

Centering Engineering Students' Voices Through Course Syllabus Negotiations & Co-Creation

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Abstract— This full, research-to-practice paper describes the design, implementation, and outcomes of the negotiation and co-creation of a course syllabus on the first day of an introduction to engineering course. The shifting landscape of higher education has many universities critically looking at the educational experiences and value they are offering students. Calls for institutions to improve the quality and accessibility of their education have led to paradigm shifts in the role of college courses and the educators who design and facilitate learning in these spaces. Research and scholarship point to the importance of student- or learner-centered education, considering the needs and holistic growth of students instead of just the amount of content covered by educators. Alongside these calls for student-centered environments and improved educational outcomes is the pressing need to prepare a workforce that has skills and competencies that transcend the technical content educators use assignments and exams to assess. The co-creation of learning, expectations, or outcomes is one way in which educators can address the calls to more intentionally center students' voices and experiences in learning environments while also helping students develop professional skills and autonomy. The results presented in this paper are a qualitative analysis of student comments when asked about their perceptions of the syllabus negotiation and co-creation activity as part of a written reflective exercise. Data analysis indicated that students' perceptions and reactions to this activity were well-aligned with the foundational concepts and practices associated with student-centered educational practices. This classroom activity supported the development of students' professional and collaborative skills while also fostering an atmosphere and environment of mutual respect between students and faculty. This activity documents a positively received step in the continued development of curriculum, pedagogy, and classroom activities as engineering education continues its work in designing engineering education systems and spaces that are learner-centered and student-serving.

Keywords—*student-centered, learner-centered, co-creation*

I. INTRODUCTION

Higher education's core purpose is educating and preparing its students to be successful in their future endeavors by teaching and developing necessary knowledge and skills. In today's fast-paced and dynamic society, data and technology heavily drive innovation [1], [2]. There is an ever-growing need for the education and training of people to meet the needs of companies and contractors working to stay on the cutting edge of progress. With this growing need, more attention has turned to institutions of higher education. There have been many calls for higher education to improve the quality and accessibility of the

education they provide students [3], [4]. This has prompted many universities in the United States to provide faculty with resources for engaging in pedagogical reviews of updates or professional development opportunities related to teaching or instruction through on-campus offices or centers and external workshops or programs (e.g., [5], [6], [7], [8], [9]). One pedagogical construct that is widely recognized and discussed in education research and literature that has been widely shown to improve students' educational outcomes and learning experiences is the idea of a student-centered learning experience or learning environment.

II. REVIEW OF LITERATURE

A. Student-Centeredness

The origins and implementation of student-centered teaching practices and pedagogy have been discussed significantly in education literature [10]. Most education scholars map student-centered teaching approaches to constructivist development theory [10]. Constructivism in education is a theory that explains student learning as the result of a process in which students actively participate in their learning by mapping and fitting new information into their already existing beliefs and knowledge, reconciling or resolving conflicting information using their own experiences to make conclusions [11], [12].

Most education literature presents the idea and principle of student-centered learning in opposition to what is referred to as teacher-centered learning. Characteristics of teacher-centered learning typically relate to the instructor taking the primary role of communicating knowledge to students, often associated with the primary mode of teaching being lectures and limited right/wrong feedback on assessments that ask recall and recognition-based questions [13]. Comparatively, student-centered learning embodies characteristics that involve more student activity and exploration, for example encouraging students to choose activities to direct their learning, explore contrarian viewpoints, as well as asking elaborative questions rather than asking students to simply recall content [13]. Layman's terminology sometimes describes this dichotomy as the instructor being either a 'sage on the stage' – referring to the traditional lecture-style approach to teaching – or a 'guide on the side' – referring to the more modern constructivist teaching approach.

Recent literature on student-centered teaching has challenged educators to move beyond this oversimplification of who has the majority of knowledge and power in the learning environment.

