Research Report Agreement T1461 Task AB Summer Youth Program

2024 WASHINGTON TRANSPORTATION CAMP PROGRAM REPORT

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EXECUTIVE SUMMARY

The primary objective of the 2024 Washington 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 2024 Washington 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 21st to 26th and the University of Washington (UW) in Seattle from August 4th to 9th. The 2024 program was generously sponsored by PacTrans and WSDOT and was offered free of charge to all participating students.

The 2024 Summer Camp started with planning, promotion via physical and digital formats, online applications, review, and acceptance. The digital marketing greatly expanded the outreach efficiency and received more student applications than before. The 2024 summer camp activities also encompassed more field trips and interactions, engaging the high school students. Finally, survey questionnaires were prepared and sent to the participants for their feedback to improve future summer camp organization and operation. The two camps welcomed 36 students, with 25 at the UW and 11 at WSU. The success of both camps was underscored by overwhelmingly positive feedback from students and parents.

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.

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1.1 Program Goals and Objectives

The overarching goal of the 2024 Washington 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 2024 Washington 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.

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2. PROGRAM OVERVIEW

2.1 Camp Locations and Dates

The 2024 Washington Transportation Camp took place at two distinguished institutions: Washington State University (WSU) in Pullman from July 21st to 26th and the University of Washington (UW) in Seattle from August 4th to 9th.

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 2024 Washington Transportation Camp project.

Name	Organization	Role	Responsibilities
Yinhai Wang	UW	Program Supervisor	Oversee program planning, development and administration; provide strategic directions.
Ami Moseley Doug Brodin	WSDOT	Consultant	Provide guidance and support in the planning, development, and administration of programs
Melissa Amrhein	PacTrans/ 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
Shiqi Ding	UW	UW Camp Coordinator	Assist with UW Camp planning and development
Sean Zhao	UW	UW Camp Coordinator	Assist with UW Camp planning and development
Kristine Pham	PacTrans/U W	UW Camp Coordinator	Develop and implement strategies for website, marketing, and communication.
Ollie Wiesner Shiqi Ding Sean Zhao	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
Melanie Paredes	PacTrans/ UW	Financial Coordinator	Process payments and administrative support
Ayumi Manawadu	WSU	WSU Camp Director and Host	Lead all WSU Camp planning, development, and execution

Table 2.1. Key Personnel and Their Responsibilities

Name	Organization	Role	Responsibilities
Rahman Mohammadkhani	WSU	WSU Camp Student Assistant	Assist with WSU Camp coordination and lead the student group project
Haifang Wen	WSU	WSU Faculty	Speaker, lab tour, and final report preparation
Supriya Savalkar Taylor Colin Luke Conboy May Thandar Danielle Murray- Kim	WSU	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

2.3 Participants' Demographics

The UW camp accepted 33 students. The accepted participants' demographics are presented in Figure 2.1.



Figure 2.1. Accepted UW Participants' Demographics

The WSU camp received 29 applications and accepted twenty-four students, of which 19 students confirmed their participation prior to the camp. However, only 11

students attended the camp, primarily due to extreme heat forecast during the camp in Pullman. Figure 2.2 shows the demographics of applications.



Figure 2.2. Accepted WSU Participants' Demographics

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:

- <u>Targeted Outreach and Recruitment</u>: We directly engaged with several high schools that serve underrepresented students to provide them with program information and encourage their participation.
- <u>Scholarships and Financial Support</u>: 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) <u>Inclusive Program Curriculum Development</u>: Our planning and development team is comprised of 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) <u>Data Collection and Analysis</u>: 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://watransportation.camp/) as a platform to promote the 2024 Washington summer high school transportation camp. The website

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

Month	Unique Visitors	Unique Visitors	Page Views	Page Views
	2024	2023	2024	2023
February	436	NA	1675	NA
March	1,436	NA	23,162	NA
April	2,998	500	10,134	8,201
May	1,027	2,295	1762	4,303
June	448	1,285	685	2,292
July	520	780	1,289	1,092
August	417	1,514	545	2,057
September	232	174	344	208
Total Views			39,596	18,153

 Table 3.1. Summary of Website Statistics by Month

3.3 Program Promotion

The program team finalized the design of 2024 camp flyers by the end of March 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 by the significantly increased website visits and the 123 applications (94 from UW and 29 from WSU) we received by priority deadline.

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, and desire for a STEM education.

Additionally, building from the knowledge and insights gained from the 2023 camp experience, we have refined our evaluation criteria and process for the 2024 summer camp. Specifically, 1) we reduced the emphasis on the performance-based assessment and placed greater importance on DEI metrics to foster a more diverse cohort; 2) we simplified the evaluation criteria/scoring items from five to one streamlining the evaluation process; 3) we narrowed the eligible grades from 9th–12th to 10th–12th, minimizing the age gap and ensuring a more cohesive group experience.

Similar to the 2023 summer camp, the evaluation process for 2024 consisted of a two-level system involving prequalification and scoring 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 2024 (10th to 12th grade)
- be able to attend the entire duration of the camp in person.

After confirming eligibility, applicants were scored on a 10-point scale. First, each applicant was automatically scored on three Equity, Diversity, and Inclusion (EDI) questions, totaling up to 6 points. Then, their personal statements were evaluated for a maximum of 4 points. Details of the EDI questions and personal statement scoring criteria are as follows:

1) Did your parent(s) attend college? (2 Points)

Evaluates the educational attainment of the applicant's parents.

- 2 points: No
- 0 points: Yes
- Do you receive free/reduced lunch? (2 Points) Assesses socioeconomic status based on the applicant's qualification for free or reduced lunch.
 - 2 points: Yes
 - 0 points: No
- Is English your primary language? (2 Points)
 Reflects linguistic diversity and multilingual environment.

- 2 points: No
- 0 points: Yes
- 4) Personal Statement (4 Points, 0.5-Point increments)

Assesses the depth of the applicant's interest and passion for transportation and urban planning as detailed in the personal statement.

- 4 points: The statement is exceptionally articulate and engaging, demonstrating a deep passion and strong personal connection to transportation and urban planning. It includes detailed experiences and thoughtful reflections. The structure is well-organized, the logic is clear, and it shows a high level of academic understanding.
- 0 points: The statement does not articulate any clear interest in or understanding of transportation and urban planning. It lacks connection to the field, is poorly structured, lacks logical coherence, and is academically weak.

3.5 Application Review (UW and WSU)

By the published priority deadline of April 28, 2024, we had received 94 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 May 12th, we had received 29 applications for WSU.

