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## **AC 2012-3511: ADDRESSING THE PUBLIC UNDERSTANDING OF ENGINEERING: A CASE STUDY**

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## **Addressing the Public Understanding of Engineering: A Case Study**

In 2008, the National Academy of Engineering (NAE)<sup>1</sup> asserted that, “despite the impact of engineering in our daily lives, most Americans do not understand what engineers do and are largely unaware of the opportunities available through an engineering education.” As a result, the NAE has instituted an initiative, called Changing the Conversation, to assist in addressing the obvious media blind spot, as well as the relative ignorance of the general public, to the importance of engineering in solving the problems confronting society. This effort is also designed to address the shortage of K-12 students who prepare themselves to study engineering in colleges and universities.

The NAE cites three important reasons for improving the public understanding of engineering: (1) Sustaining the U.S. capacity for technological innovation; (2) attracting young people to careers in engineering; and (3) improving technological literacy.

While the NAE was engaged in the development of its project, the author, in 2005, was the dean of the J. B. Speed School of Engineering at the University of Louisville (UofL). He was completely unaware of the NAE project, but was concerned about this problem. His concern was prompted by members of the public regularly commenting to him that his engineering school was “great,” to which he would reply, “Thanks! Why do you think that our school is great?” From their responses, it became apparent that the reasons for these opinions were usually grounded in the difficulty of gaining admission to the school, the rigor of the engineering curricula offered, and to the success, or non-success, of the respondent, a relative, or acquaintances in graduating from the school. No respondents cited the importance of engineers in society nor referenced what engineers actually do.

The Speed School is 87 years old, has 105 faculty and 130 staff members, and an enrollment of 2100 students (1425 undergraduate and 675 graduate students). It offers baccalaureate, master of engineering, master of science and Ph.D. degrees in seven disciplines. Its baccalaureate programs require mandatory cooperative internships, and the Engineering Accreditation Commission of ABET accredits its baccalaureate and master of engineering programs in all seven disciplines.

In January 2006, using funds from an endowment, the author commissioned a public relations firm, Creative Alliance, Inc., to develop a campaign to educate the public, citizens whose tax dollars support the school, about the importance of engineers in solving problems and developing products, systems and services used by the public every day, but who are, for the most part, taken for granted.

It must be noted that the author secured permission from the director of the Office of Communications and Marketing (OCM) of the university before entering into a contract with the PR firm to develop the program. The director agreed, subject to two provisos: (1) Any PR campaign developed as a result of this initiative must not compete with the university’s PR programs, and (2) OCM must be kept informed of the nature of the

campaign and plans during program development. OCM did not demand the right to approve the media nor creative content used in the campaign.

In the process of developing the program, the PR firm strongly recommended that a scientifically designed survey of the public be conducted in Metro Louisville to determine the depth of commonly held knowledge about the school and its reputation, and, more importantly, the depth of understanding of engineering in general as well as what engineers do. The results of this survey would then be used to drive the development of the publicity campaign. This survey was designed, administered and analyzed by IQS Research, Inc.

Through several interactive sessions among the PR firm, the survey research firm and a school committee (consisting of the dean, associate deans and staff members), it was posited that Speed School has a “positive” reputation in the community. However, when the source or reasons for those positive perceptions were explored, there appeared to be little depth of support. Essentially, a citizen in the community could articulate that Speed School is “a great school” but could not articulate *why*.

As a result, a challenge developed whereby the effort of Speed School to capitalize upon its positive reputation was constrained because the discrete attributes that created the positive reputation could neither be identified nor isolated. Therefore, the challenge of the survey project became the identification of the specific attributes that contribute to the positive reputation of Speed School.

To accomplish the objectives of this program, it was necessary to collect data that would be used to test specific assumptions and interrogate the given topic. For this survey project, two different data collection routes were employed. The two unique target audiences were:

1. The general public – This group was defined as residents of Metro Louisville, Kentucky with a home telephone, on or off of the Do Not Call list, not working for a post secondary educational institution, and over 26 years of age.
2. The Business Community – This group was essentially comprised of two distinct groups of business people:
  - a. Business owners and contacts within the Metro Louisville area, these names were acquired from the list of members of Greater Louisville, Inc., the Chamber of Commerce for the metro area.
  - b. Contacts of businesses that employ Speed School graduates and/or co-op students.

To gather information from the two target groups, two methodologies were utilized. The first methodology was a telephone interview process of the general public that called individuals from a list that was randomly sorted within each residential zip code in the target area. The business community was invited to participate in an on-line study through an e-mail invitation. The screening criteria for the business community were the same as for the general public.