Mascolo [14] notes that this two-option mentality can be limited, as student-centered teaching does pose issues and limitations and that this oversimplification has led to a false dichotomy. Mascolo instead leverages guided participation as an educational theory or framework in which teaching as something that happens in the context of a relationship between expert and learner, similar to that of an apprenticeship [15], [16]. Mascolo proposes teaching and learning strategies in which both active and passive learning can co-exist on a spectrum through a variety of learning activities in which students are participants in their own education, but their participation is still being guided by their teachers [14].

B. Learner-Centered Pedagogy

Student-centered teaching and learning is also commonly referred to in education literature as learner-centered teaching and learning. As this constructivist style of teaching became more widely studied and practiced in the late 1900's and early 2000's, specific pedagogical strategies and practices that embodied its principles began to appear in education theory and practice. Notable pedagogy techniques such as collaborative learning, problem- or inquiry-based learning, and project based learning all lend themselves nicely to creating student-centered courses by using learner-centered pedagogical techniques in which the learners are more active in their knowledge acquisition through participating in learning experiences [14], [17].

Maryellen Weimer's book "Learner-Centered Teaching" provides what she calls "Five Key Changes to Practice" that faculty can implement in their courses to make their learning environment more learner-centered without changing the overall structure or organization of their course [18]. Weimer recommends changing 1) the balance of power, 2) the function of content, 3) the role of the teacher, 4) the responsibility of the learner, and 5) the purpose and process of evaluation [18]. Weimer's writing is geared toward higher education, and literature has documented the success educators have found implementing these changes in their college classrooms [19].

C. Student-Centered Personal Development

While the focus of student-centered teaching and learning practices is most often on how the content knowledge and expertise associated with a course topic is taught by faculty and learned by students, recently educational scholars have been drawing attention to the humanistic and holistic person growth aspect of student-centered learning [20], [21]. As part of the process of learning through constructing new knowledge through active participation and inquiry-based exploration, students also develop broader skillsets like critical thinking, effective communication, inventiveness, collaboration, creativity, etc. These skills – though often not associated with higher education courses' learning outcomes or objectives and therefore not often explicitly taught, practiced, or assessed – have been identified by educators as prominent 21st century skills and capacities, and therefore educational priorities [22], [23].

The need for these transferrable professional skills has been called out globally in engineering education literature many times over (e.g., [24], [25], [26], [27]). Given the complexity and rigid technical content sequencing in engineering curricula [28],

[29], [30], first-year engineering programs and courses are prime opportunities to introduce undergraduate engineering students to holistic and foundational skills necessary to not only be successful engineering students, but also successful professional engineers and adaptable adults. These professional skills include goal setting [31], planning, and time management [32], as well as teamwork skills such as collaboration with others [23] and the existence and navigation of productive task-level conflict within working groups [33].

III. RESEARCH TO PRACTICE ACTIVITY

The first day of a college class is often referred to as "syllabus day," as on this day faculty leading the class typically review their class policies, procedures, and norms with students. The research-to-practice activity in this paper took place on the first day of an undergraduate first-year introduction to engineering course. The faculty member teaching this course frames this project- and problem-based learning course as a professional engineering workplace. Examples of how this is done include equating attendance as showing up to work, engaging with the course content in class as doing your job at work, and assignments and their grades as evidence that your job is being done – either well, or in a way that needs improvement. On the first day of class the syllabus is equated to the hiring contract, as it is the agreement of policies and conduct between the engineering manager (faculty member) and engineering employees (students) in the context of this workplace. With this framing it is explained to students that they should never sign an employment contract without reading carefully and that contracts, in many cases, are negotiated. In the draft syllabus provided to students on the first day of class, there are portions of the syllabus in red text, and it is explained to students that these portions are subject to change should the students see it appropriate to negotiate those policies to be different on behalf of themselves and their position in the course. Examples of what could be negotiated in this activity include (but are not limited to) the time-of-day assignments are due, how many unexcused absences before points are deducted, the late penalty by % per day, and the means of receiving announcements from the instructional team.

