudeva	Incident Management at TMC - Trent Alden	Sustainability - Rubnia Singh, Tianqi Zhou	DEI and Disability Rights - Anna Zivarts	To-Go Breakfast, PACCAR Test Center Tour
11:00 - 12:00		Lunch	Accessibility - Jon Froehlich	Lunch	Lunch and Star Lab Visit	
12:00 - 1:00				Public Transit - Mark Hallenbeck		Lunch
1:00 - 2:00		Visit NW Region TMC	Lunch & Project Work Time	Walking Tour of Complete Streets/Project Example	Amazon Fulfillment Center Tour	Project Work and Preparation Preperation
2:00 - 3:00		Project Introduction and Work Time				Closing Remarks - Roger Millar
3:00 - 4:00	Student Check In		Metro Electric Testbed	Project Work Time	Project Work Time	Final Project Presentation
4:00 - 5:00	Orientation & Dinner					
5:00 - 7:00		Dinner Ice Cream and 43rd St Redesign Presentation	Dinner Game Night at HUB	Dinner Transportation Themed Movie Night	Dinner Reflection and Evaluation	
7:00 - 9:00	Ice Breakers					

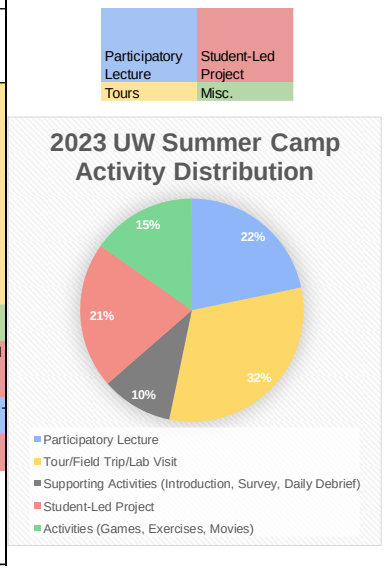


Figure 4.1. 2023 UW Camp Final Schedule and Activity Distribution

4.2 Participatory Lectures (UW)

As illustrated in Figure 4.1, the UW camp invited 12 guest speakers, resulting in 10 engaging presentations. A breakdown of organizations, the number of speakers from each organization, and their distribution are shown in Table 4.1.

Table 4.1. UW Guest Speaker Organizations and Distribution

Organization	Organization Type	Count	Distribution
WSDOT	Government Agency	4	33%
Washington State Transportation Center (1), Disability Mobility Innovation Program (1), Northwest Tribal Technical Assistance Center (1)	Public Agency/ Research Agency/ Programs	3	25%
UW Faculty (2), UW Graduate Students (2)	Institution	4	33%
AI Waysion	Startup	1	8%

Before the camp began, detailed instructions were provided to all speakers, outlining the audience's nature and a description of the student-led team project. This guidance encouraged speakers to

- Craft their presentations to foster active student participation and create an enjoyable learning experience.
- Connect their topics with the student-led team project, enabling students to apply the knowledge gained in the lectures to practical scenarios.

These efforts were intended to make the lectures both interactive and directly applicable to the students' learning experience. Examples of these engaging lectures can be found in Figure 4.2.

Figure 4.2. Examples of Participatory Lectures (UW)

4.3 Student-Led Team Project (UW)

Project Overview: The student-led team project centered around the design of a complete street, empowering each team to choose a community with which they were familiar and envision improvements for the community's transportation..

Group Size: Two.

Expected Student Learning Outcomes:

- Understand and describe the challenges and opportunities present in transportation in our communities.
- Apply fundamental principles of engineering, management, and urban planning in improving transportation within the selected community.

Final Deliverables:

- A comprehensive poster detailing the students' proposed ideas for their selected project.
- A poster presentation in which students would take turns presenting their poster to peers and parents.
- Auxiliary deliverables and supporting materials such as videos, slides, and simulations could also be included.

Schedule: The project would be developed over the five days during the camp, with planned activities for each day as follows:

Day 1: Introduce Project – ***Key Output: Project Location Selected***. The students would be introduced to the project topic and would learn the basic ideas that would be critical for completing the project, including an introduction to complete streets. Students would also go on a walking tour of a recently completed complete street project at the U-District Light Rail Station to highlight these ideas. Students would also select the location for their example, which could range anywhere between a single street or an entire neighborhood. We would also provide an option for students to select who could not or did not want to come up with their own location.

Day 2: Identify Issues – ***Key Output: List of Issues Identified***. Next, the students would have to identify the current issues that existed in the built environment of their selected project area. This could include topics such as safety, mobility, accessibility, or

other issues. This would be paired with a walking tour of the example project location mentioned in Day 1.

Day 3: Brainstorming Solutions – Key Output: List of Ideas/Solutions to Identified Issues. Once the issues with the selected project had been identified, the students would have to begin brainstorming potential solutions to these problems. This task would involve a great deal of creativity to allow students to identify unorthodox solutions to their observed challenges.

Day 4: Implement Solutions – Key Output: Final Drawn Changes to Project Area. Once a general idea of solutions for the project had been identified, they would have to be implemented in the project. This would include drawing on large printouts of their selected project and how they would change the community. This could include changes to the transportation infrastructure, changes to land use, or anything else the students came up with.

Day 5: Prepare for Final Presentation – Key Output: Poster and Final Presentation. On the last day, the students would take their final drawing posters and present them to their peers, parents, and others in attendance. This would include time to prepare for that presentation.

Presentation Format:

- Students would complete their posters by 2:00 pm.
- Family and friends could visit their posters between 2:00 pm and 3:0- pm while students joined Roger Millar's Closing Remarks.
- Presentation time would be 3:00 pm to 5:00 pm.
- Presentations would be organized into four sessions, each having –three to four groups. Each group would have about five minutes to present their posters. After all groups had presented in one session, the floor would be open for questions, comments, and feedback.

Some of the amazing moments captured by our photographer are shown in Figure 4.3.

Figure 4.3. Examples of Students Working on and Presenting Their Projects (UW)

4.4 Tours and Lab Visits (UW)

During the UW camp, participants had the opportunity to experience four field trips, one lab visit, and one guided walking tour. These experiences included the following:

1. Northwest Region Transportation Management Center tour
2. King County Metro Electric Test Bed tour
3. Amazon Fulfillment Center tour
4. PACCAR Test Site tour
5. A visit to the UW STAR Lab
6. A walking tour with Light Rail.

Figure 4.4. Examples of Field Trips, Tours, and Lab Visits (UW)

4.5 Schedule Development (WSU)

The development of the WSU camp schedule followed a structured process involving the following key steps:

Step 1: Concept Design – The WSU planning team, led by Professor Li, with coordination by Pamela Vasudeva and input from the UW planning team, determined the main activity groups for the camp. These groups included

- Student-led projects
- Participatory lectures
- Field trips/site tours/lab visits
- Recreational activities.

Step 2: Theme Development – The WSU team identified the following themes for the camp:

- Introduction to Transportation
- Artificial Intelligence and Technologies in Transportation
- Transportation Materials and Infrastructures
- Diversity, Equity, and Inclusion (DEI) in Transportation
- Multimodal Transportation
- Tribal and Rural Transportation.

These themes served as the foundation for organizing the participatory lectures, field trips/site tours, and lab visits.

Step 3: Schedule Logic Development **–** The six themes from Step 3 were logically assigned to each day (Monday through Saturday) based on activity type, student preparations needed, and logistics. To enhance students' learning experience, we blended different themes and camp activities for each day. The planned distribution was approximately 45 percent for participatory lectures, 25 percent for field trips/site tours/lab visits, and 30 percent for project work time.

Step 4: Student-Led Project Design – A student-led project was designed to align with the camp schedule, allowing students to apply what they learned each day. Two projects were developed: 1) applying Python to analyze traffic crash data; and 2) assembling and controlling robocars to overcome barriers.

Step 5: Speaker and Presenter Coordination – The WSU planning team reached out to potential speakers, presenters, and tour guides to finalize locations and dates for the camp activities.

Step 6: Recreational Activities Development- The WSU planning team developed a schedule of recreational activities to complement the daily transportation curriculum.

Step 7: Schedule Finalization – The WSU planning team finalized the schedule after incorporating feedback from WSDOT and the UW planning team and confirming the logistics and speaker availability.

A high-level view of the final schedule is presented in Figure 4.5. The colors differentiate different types of activities (blue: opening and closing talks; yellow: talks and tours given by WSDOT personnel; orange: talks and tours given by WSU faculty; pink: road trips; green: student projects).

