



CENTER FOR INFRASTRUCTURE ENGINEERING STUDIES

2002 Summer Transportation Institute

By

Dr. Gary Spring

University Transportation Center Program at

The University of Missouri-Rolla

**UTC
ETT61**

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16. Abstract Civil Engineering at UMR has hosted a USDOT Summer Transportation Institutes (STI) for the past two years. The Programs has been very successful. The STI is a 4 week intensive during summer for high school students - targeted primarily toward minorities but not limited to them. The 10th and 11th grade students are subjected to a healthy dose of Campus life. We will offer a 3 credit history course as part of the curriculum this year and consequently the program length has increased to 5 weeks and thus our request to CIES has increased from last year.			
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ABSTRACT

The Transportation Institute in the Department of Civil Engineering at the University of Missouri-Rolla hosted its fourth U.S. Department of Transportation Summer Transportation Institute (STI). The goals of the Institutes Program are to (1) expose secondary school students to and allow them to participate in a series of academic and practical experiences designed to motivate them toward professions in the transportation industry, and (2) provide secondary school students with mathematics, science and technological enrichment to enable them to pursue a career in the transportation industry.

In concert with these STI goals and with UMR's unique strengths, the objectives of this effort were to provide an educational experience for high school students which explored a wide variety of aspects of the transportation industry and its role in our society. To that end, the STI curriculum provided educational opportunities for its students in critical areas of transportation, math and science, personal growth and computers. The eighteen tenth, eleventh and twelfth grade students who were chosen for the Program were exposed to university life, leadership and team building activities, a three credit college history course, and a series of lectures, seminars, hands-on laboratories and field trips. The Institute was comprised of five weeks: Orientation, Highway, Air, Public and Intermodal Transportation weeks (see Appendix 3) and was headquartered at the Transportation Institute in the Civil Engineering's Butler-Carlton Building. Classes, however, were held in a variety of facilities across Campus.

The Federal Highway Administration's money was used as "seed" money to fund the Institute which cost more than twice the amount funded. The five week Institute was conducted by faculty, staff and students from the Department of Civil Engineering. Government agencies and private firms provided substantial support in funding, staff assistance and educational materials as well. See Appendix 10 for a complete list of sponsors.

Youths from across the State of Missouri were recruited. Email greetings, with program brochure and application attached, were sent to more than 1,500 high school students who had indicated an interest in engineering; STI staff called 45 Missouri high schools in the St. Louis area (our target population); parents of STI alumni were asked to join a parents group and recruit; and the National Society of Black Engineers and local MODOT personnel were again asked to help to identify and recruit likely candidates. Twenty applications were received and eighteen were accepted. Copies of the cover letter, brochure and application are provided in Appendix 1. Applicants were selected based upon their academic standing, recommendation letters, and their essays explaining their interest in transportation. The Project team assessed the applications and accepted the eighteen aforementioned applicants. The average grade point average of the chosen group exceeded 3.0 on a 4.0 scale. Four of the eighteen were twelfth graders, nine were eleventh graders, and five were tenth graders. There were thirteen African Americans, one asian, and four caucasian students. Eight of the students were women. The students represented the schools listed in Appendix 7.

INTERMODAL ADVISORY COMMITTEE

This year the Advisory Committee was used primarily to review the planned curriculum and to help identify speakers and arrange field trips. We have identified through the course of the Program four new members for the Committee and retired two others. Current membership on the Committee is as follows:

