Changes in Murdough Center and NIEE Staffing

Bill Lawson, former Deputy Director of the National Institute for Engineering Ethics, completed his Ph.D. degree last year, writing his dissertation on *Trust and Trustworthiness in Professional-Client Relationships*. Jimmy Smith served as his committee chair and dissertation advisor. Engineers and engineering students should find his conclusions, included in this newsletter, interesting and useful. In August 2006, Bill made a change in his employment, accepting a tenure-track position as Assistant Professor in the Department of Civil and Environmental Engineering at Texas Tech where he will be responsible for developing programs in Geotechnical education and research. He will continue as a senior research associate in NIEE to complete two on-going ethics projects: a research project funded by NSF (described on pages 8 - 10), and a Video Teleconferencing training course for TxDOT.

With Bill’s departure from a leadership role in MC/NIEE, several changes in responsibilities have been made. Patricia Harper, Unit Coordinator with seven years of increasing responsibilities in Murdough Center activities will assume the responsibility of deputy director of the Murdough Center.

We have hired a new full time employee, Richard Burgess (BS and MA in Philosophy) to take on several responsibilities in our distance learning program and to assist in continuing the NIEE program in Applied Ethics in Professional Practice (See Sample Case on page 6).

Sylvia Bermea continues to provide a cheerful face and assistance to the center and institute. Patti, Rich, Sylvia, and director Jimmy Smith will carry on the promotion of engineering ethics for the Murdough Center and NIEE.

We are seeking a Deputy Director for the National Institute for Engineering Ethics as a replacement for Dr. Lawson. If you know of anyone who may be interested and qualified, please contact Jimmy.Smith@ttu.edu.

About this Issue

This issue of TexethicS contains information devoted to engineering ethics education for colleges of engineering, engineering firms, and individual engineers. The articles herein describe several resources that are available for presenting ethics to engineering students as well as resources for Continuing Professional Competency (CPC) for licensed engineers via videos and written material.
Objective and Rationale

Principal Objective: The overall objective of the American Society of Civil Engineers initiative to combat corruption is to develop and distribute an educational video (DVD) focused on the importance of *individual integrity* among a wide range of individuals and groups.

The DVD is intended to convey the negative aspects of corruption to individuals, including engineering students and practitioners such as owners, engineers, consultants, contractors, and suppliers who are involved in the procurement and production of engineered and/or constructed projects.

Rationale: The primary reason for producing a product stressing "individual" integrity is: a number of resources are available which provide professional and ethical guidance to engineering and construction firms, societies, and other organizations. However, many, if not most, corrupt actions begin with decisions made by individuals. Thus, the objective of the entire project is to develop a product for promoting greater *individual integrity* and *moral courage* among engineers and those who work with engineers.

Funding and Recognition

A $60,000 grant from United Engineering Foundation (UEF) has been approved to initiate and partially support this project. This is a “leadership” gift to show other funding sources that there is a broad and sincere interest in this proposed project by a wide spectrum of engineering societies. The UEF will be listed in leading credits.

The ASCE Foundation has agreed to lead the effort to obtain the remaining funds. Potential funding sources are being identified from across the engineering community including corporations, the World Bank, foundations, and individuals. All individuals, associations, or firms contributing $5,000 or more to the project will be listed in the leading credits. The listing will be in order of magnitude of the contribution.

The Product

The final product will be a drama (as opposed to a documentary) on DVD portraying a variety of difficult decisions encountered by engineers, consultants, contractors and suppliers who are involved in the procurement and production of engineered and/or constructed projects. The DVD will be similar in length and quality to the *International Edition of Incident at Morales* ©2005 produced by the National Institute for Engineering Ethics (NIEE), Murdough Center for Engineering Professionalism, Texas Tech University.

The video will feature activities which tend to be early steps toward corruption. Practices highlighted will include pressures (and expectations) to provide excessive gifts and gratuities, improper political contributions or excessive entertainment for the purpose of receiving contract awards to perform engineering and construction related work. These types of activities will be among the early and important issues considered.

Proceeding into more murky activities, the video will also portray the disastrous consequences that corrupt activities such as bribery, kickbacks, extortion, blackmail, and falsification of documents have on the individual engineer, the profession, the integrity of the project, and most importantly, on humanity.

Examples of situations or activities envisioned for the video include those providing guidance to individual engineers concerning the elimination of fraud, bribery, and corruption in the engineering and construction industry by:

- not being personally involved in activities that permit the abuse of power for private gain;
- recognizing that funds intended for projects for the benefit of mankind worldwide too often go into pockets of dishonest individuals;
- understanding that corruption occurs in both the public and private sectors, in both the procurement and execution of projects, and among both employers and employees;
- realizing that corruption is not only a problem in other countries, but also exists within the United States;
- refusing to condone or ignore corruption, bribery, extortion; or payments for favors;
- urging professional engineering societies to adopt enforceable guidelines for professional and business practices; and
- enforcing anti-corruption guidelines by reporting infractions by members or non-members of the engineering profession.
The Project Team consists of a Project Director, Executive Producer, Co-Executive Producers, Technical Advisors, Manager of Finance and Administration, Assistant to the Executive Producers, and Writer-Director-Producer.