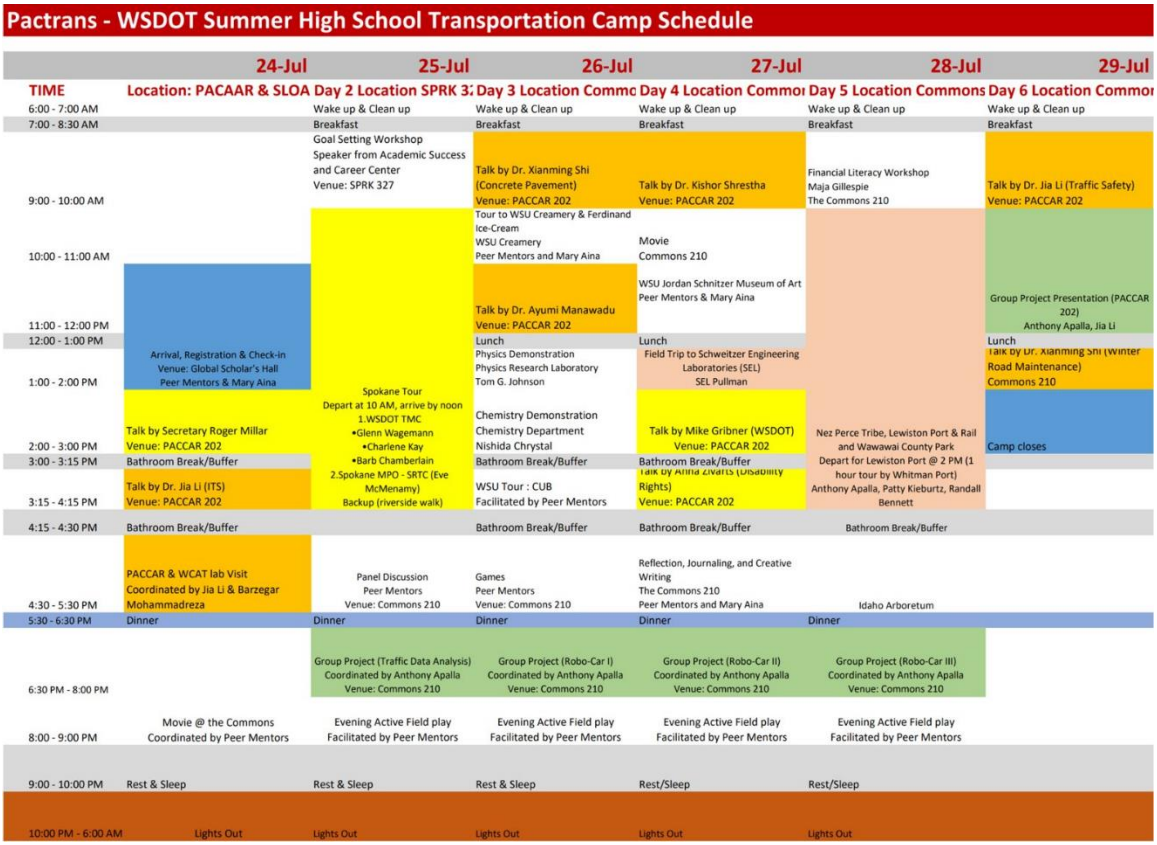


Figure 4.5. A High-Level View of the Final WSU Schedule

4.6 Participatory Lectures (WSU)

As illustrated in Figure 4.5, the WSU camp invited 12 guest speakers, resulting in 14 engaging presentations[1]. A breakdown of organizations, the number of speakers from each organization, and their distribution can be found in Table 4.2.

[1] Some presentations were given during or after a tour.

Table 4.2. WSU Guest Speaker Organizations and Distribution

Organization	Organization Type	Count	Distribution
WSDOT	Public Agency	5	33%
WSU faculty	Institution	4	33%
Port of Whitman County	Public Agency	1	8%
Spokane Regional Planning Council	Public Agency	1	
Disability Rights	NGO	1	

Before the camp, instructions were provided to all speakers outlining the nature of the camp, audience characteristics, and anticipated topics. This guidance encouraged speakers to

- Provide a more engaging and interactive learning experience for the students.
- Tailor materials suitable for students and the themes of the camp.

Examples of these engaging lectures can be found in Figure 4.6.

Figure 4.6. Examples of Participatory Lectures (WSU)

4.7 Student-Led Team Project (WSU)

Project Overview: During the five days, the students finished two projects. The student-led team project centered around 1) Using Python for analyzing transportation data (days one and two); and 2) Assembling and controlling robot cars to finish given tasks, such as making turns and overcoming barriers (days three to five).

Group Size: Two.

Expected Student Learning Outcomes:

- Learn the basic idea of data science for transportation.

- Learn the concept of self-driving cars and automated transportation.

Schedule: The day-to-day objectives, activities, and deliverables of the student projects were as follows.

Day 1. Learn Python Basics

- Objectives
  - Be introduced to Python.
  - Implement variables and arithmetic.
  - Become familiar with the Spyder Integrated Development Environment.
- Activity
  - Follow along instructions in creating variables and doing basic arithmetic in Python.
- Deliverables
  - Each student should have a saved .py file with examples from the activity.

Day 2. Use Python for Analyzing Transportation Data

- Objectives
  - Understand how to read Excel files in Python.
  - Create and display a plot using Python.
  - Collect data from a WSDOT website.
- Activity
  - Data Science Project: Students would follow along instructions and take crash data from a WSDOT website and record them in Excel. They would then read the Excel file and write a Python program to display a bar plot of the data.
- Deliverables
  - Each student would have a bar plot image file and the corresponding code saved as a .png and .py file, respectively.

Day 3. Learn Components of Robotic Cars

- Objectives
  - Learn to effectively communicate in a team.
  - Build a robotic car following an instruction manual.
- Activity

    - Robo Car: Students would be paired up in teams of two and build a robotic car in accordance with the instruction manual.
- Deliverables
    - Each team would have an unfinished robotic car.

Day 4. Finish Building Robotic Cars

- Objectives
    - Learn to effectively communicate in a team.
    - Build a robotic car following an instruction manual.
- Activity
    - Robo Car II: Teams of two would continue to build a robotic car until completion.
- Deliverables
    - Each team would have a finished robotic car.

Day 5. Program Robotic Cars to Achieve Obstacle Detection

- Objectives
    - Effectively communicate in a team.
    - Program robotic cars to complete an obstacle detection task through an app.
- Activity
    - Robo Car Presentation: Teams of two would be given the same task of block-programming the robotic car to navigate and escape a trap through obstacle detection.
- Deliverables
    - Each team would have a saved block program in the ELAGOO app that had successfully navigated the robot car out of the trap.

Figure 4.7. Students Testing the Assembled Robotic Car (WSU)

4.8 Tours and Lab Visits (WSU)

Table 4.3 shows a list of the tours that students in the WSU camp took.

Table 4.3. List of WSU Tours.

	Lab/Tour	**Theme**
Day 1	WCAT lab	Pavement materials
Day 2	• WSDOT • Spokane Regional Transportation Council (SRTC)	• WSDOT Scope and Activities (intelligent transportation, active transportation, and complete street) • Multimodal transportation in Spokane and scope of Metropolitan Planning Organizations (MPOs) and SRTC
Day 4	• Trip to Schweitzer Engineering Lab (SEL)	• Learning electric grid and energy systems
Day 5	• Trip to Wilma, Clarkson, and Lewiston Ports • Trip to Wawawai county park	• Learning multimodal transportation (water, rail, and freeway) and its impacts in local agriculture economy • Learning Indian trips and the evolution of economy and transportation in early days in Palouse region

5. STUDENT LEARNING OUTCOMES (UW)

5.1 Student Learning Objectives (UW)

On the basis of the content covered in the daily participatory lectures, tours, and student-led team projects, a set of daily learning objectives was established. Additionally, to assess student learning, two questions were formulated for each day; these were intended to be discussed at the end of daily activities, except for the final day of the camp. The daily student learning objectives and corresponding daily assessment questions are listed as follows:

Monday, Aug 14, 2023, Theme: Introduction to Transportation

Daily Learning Objectives:

- Characterize the basic impacts that transportation has on our society.
- Describe how transportation affects the student's daily life.

Daily Assessment Questions:

- Can you describe one major challenge that your/our communities face regarding transportation?
- Can you describe one thing that you learned today?

Tuesday, Aug 15, 2023, Themes: Transportation Safety and Equity

Daily Learning Objectives:

- Compare how transportation does not serve all members of our society equally and examine disparities in transportation among different communities.
- Understand the safety concerns faced by our community and the differences in safety that various communities face.

Daily Assessment Questions:

- What communities do you see that are underserved, and what would you do to improve their transportation options?
- What aspects of the transportation network cause the greatest safety issues, and what general methods would you use to address those issues?

Wednesday, Aug 16, 2023, Themes: Active Transportation, Public Transit, and Sustainability

Daily Learning Objectives:

- Compare the different available modes of transportation and contrast the benefits, availability, and effectiveness of these modes for different communities.
- Associate the use of transportation with the direct impact this has on the environment with regard to climate change.

Daily Assessment Questions:

- Name one of transportation's impacts on the environment, and how would you mitigate it?
- What are the pros and cons of using different modes of transportation, and how would you improve options for underutilized modes?

Thursday, Aug 17, 2023, Theme: Integrated Transportation System, Supply Chain and Logistics

Daily Learning Objectives:

- Identify the emerging technologies with increasing significance in the transportation industry.
- Describe the ways in which new technology will impact community members' daily lives in relation to transportation.

Daily Assessment Questions:

- Can you describe one transportation issue that you think technology can address? Please describe …
- What are the positive and negative impacts of the widespread adoption of technology on our communities in terms of transportation?

5.2 Student Daily Learning Outcomes (UW)

Daily assessments for August 14, 16, and 17 were conducted using the anonymous platform Mentimeter, while daily assessments for August 15 were conducted verbally on the bus because of severe traffic delays. The students' learning outcomes from Mentimeter exports are provided in Appendix A.

5.3 Student Overall Program Learning Outcomes (UW)

In alignment with the camp schedule and the identified daily learning objectives, a set of pre- and post-survey questions was developed. Both the pre- and post-surveys consisted of seven identical, multiple-choice questions, which were as follows:

1. How well do you feel you understand your community's transportation options?
    a) Quite well – I could explain these in detail.
    b) Somewhat well – I could explain certain aspects in detail.
    c) Not well – I could only explain minimal details.
2. How well do you understand your community's shortcomings with regard to transportation options?
    a) Quite well – I could explain these in detail.
    b) Somewhat well – I could explain certain aspects in detail.
    c) Not well – I could only explain minimal details.
3. Do you notice any parts of your community that are less well served by transportation options than others?
    a) Yes, I notice several groups in my community whose transportation options are worse than others.
    b) Yes, I notice some groups in my community with worse transportation options, but am not sure of the total extent of these shortcomings.
    c) No, I am not aware of any shortcomings to members of my community.
4. Can you describe the safety concerns present in your community?
    a) Quite well – I could explain these in detail.
    b) Somewhat well – I could explain certain aspects in detail.
    c) Not well – I could only explain minimal details.
5. Can you describe aspects of your community where multi-modal options (non-car e.g., bicycle, walking, public transit) are prevalent and where they are lacking?
    a) Quite well – I could explain these in detail.
    b) Somewhat well – I could explain certain aspects in detail.
    c) Not well – I could only explain minimal details.
6. Can you describe the issues surrounding sustainability present in our transportation network?

a) Quite well – I could explain these in detail.
b) Somewhat well – I could explain certain aspects in detail.
c) Not well – I could only explain minimal details.

