Social Dialogue in the Engineering Classroom: The Effect of National Events on the Political and Social Attitudes of First-Year Engineering Students

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Introduction

This research paper focuses on the effect of recent national events on first-year engineering students' attitudes about the role of sociopolitical events on their lives and the value of discussing these topics in the engineering classrooms. The purpose of this study is to explore depoliticization in the college engineering classroom and student awareness of current political events at the local, national and global levels. To better address this issue we used data from student interviews to examine:

1. Do students feel that the the current political climate has an influence on them, if any?
2. Do students feel that current social or political events should be discussed in their STEM courses?

Engineering classrooms and cultures often focus on mastery of content and technical expertise with little prioritization given to integrating social issues into engineering practice [1]. This depoliticization (i.e., the removal of social issues) in engineering serves to undercut the value of these issues and students' perception of the appropriateness of these topics in engineering curricula. We argue that these topics (i.e., those related to inclusion of diverse individuals in engineering, working in diverse teams, and developing cultural sensitivity) are vital to engineering; the persistent issue of the depoliticization of the field is detrimental to the development of socially-conscious engineers [2]. In this paper, we focus on the effects of the shift in the national discourse about diversity during Spring 2017 on engineering students' attitudes to better understand how they do or do not engage with current events and how those connections could be leveraged to improve mechanisms for bringing politics into the engineering classroom.

Background

Cech defines depoliticization in engineering contexts as, "the ideology... which frames any 'non-technical' concerns such as public welfare as irrelevant to 'real' engineering work; the technical/social dualism, which devalues 'social' competencies such as those related to public welfare; and the meritocratic ideology, which frames existing social structures as fair and just" [2, p. 45]. Depoliticization insists upon technological and engineering approaches that remain objective and neutral and that distance themselves from the political sphere. Depoliticization denotes an unobtainable approach to engineering that disrupts the connection between social (i.e., political) and technical content. In focusing purely on technical content, engineering is framed as asocial, and thus apolitical [3].

These above ideologies, in part, lead students to become disengaged with issues of social welfare as they are professionalized into the engineering field. People in depoliticized engineering spaces often believe they can and should separate "pure" engineering work from social or political

constraints because they may otherwise become biased. This quest for purity projects that the everyday work of the engineer is far removed from social concerns. Despite explicit instruction from engineering educators, students receive the hidden curriculum of depoliticization through subtle messages, day-to-day interactions, and informal policies [4].

The depoliticization practiced in engineering work can be selective. Cech [2] found that social interactions amongst engineers involved personal conversations about home life, weekend activities, and meeting icebreakers. Professional activities at work were not always strictly "professional"; these activities did not always exclude personal topics. However, topics that extend into issues that may be viewed as controversial or having the potential for controversy were largely ignored in engineering conversations [5]. Depoliticizing engineering spaces can be lead to a devaluing of the social issues that are central to engineering work [5]. This can be dangerous for individuals who are not in the majority because discussing issues of inequality are tangential to the primary technical concerns in engineering, making it more difficult to discuss and rectify these issues.

The 2016 national election brought a number of social and political issues into the national spotlight that could be important for engineers, but may not be discussed due to depoliticization. These issues include but are not limited to race, environmental protection versus job creation, nationalism versus globalism of the economy, women's rights, access to health care, tax reform, education, LGBTQ rights, and immigration. Specifically, sources have noted that clashes are occurring more and more in the workplace due to the new found salience of these divisive issues and the conviction individuals have for their beliefs in these issues [6], [7]. Given these recent shifts in the national discourse around diversity as highlighted by the 2016 Presidential Election [6], this work seeks to understand how the depoliticized environment of engineering served to either address or ignore these shifts as perceived by engineering students enrolled in first-year introductory courses.

Methods

This study resulted from an ongoing project investigating how students' attitudes towards diversity influence how students experience work in diverse teams. Concurrent with the 2016 presidential election and during the collection of interview data as a part of this larger study, a shift occurred in the national discourse around diversity. As such, we sought to understand how this shift in the national discourse did or did not influence engineering students in STEM classrooms. As a part of acknowledging the changing sociopolitical discourse occuring on a national scale in our own research, we included additional interview questions related to students attitudes about recent national events while conducting our planned research on students' attitudes about diversity. We felt that this shift in the research plan was warranted to capture how student attitudes may be influenced by the larger context in which our study was occuring. The results of this inquiry revealed a deep sense of depoliticization for many students, even first-semester engineering students, and some concerns about lack of connection of engineering courses to the larger social context in which engineers must work.

