AC 2011-2745: INNOVATIVE SENIOR PROJECT PROGRAM PARTNERING UNIVERSITY AND CORPORATE PARTNERS

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In addition to his responsibilities at Northrop Grumman, Eric Pearson serves on the Electrical & Computer Engineering and Minority Engineering Advisory Boards at North Carolina State University, serves as an adjunct professor in the School of Engineering at California Polytechnic University in San Luis Obispo, California, and mentors several engineering managers at Northrop Grumman. In these appointments he serves as a keynote speaker throughout the year speaking and lecturing on engineering, philosophy, leadership, grief counseling and development of leadership teams for several student groups.

Mr. Pearson has also served on several committees and a frequent presenter at the annual conference for the National Association of Colleges and Employers (NACE). He is currently the President of the Southern Association of Colleges and Employers (SoACE) having presented preconference workshops and sessions during the SoACE conference each year since 2006.

In his spare time Eric has authored two books; "Ryan's Stories: God's Perfect Child" (self-published),"A Common Sense approach to Leadership," is currently writing bedtime stories, and is preparing to start a murder mystery novel.

Innovative Senior Project Program Partnering University and Corporate Partners

Introduction

The “Internship in Conjunction with Senior Design Course Credit Pilot” was conceived as a joint initiative between the College of Engineering at California Polytechnic State University, San Luis Obispo and Northrop Grumman Electronic Systems during 2009. The pilot program was developed in response to resource shortages at Cal Poly to provide course delivery to the engineering students at the university. Recent budget cuts in California’s Educational System along with mandatory furlough days for professors during the school year have created new concerns for students as to their ability to complete an undergraduate degree in four years. It has become increasingly difficult to accomplish an on-time graduation plan as schedules are somewhat inflexible and fewer class sections are being offered every semester. Many students are forced into a fifth year of undergraduate studies in order to complete their program requirements. Looking for an alternative solution to this problem, a “credit for experience” internship pilot program was developed. The thought behind to program is to create a partnership between universities and corporate partners whereby working together a program will allow students to complete a required senior design project in conjunction with internships or co-ops at the company’s location; allowing students to use company resources towards their project and gain valuable industry experience during the process.

An additional consideration in the development of the pilot program is the growing interest in providing relevant and meaningful experiences for minority and underrepresented minority engineering students with relevant work experiences to enhance their education and build a stronger résumé of experiences through Internships / Co-ops tied to Senior Projects for credit. The decision behind adding this interest rose from interviews with students, educators and parents associated with University of Texas, Pam Am. A significant number of underrepresented minority students are first generation college students and the families of these students see the completion of the degree in four years as the most important factor in their child’s education. Parents therefore, discourage their children from participating in Cooperative Education and extended Summer Internships because schedules would require they remain in college for additional semesters beyond the normal four-year plan. By providing these students with the opportunity to receive credit during extended Internship / Co-op positions, the students would be more qualified for positions post-graduation and maintain an on schedule graduation date. At a time when positions upon graduation are at a premium, the more qualified a graduate can be through relevant work experience during the college years, the more likely the graduate will be considered for employment in industry.

Program Guidelines
Internship / Co-op Programs for Senior Design Course Credit
Pilot Program – summer 2010 dared 10 March 2010

Problem Statement:

Due to budget cuts in the Educational System in California and mandatory furloughs that do not allow professors to work their furlough days there is grave concern that engineering students will be unable to complete their undergraduate degrees in the standard four-year period. Is there a way that the university and industry partners can share in an acceptable solution that would allow students to take advantage of “credit for experience” opportunities within industry?

Discussion:

Administrative and educational issues were discussed surrounding the most recent budget cuts in the California Education System during the Fall Quarter of 2009 and the effects on students’ ability to complete their undergraduate education in the “standard” four-year period. The California system has had difficulty for a number of years in general education fulfilling the basic requirements of the broad based curriculums in the freshmen and sophomore years because of the high number of students requiring as an example, English 101 and there not being enough class sections or instructors to lead the classes. Flexibility in schedule and section offerings has been a difficult process to manage for universities and many students have found themselves in school a fifth year of undergraduate studies completing their basic requirements in English, Sociology, History, and more critical the technical requirements of selected majors. The discussion included the realization that many Engineering student loads prohibit many standard four-years plan and being on the Quarter System at Cal Poly, there are numerous students who work in the summer, participate in internships and take co-op assignments during the year; extending their time in the classroom by often more than one quarter.