7. Can you describe how technology can play a role in addressing some of the transportation challenges highlighted in previous questions?
   a) Quite well – I could explain these in detail.
   b) Somewhat well – I could explain certain aspects in detail.
   c) Not well – I could only explain minimal details.

Additionally, in the post-survey, all students were asked an open-ended question: "Please share any additional insights you gained during the camp that might not have been covered in the previous questions."

The results of UW students' pre- and post-survey results and results comparison can be found in figures 5.1 and 5.2.

Questions	Pre-Survey		Post-Survey	
	Count	%	Count	%
1. How well do you feel you understand your community's transportation options?				
a) Quite well – I could explain these in detail	2	8%	22	88%
b) Somewhat well – I could explain certain aspects in detail	20	80%	3	12%
c) Not well – I could only explain minimal details	3	12%	0	0%
2. How well do you understand your community's shortcomings with regard to transportation options?				
a) Quite well – I could explain these in detail	8	32%	22	88%
b) Somewhat well – I could explain certain aspects in detail	8	32%	2	8%
c) Not well – I could only explain minimal details	9	36%	1	4%
3. Do you notice any parts of your community that are less well served by transportation options than others?				
a) Yes, I notice several groups in my community whose transportation options are worse than others.	8	32%	17	68%
b) Yes, I notice some groups in my community with worse transportation options but am not sure of the total extent of these shortcomings.	11	44%	8	32%
c) No, I am not aware of any shortcomings to members of my community	6	24%	0	0%
4. Can you describe the safety concerns present in your community?				
a) Quite well – I could explain these in detail	4	16%	16	64%
b) Somewhat well – I could explain certain aspects in detail	14	56%	9	36%
c) Not well – I could only explain minimal details	7	28%	0	0%
5. Can you describe aspects of your community where multi-modal options (non-car e.g., bicycle, walking, public transit) are prevalent and where they are lacking?				
a) Quite well – I could explain these in detail	9	36%	21	84%
b) Somewhat well – I could explain certain aspects in detail	12	48%	4	16%
c) Not well – I could only explain minimal details	4	16%	0	0%
6. Can you describe the issues surrounding sustainability present in our transportation network?				
a) Quite well – I could explain these in detail	6	24%	19	76%
b) Somewhat well – I could explain certain aspects in detail	11	44%	6	24%
c) Not well – I could only explain minimal details	8	32%	0	0%
7. Can you describe how technology can play a role in addressing some of the transportation challenges highlighted in previous questions?				
a) Quite well – I could explain these in detail	5	20%	20	80%
b) Somewhat well – I could explain certain aspects in detail	12	48%	4	16%
c) Not well – I could only explain minimal details	8	32%	1	4%
Overall				
a) Quite well	42	24%	137	78%
b) Somewhat well	88	50%	36	21%
c) Not well	45	26%	2	1%

Figure 5.1. UW Students' Pre-Survey and Post-Survey Results

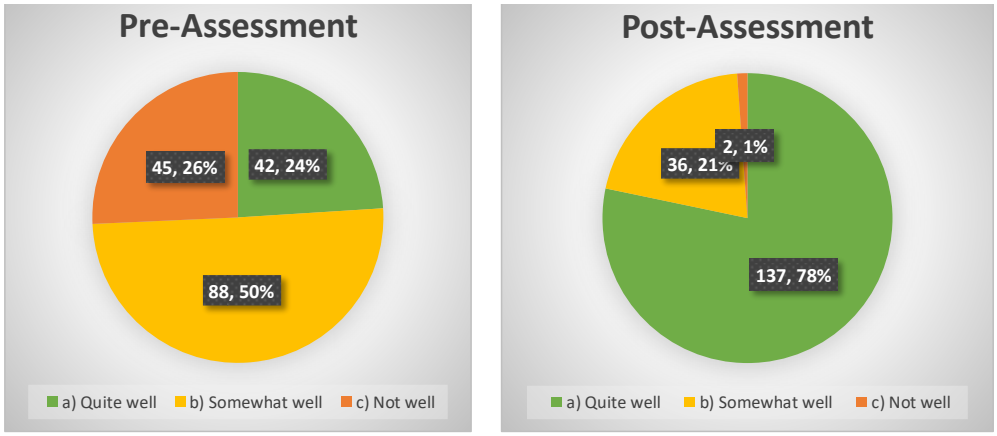
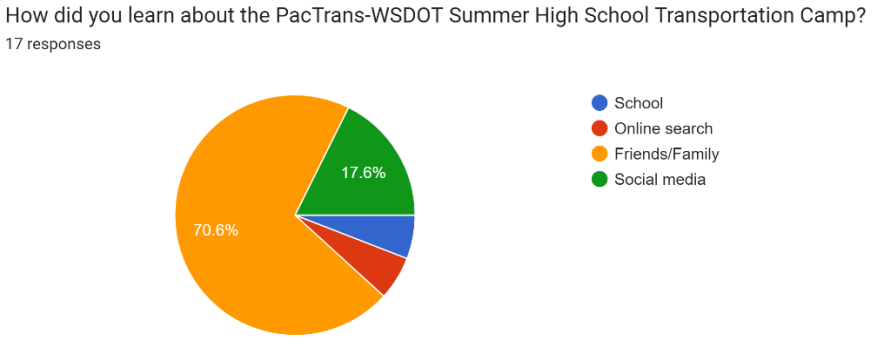


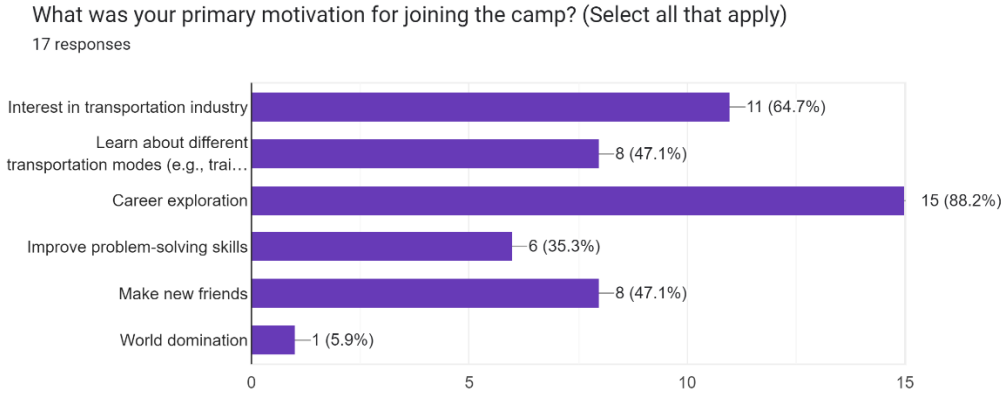
Figure 5.2. UW Pre- and Post-Student Assessment Comparison

6 PROGRAM FEEDBACK AND EVALUATION (UW, WSU)

6.1 Evaluation Results (UW)

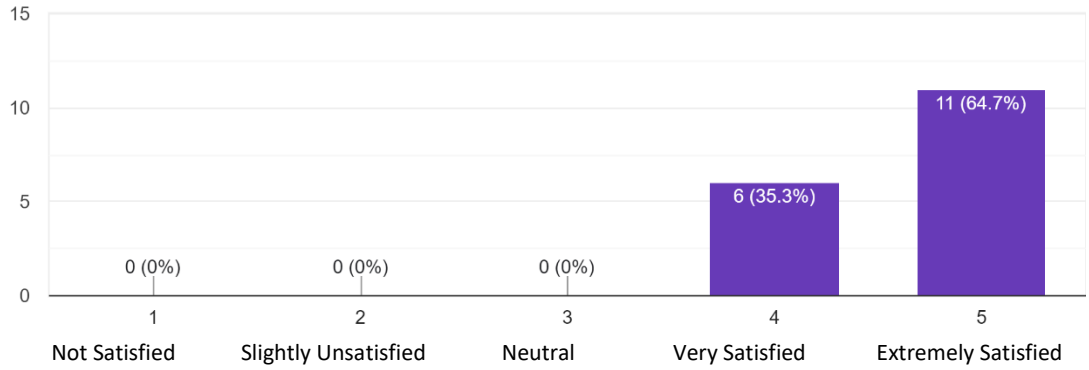
The UW team developed a comprehensive evaluation form covering various aspects of the camp, including Camp Experience, Camp Activities and Learning, Camp Organizers and Staff, Facilities and Accommodations, and Overall Evaluation and Suggestions. Remarkably, the UW camp received feedback from 17 respondents out of 25 students, representing a robust 70 percent response rate. The feedback from students was overwhelmingly positive, as illustrated by the sample answers to questions provided in Figure 6.1. For a detailed list of program evaluations collected through Google Forms, please refer to Appendix B.





