10/10/02

Version 1

IDEAS

The Institute for Diversity in Engineering And Society

Informational Booklet

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About IDEAS

The Institute for Diversity in Engineering And Society (IDEAS) is a 501(c)(3) non-profit organization committed to working with industry, education and the community to promote the valuing of diversity in engineering and society. Located in Dallas, Texas, the Institute was founded in 1999 to provide leadership in affecting systematic change to include diversity in all aspects of engineering and society.

The Institute strives to achieve its goals by providing programs and services in three key areas:

Advocacy:
An active advocate for all individuals in society to become full contributing members of the engineering profession.

Education:
Innovative educational programs for teachers, students, and practicing engineers.

Research:
Collaborative research on sponsored projects addressing topics in diversity, engineering and society.

Founding Board of Directors

Paul F. Packman, P.E., Ph. D., Board President
Professor of Mechanical Engineering
Southern Methodist University
Dallas, Texas

Kent Waldrep, Board Vice-President
CEO
Kent Waldrep National Paralysis Foundation
Dallas, Texas

Charles M. Lovas, P.E., Ph. D., Board Secretary- Treasurer
Professor of Mechanical Engineering
Southern Methodist University
Dallas, Texas

Vision and Mission

Vision
The Institute for Diversity in Engineering and Society seeks to be the recognized leader in promoting the valuing of diversity in engineering and society by:

* Working with industry to improve the productivity of the technological workforce,
* Working with educational institutions to improve engineering education and promote faculty development,
* Facilitating productive collaborations among industry, academe, government, and professional organizations,
* Encouraging the participation and success of underrepresented groups in the engineering profession and engineering education, and
* Promoting the value of the engineering profession to society.

Mission
The mission of the Institute is to

* Encourage local, national, and international communication and collaboration,
* Influence corporate and government involvement in diversity issues,
* Recognize outstanding contributions of individuals and organizations,
* Encourage youth to pursue studies and careers in engineering and engineering technology, and
* Influence the recruitment and retention of individuals from underrepresented groups.

Values
The work of the Institute is guided by the following values:

* Diversity
* Professionalism
* Collegiality/Teamwork
* Respect
* Integrity
* Entrepreneurship
* Volunteerism

Key Strategies

The Institute for Diversity in Engineering and Society has adopted the following strategies in developing programs and services:

* **Diversity.** Advance the importance of diversity by recognizing and celebrating our differences, and by addressing specific issues related to diversity in the engineering profession and society.
* **Assessment.** Construct programs to assess the effects of diversity in the engineering and technology functions in industry and in educational institutions.
* **Education and Training.** Design and present educational programs and training on diversity and related issues to the technology sector and educational institutions.
* **Research.** Conduct, commission and disseminate research on issues pertaining to diversity in the engineering profession.
* **Collaboration.** Build national and international partnerships with educational institutions, professional organizations, industry, and government that will increase and enhance the valuing of diversity in engineering and society.
* **Advocacy.** Advocate for individuals of diverse backgrounds to become full contributing members of the engineering professions and society.
* **Networking.** Offer networking opportunities for the Institute's clients through national conferences, training seminars, newsletters and electronic networks.
* **Accountability.** Assess the Institute's efforts to support its mission by establishing a system of accountability for measuring the organization's impact and effectiveness.
* **Sustainability.** Identify and obtain financial resources to implement the Institute's mission through grants, contracts, and conference fees.

Advocacy

The Institute serves as an advocate for all individuals to become full contributing members of the engineering profession. To meet this end, IDEAS develops conferences, seminars, publications and other vehicles that promote an awareness of diversity and how it can be used as an instrument for change. Advocacy activities of the Institute include:

* Establishing partnerships with professional, civic and cultural organizations

* Organizing roundtable forums, symposia and speaker series

* Developing a database of diversity information and resource individuals/organizations

* Presenting forums for nationally distinguished authorities to discuss diversity issues in engineering and society

* Supporting students pursuing careers in engineering and science

Education

The Institute for Diversity in Engineering And Society provides educational and training programs on diversity and related issues in engineering and society for K-12, academia, and industry.

K-12 Programs
Programs directed to K-12 education are focused on introducing young students to engineering with the goal to stimulate student interest in math and science, particularly in students from underrepresented groups.