NAME: Robert T. Berry TITLE: Vice President AFFILIATION: Burns & McDonnell 1630 Des Peres Road St. Louis MO 63131	NAME: Lisa Lamons TITLE: Regional TRAC Director AFFILIATION: MODOT 2217 St. Mary's Blvd Jefferson City MO 65102
NAME: Tricia Bohler TITLE: Civil Engineer AFFILIATION: Jacobs-Sverdrup 13723 Riverport Drive Maryland Heights MO 63043	NAME: Ron Moore TITLE: AFFILIATION: NSBE
NAME: Floyd Harris TITLE: Director AFFILIATION: University of Missouri-Rolla Minority Engineering Office Rolla, MO 65409	NAME: Ray Purvis TITLE: Division Engineer AFFILIATION: MODOT R& D Division 105 Capitol Ave Jefferson City MO 65102
NAME: Sherrie Koechling-Andrae TITLE: Assistant Professor AFFILIATION: Lincoln University College of Business Jefferson City MO 65102	NAME: Glenn Smith TITLE: Civil Rights Officer AFFILIATION: FHWA, MO Division Office 209 Adams St Jefferson City MO 65101
NAME: Jennifer Kuchinski TITLE: Civil Engineer AFFILIATION: Parsons Brinckerhoff 1831 Chestnut Street St. Louis MO 63103-2225	NAME: Stephanie Webb TITLE: Aviation Education Pgm Mgr AFFILIATION: Federal Aviation Administration 901 Locust Kansas City MO 64106

A draft copy of the institute schedule was sent to the Committee for its review. It subsequently met on Tuesday, May 28, 2002 at 9 AM via teleconference to discuss STI activities. Each member was assigned a set of tasks in preparation for the STI. Subsequent communication was maintained on an individual basis via email and telephone.

PROGRAM OBJECTIVES

Strategic Plan

Goals

- To increase the workforce in the transportation sector
- To increase the presence of under-represented groups in the transportation workforce

Objectives

- To provide an educational experience for rising 11th and 12th grade high school students which explores all aspects of the transportation industry and its role in society.
- To provide students with tools they need to pursue careers in transportation and positive experiences that will encourage them to do so.

Measurable Outcomes

Upon completion of the STI, students shall be able to:

1. Apply analytical skills to basic transportation applications

Instruments

Homework/lab assignments (crash cushion design lab)
Pre and post tests (questions 3 and 6)

Metric

75% of students shall receive passing grades
Score on question requiring mathematical calculation increases by at least 25%

2. Identify career opportunities in transportation

Instrument

Pre and post test (question 1)

Metric

Increase in number of opportunities named on average

3. Discuss the topics in the core areas of land, air, water and safety covered.

Instruments

Pre and post tests (questions 2, 5 and 10)
Homework/lab assignments (Newsletters)

Metrics

All students shall attain satisfactory grades

4. Understand steps necessary to enter college

Instrument

Pre and post test (question 7)

Metric

Increase in number of students providing accurate and content rich answers

5. Conduct research in a library and on the internet

Instrument

Grades in history class
Homework/lab assignments

Metric

At least 75% of students shall receive passing grades

6. Describe continuing transportation-related educational opportunities

Instrument

Pre and post test (question 4)

Metric

More students will demonstrate an understanding of these

7. Work in teams

Offer workshop on teams

8. Understand the principles of effective leadership

Instrument

Homework/lab assignments (Graded paper on leadership)

Metric

All students shall receive passing grades

9. To develop and use employability tools (such as resumes, interview skills, appropriate dress) and to understand the value of work ethics

Instruments

Homework/lab assignments (Graded resumes)

Mock interviews

Metric

All students shall receive satisfactory assessments

Non-measurable outcomes

Appreciate what is involved in the planning, design, construction and operation of transportation facilities.

Understand the interactions among the various modes.

Discuss the major environmental and social issues facing tomorrow's transportation professional.

Student Evaluations of the UMR STI

PROGRAM FACULTY AND STAFF

Description of duties

Academic Aides

Mr. Erick Webster worked with the Director and was assigned the following duties:

- Assured that speakers had what they needed to conduct lectures and laboratories,
- Assured that attendees were in the right place at the right time, on time
- Attended field trips
- Resolved conflicts among attendees
- Assisted in academic instruction
- Organized the evening program of activities
- Aided in the implementation, evaluation and revision of the academic curriculum
- Assisted with coordination of field trips
- Supervised and saw to the needs of attendees
- Served as mentor to the attendees
- Acted in the absence of the Project Director

Dr. Mohammad Qureshi worked with the Director in organizing activities and providing seminars on a variety of topics during the Institute.

Dr. Diana Ahmad taught History 175: History of the American West. She customized the course to focus on transportation in the American West.

