



Applied Theatre Facilitates Dialogue about Career Challenges for Scientists †

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The design of programs in support of a strong, diverse, and inclusive scientific workforce and academe requires numerous difficult conversations about sensitive topics such as the challenges scientists can face in their professional development. Theatre can be an interactive and effective way to foster discussion around such subjects. This article examines the implementation and benefits of such interactive strategies in different contexts, including the benefits of getting early career academics and professionals talking about some of the situations that women and underrepresented minorities face in the workplace, while allowing more seasoned professionals and colleagues to join in the conversation.

INTRODUCTION

The goal of building an optimal scientific workforce that is both diverse and inclusive requires that young scientists have an opportunity to anticipate and strategically prepare for the numerous challenges they often face along their professional development trajectory. Many of these challenges are interpersonal, and when they touch on issues of gender, language, and ethnic perceptions and misperceptions, anxieties about these topics can make it difficult for scientists to share ideas meaningfully and productively about how best to address them.

Theatre can facilitate dialogue about ethically controversial scientific discoveries and about the practice of science as a human endeavor (1). For example, a play like Anna Ziegler's *Photograph 51*, an examination of Rosalind Franklin's role in the discovery of DNA structure, can spark conversations about gender bias in the sciences (2). Theatre can create an atmosphere where it is safe to play these roles or to observe these dynamics occurring between characters in the play, thus establishing a more comfortable environment for difficult conversations about these situations. Theatre's

ability to ignite discussion is highlighted by the discipline of applied theatre—an area of study that uses theatre as a tool in education and social development (3). This form of theatre is most notably practiced in non-traditional settings and is often used as a tool to foster behavior changes and healthy discussions focused on societal and cultural issues, including issues related to education and public health (3,4). Applied theatre is currently being used successfully in the training of health professionals and scientists (5–11). This article aims to highlight the use of applied theatre as a career development tool for scientists as well as to outline its benefits, implementation, and challenges. In this article, we also discuss how the Minorities Affairs Committee of the American Society for Cell Biology has used applied theatre as a professional development activity for postdoctoral fellows and junior faculty members.

Applied theatre

While applied theatre can take many forms, it generally involves theatrical enactments of situations that highlight an underlying social issue or problem with the expectation of sparking conversations that will catalyze change and identify possible solutions (3,4,12). In applied theatre, the audience plays a key role in the performance, either directly or indirectly. Audience participation in these performances can be as active and direct as volunteer audience members incorporating themselves into a scripted play as actors. Audience participation can alternatively be passive or indirect, like engaging in a moderator-led discussion after having witnessed a theatrical enactment performed by actors.

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Applied theatre in the training of health professionals

Applied theatre has been shown to be beneficial as an educational or professional development strategy in the training of health professionals who interact with patients. More specifically, interactive theatrical techniques are being used to better prepare these individuals to deliver bad news to their patients by having them reflect on the potential contexts, approaches, perspectives, and reactions surrounding giving and receiving bad news (13). The University of Michigan Medical School and the George Washington University School of Medicine programs are some of the institutions that have applied theatre training programs in this manner (13).

Applied theatre in the professional development of academics

Faculty training has also been shown to benefit from applied theatre, including interactive or participatory theatre (14). This kind of theatre is characterized by the participation of the audience of interest in the creation of a theatrical performance. In 2005, participatory theatre was found to have success as a peer-to-peer community-building strategy for women faculty in engineering (5). In this context, the creation of a peer-to-peer mentoring community was recognized as a potential approach to provide women faculty in engineering with a much-needed support system that would allow them not only to recognize the commonalities in the challenges they faced, but also to find creative ways to meet these challenges (5). Chesler and Chesler chose to pilot the implementation of participatory theatre in faculty training by having participants enact literal or figurative scenes that represented struggles in some aspects of their professional life. They were then given the opportunity to collectively develop strategies to overcome these struggles (5). Chesler and Chesler found that this type of activity helped participants recognize their struggles and shared concerns as well as strengthen their sense of community (5).

More recent applications of participatory theatre in the training of academics have generally been implemented by presenting to an academic audience a theatrical sketch that embodies and represents relevant challenges, for example in the form of difficult situations in classroom management and faculty development (9,11,13).

