Making Space for Writing: The Case for Makerspace Writing Centers

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Generally defined as places to "design, explore, and create" (Davee et al. 3), makerspaces are collaborative work areas—often in schools or libraries but also in a range of public and private spaces—where users have access to tools of all kinds to create things. On the campus of the Rose-Hulman Institute of Technology, the private STEM college where I teach, the makerspace is a combination of a giant garage and warehouse with tools, machinery, and materials. Writing in this space is literally pushed to the periphery. Printed material is piled on the desk near the door, and white boards with notes, ideas, and instructions sit at the edges of the building, marked off by bright yellow tape that indicates students don't have to wear safety glasses. The "real" work of making—building an engine, maintaining a hydroponic farm, redesigning a birdhouse—happens at the sprawling work tables in the center of the room, safety glasses required. As a result, it's easy to think of makerspaces as monuments to STEM education and to classify making and building in opposition to reflecting and writing. Writing, however, is essential to STEM and a necessary part of a maker project, in which students often have to communicate their design process and the value of their end products. When the National Academy of Engineering defined the engineer of 2020, they included good communication as a key attribute (55). Ultimately, this article argues that writing centers can help students create these connections between engineering and communication by building on shared values and reconsidering the spaces that writing—and writing centers—inhabit.

In an effort to provide writing support to STEM students, I piloted a writing center in our makerspace during the 2018-2019 school year. My goal was to pull writing away from the edges of students' work and—with a staff of trained peer tutors—help them identify the ways that writing and communication are integral to making. In this article, I first describe the structure of the writing center pilot pro-

gram and argue that writing centers and makerspaces often share key priorities and values. I then discuss the results of a needs analysis that peer tutors and I conducted to determine what communication happens in the makerspace and what writing processes students use. Based on these results, I conclude by identifying the ways that collaborations between writing centers and makerspaces can enrich both sites.

DESIGNING A WRITING CENTER FOR A MAKERSPACE

With the support of a grant from a private foundation, I piloted a small writing center in our makerspace in the fall of 2018 called the Communication Lab, CommLab for short. I named our space a lab in part because all of the students at my institution are pursuing STEM degrees; thus they are used to spending time in labs. I also wanted to capture the experimental spirit of the early writing labs and laboratory methods that Neal Lerner highlights in his work on the history of writing labs (25). I trained five writing tutors to offer writing support to the largest group of makerspace users—our competition teams. These teams build things like concrete canoes and human-powered vehicles and compete in national events against other college students. As part of their competition scores, the teams compose things like design reports and PowerPoint presentations. Historically, they haven't scored well in these areas, so I knew we would be addressing a well-known need on my campus.

The curriculum of the tutor training course included many traditional elements. For example, we read and discussed chapters from *The Oxford Guide for Writing Tutors* and *The Bedford Guide for Writing Tutors*, practiced tutoring techniques, and analyzed online videos of tutoring sessions. We also focused on STEM genres by reading Joshua Schimel's *Writing Science*, drawing on students' past and current writing experiences in STEM courses, and analyzing and creating technical reports, research posters, and presentations. The experience of the course, however, was quite unconventional. While the makerspace is open to any student on campus, it is used primarily by engineering competition teams and for some course projects that require fabrication. For example, while some competition teams might need electrical engineering or computer science students to write code for their projects, not all electrical engineering or computer science students would have reason to visit the makerspace. As a result, most of the tutors had never spent time in the makerspace. I wanted them to be comfortable there, so we met in the small conference room in the back of the building. Prior to beginning the course, the students had to complete online modules to ensure their compliance with makerspace

safety regulations and safe workspace practices. Each day of class, we had to swipe our identification cards to enter and make sure that we wore long pants and close-toed shoes. To walk across the yellow tape into the center of the room, we needed to grab safety glasses and hair ties from a bin near the door. While these practices seemed strange to me and to the students who hadn't used the makerspace, these practices became habits that helped integrate us into the world of the makerspace. We learned how to belong there, an important first step in making the case to students that writing belongs in the makerspace too.