The UW evaluation committee comprised the following key personnel: Prof. Lingzi Wu, Shiqi Ding, Sean Zhao, Kristine Pham, Ami Peters. To mitigate unconscious bias, all applicant names were anonymized for the evaluation team. Each member of the evaluation committee individually assessed the statements of all applicants. Each committee member independently assessed the personal statements of all applicants. After individual evaluations, the scores were compiled and summarized, and applicants were categorized based on their final scores.

Accepted (Score: 4 or higher): Students who received a total score of 4 or higher were offered a spot in the summer camp. A total of 33 students were accepted into the program. These students demonstrated strong potential and met or exceeded the criteria set for the selection process.

Waitlisted (Score: 3.75 - 4): Applicants who scored between 3.75 and 4 were placed on a waitlist. Eight students fell within this range. These students showed promise

but were slightly below the acceptance threshold. If any accepted students are unable to attend, waitlisted students may be offered a place in the program.

Rejected (Score: Less than 3.75): 50 applicants who scored below 3.75 were not offered a spot in the program. While these students showed interest and some potential, their applications did not meet the minimum requirements for acceptance or waitlisting.

The WSU evaluation committee comprised the following key personnel: Prof. Ayumi Manawadu, Ami Peters and Chuang Cheng. To mitigate unconscious bias, all applicant names were anonymized for the evaluation team. Each member of the evaluation committee individually assessed the statements of all applicants and gave an evaluation score. Students were accepted if they received more than a score of 3.75. Subsequently, 24 of the 29 applicants were offered acceptance to the WSU camp.

4. PROGRAM ORGANIZATION AND IMPLEMENTATION (UW, WSU)

4.1 <u>Schedule Development (UW)</u>

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

<u>Step 1: Concept Design</u> - 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.

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

<u>Step 3: Theme Development</u> - 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.

<u>Step 4: Schedule Logic Development</u> - 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.

<u>Step 5: Student-Led Project Design</u> - 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.

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

<u>Step 7: Evening Activities Development</u> - 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.



Figure 4.1. 2024 UW Camp Final Schedule and Activity Distribution

4.2 Participatory Lectures (UW)

As illustrated in Figure 4.1, the UW camp invited 10 guest speakers, resulting in 7 engaging presentations. A breakdown of organizations, the number of speakers from each organization, and their distribution are shown in Table 4.1.

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%

Table 4.1. UW Guest Speaker Organizations and Distribution

Before the camp began, detailed instructions were provided to all speakers, outlining the audience's profile 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)

<u>Project Overview</u>: 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: 1-3.

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.

<u>Schedule</u>: 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 3:00 pm while students joined Roger Millar's Closing Remarks.
- Presentation time would be 2:00 pm to 4:00 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 three 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 Atlantic and Central Bases tour
- 3. PACCAR Test Site tour
- 4. A visit to the UW STAR Lab
- 5. A walking tour with Lightrail.



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:

<u>Step 1: Concept Design</u> –Professor Manawadu led the WSU planning team in identifying the main categories of camp activities, which included the following:

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

<u>Step 2: Theme Development</u> – The WSU team identified the following 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 3: Schedule Logic Development – The five themes were logically assigned to each day of the week (Monday through Friday), with a progression from basic to more advanced topics. The schedule was then structured to allocate about 40 percent of the time to participatory lectures, 30 percent to field trips, site tours, and lab visits, and 30 percent to project work. Another consideration when finalizing the schedule was the location of WSU and the distance to field visit sites. Given the remote location of WSU, the transportation cost out of the town is quite high for a large group of people. Therefore, all the Spokane tours were scheduled for one day, irrespective of the themed area. Also, bus passes were organized for the students to use the public transport (Pullman Transit) around the campus and inside Pullman. Following the last year's recommendations, WSU schedule included more lab tours and interactive sessions, compared to classroom lectures. Also, and walk-in breaks were scheduled in the timetable. Free time was also included in the schedule for the students to interact with each other and gain the college experience. <u>Step 4: Student-Led Project Design</u> – A student-led project was designed to integrate with the camp schedule, allowing students to apply their daily lessons. The chosen project involved designing a multimodal transportation system for a complete street section.

<u>Step 5: Speaker and Presenter Coordination</u> – The WSU planning team coordinated with potential speakers, presenters, and tour guides to finalize the dates and locations for camp activities. Speakers were instructed to make the presentations more interactive.

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

<u>Step 7: Schedule Finalization</u> – The WSU planning team finalized the schedule after confirming the logistics and speaker availability. Also, at least two chaperones with the knowledge of the campus and the schedule were accommodating the students at all times, including in the night.

An overview of the final schedule is presented in Figure 4.5.

	Sunday (21-Jul)	Monday (22-Jul)	Tuesday (23-Jul)	Wednsday (24-Jul)	Thursday (25-Jul)	Friday (26-Jul)
6:00 - 7:00 AM		Wake up & Clean up	Wake up & Clean up	Wake up & Clean up	Wake up & Clean up	Wake up & Clean up
7:00 - 8:00 AM		Breakfast	Breakfast	Breakfast (Location: Southside Café)	Breakfast	Breakfast
0.00 0.00 0.00		Location: Southside Café	Location: Southside Café	Usediasts Conjuna	Location: Southside Café	Location: Southside Café
8:00 - 9:00 AIVI		Preparation & Transition time	Preparation & Transition time	Heading to spokane	Preparation & Transition time	Preparation & Transition time
9:00 - 10:00 AM		lk by Dr. Xianming Shi (Concrete Pavemer	Talk by Mike Gribner (WSDOT)		ndidate Ms. Vishnupriya Jonnalagadda (Ri	Chemistry demonstartion
		cation: Spark, Academic Innovation Hub 3	ation: Spark, Academic Innovation Hub G0		ation: Spark, Academic Innovation Hub GC	Location: Fulmer Hall room 226
10:00 - 11:00 AM		alk by Dr. Haifang Wen (Asphalt Pavemen	Talk y Dr. Kishor Shrestha Location: Spark		Talk by Dr. Shi (Winter road maintenance)	Transition
		cation: Spark, Academic Innovation Hub 3	ation: Spark, Academic Innovation Hub G0		ation: Spark, Academic Innovation Hub GC	
11:00 - 12:00 PM		Lab Visit/Dr. Lloyd smith	Transition	WSDOT north spokane corridor tour	Lab visit/FIZ	Final Presentation (Location: Spark)
12:00 - 1:00 PM		Lunch (Location: Sloan)	Transport to SEL		Lunch (Location: Sloan)	Lunch (Location: Spark) and closing
1:00 - 2:00 PM		Asphalt Lab visit	SEL Tour	Lunch (Location: Spokane)	Ferdinanz's ice cream	Event finishes
		Break			Pullmann airport tour	
2:00 - 3:00 PM		Physic demonstartion	Transport to Spark	Amazon facility tour	Transition (back to campus)	
2.00 4.00 PM		Location: Webster 17	Falk by Ms. Anna Ziverts (Disability Rights)			
5:00 - 4:00 Pivi			ation: Spark, Academic Innovation Hub G0	Spokane river walk		
4:00 - 5:00 PM	Arrival, Registeration, and Check-in	Visit Paccar (Tentative)	Bathroom break/Buffer	Back to Pullman	Campus Tour	
	Transition	Transition			Transition	
5:00 - 6:00 PM	Dinner (Location: Southside Café)	Dinner (Location: Southside café)	Dinner (Location: Southside Café)	Dinner (Location: Southside Café)	Dinner (Location: Southside Café)	
6:00 - 7:00 PM				Brerak		
7:00 - 8:00 PM	Orientation and ice breakers	Projects (Location: Sloan)	Projects (Location: Sloan)	Projects (Location: Sloan)	Projects (Location: Sloan)	
8:00 - 9:00 PM		Fun activities	Fun activities	Dest 8 Sleep	Fun activities	
9:00 - 10:00 PM	Rest & Sleep	Rest & Sleep	Rest & Sleep	kest & Sieep	Rest & Sleep	
10:00 PM - 6:00 AM	Lights out	Lights out	Lights out	Lights out	Lights out	

