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Broadening Engineering Orientation for First-Year Students

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Abstract
This complete evidence-based practice paper presents a new model for an engineering orientation session that is focused on building student awareness of the importance of diversity, inclusion, and equity. Students new to engineering are typically aware of the courses they need to take to enter the major, the graduation requirements they must complete to become an engineer, and have some understanding of the technical attributes necessary for success in engineering. However, most students are unaware of the importance of the social and emotional aspects of their professional development and the relevance to their future as engineers. As such, many engineering students enter the major with little to no thought given to the importance of developing positive, respectful relationships with peers.

As we enter an age when diversity is highly valued, inclusion and equity are becoming common terms associated with learning and work environments. ABET EAC Student Outcome 5 specifies creating "a collaborative and inclusive environment" as part of teamwork, and, as such, it is essential we educate our incoming students on these topics and provide support for their social and emotional development as part of their professional development.

The authors present a new model for an engineering orientation for first-year students that introduces them to professional codes of conduct and educates students on the importance of acting professionally and ethically in classrooms, laboratories, makerspaces, and even in the hallways. The orientation also introduces students to the notion of inclusion and equity in engineering and has them reflect on the importance of these elements to their development, both as students and professional engineers. By building awareness of inclusion, equity, and professionalism early in students' academic career, the authors aim to create more inclusive and equitable learning environments that lead to a more diverse engineering student body and ultimately, engineering workforce, by increasing student sense of belonging. This paper includes a detailed description of the orientation session, a summary of student feedback, and a discussion on how the orientation has been adapted for online participation.

Introduction & Background

Impact of Freshman Orientation Sessions
Traditional freshman orientation sessions are designed to facilitate student transitions to college by providing information about student resources, college and department services, institutional policies, advising, course selection, technology, and an introduction to physical facilities such as makerspaces and labs. Studies suggest that well-designed freshman orientations can have a positive impact on students including improved student retention, persistence and academic success [1] – [8]. In addition, orientation programs have been shown to lead to strong personal connections between students and facilitate their overall social development [1] [6] [9] [10]. More specifically, Gentry et al (2006) found that students who participate in orientation sessions are more likely to connect with students who have different interests and to discuss personal issues with faculty and staff [10].

Orientation sessions are just one of many strategies used to help students navigate the transition to college, persist, and increase retention rates [7], [11] – [14]. Over 90% of all colleges and universities have some form of orientation for new students [15]. There is a plethora of different models for orientations ranging from full courses to one-hour seminars and the content includes a wide variety of topics focused on academic support, personal development, and/or social connection [1] [3]. Choice of content often depends on the length, format, focus, and intent of the orientation session. Each institution, program, and department has a unique culture that is reflected in the faculty, students, and staff. Creating an orientation program that reflects the culture of the institution and/or program is critical to achieving the desired goals whether it be increased retention, development of student community, increasing sense of belonging, or connected students with staff and faculty [16]. Orientation sessions provide an opportunity for institutions, programs, and departments to communicate priorities, set expectations, and develop norms [17].

Studies suggest that orientation programs have a positive impact on underserved students. Orientation sessions have shown to be particularly impactful to African American students and result in increased persistence and positive impact on social integration [3] [18]. Fidler and Godwin [18] noted that orientations benefit African American students when there is emphasis placed on the importance of diversity, equity, and inclusion. On the other hand, in a study by Burgette and Magun-Jackson [3], the positive impact of orientations on black students was found to ***not*** persist beyond year 2. The authors theorize that this may be due to lack of focus on diversity and personal development. Furthermore, Engle and Tinto [19] found that orientation programs designed to ease student transition to college benefit low income, first generation students while Davis [20] found there was a correlation between student orientation and an increase in retention rates of non-traditional students (where non-traditional is defined as being older, living off campus, and/or part-time status). In a study by Meyhew et al. [6], African American and Hispanic American students found the social learning aspects of orientation to be more impactful than the academic based learning. Furthermore, Meyhew et al. [6] suggests that there is a need to re-envision orientation sessions to include social needs, learning styles and expectations of diverse students. In summary, there is evidence to support the positive impact of orientation sessions on underserved students however, it is essential to include programming related to equity, inclusion, and diversity to maximize positive outcomes for these populations.

Diversity, Belonging & Social Integration

Freshman orientation sessions that include elements focused on developing social connection and creating a culture of tolerance, equity, and inclusion can have the ability to positively impact students' sense of belonging . Sense of belonging generally relates to self-perceptions of fit within a given context and has been well established as a theoretical construct throughout the literature [21] [22]. Studies suggest that students' sense of belonging can be positively impacted through interpersonal and academic validation which increases with positive classroom climate, appreciation of diversity, faculty connection, peer relationships, and growth mindset [21] [23] [24]. The positive impacts of a strong sense of belonging on academic achievement and persistence in STEM majors are well documented [25] – [28]. Reference [29] suggests that social and academic engagement is associated with the development of a strong sense of belonging. In addition, when students interact in positive ways with peers, sense of belonging improves [30].

