

HIGH SCHOOL TRANSPORTATION EDUCATION PROGRAM

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16. Abstract <p>The Alabama Department of Transportation (ALDOT) initiated a program entitled the <i>Jefferson County Youth Transportation Program</i>. The program was sponsored by the ALDOT Training Bureau and administered by the Minority Business Training and Development Program within the UAB Special Studies department. The purpose of the program is to introduce high school students in Jefferson County to transportation-related professions. In particular, the program is directed toward local high schools with large concentrations of minority students. It is intended to provide education and mentoring to these students and to encourage them to pursue careers in transportation. The University Transportation Center for Alabama (UTCA) sponsored a project to expand the original <i>Jefferson County Youth Transportation Program</i> through involvement of the Department of Civil and Environmental Engineering at The University of Alabama at Birmingham.</p> <p>The project directly supported the “diversity” aspect of the UTCA theme. The program provided an educational experience for participating students, served as a recruiting tool for transportation-related educational programs and, most importantly, showed that the educational system is interested in these students by offering them opportunities. The UTCA project sponsored the development and delivery of several one-time presentations to audiences of high school students as well as the development of high school-oriented materials for possible inclusion on the UTCA Web site.</p> <p>The project involved UAB undergraduate and graduate students in developing and updating course materials; identifying, coordinating, and implementing field trips; and developing a Web page for the program. UAB students also delivered some of the lectures to high school students. The UTCA project also provided opportunities for UAB students and faculty to prepare and deliver presentations about the program.</p>					
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Executive Summary

The Alabama Department of Transportation (ALDOT) initiated a program entitled the *Jefferson County Youth Transportation Program*. The program was sponsored by the ALDOT Training Bureau and administered by the Minority Business Training and Development Program within the UAB Special Studies department. The purpose of the program is to introduce high school students in Jefferson County to transportation-related professions. In particular, the program is directed toward local high schools with large concentrations of minority students. It is intended to provide education and mentoring to these students, and to encourage them to pursue careers in transportation. The University Transportation Center for Alabama (UTCA) sponsored a project to expand the original *Jefferson County Youth Transportation Program*. The UTCA-sponsored project had the following specific objectives:

- Involve undergraduate and graduate students at UAB in curriculum development, classroom teaching and organization of field trips;
- Develop and maintain a Web page for the program to serve as a recruiting tool and to convey up-to-date information on the program;
- Involve undergraduate and graduate students at UAB in developing and delivering papers and presentations derived from the program; and
- Disseminate knowledge gained from conducting the program through papers and conference presentations to professional organizations (e.g., Institute of Transportation Engineers, American Society of Civil Engineers, and American Society for Engineering Education).

The project directly supported the “diversity” aspect of the UTCA theme. The program provided an educational experience for participating students, served as a recruiting tool for transportation-related educational programs, and most importantly, showed that the educational system was interested in these students and offered them opportunities. The UTCA project sponsored the development and delivery of several one-time presentations to audiences of high school students as well as the development of high school-oriented materials for possible inclusion on the UTCA Web site.

The project involved UAB undergraduate and graduate students in developing and updating course materials; identifying, coordinating and implementing field trips; and developing a Web page for the program. UAB students also delivered some of the lectures to high school students. The UTCA project also provided opportunities for UAB students and faculty members to prepare and deliver presentations about the program.

Section 1

Introduction

1.1. Background

In the spring of 2001, the Alabama Department of Transportation (ALDOT) initiated a program entitled the *Jefferson County Youth Transportation Program*. The program was sponsored by the ALDOT Training Bureau and administered by the Minority Business Training and Development Program within the UAB Special Studies department. The purpose of the program is to introduce high school students in Jefferson County to transportation-related professions. In particular, the program is directed toward local high schools with large concentrations of minority students. It is intended to provide education and mentoring to these students and to encourage them to pursue careers in transportation. The Department of Civil and Environmental Engineering (CEE) at The University of Alabama at Birmingham (UAB) entered into a sub-consultant agreement with UAB Special Studies to participate in the development and implementation of the program. The CEE faculty member assisted UAB Special Studies in developing a program to achieve the following goals:

- Inform participants of the various modes of transportation,
- Familiarize the students with transportation systems management,
- Make the students aware of how a transportation infrastructure impacts an environment,
- Provide the participants with knowledge of career opportunities in the transportation industry,
- Familiarize the participants with the various local, state, and federal transportation agencies, and
- Enhance the personal growth and mental development of each participant.¹

The agreement provided support to involve a CEE faculty member in program implementation. Specifically, the CEE faculty member conducted lectures and assisted in the organization of field trips for separate groups (from different high schools) of students during three 5-6 week sessions.