Figure 4.5. WSU Camp Final Schedule

4.6 Participatory Lectures (WSU)

As illustrated in Figure 4.5, the WSU camp invited 7 guest speakers. Note that the talks given during filed visits are not included in this section. A breakdown of organizations, the number of speakers from each organization, and their distribution can be found in Table 4.2.

Organization	Organization Type	Count	Distribution
WSDOT	Public Agency	2	29%
WSU faculty/researchers	Institution	5	71%

Table 4.2. WSU Guest Speaker Organizations and Distribution

Examples of these engaging lectures are presented in Figure 4.6.



Figure 4.6. Examples of Participatory Lectures (WSU)

4.7 Student-Led Team Project (WSU)

<u>*Project Overview*</u>: In alignment with UW process, the student-led team project focused on designing a complete street, allowing each team to select a familiar community and propose transportation improvements for that area.

<u>Group Size</u>: Two.

Expected Student Learning Outcomes:

- Identify and describe the challenges and opportunities in community transportation.
- Apply the principles of engineering, management, and urban planning to improve transportation within a chosen community.

<u>Deliverables</u>: A detailed poster showcasing the students' proposed ideas for their selected project.

<u>Schedule</u>: The project was structured to be developed over five days, with specific activities planned for each day:

- Day 1: Project Introduction Key Output: Project Location Selected. Students were introduced to the project and learned essential concepts, including an introduction to complete streets. Afterward, students selected a location for their project, which could be a single street or an entire neighborhood. An option was provided for those who couldn't or didn't want to choose their own location.
- Day 2: Identifying Issues Key Output: List of Issues Identified. Students identified current issues within the built environment of their chosen project area, focusing on aspects such as safety, mobility, and accessibility. This was accompanied by a walking tour of the example project location from Day 1.
- Day 3: Brainstorming Solutions Key Output: List of Ideas/Solutions to Identified Issues. Once the issues were identified, students brainstormed potential solutions, encouraging creativity and out-of-the-box thinking to address the challenges they observed.
- Day 4: Implementing Solutions Key Output: Final Drawn Changes to Project Area. Students translated their ideas into tangible changes by creating drawings on large printouts of their selected project area, illustrating how they would improve the community. This could involve changes to transportation infrastructure, land use, or other innovative ideas.
- Day 5: Preparing for Final Presentation Key Output: Poster and Final Presentation. On the final day, students prepared and presented their posters to peers, parents, and other attendees, with time allocated to refine their presentations.



Figure 4.7. Students Presenting Their Work (WSU)

4.8 Tours and Lab Visits (WSU)

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

Day	Lab/Tour	Theme
Day 2	WCAT lab	Pavement materials
	PACCAR lab	• Sustainable and resilient infrastructure
Day 3	• Trip to Schweitzer	• Learning electric grid and energy systems
	Engineering Lab (SEL)	
Day 4	• WSDOT	WSDOT Scope and Activities (North Spokane
	• Spokane Regional	Corridor, active transportation, and complete
	Transportation Council	street)
	(SRTC)	• Traffic management
Day 4	• Trip to Pullman airport	• Learning about the operations related to cargo
	new terminal	management and TSA

Table 4.3. List of WSU Tours.

In addition to themed transportation labs/tours, the WSU camp students had the opportunity to visit the sports science lab, physics lab, Frank Innovation Zone, and the chemistry lab to get an idea about other STEM related laboratories on campus.

Figures 4.8 through 4.11 show WSU camp field trips, tours, and lab visits.



Figure 4.8. Examples of field trips, tours, and lab visits (WSU)


Figure 4.9. Additional examples of field trips, tours, and lab visits (WSU)



Figure 4.10. More examples of field trips, tours, and lab visits (WSU)



Figure 4.11. Final examples of field trips, tours, and lab visits (WSU)

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 5, 2024, Theme: Introduction to Transportation

Lectures: Transportation Opportunities and Challenges

Tour: Northwest Region TMC Visit

Daily Learning Objectives:

- Understand the basic impacts that transportation has on society.
- Describe how transportation affects daily life.

Daily Assessment Questions:

- Can you describe one major challenge that your community faces regarding transportation?
- Can you describe one thing that you learned today?

Tuesday, Aug 6, 2024, Themes: Transportation Safety and Accessibility

Lectures: Transportation Accessibility

Tour: Walking Tour

Daily Learning Objectives:

- Understand how transportation accessibility varies among different communities.
- Identify safety concerns in transportation systems and how they affect different groups.

Daily Assessment Questions:

• What are some examples of communities that lack good transportation options, and how would you improve their access?

• What are the biggest safety issues you noticed in transportation today, and what ideas do you have to make it safer?

Wednesday, Aug 7, 2024, Themes: Active Transportation Modes and Public Transit

Lectures: Active Transportation; Public Transit

Tour: Metro Atlantic and Central Bases

Daily Learning Objectives:

- Compare the different available modes of transportation and contrast the benefits, availability, and effectiveness of these modes for different communities.
- Understand how transportation choices impact the environment, especially concerning climate change.

Daily Assessment Questions:

- Can you name an environmental problem caused by transportation, and suggest a way to reduce it?
- What are the pros and cons of using different modes of transportation, and how would you encourage people to use more eco-friendly options?

