THEATER AS A COMMUNITY-BUILDING STRATEGY FOR
WOMEN IN ENGINEERING: THEORY AND PRACTICE

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Previously, the authors have suggested that peer mentoring through a caring community would improve the quality of life for female faculty members in engineering and could have a positive effect on retention and career advancement. Here, the authors present the background and social literature for choosing participatory theater as a strategy to develop a caring community and report on a pilot study in which participatory theater activities were used within a workshop format for untenured female faculty members in engineering. The authors identify the key differences between participatory theater and other strategies for community building that may enhance participants’ sense of community and the strength and utility of their community as a mentoring and support mechanism and discuss the ways in which these efforts could have a broader, longer-term impact.

INTRODUCTION

The Problem: A Lack of Diversity in Engineering

The underrepresentation of women in the engineering workforce nationwide is well known: Women represent 47% of the U.S. workforce; 22% of workers in science, technology, engineering, and mathematics (STEM) fields; and 9% of practicing engineers (National Science Foundation, 2000). As such, women and underrepresented minorities are an underused talent pool in STEM fields. As noted by Dr. William Wulf (1999), President of the National Academy of Engineering, "our profession is impoverished by a lack of diversity."

One strategy for improving the opportunities for women in the engineering professions is to create a more diverse engineering academy. A nationwide shortage of female and minority engineering educators at 4-year colleges and universities parallels the current nationwide shortage of female and minority technically trained employees. In 2001, women made up only 8.9% of the tenured or tenure-track faculty members: 17.5% of the assistant professors, 11.1% of the associate professors, and 4.4% of the full professors (American Society of Engineering Education, 2001). Despite much progress against overt discrimination and toward provisions for equal opportunities for women, subtleties such as cognitive differences that affect professional choices, gendered socialization patterns that affect com-
munication and conflict resolution, and small but accumulated disadvantages that impede progress result in women in academic science and engineering advancing less and less rapidly than their male counterparts with comparable talents and training (Etzkowitz, Kemelgor, & Uzzi, 2000; Valian, 1999). Even when women are present at institutions of higher education, they are often underrepresented, inadequately mentored, marginalized, and “disempowered” in ways that prevent them from reaching their full potential and making their best contributions to their fields. Nationwide, the loss and underuse of trained and talented female personnel worsens the shortage of technical employees; at the university level, it decreases the number of female role models available to undergraduate students, decreases the diversity of research teams, and reduces the return on investment from the considerable resources universities spend on faculty members and research (Fox, 2000). Thus, there exists ample evidence that women who are in or may enter STEM careers could benefit from more and better support mechanisms.

The Solution: The Creation of Community

In the face of these concerns, four generic tactics for creating change are commonly discussed; three of the four seek to change the behavior of female engineering faculty members, either directly or indirectly, and the last seeks to change institutions. The first generic tactic involves efforts to alter women’s perception of the engineering culture on the basis of the assumption that either the environment is simply not as alienating or problematic as is often claimed or, if it is, that women would be best served by adapting to it. The second generic tactic involves efforts to provide additional support for women using mechanisms such as mentoring that might enable them to more assertively and self-confidently pursue their agendas and careers. The third seeks to develop a sense of community among women, going beyond one-on-one support mechanisms to create mutual commitments that enable people to engage deeply with one another and to see and respond to a wide range of one another’s issues and concerns. The assumption here is that in a caring and trusting community, women can admit their concerns more readily, find allies, and overcome the competitive ethos that separates professionals from one another. The fourth generic tactic for enhancing the career satisfaction and advancement of female engineering faculty members focuses not on women but on the more senior men and the organizational structures and cultures that dominate engineering academia. The assumption here is that if academia and its senior personnel alter their behavior and operating principles to create more equitable environments, women (and less senior men) will achieve success at a higher rate.

We elected to pursue applications of the third generic tactic, developing a caring community for female faculty members in engineering. Previously, we have suggested that peer mentoring through a caring community would improve the quality of life for female faculty members in engineering and could have an effect on retention and advancement (Chesler & Chesler, 2002). One-on-one mentoring is traditionally a developmental relationship in which an experienced person provides both technical and psychosocial support to a less experienced person. In return, the mentor gains personal satisfaction, gains respect from colleagues for successfully developing younger talent, and, in the best case, grows intellectually as well. Female faculty members in science and engineering typically have fewer and less effective mentors than their male counterparts (Seymour & Hewitt, 1997; Wankat & Oreovicz, 1993), and anecdotal evidence suggests that they often face additional difficulties in their interpersonal relationships and with self-esteem (Astin & Astin, 1993;
Seymour, 1995; Strenta, Elliot, Matier, Scott, & Nair, 1993). Thus, as we have suggested previously, female faculty members in science and engineering could benefit from a network of mentors—peer mentors—who form a supportive community.