Management and Production

The Management Team
The Management Team consists of Jimmy Smith, F.ASCE, Project Director; Michael Sanio, AM.ASCE, M.ASME, Project Manager, Finance and Administration (ASCE Director of International Alliances, Reston, Virginia); and Patricia Harper, Assistant to Executive Producers (Deputy Director of the Murdough Center for Engineering Professionalism, Texas Tech University).

The Production Team

Executive Producer:
- Jimmy Smith, Ph.D., P.E., F.NSPE, F.ASCE (Professor & Director, Murdough Center for Engineering Professionalism and the National Institute for Engineering Ethics, Texas Tech Univ.)

Co-Executive Producers:
- Robert Crist, Ph.D., P.E., F.ASCE (Vice President, Black & Veatch, Life Member, ASCE; Fellow, ACI)
- Arthur Fox, P.E., F.ASCE (Editor Emeritus, Engineering News-Record, Past President, ASCE, Managing Director, Construction Industry Round Table -Retired)
- William Henry, P.E., F.ASCE (Chair, Association of Engineering Societies; Past President, ASCE)
- Steven Nichols, Ph.D., J.D., P.E., F.ASME (Professor of Mechanical Engineering and Director, Murchison Chair for Free Enterprise, UT/Austin)
- Carl Skooglund (Retired Vice President and Ethics Director, Texas Instruments, Inc.)

Technical Advisors:
- Colonel Joe D. Manous Jr., Ph.D., P.E., M.ASCE, Professor, US Army Military Academy
- Nancy Boswell, Managing Director, Transparency International
- Dr. Jose Sanjuan Medem, Past President, World Federation of Engineering Organizations (WFEO)
- Dr. Jorge Diaz Padilla, President, International Federation of Consulting Engineers (FIDIC)
- Russell LeFevre, IEEE-USA, VP, Tech Policy Activities
- Jean Michel Rendu, AIME
- Emmanuel Dada, AIChE
- Reginald I. Vachon, P.E., M.ASME, Past President, ASME
- Carlos E. Bertha, Ph.D., US Air Force Academy
- Representative from the World Bank, Inter-American Development Bank, a Company, Foundation, or other major sponsor

Contributions to the Furtherance of the Engineering Profession

The portrayal (via a dramatic movie) of the disastrous effects of corruption on humanity will contribute to the furtherance of the engineering profession by:
- encouraging greater commitment to ethical conduct and moral courage,
- strengthening global principles for professional conduct, and
- increasing the awareness and involvement of engineering educators and engineering professionals in opposing bribery, fraud and other corrupt activities in engineering and construction.

The Global Impact

This initiative will encourage U.S. partners and worldwide affiliates to join major corporations, the consulting engineering business community, the construction industry, equipment and material suppliers, major lenders, and the legal profession in the battle against worldwide corruption.

World-wide distribution of the DVD will provide a springboard to stimulate discussion and communication among those involved in engineering work who could be involved in situations containing the possibility or expectation of corrupt individual behavior.

Combating corruption has received strong support from the leadership of the following organizations:
- Pan American Academy of Engineers (API)
- International Federation of Consulting Engineers (FIDIC)
- World Federation of Engineering Organizations (WFEO)
- Union PanAmericana De Asociaciones De Ingenieros (UPADI)
- World Council of Civil Engineers (WCCE)
The mission of the Ethics Resource Center is to strengthen ethical leadership worldwide by providing leading-edge expertise and services through research, education and partnerships. According to the ERC website, the center was founded in 1922 (originally called American Viewpoint) and is the oldest non-profit organization dedicated to the promulgation and advancement of organizational ethics. The ERC pursues its mission through research, consultation services, character education initiatives in a number of school districts, and by serving as a resource center for ethics publications and organizations (providing Web links). The ERC recently put out a call for data collected by various companies regarding the company’s ethics and compliance surveys. The ERC intends to use this data to “further the ethics center’s research and benchmarking abilities”. Other efforts include the recognition of excellence in organizational ethics with the Stanley C. Pace Ethics and Leadership Award.

Online Ethics Center for Engineering & Science
Case Western Reserve University, Cleveland, Ohio
URL: http://onlineethics.org/ - Director: Caroline Whitbeck, Ph.D.