Students were asked to break into groups of 6-8 students and divide up sections of the syllabus for each group member to read in-depth and then share with the group the policies outlined in that portion of the syllabus – akin to the active learning technique often described as a "Jigsaw" activity [34]. The person in charge of each section was also responsible for taking notes about each section if anyone in the group had questions or concerns about the content of that section. After this jigsaw activity students were directed to revisit the syllabus and pay particular attention to the portions in red text, discussing their student perspective of these policies, and identifying any adjustments they would like to make to the red text along with a reasonable argument for those adjustments.

After students finished this activity, the class was reconvened, and the negotiation and co-creation of the syllabus began. The faculty member brought up each section of the syllabus, asking each groups' leader for that section to share any questions or concerns from their group. When the section of the syllabus of focus had content that was in red text the faculty

member would begin by explaining the purpose of that policy and the reasoning behind why it was written the way that it was in the syllabus and then open the floor for student questions, concerns, or counteroffers to make adjustments to these policies. After this activity was complete, it was explained to students that by remaining enrolled in this section of the course, they are signing their name on this contract and that they and the faculty member agree to abide by all of the terms of the syllabus as the course contract moving forward until the course ends.

A. Research Questions

To explore the effectiveness of this activity in centering students' voices and experiences in a first-year engineering classroom, the following research questions were posed and explored through the methods in the following section:

RQ 1: How do students describe their perceptions of – and takeaways from – negotiating aspects of a course syllabus?

RQ 2: How do students' descriptions of their perceptions and takeaways of a syllabus negotiation activity align with student- or learner-centered pedagogy?

IV. RESEARCH METHODS

The methods used to answer the research questions presented earlier in this paper are described below. Means of data collection and purpose behind each data set are described first, followed by a detailed description of how the student-generated qualitative data is analyzed. This section ends with a discussion of the limitations of these methods and their associated results.

A. Data Collection

The primary source of data used to answer the research questions were students' responses to a required reflection prompt. Each week, 1-2 reflection questions are given to students to answer for a completion grade. In week 6 of the semester, students were asked a series of questions to give feedback on the course to the instructional team. One prompt students were provided that week read "Please share your perspective and thoughts on how our class did syllabus day compared to your other courses. What were your perceptions / take-aways from being able to negotiate aspects of our course syllabus as students in the course?" Students' responses to this prompt were downloaded from the learning management system and all identifying information was removed for data analysis.

Secondary data are presented in this paper throughout the discussion of the results in two forms. The first form of secondary data is excerpts of text from the syllabus that students negotiated or co-created with the instructional team. This data is copied from the course syllabus and serves as an artifact of what students describe in their responses that are presented in the results to provide more clarity and context to the audience. The second form of secondary data in this manuscript is class attendance data compared between two semesters of the same course. These data were pulled from the authors course attendance records to explore if there was evidence to support claims that students' made as part of their responses to the survey question. Both of these secondary data forms are presented only in the discussion section, as their formal analysis is not necessary to answer the research questions.

B. Data Analysis

Qualitative analysis of students' responses to the reflection question was conducted in two stages. The first stage of qualitative analysis was the descriptive coding of students' responses by reading each response and associating a word or phrase that summarized it [35]. The second stage of qualitative analysis was provisional coding of students' responses to predetermined categories [35]. For this analysis the predetermined categories were Weimer's five key changes for learner centered teaching [18]. Weimer's five key changes were selected as a framework to use for this analysis for two reasons. One reason was that Weimer's recommended changes are designed to be implementable without changing the larger structure or organization of a course [18]. This was important because the courses in which the author sought to integrate more learner-centered pedagogy into were only two of over twenty section sections of the first-year engineering course being offered that semester, and it was required that the structure and organization of the course remain consistent across all sections. Additionally, in Weimer's book each key change is well-described and accessible for a variety of readers. Given that the data being analyzed were reflections coming from first-year college students, a classroom practice-practical framework for analysis would be more readily applicable to students' responses as opposed to a theoretically complex framework. Students' reflection responses were read and tagged (when applicable) with one or more 'key change' provisional codes. For student responses that did not clearly map to a 'key change', they were tagged with a sixth provisional code: "Other". After this provisional coding stage, the descriptive codes from stage 1 of analysis were examined in each provisional code group from stage 2 to explore the ways in which students described their perceptions of that 'key change' being implemented by way of the syllabus negotiation and co-creation activity.