Studies suggest that students' sense of belonging can be positively impacted through interpersonal and academic validation which increases with positive classroom climate, appreciation of diversity, faculty connection, peer relationships, and growth mindset [21] [23] [24].

Unfortunately, research also shows that underserved students' have a lack of a sense of belonging in STEM departments and in engineering specifically [31] – [33]. Research suggests that underserved minorities struggle to feel connected to their programs and do not readily see themselves successfully navigating the engineering curriculum to become engineers [23]. In addition, other studies suggest that underserved students develop feelings of isolation and loneliness when they perceive an unwelcoming and unreceptive environment [18] [34]. Incorporate programming targeted to increase sense of belonging into freshman orientation sessions can positively impact this population of students.

Freshman orientations provide institutions with the opportunity to engage with students early in their academic career by increasing awareness of support resources while developing student to student connections. These sessions are also prime opportunities to share policies, set expectations, and build awareness of the importance and relevance of equity and inclusion to their academic and professional careers. By incorporating elements of equity, inclusion, and diversity into the orientation curriculum, institutions can work to develop norms related to student interaction focused on tolerance, support, and cultural appreciation. These types of activities and connections, especially when completed early in the academic experience, are instrumental in the development of students' sense of belonging [35]. In addition, Tinto [13] found that social connection and integration with campus community can result in increased retention rates and attributed that to feelings of connection and belonging to the institution. Using freshman orientation sessions to develop social connection and departmental norms provides an opportunity to positively impact students' sense of belonging .

To achieve success in the complex, dynamic, global engineering workforce, todays' engineer must combine a firm grasp of technical knowledge along with strong professional skills. The ability to work in a global context is essential, and engineers must be able to communicate effectively, engage in diverse teams, apply ethical analysis, and be culturally competent [36]. Development of cultural competence has become increasingly important to the profession. In recent years, many professional organizations have incorporated elements of equity and inclusion into their "core value" statements. The Accreditation Board for Engineering and Technology (ABET) states that "to succeed in these global professions, graduates must be prepared to thrive in diverse and inclusive environments" [37]. Furthermore, the American Society of Engineering Education affirms that "diversity and inclusiveness is essential to enriching educational experiences and innovations that drive the development of creative solutions in addressing the world's challenges" [38]. Many professional societies reiterate these sentiments in their own statements. For example, the Society of Manufacturing Engineers is "commit[ed] to promoting diversity and inclusion of all within our community [and] believe that diverse perspectives and talents are essential within manufacturing research" [39].

Rationale

Western Washington University (WWU) is a public master's-granting institution with approximately 15,000 full-time undergraduate students, 160 academic programs, and a vibrant campus community. The Engineering & Design Department (ENGD) at WWU was formed in 2014 out of the former Engineering Technology department as part of a state-funded effort to transition the engineering technology programs to accredited engineering programs. The department offers four undergraduate-only degree programs: Electrical & Computer Engineering (EECE), Manufacturing Engineering (MFGE), Plastics & Composites Engineering (PCE), and Industrial Design (ID). Of those four programs, EECE, MFGE, and PCE are accredited by the Accreditation Board for Engineering and Technology (ABET). The Industrial Design program is accredited by the National Association of Schools of Art and Design (NASAD). Students who are interested in majoring in Engineering at WWU must formally apply to their program of choice after completing a series of prerequisite courses. Prior to being accepted into a program, students are considered "premajors." Once students are admitted to a program, they are identified by one of the four major codes: EECE, MFGE, PCE, or ID. A fifth ENGD program, referred to as First-Year Program (FYP), supports premajor students.

The department has seen substantial growth in student enrollment since its conversion from Engineering Technology (ET) to Engineering & Design (ENGD). The number of graduating students has increased from 31 graduates in the inaugural class in 2016 to 109 graduates in in 2020. Along with this increase in graduates, the number of tenure-track faculty in the department has nearly doubled.

While this growth is exciting and rewarding, the recent WWU institutional data shown in Figure 1: Comparison of Women and Underserved Students in WWU Programs vs. National Average indicates that the number of women and underserved minorities in WWU ENGD programs is far below the national average. In addition, the percentage of women in engineering at WWU has been declining since 2016 while the percentage of women nationally has been increasing. These trends are concerning and have been a focal point for recent departmental efforts related to improving equity and inclusion, with specific attention to supporting premajor students.