A great deal of social science literature exists regarding the importance of community as a psychosocial support structure (Bookman & Morgan, 1988; Lyons, Mickelson, Sullivan, & Coyne, 1998; Wuthnow, 1994). Following Halperin (2001), we define a community here as a group of individuals with a sense of fellowship, mutual aid, and commitment toward each other. Halperin’s three hallmarks of individuals connected to a community are (a) recognition of the nature and commonality of their individual situations, (b) support and caring of and for one another, and (c) pursuit of a shared task or goal. The benefits of community, such as the development of individual and collective social capital, as well as empowerment and productivity, are especially important to members of traditionally disadvantaged groups, including people of color and people of minimal means (Martin & Martin, 1985; Solomon, 1976; Valle & Vega, 1980). In terms of their history of exclusion, disproportionate failure to thrive in academia, and need for additional psychosocial support, we can add women in engineering to that list (Glenn, Monroe, & Lamont, 1993; Sonnert & Holton, 1995).

An essential step in the creation of communities of and for the disadvantaged, for whom the benefits of additional psychosocial support are the most apparent, is the process of consciousness raising, or conscientizacese according to Freire (2000). Through the process of sharing experiences, individuals can discover the commonalities in their situations and the true nature and effects of their disadvantaged locations in society or their local organizations. They can see how their individual problems are part of, or even caused by, a social or collective problem. This act requires conversation: as Freire argued, “It is in speaking the word that people, by naming the world, transform it...[and]...achieve significance as human beings” (p. 89). Or, in Wuthnow’s (1994) terms, “through storytelling, individuals turn their (personal) experience into a collective event [and] find community with others in the similarities between their stories and those told by others” (p. 292). Chesler and Chesney (1995) observed that the process of sharing experiences can lead to the development of a “narrative community,” which is a community of people with a common story and understanding of the world that lends psychosocial support to its members (see also Rappaport, 1994).

The Strategy: Participatory Theater

Participatory theater has been created and used as a strategy for temporary or long-term community building by a variety of therapists and social activists. As Halperin (2001) noted, “through mutual activity people create community out of a collection of individuals and, through community, can act to change their personal and collective worlds....Theater, as an ensemble art form, necessitates cooperation and teamwork” and results in the creation of a product(ion) (p. 34). The development of such cooperation and teamwork, through dialogue and action, has its roots in the principles of consciousness raising and collective empowerment, as noted above. What participatory theater adds is the articulation and demonstration of stories that can be performed as a meta-tale of common experience. As individual or collective stories are shared and enacted, alternative solutions can be practiced. Old stories can be reinterpreted and strategies for future actions developed collectively.

The goal of participatory theater, captured in the theater of the absurd, is “to educate and enlighten people about the circumstances, injustices and inequities they face—to
conscientize” (Noble, 2000, p. 10). As opposed to mere talk, which can devolve into unproductive “gripe sessions,” engagement in theater allows participants to express thoughts and feelings physically and visually. “Theater engages participants because it casts the source of…distress in a story dramatically rendered, rather than in a set of obstacles or list of grievances” (Brown & Gillespie, 1999, p. 39). Because most people are novices to theater, they view dramatization as “playacting,” lessening the consequences normally associated with the vulnerability and risk that accompanies the sharing of intimate and painful stories. “Once the story exists and is recognized as commonly shared, it helps knit us…into a community” (Brown & Gillespie, 1999, p. 39).