* Science, Mathematics, Engineering and Technology (SMET) program
* A World in Motion (AWIM) program
* Volunteer/mentoring program
* Teacher education programs for teaching the physical sciences

University Programs
Programs for university engineering faculty are directed to improving faculty understanding of the effects of diversity on the teaching/learning process and for developing methods to improve student individual/team productivity.

* Teaching Engineering to Teams: Improving Team Performance
* Integrating Design into the Engineering Curriculum

Industry Programs

Programs for engineers in industry are focused on understanding diversity, the effects of diversity on team performance, and methods for improving team productivity.

* Using Diversity Assessment to Improve Team Performance

The Science, Mathematics, Engineering and Technology (SMET) Program

The Science, Math, Engineering and Technology (SMET) program was initiated in the summer of 2000 with the goal of stimulating interest in math and science in students, particularly students from underrepresented groups, in grades K-8. The SMET program is a cooperative effort of industry, engineering societies, school districts, community, and K-8 teachers of language arts, social studies, math, science, and technology. Currently IDEAS is working with the Society of Automotive Engineers (SAE), A World in Motion Program (AWIM), the Society of Women Engineers (SWE), Women in Science and Engineering (WISE), and the Girl Scouts of America (GSA) on projects seeking to stimulate interest in math and science in students.

SMET Core Activities

There are eight core activities that contribute to the success of the SMET program:

* Supply hands-on design projects with inquiry-based learning
* Provide teachers with project hardware and curriculum materials
* Identify and screen volunteers to aid teachers in the classroom
* Train volunteers to support classroom teachers
* Train teachers in the physical sciences and principles of engineering
* Provide teachers/students with recognition/incentives/rewards
* Supply web site for communication between teachers, volunteers, and IDEAS
* Evaluate progress of students, teachers, and volunteers

Through the generosity of the SAE Foundation, the Institute has placed over $55,000 worth of AWIM project hardware and curriculum materials into 90 classrooms in North Texas. The General Motors Corporation has provided funding to support the identification, screening, and training of volunteers to support teachers in the classroom.

SMET Advisory Board

The SMET Advisory Board, composed of individuals who work with K-12 education and issues associated with underrepresented groups, provides IDEAS with guidance on how to best improve SMET education for our K-12 students.

Lorton Trent, P.E.
Vice Chair for Math and Science K-12,
Texas Section, SAE

Sherrie Prague, Ph. D., Science Coordinator,
Irving Independent School District

Kathy Hargrove, Ph. D., Director of Teacher Education, Southern Methodist University

Kent Waldrep, CEO,
Kent Waldrep National Paralysis Foundation

SMET Dean's Circle

The members of the Dean's Circle represent the regional universities' perspectives on the engineering pipeline problem.

Members of the Dean's Circle provide IDEAS with suggestions and ideas on how to develop programs that best promote SMET education to our K-12 students in the region.

Warren W. Burggren, Ph.D.,
Dean of the College of Arts and Sciences,
University of North Texas, Denton, Texas

Bill D. Carroll, Ph. D.,
Dean of the College of Engineering,
University of Texas at Arlington,
Arlington, Texas

Michael D. McCracken, Ph. D.,
Dean of the College of Science and Engineering, Texas Christian University, Fort Worth, Texas

William P. Osbourne, Ph. D.,
Dean of the Erik Jonsson School of Engineering and Computer Science,
University of Texas at Dallas,
Richardson, Texas

Stephen A. Szygenda, Ph. D.,
Dean of the School of Engineering,
Southern Methodist University,
Dallas, Texas

Getting Involved

If you are a

* Teacher, school, or school district wishing to participate in the program
* Volunteer wishing to support the teachers in the classroom
* Corporation wishing to support the SMET program with financial support and/or volunteers
* Community organization wishing to participate

Please contact IDEAS

* By phone 972.490.6776
* By email clovas@seas.smu.edu or
* At our mailing address below.

Institute for Diversity in Engineering and Society
12015 Shiloh Road, Suite 158
Dallas, TX 75228

Phone 972.490.6776
Fax 972.702.0919

A World in Motion (AWIM) Program

Two core activites of the Science, Mathematics, Engineering and Technology (SMET) program are to supply hands-on design projects with inquiry-based learning and provide project hardware and curriculum materials to teachers. IDEAS provides design projects and curriculum materials from the nationally acclaimed ***A World in Motion (AWIM) Program*** developed by the Society of Automotive Engineers (SAE) Foundation to participating teachers for use in their classrooms.

