ASEE Safe Zone Workshops and Virtual Community of Practice to Promote LGBTQ Equality in Engineering

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ASEE Safe Zone Workshops and Virtual Community of Practice to Promote LGBTQ Equality in Engineering

The results discussed in this paper are part of a transformative project that links diversity research with a faculty development initiative to promote LGBTQ equality in engineering. The aims of the project are to (1) identify aspects of engineering culture that present barriers to LGBTQ equality, (2) build knowledge and skills to disrupt discrimination and promote LGBTQ equality in engineering departments on college campuses and (3) to identify best practices for promoting LGBTQ equality in engineering. Safe Zone is a term commonly used in schools and workplaces to describe both a learning experience (workshops) as well as the individuals who have completed the training. Safe Zone workshops create a visible network of LGBTQ-affirming individuals who contribute to creating a positive and inclusive climate. While most Safe Zone initiatives are campus/workplace-wide, the workshops described in this paper were specifically designed for academic engineering departments. Over 270 engineering educators have attended the 20 Safe Zone workshops offered at the ASEE Annual Conference during 2014 and 2015. Evaluation results from these first two years indicated a clear call to expand the workshops and nurture the conversation about LGBTQ inclusion in engineering. To meet this need and to expand the impact of the workshops, a Virtual Community of Practice (VCP) was established through this project in 2015. The VCP redesigned the Level 1 workshops and developed Level 2 workshops with content in-formed by emerging research on LGBTQ inclusion in STEM. The redesigned workshops were launched online in spring 2016 and in person at the ASEE Annual Conference in 2016. This paper presents an update on the overall project and presents the evaluation results of the Safe Zone Level 2 workshops.

1. Introduction

Even though recent years have seen significant advances in LGBTQ (lesbian, gay, bisexual, transgender, and queer) equality in the U.S. through legislation and social acceptance, research shows that LGBTQ students and faculty on college campuses still experience exclusion and discrimination. Some college campuses offer training and programming for their student and professional community that aim specifically to promote understanding about LGBTQ issues and create more welcoming environments for LGBTQ students and colleagues. Safe Zone is a term commonly used in schools and workplaces to describe both the learning experience (ally training workshops) as well as the individuals who have completed the training. Safe Zone workshops create a visible network of LGBTQ-affirming faculty who commit to creating a positive and inclusive climate. While most Safe Zone initiatives are campus/workplace-wide, the workshops described in this paper were specifically designed for academic engineering departments.

At its 2014 Annual Conference, the ASEE Diversity Committee launched the first Safe Zone workshops ever offered at an engineering conference, to our knowledge. At that conference, a total of twelve workshops were offered, one in each technical session of the conference. The following year, eight additional workshops were run. In those first two years that the workshops were offered at the Annual Conference, over 270 engineering educators participated in a total of 20 Safe Zone Workshops offered at the ASEE Annual Conference. Evaluation results from the first two years indicated a clear call to expand the workshops and nurture the conversation about LGBTQ inclusion in engineering.

In 2015, the National Science Foundation funded a transformative project that links diversity research with a faculty development initiative to promote LGBTQ equality in engineering. The aims of the project are to (1) identify aspects of engineering culture that present barriers to LGBTQ equality, (2) build knowledge and skills to disrupt discrimination and promote LGBTQ equality in engineering departments on college campuses and (3) to identify promising practices for promoting LGBTQ equality in engineering.

A Virtual Community of Practice (VCP) was established through this project in 2015. The VCP relies on technology to support the creation of a scalable and sustainable model for sharing knowledge, tools and resources to promote LGBTQ inclusion in environments that are traditionally difficult to penetrate. Using a two-tiered, train-the-trainer structure, two experts trained a cohort of twenty leaders to facilitate online and face-to-face Safe Zone Workshops and lead a Virtual Community of Practice for engineering faculty.