Perhaps the most unique aspect of participatory theater as a technique to build community is its focus on collective brainstorming for alternative problem-solving strategies. Boal (1995), the principal architect of participatory theater as a technique to combat personal and social oppression, wrote, “The principal objective is to change the people. The [people] are encouraged to become part of the action by suggesting solutions and exploring alternatives” (p. 45). As alternative actions are imagined, they can be scripted, enacted and evaluated. A Brazilian educator like Freire, Boal described the process as follows:

In a Theater of the Oppressed session where the participants belong to the same social group (students at the same school, residents of the same district, workers at the same factory) and suffer the same oppressions (vis-à-vis the school, the district or the factory) the individual account of a single person will immediately be pluralized: so the oppression of one is the oppression of all…The oppressed must be helped to reflect on his own action (by looking at alternatives which may be possible, shown to him by other participants who, for their own part, are looking at their own singularities). (pp. 45-46)

How, then, can these techniques be applied to the situation of women in science and engineering, especially those at different institutions? How can such professionals explore and enact their struggles and their commonalities? How can they use theater as a way of building community and developing strategies for personal and professional change?

INQUIRY METHODS

The above guiding questions served to direct our inquiry into the use of participatory theater and to determine whether a sense of community could be created in the context of such a exercise and, if so, whether that sense of community and the growth developed therein could carry over into participants’ personal and professional lives. Given the innovative and exploratory nature of this pilot effort, we elected not to generate more specific hypotheses.

The principles of participatory theater as a strategy for developing and building community were pilot tested on a small sample of 9 untenured female faculty members in engineering. To ensure maximum protection for the participants in this intervention, we decided to conduct it neither within any single institution in which participants were employed nor with professionals who were in ongoing working relationships with one another. Participants were solicited from a range of different colleges and universities. It is important to note that because all participants volunteered for admission into this cohort, sample selection bias may influence our ability to evaluate the effectiveness of this program for the general population of female faculty members in engineering. Selected participants
had different amounts of experience in academia and were from diverse specialties in engineering and institutions. In particular, at the time of the workshop, their academic experience ranged from entering their 2nd to 6th years, with the majority of the participants having been in their current positions for 3 or 4 years. Their fields of expertise included chemical (1 participant), mechanical (1 participant), biomedical (2 participants), environmental (1 participant), electrical (1 participant), systems (1 participant), and general (1 participant) engineering, as well as materials science (1 participant). Most of the participants came from institutions classified by the Carnegie Classifications as extensive doctoral and research universities (4 participants); next most common were participants from liberal arts baccalaureate colleges (2 participants), and 1 participant each came from master’s colleges and universities, intensive doctoral and research universities, and general baccalaureate colleges.

Qualitative and formative (rather than summative or conclusive) evaluation principles were used to assess responses to participatory theater exercises within the workshop framework. These methods are suited for use with small groups of people when an intervention is being used for the first time (Patton, 2002). With such a small sample, statistical analysis of responses would not be particularly fruitful. We treated this as a pilot study and made no attempt to compare the experience or results to other kinds of supportive or community-oriented interventions for female engineers or to the experiences of female in a control group. We report here not a rigorous test or formal evaluation of this intervention but a documentation and demonstration of its potential utility.

The primary assessment data included observers’ documentation of the activities of the workshop and participants’ responses to them and participants’ reflections on the workshop 1 year later from recorded interviews by a professional program evaluator. The interview guide was developed to inductively explore the workshop’s immediate and broader impacts. The questions were as follows:

1. One year later, what activities and events do you remember from the workshop?
2. What details do you remember about the theater activities in particular?
3. When you were told several months before the workshop that we would be doing participatory theater, what were your expectations?
4. What did you take away from the workshop? Were there any lasting impacts?
5. Have you used anything from the workshop in your classes?

A post hoc inductive design was then used to code and analyze the transcripts of participant interviews according to established methods (Miles & Huberman, 1984; Strauss, 1987; Swanson, 1986).

**The Pilot Study: Community-Building Workshop**

Participants traveled to a remote location for 3 days away from both work and family and shared all activities during that period. In the workshop, the theater activities were complemented with comments by and interactions with a senior academic female engineer (at the dean level), writing activities facilitated by a professional technical writing consultant, a free-form pottery workshop, and informal social time. A theater and arts instructor at the Flynn Center for the Arts in Burlington, Vermont, led the participatory theater activities, which followed the teachings of Boal (1995), as described above.
After preliminary, theatrical trust-building exercises, participants were led in the formation of "struggle scenes," in which the women were asked to consider those things in their lives with which they struggled and to create a literal or figurative physical sculpture images of those situations using the other participants as actors. Examples of the resulting scenes are presented in the "Results" section below. Participants were then led in an activity to collectively develop alternative strategies to overcome these struggles. To begin, participants were asked to enact a composite scene that captured the essence of all of the previous struggle scenes. After a consensus was reached as to the best composite scene, different women took on the role of the central figure. Each central figure was instructed to act out her solution to the problem. To do so, she could interact with the other actors in the scene either verbally or nonverbally. In this way, different women developed and tested different problem-solving strategies while the rest of the group watched. Finally, participants were asked to create a "happiness scene," either real or imagined. Again, the scenes that were created are described below.