The mission of the Ethics Center is to provide engineers, scientists, and science and engineering students with resources useful for understanding and addressing ethically significant problems that arise in their work life. The Center is also intended to serve teachers of engineering and science students who want to include discussion of ethical problems closely related to technical subjects as a part of science and engineering courses, or in free-standing subjects in professional ethics or in research ethics for such students. The Online Ethics Center (OEC) was established in 1995 under a grant from the National Science Foundation. The OEC has an advisory board that represents a variety of disciplines, including engineering, neuroscience, computer science, philosophy, psychology, history, and sociology. The Center offers an abundance of resources addressing engineering practices, responsible research practices, diversity in the workplace, the responsible use of computer technology, and issues in the natural sciences. Additionally, the OEC runs an Ethics Help-Line which is intended to be an advisory resource for engineers and scientists. Sponsorship for the Help-Line comes from the OEC, The National Institute for Engineering Ethics (NIEE), and the Institute of Electrical and Electronic Engineers (IEEE). Messages (sent via e-mail) are distributed to Help-Line advisors. The Help-Line staff is composed of engineers, scientists, and ethicists familiar with the ethical issues and challenges that arise in the practice of engineering and science. The OEC also features an extensive bibliography on a wide range of topics germane to ethics. Numerous real and fictitious case studies are available for review and discussion. In late November 2006, the “Death by a Thousand Coasts: The Ethics of Climate Change” inter-research symposium will be hosted in Washington D.C. The symposium will examine the impact of global climate change with special focus placed on the development of environmental, economic, structural, and political policies intended to address this global challenge.

Sue and Harry E. Bovay, Jr. Professors in the History and Ethics of Professional Engineering
Cornell University, Ithaca, New York and Texas A&M University, College Station, Texas

Harry and Sue Bovay provided generous endowments to TAMU and Cornell University to promote the History and Ethics of Professional Engineering. The Bovay Professor at TAMU is Dr. Charles E. Harris, Jr. – Dept. of Philosophy. http://philosophy.tamu.edu/Newsletter/fall04_newsletter.html
The Bovay Professor at Cornell University is Ronald Kline Ph.D. – Dept. of Electrical and Computer Engineering http://bovay.ece.cornell.edu/

Cary M. Maguire Center for Ethics and Public Policy
Southern Methodist University, Dallas, Texas
URL: http://www.smu.edu/ethics_center/home.htm - Director: Thomas Wm. Mayo, Ph.D.

The Maguire Center seeks to recognize, honor, and model ethical behavior; provide moral reflection on the contemporary issues, and celebrate ethics that reflect SMU’s fundamental goals throughout the campus and in the Greater Dallas community. Founded in 1995, the Maguire Center was established to help ensure that SMU students were not only learning the tools and skills requisite to their chosen disciplines, but that they were also concurrently developing/enhancing their sensitivity to moral issues they will face in both their professional and personal lives. The goal is for SMU students to walk away with an enhanced ability to recognize and deal with the ethical issues that
today’s modern life presents. The Maguire Center also seeks to play a key role in the improvement of the greater Dallas-Fort Worth community through partnerships with businesses and civic organizations, the recognition of outstanding citizens, and by hosting an annual conference which features experts discussing contemporary issues. The Maguire Center also fosters ongoing scholarly development through the support of research and publication. Projects and efforts include: October 2006: Annual Conference – Domestic Spying. November 2006: Public Lecture by Professor Joe Kobylka of the SMU Political Science Department.

Center for the Study of Ethics in the Professions (CSEP) at IIT
Illinois Institute of Technology, Chicago, Illinois
URL: http://ethics.iit.edu/ - Director: Vivian Weil, Ph.D.

CSEP promotes innovative teaching. It generated professional ethics courses at IIT and assists faculty at other universities to prepare for teaching professional ethics and to develop courses and programs. CSEP assists professional societies in developing and revising codes of ethics and presenting ethics programs. It also conducts ethics workshops for businesses, trade associations, and city governments. Established in 1976, CSEP was unique in that it was the first interdisciplinary ethics center focused on professional ethics. The Center, with a grant from the National Science Foundation, developed the “Ethics Across the Curriculum” program, the aim of which is to educate instructors on how to integrate ethics into their courses. CSEP has also addressed a number of contemporary issues including: intellectual property protection, responsible conduct in science, and individual and collective responsibility in engineering. CSEP has also made available (online) a number of codes of ethics spanning a wide variety of professions. CSEP was recently awarded a three-year NSF grant to develop and offer workshops aimed at integrating ethical issues into graduate engineering curricula. The grant will also be used to develop the “Ethics In-Basket” which will be used to disseminate ethics problems to engineering faculty worldwide. CSEP has also been active in the examination of the ethics of nanotechnology.