The VCP redesigned the Level 1 workshops and developed Level 2 workshops, both with content informed by emerging research on LGBTQ inclusion in STEM. The workshops were launched online in spring 2016 and in person at the ASEE Annual Conference in 2016. A previous paper described the development of face-to-face Safe Zone workshops and their implementation at the ASEE 2014 and 2015 Annual meetings [1]. The current paper presents an updated literature review and presents a comparison of Safe Zone Level 1 workshops conducted in face-to-face and virtual environments during the spring of 2016.

2. Background

In its 2012 "Engage to Excel" Report to President Obama, the U.S. President's Council of Advisors on Science and Technology (PCAST) called for producing one million more STEM professionals over the next decade than would be produced at the current graduation rates. This equates to a 34% annual increase in undergraduate STEM degrees awarded annually. Citing a very low average undergraduate STEM retention rate of 40%, the report recommends the fastest and most economically viable option for achieving the workforce goal is to retain more STEM majors [2].

One of the key reasons that students cite for leaving STEM is the perception of a chilly climate, especially by those who are members of underrepresented groups [2]. Campus and classroom climate is essential for retention and also for learning. How students experience their campus environment impacts both learning and developmental outcomes [3]; [4]. Environments in which students experience harassment or discrimination hinder student learning [3-7]. Failure to create an inclusive environment for minority students affects both minority and majority students, and there is compelling evidence that diversity among students and faculty is crucially important to the intellectual and social development of *all* students [8-10]. The benefits of diversity extend well beyond the university years: research suggests that improving diversity in a workforce can have positive effects on innovation and productivity [11]. Given the need to increase our STEM workforce to remain competitive in a global economy, efforts must be made to attract and retain talented individuals to STEM disciplines and professions. To this end, increasing diversity in science and engineering has become a national priority [12]. The National Academies calls for elimination of all forms of bias that may hinder academic career success in science and engineering [13].

Federal funding programs have been established to increase the representation of underrepresented groups in STEM, for example, the National Science Foundation's Broadening Participation in Engineering program, which aims to increase the representation of ethnic and racial minorities. However, other groups such as LGBTQ-identifying persons, who are also underrepresented in STEM [14], have not been directly served by previous efforts to increase diversity.

Recent years have seen significant progress toward LGBTQ equality in the United States through legislation and societal acceptance, but research examining perceptions and experiences of LGBTQ people on college campuses clearly demonstrates the prevalence of negative experiences that range from exclusionary behavior to overt discrimination [15-20]. A landmark study involving over 5,100 students, faculty and administrators from all 50 states was conducted to explore how LGBTQ people experience campus climate and to examine behavioral and institutional responses to LGBTQ issues [21]. The following examples illustrate several disturbing trends that emerge from the study:

- Within the last year, 29% of LGBTQ students and faculty experienced harassment and discrimination; one-third of respondents believed the university's response to incidents of LGBTQ harassment was inadequate.

- 13% of LGBQ, 22% of transmasculine, 17.9% of transfeminine, and 17.3% of gedernonconforming respondents feared for their physical safety on campus.

- 31% of LGBTQ respondents were not comfortable with the campus climate; an even higher percentage (37%) of students were not comfortable in the classroom. The percentage of those uncomfortable in the classroom was highest (41%) for students who identified as lesbian or queer.

- 30% of LGBTQ individuals seriously considered leaving their institution due to negative experiences and perceptions. This percentage was highest (42%) for faculty and first year students (72%).

These experiences and perceptions are attributed directly to sexual orientation and gender identity, and they extend to both students and faculty. The intersection of multiple cultural and social identities (e.g. race, religion) significantly increases the risk of negative experiences and perceptions of climate. Despite the discrimination and negative perceptions that pervade the campus climate for LGBTQ people, only 4% of U.S. institutions offer support services specifically focused on the needs of this community [22].