The AWIM materials were developed and classroom-tested by the Society of Automotive Engineers (SAE) Foundation with funding from the National Science Foundation and industry sponsors. The AWIM materials supplied by the SAE Foundation provide teachers with a turn-key operation by providing a teacher's guide, project materials, student booklets, videos, letters to parents, and dynamic posters.

The AWIM Experience
During the AWIM experience, students work together in "engineering design teams" as they explore mathematics and physics through a series of hands-on, inquiry-based learning activities. The program is presented in three challenges spanning grades 4-8, with each challenge spanning a 3-week to 8-week period.

Challenge	Grade	Description	Length
1	4	Design of skimmer boat	3 weeks
	5	Design of a jet toy car	3 weeks
	6	Design of a can rover	3 weeks
2	7	Design of an electric toy	8 weeks
3	8	Design of a gliding toy	8 weeks

A new ***Challenge 4*** on electricity and electronics for grades 4-10 will be released in 2003.

Students in each challenge work together in engineering design teams, as a team of teachers lead them through a six-phase design process:

* Set goals

* Build knowledge
* Design
* Build and test
* Finalize the model, and
* Present

Science and math content and skills in each of these projects satisfy the Texas Essential Knowledge and Skills (TEKS), the Benchmarks for Science Literacy of the Association for the Advancement of Science (AAAS), and the National Science Education Standards of the National Research Council (NRC).

A key part of the program is the involvement of a volunteer from the engineering profession. The engineer volunteer and the classroom teacher work together to determine the level of volunteer involvement needed to make the program successful.

AWIM Participants

The Texas section of the Society of Automotive Engineers International has taken the lead in publicizing the AWIM program to schools throughout Texas. The Institute for Diversity in Engineering and Society supports the local teacher in the use of the AWIM materials.

IDEAS currently supports 89 teachers in 35 schools from eight school districts:

* Dallas
* Denton
* Fort Worth
* Garland
* Irving
* Lewisville
* Richardson
* Southlake

The program includes schools in five of the 20 largest school districts in Texas.

Challenge	School Districts	Schools	Teachers	Students
1(4th-6th)	8	19	36	2331
2 (7th)	4	12	40	3379
3 (8th)	4	4	13	1214
Totals	**8**	**35**	**89**	**6924**

Participants

Schools:
35

Teachers:
89

Students:
6924

Volunteers:
110

Student Demographics

4-6th Grade:
2331

7th Grade:
3379

8th Grade:
1214

Male:
52%

Female:
48%

Hispanic-American:
40%

African-American:
19%

Anglo:
34%

Asian-American:
5%

American Indian:
1%

Other non-white:
<1%

Challenge 1: Design of a Skimmer Boat

Suggested Grade Level: 4
Suggested Length: 3 weeks

Description:
The Design Experience Challenge 1 consists of three challenges suitable for grades 4-6. Each of these challenges can be taught over a three-week period or, with suggested extensions, over a longer period.

Skimmer Challenge (Grade 4)
Students make paper sailboats that are propelled by fans across the floor. They test the effect of different sail shapes, sizes, and construction methods on the performance of their skimmers. The goal of this challenge is to design a set of skimmers that reliably meet specific performance criteria. Friction, forces, and the effect of surface area are some of the physical phenomena students encounter in this challenge.

As students strive to optimize the performance of their toy vehicle, they express their ideas, test their hypotheses, and draw their own conclusions based on the evidence they gather. In this way, their experience resembles the work of scientists and engineers. The science notes that accompany each challenge describe concepts associated with the performance of the vehicles the students design and build.

Engineering Design Experience
A unique feature of this program is the use of a problem-solving process employed by engineers in design teams and taught at many engineering schools across the country. The "Engineering Design Experience" provides a problem-solving context in which students design a product or devise a

solution to a problem. Teams of three students examine what must be accomplished and who the product is for; gather and synthesize information; design, develop, and test a prototype design; and prepare a presentation of their design ideas.

The Engineering Design Experience consists of five phases:

* Set Goals
* Build Knowledge
* Design
* Build and Test
* Present

Curriculum Content

The Engineering Design Experience is an *applied problem-solving process*, which enables students to see how the field of engineering integrates knowledge and skills from science, mathematics, and technology. In using this process, the design challenge provides the contexts in which students can apply content and concepts from their previous learning experiences.

