Life after University for Engineering Graduates

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Abstract

Most Bachelors of Science in engineering programs curricula have a standard that covers main engineering skills in sciences, mathematics and design. Students are prepared through a rigorous curriculum. However, Universities fail to fully prepare students for aspects of their lives beyond the academic scope. While the Accreditation Board of Engineering and Technology (ABET) requires student training in ethics, lifelong learning, communication, and working in multidisciplinary teams, students remain insufficiently prepared with skills that help overcome many challenges they face after leaving University.

University of Illinois at Chicago (UIC) is a public research university registering greater than 20,000 students. One of the colleges at the University is the College of Engineering (COE). The Department of Mechanical and Industrial Engineering (MIE) in the COE has modified its curriculum to include a course, which addresses essential life and career skills to its students in their final semester. The course addresses challenges ranging from how to deal with financial pressure, seeking career opportunities, time management, workplace etiquette, and other necessary skills. It consists of five different modules: Financial Planning, Effective Job Hunting, Accelerating Your Career, Learning Never Stops, and Entrepreneurship. Modules utilize methodologies from experiential learning theory to enhance student learning and contribute to the body of knowledge of teaching methods in STEM.

An initial assessment was performed to measure the impact of this course and its modules. Metrics included the percentage of the cohort that was employed within six months of graduation versus the cohort that did not participate in the course. Additional metrics included a wide variety of surveys during and post course participation that provided qualitative insight on the courses performance.

This paper illustrates the framework of the Professional Development Seminar for students of MIE at UIC. The effectiveness of this composition of modules continues to be studied. Initial results have shown evidence that participating seniors experience an increase in preparedness for post university life. The proposed framework has the potential to make an impact on any program in the United States by providing a course package that can be easily recreated. Locally, the success from this course has led to different engineering departments implementing courses into their curriculum that include one or more of our described modules.

I. Introduction

Over the past few years, numerous studies have been conducted across the United States to determine the level of technical and interpersonal aptitude, that is vital to succeed in the engineering workforce[1]. As a result, U.S. accredited engineering programs have a set of courses providing engineering skills to ensure that students have the core competency foundation required for industry positions[2]. These aptitudes include: ethics, effective communication, and functioning in multidisciplinary teams. While these skills are necessary for all engineers, they alone cannot guarantee a successful transition in the crucial years after students graduate. While

96 percent of educators believe that they are delivering workforce-ready students, only 11 percent of U.S. employers believe this to be the case[3]. The President's Council of Advisors on Science and Technology emphasizes the importance of producing an adequate STEM workforce in the U.S.; Economic projections point to a need for approximately one million more STEM professionals than the U.S. will produce at the current rate over the next decade if the country is to retain its historical preeminence in science and technology[1].

There are non-technical factors that affect the potential of STEM students. Researchers from the National Center for Labor Statistics have reported that high student loan debt may cause friction in a student's ability to pursue graduate education or achieve financial independence[4]. A 2016 survey, given to major manufacturing executives from the National Association of Manufacturers, showed that a leading indicator of the disparity of employable STEM candidates in the manufacturing industry, is due to the failure to provide students with career coaching that paints an accurate picture of the many occupational opportunities for STEM-trained graduates[5]. This survey was discussed at the 2016 National Academic Press conference where one executive claimed that another solution to resolve this shortage to reinforce the concept to students that learning is a lifetime notion required for career success[5].

Reports across the United States have advised leaders of STEM stakeholders to change standard parts of engineering education, with a primary recommendation of making entrepreneurship a priority in the education of STEM students[4,6]. While numerous research-based strategies have been developed to increase the effectiveness of the transformation of STEM education, their implementation towards altering pedagogy is ambiguous[6,7]. What is certain, is that newly graduated engineers are generally underprepared for the transition to their professional lives[4].

The remainder of this paper will be broken down as follows: Section II will introduce related initiatives to the Professional Development Seminar (PDS). Section III will give background and the goals and advantages of the PDS course. Section IV discusses the general framework of the course. Section V gives an initial analysis of how PDS has impacted graduating seniors. Finally, Section VI explains the plans to sustain and expand the current course system.

II. Related Works

There are several initiatives to prepare students for their career and life. One area of research focuses on the importance of enhancing professional skills for graduating students. A primary authority in the development of these initiatives is the Accreditation Board of Engineering and Technology (ABET).