Murdough Center for Engineering Professionalism (MCEP)
National Institute for Engineering Ethics (NIEE) - Applied Ethics in Professional Practice (AEPP)
Texas Tech University, Lubbock, Texas - Director: Jimmy H. Smith, Ph.D., P.E., F.NSPE, F.ASCE

The Murdough Center for Engineering Professionalism was established by the Texas Tech University Board of Regents in 1987. The chief goal of the center is to advance engineering professionalism and ethics. Efforts to meet this goal include regular seminars presented to engineering societies, firms, and other organizations, undergraduate ethics courses offered in classroom and correspondence formats, and Professional Development Hour (PDH) courses ranging from two to sixty hours. Success has been attained with funding from the university, contracts, grants, and private donations. See the center’s website at www.murdough.ttu.edu for complete access to its resources and programs.

The National Institute for Engineering Ethics was created by NSPE in 1988, became an independent institute, then became an official component of the Murdough Center at Texas Tech University in 2001. For details of its mission see the website www.niee.org. The National Institute for Engineering Ethics:

- Develops materials to prepare students and practicing engineers to be ethical leaders and decision makers, articulate and principled, innovative and confident, and able to think critically with sound reasoning ability
- Provides programs in engineering ethics education, research, and communications for students, faculty, staff, and engineers in industry, government and private practice, other professionals, and citizens
- Is recognized as an outstanding educational and research institute in the United States and internationally promoting the study and communication of engineering ethics;

- Is proactive in seeking ways of creating and maintaining an environment where engineers and engineering students feel safe in bringing up ethical issues without fear of retribution
- Is engaged in local, regional, state, national, and international activities promoting ethics
- Provides a recognized forum for technical/professional societies, corporations, firms and individuals to exchange educational and other information on ethics activities
- Serves as a coordinator for ethics conferences, workshops, etc
- Serves as the coordinator of joint and/or special projects in connection with education and understanding of ethical issues in which several of the participating societies and organizations determine to develop together
- Serves as a resource for educational and other materials on ethics and various databases for those societies and employers of engineers requesting such assistance
- Provides a forum for participation in international ethics issues and activities.

The Applied Ethics in Professional Practice was founded in 1997 by Ronald E. Bucknam, Ph.D., P.E. The Applied Ethics in Professional Practice program transitioned to the National Institute for Engineering Ethics from the Professional Engineering Practice Liaison Program, College of Engineering, University of Washington, in October 2002.

Information about the program and a sample case is on the following pages.
Carlos has recently finished his engineering degree and has been hired by a firm, Tencasa, which currently focuses on structural design projects but wants to expand its range of services to include hydraulics projects. Carlos has a six-month contract and, after that, the company will decide whether they keep him as an employee of the firm.

It is Carlos’ first job and he will be in charge of Tencasa’s new hydraulics division. After a month, Carlos has not yet been in the field, but this situation changes. Carlos’ boss tells him that they have found a project, but it has to be completed in less than a month. The project consists of building a storage tank and several pipelines that connect with the water supply system for the town of Llíria, near Valencia (Spain).

The project seems straightforward, but Carlos spends all weekend studying and reviewing the entire project and its calculations. Under direction from his boss, on Monday morning Carlos picks up three Ecuadorian workers and goes to the town to begin work on the project.

During the first week the work is clear-cut, and the project progresses quickly. Carlos spends a lot of time with the workers – having lunch, working side by side with them, or simply talking. In time he realizes that the three workers are illegal immigrants. One used to be a schoolteacher and the other two were musicians. He also learns that the workers do not have any type of worker’s compensation or other medical insurance. They tell him that they earn three or four times the wages they earned in Ecuador and their families depend on this money. Further, they realize they do not have any medical insurance and that construction work carries some risk to their health.

Carlos sympathizes with the workers and becomes increasingly concerned about safety on the construction site as well as the potential liability associated with a government investigation related to hiring illegal immigrants. However, Carlos balances this concern with the realization that the men need to earn money and support their families. Besides, the workers are doing a good job.

During the final week of the project, the main task is the completion of the storage tank. This tank is a concrete structure, which should be completed in five days. As the three Ecuadorian workers have no experience in working with concrete, Carlos is concerned about their ability to safely and correctly complete the project. He thinks Tencasa should increase jobsite safety measures and/or hire appropriately-qualified workers to complete the tank construction.

Carlos meets with his boss and recommends that Tencasa hire qualified workers, implement additional jobsite safety measures, and legalize the Ecuadorian workers (thereby making them eligible for worker compensation benefits). Carlos’ boss smiles upon hearing the proposals and gives Carlos an ultimatum: Carlos must finish the project with the workers he has. Furthermore, Carlos must forget the Ecuadorians’ situation because they should be grateful they have a job, and if they are not grateful, there are plenty of other workers who would happily take their place.