For the telephone interviews, a household was considered to be a single unit, even if there was more than one adult willing to take the survey in that household. For the business survey, each e-mail address was considered to be a single unit. However, for the business survey, no business is represented with more than two responses.

All interviews were conducted in English and all telephone interviews were conducted during the hours of 9:00 AM and 9:00 PM. Most telephone interviews were conducted during weekdays; however, some weekend interviews also took place. The telephone interviews were gathered from March 07 through April 18, 2007. It should be noted that telephone calls were suspended for a period of two weeks during the beginning of March to allow for the remission of the influence of March Madness – the NCAA College Basketball playoffs. For the business community, the data was gathered from April 2 through April 26, 2007.

In summarizing the overall results, it was found that 73% of the general public and 98% of the business community were aware of Speed School, and when asked where the school is located, 65% of the general public and 86% of the business community correctly identified the location. However, when asked questions regarding awareness of the educational programs offered by Speed School, only 36% of the general public could identify engineering programs compared to 74% of the business community.

When asked how important Speed School is to the community, it was found that 82% of the general public and 86% of the business community indicated a 4 or 5 on a 5-point scale, with 5 being extremely important.

When the data were viewed at a high level, it was clear to the survey analysts that the Speed School reputation was an “empty vessel”. That is, most everything that the general public knows about Speed School is that the reputation is positive. They do not understand the programs that are offered; they do not even know what programs are offered.

This lack of knowledge further manifests in a lack of understanding of the contributions made by Speed School and a lack of understanding of how Speed School impacts Metro Louisville and its citizens.

The business community is significantly more informed about the specific programs and contributions of Speed School than their general public counterparts, and in the business community, the reputation of the school continues to shine.

However, people do know that to be accepted into Speed School one must be intelligent. They also believe that Speed School has set the hallmark of educational standards in the region.

Based on the belief that Speed School students are intelligent and further fueled by a general lack of understanding of what the school actually does, it made sense that its

reputation is so positive. There is not enough knowledge extant to foster a negative opinion and all of those intelligent people can't be wrong!

The PR firm was very excited by the survey results. They commented that no “branding” effort was needed because the survey showed that the public was very much aware of the school and had very favorable impressions of its quality. Thus, attention could be focused on developing a campaign that educates the public on the importance of engineers and engineering in everyday life, and to more strongly associate the Speed School with engineering in the consciousness of the public.

Interestingly, in their concurrent project, the NAE committee selected the communications firm Bemporad Baranowski Marketing Group to oversee message development, in partnership with Global Strategy Group (GSG), a market research company. GSG and Harris Interactive, another market-research firm, were selected to test a number of messages designed to encourage coordinated, consistent, effective communication by the engineering community to a variety of audiences, including school children, their parents, teachers, and counselors, about the role, importance, and career potential of engineering.<sup>1</sup>

Through the use of focus groups and surveys, the NAE study committee proposed five different messages:

1. Engineers make a world of difference
2. Engineers are creative problem-solvers
3. Engineers help shape the future
4. Engineering is essential to our health, happiness, and safety
5. Engineers connect science to the real world

In addition to the proposed messages, seven “taglines” were recommended as creative prototypes for use in media such as posters, TV ads, or web pages in order to focus public attention on the importance of engineering to society:

1. Turning ideas into reality
2. Because dreams need doing
3. Designed to work wonders
4. Life takes engineering
5. The power to do
6. Bolder by design
7. Behind the next big thing

The number one recommendation<sup>1</sup> from the NAE study was that, “the engineering community should engage in coordinated, consistent, effective communication to ‘reposition’ engineering” by using the messages and taglines above to emphasize that “engineering and engineers can make a difference in the world, rather than describing engineering in terms of required skills and personal benefits.” Specifically, the NAE studies found that all too often, PR and marketing efforts for engineering education

focused on the difficulty of curricula, especially the mathematical rigor embodied therein. This overemphasis of educational rigor discourages some talented students from even considering application to engineering schools. On the other hand, some marketing efforts emphasized the relatively high salaries paid to engineering graduates compared to those of other academic disciplines. Accordingly, NAE recommended that marketing efforts focus on the exciting work that engineers do and their importance to the fabric of society.

The forms of media chosen for the initial thrust of the Speed School campaign were radio, print media, the internet and outdoor advertising (billboards). Armed with the survey results, and after several meetings, the talented creative personnel at Creative Alliance went to work to develop a theme and content for ads designed to move engineers and engineering to the forefront of public consciousness.

The result of this creative process was the “*Without engineers . . .*” campaign. The idea behind this campaign was to show the public that without engineers, most of the products, systems, services or infrastructure that are in common, everyday use would not exist. Further, it was decided that this message would be conveyed in terse, humorous, but thought-provoking messages. Each message begins with “*Without engineers . . .*” and finishes with an appropriate punch line.