ABET requires student training in ethics, lifelong learning, communication, and working in multidisciplinary teams[2,8]. According to their official website, they aim to ensure that programs meet and surpass the standards necessary for technical fields; and that programs are "leading the way in innovation, emerging technologies and anticipating the welfare and safety needs of the public"[9]. One of many papers written that discusses the designing and teaching of courses to satisfy ABET regulations was presented by Richard M. Felder and Rebecca Brent[10]. Topics such as ethics and technical skills are readily available, but there is room for growth in the area of life and soft skills for engineering graduates. As far back as 1998 where Duyen Q. Nguyen wrote that engineering careers remain technical but are shifting towards soft-engineering due to the

multidisciplinary nature of the changing workplace[11]. The two areas he included, in which engineering programs did not offer subjects, were Social Science and Business/Management. Subjects not covered include communication, presentation, leadership, business management and accounting skills. He stressed that an engineering graduate should be equipped with a wide range of skills to prepare them for their career.

Larry J. Shuman explores whether these "professional skills" can be taught effectively, which was additionally assessed in his previously mentioned study[8]. This paper elaborates on a set of six "professional skills" and how they can be taught. The topics of discussion that these papers and the guidelines of ABET neglect to emphasize life and soft skills[12]. These are skills that help an engineer to effectively get a job, advance in their career, maintain personal finances, and obtain background on what it means to become and entrepreneur. These are essential topics in the growth of individual engineers and in the field of Science, Technology, Engineering, and Mathematics.

Prior to entering university, engineering students may have been offered a high school course such as Consumer's Education. Consumer's Education utilizes a multidisciplinary approach to teach high school students about the marketplace, decision making, money management, housing, basic necessities, and other relevant topics[13]. Each of these lessons aims to teach students about real life scenarios involving money and their future. B. Douglas Bernheim and Daniel M. Garrett have studied the long term effects this course on high school students[14]. Their finding indicate that life skills and consumer's education courses ultimately increase the rate in which students save and accumulate wealth throughout their lives.

As an extension of financial curriculum and Consumer's Education provided in high school, courses in engineering colleges have been developed to teach students about life and career skills[15]. In respect to the number of students who take high school courses for life skills and preparation, few universities provide professional development through specific classes and small groups. Harvard University began offering these life courses before 2007; and provided classes for soft and life skills such as "How does health insurance work?, When should I call an attorney?"[15]. There have been books written to supplement these courses, such as the Lifeskills and Leadership for Engineers, written by David E. Goldber[16]. These approaches and applications have been studied and discussed by Schulz in The Importance of Soft Skills[17].

In 2013, Jarka, Katarina and Michael propose a technical course to better prepare chemical engineers for the professional world. The course is based on cases studies provided in two stages through computer aided learning packages[18]. The faculty from the Department of Electrical and Computer Engineering and the College of Education at the University of Missouri, developed a two semester course to emphasize the development of professional and teaching skills[19]. Students from Oregon State University propose a curriculum to improve students' skills in communication, technical presentation, and technical writing[20]. Gider describes a case study of a course created to improve the transition of graduating students into the business world. The course focuses on innovation management, communication in R&D, project management and emphasizes the need for team building[20]. Sanchez and his team emphasize the need to improve professional skills in engineering by developing a framework to integrate professional competencies into the existing curriculum[21]. Other universities also provide various frameworks to integrate professional development skills after graduation into their existing curricula[22].

The standards of ABET, life and professional skills, and engineering programs that provide courses on life and soft skills are important areas of research. The remainder of this paper will expand on a framework for a course equipping students with the necessary skills for engineers to be successful in their lives and careers.

III. Background and Course Objectives

Prior to this course, the methods used to measure the preparedness of final semester undergraduate students for life after graduation consisted of the employment statistics of the graduating class, as well as an exit survey. In this exit survey, students were asked both general questions about their experience in the program as well as about their future plans. While this system of evaluation measures key insights, it fails to measure beyond simple job statistics or equip students with a wide variety of necessary skills. After developing, piloting, and synthesizing a more robust system, we determined that preparedness should be measured using five modules: Financial Planning, Effecting Job Hunting, Accelerating Your Career, Entrepreneurship, and Learning Never Stops. With the implementation of these modules, Professional Development Seminar (PDS) has three goals:

1. PDS strives to better prepare graduating STEM seniors for their transition to the STEM workforce, and life in general.
2. PDS aims to continually collect data for extensive evaluation to make departmental improvements for STEM underclassmen.
3. PDS attempts to strengthen the link between the department and alumni.