Carlos does not know what to do. On the one hand, he knows that an accident could happen during the tank construction and he feels it is not fair to risk the health of the workers. But on the other hand, he knows that the Ecuadorians want their jobs. In addition, if Carlos successfully completes this job on time, he can get a permanent contract with the firm.

**What should Carlos do?**

Note: The following are several observations on engineering practice in Spain as compared to the United States.

1. **One difference between engineering practice in Spain versus the United States is that in Spain, there is no limitation on engineering practice due to the engineer's age. Young engineers can design, build or supervise a project if they have been hired for that.** Hence, in very big
companies which carry out large projects, it is normal to find a senior engineer with several young assistants who carry out the whole project, while in small companies with small projects, young engineers are in charge either to design or to build the construction.

2. In contrast, engineering licensure laws in the United States would not allow a young engineer so much freedom. Rather, a young engineer in the United States (identified as an "engineer intern" or "engineer-in-training") would be required to perform all engineering work under the direct supervision of a more experienced, licensed engineer. With respect to professional responsibility, the engineer who supervises the work would be legally responsible for the work; such a heavy responsibility would not be given to a recent engineering graduate. These types of internships typically persist for a minimum of four years, and only after obtaining the professional engineer's license would an individual be allowed to do projects on his/her own.

3. Another difference between Spanish and United States engineering practice is that in Spain there are three partners in an engineering project: the designer, the builder and the supervisor, and all of them should be engineers. The designer designs the project, the builder constructs it, and the supervisor ensures that the builder does everything as it has been specified. The builder and the supervisor must be different entities (persons), but the designer can serve dual roles; that is, be both designer/builder or designer/supervisor. In fact, the designer is frequently the supervisor of his/her project.

This is not typical for public works projects in the United States. Because of the highly developed division of labor, it would be unusual for an engineer to both design and construct a project. These are separate job functions, and usually the engineer would only do the design. Other persons; that is, building contractors, would do the construction and these persons would not necessarily be engineers. And in many cases, a different engineer might perform a quality control function on behalf of the project owner during the construction process, but even this role does not strictly parallel the supervisor function found in Spanish engineering practice.

Alternate Approaches

1. Go on with the work. The chances of having an accident are very low, and the Ecuadorians agree with completing the job. Accepting the risk is their decision, even if the Ecuadorians have to work 24 hours each day in order to complete the project on schedule.

2. Tell the authorities. Although the Ecuadorian workers want their jobs, it is not fair to exploit employees by having them work at their own risk without medical insurance. Carlos should tell the authorities and report what is happening to others within his firm.

3. Withdraw from the position. It is wrong to allow further exploitation of the Ecuadorian workers! Carlos should resign his position and go to the media to openly denunciate this kind of abuse.

4. Withdraw, but without denunciation. Carlos does not want to contribute to worker exploitation, but he realizes that the Ecuadorian workers are the most vulnerable. Carlos should resign his position as a matter of personal protest but say nothing to anyone outside the company, allowing the Ecuadorians to continue work and send money to their families.

5. Discuss with engineer friends. Carlos should tell his colleagues about the situation and solicit their recommendations about what to do. With this information, Carlos will better know what to do in the future, even if the advice does not remedy the current situation completely.

6. Implement additional safety measures. Carlos and the Ecuadorian workers agree to complete the construction work. But in order to increase jobsite safety, Carlos should require the Ecuadorians to take an intensive training course over the weekend (he and some friends will teach the course) that will show them how to more safely do the work.

7. Personally complete the most dangerous tasks. It is Carlos' first construction project and he does not want anyone to be injured. So, Carlos should personally complete the most difficult tasks himself during the next few days. This will stretch Carlos' responsibilities, but the tradeoff is justified.

8. There is no dilemma. Where is the moral dilemma? All agree with carrying on with the construction. The Ecuadorian workers know what they are doing and have assumed the risks in order to have high-paying work.

9. Look to the future. If Carlos finishes the project on schedule, he can use his influence and success to persuade Tencasa to obtain papers for the (now experienced) Ecuadorian workers. This project is nothing less than an opportunity to regularize the Ecuadorians' work situation.

10. Take matters in his own hands. Carlos knows that it is both illegal and unfair to have workers without papers, and he cannot continue to allow this. At the peril of losing his job, Carlos should by-pass his boss and start the paperwork to legalize the Ecuadorians' situation.
In the context of professional services procurement using qualifications-based selection procedures, this study argues that client trust is a function of disposition, encapsulated interest, assessment of trustworthiness, and institutional safeguards against opportunism. These beliefs lead to and form the basis of a trusting attitude, and a trusting attitude is positively related to assessment of trustworthiness, and institutional safeguards against opportunism influence trusting attitudes. While dispositional trust influences whether the client trusts the consultant. The most important thing a consultant can do to gain the trust of its clients is to be perceived as trustworthy.