Individual and group reflection time was provided to discuss the results of all exercises, to discuss the parallels between the emotions raised by these scenes and ones at in their personal and professional lives, to assess the effectiveness of the problem-solving strategies developed, and to consider the application of these alternative strategies to their own personal and professional situations.

RESULTS: ACTIVITIES, DISCUSSIONS, AND INTERVIEWS

Through the enactment of struggle scenes, participants were able to express feelings of exclusion; competition in the face of inequity; inability to meet the many and varied needs of others; and a mixture of fear, insecurity, confusion, and anger. In the reflective discussions, the women testified that these were precisely the feelings generated in many of their collegial and institutional interactions within academia. One example of a struggle scene that was formed was that of several people standing in a close circle enjoying a lively conversation while the central figure stands outside the circle, peering in (Figure 1A). As explained in the group discussion, this scene expressed the central figure’s feelings of exclusion from social activities and events, mentoring and networking opportunities, and her departmental community. Another struggle scene cast one person reaching upward in a forward lunge near the central figure, who was also leaning forward and reaching upward but was held down at her feet and waist by others (Figure 1B). This scene expressed feelings of disadvantage by unequal burdens and responsibilities and hidden or subtle impediments. Note that just because the central figure feels agents pulling her back and down, they may not be real or visible to others. A more abstract image was one in which the central figure sat cross-legged with a blank expression on her face as four others stood behind her with physical expressions of anger, confusion, hope, and sadness, individually (Figure 1C). This scene expressed this woman’s conflicting emotions about her work and work environment, and her struggle to hide or contain these feelings in front of her colleagues. In a fourth struggle scene, the creator stood facing forward, arms and legs stretched in different directions as people pulled at each limb with a mixture of hostility and need (Figure 1D). This last theme of being pulled in multiple directions was repeated in several other images.

During the collective problem-solving activity, the summary struggle scene that was chosen was one in which several female "oppressors" knelt and pulled at a supine woman...
from all directions. Within this composite image, the central figure was encouraged to overcome her oppressors. As different women took on the role as sufferer, different problem-solving strategies were tested. One sufferer tried to break free from the clutches of the oppressors by overpowering them. One tried to distract them by bringing them into conflict (and physical contact) with one another. One focused on placating each oppressor one at a time.

The final scenes of happiness were almost exclusively of supportive relationships, some professional and others personal. One woman created a clear image of relaxing in front of the television with her husband; another was walking with a friend; another stood at the front of an imaginary classroom, enthusiastically lecturing to a group of happy and engaged students.

In participant interviews 1 year later in which participants were asked to reflect on the participatory theater activities, four major themes arose: (a) recognition of struggles and shared concerns, (b) building and strengthening of community, (c) immediate impacts and (d) broader impacts. Participant quotations that exemplify these themes follow, organized by thematic category.

**Recognition of Struggles and Shared Concerns**

The illustrative quotations below suggest that in the relatively safe and trusting atmosphere of this workshop, individuals were able to portray ideas and situations that
affected them deeply. Recognizing shared concerns provided psychosocial support by normalizing individuals' frustrations and worries. Participants also reported that the nonverbal and physical aspects of the exercise enhanced the emotional impact of the exercise:

Drama really helped. And [it helped me realize] the kind of situations that other people are in. I think the reason why it was so emotional was because a lot of us could really identify with what everybody else was going through. There are probably things that would have been very difficult for us to put into words and have anybody else understand.

One of the things I took away, listening to the trials and tribulations people had throughout the year, [is that] they are quite similar to my own. This makes me not feel so bad.

[The exercises] really helped me to understand more the struggles that other people were going through in their jobs. It made us realize... [that struggle] is almost a normal part of being an untenured faculty member; it's not that you are not capable or that you don't have what it takes to do it, it's just that it is difficult—it's not an easy task to do.