Thursday, Aug 8, 2024, Theme: Integrated Transportation System, Equity

Lectures: Equity

Tour: PACCAR Test Center

Daily Learning Objectives:

- Compare how transportation does not serve all members of our society equally and examine disparities in transportation among different communities.
- Learn about new technologies that are changing transportation. Discuss how these technologies can improve daily life and address transportation challenges.

Daily Assessment Questions:

- Which communities do you see are underserved by transportation, and how would you improve their options?
- What is one transportation problem that you think technology can solve, and how would it do that?

5.2 Student Daily Learning Outcomes (UW)

Daily assessments were conducted anonymously via Mentimeter every day after students' project working time. 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.

	Pre-Survey		Post-Survey						
Questions	Count	%	Count	%					
1. How well do you feel you understand your community's transportation options?									
a) Quite well – I could explain these in detail	7	28%	22	88%					
b) Somewhat well – I could explain certain aspects in detail	15	60%	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	5	20%	18	72%					
b) Somewhat well – I could explain certain aspects in detail	15	60%	7	28%					
c) Not well – I could only explain minimal details	5	20%	0	0%					
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.	4	16%	18	72%					
b) Yes, I notice some groups in my community with worse									
transportation options but am not sure of the total extent of									
these shortcomings.	16	64%	5	20%					
c) No, I am not aware of any shortcomings to members of my									
community	5	20%	2	8%					
4. Can you describe the safety concern	s present in y	our communit	y?						
a) Quite well – I could explain these in detail	4	16%	20	80%					
b) Somewhat well – I could explain certain aspects in detail	10	40%	5	20%					
c) Not well – I could only explain minimal details	11	44%	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	6	24%	21	84%					
b) Somewhat well – I could explain certain aspects in detail	15	60%	3	12%					
c) Not well – I could only explain minimal details	4	16%	1	4%					
6. Can you describe the issues surrounding sustainab	ility present i	n our transpor	tation networ	k?					
a) Quite well – I could explain these in detail	3	12%	12	48%					
b) Somewhat well – I could explain certain aspects in detail	10	40%	13	52%					
c) Not well – I could only explain minimal details	12	48%	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	2	8%	14	56%					
b) Somewhat well – I could explain certain aspects in detail	20	80%	11	44%					
c) Not well – I could only explain minimal details	3	12%	0	0%					
Overall									
a) Quite well	31	18%	125	71%					
b) Somewhat well	101	58%	47	27%					
c) Not well	43	25%	3	2%					

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



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

5.4 Student Overall Program Learning Outcomes (WSU)

In alignment with the camp schedule and student learning outcomes, three identical questions similar to UW were included in the pre- and post-surveys, as follows:

- 1. How well do 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.

	Pre-survey		Post-survey					
	Count	%	Count	%				
1. How well do y	ou understand your community's transportation options?							
a)	Quite well - I could explain these in detail.	2	18%	9	82%			
b)	Somewhat well - I could explain certain aspects in detail.	6	55%	2	18%			
c)	Not well - I could only explain minimal details.	3	27%		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.	3	27%	6	55%			
b)	Somewhat well - I could explain certain aspects in detail.	4	36%	5	45%			
c)	Not well - I could only explain minimal details.	4	36%		0%			
3. Do you notice any parts of your community that are less well served by transportation options than others?								
a)	Quite well - I could explain these in detail.	3	27%	5	45%			
b)	Somewhat well - I could explain certain aspects in detail.	4	36%	6	55%			
c)	Not well - I could only explain minimal details.	4	36%		0%			
Overall								
a)	Quite well - I could explain these in detail.	8	24%	20	61%			
b)	Somewhat well - I could explain certain aspects in detail.	14	43%	13	39%			
c)	Not well - I could only explain minimal details.	11	33%	0	0%			

Figure 5.3. WSU Students' Pre-Survey and Post-Survey Results



Figure 5.4. WSU Pre- and Post-Survey 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 14 respondents out of 25 students, representing a robust 60 percent response rate. The feedback from students was overwhelmingly positive, as illustrated by the sample answers to questions provided in figures 6.1 through 6.9. For a detailed list of program evaluations collected through Google Forms, please refer to Appendix B.

How did you learn about the Washington Transportation Camp? 14 responses



Figure 6.1 How Participants Learned about the Camp

Please rate your overall satisfaction with the camp experience: 14 responses



Figure 6.2 Participants' Overall Satisfaction with the Camp Experience





Figure 6.3 Participants' Primary Motivation for Joining the Camp



Rate the quality of the camp lectures: 14 responses

Figure 6.4 Participants' Ratings of the Quality of Camp Lectures



Rate the quality of the camp tours: 14 responses



Rate your engagement level with the camp tours: 14 responses



Figure 6.6 Participants' Ratings of Their Level of Engagement with the Camp Tours

How would you rate the friendliness and helpfulness of the camp organizers and counselors? 14 responses



Figure 6.7 Participants' Ratings of the Friendliness and Helpfulness of Camp Organizers and Counselors





How likely are you to recommend the Washington Transportation Camp to a friend or classmate? 14 responses



Figure 6.9. The Likelihood of Participants to Recommend the Camp to Others

6.2 Achievements and Success Stories (UW)

Here are a few testimonials from our students:

- I enjoyed the lecture from Mark Hallenbeck. I enjoyed the passion he showed for his work and his willingness to teach.
- All of them were beneficial but the STARlab speakers and the WADOT transport control center were my favorites.
- The ones where we got to do whatever we want and have fun with everyone. Like the night we went to the hub.
- *Tours were the most interesting.*
- *I really enjoyed the tour at PACCAR because we learned a lot about moter engineering.*
- Lectures from professionals, since they had relevant knowledge in teaching and learning, and it was easy to understand from any current knowledge level.
- I feel that I was most engaged with lectures that spoke about data collection and technology related to transportation, because most had to do with my interest in the tech field and also with an internship where I was working with IoT, LoRa, and servers
- The tours were definitely the most engaging for me because I tend to like learning while actually being shown models and walking around.
- Walking tour, northwest region TMC visit, public transit with Mark Hallenbeck

- The most engaging activity I found to be the most enjoyable was the tour around the bus system, light rail, and trail around Seattle.
- I'd say some lectures were engaging to listen to and also the tour of certain campuses around the Seattle area that dived deeper in the surface level of transportation for example like the IRT WSDOT Center
- Mark Hallenbeck's lecture was so interesting and I really could have listened to him talk for hours. Definitely have him come back! Roger Millar also gave good information. Visiting the Transit Management Center and the Metro bases was probably the thing that made me want to go into this career path the most. And seeing the ways new technology was being integrated, like the smart traffic cones (pi-lit) that would automatically send notifications of an obstruction to map programs like Google Maps.

