Competitive Placement of Engineering Students on Multiyear Project Teams

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Multiyear, multidisciplinary service-oriented projects have become prevalent in engineering curricula, providing students opportunities to meet real world needs, apply what they learn in the classroom, and often go beyond the level of course material. Project teams are usually composed of students from more than one academic year, requiring an annual selection process to assign new students to existing teams. One challenge for such an approach is to balance student candidate interest with the skill-set needs of ongoing project teams by an effective means of team formation. Project team formation methods addressed in the literature have included automated assignment, random selection, an algorithmic approach and others including one that utilizes a mix of student and instructor inputs. The engineering department at Messiah College has explored a competitive placement approach that mimics the job search process students experience after graduation. During the first week of the semester, student team leaders post online job descriptions and make presentations to prospective students to market their teams. Prospective students write resumes and cover letters, submitting them to the teams of their choice. Student team members sort through these resumes, looking to add new team members with the skills and interests that will benefit their teams. At the end of the second week, a Job Fair is held with one-on-one interactions, interviews, and simulated "plant trips." The next few days bring a flurry of job offers, acceptances and rejections, with many of the same dilemmas found in a real job search, e.g., team leaders trying to decide how many offers to extend, or a prospective student wondering how long to wait before accepting a second choice offer, while hoping the first choice will materialize. Not only do student candidates and project team leaders get exposed to the dynamics of a real job search, but the competitive approach effectively matches student interest with project needs, where the selection process rests more fully in the hands of those who must live with the choices. This paper will describe details of the competitive placement approach, results of our experience, lessons learned and recommendations for others who wish to implement it.

Introduction

Effective team formation helps encourage and sustain quality work by multidisciplinary student teams, on service-oriented projects that extend beyond a single academic year. For engineering students, the importance of teamwork, characteristics of productive teams, and multiple methods of team formation have been addressed in the literature. Such methods include automated assignment,[1] random selection,[2] an algorithmic approach,[3] and a process for forming high performance teams.[4] Although each of these methods of team formation has its respective advantages, our competitive approach to the placement of engineering students on multiyear project teams fits best with a curriculum that features ongoing multi-year projects, and helps balance student-candidate interest with the necessary skill-set of

new students, recruited by existing project team leaders to fill positions that become available as students graduate or as the project progresses. While effectively matching the interest of upcoming students with project needs, the competitive approach also shifts responsibility for selections more fully to both student leaders and recruits, who live and work with these choices. Beyond its immediate practical value, the competitive process exposes students to some dynamics of a real job search, better preparing them for their post-graduation career job search. It also provides an opportunity for students to practice at least three of the ABET Student Outcomes: functioning on interdisciplinary engineering teams (d), communicating effectively (g) and engaging in life-long learning (i).

Since 2007, the engineering department at Messiah College has been pioneering a multi-year plan known as the Integrated Projects Curriculum (IPC) that involves a four-semester project-course sequence, with students working on multidisciplinary teams, typically beginning in their junior year. Details of the IPC as a curriculum modification have been previously published, including benefits over the traditional senior capstone project course, portfolio evaluation of student project work, structure of the course sequence, and the place of Group Orientation (GO), a one-credit course normally taken by our engineering students in the Spring semester of their sophomore year, preceding the project-course sequence.[5] It should be noted that the portfolio approach for evaluation after student selection articulates a consistent method of assessing student progress toward objectives on the project work. This paper focuses on how students are placed competitively on engineering project teams during the first few weeks of GO. Current students recently provided feedback on their experience with the process by taking a survey. Details of the competitive placement ("Job Search") process, survey questions and how the survey was conducted will be described in the Methods section that follows. The Results section will present and discuss the aggregate ratings of students for each survey item. Finally, the Conclusions section will summarize results, identify lessons learned and offer recommendations.

