

A New Paradigm for Diversity In Engineering

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Introduction

Many universities are making efforts to become increasingly diverse, and with this increasing diversity there comes the need to manage such diversity effectively to maximize the potential of faculty, staff, and students, alike.¹ Challenges that women and minorities face in academia often relate to their sense of isolation, the lack of collegiality, and covert sexism and racism on university campuses.² One approach to diversity management is to create programs, such as Purdue's highly recognized Minority Engineering Program and Women in Engineering Program, that are designed to support, as well as to improve the recruitment, retention, and graduation, of underrepresented populations.

Although Purdue has been a leader among engineering schools nationwide for these programs, few of the faculty (who are predominantly white and male) have been involved. However, leadership from the faculty is critical:

- 1) To be a significant force in enlarging the pre-college pool of interested and qualified minority and female students entering engineering;
- 2) To substantially increase the numbers of both graduate and undergraduate students enrolling and graduating from Purdue engineering;
- 3) To substantially increase the number of women and minority engineering faculty; and,
- 4) To significantly improve the climate in order to provide the best education and environment to students, faculty and staff.

Moreover, there is a need to provide faculty and staff with experiences that will help them become more aware of diversity issues and the experiences of minorities and women on predominantly white campuses. Therefore, Purdue University Schools of Engineering, with encouragement and support from DuPont, began offering Diversity Forums for engineering faculty and staff in January 1998. The overarching objective of the forums is to positively change the climate at Purdue by creating a retreat-like environment that encourages participants to examine their stereotypes and prejudices, educate themselves about different groups, and learn about the experiences of underrepresented students, staff, and faculty at Purdue (i.e., to build their diversity competency). There are two forums offered in the series: one focused on multicultural issues, one focused on gender issues. Each session accommodates a maximum of 40 individuals and is run by a team of three external consultants who specialize in facilitating diversity programming. The meetings are held off-campus, with each group of participants selected so that there is an adequate representation of gender and ethnicity and with an emphasis on adequate participation of

engineering faculty and alumni. Faculty members are a critical component because they are the epicenter of the educational process, and change agents in an educational organization. Administrative staff are critical because of the important role they play in running programs that impact student and faculty. Recent graduates are also critical to the success of the forums because their insights help to identify how the climate affected them as minority/women engineering students, and how the climate can be improved.

To date, nearly 347 individuals have participated in multicultural- and gender-focused forums. Of these attendees, 153 were Purdue engineering faculty members representing all of the 13 engineering schools, departments, and divisions and including most engineering deans and heads. The remainder was 96 engineering alumni (and a few current students), 83 staff members and 15 guests from outside Purdue.

Little is known, however, about the actual benefits of these forums for faculty and staff. In fact, a hallmark of many “successful” diversity forums is that they are either missing an assessment piece or the assessment piece is limited to participants’ ratings of quality directly after attending (i.e., a reactionary measure).³ In this paper, we more systematically assess the long-term impact of the multicultural forum on the attitude of participants according to the tri-component “ABC” model of attitude theory.

The ABCs of Assessment

An advantageous approach for understanding how an individual will behave with respect to an issue (i.e., diversity) is to consider the three ABC components of their attitude:^{4,5}

- 1) The Affective (A) Component that includes positive and negative reactions and feelings (i.e., the diversity forum elicited strong positive feelings about diversity and fellow participants in the forum);
- 2) The Behavioral (B) Component that includes an intention to act as well as actual behaviors (i.e., the diversity forum led to the desire to participate in, as well as actually increased participation in, diversity related activities); and,
- 3) The Cognitive (C) Component that includes thoughts, knowledge, and beliefs (i.e., the diversity forum led to positive thoughts and beliefs about diversity and ethnic group members).

Also advantageous is to assess participants’ perceptions of the impact of attending the multicultural diversity forum over time. Thus, survey questions were designed to understand participants’ perceptions of their “before the forum” versus “after the forum” diversity-related affect, behaviors, and cognitions. For some participants, “before the forum” was as much as 5 years ago, whereas for other participants it was less than 1 year ago.

In addition, the forum was particularly designed to help whites and males (the majority of the faculty being both) and high level administrators (i.e., deans, heads of departments) recognize not

only their role in affecting the climate, but also their role as powerful diversity agents that are needed to help make the university climate more equitable and inclusive. Ipsaro makes the point that to discount, attack, exclude and/or attempt to undermine the numerical majority only impedes the process of changing the climate of the workplace.⁶ Thus, it was important that we motivate and empower white and male participants to become diversity agents. In this paper, the results that are described reflect the predominance of white (N = 95 out of the 134 surveys) and male (N = 80) participants that attended the forum.