6.3 Recommendations (UW)

<u>Check-in procedure:</u> Key distributions on check-in date was a disaster. Front desk refused to release key to camp organizer. Front desk gave key directly to students. Prepare slide projected on the screen might be very helpful. We could provide more signs to navigate the students to the right place, especially on the first day.

Evening activities: In future years, we could consider offering more free time in the evenings to students, providing more flexibility based on their preferences. We could do a campus tour for the ice-breaking activities.

<u>Promotion Channels</u>: 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.

<u>Non-Washington Residents</u>: 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.

<u>*Camp Schedule*</u>: 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.

<u>Summer Heat Preparedness</u>: 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.

<u>Additional Student Support</u>: 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 first and last day of the camp. All participants provided feedback/comments through the survey. Overall, we observed that the students were satisfied with the camp, given their levels of satisfaction and their likelihood of recommending this camp to friends and classmates. Students attended this camp for various reasons, among which "learning more about the transportation industry" and "gaining the college experience" ranked as the top two. We asked the students openended questions about what they learned in the camp and, in general, any comments (good/bad) regarding the camp. Below are some comments from our students:

- "I enjoyed the whole camp. Everyone was nice and welcoming."
- "I learned there is way more that goes into public transportation than what people see. I had fun on all the tours and making new friends, and I would like to do it again if I could."
- "I learned that it actually takes a long time to make/build transportation infrastructure. I also learned that wheelchair accessibility still remains an issue."
- "I learned that transportation is very expensive and creating new projects can cost millions of dollars even if it is to fix a mile of the road."
- "I didn't know how weather and ice could create such a big issue. The concrete vs asphalt debate was interesting as I didn't even know it existed before this camp. I thought asphalt was always used on roads. This is a great camp, and I would love to see it continue into the future."
- "I liked to learn about the history behind concrete. I enjoyed interacting with amazing people in this community."

• "There are many more complex systems than I thought for safety. I learned that there are still shortcomings in the present transportation system with respect to disability accommodations and disability infrastructure."

6.5 Recommendations (WSU)

We identified the following issues to improve for future camps.

<u>Recruitment</u>

Send a confirmation email to students a one-week before the camp to get an idea about the actual number of students that are going to be present in the camp. Given the remote location of WSU, this might be a necessary step (although 20 students had confirmed their participation earlier, there were last minute cancellations and only 11 students participated in the camp)

Camp schedule

Arrange student project in the morning and make every session more interactive. <u>Summer heat</u>

Although students were given a checklist to bring fans if they require, it is advisable that in the future, lock-in the dates early after checking the availability of airconditioned rooms. WSU has only a limited number of air-conditioned summer housing.

<u>Check-in</u>

Instead of giving a large welcome packet, it is better to summarize the check-in procedure in a few summary slides, and one of the chaperones could present it to the student

<u>SWAG</u>

Students were interested in SWAG. Maybe in the future, the camp can arrange for the students to receive a T-shirt and a water bottle with the summer camp brand.

7 PLAN FOR NEXT YEAR

- 1) 2025 Camp Program Kick-off
 - a) Set up the 2025 camp organizational structure and key personnel.
 - b) Review the 2024 camp documents (e.g., final report, and lessons learned).
 - c) Set up the 2025 camp goals and objectives.
 - d) Review and update the 2025 camp work plan.
- 2) 2025 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 2024 camp schedule and brainstorm updates and new ideas.
 - b) Contact guest speakers, facilities, and field trips.
 - c) Finalize the 2025 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.

Activities	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct
1. 2025 Camp Program Kick-off	UW Lead									
2. 2025 Camp Promotion		UW Lead								
3. Application Evaluation and Admission			UW Lead							
4. Camp Schedule Revise and Development				UW, WSU						
5. Camp Logistics Planning					UW, WSU					
6. Camp Execution							UW, WSU			
7. Camp Outcome Evaluation and Debrief								UW Lead		
8. Project Report and Recommendation									UW Lead	

Figure 7.1. 2025 Camp Plan and Development Timeline (Tentative)

8 CONCLUSION

The 2024 Washington 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 36 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 2024 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 our second 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 2024 Washington 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
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APPENDIX A. UW STUDENT DAILY LEARNING OUTCOMES

Can you describe one major challenge that your community faces regarding transportation?

The lack of choices for transportation

Transit is inefficient

There's not a lot for people who choose to walk where I live. It's also not very safe too. Lots of cars, but minimal parking space. Roadside parking turns 1 lane, 2 way roads into a single lane 1 way. Not enough space for moving traffic.



Biker visibility and lack of transit like buses.

Not a lot of bus options

Balancing the need between public transport, walking, cars, and biking.

Traveling in a timely fashion, while using buses





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Can you describe one major challenge that your community faces regarding transportation?

safe cars and bikes side by side, where cars turning left cut through a bike lane for example. factoring in blind spots, it can be dangerous. Hard to get places certain places with a bike because of small bike lanes

Walkability and spread of sidewalks in gig harbor are pretty limited due to the terrain and density

Not enough space for cyclists and there needs to be more announcements for road repairs



Public awareness; Lack of information and bus route. Congested Roadways that lead to traffic, Poor Visibility around corners

Our town does not have accessible transportation lacking the connection between towns nor bike lanes.

One major challenge my community faces is the lack of sidewalks and crosswalks





Can you describe one major challenge that your community faces regarding transportation?

Accessibility! Many areas are extremely difficult to navigate for non-able bodied people, such as indicators for crosswalks. You have to walk quite a bit to get to the nearest bus stop from the school

Safe crosswalks is one of the main concerns of my community, as it's a suburban area where many people walk, but there are also a lot of intersections with potential to be dangerous. There are virtually NO sort of transportation available to us besides a bus.



Busses are slow and inefficient over the narrows bridge People speed along a parkway looping a hill that has neighborhood branching off

A lack of bike lanes

The lack of available buses and bike lanes.





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Can you describe one major challenge that your community faces regarding transportation?

It is hard for disabled people to get to places.





Can you describe one thing that you learned today?

The government is allegedly supporting the people

I learned roundabout and traffic circles are used as a way to avoid collisions and slow down traffic.

Engineering need to take into account the public needs when redesigning the roadways since they are in public service.

WSDOT responds fast to whatever problems or emergencies happen on the highways and come prepared for whatever

Green road crossing lines are for bikes

I learned that there's total camera coverage of almost all major freeways

I learned that roundabouts decrease 90% of fatel crashes.