At the University of Michigan, the Center for Research on Learning and Teaching (CRLT) aims to use theatre to improve the institutional climate at academic institutions by catalyzing dialogue among faculty, graduate students, and academic administrators around issues of diversity, teaching, and learning (9,11,13,15, <http://www.crlt.umich.edu/crltplayers>). CRLT advances this mission through engaging academics in moderator-guided discussions following a performance that captures a relevant challenging situation. Performances are scripted theatrical pieces performed by actors. The scripts are developed with the help of focus

groups composed of academics (9,11,13). Performance titles that have been prepared by the CRLT include Hidden Disabilities in the Classroom, Conflict in the Classroom, Chair's Role in Faculty Mentoring, and Navigating Departmental Politics (<http://www.crlt.umich.edu/crltplayers/sketches-other-services>). Other academic institutions have similar applied theatre programs that aim to improve their institutional climate. Examples of these include the University of Miami (<http://www.as.miami.edu/seeds/theatre/>) and Cornell (<https://www.hr.cornell.edu/life/career/cite.html>). While anecdotal participant reflections and surveys and moderator comments suggest these approaches are effective, no systematic study on the effects of these strategies has been performed (15).

Applied theatre in the professional development of scientists who are members of scientific societies

Professional societies, including the American Society for Cell Biology (ASCB), have also used applied theatre to meet some of their goals around diversity and inclusion. For example, Women in Cell Biology (WICB), a committee of the ASCB, advocates to promote gender equality in Cell Biology. One of the ways in which they drive their mission forward is through the use of "Mentoring Theatre" (<http://www.ascb.org/community-committee/women-cell-biology-wicb/>), in which prominent scientists are recruited to act out scenarios of career challenges related to issues of publishing, funding, career-life integration, and negotiation. Following the theatrical representation, the audience is invited to engage in a discussion with these participating scientists to identify effective strategies for challenge resolution.

Similarly, the Minorities Affairs Committee (MAC) of the ASCB utilizes applied, interactive theatre in the professional development training of academics. The ASCB MAC strives as part of its mission to foster diversity in science and the success of cell biologists from underrepresented minority (URM) backgrounds in academia. Scientists considered as belonging to URM groups are African Americans, American Indians/Alaska Natives, and Latinos—scientists from racial and ethnic backgrounds that are underrepresented in STEM fields compared with their representation in the US population. The MAC organizes professional development workshops for postdoctoral fellows and junior faculty members who are URMs and for faculty members who teach at institutions with a high percentage of URM students.

The authors have created an applied theatre-based exercise for MAC workshop participants focused on situations encountered by women and URMs in academic environments. After a brief initial presentation to define impostor syndrome, stereotype threat, and microaggressions, workshop participants are divided into groups of three to five and given time to read and discuss two scenarios (Appendix 1). The scenarios describe situations experienced by senior women faculty members and subsequently reported to the authors. The groups are instructed to formulate a response

to one of the two scenarios and report to other workshop participants and facilitators in the form of a five-minute skit. Each performance is followed by a discussion of the challenges and opportunities highlighted and whether the skit provided an effective resolution. Below, we discuss the effectiveness of this applied theatre exercise, using trainee reflections that were collected during the summer of 2016 as evidence or data.

DISCUSSION

During the discussions that follow scenario skits, participants (both URM and others) often cite events in their own careers that reinforce some of the issues raised, leading to further group discussion. Moreover, some of the experiences and topics that surface during the skits and subsequent discussions are applicable not only to URM but also to early career scientists—highlighting the potential to effectively incorporate this type of activity in the professional development schema for all scientists in academia. Also, important topics like varying leadership styles, microaggressions, stereotype threat, and impostor syndrome often arise during the post-skit discussions (7,16).

Many of the workshop participants strongly identify with a particular scenario that represents scientists of color being mistaken for the maintenance staff. And, while this skit generates some of the most spirited discussions, ideas for its resolution may be focused on turning the challenge into an opportunity to educate the community about the involvement of URM in the sciences in academia. Another skit that generates a strong response from participants represents difficulties that can arise from classroom management issues, an example of a challenge that can apply to all teaching faculty members. After the activity, participants are given the opportunity to reflect on their applied theatre experience by completing a short survey. Sample reflections from the cohort of 22 participants from the summer 2016 workshop can be found in Appendix 2.