C. Limitations

There are two primary limitations of the data collection methods that should be acknowledged. The first limitation being that because this was a graded assignment – albeit for a completion grade – students answering this prompt did not have the complete protection of anonymity. This lack of anonymity may have led students to not share their complete or honest perceptions in their responses for fear of critical comments to the instructional team impacting them in a negative way for the remainder of the course. Additionally, students' responses analyzed for this paper were part of a series of questions students were asked to gather feedback on the course. An example of another prompt from this week's reflection set includes "What is working well for your learning as a student in the course, and what could be improved to be better of your learning?" The question being asked here as part of broader question set regarding feedback in the course may have also influenced students' responses by applying a two-option lens to students responses of whether this activity did or did not "work well for them" as a learner, possibly unintentionally narrowing their reflections when responding.

V. RESULTS

The results provided below relate to each of the two research questions asked. First, the alignment of students' descriptions of their perceptions and takeaways with student-centered pedagogy is provided by presenting the distribution of provisional codes – answering RQ 2. RQ 1 is then answered by providing a summary of the descriptive codes for student responses within that provisional code group. Then, to further answer RQ 1, the descriptive codes for students responses in the “Other” provisional code group are categorized and presented as additional salient outcomes of the activity according to students.

A. Student-Described Alignment with Student-Centered Teaching

The percentage of student responses that were tagged with each of the provisional codes is shown in Figure 1. It should be noted that responses could be tagged with multiple provisional codes – so while 130 student responses were qualitatively analyzed, the total number codes applied is 143 and the pie chart represents the percentage of times that code appeared across all the 143 codes applied.

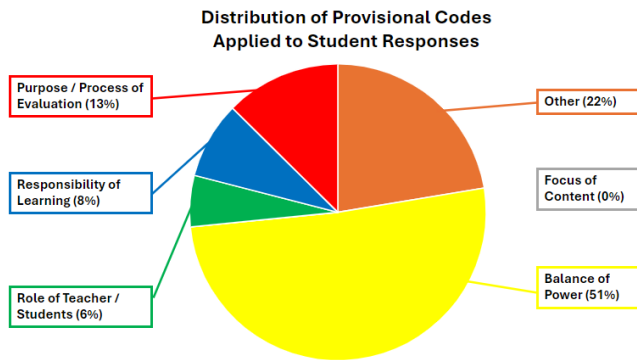


Fig. 1. Distribution of the 143 provisional codes applied to students' responses.

As Figure 1 indicates, Balance of Power (51%) was the most prevalent student-centered practice perceived by the students through the syllabus negotiation and co-creation activity. When evaluating the descriptive codes applied to students' reflection on the activity, the most prevalent phrases students were bringing up when talking about the balance of power were “having a voice”, “being heard”, “respect”, “care about students”, “fair/fairness”, and “inclusion.” Student responses tagged with this provisional code holistically expressed positive feelings about the experience and having shared power in creating policies that applied to them and valued having the opportunity to participate in creating the learning environment.

While Focus of Content (0%) was never brought up by students, the other three student-centered practices were present in students' reflections in lower percentages. Responses in the Purpose / Process (13%) provisional code group described this activity as improving students' understanding of the purpose of the first-year introduction to engineering course as well as a deeper and more meaningful understanding of the policies articulated in the syllabus. Examples of the descriptive codes

applied to responses tagged with this practice include “reasons behind policies”, “carefully read the syllabus”, “understand class purpose”, and “remember policies.”

