Leveraging Job Shadowing as a Technique to Increase Doctorate Student Enrollment

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Abstract

Most individuals are familiar with job shadowing as a standard practice in industry. Job shadowing takes on many forms, but for university students, it usually involves spending a short period observing someone working in industry. The role or roles they are observing are potential future career paths. Job shadowing helps students define their future aspirations and motivate them to perform in their current studies. Industries also benefit from job shadowing programs as they provide them with a pipeline of potential future employees. Job shadowing programs exist across multiple domains, including STEM fields, K-12 teaching positions, and the medical professionals' field. The body of literature on job shadowing practices covers these domains. These programs are implemented in various ways, with their advantages and disadvantages summarized and presented in publications. This paper takes the knowledge applied across various domains and suggests a new type of mentorship program centered around academia. For students interested in working in industry, job shadowing occurs in tandem with other experiential learning opportunities, such as internships or Co-Ops. These opportunities often benefit students because they allow them to decide if this work is right for them. However, students who could aspire to remain in academia, i.e., Ph.D. students, do not have the same opportunity. It can be challenging for students to understand what a Ph.D. does in academia, which might discourage them from considering the career as a choice. Furthermore, the few who know they want to work in academia may not know whether they want to be a teaching-oriented professor or a research-focused professor. An established job shadowing program allows students to decide what is best for them and their future careers and consider pursuing a Ph.D. as a valid career choice. A consequence of establishing a program like this could be that more students are encouraged to pursue Ph.D. programs, particularly individuals who are underrepresented in academia. This paper presents the results of reviewing the existing literature on job shadowing programs, analyzes the effects of these programs across domains, and provides advantages and disadvantages that would be applicable to the academic setting. In addition, best practices for implementing job shadowing programs are adapted and presented to provide universities and educators with a guide for beginning a job shadowing program. Finally, for students interested in an academic job shadowing program, this paper also presents a roadmap that can act as a guide for students to follow and create their own shadowing plan if they do not have access to one.

Introduction

The student experience is many things. It is a period in which students make serious decisions about their future. This process is inherently intimidating, and can be even more so if students feel as

though they lack the necessary information and experience to make these decisions. Those considering pursuing a Ph.D. often do not know what their future will look like if they pursue a career in academia. Engineering students, who can experience industry careers through internships, have no avenue to explore if a faculty position is right for them. As such, students frequently view the Ph.D. profession as just being a teacher and do not consider it due to this impression. Being a faculty member encompasses much more than students see through their university experience, from teaching requirements to scholarship and service.

This paper posits the need for a shadowing program mimicking the structure of job shadowing programs found in industry or commonly experienced in medical domains. A job shadowing program allows students to experience a role and familiarize themselves with the inner workings of a career when they lack the qualifications and skill set to perform the duties themselves. The positive effects of job shadowing programs have been applied across disciplines and have valuable lessons learned that are applicable to a faculty shadowing program. This faculty shadowing program is intended to be effective for all non-Ph.D. students. Both undergraduate and master's level students can be convinced through this program to pursue a Ph.D. and a career in academia.

This paper is organized as follows: The background section will summarize the literature relevant to the proposal. The program outline section will detail suggestions and structure for creating and executing a faculty shadowing program. The final section will conclude the paper and summarize the steps to be taken for future work.

Background

This section describes the state of the literature surrounding job shadowing techniques and practices as they apply to academia. Additional supporting information is provided to describe the faculty jobs that will be shadowed. The information outlined in this section directly informed the program proposal described in the next section.

Job shadowing is a technique for preparing individuals to join a particular workforce. It involves close observation of an individual performing a job over a given time frame. In research, job shadowing has commonly been explored in its applications for student learning in industry. This research spans a multitude of domains and industries. This section summarizes the findings of those research papers. In particular, it summarizes the generalized techniques and findings that can apply to our domain of helping students determine if they would like to pursue a career in academia.

Job Shadowing and Experiential Learning

Job shadowing is a type of experiential learning. Experiential learning is a broad category of hands-on learning techniques that are common both in classroom settings (labs and projects) and outside of it (fieldwork and internships) [1]. Job shadowing has been studied in relation to various outcomes and has been found to positively impact knowledge transfer, student motivation, training, and more. The promising nature of job shadowing techniques and the familiarity of job shadowing as an experiential learning technique makes it a good candidate for introducing students to academic careers.