Education Standards

The challenge embraces the direction of national and state standards in science and mathematics education. This program conforms specifically with both the National Research Council standards to promote the education of students to develop products and solutions to problems using technological design, and the National Council of Teachers of Mathematics standards that emphasize teaching students to see mathematical connections to the real-world through mathematical thinking, modeling, and problem solving. In addition, this program correlates with the Texas Essential Knowledge and Skills (TEKS) criteria in science, mathematics, and technology.

Challenge 1- Skimmer Materials

Components consist of a teacher's kit and classroom materials.

Teacher's kit contains

* Teacher's manual
* Videos
* Posters
* Re-order information

A set of classroom materials (enough for 27 students) contains

* 3 electric fans
* 50 skimmer hull patterns (printed poster board)
* 1 package of 100 3x5 index cards
* 1 box of 100 large paper clips
* 1 box of 100 drinking straws

***A World in Motion* is a product of the Society of Automotive Engineers Foundation.**

Challenge 1: Design of a Jet Toy Car

Suggested Grade Level: 5
Suggested Length: 3 weeks

Description:
The Design Experience Challenge 1 consists of three challenges suitable for grades 4-6. Each of these challenges can be taught over a three-week period or, with suggested extensions, over a longer period.

Jet Toy Car Challenge (Grade 5)
Students make balloon-powered toy cars. Their challenge is to design an appealing toy that performs in a specific way, such as travels far, carries weight, or goes fast. Students experiment with different chassis designs and nozzle sizes to determine their effect on the Jet Toy's performance. Jet propulsion, friction, and air resistance are the core scientific concepts students explore in this challenge.

As students strive to optimize the performance of their toy vehicle, they express their ideas, test their hypotheses, and draw their own conclusions based on the evidence they gather. In this way, their experience resembles the work of scientists and engineers. The science notes that accompany each challenge describe concepts associated with the performance of the vehicles the students design and build.

Engineering Design Experience

A unique feature of this program is the use of a problem-solving process employed by engineers in design teams and taught at many engineering schools across the country. The "Engineering Design Experience" provides a problem-solving context in which students design a product or devise a solution to a problem. Teams of three students examine what must be accomplished and who the product is for; gather and synthesize information; design, develop, and test a prototype design; and prepare a presentation of their design ideas.

The Engineering Design Experience consists of five phases:

* Set Goals
* Build Knowledge
* Design
* Build and Test
* Present

Curriculum Content

The Engineering Design Experience is an *applied problem-solving process*, which enables students to see how the field of engineering integrates knowledge and skills from science, mathematics, and technology. In using this process, the design challenge provides the contexts in which students can apply content and concepts from their previous learning experiences.

Education Standards

The challenge embraces the direction of national and state standards in science and mathematics education. This program conforms specifically with both the National Research Council standards to promote the education of students to develop products and solutions to problems using technological design, and the National Council of Teachers of Mathematics standards that emphasize teaching students to see mathematical connections to the real-world through mathematical thinking, modeling, and problem solving. In addition, this program correlates with the Texas Essential Knowledge and Skills (TEKS) criteria in science, mathematics, and technology.

Challenge 1- Jet Toy Car Materials

Components consist of a teacher's kit and classroom materials.

Teacher's kit contains

* Teacher's manual
* Videos
* Posters
* Re-order information

A set of classroom materials (enough for 27 students) contains

* 25 Jet Toy chassis pattern sheets
* 50 push-up sticks
* 50 push-up platforms
* 50 drinking straws
* 100 9-inch balloons
* 3 balloon pumps
* 12 tubing: 5/16-inch diameter clear vinyl tubing, 10 cm long
* 12 tubing: 3/16-inch diameter clear vinyl tubing, 10 cm long
* 12 tubing: 1/2-inch diameter clear vinyl tubing, 10 cm long
* 100 #31 rubber bands

***A World in Motion* is a product of the Society of Automotive Engineers Foundation.**

Challenge 1: Design of a Can Rover

Suggested Grade Level: 6
Suggested Length: 3 weeks

Description:
The Design Experience Challenge 1 consists of three challenges suitable for grades 4-6. Each of these challenges can be taught over a three-week period or, with suggested extensions, over a longer period.

Steel Can Rover Challenge (Grade 6)
Students make rolling toys from coffee cans, powered by rubber bands and weights. The challenge is for the class to design a fleet of toy vehicles that meet a range of performance criteria including speed, travel distance, and manner of stopping. Students experiment systematically to

explore relationships between rubber band thickness, number of wind-up turns, amount of weight, and wheel size. Physical concepts embedded in this challenge include inertia, friction, and energy transformation.

