

Are You Ready? The Adventures of a Student Intern and What It Means for Instructors

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Abstract

A fear of many students walking into their first job in their field of interest is that they are not prepared to do what will be asked of them. A great deal of research has been done on the effectiveness of teaching methods such as active learning and guided laboratory experiences, with the primary measurement of effectiveness being student performance on an exam or in subsequent coursework. Performance or confidence on the job is much harder to evaluate but it is important to understand how these experiences can impact the students' experience in their first engineering job. In this paper we will describe the experience of a rising senior Industrial Engineering student in her first engineering internship and how the laboratory assignments in her spring courses prepared her for her first internship. An informal survey of other students returning from internships is also discussed, as are suggestions for future research.

Keywords

Active learning; internship; self-confidence; job performance; research.

Introduction

Self-confidence and self-efficacy have been shown to be key characteristics of success for engineering students and professionals alike. For example, Shahraki et al.¹ performed a “systematic literature review” and identified a number of technical and non-technical skills demonstrated by successful construction engineering supervisors, among which were “self-confidence and decisiveness.” Similarly, García-Chas et al.² studied the effect of intrinsic motivation, experience, and “political skill” (which is related in this study to self-confidence) on performance and found that both experience and political skill influenced job performance, while intrinsic motivation did not.

Historically, studies of student success have focused on the acquisition and retention of technical skills and knowledge (Prince³ provides an excellent summary). However, in recent years engineering educators and researchers have increasingly focused on the impact of a variety of methods on self-confidence and self-efficacy, “soft skills” (such as leadership and innovation), and engineering “professional skills” (defined by Shuman et al.⁴ “an ability to function on multi-disciplinary teams; an understanding of professional and ethical responsibility; an ability to communicate effectively; the broad education necessary to understand the impact of and societal context; a recognition of the need for, and an ability to engage in life-long learning; and a knowledge of contemporary issues”). Atadero et al.⁵ used Social Cognitive Career Theory (SCCT) to assess the use of small projects in a statics class and found a number of positive effects of using projects on students' ability to connect content knowledge to persistence in their careers even though it did not appear to have any effect on actual content knowledge gains. Litchfield et al.⁶ used surveys, interviews, and questionnaires to compare students involved in

“engineering service” (aka, service learning) with those not involved in engineering service. They found that engineers in both groups reported comparable levels of “perceived technical skills”, but the group involved in engineering service reported significantly higher levels of “perceived professional skills” (teamwork, communication, understanding of ethical and professional understanding, etc.)

A number of other studies have investigated the effect of project work (and/or type of project, level of student, or degree of involvement with faculty or outside entities when completing projects)^{7, 8, 9, 10, 11} and other active learning approaches^{12, 13, 14} using (primarily) surveys of student and faculty perceptions at the end of the activity or course. What has not been investigated, it seems, is how these experiences and perceptions carry over to performance and perceptions when the student is working in an engineering field. While the reasons for this seem clear (the complexity of data collection, difficulty tying specific learning experiences to task performance, etc.), the report of one student at the end of her first internship experience raises the question of whether it might be worthwhile to try.

The student’s experience, in her own words, follows ...

A Student’s Perspective

“As a senior in high school I dreamed of attending a large college. I grew up in a small town and graduated with only 75 students. I wanted bigger and better for my college experience, or so I thought. Little did I know that my dream of attending Auburn University would come to a screeching halt because of a scholarship from a school that was never on my radar called Mercer University. The first time I visited Mercer I was not sold on the idea of going to a smaller school. The student giving the tour slowly started to make me rethink my “big school dream”. When walking by one of the academic buildings the students started talking about the benefit of a small school which were things like smaller class sizes and hands on learning. My wheels started turning and I quickly realize that small class sizes and hands on learning were exactly what I needed. Coming in freshman year at Mercer University I quickly realized I was in the right place. I had friends at other schools who sat in lecture halls that sit over three hundred people with no interaction with their professors. I on the other hand had the opposite experience from the beginning. I sat in rooms with only 30 students and knew each of my professors personally. As a student who thrives on interaction Mercer was going to provide a learning environment I needed more than I knew.