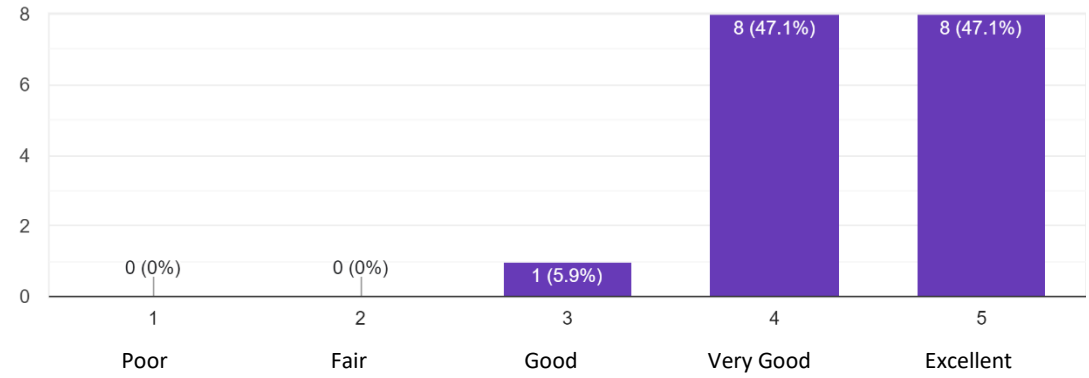
Please rate your overall satisfaction with the camp experience:

17 responses



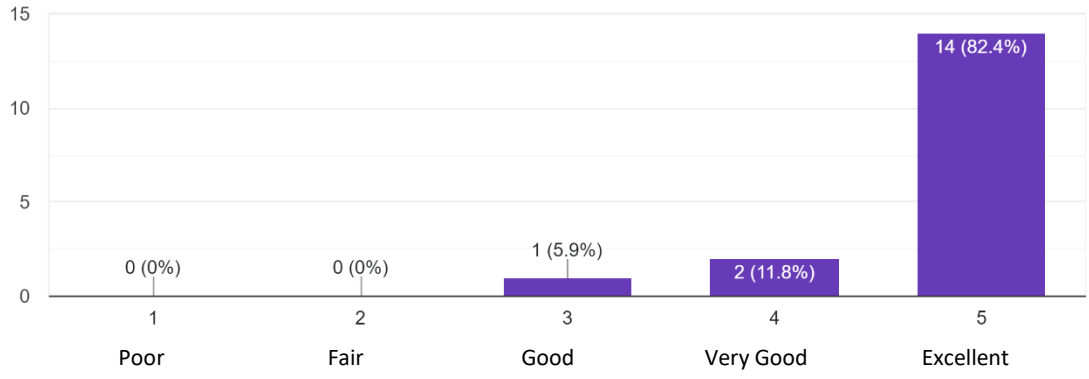
Rate the quality of the camp lectures:

17 responses



Rate the quality of the camp tours:

17 responses



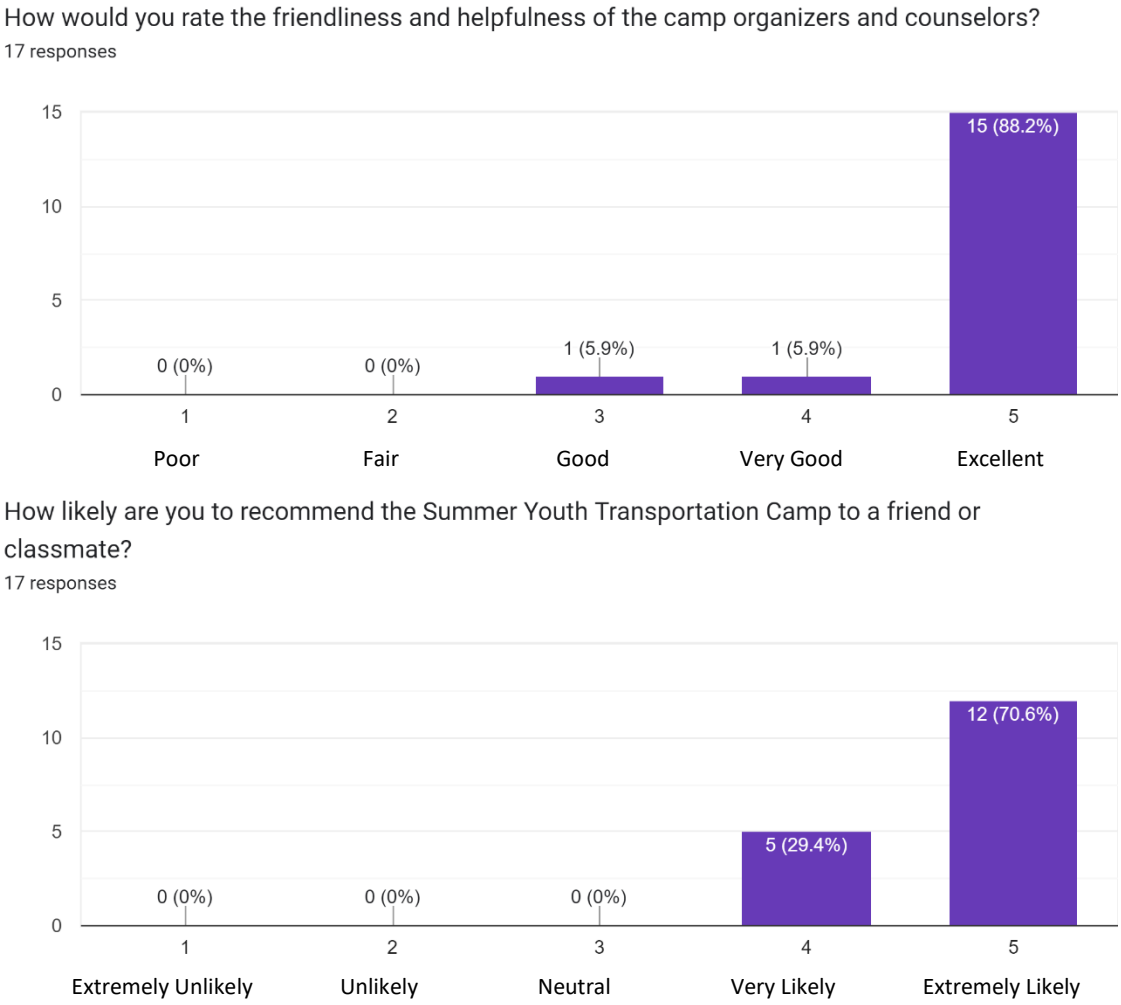


Figure 6.1. A Few Examples of the UW Program Evaluation Results

6.2 Achievements and Success Stories (UW)

Here are a few testimonials from our students:

- *"I thought the lectures were the most engaging because the speakers were all passionate and engaging and inspired me to share or join their cause and projects."*
- *"I really enjoyed most of the lectures and taking notes, it gave me knowledge that I look forward to building on. Learning about transport in rural areas was really eye-opening."*

- *"The tours were most beneficial to me because they gave our group a unique insight into transportation's role in our community. I especially enjoyed the tour of the WSDOT TMC because it was very informative and educational on the topic of our regional transportation."*
- *"I really enjoyed our project. It allowed me to put what I learned into use, which helps me understand the concepts better and will help me remember them. Discussing how to improve."*
- *"All of them were really kind and helpful, Annie helped with some of my personal questions and Ollie was able to keep the group safe from a suspicious person during a street tour. The camp host was very kind and considerate."*
- *"They did a great job about answering all my scheduling questions, even admitting that there were times they didn't know. Annie and Ollie were great."*
- *"Ollie and Annie should get a bonus they were so nice and helpful and always made sure to look out after us. Awesome ppl."*
- *"Both Ollie and Annie were really good counselors, they definitely made a great camp even better, Lingzi did a great job of keeping us all occupied and keeping the camp running!"*

6.3 Recommendations (UW)

Accommodations: In future years, we could consider offering double-room accommodation options to students, providing more flexibility based on their preferences.

Promotion Channels: To enhance diversity among participants and improve the overall quality of the cohort, we should explore additional promotion channels. Expanding outreach efforts to attract students from various backgrounds would enrich the camp experience.

Non-Washington Residents: Evaluating the feasibility of extending the application to non-Washington residents could help broaden the program's reach and foster a more diverse participant group.

Camp Schedule: Given the high level of student engagement and interaction, we should consider optimizing schedules to ensure adequate time for questions and discussions. For example, allocating additional time for tours and bio breaks could enhance the overall experience.

Summer Heat Preparedness: To address potential discomfort during hot summer days, we recommend reserving air-conditioned or basement classrooms for lectures and activities, ensuring a more comfortable learning environment for participants.

Additional Student Support: Having an on-call student assistant who is familiar with the campus, classroom logistics, and the daily schedule would be beneficial. This individual could serve as a backup resource, assisting with equipment/room setup, and serving as a contact person in case of unexpected issues.

6.4 Evaluation Results (WSU)

Two surveys were conducted on the last day of the camp. All participants provided feedback through the survey. The main results are summarized in Table 6.1. Overall, we observed that the students were satisfied with the camp, given their levels of satisfaction, their ratings of activities, and their likelihood of recommending this camp to friends and classmates. Students attended this camp for a diversity of reasons, among which "career exploration" and "interest in transportation" ranked as the top two. Regarding the camp activities, the hands-on components were most attractive to the students. They mentioned feeling more engaged and interested in tours and lab visits, and hoping the presentations were more hands-on and less repetitive. For instance, one student said, *"The asphalt and cement professor. I liked going into the classrooms and looking around. My favorite part was getting to touch the materials (he gave me a cylinder of clay!)."* As for scheduling, they suggested adding break time between talks, and "*Maybe having our group projects in the morning instead of the evening would be nice. By the evening we were all exhausted.*"

Through this camp, students learned more about the transportation industry. One student mentioned his/her key takeaway from this camp: "*It showed me all of the different jobs in transportation, how almost anyone can work in it, and all the possible jobs I could pursue.*" Another student said, "*I liked to see how their [there] is any job possible to any student and how you have so many options to do in the future also*

learned about transportation careers which many students wouldn't even know." The parent of a student sent a thank you email after the camp, saying, "*I wanted to take the time to thank you for this summer week camp. My son [student name] truly enjoyed the experience and loved to discover the campus. He loved the science, activities and made some friends.*"

Table 6.1. Evaluation Analysis, WSU

Evaluation Question	**Result**
Overall satisfaction with the camp	• 7 "very satisfied" or "satisfied" • 1 "neutral"
Primary motivation to attend the camp	• 6 "Career exploration", 3 "Interest in transportation", and 2 "Improving problem solving skill" and 1 "learning about WSU"
Rate quality of camp activities	• 3 "Excellent", 2 "Good", 2 "Average", and 1 "Poor"
Most engaging and beneficial activities	• Spokane tour • Tour of asphalt lab and SEL • Physics and chemistry demonstration
Suggestion for improvements	• Hands-on presentation • Less repetitive talks
Likelihood of recommending to a friend/classmate	• 4 "very likely", 2 "likely", and 2 "neutral"

6.5 Recommendations (WSU)

We identified the following issues to improve for future camps.