There is no single solution for all organizations therefore we are not proposing one prescription to meet the needs of every student or engineering department. We have proposed a Pilot Program designed to create a partnership opportunity with industry that allows the students to complete their Senior Design Project while gaining relevant and valuable industry experience. The ability for a student to participate in a Co-op or Internship and receive Senior Design Credit in parallel will require identification of internships opportunities with a corporate partner, soliciting students willing to participate in the program, and engineering department sponsors willing to work together in the evaluation and creation of the individual Senior Project Plan for this Pilot Program. A three-way partnership is required to create each senior project plan intended to provide a valuable learning experience for the student who will receive Senior Design credit while working at a corporate sponsor’s facility as an Intern or Co-op.

Recommended Requirements and Expectations of Corporate Sponsor, Student Participant, and the Cal Poly School of Engineering

The Intern/Co-op Assignment period must be a minimum of 8-14 week with up to two consecutive terms allowed for a Co-op experience. The Senior Design Project portion of the program must involve a significant amount of personal time and effort from the student participant; similar to the out of classroom time expected of an on-campus Senior Design project. The work must be related to the work assignment at the corporate partner facility and must be an engineering assignment that provides similar experiences and engineering tasks to on-campus Senior Design Projects requirements.

The Corporate partner will provide guidance, mentoring, materials and equipment to the Cal Poly University student during the internship / Co-op period.

The project must include all elements of a standard Senior Design Project and produce hardware, software or research results as would be produced during a standard university Senior Design Project Semester as negotiated in a Statement Of Work (SOW) prior to start of the project.

Pilot Program Requirements

The following section lays out the basic requirements for all three partners of the program. At the inception of the pilot program, project requirements were established for all three partners as outlined in this paper. It was imperative to the university that a senior design project completed within industry be equivalent in time commitment, scope, and breadth as the on-campus project experience.

The project must include all elements of a standard Senior Design Project and produce hardware, software or research results as would be developed during a standard university Senior Design Project Semester as negotiated in a Statement of Work (SOW) prior to start of the project. Throughout the project and at its conclusion the student is required to formally present his progress and work to the university senior design advisor and industry mentor.

The Corporate partner is required to provide guidance, mentoring, materials and equipment to the Cal Poly University student during the internship / Co-op period.

1. Minimum requirements for Senior Projects to be documented in a Statement Of Work (SOW)

- a. Period of performance; minimum 8-14 weeks
- b. Research & development requirements
- c. Statement of Work agreed to by Corporate Partner, University Engineering Department, and the Student
- d. Cost and Schedule requirements

- e. 2-3 presentations at corporate partner facility
- f. 1-2 presentations to university representative(s)
- g. Sr. Project Work log to indicate effort during paid time and personal time associated with Senior Project effort.
- h. A final presentation of work done and/or product demonstration
- i. Final paper and all presentation materials submitted to Corporate Partner and University.

2. University Requirements

- a. The university will certify the Senior Design Project methods
- b. The university will assign a Senior Design Project administrator
- c. The university will identify a Department mentor / advisor for each student participant
- d. The university mentor / advisor will assist in the development and negotiation of the Senior Project Statement Of Work (SOW)
- e. The university will maintain the documentation and authorize the “credit for experience”
- f. The university will accept reports and recommendations from the corporate partner in evaluation of Senior Project completed in conjunction with Internship or Co-op assignment.