Counselors

We had two full time counselors' primary responsibilities were to drive vans on field trips. Their secondary responsibilities consisted of helping academic aides as needed. Counselors were Sindhu Avalokita and Bhimanapati Mallareddy.

Affiliations

Dr. Gary S. Spring, Director Associate Professor Civil Engineering	Bhimanapati Mallareddy Graduate student Construction Management
Dr. Diana Ahmad Assistant Professor History	Dr. Mohammad Qureshi Assistant Professor Civil Engineering
Sindhu Avalokita Graduate student Civil Engineering	Erick Webster Undergraduate student (upper level) History

ACADEMIC PROGRAM

The Institute was comprised of five weeks, the first of which was focused on student orientation and the remaining weeks included tracks dealing with Highway, Air, Public and Intermodal Transportation (see Appendix 3) and was headquartered at the Transportation Institute in the Civil Engineering’s Butler-Carlton Building. Classes, however, were held in a variety of facilities across Campus. Each track began with an introductory session in which speakers from the topic area were asked to speak to the group and field questions. These sessions were followed by a series of in-class activities and field trips which corresponded with the particular theme.

ENHANCEMENT

The several enhancement activities provided this year were meant to expand students' non-technical skills, such as leadership, taking responsibility for one's own actions, establishing directions in life, relating with others in teams and in other settings, and in developing organizational skills. They are:

- Introduction to the Seven Habits for Highly Effective People
- Ropes and Challenge Course
- Teamwork Seminar
- How to Study Seminar
- Communication Seminar
- Newsletter Workshop
- Using the Library
- Using the Internet
- Introduction to College life
- History of the American West (History 175)

Introduction to the Seven Habits for Highly Effective People

This activity consisted of a three hour session which began by introducing the concepts of paradigm shifts, being proactive and setting personal goals, followed by discussions on developing good organizational skills and their importance, setting priorities, and the maturity continuum which flows from independence to interdependence. Students were asked to write personal mission statements as homework - samples of which are provided in Appendix 6. Several group and individual exercises were conducted during the session that supported the concepts under discussion (see Appendix 4). A follow up session focussed on perhaps the most difficult habit, namely "Seek first to understand, then to be understood." Students were asked to state their position on the topics shown in Figure 1.



Issue	Strongly for	No strong opinion	Strongly against
1. Quotas should be used as one vehicle for affirmative action			
2. Euthanasia (ala Dr. Kevorkian) should be legalized			
3. Women should have a right to abortion			

4. The death penalty should be retained			
5. No prayer of any kind should be allowed in public schools			
6. It is ok to use animals for research purposes.			

Figure 1. Questionnaire for Empathic Communication Exercise

The issue chosen for discussion was the death penalty based upon student responses. There were at least three students who were strongly for, and three strongly against each of these two topics. Additionally, there were at least three who had no strong opinion to serve as mediators. Students formed three groups: two groups for the discussion, for and against, and one group to referee. Each discussion group’s charge was to convince the opposing group that it truly understood the opposing group’s stand. The referee group was to assure that the discussants stayed on point. Where necessary, it provided reminders that the point of the exercise was to understand the others’ views rather than win the debate. Very lively discussions ensued. The students’ reactions were very positive and, as with previous years’ students, requested more such exercises. They seemed to gain a great deal from the experience and very much enjoyed the lively interactions.

Ropes and Challenge Course

The Ropes and Challenge Course at the Universal Challenge Center in Salem, MO provides a set of training tools meant to promote human development through Experiential (Adventure) Education. The tools include group problem-solving games and initiatives, low elements (1-2 feet from the ground), and high elements (30-40 feet up). These activities and physical challenges are used as metaphors to promote development. The Universal Challenge Center has one of the largest and best equipped courses in the Nation featuring state of the art construction and nationally established safety standards. Its accredited staff is experienced in outdoor education, human development, and group dynamics. STI students were unable to experience all of the activities given the limited time frame available (1 evening versus several days) but did receive some valuable highlights of the Course. The UCC Ropes Course tested personal courage, teamwork, and group support as the students faced challenges involving climbing and traversing obstacles high in the air. We hope that students were left with lasting impressions of their experiences that they can draw upon to meet future challenges. The activities are not merely physical challenges, but metaphors for the issues we all face in our personal and professional lives. The course consists of several challenges on which students actually experienced the need to trust team members. Activities included:

