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**Assessment of Programs That Encourage Students from Diverse  
Populations to Consider Transportation Careers**

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## ABSTRACT

The primary purpose of this study was to assess the attitudes, experiences, and awareness level of students exposed to a specialized transportation curriculum and to track the progress of participants in a series of summer transportation institutes and other outreach programs held during the period, 1999-2008. These programs include the Summer Transportation Institutes in Texas, *Go Girl!*, *On the Move!*, Career Exploration, the Rural Transportation Institutes, and Students from Nontraditional Backgrounds. Although an attempt was made to contact students from all of outreach events, the vast majority of responses and data were obtained from the participants in the Texas Summer Transportation Institute and the SWUTC funded Summer Aviation Institute and Rural Summer Transportation Institute.

Many of the students contacted are either currently attending a university or beginning their careers. This project attempted to determine the status of these students and document whether and where they are attending college as well as their course of study. If appropriate the team then contacted the student to gauge their desire for interaction with either a University Transportation Center or transportation program.



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## **DISCLAIMER**

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## **EXECUTIVE SUMMARY**

The transportation engineering profession, like every other profession that relies heavily on the engineering, technology and science fields, faces a challenging future. A recent study by the National Science Board reported a troubling decline in the number of U.S. citizens that are training to become scientists and engineers. The study showed that while more than half of the science and engineering degree holders are age 40 or older, the number of students entering college degree programs in these disciplines have declined. In short, the current and future success of the transportation infrastructure and its diverse array of components depend on developing a large diverse cadre of individuals, both male and female, to design, plan, manage, operate, and maintain the vast infrastructure in place.

Over the past ten years, the Southwest Region University Transportation Center, the Federal Highway Administration Office of Civil Rights and other entities have sponsored numerous outreach programs throughout Texas for students from diverse populations. These programs include the Summer Transportation Institutes in Texas, Go Girl!, On the Move!, Career Exploration, the Rural Transportation Institutes, and Students from Nontraditional Backgrounds. Many of these students are either currently attending a university or beginning their college careers. Many of these students are also first generation college students from diverse backgrounds. These students by their participation in the above outreach programs have also shown an interest in either engineering or transportation. Experience has shown that these students are most successful with mentoring and an informal support structure. It is crucial that the seeds of opportunity for and interest planted in these students by earlier programs be further nurtured and developed at this critical juncture.

This project conducted a follow-up study to determine the status of these students. The study attempted to document whether and where the student was attending college as well as their course of study. If appropriate the team then contacted the student to gauge their desire for interaction with either a University Transportation Center or transportation program near them.

Over 40 various one day events were conducted by TTI outreach staff during the previous 10 years. By design these events are often casual encounters with students and personal information required for follow up contact, such as name and addresses, are not gathered. This made evaluation of this type of event problematic. There were 6 smaller events which facilitated a small evaluation of the one day events possible.

Surveys were mailed to 123 students regarding the one day events and their impact. Thirty students responded and their response yielded interesting results. Twenty nine of the thirty students attended other TTI led outreach programs and 7 of the students participated in 3 or more programs. These other programs included the Summer Aviation Institute, the Texas Summer Transportation Institute, or the Rural Summer Transportation Institute.

This repeated interaction led the project team to the possible conclusion that the one day events sparked the student interest enough for them to seek out other outreach events such as Summer Institutes. When these students were individually contacted they indicated that the participation in the one day event did lead to their participation in later programs.

The Summer Transportation Institute Programs consists of 3 separate but similar programs. They are the Summer Aviation Institute, the Rural Summer Transportation Institute and the Summer Transportation Institute. Both the Summer Aviation Institute and Rural Summer Transportation Institute were programs funded by SWUTC, while the Summer Transportation Institute is funded by the Federal Highway Administration Office of Civil Rights.

A total of 410 surveys were mailed to participants of Summer Transportation Institutes. Of those 53 were returned with bad addresses and no forwarding address could be determined. For the purposes of the evaluation, these 54 students are not considered as they did not have the opportunity to respond. Of the 356 students who had the opportunity to respond, 177 or 49.72 percent responded to the survey.

Since 2002 a large number of the students participating in the summer programs were junior high/middle school level. The participation of this group of students creates a lag in survey

results regarding higher education, because the participant may have 5 or 6 years of school that must be completed prior to entering college. This participation resulted in a sizable number, 93 students (52.54 percent), who are still attending high school. The remaining students all graduated from high school.

Of the 93 students in high school, 91 students (97.85 percent) indicated they intended to enroll in a college or university after graduation. The remaining 2 students did not indicate a decision on college. Of the 84 students who graduated from high school 81 or (96.43 percent) attended college. Seventy-five of those students are currently enrolled in a College or University, one has been admitted and plans to begin college in January 2010, and 5 students graduated from college.