¹ The UAB Department of Civil and Environmental Engineering and UAB Special Studies developed the six goals to guide the overall *Jefferson County Youth Transportation Program* (sponsored by ALDOT as Project FAUP100019860).

1.2. Purpose & Scope

The project described in this report was sponsored by the University Transportation Center for Alabama (UTCA) to expand the original *Jefferson County Youth Transportation Program*. In addition to the general goals set for the original program, the UTCA-sponsored project had the following specific objectives:

- Involve undergraduate and graduate students at UAB in curriculum development, classroom teaching and organization of field trips;
- Develop and maintain a Web page for the program to serve as a recruiting tool and to convey up-to-date information on the program;
- Involve undergraduate and graduate students at UAB in developing and delivering papers and presentations derived from the program; and
- Disseminate knowledge gained from conducting the program through papers and conference presentations to professional groups (e.g., Institute of Transportation Engineers, American Society of Civil Engineers, American Society for Engineering Education).

The project directly supported the “diversity” aspect of the UTCA theme. The program provided an educational experience for participating students, served as a recruiting tool for transportation-related educational programs, and most importantly, showed that the educational system was interested in these students and offered them opportunities. In addition, the project served as an educational opportunity to involved UAB students. It displayed needs and opportunities for diversity in the engineering workplace. It also provided them opportunities to develop their educational and organizational skills that will make them better mentors as they develop their own careers.

1.3. Methodology

In addition to contributing to the original program, the UTCA project sponsored the development and delivery of several one-time presentations to audiences of high school students as well as the development of high school-oriented materials for possible inclusion on the UTCA Web site.

The project was carried out via the following tasks:

1. Involve UAB students in developing and updating course materials (e.g., PowerPoint presentations, handouts, student involvement activities).
2. Involve UAB students in identifying, coordinating and implementing transportation related field trips.
3. Involve UAB students in developing a Web page for the program.

4. Involve UAB students in delivering lectures to high school students. Students will make presentations to the high school students and direct student involvement activities.
5. Involve UAB students and faculty in preparing papers and presentations about the program.
6. Summarize all project efforts in a final report for submittal to UTCA.

Section 2 Organization and Conduct of the Project

2.1. Development of Materials

The development of materials for the program began with identification of transportation-related topics that would be interesting to high school students, as well as appropriate for their limited knowledge of engineering and planning principles. The following general topics were identified:

- Highway Engineering,
- Traffic Safety,
- Public Transportation,
- Rail Transportation,
- Air Transportation,
- Water Transportation,
- Environmental Impacts, and
- Advanced Technologies.

Once the topics were identified, information was obtained from relevant literature and the Internet, and assembled into PowerPoint presentations and handouts. The participating UAB students were integral to the development of these materials.

2.2. Delivery of Presentations

During the project period, three 5-6 week sessions were delivered at local high schools. A list of the sessions is provided in Table 2-1. Detailed descriptions are presented in the following sections of this report. Sample pictures from the lectures and field trips are presented in Figures 2-1 through 2-3.

Table 2-1. Summary of sessions

Session	Number of Students	Schedule
Ensley High School , Birmingham	20	Two 1-hour sessions per week
Jackson-Olin High School , Birmingham	15	One 1.5 hour session per week
West End High School, Birmingham	15	One 1.75 hour session per week



Figure 2-1. Delivery of two of the lectures at Jackson-Olin High School



Figure 2-2. Inspecting a traffic surveillance camera at the Birmingham Traffic Management Center



Figure 2-3. Field trip to Mercedes-Benz plant in Vance, Alabama

2.2.1. Session 1 – Ensley High School

After an initial meeting with the counselor at Ensley High School, the session was initiated with an overview presentation made to a group of approximately 20 students. Applications were presented to the students and arrangements were made to accommodate the transportation program into the class schedules of the participating students. The transportation program met in the counselor's office on Tuesdays from 9:00 a.m. to 10:00 a.m. and on Thursdays from 11:00 a.m. to 12:00 a.m. The meeting times were staggered to minimize the time that participating students missed from a single class during any given week. Lectures generally lasted between 40 and 50 minutes, with questions and answers afterwards. The lectures were held in the counselors' office suite. Field trips were conducted on Fridays, with the exception of the tour of the ALDOT Third Division Traffic Management Center, which was conducted in conjunction with a Thursday lecture on Intelligent Transportation Systems. On two occasions, field trips were followed up with an informal lunch session with the students in the counselor's office.