- Burma Bridge. A quick climb up the pole, then across the cable and back before descending back to the ground.
- Multi-Vine Traverse. With memories of Tarzan, participants crossed this bridge using only one cable for their feet and a series of "vines" hanging from an overhead cable. Balance and concentration were required to traverse this challenge!
- Cat Walk / Balance Beam. Walking across a fallen log 30 feet above the ground.
- Flying Fox Zip Line After climbing to the take-off platform, participants were secured to a pulley that carried them the length of Zip Canyon.
- The Rock Climb A vertical climb using "rock" hand and foot-holds is both a physical and mental challenge. Strength, coordination, and strategy were needed to meet this element.

An excellent experience for these young people.

Teamwork Seminar

This two hour seminar was led by Dr. Spring. Students took the Myers Briggs test to determine personality type. Dr. Spring followed this with a fairly detailed discussion of the Myers Briggs taxonomy and where each of the students fit. A NASA team work exercise was then used to illustrate the power of teamwork. The session also provided open discussion among the students regarding what attributes constitute a good team member and how one goes about acquiring those skills. It also served as an ice breaker for the students.

How to Study Seminar

In this three hour session, topics discussed were: styles of taking notes, what to do with them after they have been taken, and how to study for exams. How we learn (the learning process) and what information should be put in the students' notebooks were also discussed.

Communication Skills Seminar

The students were introduced to principles of effective presentations. Following the introduction, the students participated in a toastmasters style meeting and practiced these principles.

Newsletter Workshop

Ms. Rebecca Frisbee, Manager of UMR's Publications Department, provided a half day workshop consisting of lecture and hands on exercises in the design and creation of technical newsletters using Adobe Pagemaker. The workshop included graphic design techniques, good writing practices and layout design. Students were required to create a newsletter reporting on each week's activities.

Using the Library

Ms. Kathy Gallagher, a UMR librarian, introduced students to the use of the University library. She provided a tour of the facility and a tutorial on how to find information.

Using the Internet

A two hour workshop on the creation of HTML documents taught students the rudimentaries of coding in HTML. Each student created his or her own web site using HTML code.

Introduction to College life

Mr. Floyd Harris, Director of UMR's Minority Engineering Program (MEP) met with STI students and, provided them with an overview opportunities offered through the MEP. Counselors from UMR admissions office told students how to apply to college, what to look for when applying, and financial aid and how to qualify and apply for it. UMR students later gave the STI students a tour of campus.

History of the American West (History 175)

Students were introduced to the joys and rigors of a genuine college course. Dr. Diana Ahmad, a History professor at UMR, taught this three credit course specifically for the STI program and as stated above actually tailored the course to reflect the transportation objectives of the STI.

SPORTS AND RECREATION PROGRAM

UMR's Multipurpose Facility has an olympic-size swimming pool and full facilities for tennis, weight lifting, basketball, etc. Students were provided with several free evenings during which many availed themselves of these facilities.

Rolla's Fourth of July celebration. Several students chose to remain in Rolla during the July 4th holiday. Those that did attended this small town fair/carnival that is held at the Rolla Lions Club Park annually during the week of July 4.

Movies. Students were provided with passes to the local movie theatre. They took advantage of a rare free evening to see The Bourne Identity.

Vacating in Chicago. Students were given some free time at the end of the day on Thursday. They shopped in Chicago's "???" and spent the evening at the Navy Pier.

PROGRAM EVALUATION

Meaningful evaluation requires revisiting the outcomes established as part of the Program's Strategic Plan. The following discussion provides an evaluation of those outcomes along with an assessment of this year's student evaluations.

Measurable Outcomes Results

One assessment tool that was planned for use was the pre and post test which was administered to students at the beginning and end of the program. As we found last year, we are unable to use several of the questions on the tests because the second test was not taken seriously by the students. On the first day of the program, everyone is serious and wanting to make good impressions. So, the pre-tests were well done and taken seriously. Last year it was proposed to hold the post test earlier (at the beginning of the last week of the program) and to include multiple choice questions. Both of these ideas were implemented, where possible, with little positive result. The types of information that are being sought in many cases do not lend themselves to multiple choice questions. Even several days before the end of the Program students are comfortable in their surroundings, feel that they have less to prove and are ready for some fun - after a very demanding five weeks. Where possible and appropriate the tests are used to gain insight into program effectiveness, but they are used with caution.