Participants

Twelve first-year undergraduate students enrolled in a semester long introductory engineering curriculum at a Western land-grant institution were recruited to participate in the study. These students were part of a larger study of students' attitudes about diversity and experiences working in diverse teams (NSF number redacted). To create diverse teams, students were grouped using the Comprehensive Assessment of Team Member Effectiveness (CATME) Team Maker tool [8], [9]. This tool optimizes students out-of-class schedules and creates diverse teams without isolating minoritized students. In these groups, students were encouraged to rotate assigned roles regularly, participate as engaging and contributing members, and focus on communication. They were also given explicit instruction on how to practically enact those effective teaming behaviors.

Teams of students were selected for a in-depth study based on the average variation of students' in a team responses on a quantitative survey measuring their attitudes about diversity. We selected teams with low and high variance in diversity attitudes as well as teams with low and high mean diversity sensitivity. This process was done to observe teams with similar positive attitudes about diversity and negative attitudes about diversity as well as teams with varying attitudes about diversity. We also selected student teams that included students who resided at the intersection of multiple minoritized identities including women, underrepresented racial/ethnic groups, and students with disabilities [10]. Participants included six women (two White, one Hispanic, three multi-ethnic) and six men (4 White, 2 multi-ethnic). Three students self-identified a physical or learning disability, one male student identified as cisgender and two women identified as bisexual. Additional demographic information can be found in Table 1. One woman did not want to talk about this topic in her interview due to events outside of the scope of the research questions; she is not included in the table below. We have chosen to only include some self-identified information to reduce the chances of re-identification.

Data Collection

In the spring of 2017, data were collected through two 60 minute semi-structured individual interviews. All interviews were audio recorded and transcribed verbatim. Interviews were conducted the semester following the first-year engineering design course (between 12 and 20 weeks) and were conducted within approximately two weeks of each other. The first interview focused on students' history to gain better insight into their interests in engineering and experiences with diversity. The second interview explored students' perceptions of diversity as it relates to their experience working on teams. In consideration of national events that may have influenced students' perceptions of our research topic, a portion of the first interview focused on questions about recent national events to further explore how students viewed these events in relation to engineering. We purposefully wrote these questions to be open to a wide range of potential topics to avoid leading the interviewee to discuss particular topics and to avoid undue influence from the research team.

Table 1. Participant Demographics including discipline and self-identified demographics.

Pseudonym	Engineering Discipline	Self-Identified Demographics
Amelia	Electrical	Female, White/Multi-ethnic, Disability
Harry	Mechanical	Male, White, listed gender "Assault Toaster," Midwesterner
Lennon	Computer Science	Male, Multi-ethnic (Asian/White)
Mallory	Computer Science	Female, Multi-ethnic (White/Native Hawaiian/Pacific Islander/Indigenous/Scottish/Irish)
Claire	Environmental	Female, Hispanic
Gatsby	Computer Science	Female, Multi-ethnic (Asian/White), Single-parent male household, Disability
Clinton	Electrical	Female, Asian/White, Single-parent male household, Disability
Longhorn	Civil	Male, Multi-ethnic (German, Native American, Southerner), Sophomore
Sage	Chemical	Male, White, Cisgender, *Non-nuclear family, identified as American
Dirk	Mechanical	Male, White, *Non-nuclear family, Irish
George	Chemical	Male, White, identified as American

**Non-traditional family group consisting of more than two parents.*

To provide an audit of our potential influences as a research team we document our positionality. The research team consists of members with a wide range of political views (consisting of registered democrats, republicans, and independents) and demographic diversity (including but not limited to individuals who identify as mixed race, White, male, female, cisgender, gay, and straight). All members of the research team had an interest in understanding and improving the experiences of diverse individuals in engineering. Prior to conducting the interviews, the entire research team documented and discussed their positionality so as to understand the ways in which their position as a researcher could influence the interview and analytic processes.

During the interview, participants were asked to reflect on the personal impact of recent national events and how political discussions were or were not integrated into their STEM classrooms. Following a semi-structured interview protocol students were asked: 1) Have recent national events impacted you in any way? 2) Have national events been discussed in your STEM classes? 3) If so, what was discussed and how was it discussed? 4) Do these conversations have a place in STEM classes? 5) Are there events you wish were discussed that have not been? All recruitment and data collection procedures were approved by the research institution's IRB.