**Building and Strengthening of Community**

The quotations coded in this major theme demonstrate that the theater exercises helped strengthen both group and individual connections in a way distinct from the other activities at the workshop, such as sharing meals and talking informally. Furthermore, these and related comments suggest that as participants shared their concerns with one another, they often recognized the common nature of their concerns, which deepened the sense of trust and community within the group. The following comments reflect the creation of a sense of community, albeit a temporary one, among participants at the workshop:

The theater exercises brought people together.

We did some group exercises...[that] really helped [us] to reconnect together.

Each time we did [an exercise] we got to know each other a little bit better.

I think it did help us get more connected.

**Immediate Impact**

These comments reflect some of the ways in which the immediate impact of the exercises and images portrayed was deeply emotional and moving. The use of participatory theater in a workshop setting of this sort encouraged levels of personal sharing and communication not normally reached by casual verbal exchange alone. Moreover, it permitted some participants to go beyond communication and “try out” solutions to problems they experienced in their home institutions and settings:

The part that I thought that was most meaningful [was] where we role-played out how we felt about where we were in our workplace or at this stage in our career. This was really powerful because there are a lot of things you can’t really express in words.
Some of the images that were created are just seared in my memory.

The [exercise] that really sticks in my mind was one where each of us did a pose, and we could use the other people in our group to do a human sculpture to represent a problem, issue, or something in our lives. This exercise was really interesting...And it just almost brought tears to my eyes...somehow for her to just display it so graphically...[it] just really spoke to me.

The image [one woman] did sort of slapped me upside the head. It kind of inspired me.

Not only did you role-play/create an image of how you felt as a faculty member, but also you role-played how you would like this scenario to work out. I thought that this was sort of useful.

**Long-Term, Broader Impacts**

Participants were queried for long-term impacts of the theater exercises. Only a few participants found ways to translate these experiences to their situations and institutions back home 1 year later. The few that did made these comments:

I did some of the posing things with some...5th graders....They liked it, they were really into it. I haven't ventured into it with any of my college kids yet.

I had the faculty role-play an image of what they thought an ideal grad student should be. And then I had the grad students role-play an image of what an ideal faculty advisor should be. It broke the ice. It was kind of fun....I felt I got some insights from students about what they are looking for in an advisor. It has changed a little bit how I see my students.

Actually, one thing that I did was to use the icebreaker exercises with my class...the [theatrical trust-building exercise] where we enacted being a machine. I did that with my students as a way to build rapport, and it worked really well.

For the remainder of the participants, various factors impeded a long-term, broader impact. These factors can be categorized in the following four ways: (a) obstacles to maintaining the temporary community developed at the workshop, (b) obstacles to using the lessons learned at the workshop in the home environment, (c) obstacles to creating a supportive peer community in the home institution, and (d) obstacles to using the techniques of participatory theater for personal or professional development in the home institution. These four factors are exemplified by the following four quotations, respectively:

All of us live in separate places...you can't just drive over and visit with somebody.

In the month or two when I come back from these things, I am following up on all these things, full of ideas, and I am really excited, and then all the others things out there start to come up.

Being the only female engineering professor...there are things that I can't talk to my other faculty [peers] about.

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I haven't taken the [theater] technique and applied it in other situations...I don't know how I would apply it.

DISCUSSION

An important intervention into the presence and life of female faculty members in engineering is psychosocial support, which can arise from a sense of commonality and community. From this type of support base among colleagues with a relatively common set of experiences, female engineers may be better able to deal with the social and institutional constraints that have excluded and marginalized them within academia. There are many ways in which this support system can be built, some of which appear to be naturally arising phenomena and some of which are relatively planned interpersonal or organizational interventions such as mentoring programs. Many corporations and academic organizations have already instituted the latter kinds of programs to improve the quality of work life for female employees and managers (Lobel, 1999). As we have described previously, an adventure education program is one relatively specific way of purposefully building community (Chesler, Single, & Mikic, 2003). As we have described here, participatory theater is another.

Participatory theater has the advantages of combining several key principles in the generation of social support and of doing so in ways that depart from traditional verbal and written forms of exploration and expression. The use of dramatic portrayals of people's life experiences is not necessarily better than other forms, but it is a unique form, one that most participants come to with a naive sense of "playwork." In these settings, in which work is undertaken as a form of play and generating a scene and playing a role is the object, individuals may be freer to express themselves and more willing to take risks and practice actions with which they are unaccustomed. There appears to be a greater opportunity for deep sharing of one's experiences and vulnerabilities and for exploration of risky actions. Participatory theater also provides the opportunity for physical activity in the enactment of ones' stories in the form of dramas and dramatic encounters. As painful situations and potential resolutions are enacted, people can "see" their own and each others' options differently.