1. Apply analytical skills to basic transportation applications

Following an interactive lecture about mathematical models (see slides in Appendix 4), students were introduced to the formulation and application of math models. They designed a steel wire adequate to hold their own weight. In this way, they were introduced to the safety versus efficiency dichotomy faced in design. Following this lecture session, students were given the Crash Cushion laboratory materials provided in Appendix 4. Each group was to do the appropriate calculations and design paper crash cushions that would prevent an egg placed in the design vehicle from breaking. Fourteen of the sixteen participants understood the problem and were able to complete (correctly) the necessary computations to solve the problem. The TRAC Program encouraged the students to apply concepts from math and physics in establishing locations of physical objects, designing bridges and vehicles as well.

It was hoped that in the process of learning these skills that students would also gain an understanding of the role of math and physics in transportation design and analysis. In addition to homework and frequent admonitions from presenters who stressed the necessity of math and science, there were many examples on field trips and in video presentations that accented the need for math and science. In all of these sessions, students participated in "real world" applications of the math and physics content that they learn in school - thus, it is hoped, providing them with this "better understanding" described above.

The History course semester project exercised students' analytical skills as well. Each was charged with creating a travel diary for a typical character traveling from East to West in the middle 1800's. All received passing grades on their projects. Grade distribution is as follows: 6 A's, 6 B's, 6 C's. **MET.**

2. Identify career opportunities in transportation

A session titled "The Transportation Profession" provided an introduction to careers in transportation. The Curriculum further provided repeated exposure to a variety of career paths via classroom presentations, field trips, videos and exploration of the Internet.

The answers to this question, on the post test in particular, did not seem to be made in earnest. Consequently the scores on this question cannot be used for assessing this outcome. Based upon discussion in classes and the sharp focus of all speakers and field trips on careers it seems likely that this outcome was **MET.**

3. Discuss the topics in the core areas of land, air, water and safety covered.

Get stuff from newsletters. Additionally, although the scores on questions 2, 5 and 10 on the post test are poor, they do show slight increases in scores. **MET.**

4. Understand steps necessary to enter college

A multiple choice question was used for this outcome on the post test. We made a concerted effort this year to provide more detailed information to the participants in this regard. The answers on the post test (which is where the problem with students not answering seriously lies) seem to have been made in earnest. Average scores increased significantly for this question. **MET.**

5. Conduct research in a library and on the internet

All students taking the Literature course for credit received passing grades. Eight of the ten submitting responses to the "Egg Hunt" homework did adequate work on the assignment. This means that less than half of students were willing or able to complete the assignment. Several complained about the length of the homework. This will be re-examined for next year's program. The more substantive part of this outcome, namely the history course, was **MET.** (all students were required to do significant library and internet research for assignments and received passing grades).

6. Describe continuing transportation-related educational opportunities

Question 4 on the pre and post tests, while unreliable as a conclusive measure, is used here to gain some insight into the types of things that the students named. Answers included participation in camps such as STI, internships and/or coops with transportation companies, more math and science courses, and volunteering to work for transportation companies. The slight increase in scores for this question has no meaning given the issues discussed above.

7. Work in teams

As is described earlier, students were provided with a three hour seminar on team work and its value. With few exceptions (for example the Bridge design laboratory which has each student designing his or her own bridge using software) subsequent activities all involved working in teams.

8. Understand the principles of effective leadership

Students were assigned to write a one page paper on a leader of their choice and to enumerate the qualities of that person that made the student choose him or her. All students wrote something and all received passing grades on their thoughtfulness in describing their leader of choice.

9. To develop and use employability tools (such as resumes, interview skills, appropriate dress) and to understand the value of work ethics

A session on writing resumes and interview skills was provided at the beginning of the Institute. Students were required to submit their resumes to the UMR career development office for review and were provided with commented resumes in return. Students were also exposed throughout to professionals and a variety of professional environments. During the last week of the Institute, a series of mock interviews were held, on camera, and were critiqued for the students by a representative from career development.