As regards dispositional trust, the psychological aspects of persons which predispose them toward trusting operate in the realm of both beliefs and attitudes. While dispositional trust does contribute to a trusting attitude, due to the indirect manner in which this disposition manifests itself, the overall influence is limited.

Institutional restraints against opportunism influence trusting attitudes indirectly, by way of influencing client beliefs about the trustworthiness of the firm and the firm’s representative. Thus, they are more appropriately viewed as the “promoters of trustworthiness” than restraints, since their main function is to define, encourage and confirm trustworthiness of consultants on behalf of clients. However, when restraints against opportunism are employed directly as restraints, this indicates distrust rather than trust.

Encapsulated interest represents the simultaneous operation of both trust and distrust in professional-client relationships. The direct effect is negative, both toward trust of the firm and toward the firm’s representative, and indicates distrust rather than trust. The indirect effect on trusting – by promoting the trustworthiness of the consultant – is both highly potent and positive. Rather than representing some average expectation, encapsulated interest is suggestive of a rich understanding of human nature that acknowledges mixed and multiple motive conditions by which clients manage the complexities of market interactions.

- As predicted, this study found that trusting attitudes strongly and directly influence satisfaction. In fact, trust of the firm is the most important factor influencing client satisfaction. Further, clients appear to view satisfaction at the organizational level, that is, as being associated with the firm more than with the firm’s representative. The influence of firm trust on satisfaction is almost four times stronger than the influence of firm representative trust on satisfaction.

- Trusting attitudes influence client loyalty. However, the influence of trusting attitudes on loyalty is mostly indirect, by way of satisfaction, rather than mostly direct, as hypothesized.

- Do trusting attitudes directly influence whether a client purchases services from a consultant? In a word, this research finds the answer is “no.” Among all the variables selected for this study – trust of the firm, trust of the firm’s representative, relative fee/cost, timeliness, and service quality – the only significant predictor of procurement choice was service quality.

- Trust influences procurement choice indirectly, however. Within the context of competitive professional services procurement decisions using qualifications-based selection procedures, trust appears to operate as an “order qualifier” and not as an “order winner”. As an order qualifier, trust is one of the criteria necessary just to be considered for a project. However, after identifying a pool of trusted consultants, municipal clients base their procurement choice on factors other than trust.
This study reveals that gaining a client’s trust has little to do with happenstance. The theories of trust associated with this study – trust as assessment of trustworthiness, dispositional trust, restraints against opportunism, and encapsulated interest – explain over 90 percent of the variance associated with trusting attitudes. This means that trusting relationships are not a matter of being lucky and finding ‘that special client’ who happens to be trusting. Rather, a trusting attitude – which is the key to realizing behavioral manifestations of trust – is directly and strongly governed by the client’s beliefs, especially relative to the trustworthiness of the consultant. Client perceptions of trustworthiness serve as the gatekeeper toward trusting attitudes, and trust relationships are at their strongest when this gate is opened wide. By creating, sustaining and growing trustworthiness – which lies squarely within the purview of the consultant community – it is consultants, not clients, who control this aspect of their own destiny.

**Practical Implications, Application and Guidance:**

The findings of this study have several implications for the consultant community. The following items illustrate practical ways the research findings can be applied.

- **Clients trust both the consulting firms (the organization) and the firm’s key representative (the person).** This illustrates the importance of consultants being represented by trustworthy agents. Consulting firms doubly benefit from the competence, character, and service orientation of their employees, and those consultants who wish to be trusted in the marketplace do well to identify trustworthy persons and place them in positions of key client contact.

- **This research also offers some insight as to the type of impact that the departure of a key employee has on a consulting firm’s business.** The influence of the trust relationship relative to client loyalty is very high, and over half of this influence derives from the direct effect of the key employee-client relationship. The conclusion is that when a key employee leaves a company, he or she could take substantial business with them.

- **It has been noted that the most important thing a consultant can do to gain the trust of its clients is to be perceived as trustworthy. How does one do this?** The mainstay aspects of trustworthiness as defined for this study include competence, benevolence, and moral integrity. However, this study indicates that trustworthiness also includes client orientation – a sensitivity to the client’s desire for excellence in service delivery – as well as the chemistry of the relationship between the client and consultant. Consultants who pay attention to all of these factors – both at the organizational and the individual levels – are those who enjoy the trust of their clients.

- **Trust is about the consultant, not the client.** For consultants, this means that they can enjoy the trust of their clients — provided they are worthy of trust. Trust need not be viewed as being controlled by the whim of the marketplace or the perpetual decay of social mores. Rather, by focusing on trustworthiness – which is squarely within the purview of the consultant to establish, nurture, and maintain – consultants, not clients, control this aspect of the consultant’s destiny.