The National Society for Experiential Education has established eight guidelines for all experiential learning activities [2]. These guidelines are as follows:

1. All participants shall be clear on the intentions and educational outcomes of the experience.
2. All participants shall be prepared and plan to follow program intentions.
3. The program shall be authentic to the real-world scenario.
4. Participants shall reflect on their experience in order to create a learning experience.
5. Orientation and training shall be provided to give context about the environment and the experience.
6. Feedback shall be encouraged and used to provide continuous improvement.
7. The outcomes of the experience shall be documented.
8. The learning that occurs throughout the process shall be recognized and acknowledged throughout the process.

The guidelines listed here are reflected in the literature and studies surrounding job shadowing. Therefore, they will also be carefully implemented in the proposed shadowing program presented in this work.

Job Shadowing in Engineering

Job shadowing is only one of a handful of techniques used in engineering fields to give students a taste of industry expectations. More commonly, students are encouraged to work with and experience internships. However, job shadowing programs still exist and have been documented in the literature.

In engineering, most job shadowing experience is in connection with industry. Job shadowing programs have been found to have impacts on student career trajectories. Engineering programs are expected to help students find internships and job shadowing opportunities in industry because it is considered a best practice for students to have this experience early in their careers [3]. When paired with a near-peer mentor and participating in a job shadowing experience, research shows that there is a positive impact on student retention in STEM programs [4].

Many different aspects can influence a successful job shadowing program. As in the definition, job shadowing should involve viewing as many aspects of the job as possible. An aspect of mentorship is also important as it allows participants to ask various questions without judgment that may influence their decision [4]. The student and the mentor should be paired in a 1:1 relationship throughout the shadowing events [5]. In all experiential learning scenarios, faculty support and belief in the program has a positive impact on student involvement [5].

Without a doubt, job shadowing can increase interest in a field. However, one of the most valuable benefits for STEM is that it can also increase the confidence of underrepresented groups of people that a career path is a correct choice for them. A job shadowing program for women in engineering helped to reduce gender-related fears that they would not fit in or be able to succeed in the field [6]. Job shadowing has played a role in industry-developed outreach programs to promote future diversity in the workforce [7].

Job Shadowing in Other Fields

Of course, job shadowing experience and lessons learned are not limited to the engineering field. When considering other fields where job shadowing was successful, it was important to compare the qualities of these fields to academia. As a result, two popular fields for shadowing experiences stood out: the medical field and K-12 teaching.

One of the most popular fields for shadowing experience is the medical field. Like a career in academia, it requires experience and expertise to perform the tasks someone is expected to perform in career roles. This concern makes job shadowing an ideal experiential learning program because it gives those a shadowing experience while not requiring the shadow participants to have the expertise needed to perform tasks.

A pertinent observation found in medical shadowing programs is that there are ethical concerns when shadowing physicians during patient interactions [8] [9]. Namely, programs must consider ensuring that participants follow confidentiality expectations. This concern can be handled by having students sign confidentiality agreements and complete HIPAA training. However, there are still concerns that even if patients give informed consent to the student's presence, it may affect the honesty of the interaction. Therefore, the potential downsides of a shadowing program should be balanced with metrics that prove that these programs are also beneficial to education and training. Our proposed program takes these considerations into account, as dealing with student information causes privacy concerns due to FERPA, as well as professional privacy concerns of departments and department politics.

Guidelines were published to suggest an approach to shadowing in a pharmaceutical program [9]. In this work, they outline considerations to remember when forming a pharmaceutical job shadowing program. One of the focuses that can be applied to faculty shadowing details the importance of faculty morale. For instance, department leadership should be on board and supportive of the process to help ensure the program's success and the experience's consistency. It is also essential to consider the morale of the individual being shadowed. The eight guidelines discuss how it is crucial to understand the intent and benefits of the program. To do this accurately, the participants must be eager and willing to participate. It is easy to see how an individual who does not fully support the program may give a skewed outlook to potential shadows that contradicts the program's intent. Honesty was established as necessary in this type of mentorship, but honesty should be abstracted and non-biased to keep these discussions distinct from gossip.

The other related field in which job shadowing has been studied is K-12 teaching. Research has shown that job shadowing can relate to meaningful learning and the transfer of skills in teaching environments [10]. As covered in the following section, teaching is one of the core components of a job in academia. Therefore, the success of K-12 teaching programs is promising for the results of the Ph.D. shadowing program.

Academic Job Expectations

When students are considering and applying for Ph.D. programs, one of the topics they must consider is their future careers. Multiple career paths are opportunities for engineering Ph.D. graduates. The most common ones include academia, research labs, or research-focused positions in industry. For those integrated in the academic sphere, many adages are provided to students as

advice. Many assume that the primary goal of obtaining a Ph.D. is to become a university professor. Another common assumption is that it is nearly impossible to get a tenure position based on the job pool. These propositions and their truths are not the focus of this paper. Instead, the goal of the shadowing program is to bring awareness and provide guidance to students on deciding their future career goals. This would allow those with a passion or aptitude for faculty positions to develop skills that will help them achieve this goal in the future. Those who are unsatisfied with their job shadowing experience may reorganize for a research position or move to industry rather than spending their time and money pursuing a Ph.D.