All of the Summer Institute programs have the stated goal of encouraging students to major in science, technology, engineering, or math (STEM). One question on the survey attempted to validate the achievement of that goal. The survey respondents indicated that of the 81 students in college, 40 of them were studying a STEM related subject and 2 of the students had declared double majors (both were STEM related). Of the 19 students not yet in college that indicated a choice of major, 9 of those were STEM related.

It is the opinion of the project staff that this both the one day outreach events and the longer Summer Transportation Institute programs have complete successes. The project team met the goals and objectives of the programs. The students who attended one day events were provided with an activity that sparked interest in transportation careers and caused them in some instances to seek out further events. Students who attended the Summer Institute Programs were exposed to the gamut of career opportunities within the transportation industry, had the opportunity to gain hands-on technical experience, network with professionals to learn more about career choices, and learn skill needed for success in college.





# 1.0 INTRODUCTION

## 1.1 OVERVIEW

The transportation engineering profession, like every other profession that relies heavily on the engineering, technology and science fields, faces a challenging future. A recent study by the National Science Board reported a troubling decline in the number of U.S. citizens that are training to become scientists and engineers. The study showed that while more than half of the science and engineering degree holders are age 40 or older, the number of students entering college degree programs in these disciplines have declined. In short, the current and future success of the transportation infrastructure and its diverse array of components depend on developing a large diverse cadre of individuals, both male and female, to design, plan, manage, operate, and maintain the vast infrastructure in place.

Over the past ten years, the Southwest Region University Transportation Center, the Federal Highway Administration Office of Civil Rights and other entities have sponsored numerous outreach programs throughout Texas for students from diverse populations. These programs include the Summer Transportation Institutes in Texas, *Go Girl!*, *On the Move!*, Career Exploration, the Rural Transportation Institutes, and Students from Nontraditional Backgrounds. Many of these students are either currently attending a university or beginning their college careers. Many of these students are also first generation college students from diverse backgrounds. These students by their participation in the above outreach programs have also shown an interest in either engineering or transportation. Experience has shown that these students are most successful with mentoring and an informal support structure. It is crucial that the seeds of opportunity for and interest planted in these students by earlier programs be further nurtured and developed at this critical juncture.

This project conducted a follow-up study to determine the status of these students. The study attempted to document whether and where the student was attending college as well as their

course of study. If appropriate the team then contacted the student to gauge their desire for interaction with either a University Transportation Center or transportation program near them.

## **1.2 STUDY OBJECTIVES**

The project team attempted to contact as many of the students who attended the programs as possible. The team collected data on the status of each student, whether they are attending college, whether or not they are entering a transportation related field, and whether or not they are interested exploring further possible careers in transportation.

The project team also approached several University Transportation Centers and/or Civil Engineering Transportation Programs located on or near campuses that the students are attending about possible partnerships. If the center or program agreed to participate, the project team then worked to introduce students to them. It is envisioned that this partnership will provide further encouragement for these students through mentoring, internships, information about student worker positions or summer employment

## **2.0 ONE DAY OUTREACH EVENT STUDENT FOLLOWUP**

### **2.1 BACKGROUND AND OVERVIEW**

As previously noted, over the past ten years, the Southwest Region University Transportation Center, and other entities have sponsored numerous outreach programs throughout Texas for students from diverse populations. Many of these outreach programs consisted of various one-day events. These type of programs included the *Go Girl!*, *On the Move!*, Career Exploration, and Students from Nontraditional Backgrounds.

*Go Girl!* developed a series of one-day conferences and/or events specifically for girls. These events offered an opportunity to gain hands on experience and insight into what transportation, engineering, and technology careers have to offer. The events also provided girls with experiences to encourage interests in science and math, as well as offering exposure and mentoring from female role models that currently work in transportation and engineering fields. By providing a venue that allowed girls to recognize their interests in math and have an early successful experience, two of the crucial factors to encourage girls to enter careers in technology and engineering are fulfilled.

*On the Move!* originated from success of *Go Girl!*. The team wanted to examine if the same type of program could be applied for both boys and girls and whether those activities would be received with the same enthusiasm. The goal of *On the Move!* was to create one day events that encouraged students' interest in STEM areas and transportation careers.

Career Exploration events were one day events piloted to diverse audiences across Texas. Each event created using a slightly different approach for sparking students' interest in STEM. All of the events were produced at a cost of less than \$1,000.

## 2.2 FOLLOW UP SURVEY AND RESULTS

Over 40 various one day events were held around the State and an estimated 14,000 students participated. Many of the events were career fair style events or one day events, where student information for participants was not available for follow up contact. However, several of the smaller events did provide follow on contact opportunities with students.