As students strive to optimize the performance of their toy vehicle, they express their ideas, test their hypotheses, and draw their own conclusions based on the evidence they gather. In this way, their experience resembles the work of scientists and engineers. The science notes that accompany each challenge describe concepts associated with the performance of the vehicles the students design and build.

Engineering Design Experience

A unique feature of this program is the use of a problem-solving process employed by engineers in design teams and taught at many engineering schools across the country. The "Engineering Design Experience" provides a problem-solving context in which students design a product or devise a solution to a problem. Teams of three students examine what must be accomplished and who the product is for; gather and synthesize information; design, develop, and test a prototype design; and prepare a presentation of their design ideas.

The Engineering Design Experience consists of five phases:

* Set Goals
* Build Knowledge
* Design
* Build and Test
* Present

Curriculum Content

The Engineering Design Experience is an *applied problem-solving process*, which enables students to see how the field of engineering integrates knowledge and skills from science, mathematics, and technology. In using this process, the design challenge provides the contexts in which students can apply content and concepts from their previous learning experiences.

Education Standards

The challenge embraces the direction of national and state standards in science and mathematics education. This program conforms specifically with both the National Research Council standards to promote the education of students to develop products and solutions to problems using technological design, and the National Council of Teachers of Mathematics standards that emphasize teaching students to see mathematical connections to the real-world through mathematical thinking, modeling, and problem solving. In addition, this program correlates with the Texas Essential Knowledge and Skills (TEKS) criteria in science, mathematics, and technology.

Challenge 1- Can Rover Materials

Components consist of a teacher's kit and classroom materials.

Teacher's kit contains

* Teacher's manual
* Videos
* Posters
* Re-order information

A set of classroom materials (enough for 27 students) contains

* 24 coffee can lids with 1/4-inch center hole
* 24 lids: 6 3/4-inch plastic lids with 1/4-inch center hole
* 24 bolts: 1 1/4-inch hook bolts, 10-24 thread
* 24 hex nuts, 10-24 thread
* 24 wing nuts, 10-24 thread
* 48 washers: 1 1/4-inch, size 10 fender washers
* 100 #64 rubber bands
* 100 #31 rubber bands
* 12 canisters: 35 mm film canister with lid
* 12 nylon hose clamps
* 180 washers: 9/16-inch SAE washers
* 250 labels: 3/4-inch diameter sticky dots (adhesive labels), two colors

Before beginning this challenge, teachers need to collect one empty 4-inch diameter steel coffee can for each design team of three students. This size can holds from 11 to 16 ounces, depending on the brand.

***A World in Motion* is a product of the Society of Automotive Engineers Foundation.**

Challenge 2: Design of an Electric Toy

Suggested Grade Level: 7
Suggested Length: 8 weeks

Description:
The Design Experience Challenge 2 encourages students, teachers, professionals, and parents to participate together in an exciting learning process. This challenge introduces students to the excitement of learning math, science, engineering and technology concepts in the context of an authentic engineering design experience. The challenge is supported by a series of closely integrated, multi-disciplinary learning activities in science, mathematics, technology education, social studies and language arts.

Electric Toy Challenge (Grade 7)
Mobility Toys, Inc. is searching for new ideas for its Globe Ranger line of toys. Learning begins when students receive a "Request for Proposal" inviting their design teams to design simple, mechanically propelled toys that appeal to children between the ages of 6-10. Student design teams determine the customer requirement, build the knowledge base needed to solve the problem, develop creative designs, build and test prototypes of these designs, and communicate the results to the customers.

Engineering Design Experience
Student design teams pool their talents to create a successful prototype and make a final presentation of their design rationale. Teachers guide students through a six-phase design process:

* Set Goals
* Build Knowledge
* Design
* Build and Test
* Finalize the Model

* Present

Curriculum Content

Learning activities revolve around intense exploration of hands-on materials and community resources. The science activities form the core of the experience, but all teachers on the team assume leadership roles. The activities for the various disciplines weave throughout, reinforcing key concepts such as force, motion, gears and gear trains, ratio, the relationship between science and mathematics, design logs, customer needs, testing, experimentation, creating and using graphs, and a wide range of communication skills.