Analysis

Qualitative data were analyzed using a modified form of Interpretative Phenomenological Analysis (IPA) in which inductive coding was used to develop themes that were audited by the author team [11]. We call our approach to analysis a "modified form of IPA" because in this work, we sought to understand how students interpreted their lived experiences in engineering classrooms, rather than trying to understand the "truth" of how shifts in national discourse were incorporated into the classroom.

To code data, the lead author listened to audio recordings of student interview sessions accompanied with a written transcript. Following, the author analyzed the written transcript and highlighted patterns in students' expressions of their lived experiences [13]. These patterns were then coalesced into themes based on similar patterns of expression. Recurring themes across each were used to organize subordinate and superthemes to characterize student attitudes. Superthemes and subordinate themes were used to generate a codebook that was utilized to reexamine the students' responses for theme variation. All themes that emerged or segments of responses that did not transparently connect to subthemes, were discussed with the research group, reanalyzed, and then defined.

This interpretive approach requires quality assurance methods that align with our methodological approach. To address quality, we utilized the interpretive quality framework developed by Walther, Sochacka, and Kellam [12]. This framework simultaneously accounts for the human aspects of conducting research within a community (e.g., participants, researchers, and readers) and aligns with our methodological design as it intends to capture the voices of the participants' and researchers' interpretations. We adopted multiple validation processes to ensure quality in this work. Theoretical validation, was utilized in selecting participants who were enrolled in a first-year engineering design course working in teams that were purposefully assigned to be diverse by gender, race/ethnicity, and primary language of instruction in high school. A range of students were interviewed allowing for us to present cases that capture the range of student experiences with and opinions of political issues. To establish a level of procedural validity, a codebook was created to systematically document the analytic process and provide grounds to understand researcher positionality across the project team. To generate communicative validity, themes were generated from participants words and phrases used throughout the interview. After generation of themes, the results were related back to existing theory for comparison and enhanced discussion. The process of comparing results back to theory establishes a level of pragmatic validation. By checking interview transcripts for authenticity and checking coding results through conversations between research team members we were able to establish a level of process reliability.

Findings & Emergent Themes

Two preliminary themes emerged from the interview analysis: *future-self impact* and *political awareness*. When asked if and then how national events impacted them personally, students described social issues and political discourse as relevant to their futures as engineers but not connected to or relevant in their present experiences as engineering students. This trend emerged

despite students expressing an awareness of current political events at local, national, and global levels. Additionally, each student recognized the personal and social impacts that these events had on their close friends, family members, and society. We describe these emergent themes below.

Future-Self Impact: Who am I as an engineer?

When asked if national events were discussed in any of their STEM classes, Harry and Clinton did not recall any specific occurrences but were outspoken that these conversations should be taking place in STEM classrooms:

> Oh, 100% because a lot of these national events and ideas will affect engineering because everything is engineered. Pretty much all of manufacturing ever, that's engineering, so a lot of those things will affect production and designing and resources, so, yeah, they definitely have a place. (Harry)

> I think government policies also affect engineers. I think if there's like a national thing with the government, I think that that should definitely be talked about in STEM classes because it affects people and it affects their jobs. It will affect their future… (Clinton)

Clinton viewed policy as important for the work of future engineers and of her fellow students. However, Clinton did not see a direct connection between her major and current national events, even though she was able to connect current events and their importance to the practices of other engineering disciplines:

> I think if I was more like a civil and environmental engineer I would want to talk about the EPA more. I'm not really a civil or environmental engineer. There's a lot of things that Trump wants to do with the Environmental Protection Agency that I would probably want to talk about. (Clinton)

In contrast to Clinton, Claire was able to directly connect perceived policy changes to her future desires of joining the United Nations and making the greatest future impact by pursuing work on climate change and water management. She described being upset with the elected president's, Trump's, stance on climate change and how it might negatively influence her chances at a desirable job opportunity. Claire's outlook into future appear to be dim based on shifts in the national discourse:

> I hope the world is not in shambles to where nothing can be fixed. I don't know, he [Trump] wants to repeal a lot of good environmental things that Obama had established and, hopefully, it's not so bad to where it's irreversible just because I know some things like that are. I don't know. Hopefully, I am just looking forward to graduating and trying to fix whatever he's broken. (Claire)