An attempt was made to contact a total of 123 students from the one day events. The events that were surveyed included *Go Girl!* events in Houston and Kingsville and *On the Move!* events in Robstown, Kingsville, and Dallas. Of the 123 students contacted, 30 students responded. The responses yielded the following results:

- Twenty three of the students responding were female and 7 were male.
- Fifteen of the students were still in high school.
- Twelve of the students were in college.
- Three of the students were college graduates.
- Twenty nine of the thirty students attended other TTI led outreach programs. These other programs included the Summer Aviation Institute, the Texas Summer Transportation Institute, or the Rural Summer Transportation Institute.
- Seven of the students participated in 3 or more programs.

Due to the extremely large percentage (97 percent) of respondents who also attended one of the other outreach events, also included in this survey, a decision was made not to further document their status. This prevented multiple documentation of a small group of students.

All of the students that indicated that they participated in other outreach programs were individually contacted. The vast majority of them indicated that their experiences in the initial program, led to their participation in later programs.

## **3.0 THE SUMMER TRANSPORTATION INSTITUTES PROGRAMS**

### **3.1 BACKGROUND AND OVERVIEW**

The Summer Transportation Institute Programs consist of 3 separate but similar programs. They are the Summer Aviation Institute, the Rural Summer Transportation Institute and the Summer Transportation Institute. Both the Summer Aviation Institute and Rural Summer Transportation Institute were programs funded by SWUTC, while the Summer Transportation Institute is funded by the Federal Highway Administration Office of Civil Rights.

The Summer Aviation Institute allowed 10th and 11th graders to experience the effects of science, math, and engineering as they participate in aviation–related activities. Students across Texas often progress through the public education system with little or no exposure to aviation. Students enter high school and college with little understanding of and appreciation for aviation and the opportunities and challenges that may await them in the future. During this summer institute students participated in hands-on activities and problem solving initiatives that incorporated team building and cooperative learning to teach principles of flight, aerodynamics, aerial navigation, Newton’s Laws, aircraft instrumentation, Bernoulli’s Principle, materials science, general math, and the history of flight.

The National Summer Transportation Institute (NSTI) is an educational program supporting the Garrett A. Morgan Technology and Transportation Futures Program, a DOT educational initiative to reach and challenge one million students of all ages to focus on their math, science and technology skills so that they are prepared to become the transportation workforce of the 21st century. Initial institutes and NSTI host sites included Historically Black Colleges and Universities (HBCU) and other Minority Institutions of Higher Education (MIHE) across the nation.

The Texas Transportation Institute (TTI) has developed and presented NSTI sponsored summer programs since 1999. In 1999, the first year for the Texas program, institutes were held in Houston and Dallas. This past year 5 institutes were held across Texas. As the program has

expanded the partnerships with universities around the state has grown to include Texas A&M University at Kingsville, Paul Quinn College, Prairie View A&M University, Palo Alto College, the University of Texas at El Paso, and Texas Southern University. The number of programs conducted each year directly relates to funds available.

The Rural Summer Transportation Institute was a modified version of the Summer Transportation Institute that focused on students from selected smaller communities and rural areas that had not previously been exposed to transportation career opportunities. A considerable number of Texas students grow up in rural or small urban centers that are a significant distance from the large metropolitan areas. These students are not afforded the same access to the many summer and pre-college programs that are available in large metropolitan areas. This often affects the students' decision to further their education and attend colleges or universities. The Rural Summer Institute was an effort to provide an outreach program for those students.

### **3.2 FOLLOW UP SURVEY AND METHODOLOGY**

A survey was created to obtain follow up information regarding choices in education made by students who attended one of the Summer Institutes offered in the past ten years by TTI. This survey which can be found at Appendix A, was an attempt to document student decisions on college attendance, college major field of study, career choices, and the influence that the summer program had on those choices. An opportunity for comments about the program that the student attended was also provided.

A database of students attending the Summer Aviation Institute, the Summer Transportation Institute or the Rural Summer Transportation Institute was then created. A total of 526 students attended Summer Institute programs facilitated by TTI from 1999 to 2008. In the creation of this database it should be noted that a sizeable number of students attended multiple institutes. These students were scrubbed to receive only one survey. The final number of students mailed surveys was 410.

## 4.0 SUMMER PROGRAM PARTICIPANT RESPONSE

### 4.1 SURVEY RESPONSES

A total of 410 surveys were mailed. Of those 53 were returned with bad addresses and no forwarding address could be determined. For the purposes of the evaluation, these 54 students are not considered as they did not have the opportunity to respond. Of the 356 students who had the opportunity to respond, 177 or 49.72 percent responded to the survey.