I learned about how to think about improving the transportation within communites







Can you describe one thing that you learned today?

WSDOT can see every inch of highway/freeway from this point to Canada.

There are multiple creative solutions to solve transportation.

The DOT isn't a law enforcement agency. They simply monitor traffic and provide support + logistics. They don't actually enforce rules

Transportation takes a lot of creativity, but not only that, there are always times when some solutions don't work, and the way to overcome that is to change our approaches to solutions each time

I learned about the wsdot incident response process

Roundabouts are a tool used to slow down car speed

the speakers were super cool and being a technician in the transportation management center can be more of a trades job rather than a degree.

there are multiple careers in transportation







Can you describe one thing that you learned today?

IRT technicians are really helpful for helping communicate problems that occur on our highways and freeways

The WSDOT cleanup crew? They're sent when police aren't necessary for road issues:)

Sirens sound the same on traffic cars

The government has to ask the community if they want to change something about the community.

I learned that transportation is a lot more than I initially thought it was

Self enforcing infrastructure changed behavior more than signage or legislation







What are some examples of communities that lack good transportation options, and how would you improve their access?

Cracked or small sidewalks for those unable to walk or see Rural area and non funded areas. Give money and advocate

Rural neighborhoods without bus access and/or decent sidewalks

Ghetto neighbourhoods that don't got any bus shelters



Small towns or rural areas often lack accessible transportation or public transport in general Rural areas everywhere in America

Dropping the price for poorer communities

a lot of low income communities (and by extension people of color) don't have the funds or resources to afford to drive, but lack the infrastructure needed to go places safely.



What are some examples of communities that lack good transportation options, and how would you improve their access?

Some communities don't have public transport that run through key areas or they don't have enough. Provide more buses through more routes I guess Isolated areas away from the main parts of the city

Many historically redlined neighborhoods lack transit and have highways fracturing them, because of systemic discrimination in the government

Low income; gov't funding can improve the transportations








What are some examples of communities that lack good transportation options, and how would you improve their access?

Rural areas

Smaller communities tend to not take into consideration their disabled residents. They can try smaller changes like leveling or lowering the sidewalks.

Engineers can redesign their roads to be safer and have dedicated bike lanes.

communities along the freeway



Rural communities lack options just because of resources, so maybe reaching out to provide road infrastructure to thar area to support bus routes Any town more than 50 miles from a big city with a population below 10K, add a transit system and/or biking system

Small changes can improve walkability greatly transit hubs can be helpful









What are some examples of communities that lack good transportation options, and how would you improve their access?

Rich neighbourhoods lack bus transit because of the isolation. Add more bus stops near them Some communities don't have access to accessibility-based transportation, like rural and lowincome neighborhoods. It's important to provide attention to those places to increase those options.

more crosswalks could have haptic and tactile ways of telling when it's safe to cross, and it has to be strong enough and last long enough to be noticed.



More crosswalks could have auditory and visual cues to when to cross the street More elevated crosswalks





What are the biggest safety issues you noticed in transportation today, and what ideas do you have to make it safer?

BAN CARS

Sidewalks being extremely close to fast roads

The biggest safety issue I noticed today was the fact that some sidewalks seemed very tight, and not big enough for big groups of people. breathing fumes and having so much noise could cause lung problems and hearing impairment over time



Cracks and uneven sidewalks, especially for disabled people Safety issues for disabled people from roads and sidewalks that aren't well maintained

Cars hitting people that they can't see. I heard that you could round off corners and reduce off street parking near the intersection, and that reduces turning speed and the chance of hitting people. Some roads are not regularly maintained, so cracks and bumps can be dangerous for the disabled. Also, bus transit may not be available every few minutes, maybe it would take almost an hour





What are the biggest safety issues you noticed in transportation today, and what ideas do you have to make it safer?

1. Cracked side walks2. Thin side walks3. Speeding4. Uneven/Undistributed roadsFor the sidewalks it would be a lot of repurposing and remodeling and the drivers maybe much more strict rules? Closed sidewalks and their signs being not easily identifiable, no work-around

2

One of the biggest safety issues I've noticed were uneven and cracked sidewalks. Repairing them would make them safer.



every crosswalk sign should display how many seconds are left to cross next to the blinky hand

Homeless people. Make more homeless shelters









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What are the biggest safety issues you noticed in transportation today, and what ideas do you have to make it safer?

when a sidewalk is closed, there should be a sign before you get there and ideally at the last official crossing area so you don't get stuck on a dead-end sidewalk



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Can you name an environmental problem caused by transportation, and suggest a way to reduce it?

Causes the highest percentage of greenhouse gas emissions in the US

carbon emissions

Roads can reduce the amount of greenery and trees lowering biodiversity carbon emissions; switch to electric vehicles that are fueled by clean electricity.



Oil runoff from highways during rains or flash floods, which can cause eutrophication and kill coral

Car leaks

More then 90% of Seattle's busses are run off of gas, and something we can do to reduce the carbon footprint is utilize/expand Trollie system we have put into the city.

Gas leaks



Can you name an environmental problem caused by transportation, and suggest a way to reduce it?

Current transportation emits a lot of carbon emissions. A good way to reduce it would be to use other greener methods of transportation.

Gas cars release carbon dioxide. Solve by driving electric cars.

2

Mixing concrete causes CO2 emissions. Find alternatives to concrete that are more porous and permeable yet stable. Let water filter through concrete into soil to reduce storm water pollution.



More incentive to use noncarbon emitting methods of transport (architecture not built around cars)?

Carbon Emissions and a way to reduce this is to use more ev cars

Even if electricity is used, the electricity used must be sourced from renewable sources

heavy metals contaminate waterways and are released from brake pads. maybe we could use different ways of braking or use fewer total vehicles



Can you name an environmental problem caused by transportation, and suggest a way to reduce it?

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Rain gardens and modular wetlands (like those in Tacoma or tukwilla) can help clean a lot of runoff :D

Space is taken up and natural environment is destroyed for rail. Find ways to build with the nature not on it We need to switch out concrete and asphalt for something less conducive



more boats

antinatalist policies reduce population and need for travel and shipping of goods

thingy ma bobs





What are the pros and cons of using different modes of transportation, and how would you encourage people to use more eco-friendly options?