Sage extended the connection that Clinton and Claire described between political events and a future in engineering one step further. He politicized engineering by discussing not only the effect of policy change on his desired future in engineering but also his ability to provide beneficial solutions to society as a whole:

> …with the response to our science based organizations on the federal level, and the events that were unfolding around those concerning the gag order that was placed on the administrations or discussions of potentially pulling grant funding, etcetera, I think those are things that directly impact us as future engineers who will rely on those institutions in order to do work that benefits society. (Sage)

Clinton, Sage, and Claire, all discussed an emerging uncertainty for their futures in engineering given the shift in the political discourse at the national level. The shifting emphasis and priorities related to environmental protections and the future of federal research agencies created a sense of uncertainty in how students describe their own and other students' futures as engineers. This uncertainty lead to concern about their potential to get a job, the scope of problems to be addressed, and the removal of resources that have allowed engineers to be leading problem solvers for society.

Despite the expressed concerns and uncertainty by some students in relation to discussing political and current events in their STEM classrooms, others saw those discussions as positively related to their futures in engineering and their potential employment. After the election, Longhorn recalled the current administration focusing a lot of discussion on infrastructure:

> So that [focus on infrastructure] ... that looks good for me. That looks like some ... in a way, job security, so I like that. (Longhorn)

Longhorn displayed an optimism about policies that could create job opportunities and have a direct relation to his career path as a civil engineer. Specifically, policy changes served to further solidify his future goals as they provided a level of stability for his future employment. While Longhorn demonstrated an emotional contrast to the other participants of this study, he did indicate that current events directly affected his future as an engineer. In discussions, students largely made these connections between current events and their futures in engineering on their own, as political events were not discussed in their current courses:

> In [Introductory Engineering], I expected this most, and I was a little surprised when it didn't happen, but directly connecting what engineers are needed for. For me, a lot of that came internally, I already knew why I was an engineer, exactly what the need for an engineer in my field was, in terms of sustainability, but addressing both scientific and social problems and understanding how engineers interact with those, I don't think has ever been formally discussed in any of my classes, or that there's even ever been room to discuss those in my classes. (Sage)

Overall, students felt both positively and negatively about discussion of current events in the STEM classroom. No students described instances of these events being discussed in their classes, but many of them made connections between current events and their future engineering pathways or current pathways for other engineers. Interestingly, very few students connected current events to their current engineering roles. This lack of connection may point to the hidden messages of depoliticization implicit in engineering instruction.

Political Awareness: Personal and Social Impacts

Given students' clear connections between their desired futures in engineering and current political events, and their acknowledgement of limited discussion of these events in engineering classes, we sought to understand if students thought politics should be a part of the discourse in their engineering classes. When asked about political events and their role in the classroom, students expressed a spectrum of views. On one end of this spectrum, students took an apolitical stance and saw no relevance of national events to engineering courses. Six of twelve students were adamant in their beliefs that political discussions had no place in the classrooms. Longhorn, a self-identified conservative, shared that he enjoyed a good debate and was open to hearing differing perspectives as a means to solve problems. However, in a partner or group setting, Longhorn felt that religion and politics were best not discussed as they could lead to conflict:

> More or less if it [political discourse] has nothing to do with the topic, whatever we're trying to achieve, it has no business there. So, avoiding it is usually I would say the best way I go about it. And that way it helps stay on task to what we're trying to achieve.

Lennon, who became very politically active during the election, admitted to using politically charged jokes as a means to make friends in his introductory engineering course. Strident in his views, he did not believe that discussions about national events and topics relating to diversity belong in the classroom. Lennon said, "When I'm in physics, I'm there to learn physics. I'm not there to learn how racism in the United States has affected employment and things like that." This trend expressed by Lennon and Longhorn was also echoed throughout the interviews by Gatsby:

> Maybe depending on the specific topic that will come up in national news and things like that then it could pop up in some classes but other than that, what's going on right now in international news, I don't see it being any relevance of any of my classes.

From Lennon and Longhorn's interviews, we heard a discussion that mirrored what is found in the literature on the depoliticization of engineering. These students believed that engineering and STEM classroom spaces were not places for political discussion as those topics were not relevant to the focus of the course or what they were "supposed to learn" in that classroom. This perspective manifested in two different ways. Students either felt that a course should be focused on a particular set of limited content and not stray from that like Lennon, or they believed that discussions about current events would distract from the goal a team or group was trying to achieve in their course deliverables like Longhorn.