A week-by-week description of the lectures, activities, and field trips is presented in Table 2-2. The first session lasted only five weeks because a sixth week would have interfered with standardized testing. Some of the lectures were condensed to get all of the information into a five-week session. The high school students and their parents were invited to a dinner at the end of the session at Ensley high school. The dinner was held at a local restaurant and allowed the students additional, informal interaction with the instructors. It also gave the parents the opportunity to learn about the program. The high school students were awarded certificates in recognition of their successful completion of the program. UAB Civil & Environmental Engineering faculty and students attended the dinner and interacted with students and parents.

Table 2-2. Session 1 activities

Event	Topic
Week 1, Lecture 1	Introduction <ul style="list-style-type: none"> ○ Role of Transportation in Society <ul style="list-style-type: none"> ○ Moving People ○ Moving Goods ○ Transportation in Alabama & Birmingham
Week 1, Lecture 2	Roads & Highways <ul style="list-style-type: none"> ○ Planning ○ Design ○ Construction
Week 1, Field Trip	None
Week 2, Lecture 1	Traffic Operations and Safety <ul style="list-style-type: none"> ○ Traffic Control ○ Traffic Safety
Week 2, Lecture 2	Public Transportation <ul style="list-style-type: none"> ○ Buses ○ Light-Rail Transit ○ Subways
Week 2, Field Trip	Toured the Birmingham Jefferson Transit Authority maintenance facility.
Week 3, Lecture 1	Bicycles & Pedestrians <ul style="list-style-type: none"> ○ Benefits ○ Planning & Design
Week 3, Lecture 2	Rail Transportation <ul style="list-style-type: none"> ○ Passengers ○ Freight ○ Vehicles and Facilities ○ Alabama Perspective
Week 3, Field Trip	None
Week 4, Lecture 1	Water Transportation <ul style="list-style-type: none"> ○ Passengers ○ Freight ○ Vehicles and Facilities ○ Alabama Perspective
Week 4, Lecture 2	Air Transportation <ul style="list-style-type: none"> ○ Passengers ○ Freight ○ Vehicles and Facilities ○ Alabama Perspective
Week 4, Field Trip	Toured ALDOT Central Office in Montgomery
Week 5, Lecture 1	Environmental Impacts <ul style="list-style-type: none"> ○ Air, Water, Ecosystems ○ Energy Consumption ○ Solutions <ul style="list-style-type: none"> ○ Alternative Fuels ○ Travel Behavior ○ Governmental Policy
Week 5, Lecture 2	Advanced Technologies <ul style="list-style-type: none"> ○ Intelligent Transportation Systems ○ Fuel Cells in Transportation Educational and Job Opportunities in Transportation
Week 5, Field Trip	Visit ALDOT 3 rd Division Advanced Traffic Management Center

2.2.2. Session 2 – Jackson-Olin High School

After a kickoff meeting with the principal and counselor at Jackson-Olin High School, the program was initiated with an overview presentation to a group of students. Applications were presented to the students and arrangements were made to accommodate the transportation program into the class schedule of the participating students. The transportation program met in a high school classroom once a week on alternating Thursdays and Fridays from 8:30 a.m. to 10:05 a.m. Lectures generally lasted between 80 and 90 minutes and allowed questions and answers afterwards. Lectures were held in a classroom. Field trips were conducted on Wednesdays. On both occasions, field trips were followed up by an informal lunch session with the students in a classroom at the school.

As in session 1, an end-of-the-session dinner was held for the high school students and their parents and was attended by UAB students and faculty. A week-by-week description of the lectures, activities, and field trips is presented in Table 2-3.

2.2.3. Session 3 – West End High School

After a kickoff meeting with the principal and counselor at West End High School, the program was initiated with an overview presentation to a group of students. Applications were presented to the students and arrangements were made to accommodate the transportation program into the class schedule of the participating students. The meeting times were based on availability of the students provided by the school principal and counselor. The transportation program met in a high school classroom once a week on Thursdays from 10:15 a.m. to 11:45 a.m. Lectures generally lasted between 80 and 90 minutes and were held in a meeting room connected to the library. A week-by-week description of the Session 3 activities is presented in Table 2-4. Only one field trip was conducted because many of the students were involved with end-of-year activities and year-end exams were approaching (counselors wanted to minimize the time spent out of class). The field trip was followed up by an informal lunch session with the students in the meeting room at the school. A similar dinner reception was held for the West End High School students.

