Board 206: Best Practices and Lessons Learned for Hiring Student Staff in An Academic Makerspace

Audrey Boklage, University of Texas at Austin

Audrey Boklage is research assistant in the Cockrell School of Engineering at the University of Texas at Austin. Her current work is focused on exploring pedagogical moves and interactions within university makerspaces to create a theoretical lens to info

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Introduction

What is a makerspace?
Academic makerspaces are prevalent in institutions across the world; specifically in undergraduate engineering programs. Makerspaces are informal, opt-in STEM (science, technology, engineering, mathematics) spaces and are increasingly recognized for their potential to increase student access to and engagement with STEM (e.g., Martin, 2015, Roldan et al., 2018, Wilkczynski et al, 2019). Over the past two decades, research has highlighted the benefits of makerspaces, including engineering specific skills, such as prototyping, supporting student design projects, entrepreneurship, and innovation, (Forest et al., 2014; Wilczynski et al., 2016;).

Who is in a makerspace?
Makerspaces are often staffed by university and students representing varies degrees of student run experiences. Student staff are inherently important in the culture and operations of these spaces (Andrews and Boklage, under review). Despite this recognized importance, little is known about how these student staff are recruited and hired to work in these spaces.

Importance of mentors
Students hired in makerspaces provide the opportunity serve as peer mentors in the space. Recent research outlines domains peer mentors can support including: psychological and emotional support, goal setting and career path support, academic subject knowledge support, existence of a role model. (Ogle, Bolding, Lloyd, and Wade, 2020).

Opportunity
Despite this knowledge of the importance of students working and serving in makerspaces and the opportunities for peer mentorship they can support, very little is known about the hiring practices makerspaces have used to hire these students. This research aims to identify lessons learned and best practices of hiring student staff in a university makerspace.

Location
This research was conducted at a University, University A, in the Southwestern United States. The university is a Hispanic Serving Institutions (HSIs) and home to a school of engineering, and an academic makerspaces. While the space is open to all students at the university, it is primarily used and staffed by engineering students. The space is open during the semester between the hours of 9AM and 5PM and staffed by 5 university staff and over sixty student staff.

Methods and Analysis
Participants in this study were recruited through purposive sampling at both sites. Participants were incentives through a $25 virtual gift card upon completing an interview. At University A,

participants were recruited throughout the 2021-22 academic year by researchers. After the interviews, researchers asked participants if they recommended anyone else to interview wand snow-ball sampling was also used as a recruitment technique. A total of eight student staff and two university staff were interviewed at university A with interviews ranging from 21 minutes to sixty minutes. At University B, students were also recruited through purposive and snowball sampling. At two different points in time during the Spring 2022 semester, a total of five university staff and two university staff participated and interviews lasted from thirty minutes to sixty minutes.

The interview protocol focused on the participants' experiences as student staff members. Questions include: 'Tell me about yourself and how you got here?', 'What is your role in the makerspace?', 'What is being done well?', and 'What are some areas for improvement?' We did not collect demographic information, so the demographic information we have for each student came up organically in conversation. All participants were in STEM majors. Due to the inconsistent data we have on student demographics and the small sample size, we will not present the demographics such as gender, ethnicity, and year.

To analyze the data, we used grounded theory techniques to center the voices of the participants. The authors wrote memos throughout the process (Miles and Huberman, 2014). Throughout initial reading of the interview transcripts, the first author wrote memos to generate an initial set of codes based on in vivo and process coding. In vivo coding refers to the codes that emerge from the phrases students use verbatim which continues to center the voices of the participants (Creswell & Creswell, 2013). Process coding describes participants actions or interaction and their consequences (Creswell & Creswell, 2013) which is an appropriate coding process to answer our research question.

Findings

Recruitment and Hiring

University A participants described the evolution of the recruitment and hiring process as one that moved from subjective to more objective. When the space first opened, students and university staff described recruitment into the space driven by staff recommendation and networks. A student staff member described these initial processes lack of structure:

We don't score [the student staff candidates]. I do have like a list of questions somewhere on my laptop, so the questions are standardized, but there's no rubric, it's just me and [the university staff members]. We talk with each other, and we see like, how do we feel about their response? And we take down notes about each person about what their response is but we don't necessarily have like a rubric or anything to score their answer by.

As a result of this hiring approach, students were hiring students they knew and were like-minded, resulting in a student staff that a university staff member described as "insulated." Also, a student staff member described an interview process that was subjective based on what a potential student candidate wore to the interview:

"I forgot to mention that one of the things that we try to rule out candidates were if they were too shy. We would put a note like, "Oh, this person was a little too nervous. We're not gonna hire him." There was one kid, in particular, he showed up in a suit. He was really he was like messing

with his tie. He was doing everything. He was playing with his hair. He was looking at the lights. He was bouncing his leg and everything and we were like, "Oh, maybe next time."