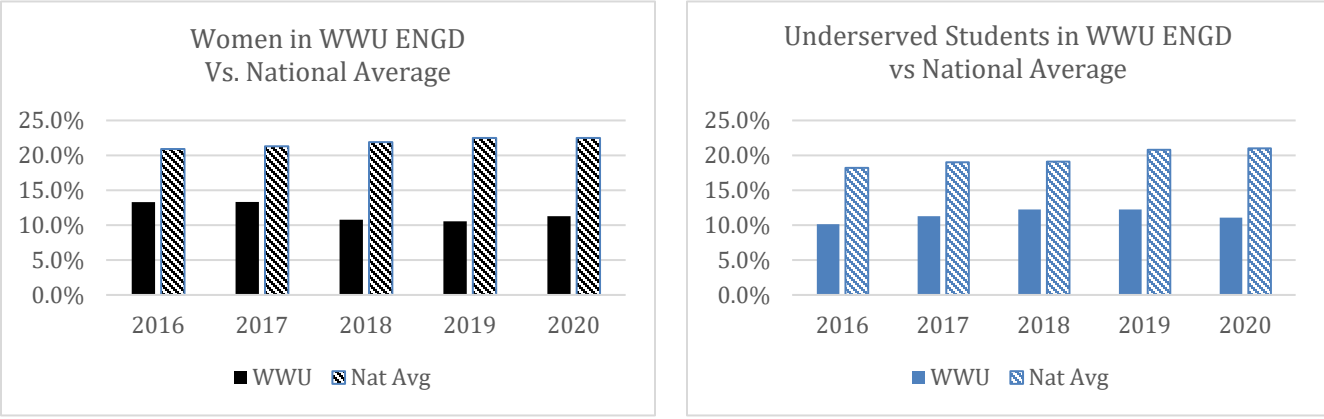

Figure 1: Comparison of Women & Underserved Students in WWU Programs vs National Average

The most recent WWU institutional data on students enrolled in WWU ENGD programs shows that, in most cases, the percent of women-identified and under-represented students declines from the premajor to the major, as shown in Figure 2: Comparison of Women/Underserved in Premajor vs Major vs Graduates for WWU ENGD Programs. In addition, the percentage of women from the premajor to graduation declines significantly for three of the four ENGD programs. In the case of the MFGE program, the percentage of women from the premajor to the major to graduation shows an overall percentage increase during the time span of data collection. Although the relative percentage of women increased, the actual numbers of women matriculating from the premajor to the major to graduation has decreased every year except one. This trend does indicate, however, that women matriculate through the program at a higher rate than their male counterparts.

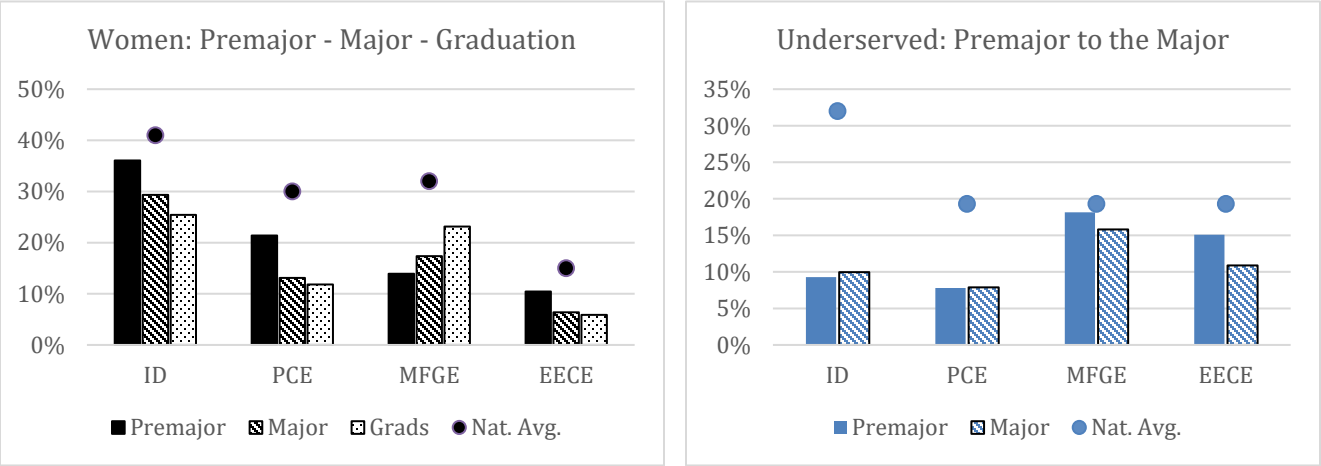

Figure 2: Comparison of Women/Underserved in Premajor vs Major vs Graduates for WWU ENGD Programs (2015/16 – 2019/20 data set)

Furthermore, when it comes to retention, WWU institutional data shows that approximately 40% of ENGD premajor students are retained (year 1 to end of year 2). This is in stark contrast to the 95% retention rate once students enter the major. Considering that, in most cases, the premajor is more diverse than the major, we can conclude that women and underserved minorities leave WWU engineering programs at a higher rate than their white male peers. In addition, institutional data has shown that math preparedness, and lack thereof, contributes to the low retention rate of premajor students.