Initiatives such as Safe Zone ally training are effecting a gradual positive change in campus climate for LGBTQ individuals [23]. Yet engineering departments have proven more impervious to change than other disciplines [15, 17, 20, 24-27]. LGBTQ engineering students are immersed in unwelcoming and often hostile heteronormative environments [17, 27]. Prejudicial cultural norms and perceptions of competence limit opportunities for success, causing stress, social and academic isolation, and anxiety over future job security [17], [28]. Science and Engineering professionals report experiences and perceptions similar to those of students [18], [15], [29]. In a study that compared the academic climate and career consequences for LGBTQ

faculty, those in STEM fields reported the highest level of discomfort on campus, in departments and in classrooms; those who were not comfortable were 2.56 times more likely to consider leaving [19]. More research is needed to understand the institutional and cultural processes in engineering education that promote or hinder LGBTQ inclusion and how interventions like Safe Zone trainings might improve the climate.

3. Project overview

The Safe Zone workshops that are the focus of this paper are part of a transformative project that links diversity research with a faculty development initiative to promote LGBTQ equality in engineering. The motivation to improve the climate for LGBTQ engineers in academic departments is based on research that shows (1) evidence of negative campus climate for LGBTQ engineers, (2) a link between climate and academic/career consequences, and (3) the importance of diversity in the intellectual and social development of students and in increasing innovation and productivity in business. These research findings point to the need to improve the climate for LGBTQ individuals in engineering [15, 18, 19, 25, 28].

3.1. Research-Action cycle

This project is a research-informed faculty development initiative that uses social change strategies to foster a positive and welcoming environment for LGBTQ individuals in engineering departments [30], [31]. Our research investigates the factors in engineering culture that hinder LGBTQ inclusion. The new knowledge that is generated from the research is being incorporated into the targeted Safe Zone interventions to better tailor them to an audience of STEM professionals and students. This approach is based on the transformative cyclical research model described by Mertens [32].

3.1.1. Research

Cech and Waidzunas [17] and others have suggested that heteronormativity and heterosexism may be promoted through particular ideologies in engineering culture, especially "technical/social dualism" (devaluation of social, communicative and personnel-related aspects) [33-35] and "depoliticization" (relegation of questions of social justice and inclusion as "political," and thus irrelevant to "real" engineering) [34, 36]. Little is understood about these cultural factors and how they undermine the advancement of LGBTQ equality. Further, manifestation of this culture within engineering departments likely varies significantly by region, policy environments, and student and faculty demographics. Research is needed to advance our scholarly understanding of cultural factors in engineering that impede and promote LGBTQ equality, which in turn will allow us to contour the content and promising practices of Safe Zone workshops to be most effective for engineering audiences.

Our mixed-methods research plan uses surveys of engineering deans, faculty and students as well as ethnographic participant observations of a Virtual Community of Practice for LGBTQ inclusion in STEM. The surveys and ethnographic research generate new knowledge and understanding of engineering cultures, which provides empirically grounded ways that the next Safe Zone workshops can be contoured to be most effective for engineering audiences. The research findings help the members of the Virtual Community of Practice advocate more

effectively as they try to promote LGBTQ equality in their departments, and help shape promising practices for promoting LGBTQ equality in engineering.

Surveys: In the fall of 2015 the survey of Engineering and Technology Deans was completed. The purpose of the survey was to understand the extent to which deans serve as formal and informal advocates for (or blockades to) positive change. The survey was distributed via the ASEE Dean's Council which has 370 members representing over 90% of U.S. deans. 40 Engineering and Engineering Technology Deans participated in the survey, which explored (1) deans' assessment of the climate in their college for LGBTQ students and faculty, (2) deans' personal support for LGBTQ equality and inclusion measures, and (3) deans' perception of support among their faculty and students for LGBTQ inclusion measures. The findings provide important insights into the cultural landscape for LGBTQ inclusion in engineering. While only about 1/3 of deans were aware of incidents of LGBTQ bias within their colleges, most deans did express strong support for a variety of LGBTQ-inclusion initiatives. The strength of their support for these initiatives suggests that engineering deans may be an underutilized resource for supporting changes that promote LGBTQ inclusion. This research also identified a potential obstacle to LGBTQ inclusion initiatives: engineering deans perceived that faculty would be unsupportive of such initiatives [37].