IDENTIFYING SHARED VALUES

At first, the loud machines, concrete floors, and safety precautions of the makerspace seemed at odds with my writing center experiences—cozy rooms with comfortable chairs, inspirational posters, salt lamps, and books everywhere. The more I worked in and read about makerspaces, however, I began to see writing centers and makerspaces as a natural fit. Most descriptions of makerspaces, for example, emphasize building a community and leveraging peer relationships: "The community aspects of makerspaces help individuals feel welcome in spaces and promote peer-to-peer instruction" (Wilczynski and Cooke 2). In a document articulating the essential elements of makerspaces, authors from three makerspaces describe ideal makerspace cultures as collaborative, supportive, and forgiving learning spaces that build trusting communities for students (Wilczynski et al.). In other words, like writing centers, makerspaces are places that value peer collaboration as essential to learning and intentionally create positive spaces for those collaborations to happen by emphasizing experimentation, encouraging shared responsibility for the space, and relying on experienced peers to guide newcomers. I didn't have to explain or defend the benefits of peer tutors to faculty or students who use the makerspace—they already rely on that model in their own way.

Values typically associated with makerspaces are also being adopted by writing studies. Several scholars have noted the overlap between makerspaces and rhetoric and composition more broadly. For example, David Sheridan argues that "makerspaces perform rhetorical work," and his scholarship emphasizes the links between writing studies and maker culture. In her 2016 four Cs chair's address, Joyce Locke Carter also emphasized the importance of adopting a maker mindset to strengthen the field. Writing centers, precisely because of the values they share with makerspaces, have the potential to strengthen these connections with making by bringing writing and disciplinary knowledge from writing studies to a completely new space dominated by different disciplines.

ANALYZING STUDENT EXPERIENCES

During our pilot year, the CommLab peer tutors and I wanted to determine what communication the competition teams produced and how they were producing it. As part of an IRB-approved study, we conducted semi-structured interviews with twenty-one students and eleven faculty advisors across twelve competition teams that use the makerspace. My students coded the interviews by genre, timeline, perceived strengths, and perceived weaknesses to develop workshops, online materials, and other strategies for engaging these teams. I coded the interviews for students' attitudes toward writing and making, and two key findings emerged:

1. Students do a large amount of writing and communication as part of these teams with very little curricular support, and

2. Despite all of the writing they produce, students both literally and conceptually separate the act of writing from the act of making.

Amount of Writing. My interview data suggest that students are writing a lot as a result of their co-curricular work—and they recognize it. Across the interviews, students mentioned eight genres of formal or scored communication, including design reports up to sixty pages, wikis, posters, and proposals. They mentioned eleven types of informal writing, including client communication, progress reports, and budget requests. These communication tasks incorporate a variety of media and audiences, ranging from videos and brochures for potential sponsors to formal reports for competition judges and emails to advisors and teammates. This communication also carries high stakes for student teams—communication deliverables often determine whether a team qualifies for a competition and can comprise up to sixty percent of their final competition score.

The National Leadership Council for Liberal Education identifies the education that happens outside the classroom, like in the context of these competition teams, as where some of the most powerful learning in college occurs (37). As Brian Hendrickson argues, writing studies could do a better job of supporting and leveraging this writing (1). One of the barriers to supporting writing that happens in co-curricular spaces is the absence of a shared course. Not all students on a team, for example, will have taken the upper-level technical writing course. Additionally, at the Rose-Hulman Institute of Technology faculty advisors are all from engineering departments and all but one of the advisors I interviewed described them-

selves as relatively "hands off" in both the design and the communication work of competition teams. As a result, students have limited opportunities to transfer writing knowledge from previous contexts to their teams and from their team deliverables back to the classroom.

Separating Writing and Making. Although the students we interviewed acknowledged that the amount of writing they're doing is extensive and that it's not as successful or polished as they'd like it to be, they also didn't see it as a priority. Students on competition teams consistently separate writing and communication from the other "stuff" of making. All of the teams reported leaving the writing to the very end of the process. While this separation (and procrastination) might also be common in students' coursework, courses provide some structure for students to capture their work along the way through scaffolding like lab notebooks or worksheets. Students are also accountable to deadlines set by instructors. In contrast, students who are working in the makerspace are doing so without any of the structure or guidance a faculty member might provide. As a result, some of the teams described writing reports or making posters in a hotel room or a tent at the competition site hours before they're due. This separation is especially problematic because many of the documents are meant to capture the team's design process and decision making—something that is lost in the weeks or months between design and writing.