Table 2-3. Session 2 activities

Event	Topic
Week 1 Lecture	Introduction <ul style="list-style-type: none"> ○ Role of Transportation in Society <ul style="list-style-type: none"> ○ Moving People ○ Moving Goods Transportation in Alabama & Birmingham
Week 1, Field Trip	None
Week 2 Lecture	Roads & Highways <ul style="list-style-type: none"> ○ Planning ○ Design ○ Construction Traffic Operations and Safety <ul style="list-style-type: none"> ○ Traffic Control ○ Traffic Safety ○
Week 2, Field Trip	None
Week 3 Lecture	Public Transportation <ul style="list-style-type: none"> ○ Buses ○ Light-Rail Transit ○ Subways Bicycles & Pedestrians <ul style="list-style-type: none"> ○ Benefits ○ Planning & Design
Week 3, Field Trip	None
Week 4, Lecture 1	Rail, Water, Air Transportation <ul style="list-style-type: none"> ○ Passengers ○ Freight ○ Vehicles and Facilities ○ Alabama Perspective
Week 4, Field Trip	Toured Mercedes-Benz plant in Vance, Alabama
Week 5 Lecture	Environmental Impacts <ul style="list-style-type: none"> ○ Air, Water, Ecosystems ○ Energy Consumption ○ Solutions <ul style="list-style-type: none"> ○ Alternative Fuels ○ Travel Behavior ○ Governmental Policy
Week 5, Field Trip	None
Week 6 Lecture	Advanced Technologies <ul style="list-style-type: none"> ○ Geographic Information Systems ○ Intelligent Transportation Systems Educational and Job Opportunities in Transportation
Week 6, Field Trip	Toured City of Birmingham Traffic Management Center

Table 2-4. Session 3 Activities

Event	Topic
Week 1 Lecture	Introduction <ul style="list-style-type: none"> ○ Role of Transportation in Society <ul style="list-style-type: none"> ○ Moving People ○ Moving Goods ○ Transportation in Alabama & Birmingham
Week 1, Field Trip	None
Week 2 Lecture	Roads & Highways <ul style="list-style-type: none"> ○ Planning ○ Design ○ Construction Traffic Operations and Safety <ul style="list-style-type: none"> ○ Traffic Control ○ Traffic Safety
Week 2, Field Trip	None
Week 3 Lecture	Public Transportation <ul style="list-style-type: none"> ○ Buses ○ Light-Rail Transit ○ Subways Bicycles & Pedestrians <ul style="list-style-type: none"> ○ Benefits ○ Planning & Design
Week 3, Field Trip	None
Week 4, Lecture 1	Rail, Water, Air Transportation <ul style="list-style-type: none"> ○ Passengers ○ Freight ○ Vehicles and Facilities ○ Alabama Perspective
Week 4, Field Trip	Toured Mercedes-Benz plant in Vance, Alabama
Week 5 Lecture	Environmental Impacts <ul style="list-style-type: none"> ○ Air, Water, Ecosystems ○ Energy Consumption ○ Solutions <ul style="list-style-type: none"> ○ Alternative Fuels ○ Travel Behavior ○ Governmental Policy
Week 5, Field Trip	None

2.3. Additional Presentations

In addition to the regular sessions, presentations were made to other high school groups over the course of the project. Information on the additional presentations is provided in Table 2-5. Although not intended for high school students, a presentation on the overall program was delivered to the Alabama Section of The Institute of Transportation Engineers (ALSITE) at their annual meeting in Gulf Shores, Alabama. The ALSITE presentation showcased the program. It informed the audience of the goals and objectives of the program and allowed them to see a sample presentation from the high school lectures.

Table 2-5. Summary of additional presentations to high school audiences

Event	# of Students	Presentation Title
2002 Knights of Peter Claver Gulf Coast Junior Conference Convention Center Montgomery, Alabama ² Presented by Steven Jones, UAB Department of Civil and Environmental Engineering	50	Introduction to Transportation Engineering
UTCA Advanced Transportation Summer Institute ALDOT Central Headquarters Montgomery, Alabama Presented by Steven Jones, UAB Department of Civil and Environmental Engineering	15	Intelligent Transportation Systems
Alabama School of Fine Arts UAB School of Engineering Open House Birmingham, Alabama Presented by Steven Jones, UAB Department of Civil and Environmental Engineering	15	Introduction to Transportation Engineering
Pre-Engineering Class Homewood High School Homewood, Alabama Presented by Steven Jones, UAB Department of Civil and Environmental Engineering	15	Introduction to Transportation Engineering
Non-linear Systems Class Homewood High School Homewood, Alabama Presented by Steven Jones, UAB Department of Civil and Environmental Engineering	10	Intelligent Transportation Systems

² This additional presentation was conducted at the request of ALDOT, *sponsor of the Jefferson County Youth Transportation Program*, but utilized materials developed and organized by the UAB students under sponsorship of the UTCA project.