Responses in the Responsibility for Learning (8%) provisional code group described this activity as increasing their feelings of personal responsibility to the course and joint ownership over the course because they co-created the expectations, policies, and rules, thus motivating them to engage with the course content and follow the expectations and policies as best as they can. Examples of the descriptive codes applied to responses tagged with this practice include “active participant of class”, “added responsibility”, “rules to hold ourselves to”, “obligation to policies”, and “we're required to do work.”

Finally, responses in the Role of Teacher / Students (6%) provisional code group described this activity as beneficial in seeing the perspective of the faculty member or instructor of a course and recognizing how the faculty and students can work together productively in a learning environment like a college classroom. Examples of the descriptive codes applied to responses tagged with this practice include “students work with instructor”, “instructor point of view”, and “class as a team environment.”

B. Additional Student-Described Outcomes

The student-provided descriptions of their perceptions and take-aways in relation to each of the five student-centered pedagogical practices are provided throughout the previous section to answer RQ 2. The Other provisional code category was used to capture the student responses that didn't clearly map to any of the five student-centered pedagogical practices and fully answer RQ 1. By reviewing the descriptive codes applied to all of the student responses tagged with this provisional code, additional outcomes of the syllabus negotiation and co-creation activity were identified.

The first of these outcomes being that students' identified this activity as “dynamic”, “engaging”, and “interactive” such that it “made a boring topic (syllabus) into a fun and exciting one.” Other student responses tagged with this code spoke not about the enjoyment of the activity, but rather the practicality of it in relation to their future experiences. Getting practice in negotiating aspects of a contract “simulated the real world” and “prepares us for our engineering jobs” shared students, noting that the activity “has real-world implications.” The last salient things that responses in the Other provisional code category talked about was the way in which this activity facilitated peer collaborations and interactions immediately, setting the tone for the team-based nature of the problem- and project-based first-year engineering course. Descriptive codes for these passages included “engagement between students”, “class wide sense of community”, and “group brainstorming and teamwork.”

VI. DISCUSSION OF RESULTS

The students' reflections in response to the question prompt indicated clear alignment between the intention of the syllabus negotiation and co-creation activity to center students' voices and learner-centered pedagogical practices and changes recommended by Weimer [18]. What was most salient to

students was the way in which this activity balanced the power between faculty and students in a fair, inclusive, and equitable way that prompted student to feel cared for and set the tone for a classroom environment that values mutual respect. Tangney [21] discusses a conception of student-centered learning that is more holistic compared to traditional definitions, presenting a humanist interpretation that centers the students through a more personal way. One example provided in Tangney's article is conscience raising [21], which is very much in line with what students were given a chance to do by negotiating policies of the course syllabus on behalf of themselves as the student body and what they are experiencing and navigating as first-year students with a breadth of commitments outside of this singular course. Examples of policies that students negotiated for themselves in the course syllabus are shown below in Figures 2 and 3. Figure 2 shows the late submission penalties negotiated and co-created by students, and Figure 3 shows the attendance and absence excusal timeline negotiated and co-created by students.

- Individual assignments are subject to a 10% per day (24 hrs. past deadline) penalty.
- Group and project work is subject to a 5% per day (24 hrs. past deadline) penalty.

Fig. 2. Late assignment submission penalty policy negotiated and co-created by students.