Encourage eco friendly transport by making non eco friendly transport more expensive or hard to use Pro of bus: reduced carbon emissions Con of bus: not convenient

You can encourage other modes by spreading knowledge as well as designing eco friendly systems to be efficient and prompt, especially in places that have high demand or density and mixed use Pros: Much more is available to youCons:More space on the roadEach form of transportation needs specific needsl would encourage people by showing them the effects of each mode of transport



methods of transport besides cars can be disadvantaged from a lack of architecture specifically for their method IT DEPENDS on the land use, situation of the area, and individual perceptions. Just having each kind of mode, especially greener ones, more available to neighborhoods that especially need it

A great approach to reduce carbon footprint are electric cars, BUT they also use dam power, which ruin salmon homes **C**. I would encourage others by offering rides maybe. The mode you use depends on many different things. Providing different modes gives flexibility and is more resource efficient. Provide communal micro mobility iptions





What are the pros and cons of using different modes of transportation, and how would you encourage people to use more eco-friendly options?

increase gas taxes for the rich and have post-industrial consumerist economies work together to help less-developed countries to switch to renewable resources Walking pros: exercise and freedom on foot cons: slow and infrastructure must be there

make it socially awkward and unacceptable to drive Pros of bikes: cleaner than cats but faster than walkingCons of bikes: you're considered a danger to peds in cities and thus grouped with cars, even though they're a danger to you



Make eco- friendly transportation more accessible to everyone pro: more eco friendly & sustainablecon: wastes a lot of time and energy. (low value for time)use taxes/subsidies for mode of transportation

Using a car can be used to get to your destination in a short amount of time but it can emit gas emissions. Using a bike can be a more eco-friendly option. Obviously cars are great to use as a convient thing to use across the US because of infrastructure although cons are carbon emissions and cost of them.





What are the pros and cons of using different modes of transportation, and how would you encourage people to use more eco-friendly options?

I would encourage more big companies and corporations to provide for their employees through a transportation hub One pro of cars I feel is less discussed is access to far rural areas, towns like fields Oregon or Omak, WA are unfortunately will likely never have enough demand for transit

focus gas taxes on superfund sites and environmental remediation



universal basic income could help people be able to afford rent and food without being forced to drive to bad jobs Rural areas applys for trips to go hiking or other recreation too





Which communities do you see are underserved by transportation, and how would you improve their options?

Rural, put a bus through it

Low income, rural areas need more bus stops

Rural areas or like places that are really far away from the cityBusesBikes

Low income neighborhoods



The redlined ones, I would just help via equity and less equality Rural communities, add on demand ride share

i would change existing bus routes to run through these communities as a short term solution. Infra improvement comes later

Rural areas are underserved, add more bus stops





Which communities do you see are underserved by transportation, and how would you improve their options?

low income communities of which people of color are often overrepresented; more frequent bus service to these areas Lower income communities tend to be underserved in transportation. I would advise more federal funding to transportation from the government.

Some communities I see with underserved transportation are suburban areas. Some ways to improve their transportation would be to add more bus stops or community bikes. Low income communities, add designated areas for buses



Low income, predominantly black and rural neighborhoods are all underserved areas, and complete streets and bus routing can help provide more mobility of people in such neighborhoods All the stations that were planned on the monorail. I would build a light rail line connecting the previous monorail plan.

Communities that have less opportunities for sufficient, safe transportation, like low-income and rural communities, are underserved by transportation. Providing programs and additional modes of trans







Which communities do you see are underserved by transportation, and how would you improve their options?

those in the foster care system or who were a part of it, and those who had a lot of adverse childhood experiences, should get reduced-price fares or free transit more free bike repair services and training so people can repair their own bikes







What is one transportation problem that you think technology can solve, and how would it do that?

Al cars to reduuice carshes

Knowing when the bus is coming. Like, maybe it already passed or it's late. Those flashing signs at Swift stops

Orca Cards makes beginning transportation journey easier and quicker

Al might be able to help us analyze vast amounts of data to determine the best routes, stop locations, and headway



I believe if we were to fully automate cars and let Al take over, everything will be much safer. They would be programmed to communicate with eachother and let eachother know what sort of movements

Al to reduce crashes and other dangers. It could also help possibly with traffic too.

ChatGPT

Technology can be anything that is developed to solve a problem. With new fuel technologies, more sustainable ways for especially airplanes can become more fuelefficient







What is one transportation problem that you think technology can solve, and how would it do that?

I believe with technology in transport problems such as carbon emissions can be reduced or be net-zero emissions. У Tech from self driving cars (detecting pedestrians and such) could be implemented in non-self driving vehicles to further assist drivers.

efficiency of bus routes.

technology can help us shift the perception of public transit and personal carbon footprints in a social sense with algorithms that promote favorable attitudes



data center tax to make public transit free for everyone







APPENDIX B. UW PROGRAM EVALUATION COMPLETE RESULTS

2024 Washington Transportation Camp Evaluation

14 responses



Camp Experience





Rate the quality of the camp lectures:







Rate your engagement level with the camp lectures:











0 (0%)

0 (0%)

Which camp activities (e.g. lecture, tour, project) were most engaging and beneficial to you? Please elaborate.

14 responses

Most of them and also mainly liked exploring campus

Tours were the most interesting

I enjoyed the lecture from Mark Hallenbeck. I enjoyed the passion he showed for his work and his willingness to teach.

All of them were beneficial but the STARIab speakers and the WADOT transport control center were my favorites. I was definitely not as active in them as I should've been because of my sleep problems, but I still got a lot out of them :D

The ones where we got to do whatever we want and have fun with everyone. Like the night we went to the hub.

The tour because we moved around

the tours; I really enjoyed the tour at PACCAR because we learned a lot about moter engineering.

Lecture from professionals, since they had relevant knowledge in teaching and learning and it was easy to understand from any current knowledge level.

I feel that I was most engaged with lectures that spoke about data collection and technology related to transportation, because most had to do with my interest in the tech field and also with an internship where I was working with IoT, LoRa, and servers

The tours were definitely the most engaging for me because I tend to like learning while actually being shown models and walking around.

Walking tour, northwest region TMC visit, public transit with mark hallenback

The most engaging activity I found to be the most enjoyable was the tour around the bus system, light rail, and trail around Seattle.

I'd say some lectures were engaging to listen to and also the tour of certain campuses around the Seattle area that dived deeper in the surface level of transportation for example like the IRT WSDOT Center

Mark Hallenbeck's lecture was so interesting and I really could have listened to him talk for hours. Definitely have him come back! Roger Millar also gave good information. Visiting the Transit Management Center and the Metro bases was probably the thing that made me want to go into this career path the most. And seeing the ways new technology was being integrated, like the smart traffic cones (pi-lit) that would automatically send notifications of an obstruction to map programs like Google Maps. Were there any activities you didn't enjoy or think could be improved? Please provide suggestions for improvement.