One of the main considerations of having a shadowing program is that there is little transparency in academia about what a professor actually does in a day. This confusion stems from multiple reasons. On the one hand, the expectations for being a successful professor differ between institutions. On the other hand, there are also issues with department communication with their faculty about what the expectations for success are [11]. This project disseminates some of the literature around academic professions so that these expectations are laid out so that the shadowing program can take advantage of that information. It is important to know that this work cannot thoroughly disambiguate the role of a professor. This is due to the vast array of differences in expectations and policies between universities and even departments within a university. To make matters more complex, these expectations are not clearly provided in written form, as faculty handbooks and contracts are written vaguely. There is no class, no singular source of knowledge, which helps students and junior faculty understand these expectations. This means that the information is usually disseminated by word of mouth and through social interactions, both strategies that complement a job shadowing program.

Price and Cotton studied faculty across departments, schools, and experience levels [11]. While their work focuses more closely on the humanities, they establish several categories of job performance for faculty. These categories are teaching, scholarship, and service. Teaching is expected to be average or above and absent of disastrous practices or consistently negative reviews. The scholarship expectations align with publishing and securing funding. The emphasis on publishing in peer-reviewed publications and securing significant funding is greater for research institutions. For teaching institutions, the emphasis on scholarship is much lower. Finally, service expectations exist within each department. Service expectations could involve volunteering to sit on committees at the department, college, or university level, providing peer reviews on publications and proposals, and getting along socially with others in the department.

One of the benefits attributed to job shadowing programs is that it allows individuals to understand workplace requirements, culture, and employee evaluation or performance without requiring them to perform the job themselves [5]. These benefits make Ph.D. programs and careers in academia a perfect fit for job shadowing programs. However, the idea has been explored very little in published research. In the nursing profession, they have explored convincing students to pursue a Ph.D. in nursing to become educators in nursing programs. This application likely stems from the strong culture of shadowing that exists in the medical field. Though some of the experiences and expectations of nursing educators differ from what would be expected in an engineering field, this application gives valuable insight into a potentially generalized academia shadowing program.

One faculty shadowing program was run to expose nursing students to the roles of clinical nursing faculty [12]. The goal was to attract students to the profession in response to an impending faculty shortage. During this program, students shadowed the faculty for two days of clinical teaching. Some of their findings were domain-specific, such as having faculty be excited to participate because the students could help ease their workload in the clinic. Other findings are general to the faculty role and can be applied to this work. For example, students had apprehension about the disparity between the salary of faculty and the salary in industry. Additional concerns also addressed the faculty workload. Despite this, students had a more positive and accurate view of the profession after the shadowing program. In alignment with previously discussed research, the recommendations from this study outlined the importance of honesty between faculty and shadow. However, while it was essential to be honest about challenges, it was necessary to balance the negatives with the positives. Finally, this program only handled one aspect of the faculty profession, i.e., teaching. While the proposed shadowing plan will apply these suggestions to engineering faculty shadowing, it will also expand the shadowing proposal to encompass other aspects of the faculty position.

Program Outline

This section describes important aspects to consider and include in a faculty shadowing program, detailing the program as represented in Figure 1. These suggestions build off the established research but are altered to fit faculty jobs' unique requirements and responsibilities.

Program Planning

The first step to getting a program like this up and running is getting everyone on board: department leadership, other university leadership, and any professors participating in this process. Since having willing participants is key, the participants in this stage should be limited to those who are enthusiastic about and engaged with the process. As the program is successful, new faculty members will become engaged and assist with the program's growth.

Giving the program a structure that makes sense and can be implemented is essential. These tasks can be spread over a short period of 1-2 weeks or extended into a semester-long program. Given that faculty tasks and responsibilities can be spread over the semester, scattering events over a more extended period can give shadows a more thorough understanding of the job. Unfortunately, interest can also degrade over a long period. If this is a concern, shortening the program to occur over a shorter time period may be of interest.