Education Standards

The challenge embraces the direction of national and state standards in science and mathematics education. This program conforms specifically with both the National Research Council standards to promote the education of students to develop products and solutions to problems using technological design, and the National Council of Teachers of Mathematics standards that emphasize teaching students to see mathematical connections to the real-world through mathematical thinking, modeling, and problem solving. In addition, this program correlates with the Texas Essential Knowledge and Skills (TEKS) criteria in science, mathematics, and technology.

Problem-solving skills and career orientation emphasized in the school-to-work initiative receive special attention. Challenge 2 has also been endorsed by the National Middle School Association and the National Association of Secondary School Principals.

Challenge 2 Materials

Components consist of a teacher's kit and classroom materials.

Teacher's kit contains

* Teacher's manual
* Videos
* Posters
* Re-order information

A classroom set of laboratory materials containing nine sets of laboratory and fabrication materials to meet the needs of nine student design teams (from 27-36 students). The set of materials for each student team includes:

* Chassis
* 4 wheels
* Set of different gears
* Axles for mounting wheels and gears
* Electric drive motor
* Electric transformer to power motor from wall voltage
* Spring scale to measure force
* Miscellaneous fastening hardware

A World in Motion **is a product of the Society of Automotive Engineers Foundation.**

Challenge 3: Design of a Gliding Toy

Suggested Grade Level: 8
Suggested Length: 8 weeks

Description:
The Design Experience Challenge 3 encourages students, teachers, professionals, and parents to participate together in an exciting learning process. This challenge introduces students to the excitement of learning math, science, engineering and technology concepts in the context of an authentic engineering design experience. The challenge is supported by a series of closely integrated, multi-disciplinary learning activities in science, mathematics, technology education, social studies and language arts.

Gliding Toy Challenge (Grade 8)
Mobility Press, Inc. wants to publish a book of designs for gliding toys that children of ages 8 to 12 can build with assistance from an adult. Learning begins when students receive a letter from Mobility Press inviting them to submit a manuscript for this book, including drawings and plans for building and operating the gliders. Each student design team investigates different glider designs, tests their designs, and develops prototypes for inclusion in the book. The challenge culminates in a book-

signing event where each design team presents its prototype and the class presents its manuscript to Mobility Press "representatives" and members of the local community.

Engineering Design Experience

Students work together in engineering design teams, as a team of teachers leads them through a six-phase design process:

* Set Goals
* Build Knowledge
* Design
* Build and Test
* Finalize the Model
* Present

Curriculum Content

The science activities form the core of the experience, but all teachers on the team assume leadership roles. Students become engaged in an intensive exploration of hands-on materials as they investigate the relationship between force and motion, the effects of weight and lift on a glider, data analysis and manipulation, and the importance of understanding consumer demands. They learn to create design briefs, sketches and models, and are eventually challenged to communicate their findings to a specified audience.

Education Standards

The challenge embraces the direction of national and state standards in science and mathematics education. This program conforms with both the National Research Council standards to promote the education of students to develop products and solutions to problems using technological design, and the National Council of Teachers of Mathematics standards that emphasize teaching students to see mathematical connections to the real-world through mathematical thinking, modeling, and problem solving.

Problem-solving skills and career orientation emphasized in the school-to-work initiative receive special attention. In addition, this program correlates with the Texas Essential Knowledge and Skills (TEKS) criteria in science, mathematics and technology.

Challenge 3 Materials
Components consist of a teacher's kit and classroom materials.

Teacher's kit contains

* Teacher's manual
* Videos
* Posters
* Re-order information

A starter set of classroom materials (enough for 27 students) contains:

* 15 standard model gliders
* 36 sheets of styrofoam
* 36 balsa sticks
* 4 meter sticks
* 2 glue guns
* Modeling clay
* Rubber bands

***A World in Motion* is a product of the Society of Automotive Engineers Foundation**

Volunteers

Two core activities of the Institute's Science, Mathematics, Engineering and Technology (SMET) program are to identify and screen volunteers to aid teachers in the classroom and to train volunteers to support classroom teachers. The Institute coordinates volunteer placement from industry and universities. IDEAS has developed working relationships with the following local organizations to recruit and provide volunteers for the SMET program in the future.

* Volunteer Center of Greater Dallas (Collin, Dallas, Denton, and Tarrant Counties)
* Senior Citizens of Greater Dallas
* Senior Citizens of Irving

This past year the Institute has coordinated volunteer placement for programs sponsored by the Society of Automotive Engineers (SAE), Women in Science and Engineering (WISE), and the Society of Women Engineers (SWE).