Starting as early as my freshman year professors started engaging with the class in numerous ways such as in class assignments or discussions that brought the classroom to life. I have always been a student who enjoyed an interactive classroom, and many of my professors used this strategy to bring real meaning to what we were learning in class. As many students do you wander through your undergraduate experience taking bits and pieces of what you learned with you. Fast forward about two and a half years later and I am now a Junior in college wondering what my next step was going to be. As many students do I found myself in a place where I desperately wanted an internship. I applied to many places and waited with anticipation until the door opened to my dream job at Gulfstream Aerospace in Savannah, Georgia. The summer after my Junior year at Mercer I moved to Savannah with many expectations of what the summer would hold, but no idea what I was getting myself into.

The semester before my internship I was enrolled in a class called Ergonomics with Dr. Moody. I had no real knowledge of ergonomics coming into this class. Going in on the first day I had no idea the impact the class would have on me in just a matter of time. Like many of other classes that I have had during my undergraduate experience the class contained a plethora of labs, in class assignments, and real world projects. In class, we were asked to complete things like actual assessments on real work station, time studies, and so much more. Ergonomics was no exception to many of the other classes I had taken in the way that I enjoyed the class so much more because it was interactive. Retention of information is not always a simple task. In my opinion I tend to remember more of what I learned if I had a project or activity to connect it with, which was the case with ergonomics. Walking out of the class knew I had learned a lot, but I was about to shock myself with how much I would remember.

Walking into my first day at Gulfstream Aerospace my biggest fear was that I would not be prepared. This is a fear I am sure that many students have walking into their first job in their field of interest. At this point I had been a student for three years, but yet had I gained any practical skills needed to prepare me to succeed? I was about to find out. After my first week, I quickly realized I was going to be challenged and put outside of my comfort zone. In the position I was working in at Gulfstream I had a co-worker who was also an intern, but from my dream school, Auburn University. Being that I knew how smart my co-worker was I became extremely nervous that I would not measure up or that he was more prepared for this internship than I was. This is a real fear that I am sure many students have going into a competitive work environment. For the first part of the internship we were given tasks to work on together. I am sure this was supposed to make us both feel more comfortable, but it only worried me more that I was not as prepared as my coworker.

The first task given to us was performing an Ergonomic assessment. My first thought was, “wait, I know how to do this! I can do this!”. With excitement I was able to go back to my desk with my co-worker and pulled together an assessment that fit the types of jobs performed on the production floor. This is where I started to see that I was just as prepared as my co-worker, if not more. You see, my co-worker knew what an Ergonomic assessment was; however, he had no idea how to carry one out. He had theoretical knowledge, but no experience executing a full assessment. I on the other hand, due to my interactive lab assignments in Ergonomics had complete confidence in carrying out this task. In ergonomics the past semester, we were asked to do an assessment where I was the employee the class was evaluating. This assignment made me retain the information we learned in class better than if we were only to learn it in lecture. I fully understood what ergonomic concerns were and how to look for feasible solutions. My co-worker on the other hand did not have the confidence I had gained from my professors teaching strategy. After creating the form I was able hit the ground running. I started collecting data and evaluating work station concerns. This was one of many examples where I had more than just theoretical knowledge that helped me succeed in the workplace.

The hands on experience I gained in the classroom gave me the skills and confidence I needed to carry out responsibilities in the real world. This one task was just the start to me realizing how different my educational experience was from my peers. I found that because my professors insisted that we try to carry out evaluations or projects I have more practical knowledge. To me being prepared means having the skills and confidence needed to approach a given situation.

Ergonomics is not the only class that has given me the skills needed to succeed in the work place. I have had classes like Technical Communications where I learned how to write proposals

and create technical presentations, which proved to be valuable. I had to learn how to present technical information in front of an audience that might not have a technical background. These skills also gave me confidence that I needed during my internship. For example, after going through and conducting the ergonomic assessments I was asked to meet with the ergonomic committee and present my findings. I was asked to talk through their concerns and compare them to the issues that I found during my walk through. This committee consisted of 10 floor works who volunteer to bring ergonomic issues to management's attention. I learned very quickly that the people on the committee did not understand what exactly ergonomics was and I needed to effectively communicate my knowledge. This was a difficult situation for me to be in because I was way younger than the individuals I was meeting with and I did not want to come off arrogant. I found that my knowledge from ergonomic and technical communications skills gave me the confidence to move forward in the meeting. I was able to properly educate the members of the committee and give them a new direction for their concerns. I then proceeded to present my findings and open up a round table discussion to let the committee be a part in finding ergonomic solutions for the issues we found.