To achieve this, we consulted and incorporated both university and industry resources during the development phase of this concept. Throughout the course, these professional resources also come to the university to lecture students on the relevant modules. This system is known as our Ecosystem of Support (EOS) as illustrated in Figure 1.

Figure 1: Ecosystem of Support

IV. Organization of the Course

Course Timeline

Professional Development Seminar is offered as an hour-long course that meets once a week. The general timeline of this course is illustrated in Figure 2. This course is offered to both Spring and Fall semester graduates, Figure 2 is the timeline for Spring graduates.
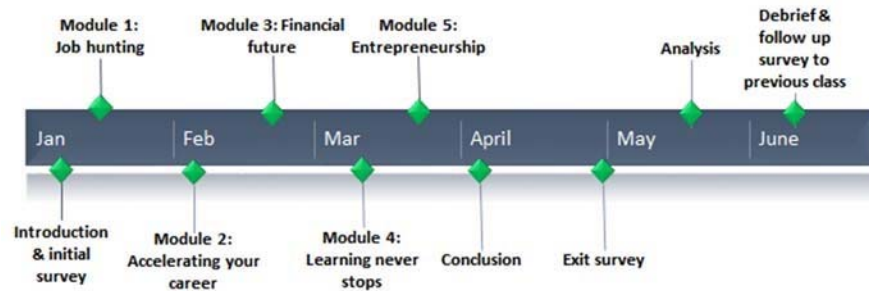

Figure 2: Sample Timeline for Spring Semester

Financial Planning

The National Student Financial Wellness Survey surveyed nearly 19,000 undergraduates from over 50 colleges and universities within the U.S. It indicated that 70% of college students are stressed about their personal finances, and nearly half are concerned about their monthly expenses[23]. While the financial stresses of students remain a concern, the financial obstacles and decisions awaiting them after graduation are a crucial issue as well. According to the National Postsecondary Student Aid Study, graduating seniors with educational debts carry an average debt load on the order of $20,000[24].

The long term implications of this situation hinder both the borrower and the economy[25]. Analysts from the Federal Reserve Bank of Boston discovered that people under 40 who rent their places of living have lower wealth. This disparity is attributed to their student loans and not to an increase of external debt outside of student loans, or to a failure to invest in assets[25]. Figure 4 illustrates the distribution of total wealth relative to income for households with student debt compared with households that do not have student loans[25]. The New York Federal Consumer Credit Panel released its 2016 quarterly report showing a national level of decrease over time in non-student loan debt while student loan debt continues to increase.

To address this epidemic, we have developed a financial planning module delivering key financial strategies that equip students with the competence and confidence to handle their financial future. As a requirement, students create a personal financial plan that is validated by the instructor. The financial plan is generated by a software that was developed by our team based on input gathered from consulting experienced financial professionals. The development of each student's financial plan follows a system defined as the 3 P's: *Prepare*, *Predict*, and *Plan*.

In the *Prepare* phase, students collect metrics of their current financial situation. Guest speakers from industry present a lecture or panel discussion demonstrating the impact of having a financial plan. Figure 3 provides examples of the topics that are discussed during this phase.

Figure 3: A sample of topics that are discussed during the financial planning module

In the *Predict* phase, students use the application interface to map out various financial decision paths of their life after graduation. Whether they are continuing their education or full-time employment, the application adjusts according to expected salary. It also allows the option of simulating extreme life events, including losing or never obtaining a job post-graduation. Students input various credits and debits that they may experience over the next few years based on their decisions. A snapshot of the tool's interface with sample student input is shown in Figure 4. The tool outputs a visual 3-year summary of the student's simulated financial future, depicted in Figure 5.

Year						Year 1	
Month	1	2	3	4	5	6	7
	August	September	October	November	December	January	February
Transportation							
Down Payment	$3,500.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Monthly Payment	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00
Auto Insurance	$160.00	$160.00	$160.00	$160.00	$160.00	$160.00	$160.00
Fuel	$60.00	$40.00	$35.00	$40.00	$70.00	$62.00	$40.00

Figure 4: 3-year summary of simulated financial future

3-Year Financial Forecast

Figure 5: 3-year Financial Forecast

Finally, in the *Plan* phase, students select their desired path, and the tool provides a score to students based on each decision made. At the end, the scores are inputted to a model, which categorizes the financial soundness of the selected path. Students manipulate their decisions until the application outputs a passing score, at which point the instructor validates the financial profile.

