

Cooperative Education in Brazil: Coordinating Work Terms

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Abstract - The operational structure of a course that interacts with the work market is very different from that of a conventional course, since the university must adapt its administrative procedure to reconcile work aspects (including constraints imposed by the employer) with academic requirements. This paper demonstrates how active management can reconcile the external work market with the bureaucratic structure of the university. We describe three different modalities through which an educational institution can supply interns to meet the needs of employers. We also discuss certain aspects of attaining and maintaining the number of positions to be filled in each term: student intellectual potential; detailed information regarding student work skills; the specific status of the university in the enterprise community; dissemination of course information to human resources departments; and the appropriate student profile for a specific work term. Finally, work term follow-up visits are described in terms of points that must be evaluated with the student and of interactions between the academic advisor and the engineer supervisor, which are useful for maintaining and improving the work-study program. The influence that such a program has on student maturity is also addressed.

Index Terms - Co-op Education, Intern, Work Term

INTRODUCTION

The *Escola Politécnica*, the engineering school of the University of São Paulo, has been in existence since 1897. This paper describes various measures taken over the sixteen years during which the author coordinated work terms and advised students enrolled in the work-study program of the *Escola Politécnica* chemical engineering course.

At the University of São Paulo, the chemical engineering work-study program is conducted on a four-month period basis, which is common for such cooperative (co-op) engineering courses.

The items discussed represent experiences acquired in the field. We explain how modifying the program based on these experiences has made this program a success at the University of São Paulo.

The beginning of this experience is reported in [1], with a detailed description of the main ideas in [2], [3] and [4]. The Brazilian law for work term periods were discussed in [5], [6] and [7]. The most recent publication of the author about work term coop education was chapter 8 in [8].

THE OPERATIONAL STRUCTURE

At first glance, the main difference between a semester-based course and a four-month co-op course is chronological. A four-month co-op course defines a specific time period, integrated into the curriculum, during which studies pursue work activities. In contrast, students enrolled in semester-based courses can gain work experience only during their vacation break or on a part-time basis, as a student initiative to be added to the curriculum. In a conventional semester-based course, all of the administrative procedures are carried out by the school. However, in a four-month co-op course, these administrative procedures are shared with the employers.

At the *Escola Politécnica*, the challenges related to conducting a work-study program were addressed by creating a Coordinating Board (CB), which works in parallel with the University administration and is directly linked to the Principal Office. The CB is composed of a main coordinator (the principal representative), the specific engineering course coordinators, the work term coordinators and the student body representatives (one for each class). This team is charged with the following duties, which are conducted on an ongoing basis:

- a) Evaluating the performance of the students in the academic terms, updating the number and personal profiles of students that will be available for the next work term
- b) Promoting interaction with the work market: organizing seminars to tout the benefits of the work-study program; scheduling meetings with specific employers to sign work term position contracts; and inviting potential employers to hold conferences at the University in order to motivate students for their own work-study programs
- c) Evaluating the work term market movements under current social and economic forces and attempting to determine the potential impact of those forces on the number of positions available in the upcoming term
- d) Analyzing student body reports regarding the most recent work term and taking measures to improve conditions during the current work term
- e) Holding regular monthly meetings to update information related to the present work term and correcting trajectories if necessary

None of these activities are typically within the purview of the administrative office of a University. They constitute

the means by which the *Escola Politécnica* successfully meets the challenge of interacting with the work market.

THE PARTNERSHIP WITH POTENTIAL EMPLOYERS

Employers participating in a work-study program usually see the students as auxiliary personnel who benefit from the program by acquiring professional experience. This simplified vision of work-study programs tends to promote resistance to the idea of dividing the academic year into three four-month terms, which are thought by some to be too short to allow the average student to perform well.

When the focus of the work term is changed from a particular student to a set of continuous activities in a job position occupied by a sequence of students over the course of several work term periods, at least three scenarios can be envisioned, all of which broaden the work term parameters:

- a) The work term employer chooses a different intern for each work term period. In this scenario, the employer can, through observation, create detailed profiles of students that could be contacted in the future. These profiles can play a dual role in that they can also show the quality of the enterprise services or products to potential future clients who hire the student.
- b) The work term employer chooses a pair of students; when the first is in the work term the second is in the academic term and vice versa. This addresses the concerns of those who believe the work term to be nothing more than a vehicle for students to help their supervisor engineer. The greatest advantage of this scenario is that the student who is in the academic term can provide support to the other in terms of literature and academic discussion.
- c) The work term employer creates a sequence of work term positions (like a trainee program) in several departments of the enterprise and chooses several students to consecutively follow the job position sequence. A student completing this sequence by the end of the course will have a complete, in-depth knowledge of the business. Such recent graduates would be prime candidates to fill any openings the employer might have, since they could immediately assume their professional functions, assimilate seamlessly into the work environment and perform their duties with great skill.