Methods: Job Search Process

At the beginning of the GO course, students engage in a "Job Fair"[6] activity to place them in one of seven application groups by a competitive Job Search selection process. Preparation for the Job Fair involves senior student leaders consulting with junior student team members and faculty advisors within each application group. The result of this consultation is to specify the number of open positions for each ongoing project, and define an official Job Description (JD) for each open position. JDs are posted online in a specified format using a designated wiki site.[7] In this educational version of the Job Search, department faculty negotiate and allocate how many openings are allowed for each application group beforehand, so that the total number of positions for all seven application groups matches the number of incoming GO students, ensuring that all students will be "employed."

During the first week of the semester, GO students are instructed to ready themselves for the Job Fair, by preparing a personal resume, uploading it to the GO Learning Management System (LMS), and reviewing the current JDs online. The following week, the Job Fair commences as all GO students witness a brief presentation given by the leadership of each application group. These presentations highlight the unique attributes of each group, and showcase specific projects. After the presentations, existing project group members are encouraged to interact face-to-face, as they would during a "real" job fair. To facilitate this interaction, prospective students can visit work areas of specific projects, as a sort of "plant trip". GO students typically take advantage of the plant trip opportunity to learn more details about what specific groups do, and to further communicate their interest in joining a particular group. It should be noted that some GO students have already been working voluntarily with the project team, through a non-credited interdisciplinary organization known as the Collaboratory for Strategic Partnerships and Applied Research that allows students of any discipline or level to join together in project work, outside of regular academic hours. Working on a project as a Collaboratory volunteer roughly parallels the internships students take with a company, prior to graduation and can provide similar advantages for a GO candidate during the Job Search process.

Following the Job Fair, GO students "apply" for positions that interest them. To prepare for this, they may check the "Job Status" page on the LMS to see which positions are still open. A GO candidate who finds an open position of interest may apply by writing a cover letter and uploading it to an LMS "Submissions" page, accessible to the group that posted the position. A GO candidate may also receive an unsolicited offer from a project team, since a project team may be impressed by the resume of that candidate and/or in particular need of those skills, even if the candidate didn't specifically apply.

Meanwhile, student project leaders, with the assistance of group advisors, consider and evaluate cover letters, resumes, and interactions with GO candidates during the Job Fair and plant trips, to decide which ones best match the requirements of each specific job position. Prior voluntary involvement of any GO candidate on the project usually works in a candidate's favor, just as an internship can give a student an advantage when applying for a job at the same company. After selecting the most desirable candidate, project leaders send the student a job offer inviting the GO candidate to join a specific project-team within a group. GO candidates who receive a job offer are encouraged to respond as quickly as possible, since groups often extend more job offers than they have open positions, and take the best respondents. To accept a job offer, the candidate uses the LMS to sign up for the job. To reject an offer, the candidate sends an email to the student project leader, so that the position can be offered to another candidate.

When a GO candidate accepts a job offer, the job status page on the LMS automatically updates (using an in-house process designed by the IPC manager) to reflect the change in the number of available positions, and the GO candidate's name is removed from the list of available candidates on the Student Status page. Thus, GO students who have not yet received an offer can monitor

the Job Status page to see which positions remain open. Likewise, student leaders can monitor the Student Status page, so that they can make informed decisions when considering extending secondary offers.

Once a GO candidate gets "hired," that is, accepts an offer for a position on a particular project, that candidate becomes a member of the application group and normally remains in that group throughout the remainder of GO and the project course sequence. While a policy for switching to a different application group does exist, we consider it an exception for special cases such as when a project reaches completion, or loses a client, etc. Thus, GO students who become the equivalent of application group employees are obligated to attend all of its activities from that point forward. Portfolio evaluation and graded checks on individual student progress as set by project course requirements act as accountability; a passing grade is needed to avoid "employee termination."

The process of extending job offers continues until all GO candidates are hired. If unselected GO candidates remain at the end of the week following the Job Fair, a meeting is held with all the project leaders and faculty advisors when the remaining GO candidates are assigned to groups by negotiation. This insures zero unemployment, while hopefully minimizing the number of students unhappy with their job placements.