The timeline scope for financial plans is for 3 years' post-graduation, but can be easily extended. The tool is available for students to keep when they leave the course.

Effective Job Hunting

In 2014, the U.S. Census Bureau reported that 74 percent of those who have a bachelor's degree in a STEM major are not employed in STEM occupations[26]. One challenge is the current inadequacy of career counseling at the collegiate level[5]. Engineering courses focus on technical skills, and the soft skills are not taught until they enter the workplace[28]. Sanjeev et al. describes how the demands of the changing workplace puts a need for engineering programs to better integrate measures to prepare engineering students for more than just the technical skills of a job[28]. Job hunting is typically viewed as a self-regulated process which begins with the identification of and commitment to pursuing an employment goal that then activates search behavior to bring about that goal[27]. This process can be enhanced with the tailored guidance of trained mentors.

The Effective Job Hunting module facilitates effective and efficient application for entry-level STEM careers within the student's desired industry. Under the guidance of the instructor and trained teaching assistants, students meet to develop their resume and cover letters specific to their major and industry of choice. After this process, an expert verifies their resume before they move on to applying for jobs. The instructor introduces a multitude of different job boards to the students, and explains the pros and cons of each board. Professionals from the university's career center spend two lecture sessions explaining advanced job hunting and networking techniques that go beyond application to job boards. Techniques include how to have an efficient and effective experience at recruiting events, leverage sites such as LinkedIn, give an elevator pitch, and develop interview skills. In addition, students are provided with an up to date list of keywords specific to the students major. This list aids in job board navigation and improves the students resume. Keywords help students find opportunities that they may have overlooked. The keywords were detected through a web crawler we developed to scrape recent job openings across numerous job boards, as well as through the major curriculum. This enhancement sets this

module apart from the University Career Center as the course is more specific towards each students major and needs.

To reinforce these lessons, students are required to apply to a minimum of ten jobs per week. Students show evidence of their submissions to improve their chances of getting interviews, and to help them explore their job options. We trace student job-hunting progress by having them fill out a weekly survey, shown in Figure 6, reporting their weekly progress. This allows us to intervene when students start to display a lack of progress. It also allows us to investigate the entire session's performance for any trends to develop future course enhancements.

Username	MM2349			
Last Name	Mouse			
First Name	Mickey			
Date	4/24/2016	4/17/2016	4/10/2016	4/3/2016
How many cover letters have you created or modified this week?	1	0	0	0
How many jobs did you apply this week?	8	4	0	10
How many cover letters have you submitted this week?	2	0	0	0
How many rejection decision did you receive this week?	1	0	2	4
How many phone interviews did you have this week?	1	0	0	2
How many onsite interviews did you have this week?	0	0	0	1
How many jobs offers did you receive this week?	0	0	0	0
How many job fairs did you attend this week?	0	0	1	0
Approximately, how many hours did you spend job hunting this week?	1	4	0	5

Figure 6: Example of a student's trace

Once a student has applied to jobs and starts the interview process, there is a system of support to help students succeed in the interviewing process. Mock interviews allow students to experience a situation comparable to an actual interview. Mock interviews are recorded, critiqued, and reviewed, which helps students learn to avoid ineffective habits.

A lecture demonstrating the effectiveness of evaluating qualitative features when comparing multiple job offers via the Analytical Hierarchy Process model (AHP) is included as a component of this module. The instructor simulates a decision-making process using a spreadsheet, which is provided to students for future use.

This module also concludes with a guest lecturer, the Director of the Engineering Career Center at the university. The lecture covers job offer negotiation, and up-to-date salary offer and placement statistics for each major.

Accelerating Your Career

The next module allows students to experience different aspects on accelerating in their careers once they have been hired. Several guest speakers are invited to address how students should make goals and build their network during their career. Guest speakers share their experiences on

progressing through their respective companies. One of the recent guest speakers spoke about mentorship programs that provide opportunity to learn from senior members in your company. These senior members do not work directly with the mentee, allowing for unbiased advice during mentor sessions. This guest speaker illustrated how participating in mentorship programs helped him in building both connections and his network and how that ultimately helped him move up in his company.