3. Industry Partner Requirements

- a. The industry partner will provide a Senior Project advisor /mentor who can be the student’s assignment manager for Intern/Co-op performance period.
- b. The industry partner will define the project in detail and negotiate the S.O.W. with student and university advisor / mentor
- c. The industry partner will provide tools/resources to facilitate the students ability to complete the project
- d. The industry partner will provide reasonable funding to support required materials if a design and build activity is involved in the Senior Project
- e. The industry partner will provide certification of completion and a # or grade rating for all project work submitted
- f. The industry partner will create performance objectives for the performance period and provide formal documentation of completion and assessment of performance.
- g. The industry partner advisor / mentor will participate in the review and evaluation of each presentation and final project submittal.
- h. The industry partner will provide university with evaluation of work performance and Senior Design Project to assist in evaluation of student for grad determination.

- i. The industry partner will pay the student for all hours worked performing the internship responsibilities during the period of performance. The student will not be compensated for time spent researching, completing, reporting and presenting the Senior Design Project he will be receiving credit from the university.

4. Student Participant Requirements

- a. Student will register for Senior Project Class through the university
- b. Student will work with corporate advisor/mentor and university advisor to develop Senior Design Project options
- c. Student will be responsible to develop and negotiate Senior Design Project
- d. Student will commit appropriate amount of time outside Internship / Co-op work period to the research, design, development and test of Senior Design Project elements.
- e. Student will maintain a Senior Design Project work log to identify work time and personal time associated with the Senior Design Project.
- f. Student will present a minimum of three project updates and formal presentations during the period of performance at the corporate partner facility to be documented in S.O.W.
- g. Student will present a final project to university as required by university advisor / mentor to be documented in the S.O.W.
- h. Student will provide a separate document summarizing the Senior Design Project and Intern / Co-op experience and provide a personal essay describing the dual purpose experience and recommendations.
- i. Student will submit all documents necessary to satisfy the Senior Design Statement Of Work requirements to the corporate partner and the University.
- j. Student will follow the work-rules, policies and procedures of the industry partner while at the industry partners location and during all paid hours performing the internship portion of this agreement.

Pilot Program Summary

The pilot program designed as a partnership between California Polytechnic University at San Luis Obispo (SLO) Engineering Department and the corporate partner. The project was developed over a ten month period after engaging the Senior Staff in the Office of the Dean of Engineering, several Department Chairs within the School of Engineering and potential students who had previously participated in a summer internship at the Northrop Grumman, Aerospace Sector's facility located in Palmdale, California.

Although the Senior Project was completed at the corporate partner's facility, the work involved required personal time commitment beyond the Internship hour from the student equal to an on-campus Senior Design Project. The senior project plan was designed to be completed on the

student's own time in parallel with the paid internship at the Northrop Grumman facility. Northrop Grumman was responsible for providing guidance, mentoring, materials and equipment needed for the student to complete their project and project review of presentation during the according to the project plan and schedule.

As any Pilot Program would expect to proceed, there were supporters of the program and there were others who felt the program was unnecessary, would detract from existing Senior Design programs already in place, thus several professors and Department Chairs were not interested in supporting this project idea. Gaining support from students to participate in the pilot was also more difficult than expected. One finding during discussions with Engineering Department Chairs was that each Department within the School of Engineering was responsible for and managing their Senior Project Programs in different fashions. For example; The Aerospace Department was supportive of the pilot program option because they were more flexible in their program design; allowing students to perform their Senior Design Project for Credit in groups of as an individual project. On the other hand, the Mechanical Engineering Department required that Senior Design be a full-year project where the students developed process and ideas regarding Senior Design Projects in the Classroom for two quarters, then followed the study with two semester of a Group Project, not allowing a single student project option. Of the three previous engineering students returning to the Northrop Grumman facility at Palmdale, only one agreed to become a participant in the program. One student felt the program scope and requirements were more detailed and difficult then completing the on-campus program and did not wish to tie up all of his spare time away from the internship responsibilities working on an additional project. The second student who chose not to participate was able to work out an option to complete a research on campus during the following quarter for her senior design credit which appeared to be more defined and less taxing than completing the Senior Project at Northrop Grumman.