Methods: Job Search Survey

While faculty advisors generally consider the competitive "Job Search" efficient and effective for placing students on teams, formal and detailed student opinion data has been lacking. Thus, to acquire feedback from current students who have already participated in the GO Selection process, the authors of this paper formulated a survey and asked students to complete it by the end of the Fall 2013 semester. The survey (IRB exemption approved as per Messiah College protocol #2013-035) was administered online via Qualtrics (http://qualtrics.com/), as part of a required final exam period activity. Students were instructed to rate each item as Strongly Agree, Somewhat Agree, Neutral, Somewhat Disagree, or Strongly Disagree, using radio buttons of the online survey tool, and for certain items provide a short answer response. The survey questions addressed students' experience with: A) choosing a project prior to or during the Job Fair, B) participating in the Job Search/Selection process itself, and C) working on the project with team members since then. Some of these questions were adapted from the work of Orono and Ekwaro-Osire on assessing team formation,[8] and others emerged naturally from the unique aspects of our competitive approach. Figure 1 below shows the survey questions, including an introductory heading explaining the purpose and confidentiality of student responses.

We would appreciate getting some feedback on your experience with the "Job Search" method of IPC project selection. Please base your responses on your own personal experience with the Job Search process in Group Orientation (GO), as well as your current satisfaction with project activity and teamwork. Your responses will be kept strictly confidential …. However, (anonymous) results may be distributed for department use and/or for potential publication. Thanks for your valuable contribution to help improve IPC as we continue to strive for excellence in engineering education.
A. Tell us about your experience choosing a project:
1. I decided on my 1st choice project based on prior experience in working with the team through the Collaboratory...
2. I decided on my 1st choice project based on best fit with my interest and concentration(s).
3. I decided on my 1st choice project based on the recommendation of a friend.
4. I decided on my 1st choice project by reading the Job Description (JD) online.
5. The project Job Description (JD) for my 1st choice project was detailed enough.
6. I compared the Job Description (JD) of my 1st choice project with other JDs.
7. I decided on my 1st choice project based on my personal interview with the then current project leaders and/or faculty advisor during the GO Job Fair.
8. I decided on my 1st choice project based on some other reason (please explain reason below).
9. Other reasons for choosing 1st choice project, not included above.
B. Tell us about your experience during the job search process:
1. During the GO Job Search, I was hired by my 1st choice project group.
2. During the GO Job Search, I was hired by my 2nd choice project group.
3. I would have preferred to work on my 1st choice project (answer only if you were not hired by your 1st choice group)
4. I would have been equally happy working on either of my top two choices.
5. The GO Job Selection process was fair.
6. Overall, I'm happy with the results of the GO Job Selection process.
7. The GO Job Selection process helped me prepare for finding a real job.
C. Tell us about your experience since the job search:
1. During the GO Job Search, the group presentations and Job Fair gave me a good idea of what each group was about.
2. What I do in my group is close to what I expected, based on the Job Description (JD).
3. I switched to a different project and/or IPC group once or more since the GO Job Selection process. Please explain why below.
4. I would like to have had more detailed Job Descriptions (JDs).
5. I would have liked to have had more diverse project offerings.
6. I would like to have been allowed to propose my own project.
D. If you changed projects or groups since the GO Job Selection process, please explain why.
E. Any other comments on the GO Job Search process?

Figure 1. Parts A-E of the Job Search Survey items administered to students online via Qualtrics.

Results: Job Placement

Over the past two years (2012 and 2013), a total of 80 students were placed in job positions by the GO Job Search process. Table 1 below shows the distribution of students placed in each application group, and on each particular job position, within one or more projects as defined by Job Descriptions (JDs).

Table 1. Number of students placed in each of the project job positions by the GO Job Search process over the past two years. Job positions are organized by Group. *These positions were not created until Spring 2013. **These positions were discontinued due to project completion or lack of project client. Complete Job Descriptions (JDs) for each job position available online.[7]