Survey Administered

The survey instrument used to assess the **multicultural forum** was developed to assess forum effectiveness and forum ABC outcomes. If one ensures 1) a high quality experience (i.e., participants rate the forum high in quality and would recommend the forum) and 2) an appropriate atmosphere (i.e., participants feel safe and comfortable), then the forum experience has been positive, and desired forum outcomes should be obtained (i.e., positive affect, behaviors, and cognitions related to diversity).

The survey had six general sections. First, we assessed the quality of the forum (i.e., Quality of the content; Quality of the consultants; Quality of the facilities; Overall quality of the forum) on a 1 (Awful) to 7 (Excellent) scale. Second, we assessed the atmosphere of the forum (i.e., I felt safe participating in the forum; I was uncomfortable voicing my opinion) on a 1 (Not at All) to 7 (Very Much So) scale. Third, we asked participants to circle whether they would recommend the forum for various populations (i.e., Would you recommend the forum for... Engineering staff? (yes, no, maybe); Engineering faculty? (yes, no, maybe)). We also asked whether they had already recommended the forum to someone. Fourth, we assessed the impact of the forum on participant's attitude. This entailed asking participants to rate on a 0 (None) to 7 (A Lot Of) scale their "Before the Forum" and then "After the Forum" response to questions reflecting their 1) Affective response to the forum (i.e., My feelings of... Personal responsibility for changing your work climate), 2) Behavioral response to the forum (i.e., My level of involvement with... Research or other collaborative projects with a person of color), and 3) Cognitive response to the forum (i.e., My understanding/awareness of ... How stereotypes and prejudice negatively impact students of color). Fifth, participants were given the opportunity to answer a series of open-ended questions about the forum (i.e., what they liked about the forum; didn't like about the forum; would improve upon, or any other venue they would like to see). Sixth, we asked participants to fill in their demographic information. A detailed analysis of the influence of the participants' sex, ethnicity, and nationality (among other participant demographic information) will be presented in a subsequent publication that also incorporates the qualitative findings of the survey.

253 surveys were sent to all past participants of the Multicultural forum. The response rate was 53 percent.

Survey Findings:

The results presented below are either descriptive statistics (i.e., means, derived from frequency

distributions) or were obtained using repeated measures Analysis of Variance (ANOVA) of participants' "before the forum" and "after the forum" ratings. All reported analyses were significant ($p < .05$).

Forum Effectiveness

High Quality Experience. **91%** of the forum participants rated the "**Overall Quality of the Forum**" as *good, very good, or excellent*, with the mean being a 5.85 on a 1 (*Awful*) to 7 (*Excellent*) Scale. Mean ratings of other aspects of the forum were similarly high (i.e., quality of the content, $M = 5.77$; quality of the facilities, $M = 5.57$; quality of the consultants, $M = 5.76$).

Furthermore, **91% of the forum participants would recommend the forum for engineering faculty** and **88% would recommend the forum for engineering staff**. When asked whether they **had actually recommended** the forum to someone, **75%** of the forum participants indicated that they had. Thus, there was consensus about the high quality of the forum.

Appropriate Atmosphere. **78% (or more)** of forum participants reported **feeling somewhat to very safe, supported, and respected**, with means 5.6 (or higher) for each question on a 1 (*Not at All*) to 7 (*Very Much So*) scale. Furthermore, the majority of forum participants felt "**not at all**" to "**very little**" concern, worry, or discomfort expressing their opinion in front of colleagues and/or a supervisor/administrator, with means 3.2 (or lower) for each question. However, there was not as much consensus among participants in answering these negatively framed questions. This is understandable with a topic that is as potentially sensitive and volatile as multicultural diversity issues. Sensitivity to the make-up of the forum participants (i.e., being careful not to include an individual's direct supervisor; stressing respect for other's opinion and confidentiality concerns) has been, and will remain, a priority in implementing the forums.