In addition to sharing the importance of work programs like mentorship programs, this module teaches students to set personal performance objectives. With the practice that the instructor assigns, students learn that these goals must have a timeline and a quantifiable objective. These translate into a way for students set their personal performance objectives and goals in the workplace.

Professional Development Seminar includes the Accelerating Your Career module to ensure that once students have a job, they also have a career that will grow with them. The instructor provides additional tips and tricks to compliment the assignments and guest speakers.

Learning Never Stops

This module seeks to instill the values of continuous self-development in students.
Lifelong learning is sustainable learning that relies on self-directed individual initiatives as opposed to handing down knowledge[29]. The term lifelong learning, or life-wide learning, has the intention of expanding means of obtaining knowledge beyond the scope of formal education. Going beyond the set educational style allows for individuals to obtain knowledge and learn skills in the way that best suits their learning style.

PDS encourages lifelong learning in all forms and presents variety of options. Students may pursue graduate studies, whether it is directly after graduation from a bachelor's degree or well into a career. Another source of lifelong learning comes from joining professional societies, which open many doors, both for students and professionals. These societies offer information about current developments in the field, networking, mentorship opportunities, and a variety of other options. Attending conferences and workshops offers students the opportunity to developing skills and obtain information about advances in a field. They also allow individuals to make connections with experts and maintain their interest in the field. Obtaining professional certifications sets individuals apart from their colleagues. These certifications can be obtained within a company or in an employee's own time. Certifications show an individual's interest in their work and their willingness to go beyond the expected. A popular way of building a skill at your own pace is through online training courses. Sources, such as Coursera, Udacity, and Lynda offer courses in a wide range of fields. These online sources allow the user to learn in a hands-on environment and spend time on material that is individually prioritized.

This module exposes students to a sample of their options in personal development. The goal is to expose students to the benefits that continuous learning can have on their personal and professional lives.

Entrepreneurship

Start-ups are a key element to the U.S. economy[30]. According to a study performed by the National Bureau of Economic Research, the entrepreneurial activities in the 1980s and 1990s led

to more innovation, productivity, and job creation[31]. The Kauffman Foundation shows that since the 1990s there has been a decline in adults owning businesses[32]. Additionally, according to Leigh Buchanan, there has been a decline of entrepreneurs, aged between 20s-30s, from 35% in 1996 to 18% in 2014[33].

This decline is attributed in part to a lack of awareness of available student resources. The aim of the module is to provide the students information on resources available to them on starting a business. The module is a short, two-week module consisting of two guest speakers and a lecture.

One of the guest speakers exposes students to real-world experiences by sharing his journey in starting a successful business. The other guest speaker, a manager of an incubator, provides a handful of information on incubators, entrepreneur tools available to students, and tips on starting business. Video presentations of each speaker are provided online.

V. Evaluation & Results

Data Collection & Methodology

The Professional Development Seminar has been offered in its new format since Spring 2016. For the purposes of our study, students who opted to take the new version of this course belong to Cohort 1, and the remaining students belong to Cohort 2. The data collection process is conducted via weekly survey administered to both cohorts at the beginning and end of their final semester. These surveys are designed to measure student knowledge of each module. In addition to these surveys, Cohort 1 students filled out weekly evaluations to measure the effectiveness of each module.

In this paper, an initial analysis is presented of the first semester, Spring 2016, cohorts. In this semester, the number of students in Cohort 1 and 2 were 69 and 45, respectively. Our analysis of this course will focus on this semester, as the cohorts have completed that course and graduated more than six months ago. Information for a six-month follow-up was collected through a postgraduate survey. It is important to note that the intention of this analysis is not to assess whether the new system is an improvement. Rather, the intent is to report the initial findings of the pilot course.

When analyzing the PDS, there are three evaluations of interest. The first is the cohort's response to the course and their feedback on the aspects of the course they found most useful. Second is the impact of the course on students at the time of graduation. The last is the long-term impact of the lessons taught in the course, as evaluated six months after graduation.