GROUP	PROJECT JOB CODE	NUMBER OF STUDENTS PLACED	
		SPRING 2012	SPRING 2013
BioMed	BIO001	3	2
Communications Technology	COM001	2	1
	COM002	1	**
	COM003	1	1
Disability Resources	DIS001	2	1
	DIS002	1	1
	DIS003	2	2
	DIS004	1	1
Energy	ENR001	4	5
	ENR002	1	1
	ENR003	4	1
	ENR004	1	3
	ENR005	*	3
	ENR006	*	1
	ENR007	*	3
Transportation	TRN001	1	1
	TRN002	2	2
	TRN003	2	2
	TRN004	1	1
	TRN005	1	**
	TRN006	1	**
Water	H2O001	*	3
	H2O002	3	1
	H2O003	1	2
	H2O004	2	2
	H2O005	*	2
	H2O006	*	1
TOTALS: 6 groups	27 job positions	37	43

Due to growth in the number of students enrolled and expansion or progression of projects, some of these job positions were newly created starting in 2013. Also note that some of the job positions were discontinued as of 2013, due to project completion or lack of a project client. All

students placed in a project identify one or more of five concentrations offered by our ABET accredited engineering program toward the B.S.E. degree: biomedical, computer, electrical, environmental or mechanical. As of 2013, civil has been added as a sixth concentration. Each application group identified in Table 1 is supervised by one or more faculty members with interest and expertise in that area. Each group hosts one or more projects as indicated, involving multidisciplinary (multi-concentration) student teams. JDs available online[7] describe each project job position in more detail, including its multidisciplinary nature.

Results: Student Response to Job Search Survey Items

This section reports the distribution of student responses for each item in the Job Search Survey, administered at the end of the Fall 2013 semester to all the students at our school currently enrolled in the Engineering Project I through IV courses. A total of 64 students responded, representing 84% (64/76) participation, a very representative sample of our engineering project students currently enrolled. Distribution of responses by the 64 students taking the survey are shown in Table 2 below.

Table 2. Results of 64 student ratings on survey items, including mean and standard deviation using a scale where 1 = strongly agree, 2 = somewhat agree, 3 = neutral, 4 = somewhat disagree, and 5 = strongly disagree. * These items include 1 no response. ** This item includes only the 17 students who did not receive their first choice. Items A.9, D, and E indicate the number of free response comments.

	Strongly Agree (1)	Somewhat Agree (2)	Neutral (3)	Somewhat Disagree (4)	Strongly Disagree (5)	Mean Rating	Standard Deviation
A.1	25	5	6	9	19	2.9	1.7
A.2	30	28	5	1	0	1.6	0.7
A.3	7	17	14	14	12	3.1	1.3
A.4	14	23	12	9	6	2.5	1.2
A.5	17	28	14	5	0	2.1	0.9
A.6	21	21	8	9	5	2.3	1.3
A.7	11	18	15	13	7	2.8	1.2
A.8	3	5	28	8	20	3.6	1.1
A.9	Other reasons for picking first choice: 6 responses. See discussion below.						
B.1	46	3	2	5	8	1.8	1.5
B.2*	7	3	12	4	38	4.0	1.4
B.3**	5	4	3	3	2	2.6	1.4
B.4*	11	17	20	10	5	2.7	1.2
B.5*	17	33	9	3	1	2.0	0.9
B.6	32	19	7	5	1	1.8	1.0
B.7	6	20	13	20	5	3.0	1.1

	Strongly Agree (1)	Somewhat Agree (2)	Neutral (3)	Somewhat Disagree (4)	Strongly Disagree (5)	Mean Rating	Standard Deviation
C.1	26	31	6	1	0	1.7	0.7
C.2	16	27	11	8	2	2.3	1.1
C.3	8	3	8	5	40	4.0	1.4
C.4	2	18	28	12	4	3.0	0.9
C.5	4	23	25	9	3	2.8	0.9
C.6	3	12	30	14	5	3.1	1.0
D	About switching projects or groups: 13 responses. See discussion below.						
E	Other comments on the GO Job Search process: 9 responses. See discussion below.						

Analysis of Results

Items in part A of the survey dealt with factors students considered important in selecting their number one project preference, before or during the GO Job Fair. Ratings of item A.1 suggest that 39% (25/64) of these students had a preferred project picked before the Job Fair, based on prior experience working with the team via the Collaboratory. Another 30% (19/64) indicated that involvement with the project team via the Collaboratory was definitely not the main factor, while the rest 31% (20/64) were not so sure. Question E discussed below provides more insight on this issue.