Forum Outcomes

Affective component. Forum participants reported feeling:

- **more positive toward diversity issues** that were positively framed (i.e., feelings of empathy for people of color; feelings of personal responsibility for changing climate at work);
- **less negative toward diversity issues** that were negatively framed (i.e., feelings of defensiveness whenever diversity is mentioned; feelings of disinterest because it just isn't my problem) after, as compared to before, the forum;
- there were some **emotional benefits experienced by participants** (i.e., less discomfort when interacting with people from other ethnicities; more excitement about doing something to help),
- there were also **some emotional costs** (i.e., guilt about how people of color are treated in America; frustration about what to do to change sexism, racism, etc.; sadness that discrimination still exists). This mix of emotions reported after as compared to before the forum is a natural outcome of raising one's awareness and understanding and, in fact, may help to mobilize people as diversity agents.

Thus, the forum led to a positive affective response and is helping to bring diversity alive at an emotional “gut” level.

Behavioral component. Forum participants reported

- becoming **significantly more involved in diversity related activities** after as compared to before the forum (i.e., taking part in diversity efforts within their School; attending diversity forums or talks; having diversity-related conversations with people at work).
- 61 forum participants gave suggestions about what they would specifically like to see as a follow-up activity to the forum.

Thus, the forum led to a positive behavioral response and is helping to mobilize participants to become diversity agents.

Cognitive component. Forum participants reported

- having a **significantly better understanding/awareness of diversity issues** after the forum compared to their understanding/awareness level before the forum (i.e., better understanding of history of ethnic groups different from my own; more awareness of how stereotypes and prejudices negatively impact students of color; why the climate might be chilly for people of color at Purdue).

Thus, the forum led to a positive cognitive response and is helping to enable participants to become *informed and knowledgeable* diversity agents.

Furthermore, across the five years that participants attended the forum, there were no significant differences in rating the quality or atmosphere of the forum, and very few differences in the ABC forum outcomes reported. What few differences were found for forum outcome questions were for “before the forum” responses and not for “after the forum” responses, suggesting that attending the forum converged participants’ responses.

Discussion and Conclusions

These survey findings show that the impact of the multicultural forum over the last five years has been consistently positive. If success can be measured by looking at faculty and staff’s self-reported increase in positive feelings toward diversity issues, increased involvement in diversity related activities, and increased understanding/awareness of diversity issues, then it is likely that the climate within Purdue’s Schools of Engineering has improved.

Participants typically attend the multicultural forum, and then months or years later, attend the gender forum. We chose, therefore, to assess the multicultural forum first and use the findings to inform our development of the gender survey. It is hoped that future assessments of the gender forum will yield similar positive outcomes.

Another measure of success can be found in activities that took place in the Schools of Engineering following the first multicultural forum. The formation and activities of a Diversity

Action Committee within the Schools of Engineering, and some of the successes in the recent diversity in faculty hiring as well, may be due to the fact that the enthusiasm and activism of forum participants was harnessed. Maintaining the momentum with follow-up activities to sustain and continue to build the diversity competency of the faculty and staff is critical if one's end goal is to successfully change the university climate.

As with any effort to assess, there are always limitations and improvements to be made on the assessment tool and the assessment process. Our assessment tool relied on retrospective reports of affect, behavior, and cognition "before the forum." Ideally, participants would be assessed prior to their participation in the forum. In addition, the direct effects of the multicultural forum directly on "warming the climate" in Engineering needs to be established.

In conclusion, as Gainen states, "... faculty will remain relatively homogeneous unless those who hold power – the senior faculty and administrators who distribute recognition and rewards – radically alter their responses to the scholarship and values of nontraditional newcomers in our midst." Forums such as we have described begin to build relationships and a basis for understanding that will open the doors for collaboration and interaction that improve the climate and increase the diversity and quality in academia. The Purdue Schools of Engineering are committed to providing faculty and staff with the needed tools to effectively manage diversity and fulfill their mission of learning, discovery and engagement.

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Biography

DENISE M. DRISCOLL, PhD, is a social psychologist with 8 years of experience as a faculty member teaching and researching the processes involved in changing stereotypes and prejudice, as well as 6 years of experience as an administrator in the Diversity Resource Office directing projects, writing grants, and developing forums based upon theory and research for creating effective diversity tools and best practices.

KLOD KOKINI, PhD, is Assistant Dean of Engineering and Professor of Mechanical and Biomedical Engineering at Purdue. He has been involved in improving diversity in engineering since the beginnings of such efforts at Purdue. Currently, he is in charge of improving student, faculty diversity and improving the climate for all in engineering.

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CAROLYN P. PERCIFIELD, is Director of Alumni Relations for Engineering at Purdue. She has been a critical component in initiating, coordinating and establishing the alumni participation for the diversity forums. She has also been active in obtaining funding for the forums.