I feel as if my academic experience at Mercer has successfully prepared me for my future in engineering. I have found that through projects and lab assignments I have gained hands on experience that would prove to be valuable in this industry. At the time these assignments seem trivial, but I found that they do give students problem solving skills needed in the workplace. Little did I know how important this teaching strategy was going to be for me.

Opportunities like the one I had at Gulfstream directly translate to workplace confidence. My experiences this summer showed me the importance of labs, in class assignments, or real world projects hold in an academic environment. I now understand how important both theoretical and actual knowledge are when you enter into the workforce. I have had an abundance of hands on experiences in college, which has given me the confidence to step up as a leader among my peer. The confidence I gained in my years at Mercer have allowed me to volunteer for tasks that others might be intimidated to tackle. Mercer University has given me an academic portfolio that I would not trade for the world and successfully prepared me to be a prosperous person in the workplace.”

Results of an Informal Survey

After hearing the student's story, the instructor was curious if this experience is familiar to other interns, and more specifically whether tools and techniques learned via active learning techniques in classes translated to confidence and ultimate success on the job. A quick survey was constructed and deployed using SurveyMonkey and an invitation to participate was sent to all students in the School of Engineering who had an internship during the summer of 2018. Because the survey was quickly devised, informally administered, and not subjected to IRB approval the results will only be discussed in general terms.

With the caveat that the results presented here are only general observations and not statistically significant, a few interesting points have emerged. The majority of respondents completed their internships between their junior and senior years, with the next largest number being completing it between the sophomore and junior years. For most, this was their first internship experience. Coming in to the experience, they were equally divided in reporting that they felt “nervous” or “very nervous” on their first day and reporting that they felt “fairly sure” about their likelihood of success, “confident” that they would succeed, or “ecstatic” about taking on their “dream job”

on their first day. Overall, they were less confident about their level of preparation for their first assigned task, with half of the respondents feeling “unsure about where to start” or “completely unprepared”. Fortunately, by the time that first task was completed most believed they had done well, with nearly all students feeling that the task went well and over half feeling more confident as they approached the next challenge. Looking back at the entire internship, students report that their experience was positive with the majority being willing or looking forward to returning to the same company. The internship also appears to be useful for helping students reflect on their career goals. In this survey, about half of the students reported that they might reconsider their career direction (albeit in the same field of study) while most of the remainder reported that the experience either confirmed or made them more confident about their chosen career path.

With respect to students’ exposure to active learning methods in the classroom, respondents were asked which courses they found most useful in their internships and, among those, what types of teaching and learning methods were used. A wide range of methods was reported, with lecture/homework, in-class demonstrations, guided and unguided laboratory assignments, and small projects all being reported at least a third of the time. When asked which of these methods the students felt were most useful when understanding what they needed to do or how to do it, guided and unguided labs, in-class demonstrations, and in-class exercises were selected most often. For those students who felt “fairly confident” or “very confident” that they were prepared to accomplish their first task these same methods, along with small projects, were most often reported as having been used in class.

These results lead to several intriguing questions with respect to the effect of active learning techniques on student confidence and performance during internships in their chosen career fields. For example, does active learning improve student confidence in their ability to perform well on the job? The corollary to this is, does active learning have a real effect on the student’s level of preparation for the job; that is, does it actually help students to know what to do and how to do it when given a specific task? Do specific teaching methods (active or not) lead to better outcomes (confidence and performance) on specific types of tasks? Or are there certain active learning techniques that result in better outcomes overall? What is the impact of individual differences in learning style, personality, etc.?

Conclusions and Recommendations

The experience of one student during her first internship in her field of study suggest a positive impact of active learning on both confidence and performance on the job. A subsequent informal survey of other students involved in internships this summer provides some support for that conclusion, but at the same time highlights the need for further research to confirm that impact and produce generalizable conclusions.

As a result, the instructor is interested in exploring the effect of active learning on the transferability of technical and professional skills to the workplace. The challenges are great but the rewards in terms of increased understanding of the long-term effects of active learning are immense.

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