Deans who participated in the survey were asked to forward separate survey links to faculty and students in their college. These surveys, which were conducted in the spring of 2016, explore personal support for LGBTQ equality and inclusion measures, assessment of climate among peers and in their college, and experiences of LGBTQ faculty in comparison to their non-LGBTQ peers. Eight engineering deans ultimately agreed to have their colleges participate in the study. Survey responses from 240 faculty and 1729 students across these eight schools were used in the analysis. The results of the student survey are the focus of a forthcoming paper [27]. Findings show that (1) LGBTQ students are significantly more likely than their non-LGBTQ peers to report marginalization in their engineering programs; (2) LGBTQ students are less likely than their peers to feel that their work is respected, (3) these negative experiences have serious personal consequences such as emotional strain, difficulty sleeping, stress and exhaustion caused by compartmentalizing their lives [27]. These findings were consistent across all eight school involved in the study, indicating that heteronormativity and homophobia are part of STEM culture more broadly, not micro-cultures that are observed in environments that are especially conservative.

Ethnographic Participant Observation: The goals of participant observation in the Virtual Community of Practice is to illuminate advocates' experiences to promote LGBTQ inclusion, and to develop promising practices in Safe Zone workshops for engineering audiences in general and also for different engineering school environments. The ethnographic observation is ongoing.

3.1.2. Action

The Virtual Community of Practice (VCP) A community of practice has three essential elements: the domain (interest in LGBTQ equality), the community (members who engage in

discussions, support each other, share information and learn from each other) and the practice (promoting LGTBQ inclusion at the department level) [38]. A Virtual Community of Practice was established to promote LGBTQ equality and inclusion in Engineering. VCP participants were recruited via email distribution lists, and ultimately 20 leaders were selected from institutions across the country. The participants bring diverse personal and professional experiences to the community and a common commitment to advancing LGBTQ equality in their institutions.

A series of facilitator training sessions was led by two meta-trainers who trained twenty faculty to facilitate Safe Zone. The meta-trainers brought rich perspectives and expertise to the community: The training involved about 10 hours of online facilitator training and practice prior to the start of the Safe Zone Workshops, and two follow-up meetings after the facilitator training was complete. The participants learned human relations facilitation skills, developed workshop content and produced actionable resources for their Safe-Zone workshops and VCP.

The VCP meets approximately biweekly to (a) identify LGBTQ inclusion approaches appropriate for their department context, (b) share resources and (c) support each other as they develop and implement an action plan to change climate and promote LGBTQ equality in their own departments.

Safe Zone Workshops are campus ally training programs that aim to create a visible network of LGBTQ-affirming individuals and contribute to creating a positive and inclusive climate [23, 39]. Conventional Safe Zone Workshops are general training for all members of a campus community, and they address general campus concerns rather than issues that might arise in departments and classrooms. This project has created a series of research-informed interactive Safe Zone workshops to raise awareness for LGBTQ inclusion *in engineering* and create a network of allies to foster a supportive atmosphere for LGBTQ individuals *in engineering*.

The content of the Safe Zone Workshops was developed to address learning outcomes embraced by the Consortium of Higher Education Resource Professionals [39]:

> (1) understanding LGBTQ concepts and developing awareness of biases,
>
> (2) understanding LGBTQ issues and recognizing discrimination and heterosexual privilege and
>
> (3) becoming support persons to LGBTQ individuals.

A fourth, unique objective of our training is:

> (4) to develop an understanding the aspects of engineering culture that act as barriers to LGBTQ equality.