University and student staff then decided to include technical and behavioral questions in the interview process. This technical expertise was demonstrated through questions on the job application and paired with a behavior task during the interview. Students were asked to build a fish tank that could exist on the international space station. Students that had gone through this interview process described the task as a challenging experience. One student staff member who was hired to work in the space said, "*[The interviewers] said, 'well now you have to kill the fish…So, it was much more intense than I thought it would be. I was a fun topic, but I didn't think it was gonna go into a [behavioral] interview."*

Students staff in charge of hiring described "red flags" that they recognized as hiring students who might work in the space for a short amount of time yet brough the desired strong technical expertise, namely senior classmen. "*It was hard to turn down really experienced seniors – but they only have one semester left – because we want to invest more in underclassmen who are going to go up in the ranks and actually have the time to work here.*"

Student staff then transitioned to the importance of employing a rubric and an interview panel to help with the process of hiring student staff. As one student described the balance, "I *selfishly want to know how to fix these machines, which is – yeah, anyone can do that, but it takes a certain type of person to go out and help*."

As the hiring process evolved, students applied and included a paragraph which was how the hiring committee "*sorted people out.*" A student described the paragraph as "why you wanted to work [at the space]." And a desire for it to be "*at least more quantifiable, if that makes sense. So, it's nice to see obviously we want people with passion and stuff like that. But also just seeing like how they interact with the space, what they like, what they don't like, all that stuff.*"

Student staff and university staff "*collectively decided*" if student got hired using the application and rubrics.

Lessons Learned

University A experienced a forced shift in hiring as a result of the COVID-19 Pandemic and the closing of the university campus and makerspace. When classes resumed in-person, the makerspace did not return to pre-pandemic student usage levels. As a result of this down-time in working with students, both students and university staff had the opportunity to re-design systems, including hiring. This forced pause and reflection, while not ideal, was an important lesson learned to remind staff to re-evaluate existing systems. This shift resulted in a staff that was close to pre-pandemic gender parity levels at the time of interviews in 2022. One female-identifying student staff member described the this as "*a good thing, In engineering, I have faced discrimination, of course, just being one of the minority women. I know in petroleum engineering, we're only like, 25 percent women. Sometimes it's very intimidating and we're always treated nicely. So, the fact that our staff before COVID was 50/50 was so welcoming and it was a very nice change of pace from the daily class life where I was often excluded even when*

like, sitting next to guys in class, they didn't really like that. So, having girls to relate to in The Maker Studio, it was very refreshing, I think it's a very good thing in engineering especially."

Another lesson learned because of iterating on the hiring process was one of purposeful and objective interview processes. Early in the student staff hiring process, student staff were responsible with hiring other student staff members. As a result, students were recruited for likeminded thinking and unnecessarily judged for what they wore or how they presented in an interview. University A made a very purposeful shift to include university staff members in hiring and move towards interview tasks and rubrics to move the process towards an equitably objective approach.

An additional lesson learned was to hire student staff who had time to evolve in the space versus spending one semester (because of their classification as upper classmen). Inherent in hiring student staff, is the inevitable turnover as students graduate, get summer internships, and leave the space to pursue their careers. As part of the hiring, student staff recognize the importance of hiring student who want to learn about the machinery, bring expertise into the space, as well as a desire to help other students.

Implications and Future Research

The deep understanding of the evolution of student staff hiring provided the research team with opportunities to identify processes, lessons learned, as well as opportunities for future research. Moving forward, makerspace management should seriously ask themselves what a student-led makerspace means in practice. Should students oversee hiring other students? What is the appropriate level of including university staff? How can safeguards and support be in place to ensure the process is equitable and inclusive of others with experiences that might not reflect the current group-think of those in the space. Future research should examine what inclusive hiring practices look like in a makerspace and university staff should encourage human resource professional in the hiring practices.

While recent research (Chambers et al, 2023) has recognized the soft skills and technical skills student staff gain as a result of working in academic makerspaces, hiring processes and practices should purposefully include these in the competencies they assess in staff candidates.

Given the high turnover of university staff, it is imperative that university staff are involved in the hiring practice to ensure the institutional knowledge is preserved as the space.

Finally, while student staff are recognized as important innovators in university makerspaces; ensuring they are equitably hired into inclusive spaces is the responsibility of institutions and the university staff supporting makerspaces.

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