Themes were identified in participants' responses and quantified (Appendix 3). Many of the participants expressed confusion and discomfort initially as to the purpose and scope of the exercise. The details of how the groups were to convert the scenarios into a skit were intentionally vague, allowing group members the fullest range of interpretation and problem-solving. Some groups enacted only the scenario as their skit; while other groups incorporated a response to the situation in their skit. Four participants expressed that they would have preferred that all of the groups "acted out a response, instead of just the scenario." A few participants (4 of 22) indicated that they felt uncomfortable with acting in front of others. One person indicated that the role-playing experience was difficult because it was "difficult to make microaggressions 'micro' when trying to bring it to the forefront." The participant-developed skits typically exaggerated the scenarios that included microaggressions. Three of the 22 participants expressed

that the role-playing allowed for a "very safe space" in which to discuss and laugh about serious situations. Others (six) found the session to be a disruptive experience. One participant indicated discomfort with watching "people being mistreated.... Watching them is hard because you hope things will change." Four indicated that they had not considered that some of the scenarios, particularly those in the context of an academic setting, could be considered as episodes of microaggression. One person acknowledged not knowing what microaggression meant.

The discussion that followed each group presentation allowed the workshop participants and the speakers, including MAC members in attendance, to provide alternative responses and additional personal examples of similar situations to those in the scenarios. A few of the MAC members willingly revealed which scenarios came from their own experiences. It became clear during these discussions that the scenarios were real, and a few of the participants were surprised that the scenarios were lived experiences. Several of the participants also indicated that situations similar to the scenarios had happened to them and shared details freely. The time allocated for the groups to choose between the two scenarios and to plan and write the short skit was approximately 30 minutes. Many (eight) felt that the amount of time allocated to the groups to develop the skits was not adequate and some (four) felt that the discussion of alternative strategies could have been extended.

In terms of the impact on the participants, many shared that they had been unsure how to handle similar situations that occurred during their training as graduate students and postdoctoral fellows or as junior faculty members. A majority of the participants (17 of 22) stated that the exercise and the subsequent discussions provided them with alternative coping and/or response strategies. One participant noted being unsure how to handle a similar situation at the time, and that the situation had had an impact on their self-perception. Another participant indicated that "in general, I have scooted things under the rug. Even if I treaded lightly, some things that happened likely needed a response or action from myself." A number of participants (5 of 22) were surprised by how frequently similar scenarios occurred, as revealed during the post-skit discussions, when other participants provide additional examples. One participant indicated that the skits were "a useful means of addressing complications in the workplace." Another indicated that the exercise helped them "to think about how to come through situations like that without hurting your career." Another participant indicated that "it was difficult to bring back these dark experiences" but that it was a "very safe space to discuss challenging experiences." Three participants indicated that they felt uncomfortable acting out the skit and with the "degree of improv required." Finally, five participants indicated that they enjoyed the role-playing activity being interactive, and one said that it was "fun to get up, move, and do something unexpected especially at a science meeting."

CONCLUSION

Applied, interactive theatre can help prepare trainees to deal with challenging situations in their profession and can raise awareness of the challenges students and colleagues from different backgrounds might face. By bringing together scientists of diverse backgrounds and levels of experience within a safe environment, these exercises can support critical conversations that would otherwise not take place. Applied theatre can be an avenue to encourage dialogue among early career scientists about some of the situations faced in academia and medicine and between these scientists and more seasoned professionals, who provide additional insights and share their coping and support strategies.

Helping scientists-in-training prepare to face professional challenges outside the classroom

As discussed above, applied theatre has proven to be an interactive and effective way to engage health professionals and scientists in discussions of challenges that can be encountered in their professions. Applied theatre might also be useful in helping scientists at earlier stages of their scientific training prepare to face professional challenges *outside the classroom*. While role-playing has been reported to be a useful tool in helping undergraduates learn basic concepts like mitosis, meiosis, chromosome segregation, and diffusion in the classroom, these forms of role-playing are often considered interpretive dance and not applied theatre (6,8,17–22). Applied theatre has been used in the undergraduate science classroom to discuss important topics in science policy (10). In undergraduate education, applied theatre has the potential to be used to spark discussions about *professional challenges* students face outside the classroom, especially the challenges URM students will likely face. Applied theatre is already being used in the context of graduate education to train participants on the responsible conduct of research (23,24). We think that applied theatre could be used more fully in undergraduate education. Undergraduate training is a critical stage in a person's scientific development, and is not too early to engage them in thinking about professional issues. Undergraduate students are in the process of making decisions about which career paths suit them and starting to develop an identity within the scientific community. This could be an opportune time to start talking about what they want to bring to the community, what obstacles they might encounter, and what kinds of changes and solutions they might be able to propose to improve the "climate." Scientists face significant pressure that can challenge their persistence and ethics. Early opportunities to anticipate and prepare for such challenges in a safe environment can help young scientists prepare appropriately for them.