**Survey Responses**

<b>Action</b>	<b>Numbers</b>	<b>Percentage</b>
Surveys to STI Students Mailed	410	
Surveys returned with Bad Address	54	13.17
Surveys of Students with opportunity to respond	356	86.83
Surveys no response known	179	50.28
Surveys responded to	177	49.72

### 4.2 EDUCATIONAL STATUS OF RESPONDANTS

Since 2002 a large number of the students participating in the summer programs were junior high/middle school level. This age group has become the targeted group for many outreach activities (1, 2). Middle school students, also known as junior high school in some geographical areas, are at a critical point in education. Choices made by students and their parents during these years often effect the types of courses that are also chosen in high school. Poor choices in coursework can limit the students later career plans as well as options for college (1).

The participation of this group of students creates a lag in survey results regarding higher education, because the participant may have 5 or 6 years of school that must be completed prior to entering college. This participation resulted in a sizable number, 93 students (52.54 percent), who are still attending high school. The remaining students all graduated from high school.

Of the 93 students in high school, 91 students (97.85 percent) indicated they intended to enroll in a college or university after graduation. The remaining 2 students did not indicate a decision on college.

**Survey Response High School Retention Rate**

<b>Survey Responses</b>	<b>Action</b>	<b>Percentage</b>
Total Responses	177	
Still in high school	93	52.54
Graduated from high school	84	47.46

Of the 84 students who graduated from high school 81 or (96.43 percent) attended college. Seventy-five of those students are currently enrolled in a College or University, one has been admitted and plans to begin college in January 2010, and 5 students graduated from college.

**Survey Response Higher Education**

<b>Survey Responses</b>	<b>Action</b>	<b>Percentage</b>
Total Responses	84	
Entered College	81	96.43
<i>Currently attending College</i>	<i>75</i>	<i>92.59</i>
<i>Plan to begin college next semester</i>	<i>1</i>	<i>1.23</i>
<i>Graduated from College</i>	<i>5</i>	<i>6.18</i>
Did not attend College (entered the workforce	3	3.57

**4.3 COLLEGE CHOICES**

Students attending the summer institutes chose the following colleges and universities to further their education and career goals. Students contacted for follow up interviews indicated that their decision to attend a particular college or university was based on a number of factors including: location, major, funding, and familiarity with the school.



**Choice of College by Summer Transportation Students**

College or University	Number of STI Students		
	Attending	Graduated	Plan to attend
Cedar Valley Community College	1		
Central Christian College	1		
Duke University			1
Embry Riddle University	1		
Houston Community College	1		
Houston-Tillotson College	1		
Langston University	1		
Louisiana Tech University	1		
McNeese State University	1		
Navarro College	1		
Notre Dame University		1	
Oklahoma State University	2		
Paul Quinn College	5		2
Prairie View A&M University	3		
Rice	1		1
Sam Houston State			1
Southern Methodist University	1		
St. Edwards University		1	
Stephen F. Austin State University	2		
Texas A&M College Station	11		2
Texas A&M Commerce	1	1	
Texas A&M Corpus Christi			1
Texas A&M Kingsville	31	1	2
Texas Southern	3		
Texas State University	1		
Trinity University	1		
University of Arkansas Pine Bluff	1		
University of Houston	1	1	
University of Oklahoma	1		
University of St. Thomas	2		
University of Texas Austin	2		2
University of Texas Dallas	1		
University of Texas El Paso	3		7
University of Texas Medical Branch (Galveston)	1		
University of Texas San Antonio	2		
Xavier University	1		
Not Sure of University they will attend			9
<b>Total</b>	<b>86*</b>	<b>5</b>	<b>28</b>

*\*Note: Some students attended more than one University of College*

All of the universities hosting summer institutes were among the top choices for students when selecting a college or university to attend.

#### 4.4 STUDENTS CHOICE FOR MAJOR FIELD OF STUDY IN COLLEGE

All of the Summer Institute programs have the stated goal of encouraging students to major in science, technology, engineering, or math (STEM). The next question on the survey attempted to validate the achievement of that goal. The survey respondents indicated that of the 81 students in college, 40 of them were studying a STEM related subject and 2 of the students had declared double majors (both were STEM related). Of the 19 students not yet in college that indicated a choice of major, 9 of those were STEM related.

**Student Major Field of Study**

<b>Major</b>	<b>STEM</b>	<b>Students studying this Major</b>	<b>Students planning to study this major</b>
Accounting		1	
African American Studies		1	
Agriculture Development		3	
Agricultural Systems Management		1	
Air Traffic Control	1	1	
Airway Science	2	2	
Architectural Engineering	1	1	
Architecture	1	1	
Aviation	2	2	
Biological Sciences	2	2	
Biology	2	2	
Business		3	
Business Management		1	
Business Administration		1	
Chemical Engineering	2	1	
Civil Engineering	9	7	2
Communications		1	
Computer Technology Engineering	1	1	
Ecosystem Science and Management	1	1	
Education	1	3	1
Engineering	8	6	2