The several objectives described in the Strategic Plan that are not readily measurable are discussed below. No quantifiable measures were identified to assess the attainment of these.

Non-measurable Outcomes Results

Appreciate what is involved in the planning, design, construction and operation of transportation facilities.

These concepts were introduced at the beginning of each week in the introductory panel discussions. They were then developed using the subsequent site visits each week. At several site visits the STI students were shown plans and told how long the planning and design periods existed prior to the construction phase. The scope of details necessary for the successful operation of airports, traffic flow, highway safety, and waterways were highlighted by many of the field trips.

Understand the interactions among the various modes.

The final theme of the Institute was intermodal transportation. The prime focus of the Chicago field trip was on intermodal activities. Students were provided a tour of Regional Transportation Authority (RTA) facilities (which include light rail, heavy rail and bus modes) and were provided tours of the Chicago Transit Authority's operations and control centers, a transit station and a transit "yard" by Dr. John Allen, Senior Transit Analyst for the RTA and Dr. Mark Pitstick, Program Manager for RTA. Students were also provided a two hour tour of the 388 acre Corwith Intermodal Facility (the second most productive in the Nation).

Speakers in panel sessions and field trips stimulated discussions on the issues and logistics associated with intermodal operation. Comparisons were also made to give students an idea of the relative benefits and costs of hauling freight by rail, water, road and air. A tour of Consolidated Freight Inc. (among the top five trucking companies in the U.S.) by company president and CEO, Mr. Herb Schmidt provided a dynamic culmination to the week. Mr. Schmidt provided STI students with a two hour lecture/discussion on the trucking industry, the logistics of getting products to market and technological advances in the industry. After lunch (which he provided), he gave them a tour of the Joplin facility which highlighted operations and dispatch, security, and technologies.

Discuss the major environmental and social issues facing tomorrow's transportation professional.

In St. Louis, the proposed expansions of the Metrolink, The Municipal Airport, and several highway projects presented fertile ground for several presenters to discuss these issues. The panel discussions and visits to Burns and McDonnell and Jacobs also provided discussions of these sorts of issues.

Student Evaluations of the UMR STI

This year's results were compared to the previous two years' in an effort to determine problem areas for the Institute. As the evaluation summary in Appendix 9 shows the Program experienced significant improvement in two areas: Significant improvement was shown in two areas: counselor helpfulness and quality of life in the dorms. The only variable showing a significant worsening was the quality of speakers' responses. In our "rap" session (described below), students suggested that we should provide speakers with more help in structuring their presentations. There were no other significant changes for this year (improved areas are shown in boldface in Table 9.2).

Dr. Spring met with the students on the day before the end of the Institute to discuss what suggestions they have for improvement. Students in general were very positive about the program but provided some excellent suggestions for improvements (see Appendix 9).

MARKETING

Electronic brochures and applications were emailed to approximately 1,500 students who had expressed interest in engineering; admissions people spoke to students and counselors while recruiting for UMR; STI staff called counselors from 45 different high schools in the St. Louis region and asked for help in identifying likely candidates for the Program; representatives of the National Society of Black Engineers again helped in identifying candidates; and, parents of STI graduates were asked to join UMR's new STI Parents group and to recruit in their communities. A copy of the brochure and of a one page briefing summary, prepared for the admissions folks and counselors, are provided in Appendix 11.

The STI Parents Program

This program has essentially two goals: to maintain contact with parents and alumni which it is hoped will facilitate tracking, and to aid in recruiting each year. Parents will also provide help in arranging venues for field trips and in program development where appropriate.