- *Recruitment*
  - Plan early and develop a more systematic approach to reach high school students (e.g., contacts of local school districts, social media, advertisement, etc.).
- *Program planning*
  - Include more interactive tours and lab visits and reduce the length and number of presentations, especially presentations of similar topics.
  - Arrange student project in the morning.
  - Add breaks between sessions.
- *Logistics*
  - Send a detailed packing list and dietary questionnaire before the camp.

7 PLAN FOR NEXT YEAR

1) 2024 Camp Program Kick-off
    a) Set up the 2024 camp organizational structure and key personnel.
    b) Review the 2023 camp documents (e.g., final report, and lessons learned).
    c) Set up the 2024 camp goals and objectives.
    d) Review and update the 2024 camp work plan.
2) 2024 Camp Promotion
    a) Update and finalize flyers and websites (e.g., add photos and videos, etc.).
    b) Outreach to diverse communities (e.g., agencies, school districts, tribal communities).
    c) Design and finalize camp swag.
3) Application Evaluation and Admission
    a) Update application forms.
    b) Review and update application review criteria.
    c) Application review and admission to the 2024 camp.
4) Camp Schedule Revise and Development
    a) Review the 2023 camp schedule and brainstorm updates and new ideas.
    b) Contact guest speakers, facilities, and field trips.
    c) Finalize the 2024 Camp schedule.
5) Camp Logistics Planning
    a) Secure residence halls.
    b) Book shuttle services.
    c) Arrange food (including on-campus dining options, catering).
    d) Book classrooms, labs, presentation halls, evening game rooms.
    e) Develop a detailed agenda (all activities, breaks, timeline, responsible staff).
    f) Develop a contingency plan for unexpected challenges.
6) Camp Execution
7) Camp Outcome Evaluation and Debrief
    a) Analyze student learning outcomes.
    b) Hold a debrief meeting on feedback and lessons learned.
8) Project Report and Recommendation

The tentative scheduling of proposed major activities, along with their primary responsible organizations, is illustrated in the bar chart in Figure 7.1.

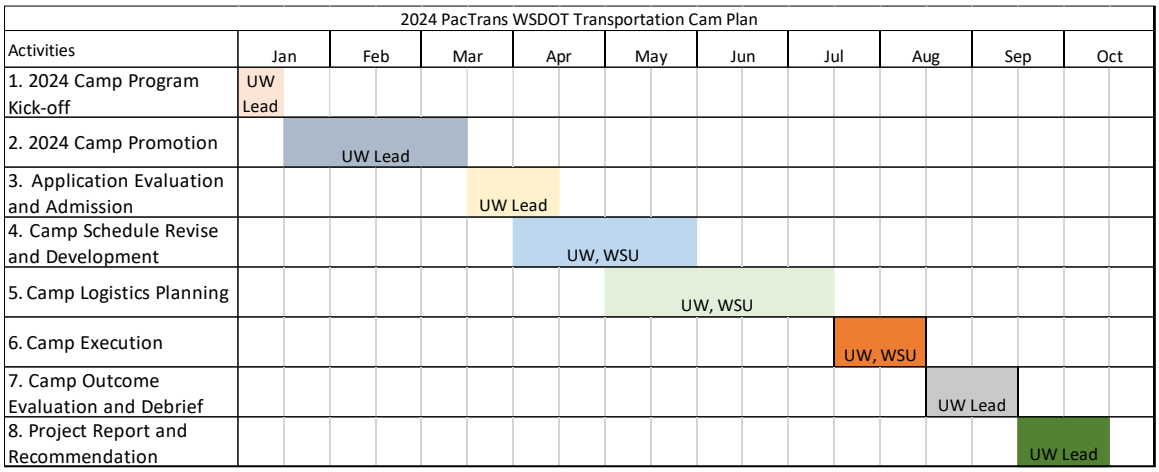


Figure 7.1. 2024 Camp Plan and Development Timeline (Tentative)

8 CONCLUSION

The 2023 PacTrans-WSDOT Summer High School Transportation Camp marked a significant milestone in our ongoing efforts to inspire and educate the next generation of STEM professionals in the field of transportation. This immersive and enriching experience, hosted at two distinguished institutions, Washington State University (WSU) in Pullman and the University of Washington (UW) in Seattle, served as a beacon of learning, discovery, and personal growth for the 33 participating students.

Our overarching goal was to ignite the passion of these young minds and empower them to consider advanced degrees and careers in STEM fields associated with transportation. We were also strongly committed to broadening participation, particularly among women and underrepresented minority groups, with the aim of contributing to a more diverse and inclusive STEM workforce.

The success of the 2023 camp program was evident in the overwhelmingly positive feedback received from students and parents alike. The engagement of our guest speakers, the interactive nature of participatory lectures, the eye-opening field trips, and the thought-provoking student-led team project all played vital roles in enriching the learning experience.

As we reflect on this inaugural year, it's clear that there is great potential for future growth and improvement. Our program evaluation provided valuable insights and recommendations for refining both the planning and execution aspects of the camp. From considering accommodation options to optimizing schedules and addressing logistical challenges, we are committed to enhancing the overall experience for future participants.

In closing, the 2023 PacTrans-WSDOT Summer High School Transportation Camp has set a strong foundation for future endeavors. We are excited about the potential to shape the future of transportation by nurturing the talents and passions of these exceptional students. With ongoing dedication and continuous improvement, we look forward to making a lasting impact on the world of STEM and transportation, one young mind at a time.

We express our sincere gratitude to all the students, parents, faculty, staff, and sponsors who contributed to the success of this program. Together, we are driving

innovation, diversity, and excellence in the field of transportation, and together, we are shaping a brighter future for all.

9 REFERENCES

[1] The Workforce Challenge, Special Report 275, Transportation Research Board, 2003

[2] National Summer Transportation Institute Program Desk Reference, USDOT, Federal Highway Administration, 2019

APPENDIX A. UW STUDENT DAILY LEARNING OUTCOMES

Can you describe one major challenge that your/our communities face regarding transportation?

23 Responses

Safety for kids

Poor access to public education

It is not fast enough

More marketing for public transit options

The roads are only built for cars, not bikes, not walking, nothing. Just roads and Toad from Mario.

Unease of access to public transit.

Some places have little to no options other than driving, and it makes it hard to get around places.

Speeding, which leads to swerving, which leads to crashes.

the roads are heavily dependent on cars

Can you describe one major challenge that your/our communities face regarding transportation?

23 Responses

It is hard to get from point A to B while being conscience about the environment.

The lack of city bus stops

safety

A lack of safe walkways/ bike lanes

No bicycle lanes which should be changed.

Lack of transparency/communication regarding transportation projects

Bike lanes and sidewalks suddenly end

Roads are not good for walking or biking or those things.

Not much designated bike lanes, bus lanes

Can you describe one major challenge that your/our communities face regarding transportation?

23 Responses

It isn't always available and many cannot afford the material

Pedestrian and bike traffic can be severely limited.

Lack of sidewalks, bike lanes 😡. That's all that I kind of know of 😕.

access to more communities

Our community relies heavily on cars, which is very bad for the environment. Nobody is willing to walk or bike even just one block.

Can you describe one thing that you learned today?

22 Responses

I love university of Washington and it's now my dream school

I learned about how many cameras wsdot has patrolling our highways.

DOT has a very wide spectrum of job backgrounds and job opportunities provided.

Traffic cameras have many uses

We being watched on the highway by cameras

there's a lot of cameras on the highway

The high number of crashes per year

how traffic management works with the screens at the place

Don't drink mtn dew at dinner

Can you describe one thing that you learned today?

22 Responses

UW campus is huge

How hot 80 degrees is

I learned that high ways back then were built in the neighborhoods of people of color because they can't fight back.

Collisions almost always cause secondary collisions because of blockages

There are a wide range of jobs that contribute to safe and quick transportation

I learned how the wsdot uses cameras to keep roads safe

I learned that WSDOT helps manage crashes along with highway patrol

I learned that there are eyes everywhere, and that the eyes are tired of watching us die stupidly

The transportation technology is still developing

Can you describe one thing that you learned today?

22 Responses

There are many jobs that contribute to safe and quick transportation

That the media has access to traffic cam footage. Also some of the nuances of incident response. Also how crazy hot it is. Climate change is annoying.

I learned a lot about how they manage accidents, sirens, about the llama 🦙 etc. 😎

I learned that there is a traffic control center

Name one of the transportation's impacts on the environments. And how would you mitigate it?

23 Responses

Co2 emissions and regulate it by electrical things

Too much pollution use of electricity in all transportation

The construction of roads leads to deforestation and the displacement of large amounts of wildlife.

The Americans Disabilities Act of 1993 and letting transportation to be more accessible.

Pollution or green house gasses so we can use electric or hybrid cars to reduce it.

gas vehicles' carbon emissions ---> go electric

cars, by creating a system where people cannot use it on certain days

CO2 Emissions impacting the environment, it can be mitigated by using electric transportation

the car pollution from gas powered vehicles. Used electric vehicles instead

Name one of the transportation's impacts on the environments. And how would you mitigate it?