**Student Major Field of Study (Continued)**

<b>Major</b>	<b>STEM</b>	<b>Students studying this major</b>	<b>Students planning to study this major</b>
Engineering Technology	1	1	
Forensic Sciences	1	1	
General Studies/Undeclared		9	10
Health Sciences	1	2	
Human Sciences	1	1	
Interdisciplinary Studies		1	
International Business Management		1	
Kinesiology		2	
Liberal Arts		2	
Management		1	
Marine Biology	1		1
Marketing		1	
Mechanical Engineering	3	3	
Medicine	1	2	1
Metallurgical Engineering	1	1	
Nursing	1		1
Petroleum Engineering	1	1	
Pharmacy	1	1	
Political Science		1	
Pre-Engineering	1	1	
Pre-Medical	1	1	
Psychology		2	1
Radio/TV Communications		1	
Science	1	1	
Sociology		1	
Sports Management		1	
Technology	1	1	
Veterinary Medicine	1	1	
<b>Totals</b>	<b>51 (50%)</b>	<b>83</b>	<b>19</b>

*Note: 2 students reported a double major*

**4.5 PROGRAM INFLUENCE ON STUDENT CHOICES**

In answer to more detailed questions regarding the influence that the summer institute programs had on student choices. The following questions were posed:

- Did the program you attended create awareness of career opportunities in the transportation field?

- Did the program acquaint students with the various aspects of the transportation industry/
- Did the program improve skills needed in the job market?
- Did the program help develop critical thinking?
- Did the program develop skills for working in groups or teams?
- Did the program provide exposure to new and emerging technology?
- Did the program influence your decision to attend college?
- Did the program influence your decision in choosing your major?

The participants' answers to the first six questions were overwhelmingly yes. Individual comments and remarks revealed that the most overwhelming influence was exposing the students to developing skills required for working in teams and groups.

The question on influencing the decision to attend college was answered by 44 participants. Twenty (45.45 percent) of those participants indicated that the program did influence their decision and four (9.1 percent) more indicated that it provided reinforcement of their decision to attend college.

Forty-four participants also answered the question about the program influencing their major. Fourteen (31.82 percent) of the students indicated that the program did influence their choice and 5 (11.36 percent) additional students indicated that it somewhat influenced their choice of major. It is important to note that all fourteen students that indicated the program influenced their choice majored in STEM and six of the students have chosen a career in transportation.

### Student Selection of Major Field of Study

Major	Number of Students	Transportation Emphasis
Engineering	4	2
Science	1	
Civil Engineering	1	1
Mechanical Engineering	1	
Education (Science Teacher)	1	
Airway Science Management	1	1
Architectural Engineering	1	
Computer Engineering Technology	1	
Technology	1	
Air Traffic Control	1	1
Aviation (Pilot)	1	1

#### 4.6 INTERACTION OF STUDENTS WITH UNIVERSITY TRANSPORTATION CENTERS AND PROGRAMS

A number of students were contacted and interviewed about their interactions with University based transportation centers and transportation programs. It was found that a number of students made contact and had interactions with transportation programs at their respective colleges. Six students who participated in summer institutes worked for TTI as student workers while working on their undergraduate degrees. Four students worked for the Department of Civil Engineering at Texas A&M Kingsville as student workers. Seven students worked as counselors for Summer Transportation Institutes at Paul Quinn College and Texas Southern University. Four students are currently working as student ambassadors for engineering at the University of Texas El Paso. One student worked with the Summer Transportation Institute as a counselor at University of Arkansas Pine Bluff.

Students were enthusiastic about the possibility of future interactions with transportation programs at their school. A list of students currently attending college were made available to either the Department of Civil Engineering or the University based Transportation Program at Texas A&M Kingsville, University of Texas El Paso, the Texas Transportation Institute, and Oklahoma State University.

Students also commented on the desire to stay connected to the Summer Transportation Institute and to the other students who attended similar programs. Many felt this was a way to create a networking opportunity that could be used for students who had similar interests in both college and later on as young professionals. As a result of these requests the Summer Institute staff is exploring utilizing popular social networking sites such as Facebook, My Space, and Twitter to maintain communication with past participants.

## 5.0 IN THEIR OWN WORDS

This chapter is a chronicle of the stories and comments provided by the participants in their responses. The participants are only identified by their first name and the program they attended to provide some anonymity. Many of the comments are poignant and depict the influence a program can have on a young person.