The hoped-for result of such narrative engagement is psychosocial support through community. Communities are developed on the basis of individuals sharing their life stories and experiences, taking risks in exposing vulnerabilities with one another, and working together with clear purposes in mind. "My problems" become "our problems," and people can engage in communal coping, whereby they pool their knowledge and resources to confront adversity. Communal coping captures many of the elements of participatory theater described above. It requires a belief that it is beneficial to join together to deal with a problem, communication and narration of stressors or aspects of problematic situations, and cooperative action to generate alternatives to unsuccessful coping strategies (Lyons et al., 1998).

In a single pilot study with a small group of untenured female faculty members from different colleges and universities described here, participatory theater exercises within a weekend workshop led to recognition of shared experiences, a strengthening of community, and immediate emotional impacts on participants. In addition, participants experienced empathic support and engaged in collective strategizing and problem solving. One year later, some participants reported that they had been able to apply the techniques and self-
confidence gained through the workshop to their situations back home, in either their personal or their professional lives.

The workshop and engagement in participatory theater had positive impacts on many participants. Some of these impacts were fleeting, however, and hard to incorporate on a long-term basis in the participants’ home environments. The problems of transfer can be traced to four issues. First, the temporary community that was built at the workshop was difficult to maintain after the workshop because the participants were separated geographically. Thus, the impact of the community on the lives of the participants lessened over time. Second, the press of traditional research, teaching, and service work once participants returned to their home environments took precedence over pursuing innovative forms of personal and professional development. Third, some colleagues existed in home departments in which the development of a supportive peer community was impossible either because of a lack of peers or a lack of support. Fourth, few participants had access to continued learning opportunities on how to develop and use participatory theater from resources in their home institutions. Developing participatory theater programs in the absence of these resources was too daunting a task. Efforts to increase the impact of this program clearly require the continuing provision of key resources (such those available from the Theater Group at the Center for Research on Teaching and Learning, and its association with the ADVANCE program at the University of Michigan). Perhaps more important, departments and colleges must pay attention to the personal and professional growth needs of female faculty members in engineering and must strive to help them develop supportive peer communities.

The current pilot test suffers from several limitations. The persistence of the community and its long-term utility as a psychosocial support cannot be evaluated at this time. Future studies will be required to assess the impact of a supportive community on the career success and quality of life for members of the community. Future studies can also assess, via comparative methods or control groups, the utility of participatory theater in comparison with different interventions designed to provide support for female engineering faculty members.

**CONCLUSIONS**

We have argued that women in engineering often represent an excluded, marginalized, or underused resource in their institutions and the nation. One response to this situation is the development of more supportive communities in academia and in those institutions employing women in STEM fields. Various programs and interventions exist to help develop more supportive communities in both academia and industry. One relatively novel intervention is participatory theater for community building.

The noteworthy advantages of participatory theater are the use of narrative techniques that encourage participants to discover the communal nature of their experiences, engagement in forms of “play” that emphasize a safe environment in which to take risks and try out new behavior, and the production of such new behavior in front of peers with subsequent collective brainstorming for problem-solving alternatives. Discussion and analysis of these common stories, and of the behavioral alternatives suggested and enacted, should not only create a sense of community but also strengthen each individual’s repertoire of strategies for coping with her local environment. The pilot study results we provide show preliminary evidence of community building through participatory theater, but further
studies are required to assess the comparative value of this intervention vis-à-vis others and the persistence of the community and its impact on the career success and quality of life of the participating women.

Given the persistent and serious nature of the problems faced by female faculty members in engineering, brief workshops that use participatory theater or other community-building techniques will not be effective in isolation. Changes in local departments or colleges that can support female faculty members and their continued personal and professional development are required. We hope that members of a supportive community developed by participatory theater will apply new coping strategies in their own communities and institutions and that they themselves help develop patterns of communal coping and support in these communities and institutions. It is more likely that change at the institutional level will be more successful and have stronger and broader impacts if initiated and supported by senior faculty members and the administration. Once these caring communities have taken root, they are likely to improve the quality of life for female faculty members in engineering, increase the retention and advancement of these women, and eventually lead to greater diversity in engineering academia.

REFERENCES