Next to prior experience on the project, ratings of items A.2–A.4, A.7 and A.8 show that students considered best fit with their interest and concentration as the most important factor in choosing a project, while reading the JD online was somewhat important, followed by the personal interview. The recommendation of a friend seemed less important; other factors were cited by a few (based on mean ratings in Table 1). The other reasons mentioned by less than 10% (6/64) of the students included previous experience on the project (3), friends in the group (1), recruitment of a project advisor (1) and nature of the project (1).

Ratings of items A.5 and A.6 dealt with the quality and the role of JDs in the selection process. The mean rating of item A.5 indicates that on the average, students somewhat agreed that the JDs were detailed enough. Furthermore, the response to item A.6 indicates that most students did compare the JD of their first choice with other JDs. This suggests that more often than not, students were making an informed choice including consideration of alternatives.

Survey section B focused on students' experience during the Job Search process. Based on the ratings of items B.1 and B.2, a 72% (46/64) majority of students were hired by their first choice project group, while another 11% (7/64) were hired by their second choice group. This accounts for 83% of the students. Including students who rated these items as Somewhat Agree, this majority grows to 92% (59/64) of the students indicating that they were hired either by their first or second choice project groups.

Items B.3 and B.4 attempt to assess students' perceptions on the difference between their first and second choice project options. That 34/64 students rated this item, even though they were explicitly instructed to "answer only if they were not hired by their first choice group," suggests an inconsistency with results of item B.1, where 46 students strongly agreed to having been hired by their first choice group. It is probable that some students who were hired by their first choice group also responded to B.3. In any case, the mean rating on item B.3 of 2.6 shows that most students who did not get their first choice seem reasonably satisfied with their second choice. As the result of B.4 shows, most students on the average did not see a big difference between working on either of their top two choices.

Item B.5 and B.6 address the students overall perception of the GO Job Search process. On fairness, the mean of 2.0 on B.5 indicates somewhat agree on the average, while a mean of 1.8 on B.6 suggests that most students were pretty happy with the Job Search process overall. These results suggest that overall, students had a pretty positive attitude about their experience.

The response to item B.7 was surprising, showing that, on the average, students were neutral about whether the process helped them prepare for the "real" job search process.

Section C assesses students' experience since the job search, after having worked on the project with the team for one or more semesters. The mean of 1.7 on C.1 indicates that most students were in at least some agreement that the group presentations and the Job Fair gave them "a good idea of what each group was about." The mean of 2.3 on C.2 shows less strong agreement, yet leaning towards somewhat agree on the correlation between what they do on a project in the group and what they "expected, based on the Job Description (JD)." On switching projects or groups, a mean of 4.0 on C.3 shows that most students kept working on the project where they were initially placed. However, the 20% (13/64) of students who did switch provided reasons in item D. Some reasons included: a project was canceled, put on hold, or didn't have a client, or the project wasn't a high priority, and/or another project was starting up or was a higher priority (6); starting a new project within the same group due to lack of interest in other projects in the group presently available (1); a need in another project matched interests better than the original one (1); too many members of the original group and not enough work to delegate to each one (1); or a new temporary project need arose (1).

Items C.4—C.6 gave the students an opportunity to suggest changes to the process. The mean of 3.0 on item C.4 showed students were pretty neutral overall about having more detailed JDs. Likewise, they were only slightly leaning towards somewhat agree (mostly neutral) on preferring "more diverse project options," as indicated by the mean of 2.8 on C.5. On C.6, the mean of 3.1 shows only a slight leaning towards somewhat disagree (mostly neutral) on "having been allowed to propose my own project."

Discussion of results

The results of the survey seem to substantiate many of our pre-suppositions about the Job Search process. Not surprisingly, most student candidates based their first choice of project on either prior experience working on the project, or because it matched their personal interests. Most students were satisfied with the online JD's, and most were neutral when asked if the JD's should be made more detailed. In general, students seemed to be satisfied overall with the Job Search process, but seemed slightly less positive when asked if they thought the process was fair. A surprising number of students were hired by their first choice group, which may well account for the overall positive perception of the process. This result appears to indicate a high level of satisfaction from the student point of view, lending support to the idea that the process effectively matches student interest with project needs.