A focus on sense of belonging & premajor students

In response to the above, the WWU ENGD department recently hired a Director of First Year Programs. The focus of this new tenure-track position is to support premajor students through curriculum development efforts, creating support systems to better prepare students for the major, and researching the impact of co-curricular efforts on inclusion and equity. The goals associated with the work have been focused on increasing student sense of belonging and student retention, with specific focus on underserved student populations. This paper describes one of the efforts associated with this goal: a new student orientation session focused on diversity, equity, and inclusion.

History of Orientation Efforts in Engineering & Design

Lab Safety Orientations for Majors

The implementation of student orientations in ENGD coincided with the beginning of transition from engineering technology to engineering programs in fall 2014. The main goal of the first orientation was to develop a culture of safety in the students with the hope of improving lab safety and helping students develop good long-term habits vis-à-vis lab safety and safety overall. The original orientations were either for new majors or for returning majors who had not participated in a lab safety orientation in the last year (typically seniors). The orientations accomplished basic goals such as introducing students to members of the technical staff, providing an overview of basic lab rules and policies, and outlining the students' expectations and responsibilities. From the first orientation through today, the underlying mission has always been to help students develop professional skills and mindsets that would serve them well in the future. Lab safety is discussed as both a professional development opportunity for the students and a partnership between students, faculty, and staff to keep the lab spaces as safe as possible and to give everyone a chance to learn in them.

Lab Culture

The first year or two of student orientations had almost no mention of equity, inclusion, and diversity (EID) topics. Development of positive and inclusive lab culture, expectations for lab behavior, and the need for everyone to feel welcome in the labs was mentioned, but it was a minor part of the orientation and not emphasized, especially compared to safe use of equipment and chemical/material safety. Over time it became clear that the orientations were working to improve the safe use of equipment and lab spaces and incidents of noncompliance with lab rules almost disappeared. Unfortunately, it also became clear that the lab atmosphere was not improving as quickly as lab safety, especially when faculty and staff were not immediately present. In essence, students understood that labs were places that required attention to safety policies and procedures, but they did not fully view the lab spaces as professional spaces where they needed to act in a professional manner.

Integration of EID into Lab Orientations

To address this issue of lab culture, a few basic changes were made to the lab orientations. First, the EECE students, who work in labs with far fewer safety issues and therefore have far more unsupervised lab access than students in the other majors, were split off into a separate orientation. The EECE orientations immediately began to focus on issues of lab culture and inclusivity, and relegated safety to a minor part of the orientation. The EECE orientations continue to be run in this manner. The orientations for the other majors have evolved to include a focus on inclusivity and professional use of space with approximately 30% of the orientation focused on a discussion of the ABET Teamwork outcome (SLO 5) and an active learning exercise to get students discussing the idea of professional behavior. The overall goal is to have the students develop habits and mindsets that will serve them well as they enter their professions and includes instruction on both safety and lab culture instead of focusing on the former and merely mentioning the latter. It is from these roots that the premajor orientation was developed.

Project Approach

Design & Implementation of Premajor Orientation

In fall of 2019, a small group of faculty and staff began planning a new student orientation specifically designed for engineering & design premajor students. With the knowledge that many of these students had already participated in university-wide orientation sessions, this session was created to focus on department specific content including norms, expectations, and standards. Understanding the importance of creating a welcoming, inclusive, and equitable learning environment, the development team placed a strong emphasis on sharing behavioral expectations, creating a common language, and engaging students in self-reflection. While the department has held lab-based orientation sessions for major-level students for years, this orientation was the first focused solely on premajor students.

Goals

The purpose of the premajor orientation session is to prepare premajor students for their experience in engineering & design by:

- Providing information on programs (EECE, MFGE, PCE, ID) and department resources to help facilitate preparedness and success
- Connecting premajor students to faculty, staff, and students
- Promoting student awareness of equity, inclusion, and diversity
- Create a welcoming environment that builds a sense of belonging and strong community
- Communicate expectations, norms, and standards that guide behavior and development

Structure

The orientation is divided into 6 topics areas as shown in Table 1: Orientation Structure. More detailed information regarding the content of each topic area is summarized below the table. The orientation sessions were scheduled for one hour and free food was provided at all in-person sessions. For most of the sessions, tables were grouped in blocks to encourage students to sit near one another. Although the sessions were officially scheduled for one hour, there were a significant number of students who stayed after the end of the in-person sessions to connect with one another and ask questions of the student panelists.

Table 1: Orientation Structure

Topic Area	Brief Description	Time
Welcome	General introductions	2 min
Department Information	Social connection & student support	5 min
Setting Expectations	ASEE Code of Conduct & department norms	5 min
Creating a Common Language	General definitions & terminology	5 min
Think – Pair - Share	Equity and inclusion discussion	10 min
Student Panel	Major level students from all programs	20+ min

The event moderators and presenters consisted of the department chair, one faculty member (first year programs director), the premajor advisor, and 4-8 student panelists. The student panelists were invited to participate by department staff and, in most instances, were not paid for their time. There was at least one student panelist from each of the four academic programs. All

student panelists were major-level students which, in most cases, meant they were juniors or seniors.