As recommended by Woodford [39], the program offers an incremental design with successive trainings to address audiences with varying levels of knowledge and awareness. The content of the Safe Zone workshops are tailored for a Engineering/STEM audience by incorporating the findings from our research on LGBTQ in Engineering. This is done by various means such as

direct presentation of quantitative results, case studies about experiences of LGBTQ individuals in STEM, and activities exploring how STEM culture impacts LGBTQ individuals. Upon completion of Safe Zone training, graduates receive a Safe Zone sticker to display in their workplace. This simple symbol of LGBTQ alliance has been shown to benefit LGBTQ students and faculty in powerful and meaningful ways [23].

4. Implementation

In the spring of 2016, ASEE hosted two Safe Zone Level 1 workshops online. Adobe Connect was used for synchronous communication during the webinars; this web conferencing tool provides a broad range of capabilities for real time collaboration. ASEE staff provided technical support for the communication platform.

Four additional Safe Zone Level 1 workshops were conducted in a face-to-face format at the ASEE Annual Conference in June. These were held during regular technical sessions throughout the conference.

Workshops in both formats were 90 minutes in duration and were co-facilitated by members of the VCP.

ASEE conducted surveys with the participants from all of the Safe Zone 1 & 2 workshops from Table 1 and the finding of this mid-term evaluation report are based on the survey data. The survey questions evaluated (1) participants' gains in knowledge and awareness and (2) "action gains" which indicate a participants' likelihood to adopt a specific inclusive behavior.

5. Results and discussion

5.1. Survey responses

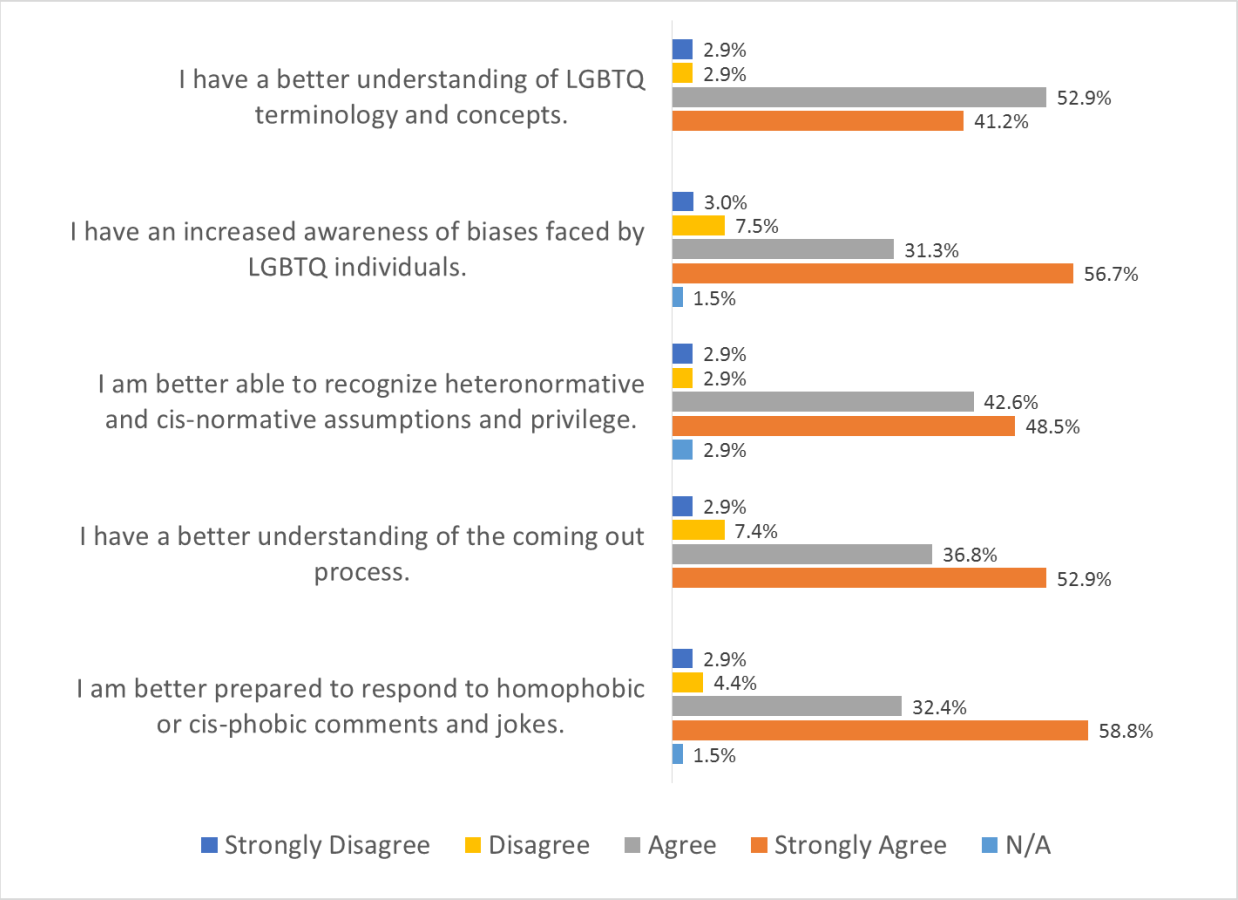
A total of 69 survey responses were received. There were a total of 49 responses for the online Safe Zone workshop surveys and 20 responses for the face-to-face workshop surveys.