This latter result also compares well to results reported by Laguette, for high performance capstone project teams involving mechanical engineering students, where the fraction of students who were placed in their first or second choices by that process was 81% (59/73) in 2009/10 and 94% (64/68) in 2010/11.[4] Although the Laguette study reports students coming from a narrower range of engineering disciplines, and engaging in a shorter term (capstone) project, our student pool sample size and the first or second choice placement outcomes for the competitive process reach similar percentages.

The somewhat surprising response to Item B.7 may be due to the fact that most undergraduate students have not yet experienced the “real” job search process, and so have little experience upon which to evaluate this question. On the other hand, we would have expected a greater majority of students to realize the value of having some experience with a competitive process that parallels marketplace dynamics. Thus, we have further work to do to help the students make that connection.

Question C was aimed at finding out more about what the students have experienced after the Job Search process was completed, as they began working in their chosen groups. Most indicated that the group presentations and job fair gave them a good idea of what their group was all about, but the responses were a bit less positive when asked if they ended up doing what they thought they were going to do, based on the JD. This is not surprising, considering that the Job Descriptions are written a full semester before the candidates actually begin working “full time” on the project. Real projects of the type carried out in the IPC are inherently more dynamic than a contrived, “textbook” exercise, and so there is likely to be a difference between what the JD explicitly states and what the student ends up actually doing. We do explain this to students coming into the class, encouraging them to base their selection more on the overall type of work a particular Group is doing, and less on the specifics of the JD. However, this may be an area where we can improve our process.

While it appears that some would have liked to have more job options, apparently not quite so

many would have been interested in proposing their own project. This last result was a little surprising, considering that prior to implementing the IPC, our department required students to complete a more traditional capstone project, each of which was proposed by the student team completing it. During the process of transitioning to the IPC, one concern expressed by students was that in the new program they would no longer be able to propose new projects every year. Perhaps students have come to recognize the value of proposing projects within the group context, and that having multiple groups provides sufficient diversity of projects. The ongoing application group context and diversity of projects were two of the primary motivating factors for intentionally creating multiple multidisciplinary groups in the IPC.

The responses to Question D would seem to indicate that a good number of students had switched projects or groups, which might be construed as an indication that the Job Search process had not resulted in students having long-term satisfaction with their jobs. However, closer examination of the responses reveals that nearly all of those who changed jobs did so within their chosen groups, as the individual projects within their group expanded, shrank, or were completed. In several instances, new projects were started, which caused interested students to switch. During the Job Search process, student candidates are told that the needs of the group are likely to change over the four semesters during which they are members, and that they should choose their job based more on whether or not they like what the group is doing overall and somewhat less on the actual job they're considering. This is realistic, not only as students begin to understand that the group they're joining will have developing and changing needs, but also as they consider their future career with a real company, where their actual job responsibilities will almost certainly change over the course of their employment.

In response to the open ended question E, several students raised questions about the fairness of having to compete with those students who were already involved with projects administered by the Collaboratory for Strategic Partnerships and Applied Research. The Collaboratory, or Collab for short, is an interdisciplinary organization established by the engineering department at Messiah College in 2000. The Collab seeks to involve students and faculty in service-oriented projects that encourage them to bring their talents and abilities to bear on real-world problems involving clients from around the globe.[9] Not surprisingly, the underlying purpose of the Integrated Projects Curriculum (IPC) and the mission of the Collab are very similar, as they both originated from people in the same department. While the two are closely intertwined, some significant differences exist. Student participation in the Collab is voluntary and typically non-credit bearing, while the IPC is required of all engineering students and has absorbed the credit hours formerly allocated to the capstone engineering project. On the other hand, many of the projects undertaken by students in the Collab are also part of the IPC, which means that any given project may well have both curricular and volunteer personnel working on it. While the volunteers may not be receiving credit for the work they're doing, they tend to be enthusiastic participants, with intrinsic motivation. At issue is what happens when these volunteers from the Collab side of the project enter the Job Search

process. With their prior experience working on the project, upper class team members tend to give them preference for open positions in their group, compared with other applicants who lack a similar "track record." This situation is certainly understandable; one could argue that applicants with prior experience should be given preference, just as students who have successfully completed internships with companies often get preference when it comes time to hire. However, judging by our survey results, the perception exists among some that students who have been involved with the Collab have an unfair advantage in the Job Search process.