Welcome: At the beginning of each orientation session students were invited into the room by the staff and faculty presenters and were asked to sign in (name & email). There was a focus on creating an informal, comfortable space within the classroom so students felt welcome in the space. Students were invited to get some snacks, which were placed at the back of room creating a place for students to gather and talk before being seated. The presenters began the presentation by welcoming students, inviting them to be seated, thanking them for their attendance, and briefly introducing the main speakers. The presenters then gave the students a minute to introduce themselves to others at their table (name, pronouns, something unique about themselves).

Department Information: Following the welcome, the premajor advisor and faculty member shared relevant department information with the attendees. Focus was placed on social connection opportunities and student support resources rather than more traditional department specific information such as applying to the department or course selection. This part of the presentation included sharing information about the makerspace, peer mentoring programs, importance of advising, student clubs, and any upcoming events. Students were encouraged and invited to make an appointment with the premajor advisor and a sign-up sheet was passed around the room. The presenters did not spend any time answering specific questions about the programs, classes, entry requirements, or application process but ensured students all their specific questions would be answered during their advising session. This was done intentionally since one of the goals associated with this event was to connect premajor students with department support staff and to build 1:1 connections and relationships.

Setting Expectations: For this segment of the session, the department chair shared the ASEE Code of Conduct with the students [40]. He engaged students in a discussion focused on the importance of diversity in the workplace, how equity and inclusion are relevant to engineering, and professional codes of conduct. He shared with the students the expectations of professional and ethical behavior in classrooms, labs, makerspaces, and hallways, and the importance of developing appropriate habits and mindsets to students' professional development. As with the aforementioned orientations for majors, the underlying goal was students' long-term success, so the ASEE Code of Conduct was used as an example of the expectations that engineers set for themselves and their peers. The hope was that students would recognize that professional behavioral standards, as well as understanding issues related to equity and inclusion, are important to their success as future engineers. The intention was to avoid the expectations being set as seeming either arbitrary or only for students' time in engineering classrooms and labs. In other words, that helping to maintain an equitable and inclusive environment is something that students should do for themselves as well as for others.

Creating a Common Language: To engage in productive conversations related to equity and inclusion, it is first necessary to create a common language. In this part of the session, the faculty member shared definitions of diversity, inclusion, and equity. Focus was placed on discussing the difference between diversity and inclusion using the Verna Myers quote: "Diversity is being

invited the party; inclusion is being asked to dance" and then taking that one step further by asking the audience if being asked to dance is enough. There was discussion around inclusion focusing on involvement (rather than representation) and the importance of creating spaces where diverse members feel comfortable, are welcomed, and contribute. In addition, the presenters discussed the difference between equity and equality and provided some examples of what it means to be equitable.

Think-Pair-Share: The next segment of the session involved engaging all attendees in a "think-pair-share" activity. The student panelists joined the attendees at the tables and each table was assigned one of questions below. The questions were designed to reflect statements and topics in the ASEE Code of Conduct. Attendees were given 2 minutes to think among themselves followed by 3 minutes to discuss with their table. After the 5 minutes, each group was asked to share out the "main take-home" from the conversation with their team. Discussion was facilitated by the faculty member.

Questions:

1. What does it mean to "act in a professional manner"? Give examples of professional and non-professional classroom/lab behavior that you have experienced.
2. What does creating a "safe and welcoming environment" mean to you? How would this enhance your learning? Give examples of what this might look and/or feel like.
3. What does it mean to be inclusive? Give an example of a time when you have not felt included or welcomed in an academic environment. How did this impact your learning and/or involvement?

Student Panel: The session concluded with a student panel. Each of the panelists shared a bit about themselves and then floor was open to questions from the attendees. Panelists were invited to share both professional (major, research interested, etc.) as well as personal information (something unique, hobbies, etc.). The presenters had a few general questions they would ask panelists if conversation seemed to stall out.

Examples of questions asked:

- What led you to choose _____ as your major?
- Tell us more about the application process. What was that experience like for you?
- How did you get involved with research?
- What is the best way to get to know other premajors?
- What do you know now that you wish you knew when you were a premajor?
- What do you like best about being in the _____ major?
- How do you connect with engineers and designers in industry?

Session conclusion: At the end of the session, students were asked to fill out feedback forms and share their impressions of the orientation. Many students stayed after the session ended and continued to ask questions of the students on the panel. Some panelists shared contact information and encouraged premajors to connect with them after the orientation. Signup sheets for student clubs and appointments with the department premajor advisor were provided at the end of the session for students who did not see them before/during the session.