- **Consultants also influence certain kinds of institutional restraints against opportunism.** Some consultants diligently work to educate prospective clients about their quality assurance programs. Other consultants prominently identify trust-related concepts – such as integrity or ethics – as part of their corporate culture and value system. Such efforts communicate to clients that institutional restraints are in place within the firm to help facilitate trustworthiness, and favorable beliefs about these restraints is related to higher trusting.

- **Many professional and technical societies prominently identify ethics initiatives as part of their mission.** This research clarifies that, with respect to application, the domain of influence for these types of initiatives lies firmly in the realm of promoting trustworthiness in the design professional community. Apart from their educational function, professional and technical societies can and should promote trustworthiness as a professional ideal, and encourage engineers and architects to be trustworthy.

- **Many – perhaps most – design professional consultants explicitly name client satisfaction as one of their core values.** These same firms promote client satisfaction as the direct focus and objective of their business development plans and marketing programs. This study informs these efforts by clarifying that trust is the dominant contributor to satisfaction in client-consultant relationships: “You show me a satisfied client, and I’ll show you a client who trusts their service provider.” This suggests that the best way to operationalize client satisfaction goals within a consulting firm’s marketing program is to focus on those activities which create trust. These activities center around creating, nurturing, and growing trustworthiness.

- **It is widely acknowledged that trust is important – for society, for organizations, for persons.** What has been lacking and what this study contributes is insight as to the different components of trust and how these reflect relationship characteristics in with the person who desires to be trusted has definite responsibilities for being trustworthy. This study reveals three bottom line outcomes of trusting for the consultant community.

- **First, trust is a project qualifier, not a project winner.** Second, trust drives client satisfaction. Third, satisfaction and trust drive loyalty. Consultants who enjoy repeat business get this business from satisfied clients. Satisfied clients trust their consultants, and trusted consultants are trustworthy. Trustworthiness is the first virtue of professional life.

**Limitations:**

Three primary limitations of this study should be noted.

First, the design was cross-sectional (a “snapshot,” not a longitudinal picture), making it difficult to draw causal inferences regarding the time order of the relationships among the variables that were analyzed.

Second, this study relied on self-report measures. Such measures are consistent with the focal constructs of the study, in that trusting beliefs, attitudes, and outcomes are inherently subjective constructs, and the survey respondents (those who procure professional services) were probably the most accurate source for this information.
Third, due to the specific characteristics of the respondent population, the findings of this study will not generalize to all engineering and architecture groups, nor to all client sectors. While those engineers and architects employed in industry and who work under the professional licensure exemption also stand to benefit from this research, the applications and implications are specifically directed toward the consultant community.

Further, the client group chosen for this study – Texas municipalities – operates under professional services procurement constraints which do not exist for most clients. The public-domain, qualifications-based selection, design-bid-build, long-term, owner’s perspective reflected in the survey results will not generalize to all architect/engineer client groups.

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**New NSF Grant: Ethics Instruction for International Graduate Students in Engineering**

The proposed study, headed by Dr. William D. Lawson, is a combined *education and research project* aimed at improving ethics education for *international graduate students in engineering*.

Our major argument is that an educational intervention consisting of a series of online ethics learning modules will help international graduate students overcome the acculturation barriers to inculcating normative ethical obligations associated with engineering practice in the United States. Our multidisciplinary team of researchers from Texas Tech University, Baylor University, and the University of Texas at Austin proposes to create and implement web-delivered ethics instructional materials to heighten international student awareness and mastery of normative values and standards in the field of engineering.

Forty percent of international engineering students remain in the United States and are employed in some facet of engineering research and practice. These students face acculturation challenges that domestic students do not encounter, making them a natural audience for an educational intervention. While our instructional materials will assist all engineering graduate students in acclimating to engineering ethics standards and expectations, we propose to design educational materials sensitive to the needs of the international graduate student. A robust three year research design will enable the team to refine the instructional materials to allow students to achieve ethics mastery upon completion of the modules. The technology-based delivery allows students to complete the training at their own pace and in an environment of their choosing.

**Intellectual Merit:**

Our proposed project has assembled experts in engineering ethics, assessment, instructional technology, graduate engineering education, international student education, and acculturation. Our research design incorporates assessment of individual ethics competency after completion of the educational modules, compared to performance prior to instruction. As a result, we will be able to more clearly isolate variance in performance associated with the educational intervention, in order to determine the predictive validity of our instruction. We propose to link specific pedagogical and instructional design techniques to learning objectives measured by a cluster of questions on the assessment instruments. In this manner, we will be able to test the efficacy of specific aspects of the educational modules and vary our technique and design according to the performance data. Once the modules have been validated and tested, they will constitute a self-contained means of assisting international engineering students in understanding and mastering normative values relevant to all engineering disciplines.