Analysis of Course

The course modules intend to provide students essential information for their lives after graduation. Where every module has the potential to provide students with useful information, the impact of each module will vary for each student. Figure 7 illustrates the opinions of Cohort 1 on the module that they see being most beneficial in their lives. The majority of Cohort 1 claimed that the Financial Planning and Job Hunting modules were the most beneficial.
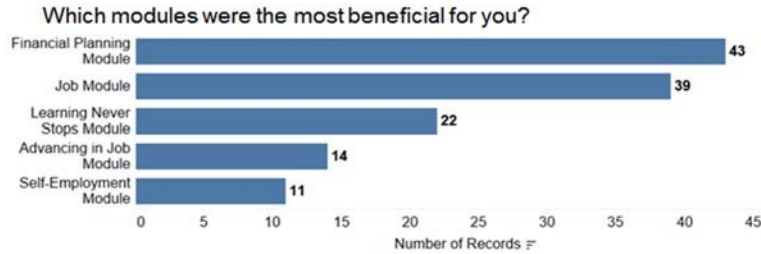
Figure 7: Histogram of Cohort 1 opinions of beneficial modules

Additional analysis was conducted on the effectiveness of teaching specific components of each module. For instance, improved knowledge in the interview skills component shows the effectiveness of the Job Hunting Module. As a graduating senior, the majority of students' prioritize obtaining a full time job. For this reason, it is essential to evaluate the student's knowledge of components involved in obtaining a job. Figure 8, illustrates some of the components involved in the PDS. Cohort 1 students believe their knowledge of skills essential to obtaining a job has improved as a result of taking the course.
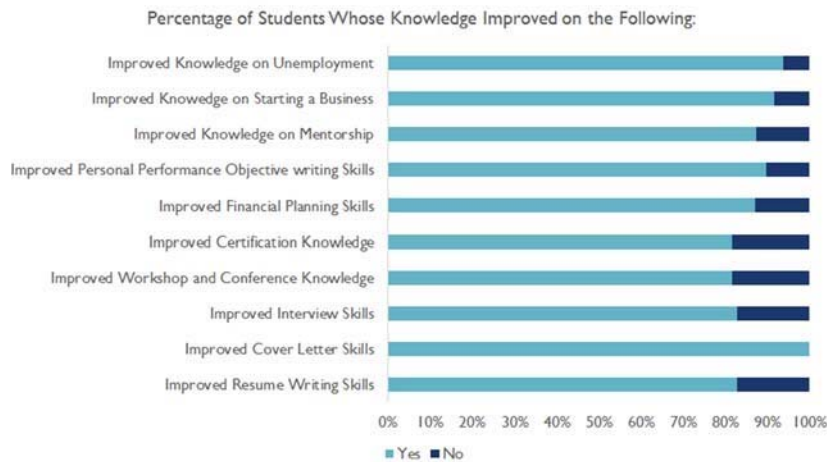

Figure 8: Percentage of Cohort 1 students uses skills improved as a result of this course

Comparison at Graduation

To evaluate the effectiveness of the course modules, the two cohorts are compared at the end of their final semester using statistical tests. Equations (1) and (2) represent the null hypothesis and alternative hypothesis. The population proportion of Cohort 1 and Cohort 2 are characterized with p_1 and p_2 and we set the α level to 0.05.

$$H_0 : p_1 = p_2 \tag{1}$$

$$H_1 : p_1 > p_2 \tag{2}$$

The population proportion of each Cohort is compared based on information critical to the individual modules at graduation. Graduation is an appropriate time to evaluate the effects of

certain modules presented in the PDS, but is early to evaluate other modules. In this section, we focus on the Effective Job Hunting, Financial Planning and Learning Never Stops modules.

The impact of the Effective Job Hunting module is best shown in the shift of students that have obtained a job. Over the course of the semester, there was a 45.6% increase of Cohort 1 students that obtained a job, as opposed to the 22.6% of Cohort 2 students. Using a difference in proportions test, we obtained a p-value of 0.002, which indicated the difference between the two cohorts' proportions. The main goal of this module is to make sure students obtain jobs in their field. Cohort 1 students prove to have received the skills that allow them to achieve this goal better than Cohort 2.

As a part of the course, all students in Cohort 1 had their resumes professionally verified and were given information on how to keep their resume up to date throughout their careers. Only 61.4% of Cohort 2 had professionally verified resumes. The p-value attained for the difference of proportions between both these cohorts is approximately 0, a significant difference between the two cohorts. This along with interviewing skills makes Cohort 1 more prepared when it comes to job searching.