The 2010 pilot program was completed by Brian Binkowski, a student at Cal Poly entering his fourth year, and a returning third-term intern at the Northrop Grumman Aerospace (NGC-AS) facility in Palmdale, California. Brian did have some reluctance in participating in the program, including some of the reasons mentioned above by the Department Chairs and the other students who considered the program. Brian's comments and recommendations during and upon completion of his project have been documented and will be used as we go forward with further development of a more formal program offering in the future. As noted in other sections of this paper, the university, the student and the participating Northrop Grumman representatives were pleased with the success of the pilot and all recommend further development and offering of Senior Design Projects for university credit in parallel with an Internship / Co-op session.

At the conclusion of Brian's Internship with Northrop Grumman he presented his project findings via a webcast including a demonstration of the research and technology development he successfully demonstrated during the summer. Brian returned to Cal Poly for the fall 2010

quarter, signed up for the Senior Design Class and was only required to present his final paper to be reviewed by his department to receive his credit.

The Red Raiders Cohort Group of the Northrop Grumman, Electronic Systems, Group XV, Early Career Leadership Training Program assisted in the research, summarization of process, and met with Brian to validate his project and the make recommendations going forward to expand the pilot program beyond the Cal Poly University to other Electronic target universities. Their summaries, recommendations and thoughts are included within this paper.

Pilot Program Results

To evaluate the success of the pilot program, feedback survey data was collected from the three program partners. The survey was developed to; establish how well expectations were met, what problems were encountered, and provide an overall opinion of the program outcome from the viewpoint of each participant. The feedback provided by all three partners was generally positive and indicated that the pilot program was an overall success. A critical factor to the success of the pilot is the importance of communication between all participants upfront in establishing program requirements and throughout the duration of the project. It was agreed by all, that the program promoted a valuable relationship between the university and industry partner.

Mr. Binkowski, the pilot program student participant, responded that establishing requirements and expectations of the student before commencing the project was crucial, and while the pilot program made significant strides to do so, the requirements should be refined. He stressed that his three years of prior experience with NGC-AS in the same department were very instrumental in his project choice and knowledge of available resources. He suggested that NGC managers could establish a list of projects acceptable for a senior design effort and a list of NGC contacts to aid in program planning and introduced the idea of creating projects that involve several interns. Mr. Binkowski commented that, while difficult, he was satisfied with his decision to participate in the pilot program, stating that, "Overall, I would recommend [the internship in conjunction with Senior Design Project] to anyone, because it was a great opportunity to meet other NG employees across the country and share our ideas to discuss a real life industry issue, you can't get better hands on experience than that."

Feedback from Cal Poly was provided by Dr. Noori. He responded that the university is mainly concerned the Senior Design Project completed while interning at NGC is equivalent to the traditional course work, which can be addressed with a clearly defined SOW. Dr. Noori also pointed out that the completed project is a public domain report, which needs to be considered during project selection. He saw the internship in conjunction with Senior Design Project as a valuable relationship between Cal Poly and NG, writing "Let's each take strides to

institutionalize this process.” Dr. Noori was also interested in expanding the program to engage faculty on campus and create a linkage between longer duration on campus projects and NGC.

Chuck Osberg, Manager, Engineering, was Mr. Binkowski’s NGC project adviser and provided feedback from NGC-AS Palmdale. Mr. Osberg was impressed with Mr. Binkowski’s efforts in the program and his project report. He noted that while Mr. Binkowski’s work was integral to NGC initiatives, it was separate from his responsibilities as an intern and completed entirely on his own time. Similar to Dr. Noori, Mr. Osberg felt that the program fostered valuable relationships pointing out that “[The program] allowed the school some insight into NGC, as well as contacts. [The program] was valuable to NGC in that we had some input into the curricular activities of Brian and future students.”

Current Intern Questionnaire Results

In addition to feedback from the pilot program, current interns were questioned about their opinion in the opportunity to complete a project for senior design credit in conjunction with a regular internship. The survey was geared to measure the interest of the current intern population in the program and establish other schools that may be feasible targets for an expanded program pilot. 2010 summer interns across ES were surveyed; Figure 1 below displays the responses received by site and college major.