Section 3

Continuing Efforts

To supplement the in-class activities and develop materials that can be used to solicit interest from future high school participants, the presentation materials were converted to a web-based format. It is envisioned that a *UTCA High School Program* Web site will be developed and linked to the main UTCA Web site.³ The link to the website could then be e-mailed to high school counselors to stimulate interest in the program. As the site would be directly accessible from the main UTCA site, it can also promote UTCA's outreach activities to visitors to the site. It is proposed that a link be added to the main UTCA Web site that directs browsers to the "High School Programs" page. An example of how the High School Programs page might appear on the Web is shown in Figure 3-1. To allow interested parties (e.g., high school counselors and teachers) to obtain information about the program, a request for an information/contact form has been proposed. The form, shown in Figure 3-2, would facilitate the collection of contact information of interested parties for follow-up telephone calls and possible presentations by UTCA representatives.

³ The materials have been developed. The PI will work with UTCA to determine the Web space to host the materials and develop appropriate links.

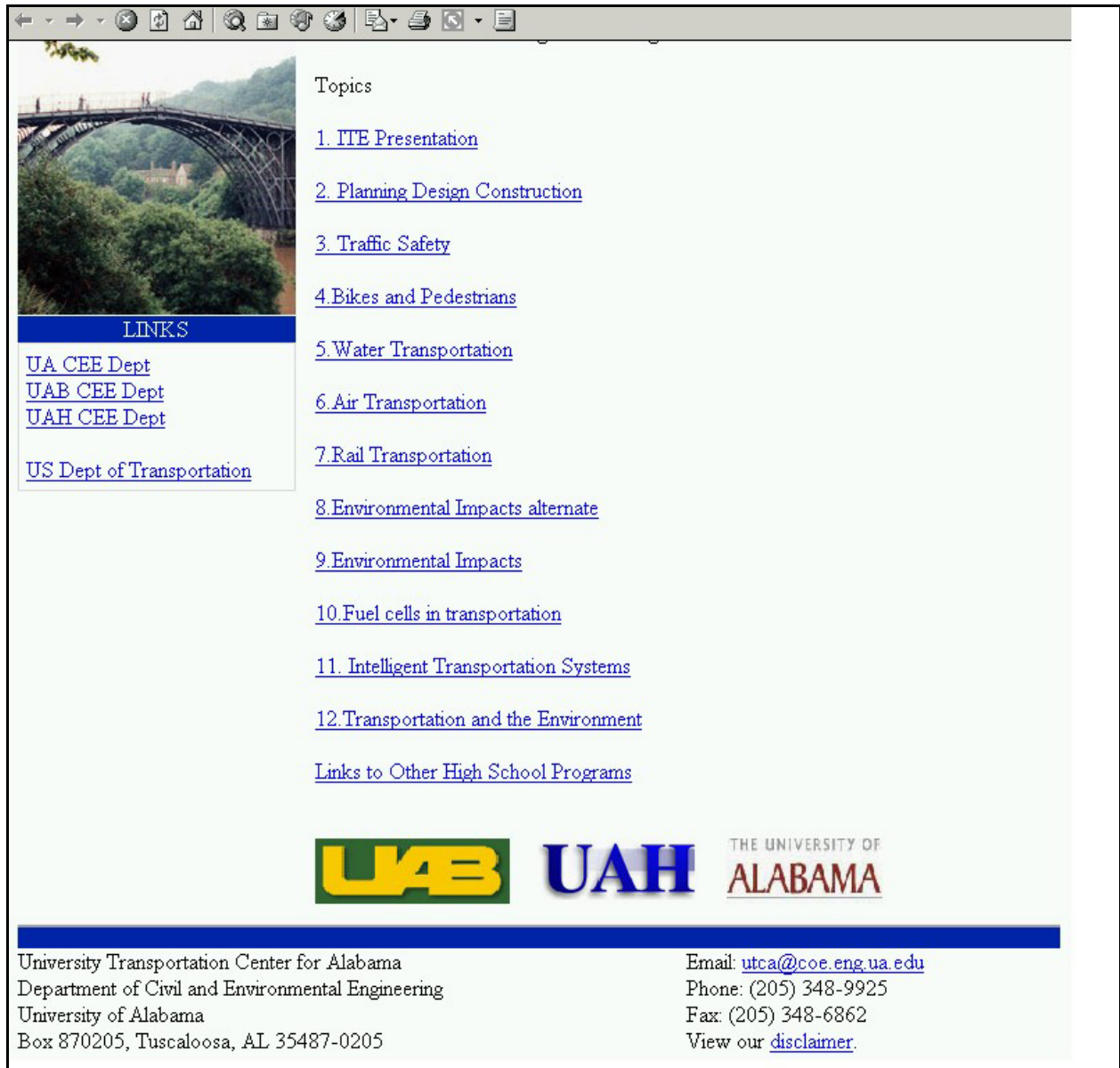


Figure 3-1. Example UTCA high school programs Web page

HIGH SCHOOL PROGRAMS

REQUEST FOR INFORMATION

NAME:

FIRST NAME:

LAST NAME:

MIDDLE INITIAL :

TITLE:

ORGANIZATION:

ADDRESS:

PHONE NUMBER:

E-MAIL:

INTERESTS:

PRESENTATIONS

EXTENDED PROGRAMS

FIELD TRIPS

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Figure 3-2. Example UTCA high school request for information Web page

Section 4 Conclusions and Recommendations

4.1. Conclusions

This project allowed UTCA to enhance the ALDOT-sponsored *Jefferson County Youth Transportation Program*. Table 4-1 provides a summary of how each of the UTCA project objectives was achieved.

Table 4-1. Project objectives and outcomes

Objective	Outcome
Involvement of undergraduate and graduate students at UAB in curriculum development, classroom teaching, and organization of field trips	UAB students developed lecture materials (e.g., PowerPoint presentations, handouts, student involvement activities). A graduate student from UAB delivered portions of several lectures at each of the sessions. An undergraduate delivered a lecture during one session. The UAB students assisted in the setup of presentation equipment during all sessions. The UAB students attended field trips and the end-of-session dinners and interacted with students.
Develop and maintain a Web page for the program to serve as a recruiting tool and to convey up-to-date information on the program	A UAB graduate student converted all of the PowerPoint presentations to HTML format for posting on the Internet.