An additional consideration to make when designing the program is whether undergraduate or master's level students will be targeted by this program. Master's level students will have more experience, and therefore can participate in more detailed and extensive tasks. For example, you can expect to engage a master's student in the process of reviewing a policy proposal as they have more experience writing longer and complex works. However, this experience may be so above
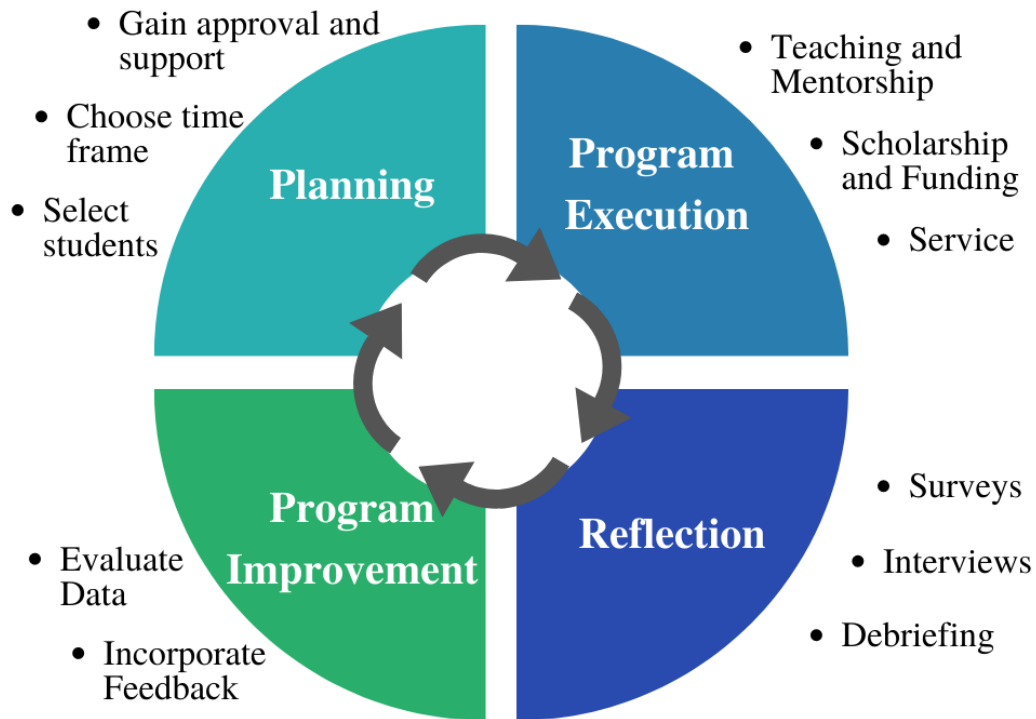
Figure 1. A graphical depiction of the stages in the proposed faculty shadowing program

the skill level of an undergraduate student, who should instead be engaged in discussions and overviews that align with their skill level. This is why, though the program is appropriate for engaging both undergraduate and non-Ph.D. graduate students, activities should be separated based on skill and experience.

When structuring the program, guidelines should be set about activities to encourage and what professional boundaries to set. The students in the program may be attending the university the professors are teaching at. Department leadership should set limitations to ensure that while open and honest communication is encouraged, sensitive aspects of department politics and decision-making should be off limit. This will ensure that no information is spread that could tarnish the student experience at the university. With that, ensure that all faculty members are aware of potential privacy concerns regarding other students' information. Having these policies clearly defined will help ensure the success of the program.

Student selection is an important consideration. When starting the program, selecting and inviting students based on their university performance may be tempting. This can be beneficial to getting a program started and ensuring that the program's size matches the faculty's availability. However, the proposed benefits of a program like this include introducing individuals outside the traditional academia pipeline to the faculty career path. These students will have the potential to succeed, but unconscious bias and other systematic structures may prevent them from being selected for programs like this. Therefore, it is important to consider demographics and recognize innate biases when selecting students.

Teaching

Teaching is the aspect of faculty jobs that students will feel they are most familiar with. After all, the university experience for undergraduate students centers heavily around the classroom and learning. However, there are experiences related to teaching that exist outside of the classroom. Professors engage with students to provide guidance both in class topics and broader life or career challenges. Time is spent developing content and assessment methods. Most importantly, professors have a personal philosophy about what it means to be a good teacher.

One option to give student shadows is letting them sit in during office hours. The goal of this is to help them understand the guidance provided by faculty, both academically and otherwise. Faculty know the requirements of their courses well and should schedule shadowing office hours during the semester when they expect frequent student traffic. Additional considerations should be made to focus this part of the program on professors who frequently engage with students during office hours. Classes with a TA or tutors to provide guidance may be associated with fewer students engaging in office hours.