Class Attendance

Active engagement during class meetings is an important component for successful completion of this course. Many class periods will involve activities helpful in completing assignments, and some graded activities may pop-up in class and work submitted as a graded assignment will be accepted only from students who were present in the class or those with a documented and approved absence. You should plan to attend all class meetings on the [redacted] Course Schedule (provided on Canvas), as your attendance will be noted by the UTA in class. **Should you arrive late to class, check in with the UTA to ensure they can update the attendance to reflect your arrival!**

You all reserve the right to make the final call in deciding if coming to class should or should not be the priority for you that day (e.g. mental/physical illness, family/personal emergency, internet connectivity or availability concerns, etc.). As soon as you realize or decide that you will be unable to make it to class it is expected that you 1) contact your team members and 2) complete the **Absence Alert Form** to tell me you will be unable to attend class that day. If you cannot do this before class, please do it as soon as you are able. **Absence Alert Form submissions will be accepted up to 3 class/business (university open) days (72 hours) after the unexcused absence occurred.**

You will receive an "unexcused absence" if there is no Absence Alert Form submitted and the UTA notes you as absent that day in class. **Any attempt to get an absence excused past the 3-day window to submit the form must have documentation of a medical / personal emergency or academic obligation that was in direct conflict with class.**

Fig. 3. Class attendance and absence excusal policy negotiated and co-created by students.

In negotiating late penalties, the faculty member explained the purpose of course deadlines to students, stating that deadlines exist to maintain a steady pace of learning and demonstration of new knowledge as it is needed to build additional knowledge upon throughout the semester. Not having deadlines would make it nearly impossible for the faculty member to monitor student progress and ensure that everyone is on track to complete the course learning outcomes by the end of the course. Students agreed that a late penalty policy should exist with the conditions that: 1) student have the ability to request an extension under extenuating circumstances (this policy not pictured in the figure) and 2) there is a less severe penalty for team-level submissions giving the additional challenges that come with coordinating a submission across multiple peers and to also lessen the guilt that a person might feel for negatively impacting teammates grades if they are behind on their work. Students' arguments while presenting this policy demonstrate their engagement with empathy and acknowledgement of the challenges of peer collaboration.

A similar approach was taken in negotiation with the course attendance policy. The purpose and importance of attendance was explained, and then students were invited to co-create optimal policies amongst themselves and then negotiate these policies with the faculty member. This portion of the syllabus provides an example in which some aspects of the policy were not up for negotiation (e.g. attendance being monitored, mandatory, or the mechanics for how excused absences would be requested), but students were given the power to propose smaller aspects of the policy (i.e., how to handle coming to class late after attendance has been taken, how many days an excused absence can be granted past the missed class day, etc.).

Many examples in education literature shift the balance of power in a course through giving students increased autonomy in instruction activities or assessments (e.g., [18], [36], [37]), but the co-creation of course policies is not widely implemented as a means of power redistribution in courses. Giving students options and autonomy in choosing assessment methods, for example, is something that instructors can still plan and be fully prepared for and maintain significant levels of control over (how many options, what the options are, the requirements for each option, etc.). Having students be involved in creating course policies is significantly less bounded, and poses more of a risk of students pushing boundaries of what is reasonable from an instructional perspective. Weimer [18] recommends strategies for guiding students through the creation of policies through prompting questions and guiding responses in the event that they struggle to craft equitable policies. It should be noted that there are also valid arguments for avoiding giving away or sharing elements of power or authority in the classroom. Pittman and Tobin [38] point out the challenges that accompany such actions due to the limited power or respect for certain faculty members, specifically those that identify as member of a marginalized, under-represented, or underserved populations in higher education context.

Students also noted in their responses that this activity expanded their awareness and understanding as well as an appreciation for the policies in the syllabus – both through the lens of the instructor, but also for the purpose of their use as they navigated the course throughout the semester. This was certainly a welcomed outcome of this activity, as it is a common reality across many university settings that the syllabus is not something students read or take time to become familiar with [39]. Students articulated that they were both more aware of the syllabus's policies and more motivated to follow those policies given that they invested time in reviewing the document carefully and then also contributed to the creation of the rules with which they would be held accountable to. In an effort to explore evidence that might back up this claim by students, the attendance records of the students who participated in the syllabus negotiation were compared to the attendance records of students enrolled in the same course the previous year with the same attendance policy, but who did not experience a syllabus negotiation and co-creation activity on the first day of class but rather the policies were reviewed and presented to them. Table 1 shows the number of unexcused absences in each section of the first-year introduction to engineering course for Spring 2024 (syllabus negotiation and co-creation) and Spring 2023 (stand syllabus review).