Figure 1 Summer 2010 Intern Survey respondents

The majority of business students responded that they are not required to complete a senior design project. Of the engineering students, most responded that their programs had a senior

design requirement and that they thought a program that would combine an internship and project for senior design course credit was a great opportunity and would be worth the extra efforts required to complete at the same time. Some did not think that an individual project would be accepted in place of the group project in the current curriculum at their university; a sentiment mentioned by some of the Department Chairs in the School of Engineering at Cal Poly. Suggested universities that may be open to working towards a senior design program with NGC include: University of Texas – Pan American, West Virginia University, Ohio State University, University of Maryland, Pennsylvania State University, UCLA, University of Utah, California State University, Northridge, Cal Poly, San Luis Obispo, University of Southern California, Arizona State University, Stanford University, Rose-Hulman Institute of Technology, University of Arizona, and University of Illinois – Urbana Champaign.

⁽¹⁾ For additional information on the Summer 2010 Intern Survey please contact the Northrop Grumman Red Raiders through Liam McKusker at liam.mccusker@ngc.com

Program Recommendations

After conducting interviews, compiling data and analyzing the pilot program development and results, the Red Rangers group of Class XV of the Northrop Grumman Electronic Systems, Early Career Leadership Training Program (ECLTP), established recommendations to improve the joint internship and senior design for college credit program and have initiated an effort to expand the program to facilities and universities in the recruitment area across the Electronic Systems sector. The group refined the program mission statement, identified ideal intern and manager candidate profiles, and outlined revisions necessary to proposing moving the program forward.

Project Mission Statement

The Senior Design Project for credit while participating in a paid Internship or Cooperative Education program is designed for interns with prior work experience and initially for students entering their senior year who are interested in obtaining college level course credit as part of completion of their degree. It is felt that the ability to complete two programs in parallel requires significant coursework at the university and relevant work experience in an industry setting. A future expansion of the program would be to evaluate methods to provide significant experiences and acceptable projects such that students without prior industry experience could be successful in this kind of intense program. This program feeds off of the standard internship program existing in partnership between industry and the universities and seeks to engage the intern in a mutually beneficial relationship between the participating university and the corporate partner. At the conclusion of the internship period the student will have coordinated with both university contacts and corporate management to complete a project, typically in research paper form. The internship participant will benefit by obtaining college course credit, realize industry relevant

technical growth having been afforded access to corporate subject matter experts supplemented by the ability to discuss application of the project outcome in an operational business setting.

The project choice should be a collaborative effort between the internship participant and the corporate partner. Because the internship will be paid and include access to certain corporate resources, such as subject matter experts, senior engineers and management, the intern is expected to focus his or her efforts on an end product that will benefit both parties involved, however the contract between the Intern, the corporate partner and the university must include clauses and agreements regarding technical ownership; Proprietary Information Exchange Agreements (PIEA), International Traffic in Arms Regulations (ITAR) regulations, and Authorization for Releasability of Information to allow the student to present technical findings in accordance with the university reporting and documentation for credit requirements. The project will be tracked by both the corporation and the participating university sponsors in order to assist the intern in his/ her progress throughout the course of the project completion.

Recommended Improvement Areas to be able to expand the Pilot Program to become a formal program and include other University partners.

Formalized application process

- Determine target universities
 - i. Contact the Deans of the Schools within your target universities
 - ii. Review ABET / AACSB certification requirements
 - iii. Leverage University Relations Advisory Board (URAB)
- Application for students
 - i. List minimum requirements needed to participate in the program
 - Degree pursued, Minimum GPA, Minimum Credits Earned
 - May vary depending on each university's requirements for graduation
 - ii. Students area of interest
 - Student may have general field of interest (i.e. radar, communications, etc...) in which they prefer to focus in.
 - Student may have specific project in mind
 - iii. Written Applications for down select
 - Approval first from advisor to allow particular student to participate
 - Factors may include students class performance to date
 - NGC will only review advisor approved applications
- Interview process
 - i. Approach 1: Interview with managers who have specific project ideas
 - ii. Approach 2: Interview with HR, who then assigns intern to manager working in an area of student's interest