### 5.1 STUDENT COMMENTS ABOUT THE PROGRAM

“Will be a commercial pilot. You are gonna jump out of your socks when I tell you about all the progress I've made in the last four years. The program back in 2001 was one of the best experiences in my life. I'm a senior at Embry Riddle Aeronautical University I'm going to school to be an airline pilot, my major is a B.S in Professional Flight, and a masters in Aeronautical science, I'm working on my flight training and hope to get hired by Delta the year after next. I still have the airplane you gave me on my desk. I've been trying to get in touch with you for a real long time I was happy when the survey letter came to the house, how are you?” .....*Chris, San Antonio.*

“This type of program should be available to all youth especially during the summer months. Also to have the opportunity to learn so much about transportation. One good thing for me was while attending the camp it allowed me to ride a city bus for the first time.” ....*Eugene, Dallas*

“Ok, first of all I think it was an interesting experience, but now I know that I'm not interested in engineering.” ....*Jasmine, El Paso*

“I am a math teacher and I am currently applying for the Bush School of Public Policy.” ...*Amanda, Houston*

“I truly appreciated the exposure and would like to see the programs current stats as well as see it used as a networking tool for "Alumni" such as myself for current opportunities in transportation. Also better follow up with students especially from Oak Cliff is needed to further encourage transportation interests.”...*LaQuasha, Dallas*

“My summer program experience was one that I will never forget and I loved the opportunity to attend. It has persuaded me into pursuing a career in engineering.”...*Ernesto, Kingsville*

I really enjoyed the transportation cam. It was really exciting, thanks for the award, I really appreciated it. I believe the camp should be continued for years to come.”...*Krystal, Dallas*

“I enjoyed the program, teamwork and experience.”...*Brandon, Dallas*

“It was a great experience that enabled me to broaden my horizons and learn more about different types of transportation. It was fun; I just wish it was a longer program, It went by too fast!”...*Le'ondria, Dallas*

“I had a blast and did not want to leave. I got to meet some new people with the same interests as me. Once I attended, I knew I wanted to be a civil engineer.”...*Henry, Kingsville*

“I realized I was not inferior when I realized that I had a clear understanding of the concepts and principles introduced and how the “crash test” conducted at the Texas Transportation Institute actually worked.”...*Jose, Houston*

## **5.2 STUDENT STORIES**

**Sara** from Falfurrias High School thought she wanted to do something in communications, perhaps television news casting. She attended the 2002 Summer Institute in Kingsville only because she was urged to do so by her science teacher. Sara fell in love with engineering and majored in Civil Engineering at Texas A&M Kingsville. She worked for TTI as a student worker



as a counselor for the Summer Institutes for 3 years and graduated from TAMUK in December 2007. Sara now works for the TxDOT Corpus Christi area office as a design engineer-in-training.

**Sharla** attended the Summer Institute in Texas A&M Kingsville in 2006. Sharla now attends Oklahoma State University on a Tribal Scholarship (Sharla is one-quarter Cherokee Indian and is an Oklahoma Tribal member). She is majoring in engineering and has summer interned at NASA in 2007 and 2008. Sharla accepted an intern position at Hughes Christensen in the Woodlands for the summer of 2009 and has been offered a follow on internship with Hughes in the summer of 2010.

In 2002 **Michael** from Klein High School near Houston attended the Summer Institute at Paul Quinn College in Dallas. Michael attended the University of Oklahoma and majored in Business Marketing. He now attends Sam Houston State University and is working on his masters degree. He has also started a small entrepreneurial business through Cyberwize. He credits a Summer Institute field trip to DeShazo, Tang and Associates and Engineering with sparking his interest in business and marketing. Michael noted that during that trip he was able to see what an actual transportation engineering firm was like and the various positions available.

**La Quasha** of South Oak Cliff High School attended the 1999 Summer Institute in Dallas. She made the decision to attend Prairie View A&M University and major in Computer Science.

**Brandon** of Mesquite High School attended the 2001 Institute in Dallas and then attended Texas A&M Commerce. He credits the institute with helping him understand all of the options and career choices that were available to him.

**Christina** attended the 2001 and 2002 Summer Institutes in Houston at Texas Southern and then entered St. Thomas University in Houston. She credits the summer institute with teaching her needed interviewing skills and job skills during the internship phase of the program.

**Jose** of Alice attended the 2003 Summer Institute at Kingsville. Jose thought he might be interested in mechanics because he liked to build things. However by the end of the institute he

knew that he wanted to be a civil engineer. He is now a senior at Texas A&M Kingsville. He worked as a counselor for the 2005 and 2006 Summer Institutes.

**Michael** who attended Lincoln High School in Dallas and is now at the University of Arkansas at Pine Bluff, credits the Dallas Summer Institute with providing him the encouragement to explore different career options. Michael is on a Tennis Scholarship and is majoring in engineering technology.