Table 1: Table of unexcused absences in Spring 2024 and Spring 2023. Each row represents one section of the first-year engineering course.

Semester	Total # of Unexcused Absences	Average # of Unexcused Absences per student
Spring 2024	131	0.92
Spring 2023	426	1.97

By this account, this activity did improve the number of unexcused absences and this could serve as evidence to support students' claims that they were more aware of the policies and/or felt more motivated or obligated to attend class or go through the appropriate steps to have their absence excused when they could not be in class compared to the students enrolled in the course the previous year with the same attendance policy.

Along with students describing ways in which this activity aligned with learner-centered pedagogical changes in classrooms, they also pointed out positive outcomes related to them and their own skill development, learning, and understanding throughout the activity. Students noted that the jigsaw-style reading of the syllabus and discussion of the syllabus and possible changes to be made to negotiable policies with their peers engaged students' peer collaboration skills as early as the first day of class. The syllabus negotiation process with the faculty member also helped students engage in empathy by intentionally listening to the faculty perspective on various policies to better present their counter-proposals for these policies to ensure both parties needs were met. Not only did students share they enjoyed this activity because a mock contract negotiation served as a way to educate them about one aspect of being hired as a professional engineer, but they also described engaging skillsets such as active listening, empathy, cooperation, and collaboration throughout this activity. These skills are only some of a longer list being discussed throughout engineering education literature as the increasingly important transferable professional skills that employers are looking for in their engineer hires [40].

VII. CONCLUSIONS

As the landscape of higher education shifts and changes to better address and meet the needs of society, a renewed focus has been placed on the quality and accessibility of the education universities provide. One evidence-based approach to improving students learning is engaging them in the creation and construction of their own knowledge by using student- or learner-centered pedagogical practices. This paper describes the design, implementation, and outcomes of a syllabus negotiation and co-creation activity designed to center students' voices and experiences at the start of a first-year introduction to engineering course. Students' reflections sharing their perceptions of and takeaways from this activity confirmed that the intention of the design was met, as the vast majority of their reflections related to core changes associated with making classrooms more learner-centered. Additionally, students described in engaging skillsets such as empathy and consideration of other perspectives, collaboration, and communication while participating in this activity. The negotiation and co-creation of syllabus policies functioned not only to share and balance power

between students and faculty to create an inclusive and mutually respectful learning environment, but students also described having a deeper and more complete awareness of course policies and procedures as well as feeling more obligation and motivation to abide by these policies given that they contributed to writing them.

The outcomes of this activity were widely positive across all dimensions of consideration discussed in this paper. The course's overall structure and organization remained largely unchanged and equitable policies and procedures were still in place to provide course structure and organization such as they had been in previous iterations of the course. In response to a reflection prompt five weeks after participating in the syllabus negotiation and co-creation, students' described feeling cared about, respected, listened to, and valued by being given the opportunity to be active participants in creating the policies and procedures for their own learning environment. Depending on the course content or context this method of student-centered pedagogy may or may not be directly applicable, but what is recommended is considering how centering students voices, needs, and experiences can be adapted to various courses and learning environments in an engineering curriculum. In prioritizing student-centeredness, students self-described an increase in engagement, motivation, and ownership over their learning experience in a first-year introduction to engineering course. As the engineering education community continues to work to increase student motivation, belonging, and inspire students engagement in their own learning with the broader goal of retaining and graduating a diverse and well-prepared engineering workforce, we should more intentionally explore ways in which we can meaningfully center learners and whole students in the design of our courses.

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