Develop standardized internship curriculum guidelines

- Project decision
 - i. Meet with NGC manager to discuss potential project ideas
 - ii. Decide on project
 - iii. Obtain approval from university advisor
- Bi-weekly project reviews
 - i. With manager
 - Ensure student is getting the assistance needed
 - Verify student is on course for completion of project
 - Ensure NGC requirements continue to be satisfied
 - ii. With student's university advisor
 - Ensure university requirements continue to be satisfied
- Peer review with other interns
 - i. Allows interns to communicate their ideas to each other.
 - ii. Receive peer feedback
 - iii. Network and build future relationships
- Mid way point Presentation or Report
 - i. With manager and university advisor
 - ii. Assess whether project needs to be adjusted to fulfill NGC and university requirements.
 - Change required due to scope of original project, time remaining, resources available, etc...
- Final Report to NGC and University
 - i. Formal written report to be handed to NGC and University
 - ii. Presentation given to NGC managers and employees
 - iii. University may also require student to present
 - iv. Must remain cognizant of the potential NGC Proprietary Information issues

Creating a credible and beneficial Senior Design Project providing benefit to the student, the university and the corporate partner

In order for the student, university, and a corporate partner to benefit from the Internship-for-Credit program one of the most important factors is a list of relevant project is generated for consideration by the student and university to complete the project requirements and to provide the best learning opportunity possible. To begin the search for a project that will be beneficial to both the company and the student, it is recommended that functional organizations within the corporate partner's organization be polled to see in what areas projects would be applicable. This would involve first determining the area of technical concentration; systems engineering,

mechanical or electrical design, manufacturing operations, or other relevant departments that would offer both the student and Northrop Grumman a learning experience and partnership between the student and the organization. Once an appropriate technical department is selected, the managers in that area would be requested to list possible project ideas that an intern would be able to complete over the defined project period of performance.

When initiating a potential placement it is recommended that former interns and their managers be approached first with the Internship-for-Credit idea. The previous work experience of the intern in conjunction with their Intern assignment manager would allow for a relevant project to be created. Having prior experience at the corporate facility and an understanding of the working climate can be an advantage to the successful completion of an Internship / Co-op experience and Senior Design Project in parallel.

After a suitable project gains approval from management, the feasibility of the project must be addressed. This process would include evaluating the tools required to complete the project including things like; time, software, hardware, advisors, mentors, physical equipment and other materials that would be needed to complete the project in a timely manner. Along with the proper materials and resources, the use of company proprietary information in the project must be addressed. After all concerns are evaluated the project approval from all relevant parties including the student, college, company management and other company personnel are required before signing the Senior Design Project contract.

Concerns

With the successful completion of the initial pilot program completed during the summer session of 2010, there are a few concerns to be addressed before a program can be implemented across other facilities. The main concern is that all responsible parties will be notified and involved in the program. The corporation and individual sectors are very large organizations and there located at many facilities across the country with many different departments that interface with interns, colleges, and recruiting teams. When this project format is implemented at multiple locations a standard protocol to be followed by the responsible parties will need to be documented and shared with all parties interested in participation in a project. Using the Statement of Work format from the Cal Poly Pilot Program, each location interested in adopting the project idea will evaluate the S.O.W. format and working with a specific university modify the S.O.W. model to best suit the specific project while maintaining the intent and integrity of the university's requirements for a successful Senior Design Project credit. The Leadership Training Program (LTP) group has offered to assist in ensuring that responsible parties are involved.

Another concern when moving forward with this project is the overall logistics involved in integrating across multiple campuses and universities. There are many different steps that need to be evaluated in order for this project to be successful and the three partners involved; the

corporate sponsor, the student-intern, and the college /university engineering representative will all need to give approval for the program. Determining a suitable project, finding an organizational manager, obtaining the acceptance of a college, and finding a suitable intern are all tasks that need to be completed in parallel and well in advance of the project projected time period. This is a challenge but it is one that the LTP group believes can be overcome with dedicated coordination and division of resources.