It became obvious after the first year of the campaign that outdoor advertising was the most effective, cost efficient media to use, so all resources were devoted to billboard rental and creative content development. The format of every billboard is identical, i.e., two-thirds has a black background with the “*Without engineers . . .*” message written in large, white boxcar-sized letters so that a motorist travelling at high speed on an interstate highway can easily read it. The remaining one-third of every billboard has the school logo superimposed on a white background.

The idea for standardization of the look and layout of the billboards was borrowed from the famous Burma-Shave sign campaign. At their height of popularity in the 1950s, there were 7,000 Burma-Shave signs stretching across America. The familiar white on red signs, grouped by fours, fives and sixes, were a treat to motorists who would read the first one, then another, anticipating the punch line on number five, followed by the familiar Burma-Shave on the sixth.

It was hoped that by using the standardized color scheme and layout, when motorists saw Speed School signs in the distance, they would know it is a Speed School sign and take the time to read it, have a laugh, then think more deeply about the importance of engineers and engineering in their lives. Following are eight example billboards developed and used in the PR campaign.

**Without engineers,  
bluetooth would be a gum disease.**

UNIVERSITY OF  
**LOUISVILLE**  
J.B. SPEED SCHOOL  
OF ENGINEERING 

**Without engineers,  
your laptop would be a place  
for kids to sit.**

UNIVERSITY OF  
**LOUISVILLE**  
J.B. SPEED SCHOOL  
OF ENGINEERING 

**Without engineers,  
the Mustang that passes you  
would have four legs.**

UNIVERSITY OF  
**LOUISVILLE**  
J.B. SPEED SCHOOL  
OF ENGINEERING 

**Without engineers, an air bag  
would be a chatty passenger.**



**Without engineers,  
you'd be walking right now.  
Barefoot.**



**Without engineers,  
there'd be no air conditioning.  
Just air.**





**Without engineers,  
there'd be no satellite radio.  
Or satellites. Or radios.**



**Without engineers,  
there'd be no Facebook.  
Just faces.**



Although there was a change of PR firms from Creative Alliance, Inc., to Red7e, Inc., in 2010, the campaign has been in effect for over four years and has demonstrated some success in gaining the attention of the public to these key issues. The billboards have been posted along major interstate highways in Metro Louisville, as well as in several strategic cities and towns throughout the state of Kentucky.

Assessments of the effectiveness of the campaign are anecdotal at this time. For example, the author is frequently complimented on the billboards, and many people offer recommendations for messages that should appear on future billboards. Some people in rural parts of the state have contacted the school to ask why a neighboring town has a Speed School billboard while their town does not have one. A local television station has interviewed the author about the PR campaign and its objectives.

Now that the campaign has been well established, IQS Research has been retained to re-survey the general public with the objective of quantitatively assessing its effectiveness, and this study will be conducted in March and April of 2012. The results of this survey will be used to decide whether to continue the campaign unaltered, to make alterations to the program, or to completely change its thrust and/or media used. Perhaps the result will

be to explicitly incorporate the NAE messages and taglines into the Speed School campaign in the future.

It should be obvious that the objective of the Speed School campaign was not student recruitment. In fact, student enrollment in the school is currently at capacity. Rather, the objective of this campaign was to educate the public regarding the importance of engineers and engineering to society. It was hypothesized at the outset that if this objective is achieved, decision makers like parents, grand parents, and other relatives may encourage K-12 students to prepare for entry into an engineering school.

In fact, the students themselves may see the ads and decide to explore careers in engineering. However, Speed School also has an intense K-12 outreach effort conducted in the public and parochial school systems in Metro Louisville, Kentucky. The PR campaign is viewed as a complement to that effort.

Due to the parallel development of the projects, the Speed School PR campaign does not incorporate the messages or taglines recommended by NAE. However, it aligns well with the philosophy of the NAE study in that it does not emphasize the math and science competency required of engineers, how difficult it is to earn an engineering degree, or the financial rewards of a career in engineering. Rather, the Speed School campaign emphasizes that engineers and engineering make differences in the world, i.e., what engineers do is vital to the functions of every day life. Once the public understands the scope of contributions engineers make, then it should not be too big a leap to show them the critical role of engineers in solving the grand challenges of the future.

## Reference

1. Changing the Conversation: Messages for Improving Public Understanding of Engineering: Messages for Improving Public Understanding of Engineering, Committee on Public Understanding of Engineering Messages, National Academy of Engineering (ISBN: 978-0-309-11934-4), 2008