The survey response rate for the face-to-face workshops was very low. An estimated 60 participants attended the face-to-face conference workshops, but only 20 survey responses were received. For comparison, there were a total of about 80 online workshop participants, and 49 survey responses were received. This is thought to be due to time constraints which are a result of the face-to-face interaction as well as the conference schedule.

5.1.1. Knowledge and Awareness

Participants reported increased awareness and positive learning outcomes from the workshops. Understanding and awareness of LGBTQ concepts and terminology; identity formation and disclosure; awareness of bias, challenges, assumption and privileges have all increased, as reported by participants (Figure 1).

Figure 1. Awareness and Knowledge Gains: Safe Zone Level 1 Workshops

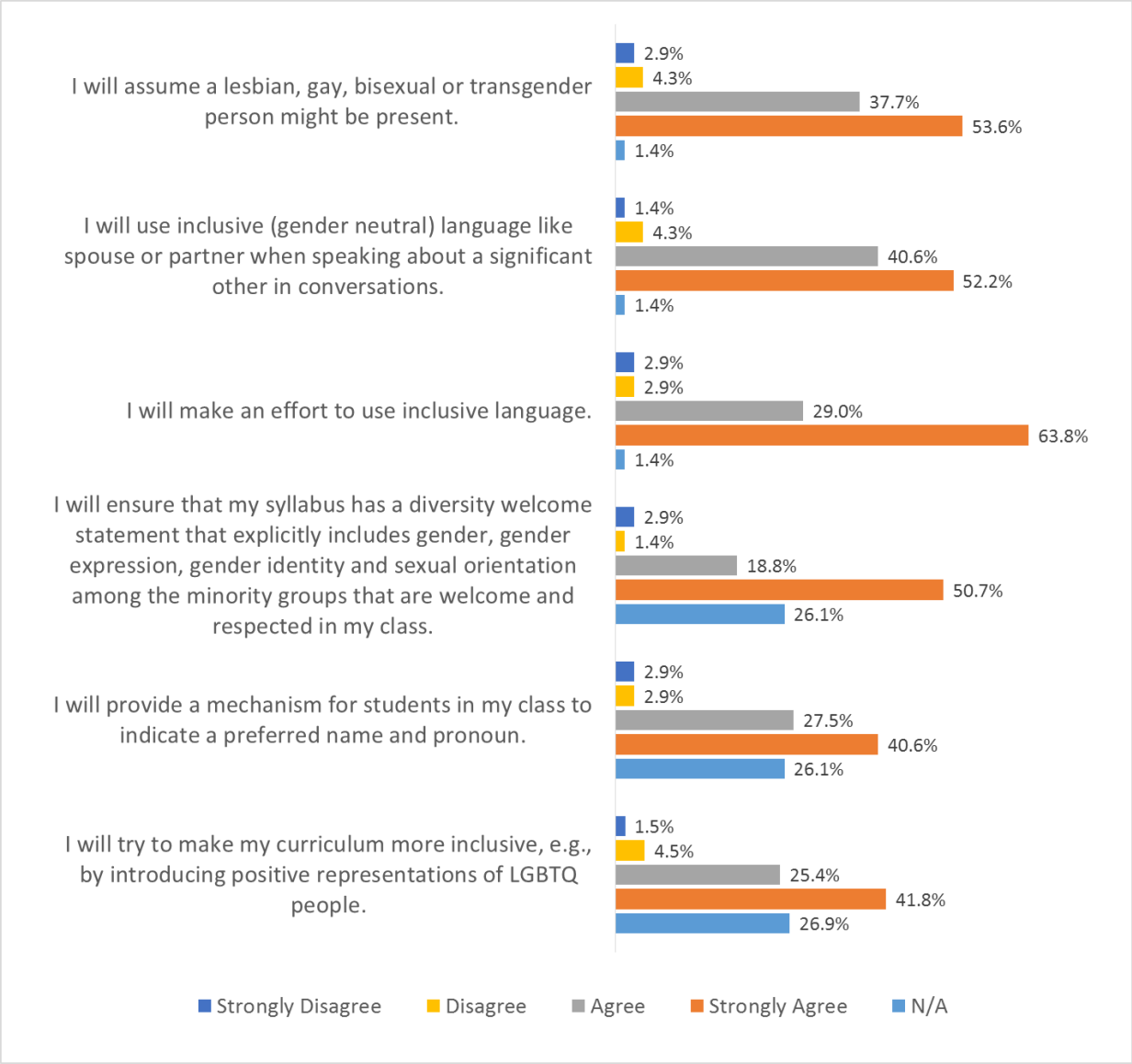


5.1.2. Action Gains

Preparedness to take action to promote LGBTQ inclusion showed higher gains in comparison to knowledge and awareness. Respondents overwhelmingly reported increased levels of readiness to act (Figure 2).

We did not collect data on participant level of experience with LGBTQ concepts and issues, but one plausible assumption is that attendees were already LGBTQ allies who were knowledgeable on LGBTQ issues and attended the Safe Zone Level 1 workshop to mostly gain applied skills on strategies and action items from practical experience and hands-on activities. Three (3) participants from the face-to-face Safe Zone Level 1 workshops at the 2016 Annual Conference validated that point by sharing in their open-ended comments that they really valued the practical examples of how to be more receptive, what to do in problematic situations, and how to respond to bias, as well as valuing the ‘coming out’ activity.

Figure 2. Action Gains: Safe Zone Level 1 Workshops



5.1.3. Comparison of online and face-to-face Safe Zone Level 1 workshops

We also compared how online and face-to-face Safe Zone Level 1 participants reported on the knowledge/awareness questions action item gains questions shown in Figures 1 and 2. Given that the sample sizes were unequal and that conditions for normality and variance were not met, a non-parametric test (Kruskal-Wallis) was used to compare means. For Safe Zone Level 1, there were no statistical differences for the questions of interest in Figures 1 and 2, using a conventional 0.05 alpha level. A summary table of the p-values for each of the variables is included below (Table 1). While there were no statistically significant results, there were three questions which approached statistical significance, and hence may be reviewed for clinical or

practical significance. These results were the *Respond_comments, Syllabus_diversity_statement*, as well as the *Preferred_Pronoun*.