Conclusion

Based on the research completed of the Cal Poly Senior Design for Project for Credit while completing a paid Summer Internship and the input from the participant, it is believed that the successful completion of internship/senior design program at a corporate partner facility can be developed into a formal program and efforts across the corporation would become a successful program. We believe that with the collaboration between corporate partners and willing universities, the senior design for credit internship program should proceed. Though the pilot program worked well in this controlled environment and the project elements and partner responsibilities are well documented, it is recommended that further experiences be evaluated before creating a formal program providing credit for Senior Design in parallel with a paid Internship / Co-op experience. The program should continue to be well documented and the student participating must understand the efforts and responsibility necessary to be successful. Any student who is able to successfully complete a Senior Design for Credit and an Internship / Co-op experience in parallel will certainly be a valuable asset to the company and they are more likely to receive an offer of employment upon graduation. If the student does not put forth the extensive effort required during this kind of program, both the Senior Project and the Internship / Co-op experience will suffer seriously limiting the student's future employment opportunity.

Supporting Research on the Importance of Internships on future employment for Engineering Graduates

During the process of research and evaluating the effectiveness and success of the Senior Design Project in Parallel with an Internship, it was decided to investigate the importance of students participating in Internships / Co-ops during their undergraduate studies. The results and anecdotal evidence below from Internships.com and the National Association of Colleges and Employers (NACE) validate the belief by corporations that there is a significant advantage students have in the employment search that have successful industry experience prior to graduation. We suggest that participating in a joint Senior Design Project in parallel with an Internship / Co-op experience will further increase the student's ability to receive employment offers.

Facts and Statistics About Internships - Dated 5 November 2010

Provided by;

Did You Know

- For those under 25, the unemployment rate in the US is over 20%....It's 44% in Spain!
 - Employers extended offers of full time employment to 2 out of 3 of their 2007-2008 interns
 - The White House has interns. A Public Services Leadership Internship Program
 - About 90% of students plan on taking part in an internship sometime during college
 - Walgreen's hired almost 6,000 interns in 2009 across the United States college
 - In French universities it is common to do an internship, it is called "stage"
 - Internships are not just for the summer. Employers are now focusing on part time interns year round
 - Internships are often referred to as “sandwich placements” in the UK
- UNEMPLOYMENT – worse for young people & showing no signs of improvement**
- National unemployment rate in August 2010 was 9.5% (National Bureau of Labor Statistics), the same rate it was exactly one year ago when we were in the “midst” of the recession

- National unemployment rate for 20-24 years-olds in August 2010 was 17.9% (National Bureau of Labor Statistics)
- Only 47.6% of people ages 16 to 24 had jobs in August, the lowest level since the government began keeping track in 1948 (Labor Department, 9/3/10)
- 81 million out of 630 million 15-24 year olds were unemployed at the end of 2009, some 7.8 million more than at the end of 2007 (The International Labor Organization, August 2010)

IMPORTANCES OF INTERNSHIPS – Internships are the answer to getting a job

- A quarter of the nearly 480 respondents to The Wall Street Journal's survey of college recruiters said more than 50% of their new-graduate hires had been interns at their companies; 14% said more than 75% were (Survey results released September 13, 2010)
- Career Builder Survey conducted between May 18 and June 3, 2010 - Fifty-Two Percent of Companies Likely to Hire Interns as Full-time, Permanent Employees
- NACE reported in its 2010 Internship & Co-op Survey that nearly 57% of students from the class of 2009 were converted from interns to full-time hires, up from 50% the previous year
- 83.4 % of companies say internship programs are designed to help the organization recruit entry-level college hires (NACE Survey)
- According to Monica Wilson, acting co-director of career services at Dartmouth College, "Internship recruiting will largely replace entry-level recruiting in the next few years" (as quoted in the Wall Street Journal September 13, 2010)
- PricewaterhouseCoopers hired 1,454 rising juniors and seniors for summer 2010 internships and offered 90% of eligible interns a full-time position before they returned to campus (Wall Street Journal, September 13, 2010)
- NACE's 2010 *Student Survey* found that 42.3 percent of the seniors who had internship experience and applied for a job received at least one job offer. Conversely, only 30.7 percent of seniors without internship experience who applied for a job received an offer
- According to NACE's 2010 *Student Survey*, students who had an internship were more likely to accept the offer—and have a job to go to following graduation. More than one-

quarter of the intern group with offers accepted them; less than 20 percent of the non-intern group did so