Modifications for Online Session:
In response to the move to remote instruction due to the pandemic, the orientation session was reformatted to an online format using a Zoom meeting. As a result, the modifications were made to both structure and content:

- Included videos from club representatives
- Utilized google docs to collect information from students (signup sheet for clubs, appointments with premajor advisor, contact info).
- Used breakout rooms for discussion on EID related questions.
- Feedback form was administered online
- Held one session per quarter (rather than two)

Scheduling
Orientation sessions were held each quarter and all premajor students were invited to attend one of the sessions. Class announcement, social media, flyers, and email invitations were used to notify students of the sessions. Attendance was voluntary. Session attendance ranged between 30-45 students, not including panelists. The in-person sessions were held 2-3 times per quarter and the online session was held once.

Student Feedback
At the conclusion of the session, each student was asked to fill out a short feedback survey. The survey was given in paper form during the in-person sessions and in digital form during the online session. The surveys were anonymous and were kept as short as possible to encourage participation. The survey consisted of 5 short questions followed by 3 open-ended questions as summarized below.

Part 1: Likert scale: Strongly disagree (1) to Strongly agree (5)

1. Overall, the orientation was useful and informative.
2. The orientation was well organized.
3. The information presented and topics discussed were relevant to my future as an engineering/design student
4. I feel connected and supported by my peers.
5. I feel as though I am part of this department.

Part 2: Open-ended questions:

1. What was the best part of the orientation?
2. Was there anything additional you had hoped to learn?
3. Are there any topics you think should be covered at future orientations?
4. Comments/suggestions:

Results & Discussion

Survey Results
The results of the feedback survey are shown in Table 3: Student Survey Results. On average, 40 students attended each of the in-person sessions and a total of 54 students attended the online

session. Survey completion rate was higher for the online session (76%) than it was for the in-person sessions (41%).

Table 2: Student Survey Results

	Percentage of Students Strongly Agreed/Agreed	
Question	**In-Person (n=52)**	**Online (n=41)**
Overall, the orientation was useful and informative.	87.0%	90.2%
The orientation was well organized.	87.2%	100%
The information presented and topics discussed were relevant to my future as an engineering/design student	87.4%	92.7%
I feel connected and supported by my peers	85.5%	87.8%
I feel as though I am part of this department.	72.2%	78.0%

The orientation sessions were generally well received by students. The results of the survey show that most students found the orientation to be useful and informative. Most students agreed that the information was relevant to their future as a student. This is true for both the online and the in-person sessions. As shown in Figure 3: In person vs Online Sessions Average Ratings, the online orientation session received a slightly higher average rating than the in-person orientation session on all questions asked. The authors theorize that this may be due to the fact that there are very few opportunities for students to engage in orientations and other co-curricular support efforts during the pandemic and thus, feel grateful for the opportunity to connect with faculty, staff, and each other in this manner.

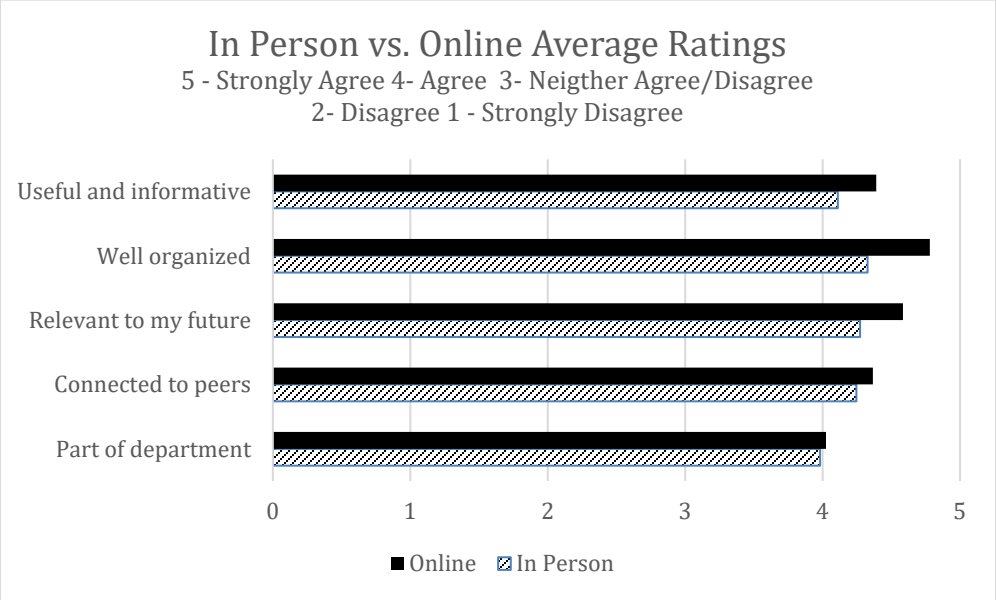

Figure 3: In Person vs Online Sessions Average Ratings

The authors did notice that, on average, students feel less connected to the department than they do to their peers. This could be because students are new (most are first-year students) and have not yet integrated into the department culture and community. It was surprising to the authors that the students' ratings for connection to both the department and their peers was higher in the remote learning environment.