Realizing that this may cause discomfort for the students attending office hours, precautions should be taken to establish the university's legal and ethical commitment to student privacy. At a minimum, the professor should explain to the student the role of the shadow and their commitment to confidentiality and give the students the option to choose to speak privately. Professors participating in the shadowing program frequently throughout the semester can consider designating certain time blocks to not having a shadow present, allowing their students to know and choose their comfort level before engaging in office hours.

Additional information can be provided on how professors structure their classes. This is the place for a candid conversation about how they like to measure student performance, how they create material, and their grading philosophy. For an advanced and in-depth program, activities such as lecture or test creation can be offered to students as deemed appropriate.

Scholarship

The best way for undergraduates to begin to understand research demands is to engage in research themselves. It has been well documented that experience in research as an undergraduate student allows for better performance in their current program and increases the likelihood of enrollment in graduate programs [13]. For reasons including time constraints and a lack of experience, some undergraduates may not be ready to participate in the research process. However, tangential experience research may convince students to participate in research in the future. Students can sit in on research meetings and still learn about the research process without having to do the work themselves. For a shorter shadowing program, sitting in on a few meetings led by different professors can help them grasp the spectrum of research and scholarship. If the program spans a longer period, the student can instead sit in on the same research meeting over the course of a semester so they can see how research projects progress.

For master's students at this stage, or students already engaged in research, this stage should involve giving them a more in-depth and novel research experience. Over a long-term program,

this could be encouraging students to take a leadership role and take ownership over projects. Activities that can occur either over the long or short programs can include allowing students to view the grant writing process, attending conferences in their field of interest, or even engaging them in reviewing the work of others as an experiential exercise.

The conversations at this stage should cover research expectations, funding expectations, the process of acquiring funding, and how the institution assists funding opportunities.

Service

The level of interaction in service positions depends on university policies. Some universities already engage students to sit on various committees along with faculty, and it would be easy to get permission for a student shadow to participate as well. At other schools, without the established presence of students, faculty may not react positively to a student's presence in their meetings. In these cases, active shadowing can be replaced by a conversation with the faculty mentor about service expectations, the type of decisions made, and how much time and effort they spend engaging with their various service responsibilities.

Reflection and Data Collection

As stated earlier, reflection is integral to the experiential learning process. Gaining an understanding of the student experience is also an important part of ensuring the program is meeting the intent that was set. Additionally, given the sparsity of literature surrounding this topic, collecting and disseminating data through publications allows other universities to learn and grow from the program. Therefore, it is suggested that students engage in reflection in measurable ways: with surveys and documented interviews. These should accompany debriefing sessions between the mentor and shadow so that the shadow is able to process their experience and receive answers to follow-up questions in the presence of an expert.

The data collection will mirror other data collection processes in the field of measuring job shadowing and experiential learning. Like the work in [4], demographic data will be collected from participants to analyze the impact of demographics on the result of this study. Additionally, students will be asked to rate their experience, both overall and on particular activities, on a linear scale. When possible, their future experience, known as outcome tracking, should be documented to determine if they enroll in a Ph.D. program and pursue a role in academia. As stated in [5], exit interviews and focus groups should be used to identify benefits of and problems with the program not expected and thus not measured through close-ended questions. These can be used to improve the future of the program and ensure that it remains aligned with its goals. All of these metrics are commonly used in the field of experiential learning to determine the effectiveness of programs.

Conclusion

By enhancing the traditional mentorship role with proven job shadowing practices, the innovative approach detailed in this work stands to enhance the perceptions of a career in academia. A traditional job shadowing program is adapted to give students of all levels insider knowledge of what a career in academia would look like for them. They will get the chance to experience different aspects of faculty career expectations— from teaching and mentorship to research,

funding, and service expectations. Participating in this program will allow them to decipher if a career in academia is a viable career path for them.

Based on previous research, a program of this style is expected to benefit both students and hosting institutions. Job shadowing programs help students determine the career type they want. Having career goals helps students stay focused and motivated throughout school and potentially join programs they would not have considered otherwise. Encouraging students to pursue a Ph.D. and a career in academia benefits the university by attracting new candidates to the field.

This program's advantages align with university efforts and diversity, equity, and inclusion projects. Job shadowing programs of this style not only increase the level of interest in a career but show unrepresented students that a career like this is possible for them. This program's dissemination of information will narrow the knowledge gap and allow an understanding of the faculty position for students of all backgrounds.

This work will be executed through a documented study. The reflections that allow students to engage in the learning process will provide meaningful data that will allow the program's effect to be reviewed. Comparison of these students and their career paths over a long period will determine if the program has any effect on encouraging Ph.D. enrollment, particularly for minority groups. The results of these efforts will be disseminated in future publications.

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