Not only do students literally separate writing from making by completing writing and communication tasks in a different space and at a different time, students also separate writing from making conceptually. This view of writing is perhaps common among students, but the ability for students to set their own goals and priorities in the makerspace brings clarity to this separation and highlights the challenges writing centers face in encouraging students to participate in writing as a process. One student explained, "[Writing] is not a huge priority of our team. It should be a bigger one, but we don't put that much effort in since we like the dynamic events more." Another student answered a question about why her team leaves writing to the very end by saying, "it's not the fun part—not very glamorous." Several students also contrasted writing to their other tasks by explaining they just weren't as good at writing. As these examples demonstrate, students create binaries like dynamic/static, fun/boring, and skilled/unskilled that separate the experience of making from their experience of writing. These binaries keep students from the potential benefits of seeing making and writing as part of the same task.

ENRICHING WRITING CENTERS AND MAKERSPACES

The challenge for our writing center has been to help students bring writing into their making process. One thing I noticed as we read through interviews was that students talk about making the way writing centers and writing instructors talk about writing. For example, one student described his team's process for designing more efficient engines as very focused on iteration: "We'll talk a lot about improving the cars, because this stuff is all very complicated and no one knows 100% what's happening. So we do a lot of researching and going back and forth about what we should do and how we should do it." Another student described her team's focus on learning and experimenting with design: "We're not going to win the competition, but we all kind of recognize that and support each other in all that we can do. We like being a team together and learning new things. Trying stuff out." All of the teams talked about their vehicles, robots, and machines as a process. They see their work as engaging, as iterative, and as about learning new things—exactly the way that writing centers hope students see writing.

Our writing center became more flexible and responsive by identifying these shared values and tinkering with our own services. For example, we created programming that diverged from the typical thirty to fifty-minute session. We hosted "sit down and write" events where teams could draft with their peers and blitz appointments where students could ask quick questions about posters and presentations. We also walked around the makerspace asking students about their work and designs. In other words, our writing center became focused on making it easy for students to work the writing center into their existing, process-based work. In turn, we also became iterative and experimental by trying to find strategies that would best meet team needs. Our most successful relationship was with a robotics team that typically started its design process with open team meetings focused on discussion. Tutors used this same strategy to get the team to work on writing their competition report by facilitating a team discussion about the report scoring rubric and model reports on the organization website. After starting the discussion, tutors then functioned as notetakers, occasionally asking clarifying questions. By the end of the meeting, the team had an outline for their report and a plan for follow-up meetings. This strategy worked well because it integrated writing support into a process that the team valued and felt comfortable with.

Being in a makerspace has benefited our writing center by making it more responsive to students' needs, and our writing center has benefited the makerspace beyond providing peer tutoring. For ex-

ample, by locating our writing center within the makerspace, we've expanded the possible role of the makerspace and the people who might use it. One of the common critiques of makerspaces, popularized by Debbie Chachra's article "Why I Am Not a Maker," is that, by privileging making, these spaces ignore and devalue work that doesn't create stuff and doesn't conform to traditional ideas of capitalism—thus often also ignoring and devaluing the work of women, students of color, and other minoritized populations. Moreover, makerspaces can be intimidating and be perceived as having high barriers to entry. While students who chose engineering because they love working on cars or doing construction feel comfortable with the machinery in makerspaces, students who are drawn to Chemical Engineering, Computer Science, or Biomathematics do not always fit that stereotypical mold. As a result, students who don't need to build an engine might avoid the makerspace despite the opportunities to make jewelry or screen print shirts. The writing center gives some of these students the opportunity to visit the makerspace. For example, only one of the CommLab's six tutors had been in our makerspace before. Of those six tutors, four were women and three were people of color. By locating our writing center in the makerspace, we're also pushing against the norms of who inhabits those spaces and what kind of work might be valuable there—of who counts as a peer, what collaboration might look like.

CONCLUSION

By bringing ourselves to the spaces where engineers are working, we became a noticeable part of engineering education on our campus. As a result, STEM faculty, also eager to help students see the relationship between communication and engineering, invited peer tutors to teach class sessions about poster design and review student work. As the second year of our pilot comes to an end and our presence on campus is uncertain due to the spread of COVID-19, we will again seek new spaces online to engage with students where they're working, collaborating, designing, and—perhaps with a gentle reminder from a peer tutor—writing.

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