Student Comments & Suggestions:
As shown in *Figure 4: Best Part of Orientation as Indicated by Student Comments*, the results for the in person and online sessions differed when it came to student comments and suggestions. For the in-person sessions, the majority of students (88.4%) noted the student panel as being the best part of the orientation session. They commented on it being "eye-opening" to hear from the major level students and also mentioned that it felt "connecting" to talk to peers. However, for the online sessions, student rating was more equally distributed between the four categories.

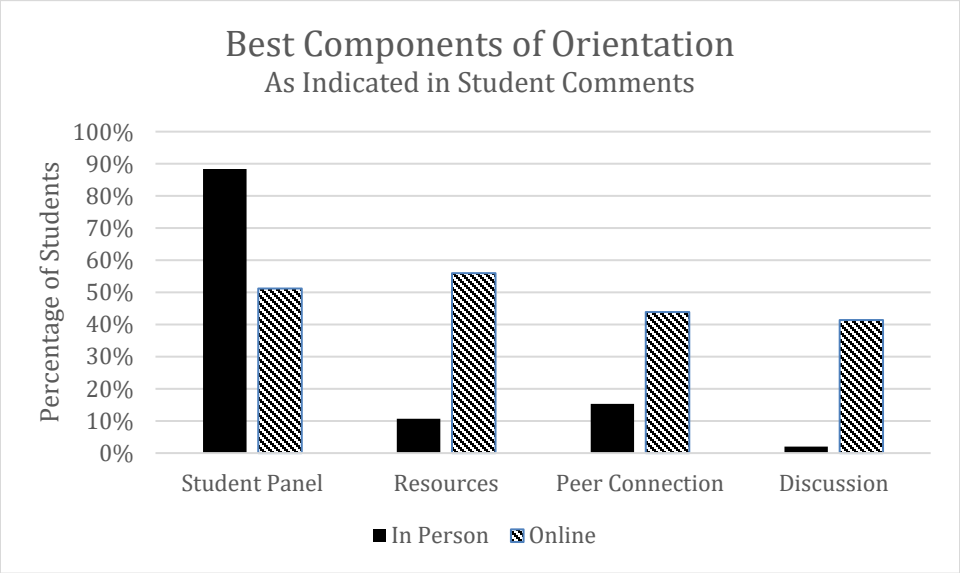

Figure 4: Best Part of Orientation as Indicated in Student Comments

In both in-person and online sessions, students mentioned that they would like to learn more about the different majors, the application process, and student clubs. A small number students had a negative reaction to the EID topics with one student saying there was "too much of a focus on diversity" and another requesting to "get rid of the diversity stuff."

Survey Limitations
The data gathered from the feedback survey is limited. A short anonymous feedback survey directly following the event was deemed appropriate considering the short time allocated to the session. As such, the authors did not choose to include questions related to demographic information, major area, or other personal information. The authors felt it important to keep the survey short and focused on high-level feedback in order to receive a high percentage of student responses. In addition, the orientation sessions have only been offered a handful of times which is another contributing factor to limited data. The intent at this stage in the project was to use the

survey results to gather some high level feedback from student participants to help determine student impressions of the event and, more specifically, what aspects of the orientation resonated with the students the most.

It would be worthwhile to conduct a more expansive long-term study to follow-up with these students to investigate the overall impact of the orientation session on their first-year experience. In addition, it would be informative to survey students who did not attend the orientation and compare their experiences to students who have attended the session (both during their premajor and major level experience). A more robust analysis would provide additional insight to the overall effectiveness and long-term impact of the orientation session. In addition, it would be interesting to investigate student awareness of equity, inclusion, and diversity before and after event and how that impacts their future behavior, understanding, interactions, and overall sense of belonging. Adding questions on the survey that relate directly to the EID related content of the session would be helpful in investigating the overall impact of the event.

Findings & Reflections:

- Engaging Students: The authors noticed that student engagement in discussion was enhanced when the invited student panelists were involved in conversations and discussions throughout the session. This was especially true in the in-person sessions. In later sessions, faculty and staff prepared the panelists by encouraging them to come early, connect with students prior to the session, and sit at the tables with the attendees (in-person) or have their cameras on (online). They also encouraged the panelists to respond to the discussion prompts and engage in the conversations with the students. The authors noticed that when the panelists actively participated in the early parts of the session, overall student engagement increased.