The impact of the Financial Planning module is best shown by the number of students that graduate with a written financial plan. Throughout this course, all Cohort 1 students created personalized financial plans. This is opposed to the mere 25.5% of Cohort 2 students that had a financial plan at graduation. When performing a statistical test, the difference in proportions test led to a p-value of less than 0.05. This depicts a significant difference in both the cohorts.

This module goes beyond creating a short-term plan and prepares students for other financial decisions they will need to make. This includes adjusting Financial Plans for the long term, establishing good credit, planning for retirement, and much more. Where Cohort 2 students can learn this information in time, Cohort 1 students proved to have a better grasp of financial knowledge at graduation.

The Never Stop Learning Module has a wide variety of components, which are beneficial to an individual, depending on their situation. This module, while important, cannot be measured in the short term, since a student's decision to further their education is situational. The goal of this module is to instill students with the importance of furthering their education. Overall, this module introduced students to a variety of opportunities available for continuous knowledge based progress including: professional societies, workshops, conferences, and online-courses. At the conclusion of the semester, Cohort 1 students claimed to have a better understanding of the options available in continued learning, and how to pursue these options.

Comparison Six Months After Graduation

To show the lasting effects of this course, we surveyed these cohorts six months after graduation. This survey has 36 participants from Cohort 1 and 16 participants from Cohort 2. Here we see that 87% of Cohort 1 participants are currently employed in their field of study, as opposed to the 85% for Cohort 2. These numbers have balanced over the six-month period, where Cohort 1 had previously shown a greater proportion of employment in their field.

The fact that the employment rates of two cohorts have converged is not surprising, and it shows that Job Hunting and Accelerating your Career need to evaluate factors beyond simply obtaining a job. When surveyed, more Cohort 1 participants reported to have an up to date resume (63%) than Cohort 2 participants (50%). Maintaining an up to date resume allows young professionals to easily take advantage of opportunities to shift in their career path and possibly obtain positions beyond their current state. In addition, a larger percent of Cohort 1 participants partake in job mentoring programs (54%) versus Cohort 2 participants (24%). Job mentoring has the effect of establishing an employee into the company culture and helps when it comes to advance in their jobs.

To determine the effects of the Never Stop Learning module, we asked participants which components of the module they had achieved since graduation. Six months is fairly early to evaluate the total effects of continuous learning on a person, but there were some distinctive differences between the cohorts when it came to the components and the proportion of the cohorts that obtained a certificate and completed online courses. For these components, Cohort 1's participation was 73% & 27%, respectively compared with Cohort 2 that was 29% & 19%, respectively. When evaluating status of participants' financial plans, we found that 93% of Cohort 1 claimed to use their financial plan, as opposed to 87% of Cohort 2 participants.

A summary of p-values obtained when the performing a difference in proportions test of both the cohorts are shown in Table 1. It should be noted that some of the proportions do not show a significant difference in proportion. We believe this is due to a small sample of the proportion responding to the survey six months after graduation.

Table 1: Various p-values for the difference in proportions test

	P-value	*Significantly Different*
Participants currently employed	0.446	No
Participants with updated resume	0.173	No
Partaking in mentorship program	0.031	Yes
Certifications obtained	0.003	Yes
Online courses completed	0.244	No
Developed and used a financial plan	0.319	No

VI. Conclusion & Future Work

The Professional Development Seminar has proven to be a more effective method of educating students on life after graduation. Department of Mechanical and Industrial Engineering (MIE) at University of Illinois at Chicago (UIC) has modified its curriculum to require this seminar for all graduating seniors. This course has been presented within the College of Engineering (COE) to show its potential. Other departments within the COE have been very receptive and are working to implement a similar course within their own department. The goal is to mandate a course similar to the PDS in all COE departments. This would effectively create a course system that better prepares the college's graduates, but does not generalize to the point of giving all students the same career advice.

Additionally, MIE has the intention of modifying the current course into a two-semester sequence. This modification would better serve students that truly need support in time critical situations. Perhaps the clearest benefit would be the additional time and support dedicated to preparing for and executing the job hunt.

As this course expands, it is important to be mindful of how PDS can be sustained throughout the coming years. Sustainability of the course is ensured through the embedding the course into the culture of the campus. This was achieved by incorporating campus resources into each module. An example is the support of the University's Industrial Advisory Board and University Career Center to create and assist with the development of the Job Hunting Module. Another measure is the support of campus entrepreneurship services in educating students about the possibilities of self-employment.

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