Summary, Conclusions, and Recommendations

An innovative paradigm for selecting teams to work on ongoing projects has been presented, along with the results of a survey conducted to assess the quality of the student experience with the process. Assigning new members to project teams can be done by a variety of methods, each with advantages and disadvantages, but we believe that the method presented here has the potential to be superior to all other approaches, for at least the following four reasons:

The Job Search paradigm efficiently matches a student candidate's interests and skill set with the specific needs of each project team.

The student team members and the student candidates are heavily involved in the process, with minimal input from faculty advisors, which places the responsibility for the outcome in the hands of those who must live and work with the consequences of their choices.

The GO Job Search process closely mimics the process that a typical student will encounter when they complete their engineering education, providing practice in writing a resume and cover letter, and gaining experience navigating the complexities of job applications, the job fair, interviews and plant trips, and dealing with multiple offers.

The paradigm also provides student leaders of existing project teams with a realistic experience of the hiring side of the job search process, including writing job descriptions, preparing a job fair presentation, interviewing candidates, and dealing with the complexities of candidate selection.

Beyond its intrinsic pedagogical value, the GO Job Search process also provides an opportunity for students to exercise and demonstrate at least three of the ABET Student Outcomes. Students gain experience with an important ingredient of “(d) an ability to function on multidisciplinary teams” by participating in the process of team formation, being directly involved and responsible for making decisions about the best match between project needs and the skill-set of students available. This applies both on the student candidate side as well as the student leadership side. Throughout the process, students must practice “(g) an ability to communicate effectively”

regarding a match that satisfies both sides of the job offer "table." Especially for students who may not have received their first choice offer, if not for all students involved, the experience should heighten "(i) a recognition of the need for…life-long learning" regarding their job search skills.

The results of our survey confirm that the GO Job Search process has proven effective for achieving the desired results, as evidenced by the high level of student satisfaction with their chosen project. However, it has also raised some questions identifying areas where improvements can be made. First, it is clear that we need to do a better job of helping students make the connection between the GO Job Search process and what they will experience when they look for a job after graduation. Second, we need to clarify exactly how prior experience working on a project within the Collab affects the GO Job Search process. The fact that some students chose to opt out of the survey, citing that they had a "guaranteed" position because of their prior experience, indicates a lack of understanding of the process. We need to more effectively communicate to students that while prior experience can increase the likelihood of getting their first choice, it is not a guarantee, and all students are expected to fully participate in the selection process and have an equal chance at every job. Perhaps the best way to approach this is to use the internship analogy to help them understand the difference between an advantage and a guarantee.

The Job Search process as described herein is greatly enhanced by wiki and LMS tools that we have developed to organize resumes and JDs, allow submission of cover letters, keep job openings updated, and track student candidate status. The wiki is also used extensively to document policies and procedures, allowing easy access for students and the ability to keep the information current and up-to-date. The majority of the work associated with developing and maintaining these resources has been carried out by the manager of the IPC, without whom the Job Search process as we have implemented it would be impossible.

Our final recommendations for those who wish to implement the Job Search process are as follows. Establish groups that host project teams. At a departmental level, recognize that successful operation of the process requires significant time and effort by faculty advisors, including a manager of the project curriculum, with appropriate load credit. Plan ahead at least a year in advance, so as to adequately structure and schedule the experience. Prepare students and faculty with clear expectations. Configure an LMS to facilitate the process. These steps help not only in effectively guiding the students through the process, but in making the experience a more authentic model of the "real" job search.

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