14 responses

Wish there was more free time in the evenings

Most lectures were not interesting I liked only a couple

I think most activities were fun. The equity presentation was a bit boring and uneventful

The project probably could have been a little more polished, but it was quite good as is

The icebreakers we did on the first day could've been a whole lot better because it wasn't until yesterday evening we all really started talking to each other and learning our names.

The movie night you should choose a better movie

n/a

The tours could have been more applicable through understand why these companies and locations matter in the overall scheme of things.

I don't have any activities in mind. Only the walking was a bit tiring for me.

Perhaps there could have been a better choice of movie. (Still very engaging!)

PACCAR was probably the least necessary field trip, and it was the farthest away

Improve the project to create more engagement and perhaps more time

Icebreakers or introduction of the program on the first day was very minimal and not engaging for everyone to know each other maybe like a few groups of people knew eachother names.

The visit to the PACCAR center was interesting but I think ultimately not worth my time. The drive there and back was really long, and I felt that was kind of the first time we were hearing about shipping of goods rather than people. We could have watched a YouTube video instead, I think. However, the documentary we watched on the drive back (Who Killed the Electric Car?) was really insightful and you should show it again next year.



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

12 responses

They're good at providing detailed instructions

All of the councilors were enjoyable to talk to and gave us a lot of agency, they were very helpful when I wanted to draw my project backdrop instead of print it, and let everyone do their project their way

Everyone was really outgoing and had a lot of fun with us. Also giving us tips on our projects too.

I had lost my group and they helped me get back with them

counselors offered great advice for the projects; they were willing to sit and talk through ideas with us.

Every time that we were in a bus, the counselors always made sure that if anybody was hungry, they had snacks available. I felt that they cared about students learning capabilities and that basic needs come first especially at overnight camps.

I really liked it when I was talking with counselors about their research. Additionally, the counselors were very nice and friendly to us, and I felt safe with them.

Whenever someone seemed to forget something in their room, or perhaps wanted to do something else for an activity, they were very understanding and changed plans to accommodate for us.

I got help from two different counselors when I was behind on my project

One time my key was locked in its lock and I asked one of the counselors for help. They did come help me in my aid.

Mr Ollie is a kind dude and helped navigate us any side missions we needed to do and also questions and feedback we needed on projects

All of them were great, Ollie especially. He helped me figure out my room situation when my roommate didn't show up.

Please share any experiences or specific instances where the camp organizers or counselors could have been more helpful.

12 responses

N/A

N/A they were great

There wasn't anything, for me at least

Nothing really they were great.

Better snacks

n/a

I wish the counselors proactively shared connections to their studies and works! They could have also shared more about UW on walks.

Not at all. The counselors were great!

I think all the counselors were helpful

I wish that every morning one of the counselors had taken a group to one of the dining halls for breakfast if they wanted it, just as an extra option. Other than the first morning, we were allowed to go wherever we wanted for breakfast, but I wasn't always feeling that ready to make the trip and get a group of people together. Did the facilities and accommodations meet your needs? Please elaborate.

14 responses

Yes

Yes, everything was great. Did need laundry bags which weren't provided

Yes, the campus was awesome

Absolutely

Yes everything was nice

yes; i felt that my needs were met.

Absolutely. I felt that everything was provided for. I felt like the environment was best designed so that we could learn more about the field. Norms could have been more clear with safety and noise.

Yes! I feel that I was able to have a comfortable and safe college living experience, and I'm proud to have been able to stay healthy on my own. I was wondering for next time laundry services would be available as well, if it's not difficult to implement

Yes, both the facilities and accommodations met my needs. I was never put in a situation where I needed anything.

Ye

Yes the facilities met my needs because there were no needs to be met.

I'd say more hand towels for a weeks worth of camp

I'm vegetarian, and it was generally really difficult to find good meal options. I'm glad we were able to go to Center Table for dinner, because they had a pasta option every night. But other than that, it was limited. Even for breakfast it was mostly meat, so I ate at Starbucks most mornings. UW just doesn't offer as many options in general during the summer, but this was a really big lack. I hope they choose to make more of their meals vegetarian in the future.

Overall Evaluation & Suggestions for Improvement



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

14 responses

More free time in the evenings

Icebreakers at start were a bit lack luster and so was the first day when we arrived

I think everything was great.

Maybe a bit more walking tour type activities? We talked a lot about urban transit but never went into Seattle proper. It also was VERY focused on Seattle from a speaker perspective for a class with students from all over the state, but it still worked out :D

I don't know if it was just me but the lectures maybe?

More social interaction

clearity in the agenda; timing was very different than what was given to us.

It kind of felt like a mystery. More signage would be cool to make students more understand where they are going on the first day.

I think if we could utilize the public bus transport, that would be great. That way, it isn't too much walking, because there were times I got tired easily.

Make activities where EVERYONE has to interact. Maybe something where people don't go into their own groups.

Cut down on project work time

More cooler dorms for the evening.

I think the camp is well thought out and planned

See my previous response on potential removal of PACCAR. Also, maybe add more about the impact of transportation on climate change, and climate change's impact on transportation systems.

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

12 responses

N/A

More tours of transit infrastructure

A trip to downtown, probably to discuss space constraints in design. I don't know if this works from a safety standpoint, though

Sports

autonomous vehicles

Air transport - planes but also UAV and sky taxi tech

I think it was be interesting to go more in depth into the financial aspect of transportation, eg: cost to travel, maintenance costs, taxes, etc

_

board games to pass time in the evening lounge or a fun game

I want to learn more about how bus and other transit routes, stops, and headways are planned. It would also be good if at the end of the camp we could submit recommendations to the legislature and WSDOT directly, in groups. That way we could know our ideas are getting out there, and though they wouldn't be binding, I would hope that our voices would be heard. Any other comments or feedback you would like to share about your camp experience?

12 responses

None

Icebreakers need to be better next year, they were not that helpful. Maybe a party game of some sort? Not sure

Ollie was a lot of fun.

No

n/a

Couldn't have asked for better. Counselors and organizers doing their own presentations would also be cool since some of the presentations felt basic or could be combined.

Loved this camp a lot. Will miss all the counselors and peers here.

Was both educational and fun, and the counselors were amazing!

It was really fun and a great experience with both a college environment and exploring a big branch of engineering

The camp was great and loved the way the camp included multiple way transportation can be utilized in different settings .

nope

Absolutely loved this experience. I would have done this for a couple weeks if given the chance. I'm seriously considering a career in transportation; I can see myself doing it for decades and enjoying it, and I hope that WSDOT considers my potential future employment to be worth the money that went into this camp.

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