CLOSING PROGRAM

The week ended with the closing luncheon to which all parents, students, faculty, staff, advisory committee members and dignitaries were invited. More than 90 people attended. The Program began before lunch with welcoming comments from Gary Spring, STI Director, Jerry Bayless, Associate Dean of Engineering, on behalf of the University, Allen Masuda, Missouri Division Administrator, on behalf of FHWA and Mr. Ray Purvis, Division Engineer for Research and Development, on behalf of Missouri Department of Transportation. Each speaker urged the students to use the information they have gained from and their experiences during the Institute in positive ways. Their comments were followed by a slide presentation detailing the five weeks for parents, and lunch and by student presentations. Two groups chose to do standard descriptions of the STI experiences and one chose to combine this with a comedic skit featuring the inimitable Dr. Spring in his shorts, suspenders and ever-present coffee cup (played by Courtney Ward).

The Annual Awards Ceremony was held following lunch. Certificates of completion and a class year book (created by the students) were given to all attendees who successfully completed the five weeks. In addition to the special award plaques provided by the NRC, namely, the Director's, FHWA's and State DOT's awards, special commemorative plaques were prepared for the following:

- Citizen Award. Given for service as mentor and friend to peers, helpfulness to advisors and professors, and excellent attitude. Winner was: Joseph Burgess.
- Best Future Engineer Award. Given to the student who demonstrated potential as a creative, analytical, and thoughtful future engineer. Winner was: Claire Lehman.

- Comedian Award. Given to the student who was able to keep peers, mentors, and professors smiling and laughing. Winner was: Joseph Burgess.
- Best Travel Guide Award. Given for interpretation of historical facts, eloquent writing, and contribution to the field of history. Winner was: Fern Yoon.
- Most Improved Award. Given to the student who demonstrated the most growth as a student, scholar and friend. Winner was: Corey Lofton.

The three “official” awards were given to the three students who combined excellent scholarship, high productivity and significant service to the STI. All students were ranked in each category, categories were then combined and the top three ranked were awarded the plaques. Highest award, Director’s Award went to Fern Yoon, Second Award, State DOT Award went to Claire Lehman, and third, FHWA Award went to Courtney Ward.

Closing comments by Dr. Spring included expressions of appreciation to the STI sponsors, Advisory Committee and staff. He gave a special thanks to parents for taking the initiative to involve their children in the STI , and appealed to the students to use their experiences at the Institute when making career decisions and to keep in contact with him as they proceed in making their decisions. The luncheon adjourned at 2:30 PM.

CONCLUSIONS AND RECOMMENDATIONS

This year's STI at UMR was the most successful yet. Students were more serious, of a higher caliber and more diverse than in previous years. They were also more demanding. The Program included several new and/or improved activities, such as the sessions on math modeling, crash cushion design, Seven Habits, and, of course the field trips to Chicago and Joplin. For the first time a set of formal program goals similar to those to be used as part of the NSTI strategic plan were established and were evaluated using a set of related criteria. Based upon the outcomes of this evaluation effort, the following changes will be considered for future STIs:

- Continue to attempt pre and post tests that involve exclusively multiple choice questions. In an effort to get students to take the tests and other assignments seriously, consideration will be given to assigning college credit for the STI – perhaps one or two credits of free elective. It is hoped that this will make it more likely for students to complete the exams and will provide more quantifiable results as well.
- Change the five week schedule back to a four week one but require students to remain on campus over the weekends. A firm schedule for the college course will be established, including some time on weekends which will leave the remainder of the week for STI activities. Short blocks of time continued to be problematic for scheduling field trips and it is believed detracted from the quality of instruction of the history course.
- Work more closely with the Advisory Committee in establishing an improved strategic plan and curriculum. Similar to last year, this year the Committee mainly served as a review board for the curriculum and a resource for arranging for speakers and field trips. The Program would benefit from a more fundamental role for the Committee.

APPENDIX LIST

- Appendix 1. Application Package (13 pages)
- Appendix 2. Student Handbook (7 pages)
- Appendix 3. Curriculum Description (22 pages)
- Appendix 4. Course Materials (49 pages)
- Appendix 5. Closing Program (2 pages)
- Appendix 6. Samples of Student Work (58 pages)
- Appendix 7. List of Participants (2 pages)
- Appendix 8. Demographic Summary Sheet (1 page)
- Appendix 9. Evaluation Materials (6 pages)
- Appendix 10. Sponsors (1 page)
- Appendix 11. Marketing Materials (9 pages)
- Appendix 12. Preliminary Financial Report