23 Responses

CO2 emissions. Carbon sucker machine

Transportation releases a large amount of co2 and other gasses, especially single occupancy vehicles. Public transit or other sharing services reduce this by a large amount. eletric vehicles work also

Freeways create a lot of noise, so large concrete walls can be built to block some of it for nearby residents.

Car pollution and I would convert to electric

Pollution

Transportation releases pollution, and electric vehicles can reduce that

Greenhouse gasses in the atmosphere. Start using electric vehicles and public transit more.

Co2 and we should move to electric

Too much greenhouse gases, switch from gasoline to hybrid and electric cars, buses and other transport forms

Name one of the transportation's impacts on the environments. And how would you mitigate it?

23 Responses

Building roads and rails for public transit can contribute to deforestation and habitat fragmentation. One way to mitigate is to ensure land zoning that prioritizes green space

Carbon emissions 😕! Mitigate it through reducing transportation emissions and planting trees 🌲 😎👍😄!!!!

Transportation impacts the environment by releasing CO2 into the atmosphere. This can be mitigated by using low- or zero-emissions vehicles and more efficient forms of transportation

Chemicals in wheels kill salmon, changing the composition of tires could combat this.

The transportation industry accounts for a large share of c02 emissions. These can be mitigated through ride sharing platforms like carpooling or busses.

What are the pros and cons of using different modes of transportation, and how would you improve options for underutilized modes?

12 Responses

Depends on where you are, the price of things, and also the cost for the environment. We'd improve these modes by making them more accessible.

Walking and biking reduce CO2 emissions, but better sidewalks and bike paths would make them easier to use.

pros of gas cars is faster travel cons are pollution both chemical and noise. Use electric vechiles

being able to carry things with you, lower the costs of certain modes or make it more available

Pros: possible reduction in emissions 🙂👌! Cons: harder to access some places or you might have to use many different types of transportation 😕😕😕.

Advertising to the public can play a large role in transportation use and as professor Hallenbeck also said, transportation relies on culture.

Make underutilized modes more cost effective for the user. Cheap enough to counterbalance convenience lost.

Make underutilized modes more cost effective for the user. Cheap enough to counterbalance convenience lost.

Bikes - Pros: no carbon emissions, convenient for medium distances, and good for exerciseCons: vulnerable to weather, can be tiring for long or hilly commutes

What are the pros and cons of using different modes of transportation, and how would you improve options for underutilized modes?

12 Responses

Infrastructure and psychological habits tend to influence many transportation mode choices. Making options more mainstream is less about efficiency and more about what people think is efficient

Public transit (bus train) pro- don't have to drive, free for youth, more environmentally friendly Con- can be confusing 2 navigate, delays and schedule changes

A pro is that if you use public transport then you reduce the CO2 you're putting in the air. A con is that it will take much longer. I would make more modes accessible to the public.

Can you describe one transportation issue that you think technology can address? Please describe ...

15 Responses

Technology can give assessments of intersections which allow engineers to modify intersections to promote safety.

electric vehicles, as technology rapidly improves it reduces co2 emissions more and more

It can take bus line data to help improve the bus stop locations on a specific route.

fatal crashes by cameras

I think that a lot of collisions could be addressed, especially as we get more ITS and connectivity. Also optimizations within the road system, encouraging multi modal transit and reducing congestion

The danger of crash-prone intersections can be mitigated by using ITS to collect data about types of movement in the intersection and making design changes based on the data

One issue could be the pollution transportation is causing, and with advancing technology, electric cars, vans, etc, could be developed, reducing the carbon emissions.

making public transportation more accessible by improving the tech that runs buses and stuff like better wheelchair lifts and such

Education about public transport option

Can you describe one transportation issue that you think technology can address? Please describe ...

15 Responses

idk

Congestion. Just add more lanes, overpasses, or walkable transit as a last resort.

The lack of employees in fields that specialize in transportation. AI could definitely help with this problem.

Pollution can be solved by the development of EVs

Congestion and cars not being able to get from point a to point b

Making self driving cars less awful

What are the positive and negative impacts of the widespread adoption of technology on our communities in terms of transportation?

10 Responses

Pro: safety and efficiencyCon: privacy and replacement of jobs

Potential privacy concerns, however, there would be many positive that could significantly improve the safety and equity of the roads for drivers and pedestrians

As technology continues to improve it gives people a better quality of transportation, but it also starts to limit other lacking methods as it isn't as popular anymore

Transportation is becoming more and more available to everyone, but it could invade people's privacy.

Hacking 😢. Inaccuracy 😕. To much reliance on it 😔.

More surveillance means that privacy is often at risk. Lower income communities are often negatively impacted by such changes. However, the safety and optimization of transportation would be improved.

There are so many impacts

Pro: safeCon: privacy

+: better tech and faster-: less jobs for manual labor

What are the positive and negative impacts of the widespread adoption of technology on our communities in terms of transportation?

10 Responses

Pros: Data collection improves safety and connectivity, multi-modal options improve emissions, equity, and connectivity. Cons: new tech can be expensive, transportation projects can divide communities

APPENDIX B. UW PROGRAM EVALUATION COMPLETE RESULTS

Evaluation PacTrans-WSDOT Summer High School Transportation Camp

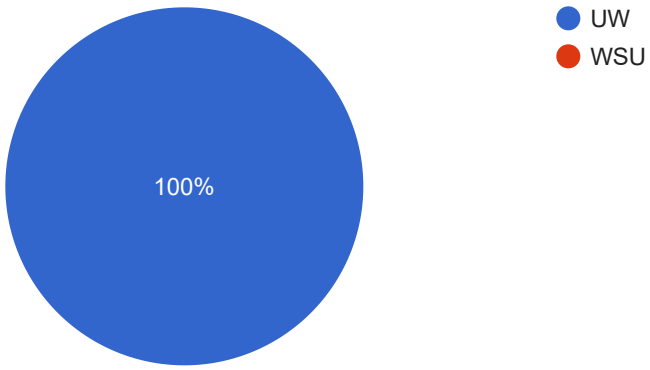
17 responses

Publish analytics

Campus

Copy

17 responses



How did you learn about the PacTrans-WSDOT Summer High School Transportation Camp?

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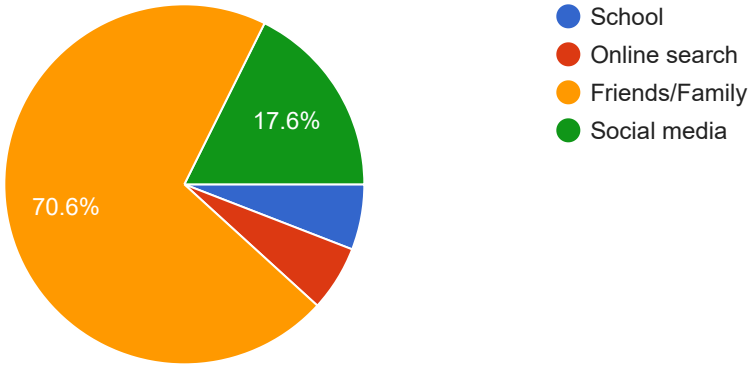
17 responses



Camp Experience

Please rate your overall satisfaction with the camp experience:

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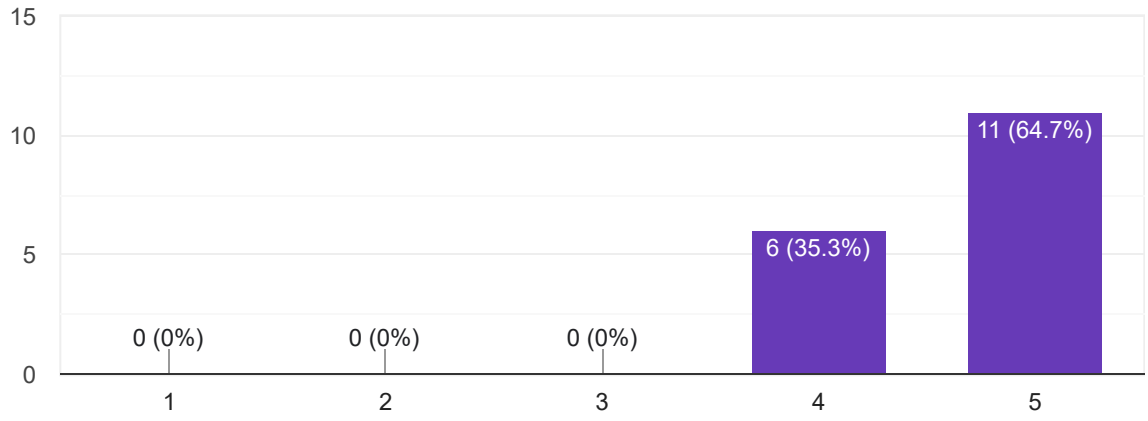
17 responses



What was your primary motivation for joining the camp? (Select all that apply)

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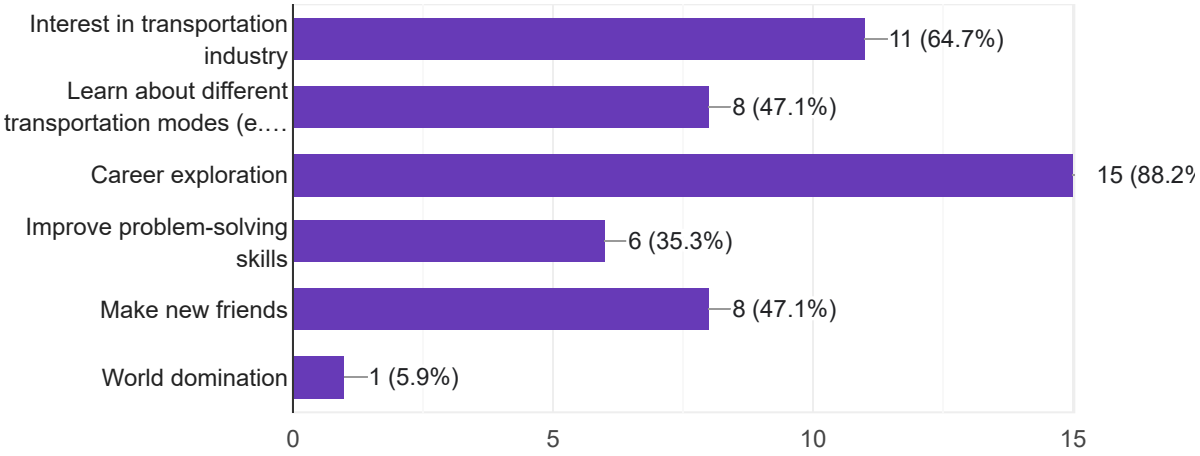
17 responses