While some students focused on course content or goals as influencing if discussions of current or political events should be present, other participants felt that political discussions in class were messy and controversial, likely to cause debate instead of opportunities to come together. Even if they felt that these topics affected them as engineers, they did not feel that an engineering or STEM classroom was a place in which they could have a collegial conversation with differing views. For example, Claire shared, "...people see [recent national events] as an opportunity to debate, not as an opportunity to come together and discuss a good idea." This trend was further illustrated by George when he shared that he felt discussion of current events took up too much class time, "Everyone is going to have their own views, so I'm going to say no. Just because there's too many views in a single class, that it would take up the entire class."

Having experienced classroom environments where debate was the central mechanism for discussing political events, Amelia expressed a fear of offending other students:

> Some people would be supportive of it but then some people would not. I think it's hard to present stuff like that in a way that doesn't offend anyone. I think that's a really difficult thing.

Dirk expressed fear not of offending someone but that incorporating discussions surrounding national events would expose his political beliefs, ultimately leaving him susceptible to negative interactions with peers and classmates. Additionally, Dirk found it challenging to have passionate conversations related to politics. For him, the engineering classroom was a place to learn technical content. Between digesting the curriculum and finding time to study with his teammates, he did not feel that there were opportunities to incorporate such political and personal conversations. Recalling a heated discussion that occurred in his English class,

> ...you're just venting at that point, so I kind of laughed because it was like, if you really just sat down and calmly talked about stuff, this would be so much nicer. You could actually get some stuff out. You can still say everything you're screaming right now, but if you say it instead of yelling it, it will actually be received.

He also shared,

> If someone is just yelling their opinions at you, you're just going to get angered up and fire back, right? But if you sit down and just say, "Hey, this is what I think." Then, they actually hear those words, they don't accept it but they receive the info you're trying to put across and then they come back with whatever they have. It's more just a back-and-forth instead of just yelling at each other.

Amelia, Claire, and Dirk represented students who did not want politics in the classroom as they felt those types of discussions served to divide students rather than bring them together. Claire's quote hinted that introducing politics serves to move the engineering classroom away from good ideas and conversation. While Dirk expressed a fear of being outed for his viewpoints and losing potential colleagues as a result.

Despite these fears and concerns highlighted by Claire and Dirk, some students on the other end of the spectrum expressed a desire to have *valuable* conversations related to politics in engineering environments. Mallory saw value in having open and intelligent discussions about politics in engineering classes. She did put in a caveat that the value was only as long as those conversations did not interfere with learning that was essential to her courses. She focused on the tradeoff between the time it took for discussions focused on national events and lecture. She said, "Yeah. Maybe, depends on how long it would take. If it takes time out of a valuable class, like lecture, maybe not, but I think people should be talking about issues right now."

Lennon, amended his earlier comments about how he was only in a physics course to learn physics. He said that he could not find a reason as to why politics should be incorporated into STEM, but he was open to the potential of these conversations entering engineering and STEM classrooms. He stated, "I just have to, if someone can present a good argument why it [politics in STEM classrooms] should exist, then certainly. Right now I don't really see a reason."

From the above dialogue students present reasons that they did not want to see political conversations incorporated into their engineering or STEM classes including, but not limited to: other priorities, fear, and tradeoffs between having those conversations and other more technical grounds. These reasons present themselves despite students seeing the connections between politics and their intended future careers.

Discussion and Implications

These interviews demonstrated students' perceived usefulness and perceived potential negative effects of politicizing the engineering classroom. When asked if there were political topics or national events they wished were discussed in their STEM classes, students were concerned that introducing political topics outside the technical parameters of engineering would shift classroom rhetoric to conversations that were not objective or valuable. This conversation illustrates the pervasive beliefs of students that engineering classrooms should be depoliticized.While appreciating efforts to make the classroom more culturally sensitive and diverse, students struggled to rationalize how to integrate these larger conversations into the STEM classroom. Ultimately, most students felt that including discourse around national events was disruptive, provoking loaded interpretations that class time would be used to dispute ideology and would not connect to students futures in engineering.

We see connections between students' discourse about both usefulness and the toll that current events and political discussions may have in the engineering classroom and motivation theory. Students see value for their future engineering roles and potential costs simultaneously. They focus on future-oriented time scales when discussing how current national events *will* affect them later in engineering, and they discuss the present-oriented costs of including current national events in their STEM courses. This finding begs the question, if students feel that these topics are important for their futures but do not see the value in learning them now, how will they be prepared to navigate these issues in their future roles as engineers?