- Of all new hires, about 62 percent had internship experience, about 66 percent of interns were offered full-time jobs from their sponsoring organizations and 47 percent would consider a candidate with internship experience over one without (NACE 2009 Experiential Education Survey)
- Students With Internship Experience Get a Higher Starting Salary - The median accepted salary offer for seniors with an internship was \$45,301—nearly 31 percent higher than the \$34,601 median accepted salary offer to non-intern seniors (NACE's 2010 Student Survey)

⁽²⁾ Additional Information may be obtained by contacting, C. Mason Gates at mason@internships.com or through the Internships.com website at www.Internships.com

The article is available at;

⁽³⁾ <http://www.americanconsumernews.com/2010/12/employers-prefer-candidates-with-experience-over-a-degree-from-an-elite-school.html#>

“A recent survey by ⁽⁴⁾ American Consumer News www.americanconsumernews.com published results from the 2010 Internship Survey. When it comes to hiring interns, 93% of employers indicated that the most important qualification is “Relevant internships or experience.” The next two highly-rated qualifications were “Strong Resume/Cover Letter” and “Interview Performance.” These results indicate that students should learn how to quickly and clearly communicate their experience as well as their value to employers both on paper and in an internship interview setting. “Attendance at Preferred Schools” and “High Academic Performance” was the two lowest-rated qualifications, indicating a heavier reliance on highly valuable relevant experience and interview skills vs. a student’s educational pedigree.”

The article continues with a quote from Internships.com Employers recognize that interns have a positive effect on their business, and that Internships.com is the best place to find the most qualified interns,” stated Robin Richards, CEO of Internships.com. “Students who are looking for an edge in this difficult economy should look no further than internships to provide that advantage.”

Aligning significant internship experience with a Senior Design Project program as proposed by Eric Pearson and Dr. Noori would greatly increase the value of the parallel program experience and the significantly increase the interest in these participants of the program by future employers.

Internship and Co-op Survey- May 2010

The National Association of Colleges and Employers (NACE) conduct an annual survey regarding Internships and Co-ops. There were 235 corporations that participated in the 2010 survey and some of the key findings are included in this paper to validate the importance of Internships / Co-ops in the preparation of college graduates to enter the workforce. This information is important to the success of the Senior Project Design in conjunction with Internships / Co-ops to ensure that the combination of the two programs is accepted by; students, universities and employers. Complete details of the survey are not provided here, only some of the key response categories that demonstrate the overwhelming value given to Internships / Co-op programs.

86.5% of respondents have internship / Co-op Programs.

83% of respondents indicated Internship / Co-op Programs are their primary focus for permanent new grad hires.

97% of Interns / Co-ops time is spent on essential functions.

92% of respondents plan to hire Interns / Co-ops during 2011.

98.6% of respondents pay their Interns / Co-ops.

53.3% of Interns and 60.4% of Co-ops from 2009 were converted to full-time hire upon graduation

⁽⁵⁾ *The 2010 Survey was conducted January 11 – March 5, 2011. Additional information and a copy of the full report may be purchased by contacting NACE at www.nacweb.org/products/2010internship_co-op_surveyor by contacting Ed Koc, NACE research director, 800/544-5272, ext. 164; ekoc@nacweb.org*

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⁽⁶⁾ National Association of Colleges and Employers (NACE) www.nacweb.org/

Bibliography

⁽¹⁾ *For additional information on the Summer 2010 Intern Survey please contact the Northrop Grumman Red Raiders through Liam McKusker at liam.mccusker@ngc.com*

⁽²⁾ *Additional Information may be obtained by contacting, C. Mason Gates at mason@internships.com or through the Internships.com website at www.Internships.com*

⁽³⁾ *<http://www.americanconsumernews.com/2010/12/employers-prefer-candidates-with-experience-over-a-degree-from-an-elite-school.html#>*

⁽⁴⁾ American Consumer News www.americanconsumernews.com published results from the 2010 Internship Survey

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⁽⁶⁾ National Association of Colleges and Employers (NACE) www.nacweb.org/