## **6.0 SUMMARY AND CONCLUSIONS**

Over the past ten years, the Southwest Region University Transportation Center, the Federal Highway Administration Office of Civil Rights and other entities have sponsored numerous outreach programs throughout Texas for students from diverse populations. These programs include the Summer Transportation Institutes in Texas, *Go Girl!*, *On the Move!*, Career Exploration, the Rural Transportation Institutes, and Students from Nontraditional Backgrounds. Many of these students are either currently attending a university or beginning their college careers. Many of these students are also first generation college students from diverse backgrounds. These students by their participation in the above outreach programs have also shown an interest in either engineering or transportation. Experience has shown that these students are most successful with mentoring and an informal support structure. It is crucial that the seeds of opportunity for and interest planted in these students by earlier programs be further nurtured and developed at this critical juncture.

This project conducted a follow-up study to determine the status of these students. Approximately The study attempted to document whether and where the student was attending college as well as their course of study. If appropriate the team then contacted the student to gauge their desire for interaction with either a University Transportation Center or transportation program near them.

### **6.1 EVALUATION OF ONE DAY OUTREACH EVENTS**

Over 40 various one day events were conducted by TTI outreach staff during the previous 10 years. By design these events are often casual encounters with students and personal information required for follow up contact, such as name and addresses, are not gathered. This made evaluation of this type of event problematic. There were 6 smaller events which facilitated a small evaluation of the one day events possible.

Surveys were mailed to 123 students regarding the one day events and their impact. Thirty students responded and their response yielded interesting results. Twenty nine of the thirty students attended other TTI led outreach programs and 7 of the students participated in 3 or more programs. These other programs included the Summer Aviation Institute, the Texas Summer Transportation Institute, or the Rural Summer Transportation Institute.

This repeated interaction led the project team to the possible conclusion that the one day events sparked the student interest enough for them to seek out other outreach events such as Summer Institutes. When these students were individually contacted they indicated that the participation in the one day event did lead to their participation in later programs.

## **6.2 EVALUATION OF SUMMER TRANSPORTATION INSTITUTES**

The Summer Transportation Institute Programs consists of 3 separate but similar programs. They are the Summer Aviation Institute, the Rural Summer Transportation Institute and the Summer Transportation Institute. Both the Summer Aviation Institute and Rural Summer Transportation Institute were programs funded by SWUTC, while the Summer Transportation Institute is funded by the Federal Highway Administration Office of Civil Rights.

A total of 410 surveys were mailed to participants of Summer Transportation Institutes. Of those 53 were returned with bad addresses and no forwarding address could be determined. For the purposes of the evaluation, these 54 students are not considered as they did not have the opportunity to respond. Of the 356 students who had the opportunity to respond, 177 or 49.72 percent responded to the survey.

Since 2002 a large number of the students participating in the summer programs were junior high/middle school level. The participation of this group of students creates a lag in survey results regarding higher education, because the participant may have 5 or 6 years of school that must be completed prior to entering college. This participation resulted in a sizable number, 93 students (52.54 percent), who are still attending high school. The remaining students all graduated from high school.

Of the 93 students in high school, 91 students (97.85 percent) indicated they intended to enroll in a college or university after graduation. The remaining 2 students did not indicate a decision on college. Of the 84 students who graduated from high school 81 or (96.43 percent) attended college. Seventy-five of those students are currently enrolled in a College or University, one has been admitted and plans to begin college in January 2010, and 5 students graduated from college.

All of the Summer Institute programs have the stated goal of encouraging students to major in science, technology, engineering, or math (STEM). One question on the survey attempted to validate the achievement of that goal. The survey respondents indicated that of the 81 students in college, 40 of them were studying a STEM related subject and 2 of the students had declared double majors (both were STEM related). Of the 19 students not yet in college that indicated a choice of major, 9 of those were STEM related.

In answer to more detailed questions regarding the influence that the summer institute programs had on student choices. The following questions were posed:

- Did the program you attended create awareness of career opportunities in the transportation field?
- Did the program acquaint students with the various aspects of the transportation industry/
- Did the program improve skills needed in the job market?
- Did the program help develop critical thinking?
- Did the program develop skills for working in groups or teams?
- Did the program provide exposure to new and emerging technology?
- Did the program influence your decision to attend college?
- Did the program influence your decision in choosing your major?

The participants' answers to the first six questions were overwhelmingly yes. Individual comments and remarks revealed that the most overwhelming influence was exposing the students to developing skills required for working in teams and groups.

The question on influencing the decision to attend college was answered by 44 participants. Twenty (45.45 percent) of those participants indicated that the program did influence their decision and four (9.1 percent) more indicated that it provided reinforcement of their decision to attend college.

Forty-four participants also answered the question about the program influencing their major. Fourteen (31.82 percent) of the students indicated that the program did influence their choice and 5 (11.36 percent) additional students indicated that it somewhat influenced their choice of major. It is important to note that all fourteen students that indicated the program influenced their choice majored in STEM and six of the students have chosen a career in transportation.