Involvement of undergraduate and graduate students at UAB in developing and delivering papers and presentations derived from the program	A UAB graduate student helped synthesize five weeks of lecture material into the representative sample lecture that was presented to ALSITE.
The dissemination and transfer of knowledge gained from conducting such a program through papers and conference presentations to audiences (e.g., Institute of Transportation Engineers, American Society of Civil Engineers, American Society for Engineering Education).	A presentation on the program, including a sample lecture was delivered to ALSITE. As a result of this presentation, the PI was contacted by Mr. John Van Winkle (President of the Southern District of the Institute of Transportation Engineers) who requested copies of the presentation materials as examples for use in other transportation outreach activities.

The overall program was well received by the high school students as well as the participating teachers and counselors. Allowing UAB students to participate added to the high school students' experiences, because they were comfortable interacting with individuals close to their ages. It was also positive for the high school students to see UAB students interact with their professor, as well as showing interest in such outreach activities.

4.2. Recommendations for Future Activities

A considerable amount of presentation material was developed during the project. This material is available to other UTCA participants involved in outreach activities (e.g., the Transportation Summer Institute and the Advanced Transportation Summer Institute). Given the availability of the existing materials, the following recommendations are offered:

- It is recommended that the program be presented to ALDOT as part of a proposal to develop a statewide outreach program. Since the materials have already been developed, the costs associated with a statewide outreach program would largely consist of time and travel expenses for the presenter(s).
- It is also recommended that both UTCA and ALDOT explore the feasibility of extending the program to one or more of the historically black colleges in the State (e.g., Alabama A&M, Miles College, Tuskegee, Alabama State).

Section 5

Acknowledgements

The authors are grateful for support from UTCA and ALDOT for the program presented herein. In addition, special appreciation is extended to the counselors and teachers at the participating schools for their support and enthusiasm. The authors would also like to commend the participating students who showed a genuine interest in learning more about how the world around them works and made the experience enjoyable as well as informative.

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