One way that may serve as a way to re-politicize the engineering classroom is to connect students future goals with their current STEM coursework beyond just gaining technical skills. Previous work in motivation theory, has expressed the connection or valuing of present tasks for emerging future identities as perceived instrumentality. Having perceived instrumentality for a task has been shown to positively influence student learning across a range of environments such as problem solving, self-regulated learning, and development of content knowledge [14]–[16]. Additionally, simple classroom interventions developed for engineering students (i.e., videos of more senior students discussing the importance of present tasks to younger students) have been able to positively develop students' instrumentality [17]. Given that students are connecting politics to their emerging future identities as engineers, we as educators, may be able to leverage this connection to bring politics into the engineering classroom by further highlighting the value or importance of understanding the intersection of politics and engineering. This type of intervention is still untested; however, our results find connections in students' dialog that may be useful in re-politicizing the engineering classroom.

When leveraging students perceived instrumentality for the intersection of politics and engineering, educators must also work to minimize the present costs to students. Students discussed desire to minimize the costs (e.g., fear, loss of time spent on content, argumentation rather than collaboration) of political discussions in the engineering classroom by simply avoiding the discussions all together. While cost has been discussed at length in the education literature [18], [19] it has been relatively understudied in education and engineering education literature [20], [21]. Of the work that has been conducted on cost, student perceptions of cost have been negatively attributed to trade-offs in the long and short term value of devoting time to a task. The participants of this study not only expressed the potential costs of politicizing the engineering classroom, but also demonstrated that these perceived costs served to override their perceived instrumentality of politicizing the engineering classroom. Given the conversations of costs and their ability to override perceived instrumentality, engineering educators may want to rethink the use of common approaches to political conversation (e.g., debate, point-counterpoint, argumentation) and focus on mechanisms that better integrate engineering and politics. One potential example is that educators could provide different constraints that are based on local and regional politics to different groups approach engineering design tasks. These different constraints could then be used to facilitate a larger discussion of how politics and engineering intersect with one another.

Engineering education should be a place where students are able to make connections between current political discourse, engineering content, and their practice as future engineers. Yet, the pressure to be the upholders of cultural practices in engineering can interrupt the cultivation of their emerging identities that integrate politics with engineering. Students should be afforded a space where they can co-create meaning between their emerging identities and, introspectively, synthesize a transparent view of the ethical role and relationship that engineering has to society. Our work begins to highlight some of the challenges of pushing against the current culture of engineering and re-politicizing the engineering classroom.

Limitations and Future Work

The results of this work represent a detailed view of participants at a singular institution and while transferrable these results may not reflect the experiences of students at other institutions. As such, future work should seek to expand the populations included in this type of study. However, replication of this specific study may be difficult as the conditions surrounding this study (i.e., the 2016 presidential campaign) are not easily recreated. It may also be beneficial to examine depoliticization of engineering during less-controversial election years. The discussion of cost moderating students perceived instrumentality warrants further exploration in the engineering education literature. While work has suggested that motivation operates simultaneously at multiple time scales (i.e., varying degrees of present and future) [22], little work has examined how different motivational frameworks intersect with one another or intersect with the culture of engineering. Finally, we provide suggestions for educators to implement political conversations into the classroom, but future work should be conducted to develop, implement, and test interventions leveraging the results of this work.

Conclusions

Results of this qualitative study exploring engineering students perceptions of how politics could and should be brought into the engineering classroom suggest that students see engineering and politics as connected to their futures as engineers. These results also indicate that students do not see value in discussing politics in engineering courses as they perceive the discussion will reduce their ability to explore engineering content or expose their political views and cause them to sacrifice potential relationships in engineering. By catering to students emerging identities as engineers and reducing the perceived costs of political discussions, we may be able to re-politicize the engineering classroom and the next generation of engineers. This change would allow engineering education of students to be situated in the larger sociopolitical context in which engineers work.

Acknowledgements

This work was funded by National Science Foundation EEC grants (1531586 and 1531174) and a National Science Foundation Graduate Research Fellowship (DGE-1333468). Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation. The authors would also like to thank members of the STRIDE and PRiDE research teams who helped in data collection and analysis.

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