### **6.3 INTERACTION WITH TRANSPORTATION CENTERS AND PROGRAMS**

A number of students were contacted and interviewed about their interactions with University based transportation centers and transportation programs. It was found that a number of students made contact and had interactions with transportation programs at their respective colleges. Six students who participated in summer institutes worked for TTI as student workers while working on their undergraduate degrees. Four students worked for the Department of Civil Engineering at Texas A&M Kingsville as student workers. Seven students worked as counselors for Summer Transportation Institutes at Paul Quinn College and Texas Southern University. Four students are currently working as student ambassadors for engineering at the University of Texas El Paso. One student worked with the Summer Transportation Institute as a counselor at University of Arkansas Pine Bluff.

Students were enthusiastic about the possibility of future interactions with transportation programs at their school. A list of students currently attending college were made available to either the Department of Civil Engineering or the University based Transportation Program at Texas A&M Kingsville, University of Texas El Paso, the Texas Transportation Institute, and Oklahoma State University.

Students also commented on the desire to stay connected to the Summer Transportation Institute and to the other students who attended similar programs. Many felt this was a way to create a networking opportunity that could be used for students who had similar interests in both college and later on as young professionals. As a result of these requests the Summer Institute staff is exploring utilizing popular social networking sites such as Facebook, My Space, and Twitter to maintain communication with past participants.

## **6.4 CONCLUSIONS**

It is the opinion of the project staff that this both the one day outreach events and the longer Summer Transportation Institute programs have complete successes. The project team met the goals and objectives of the programs. The students who attended one day events were provided with an activity that sparked interest in transportation careers and caused them in some instances to seek out further events. Students who attended the Summer Institute Programs were exposed to the gamut of career opportunities within the transportation industry, had the opportunity to gain hands-on technical experience, network with professionals to learn more about career choices, and learn skill needed for success in college.

It is disheartening to note that these outreach programs reach only a small portion of the population of Texas. The vast portion of Texas students, including some of the neediest (students in rural south and west Texas) do not have access to such outreach programs. The funds needed to conduct programs are not great. The average cost for a 1 day event is often less than \$5,000 and the average cost for a summer program is \$4,000 per student for a 2 week program. Funding for the programs come from grants that are primarily funded through SWUTC and the Federal Highway Administration. These grants are currently only one year in length and the funding for the Summer Institute programs has not increased in the ten years of the program. At current funding levels it has been impossible for the programs to in some cases continue and in all cases expand into other areas in Texas.

Even more problematic is the consistency of the funding. If funds were dedicated to outreach on a consistent basis, the overall cost of programs would drop and the quality of the programs

would rise, because program staff could plan and budget on a regular basis, rather than putting something together as funding becomes available. Smaller and more frequent events could also be planned through dedicated funding. This consistency of events would allow student interest to be reinforced and developed through regular contact and programs.



## 7.0 REFERENCES

1. W. Schwartz, "Preparing Middle School Students for a Career," information drawn from *Vocational Education in Middle School*, Digest No. 155, ERIC Clearinghouse on Adult, Career, and Vocational Education, Columbia University, New York, New York.
2. B. Carlson, *Career Perceptions of Middle School Youth*, Gender, Diversities and Technology Institute, Education Development Center, 2004.



## **8.0 APPENDIX A – SURVEY SAMPLE**



**Section 1- Background Information**

Name \_\_\_\_\_  
First Last

Address \_\_\_\_\_  
Street and Number City State Zip

e-mail: \_\_\_\_\_

High School \_\_\_\_\_

High School Location \_\_\_\_\_  
City State

What year did you attend a summer Program (Javelina, STI, or Excites)? \_\_\_\_\_

Which Program did you attend? \_\_\_\_\_  
(city or university)

Have you graduated from High School? \_\_\_yes \_\_\_no

In no, are you in high school? \_\_\_yes \_\_\_no

Are you attending or do you plan to college? \_\_\_yes \_\_\_no

Name of College or University \_\_\_\_\_

If attending college what is your major? \_\_\_\_\_

**Section 2 – Summer Transportation Institute Program Follow-up**

In your view did the Program that you attended achieve the following goals/objectives? Check all that apply.

- 1. Create Awareness of career opportunities in the transportation field [ ]
- 2. Acquaint students with the various aspects of the transportation industry [ ]
- 3. Improve skills needed in the job market [ ]
- 4. Develop critical thinking [ ]
- 5. Develop skills for working in groups or teams [ ]
- 6. Provide exposure to new and emerging technology [ ]

Did the program influence your decision to attend college? \_\_\_\_\_

Did the program influence your decision in choosing your major? \_\_\_\_\_

Are you employed? \_\_\_full-time \_\_\_part time \_\_\_seeking employment

If you are employed is your job related to transportation? \_\_\_yes \_\_\_no

Please provide your comments about your experiences in the Summer Transportation Institute?

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