SUPPLEMENTAL MATERIALS

Appendix 1: Supplemental Table 1: Sample scenarios for group skits and discussion

Appendix 2: Supplemental Table 2: Participant responses to reflection questions

Appendix 3: Supplemental Table 3: Themes in participants' reflections: coding schema

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REFERENCES

1. Baillie C. 2007. Public dialogue on science: theatre as mediator. *Can Theatre Rev* 131:6–13.
2. Ziegler A. 2011. Photograph 51. Dramatist's Play Service, New York, NY.
3. Boal A. 1997. The theatre of the oppressed. *UNESCO Courier* 50:32–36.
4. Boal A. 1995. The rainbow of desire: the Boal method of theatre and therapy. Routledge, New York, NY.
5. Chesler NC, Chesler MA. 2005. Theater as a community building strategy for women in engineering: theory and practice. *J Women Minorities Sci Engineer* 11:83–95.
6. Chinnici JP, Yue JW, Torres KM. 2004. Students as human chromosomes in role-playing mitosis and meiosis. *Am Biol Teach* 66:35–39.
7. Clance PR, Imes S. 1978. The imposter syndrome phenomenon in high achieving women dynamics and therapeutic intervention. *Psychother Theory Res Pract* 15:241–247.
8. Hudson ML. 2012. Easy, cheap, & fun: role-play on endocrine regulation & negative feedback. *Am Biol Teach* 74:644–646.
9. Kaplan M, Cook CE, Steiger J. 2006. Using theatre to stage instructional and organizational transformation. *Change Mag* May–June:32–39.
10. Kimbrough DR, Dyckes DF, Mlady G. 1995. Teaching science and public policy through role playing. *J Chem Educ* 72:295.
11. LaVaque-Manty D, Steiger J, Stewart AJ. 2007. Interactive theatre: raising issues about the climate with science faculty, p 204–223. In Stewart A, Malley J, LaVaque-Manty D (ed), *Transforming science and engineering: advancing academic women*. University of Michigan Press, Ann Arbor, MI.
12. Thompson J. 2012. *Applied theatre: bewilderment and beyond*. Peter Lang Publishing, Oxford, UK.

13. Skye EP, Wagenschutz H, Steiger JA, Kumagai AK. 2014. Use of interactive theatre and role play to develop medical students' skills in breaking bad news. *J Cancer Educ* 29:704–708.
14. Brown KH. 1999. Responding to moral distress in the university: Augusto Boal's theatre of the oppressed. *Change Mag* Sept–Oct: 34–39.
15. Armstrong S, Braunschneider T. 2016. Receive, reorganize, return: theatre as creative scholarship. *Improve Acad* 35: 229–248.
16. Steele CM, Aronson J. 1995. Stereotype threat and the intellectual test performance of African Americans. *J Person Soc Psychol* 69:797–811.
17. Cherif AH, Somervill CH. 1995. Maximizing learning: using role playing in the classroom. *Am Biol Teach* 57:28.
18. Riechert SE, Leander RN, Lenhart SM. 2011. A role-playing exercise that demonstrates the process of evolution by natural selection: caching squirrels in a world of pilferers. *Am Biol Teach* 73:208–212.
19. Ross PM, Tronson DA, Ritchie RJ. 2008. Increasing conceptual understanding of glycolysis & the Krebs cycle using role-play. *Am Biol Teach* 70:164–169.
20. Stencil J, Barkoff A. 1993. Protein synthesis: role playing in the classroom. *Am Biol Teach* 55:102.
21. Strguic KS, Vilhar B. 2010. Interactive learning active teaching of diffusion through history of science, computer animation and role playing. *J Biol Educ* 44:116.
22. Wyn MA, Stegink SJ. 2000. Role-playing mitosis. *Am Biol Teach* 62:378–381.
23. Brummel BJ, Gunsalus CK, Anderson KL, Loui MC. 2010. Development of role-play scenarios for teaching responsible conduct of research. *Sci Engineer Ethics* 16:573–589.
24. Seiler SN, Brummel BJ, Anderson KL, Kim KJ, Wee S, Gunsalus CK, Loui MC. 2011. Outcomes assessment of role-play scenarios for teaching responsible conduct of research. *Accountability Res* 18:217–246.