Rate the quality of the camp lectures:

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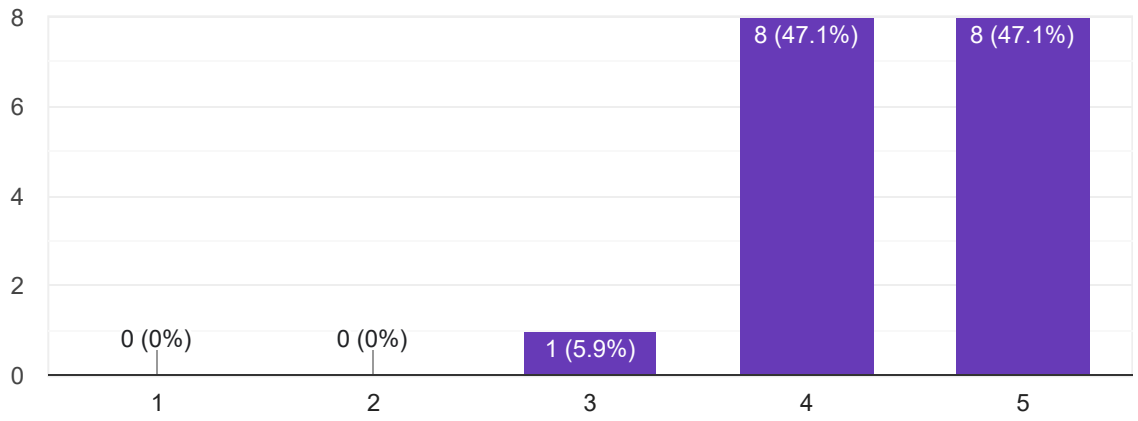
17 responses



Rate the quality of the camp tours:

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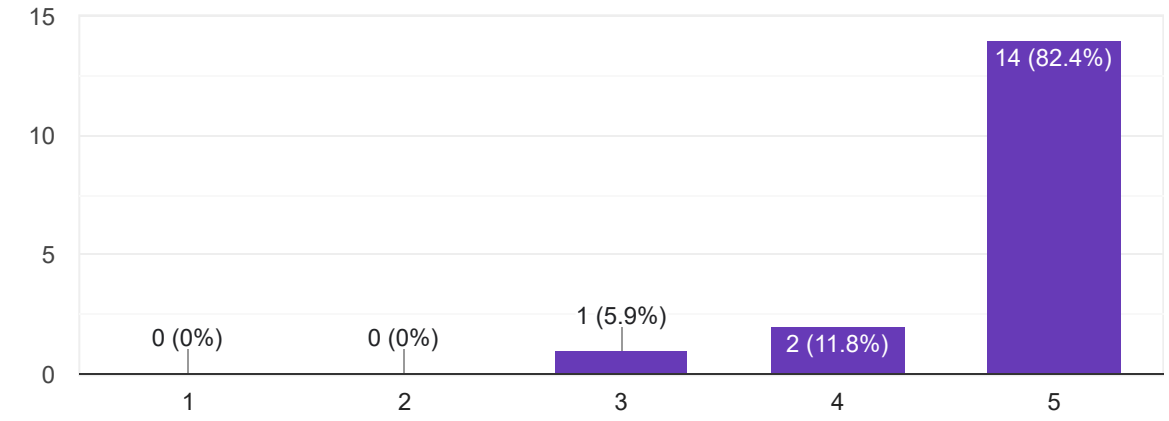
17 responses



Rate the quality of the camp evening activities:

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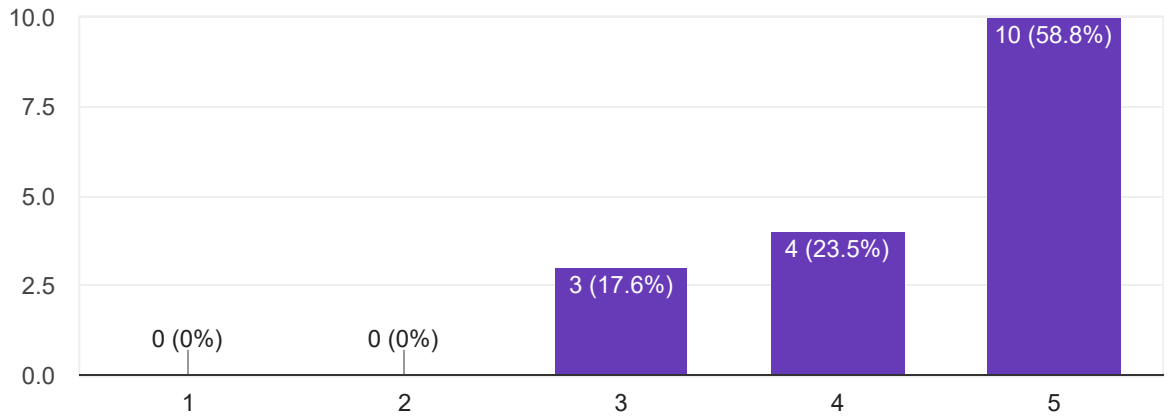
17 responses



Rate the quality of the camp project:

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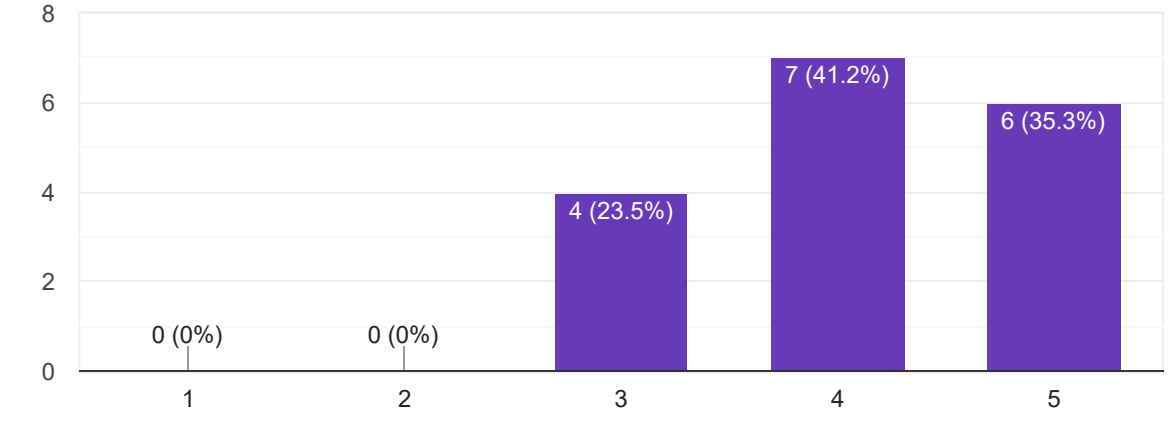
17 responses



Which camp activities (e.g., tour, project, lecture) did you find the most engaging and beneficial? Please explain.

17 responses

My icebreakers

The walking tour. I enjoyed the light rail

I enjoyed the tours because I was able to see and learn the most on certain topics

Project Sidewalk

I thought the lectures were the most engaging because the speakers were all passionate and engaging and inspired me to share or join their cause and projects

The paccar and Amazon tours

I found tours the most engaging because we were actively involved and learning firsthand about different things.

King County Metro electric bus tour - really engaging your/conversation about interesting tech. I also really enjoyed the Paccar technical center tour.

The tours were the most engaging and beneficial because they were place we could meet professionals in the field and have more of a “hands on” or at least in person experience.

The Amazon fulfillment center was very engaging because it was a high quality tour at a company I am interested in possibly working for.

I liked the electric bus tour we did. The speakers were great and I learned a lot.

I really enjoyed most of the lectures and taking notes, it gave me knowledge that I look forward to building on. Learning about transport in rural areas was really eye-opening.

I think some of the lectures were super engaging, specifically that ones in ITS (AIWaysion & STARLab). I thought that all of the lectures were very interesting overall though.

I also really enjoyed the tours, and I think they really added a lot to the experience. They were what made this camp stand out amongst similar ones I have done in the past.

The tours were most beneficial to me because they gave our group a unique insight into transportations role in our community. I especially enjoyed the tour of the WSDOT TMC because it was very informative and educational on the topic of our regional transportation.

I really enjoyed our project. It allowed me to put what I learned into use, which helps me understand the concepts better and will help me remember them. Discussing how to improve a road with my partner also made us friends and we feel accomplished that what we are doing might potentially benefit our community.

Tours, it was great learning and seeing the inner workings of transportation.

The tours since you get to see in person and learn in person about transportation.

Were there any activities you didn't enjoy or think could be improved? Please provide suggestions for improvement.

17 responses

N/a

Everything was amazing

Lectures were really early and I often almost fell back asleep

N/A

The paccar facility was a little boring, not too related to transposition and far away

The lectures

We should ride the bus or light rail more or explore other public transit options like scooters.rather than the charter bus

I think three lectures back to back some mornings were a little too much sitting - maybe dividing them up a bit more would be helpful

n/a

Lectures could be improved with AC

I did not enjoy the one where we went on the light rail thing we did where we looked at the city.