- Personal Story Sharing: It was surprising to the authors that the student panelists often chose to share personal experiences with the audience. It is important to note that faculty and staff organizers did not preemptively suggest that the panelists share personal stories or experiences. The authors theorize that the tendency for student panelists to share authentic experiences with the audience may have to do with the general tone set by preceding conversations. In particular, discussions centered around the question prompt "What does it mean to be inclusive?" often resulted in conversations focused on themes of kindness, acceptance, tolerance, authenticity, and vulnerability

- Integration with College Orientation Efforts: The basic structure of this orientation was shared with the College of Science and Engineering Equity, Inclusion, and Diversity committee. The committee is in the process of creating an "EID Orientation" template that will be shared with other departments who wish to adopt and facilitate similar orientation sessions. In addition, the college has begun preliminary efforts to incorporate EID content into a college wide orientation for all STEM students.

- Online Session = Engaging EID Discussion: The authors found the students engaged more deeply in the EID discussion prompts in the online sessions than they did in the in-person setting. There were a handful of students who commented positively on the

discussion topics and one student who suggested devoting more time to discussions. The authors theorize that this may be due, in part, to the lack of authentic student connections during the time of remote learning and the fact that this orientation provided an opportunity for students to connect with other premajor students. This was in contrast to the in-person sessions where it was more challenging to get students talking about the questions. As mentioned previously, engagement in discussions during the in-person sessions increased when panelists were included in the conversations.

- Student Panel: In all the in-person orientation sessions, the student panel led to engaging conversations as was rated at the best part of the orientation by most students. At every in-person session, the panel members stayed after the session ended and continued talking and connecting with students in the audience. However, this was not the case during the online orientation session. Very few students asked questions of the panelists and there was very little conversation, especially compared to the in-person session. The authors theorize that the impersonal nature of online meetings has a negative impact on the ability of students to engage with one another, especially in a large group setting. In addition, the panel was held in the main session rather than in break out rooms. The fact that there were 54 students in attendance, many of whom had their videos turned off, may have created a challenging environment in which to ask questions of the panelists.

Challenges

- Recruiting Panelists: The panelists were invited by email and encouraged by faculty and staff to voluntarily participate in the session. Students readily volunteered for the initial session however, it became more challenging to find students for later sessions. Considering that the panel is an essential component of the orientation, the authors suggest compensating the panelists for their participation.

- Content: With EID related topics, there are occasionally times when conversations become challenging. It is important to be able recognize these moments and respond appropriately which could mean either continuing, ending, or postponing the conversation. It is good practice to keep things simple and direct and consider this a basic introduction. The authors found it helpful to use the ASEE code of conduct to help govern the conversation.

- Timing: Since the session is designed to be completed in one hour, it is necessary to efficiently move through the content. This can be challenging, especially when students are actively engaged in productive conversations. The authors are considering extending the session to 1.5 hours to allow for more interaction between students, increased depth of discussion, and opportunities for informal engagement between students.

- Facilitating EID Discussions: It is often challenging to facilitate discussions centered around equity, inclusion, and diversity. This is especially true for faculty/staff who are not comfortable, trained, and/or well-versed in EID related topics. The authors suggest that faculty and staff who plan to lead the orientation sessions spend some time familiarizing themselves with EID related topics and/or consider completing an EID

training or seminar prior to facilitating the orientation. Alternatively (or in addition), they could attend the orientation as an observer to learn how others facilitate the discussions and conversations.

Future Work

The authors plan to continue offering this orientation to premajor students and will work to address the challenges and respond to student feedback. The authors would also like to dig deeper into the impact of this orientation on students and the culture of the department (both short and long term). Future work includes enhancing the content of the session to create dialogue that explores equity and inclusivity in more depth, exploring ways to compensate student panelists, and investigating the long-term impact of this orientation on students. In addition, the primary author is involved in additional EID related efforts focused on premajor students with the aim of extending the impact of the orientation session by providing additional opportunities for students to engage in this work and reflect upon on the importance of creating an equitable and inclusive environment both in school and the workplace.

Conclusion

This new model for an engineering orientation session is designed to increase student awareness of the importance of a culture centered around equity and inclusion. By focusing on sharing departmental expectations and behavioral norms, developing a common language related to diversity, and engaging students in discussion centered around creating a welcoming environment for all, the orientation session exemplifies the qualities of inclusivity. By integrating this content into a department wide orientation session, the hope is that first year students will begin their academic experience with knowledge of the importance and relevance of equity, inclusion, and diversity to their career, both as students and professionals. The orientation sessions provide the opportunity for students to engage and reflect upon these important topics with their peers and sets the stage for continued personal and professional development focused on respect, tolerance and cultural competence. By building awareness of inclusion, equity, and professionalism early in students' academic career, the authors aim to create more inclusive and equitable learning environments that lead to a more diverse engineering student body and ultimately, engineering workforce, by increasing student sense of belonging.

Although these premajor orientation sessions provide a good starting point, it is essential to integrate this content into both curricular and co-curricular efforts. It is not enough to spend a single hour engaged in this work. It is important to find ways to encourage students to explore these topics in more depth and to allow them to continue to engage in meaningful discussions as they develop their personal and professional identities.

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