Table 1. Summary Table of p-values for Kruskal-Wallis Analysis, Safe Zone Level 1

Items	p-value
Better_understanding I have a better understanding of LGBTQ terminology and concepts.	0.169
Increased_awareness I have an increased awareness of biases faced by LGBTQ individuals.	0.136
Recognize_privilege I am better able to recognize heteronormative and cis-normative assumptions and privilege.	0.661
Coming_out_process I have a better understanding of the coming out process.	0.292
Respond_comments I am better prepared to respond to homophobic or cis-phobic comments and jokes.	0.070
LGBTQ_Present I will assume a lesbian, gay, bisexual or transgender person might be present.	0.207
Inclusive_language I will use inclusive (gender neutral) language like spouse or partner when speaking about a significant other in conversations.	0.815
Use_inclusive_language I will make an effort to use inclusive language.	0.384
Syllabus_diversity_statement I will ensure that my syllabus has a diversity welcome statement that explicitly includes gender, gender expression, gender identity and sexual orientation among the minority groups that are welcome and respected in my class.	0.093
Preferred_pronoun I will provide a mechanism for students in my class to indicate a preferred name and pronoun.	0.098
Inclusive_curriculum I will try to make my curriculum more inclusive, e.g., by introducing positive representations of LGBTQ people.	0.184

A series of open-ended questions was included to provide further context to the survey responses. Online workshop participants provided very few responses to the open-ended questions, but there were 21 comments in total for the Safe Zone Level 1 face-to-face workshop at the 2016 ASEE Annual Conference. The number in brackets following the summary of open-ended comments is the frequency in which they occurred across the data. Attendees praised the workshops as a safe and open environment, and their content for being focused and very informative (2). Good resources and handouts were available (2). The facilitators were excellent – welcoming, genuine, open and inclusive (5). Respondents enjoyed the participatory nature of the workshop: it wasn't just a lecture with presenters talking at the audience. There were also activities, group work, and small group discussions (3). Specifically, they valued practical

examples of how to be more receptive, what to do in problematic situations, how to respond to bias, as well as the 'coming out' activity (3).

5.1.4. Recommendations for improvement to Safe Zone Level 1 workshops

Several respondents indicated that the conference workshops did not offer sufficient time (12). One suggestion, if scheduling for longer workshops is not possible, was to have the option of participants to voluntarily stay afterwards for more discussion and Q&A, at the discretion of the facilitator. Further suggestions for improvements of future Safe Zone workshops were to provide handouts as a packet at the beginning of the session (*note: that was the norm but it's possible that a facilitator forgot and distributed them at the end*); and to offer Safe Zone Level 1 & 2 sessions consecutively.

6. Conclusions

Overall the Safe Zone workshops in both formats are meeting the goals of raising awareness and increasing knowledge; participants also indicate intentions to adopt LGBTQ-inclusive behavior using promising practices presented during the workshops. Although there was no significant difference between the mean survey responses for the two workshop formats, the participants in the face-to-face were much more likely to provide feedback via the open response questions. Their responses indicate that the participants found the participatory nature of the workshop to be particularly valuable, and they learned through the different types of interaction such as group conversations, case studies, and activities. Participants also indicated that the workshops could be improved by allowing more time for them.

Our experience has been that time management is more challenging in the face-to-face workshops. While the activities were basically the same in the two workshop formats, the modes of communication are different. The face-to-face workshops are more likely to involve spontaneous questions and group discussions, whereas the content coverage and participatory activity were more clearly defined by the online structure.

There are practical considerations that prevent offering longer Safe Zone workshops during regular conference sessions. In the specific context of the ASEE conference workshops, there is a practical limitation of a 90 minute conference session; at the end of the session participants move to other sessions, and another session is scheduled in the same room. The only practical options are better time management and reduced content coverage.

Moving forward we will consider both better time management and modified content coverage as possible ways to improve the Safe Zone experience. Time management should be addressed in a manner that does not negatively impact the participatory nature of the workshops.

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