SAE A World In Motion Program. Volunteers assisted students and teachers as they worked on the three SAE challenge projects. Volunteers provided technical assistance, acted as role models, and provided information on engineering and the engineering profession.

Women in Science and Engineering. The Women in Science and Engineering at Southern Methodist University hosted a monthly Saturday workshop for girls in 3-5th grades from four elementary schools in the Dallas Independent School District.

Young students worked on science and engineering projects and met with female engineering professionals. Volunteers assisted the student teams as they worked on hands-on science and engineering projects.

Society of Women Engineers/Girl Scouts of America. The Dallas chapter of the Society of Women Engineers sponsored a full-day science and engineering workshop for the Girl Scouts of America. Girls from throughout North Texas worked on their science and engineering badges. Volunteers assisted in logistics, supervised teams, and assisted with hands-on projects.

Teaching Engineering to Teams: Improving Team Performance

Objectives

This workshop provides:

* Information on teams, team building, and group dynamics,
* Proven methods and resource materials for teaching engineering teams,
* Techniques for selecting, managing, and evaluating teams, and
* A forum for participants to exchange information and experiences on teaching engineering teams.

Who Should Attend?
Typical profiles of faculty attending this workshop include:

* Faculty desiring information on how to improve team performance.
* Faculty with a desire to include cooperative team learning in the classroom experience.
* Administrators desiring additional information on the team experience.
* Experienced engineering faculty seeking additions to their current bag of team teaching tricks.
* New faculty transitioning from industry to education desiring a better understanding of the college age student in the team environment.

Topics
Forming Teams- Organizational Behavior; Types of Teams; Team Functions; Co-operative Learning; Understanding Needs and Work Styles; Learning Styles.

Managing Teams - Management Styles; Laissez-Faire; Participative; Authoritarian; Five Essential Coaching Skills; Conflict Resolution; Self-Managed Teams.

Evaluating Teams - Individual Efforts; Team Efforts; Peer Evaluations; Instructor Evaluations; Personal Assessment.

Personality Type - Myers-Briggs Type Indicator Test; Type and Learning Styles; and Group Dynamics; and Management Styles; and Problem Solving; ...

Gender/Cultural Effects - Valuing Diversity; Perceived Status/Team Hierarchy; Perceived Male/Female Roles; Communication; Leadership Style; Learning.

Team Building - Steps in Team Building; Four Styles of Team Players; Six Factors for an Effective Team; Twelve Characteristics of an Effective Team.

Team Similarities/Differences - In First Year Courses; Engineering Science Courses; Capstone Design Courses; Analysis/Design/Laboratory Teams.

Assessment of Team Work- Engineering Log Books; Progress Reports; Portfolios; Video Recording/Review; Written and Oral Reports.

Workshop Exercises - Diversity Assessment; Building Bridges; Communications; Individual Participation Levels in Team Efforts; Team Member Roles; Control of the Team Effort.

Format
Participants are encouraged in this two-day workshop to bring and share cooperative learning experiences. Participants actively participate in team activities during the workshop sessions.

Integrating Design into the Engineering Curriculum

Objectives
This workshop provides:

* Information on engineering design and design methodology,
* Proven methods for introducing design throughout the curriculum,
* resource materials for teaching (coaching) design, and
* A forum for participants from all engineering disciplines to exchange information on the above topics.

Who Should Attend?
Over 780 engineering faculty from over 225 universities in 11 countries have participated in the previous 33 workshops. Typical faculty profiles include:

* Faculty desiring an introduction to design methodology and how to include design in engineering science courses.
* Faculty assigned to develop/teach a first year or capstone design course.
* Administrators desiring information on ways to improve the design experience.
* Experienced design faculty seeking additions to their current bag of engineering design tricks.

* New faculty transitioning from industry to education.

Topics

Design Methodology- What is (not) Design?; Domain/Process Knowledge; Discipline Differences/Similarities; Top Down/Bottom Up; Total Product Realization Process.

First Year Design- Design Methodology; Design and Test Projects; Teaching Process Before Content; Creativity and Problem-Solving.

Engineering Science Courses- Problems in Natural Context; Design by Memo; Case Studies; Design Through Failure; Engineering Design Projects Compendium.

Capstone Design - Evaluating/Selecting Projects; Industrial Projects; Research Projects; Laboratory Equipment Designs; Design for Individuals with Disabilities.