**Broader Impacts:**

Perhaps the largest and most direct impact of the proposed study will be on the private sector as we better train international graduate students, many of whom remain in the United States, to handle, practice, teach, and apply ethical standards in their various engineering capacities. Given that most higher education institutions have a unit designated to process and assess international graduate students, our program design is one that can easily integrate into existing institutional procedures and processes.

While the fundamental goal is to help international graduate students acculturate to normative standards associated with United States engineering practice, the project engenders far broader benefits. International graduate students who elect to remain in academe will be better prepared to instruct undergraduate students on ethical matters; and those who practice abroad will be more sensitive to standard requirements in the United States.

With the trend towards the globalization of engineering and science, we will be contributing to a clear articulation of ethical standards and expectations. In addition, by heightening the ethical acumen of international (future) faculty, the proposed study will raise the awareness and sensitivity to ethical issues and obligations in undergraduate engineering education, thus promoting ethics across the curriculum. Finally, many of the ethics principles and learning objectives for engineering overlap with the broader science disciplines, and as such, the proposed study would both reinforce and extend ethics training and education for the sciences.

In sum, the motivating need for international graduate student acculturation is common to all disciplines, and the proposed project is designed to serve as an educational model for ethics instruction where content is tailored to the specific needs of any particular engineering or science program.
Continuing Professional Competency (CPC) in engineering ethics is now required for renewal of Texas engineering licenses. CPC opportunities are available in several formats from the Murdough Center and NIEE. Programs currently available include:

- **Organized Study**: Professional Development Hours (PDH-2, PDH-3, and PDH-5 – indicating hours of credit) based on your analysis of ethics videos
- **Self study**: a 368-page ethics reference book (See information below).


### Products and Services of the Murdough Center and NIEE

#### Ethics Videos

**Gilbane Gold ©1989**
A Z CORP environmental engineer knows of an updated test which shows that their toxic waste discharge may meet the letter of city regulations, but exceeds the spirit of the regulations. Protection of the health, safety, and welfare of the public is a major concern.

**Incident at Morales © 2003 and the International Edition of Incident at Morales ©2005**: Involves a variety of ethical issues faced by a company that wants to quickly build a plant in order to develop a new chemical product to gain a competitive edge over the competition.

#### Reference Book

A National Institute for Engineering Ethics publication containing basic concepts of ethics, a variety of viewpoints expressed by experienced engineers, philosophers, and others, numerous case studies and several professional codes of ethics.

#### Engineering Ethics Courses by Correspondence (Web-Assisted)

Courses for Continuing Professional Competency (see article above): 2-PDH; 3-PDH; 5-PDH
Courses for Professional Development Hours: PDH-20; PDH-40; PDH-60
Course for Academic Credit Hours: ENGR 4392 (3 Academic Credit Hours)

#### Presentations, Workshops & Seminars

Over 400 workshops, seminars and other presentations on professional and engineering ethics have been provided for engineering societies, engineering firms, state agencies, colleges and universities. Length ranges from 30 minutes to two days. For additional information and fee structure go to Products & Services at [www.niee.org](http://www.niee.org).

### Using Incident at Morales as an Educational Tool

The Fall 2005 issue of TexethicS contained detailed information about *Incident at Morales*, Produced by NIEE. Funding to create this educational video was provided by a major grant from the US National Science Foundation (NSF SES-0138309) and donations from engineering societies, firms and individuals. A free copy of the US Edition has been distributed to all 340 engineering colleges with ABET accredited programs. A free copy of the International Edition has been sent to over 250 colleges of engineering outside the United States. The goal is to provide a free copy to every engineering college in the world. If you know of an international engineering college that does not have a copy, email the name and address of the dean of engineering to [engineering.ethics@ttu.edu](mailto:engineering.ethics@ttu.edu).

(The US Edition is subtitled in Spanish and the International Edition is subtitled in 13 languages)

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National Institute for Engineering Ethics  
Texas Engineering Foundation – Purpose and Officers

The Texas Engineering Foundation (TEF), a co-sponsor of this newsletter, was established by the Texas Society of Professional Engineers as a nonprofit charitable foundation to support the goals and ideals of professional engineers in the State of Texas. The general purpose of the Texas Engineering Foundation (TEF) as indicated by its Mission statement is:

"to enhance the practice of engineering through supporting high quality formal engineering education and continuing professional development, encouraging the development and maintenance of the high standards of conduct expected of members of a learned profession, and providing scholarship assistance to outstanding engineering students."

Every member in good standing of the Texas Society of Professional Engineers is automatically a member of the Foundation.

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