The tours dragged on a bit, not always feeling like they were directly related to the camp.

I don’t really like evening stuff because I’m tired. I think more casual game nights / stuff in alder would be better, to help with winding down after the day. Also optional.

Not really anything else off the top of my head that couldn’t be attributed to it being the first year this camp was run.

I enjoyed the group project but I wish we could have done the intersection corrections in an online software. That would’ve allowed us to be more precise and experience the industry standard for design.

Some of the lectures were long, and the speakers didn’t have enough time to talk about things they wanted us to know.

The lectures were a little long, maybe do a little less or make them more engaging.

On some days, there were too many lectures.

How would you rate the friendliness and helpfulness of the camp organizers and counselors?

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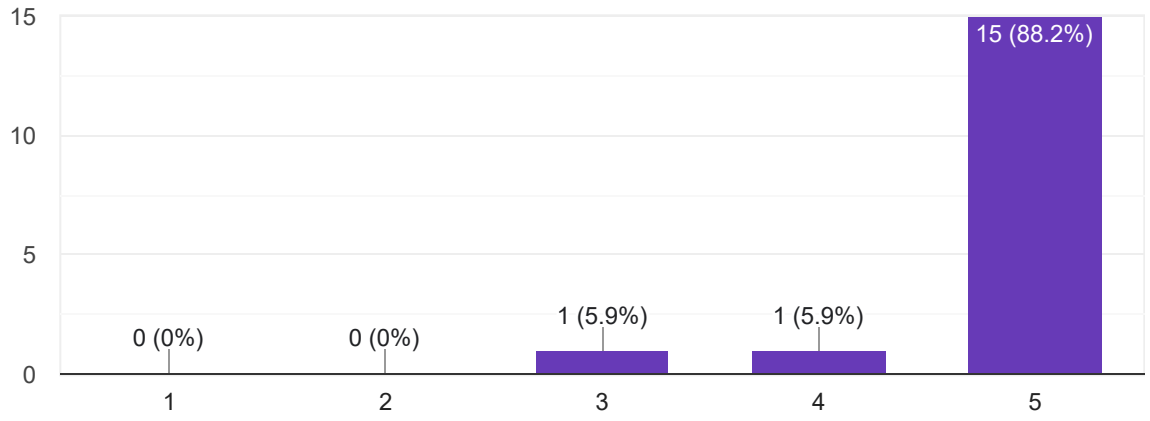
17 responses



Did you feel comfortable approaching the camp organizers and counselors with questions or concerns?

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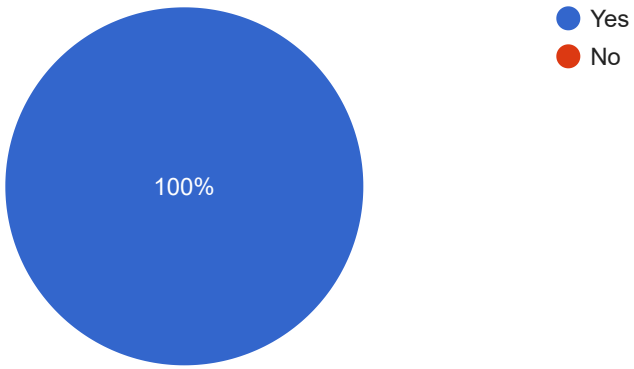
17 responses



Please share any positive experiences or specific instances where the camp organizers or counselors were particularly helpful.

17 responses

I think we're pretty cool, though there might be some bias

They did a good job of answering questions while we were working on our projects

Dorms were super fun

Telling us where to go and what to do.

Ollie and annie should get a bonus they were so nice and helpful and always made sure to look out after us. Awesome ppl

Bowling and basketball bc

Annie and Ollie always answered our scheduling questions and any other questions and were extremely helpful and friendly so they should get a bonus 😁 😁

Annie and Ollie were great counselors! I had a lot of fun talking to them and doing the activities they organized

Both Ollie and Annie were really good counselors, they definitely made a great camp even better, Lingzi did a great job of keeping us all occupied and keeping the camp running!

The game night was very fun and all organizers and counselors were friendly and helpful throughout

They were helpful. They made sure no one got lost.

One of the counselors taught me how to look up data for cyclist deaths involving bollards.

They did a great job about answering all my scheduling questions, even admitting that there were times time didn't know. Annie and Ollie were great.

Ollie gave his basketball to a few of the campers and I got us to play basketball. This experience enriched my relationship with many of my classmates.

On the first day, I didn't know that the dorm doors would automatically lock, and I locked myself out. The counselors were really nice and helped me get a spare key.

All of them were really kind and helpful, Annie helped with some of my personal questions and Ollie was able to keep the group safe from a suspicious person during a street tour. The camp

host was very kind and considerate.

The counselors had a lot of fun activities and engaged with everyone. We also had a best t shirt contest which was really fun.

Were the facilities and accommodation suitable for your needs? Please elaborate.

15 responses

👍

They were!

Yep everything was great and super simple

Not the best ever, the local point was lacking in good food I'd like, and how even with the $30 a day, the breakfast was like $15 and then dinner was more than $15 so even though it was a free camp, it still cost money out of pocket for me

Yes I love the uw campus it's a beautiful place

The dorms

Yes, the dorm room was very nice but the dining hall food was just okay but that was fine

Yes, it was really nice having a dorm to myself

Yes, I was never hungry, thirsty, or cold. However, there was some uncomfortable heat.

Yes they were super suitable.

Yes, aside from lack of air conditioning during a heat wave. I never went hungry.

Yes, only wish we had ac. I liked the single person rooms and private baths, made the experience a lot easier and less stressful than some camps I have done in the past. Overall very happy with them.

Yes, the accommodations were great, especially considering that we had a room to ourselves and a private bathroom.

Yes, I was given everything I needed in my dorm and all food accommodations were amazing. I only wish there was ac in the dorm.

Yes, because the dorms was fine.

Overall Evaluation & Suggestions for Improvement

How likely are you to recommend the Summer Youth Transportation Camp to a friend or classmate?

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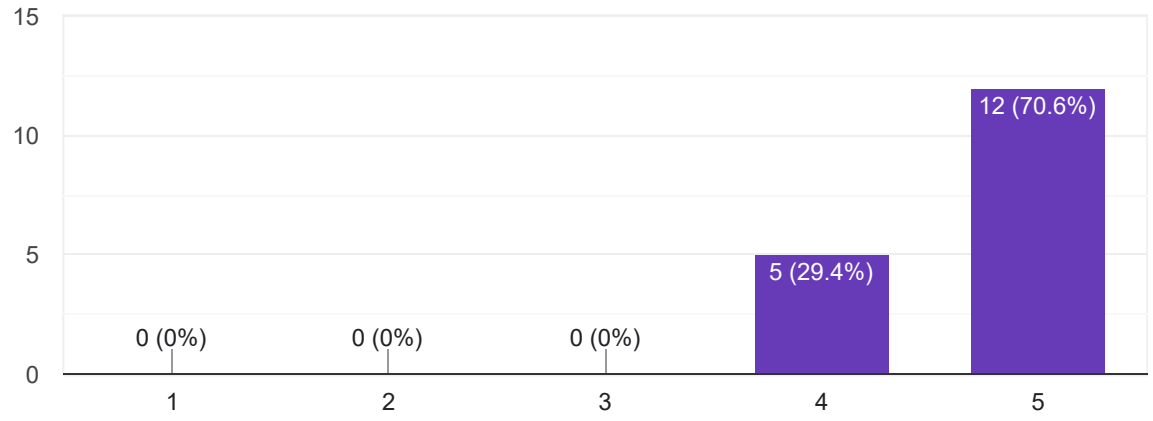
17 responses



What aspects of the camp do you think could be improved? Please provide specific suggestions.

17 responses

N/a

The dorms were kinda warm, but everything else was good

Planning because often we didn't know what stuff was open or not

Making sure the budget for food is accommodating for all food places (I.e the $15+ breakfast and dinner)

More riding on public transit to experience it ourselves
More specific guidelines for project

Not thing

We can ride the lightrail more

Honestly, my biggest feedback would be to just split up lecture time. Other than that it was really fun!

Everything during the day was scheduled for the whole time and it would maybe been nice to have a break in the middle of the day.

Equipping classrooms and dorms with AC would be nice

Um I think the planning was good.

It was awesome, I'm not sure how to improve it.

See previous comment on late night activities. Not really anything besides that.

Oh wait, UW should install ac in More hall.

As I mentioned earlier, I think that the group project should have been conducted through an industry standard software.

With experience from this year, I believe the schedule could be improved because we had to improvise and change some of the activities according to our situation.

Make the schedule a little less busy.

Sometimes, we would go overtime which would make us speed through some stuff.

Are there any additional activities or topics you would like to see included in future camps?

15 responses

The port

Nope

How streets are built and how the speeds are chosen etc

A tour that explores sustainability and ecology in the local environment

Not

No, I enjoyed the topics

Definitely the tours and the evening activities

Maybe a visit to the ferries since they're a big part of transportation in the area.

I would like to see exercise availability in the future

Hydro cars! Maybe boats and ferries would be cool.

I want to learn more about what you learn in a civil engineering university class, and what other classes relate to transport.

More on the logistics and goods transportation side of the industry.

No, all the tours were great.

Perhaps more topics about air and water transportation? They were only mentioned as forms of transportation but not really talked about.

No

Any other comments or feedback you would like to share about your camp experience?

13 responses

No

Amazing camp, 10/10

Nope

N/A

the counselors for the uw camp were amazing

Nope, thank you so much!

Thank you for choosing me! I had fun!

I had a lot of fun and learned a lot. Thank you so much for this opportunity!

Nope, I thought the camp was great!

No, I'd highly recommend this camp.

I was a little hesitant about this camp at first, but besides the heat and busy schedule this was pretty fun.

It was a really fun experience and the counselors and camp organizers made it so much better.