Externally Sponsored/Supported Design Projects- Starting a Program; Identifying Clients; Running a Program; Support Requirements; Industrial Sponsors.

Design Project Teams- Selecting Teams; Mentoring/Coaching; Team Building; Evaluating Individuals/Teams; Personality Type and Group Dynamics.

Multidisciplinary Design - Horizontal/Vertical Integration; In General Engineering Programs; In Programs with Engineering Disciplines; Support Requirements.

ABET and EC2000- Criteria/Visit/Process; Developing a Design Plan; Documenting Design Content; The Design Portfolio; Assessment of Design Content/Process.

Format

Participants in this two-day short course and workshop are encouraged to bring and share design materials from their programs. A mix of informal sessions and workshop sessions provides material coverage that is sensitive to the design background, engineering discipline, and current needs of the participants.

Using Diversity Assessment to Improve Team Performance

A diversity assessment of engineering and technology teams will determine the current status of team diversity issues and how they affect the productivity of the team. Participants in this program will be sensitized to diversity issues through total immersion in diversity-related technology activities. Managers participating in this program are better able to assess how diversity issues affect individual and team performance. As a result, managers are better able to manage their teams to increase team performance. This is an assessment program tailored to your engineering and technology needs.

A few characteristics of highly effective teams-

* Members are involved in setting directions and making decisions
* Rewards are known, accomplishments recognized, and success is celebrated
* Procedures are established, well organized, accepted and effective
* Climate and procedures are such that members
* Trust one another
* Support one another
* Take risks
* Share information freely
* Deal with conflict effectively
* Avoid group think
* Meetings are productive

In this two-day assessment program you will learn how these characteristics correlate to diversity and how to work with your team to reach its full potential. Become aware of characteristics of highly effective teams and how your role in the team impacts others. You will learn how to apply diversity concepts and structures team assessment techniques to your teams.

Specifically you will learn how-

* To introduce personality type to team thinking

* Stereotype thinking affects teams
* Values and expectations of individuals impact team operations
* To improve cross-cultural communication
* To identify team strengths and blind spots
* To assess team effectiveness and individual effectiveness
* Diversity affects how you act as a team builder
* To use team exercises and activities to improve performance

After completing this assessment program you will be able to-

* Implement ways to use diversity to improve team performance
* Choose from a variety of assessment processes to determine team needs
* Employ a variety of diversity and team building exercises to enhance the functioning of a team
* Ascertain when it is appropriate to use diversity with a team

These programs are especially designed for-

* Engineering and technology managers
* Team leaders and facilitators
* Project and design engineers
* Education coordinators
* Human resource professionals
* Individuals interacting with engineering teams

Research

The Institute for Diversity in Engineering and Society fosters collaborative research on projects that add to both the knowledge base and understanding of diversity effects in engineering and society.

* Act as catalyst for cross-disciplinary research
* Establish research partnerships with professional, civic and cultural organizations
* Develop a research repository for databases, papers and reports

Currect Projects

Evaluation of Team Performance. The assessment and performance of design teams is monitored, video taped, and evaluated to determine a correlation of performance with diversity characteristics including gender, ethnicity, personality, and others. The study includes design teams with participants from K-12, the university, and engineers in the profession.

Career Selection. First year engineering student data is collected. The selection of career major by first year engineering students is monitored to determine the effect of diversity and other characteristics on career selection.

Future Activities

* Support graduate research projects on diversity and engineering
* Develop a metric for evaluation of diversity effects on team performance
* Determine effects of diversity on multinational design efforts separated by a distance
* Develop a consortium of universities to work on projects that emphasize the interdisciplinary and humanitarian aspects of designing products for individuals with disabilities.

Press Releases/Stories

Press releases for the Institute for Diversity in Engineering and Society

* Congressional Trip

Press stories of Institute activites:

* Southlake
* Irving
* ASME DC
* SAE DC

Contacting the Institute for Diversity in Engineering and Society

Individuals, corporations, non-profit organizations, schools and universities, and community organizations are invited to participate in the activites of the Institute for Diversity in Engineering and Society.

* Volunteers
* Board members
* Collaborative projects
* Project sponsors
* Student interns

IDEAS encourages alliances with all organizations interested in diversity, engineering and society.

For further information, contact IDEAS:

* By phone 972.490.6776
* By email clovas@seas.smu.edu or
* At our mailing address below.

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