Work term employers come in different sizes and have different needs. Therefore, our CB members advise each human resources department as to the best configuration for their specific needs.

ATTAINING AND MAINTAINING THE DESIRED NUMBER OF AVAILABLE WORK POSITIONS IN EACH WORK TERM

One might think that, having once advised the staff of a given human resources department regarding the conditions under which a co-op course is conducted, the subject would never need to be addressed again at that particular company.

However, experience shows that it would be a mistake to think so. It would not be a surprise if, in the next work term, that company has hired new staff members who have never ever heard of co-op courses. Therefore, the CB must schedule periodic meetings with the human resources departments of the companies participating in the work-study program. These meetings serve as a venue for updating co-op course information for the people that are currently in charge, as well as for sharing strategies and exchanging ideas involving work terms. This is priority number one in maintaining a work term position at a given company.

Another challenge facing the coordinators of work-study programs is determining exactly how to approach new companies that have never received a work term student on a co-op course basis. There is a well-known saying: "The most important part of any business is its employees." An approach focusing on the idea that the work term period can reveal new talents and a diversity of profiles for future hires typically makes employers more receptive to a more detailed explanation. In addition, informative material on the subject (articles published in trade journals or magazines) can facilitate this first contact. Of course, knowing someone within the organization who can organize internal seminars to be conducted by school managers can be of great help in introducing a work-study program.

There is another important question to be addressed: What are the factors involved in persuading human resources personnel to create a work term position? Our experience in the São Paulo area shows the following:

- a) The academic reputation of the university is paramount. The recognition of a particular university by society as a center of excellence in the formation of human resources and generation of knowledge is seen as having value that will be aggregated to the partner enterprise. An intern trained at that university can provide a new perspective on routine procedures, and this new perspective can promote innovations in those procedures.
- b) The quality of the students at the university is also important. Intellectual potential and a strong academic background, as well as a set of very well-defined personal skills, on the part of the student are crucial to meeting employer expectations and to maintaining the position available for another student in the next work term. The admission criteria of the university can be used to set the desired level of intellectual potential. A strong academic background is achieved by developing this intellectual potential, allowing the student to structure complex thoughts and to take a methodical approach to the specific topics related to the professional area in question. Finally, well-defined personal skills are gained over the course of the alternating academic and work terms. The serial nature of the course allows the manager of the partner enterprise to evaluate the difference between the performance of a student in the first work term and that seen in the second work term,

after the student has experienced the first work term and the next academic term. This scenario is quite different from that observed in courses in which students apply themselves to a set of independent disciplines. In that type of arrangement, students having completed the same number of semesters are not necessarily at the same academic level.

- c) The work term supervisor engineer plays a key role. It is mandatory that the university motivate this person to be committed to improving the engineering profession by promoting a detailed and well-structured work-study program that furthers the formation of the future engineer. In addition, the tremendous potential for professional growth of both parties, coming out of their day-to-day interaction, could translate to a considerable profit for the partner enterprise if it uses the capacity of the intern to meet its technological challenges and achieve mid-range goals. Interns can recognize and systematize the specific knowledge applicable to the problem at hand, combining their relative distance from the hustle-bustle of the regular working day with their best skill, the ability to study issues in-depth, and thereby put the company at a great advantage. Therefore, the university must provide support to the supervisor engineer in the development of a specific work-study program that combines the recommendations of the human resources department with the particular student profile, taking into account the level of difficulty and complexity of the proposed activities.

THE FOLLOW-UP VISIT

All of the previously mentioned activities are necessary to achieve the goal of creating a work term position. Once such a position has been created and defined, the university must address the activities within the goal, i.e., a successful program for the intern that truly complements the academic background. For the student, the transformation in the daily routine is extraordinary because there is no lecture to introduce the student into the company, and, unlike the situation at school, the student is not the focus of the company. In addition, processes at the company are ongoing (being set in motion prior to the entry of the student and continuing after the departure of the student), and there is no party at the end of the work term. Student interns must immerse themselves in all of the pertinent processes of the company, applying their specific skills and adapting to deal with the challenges faced.

In the work term activities, uncertainties and imponderables arise in the rhythm of routine jobs that must be finished without wasting time. In this situation, continuous planning is mandatory because material resources need to be acquired in advance (there is no supermarket with industrial equipment on its shelves). In addition, the student

cannot call upon a classmate for help with a laboratory test or to accelerate an ongoing project.

The uncertainties and psychological insecurities of interns are not always perceived and understood by the supervisor engineer who is involved in the daily operations. At these moments, observing the actions of the supervisor engineer represents a unique opportunity for interns to learn professional skills, and the reality encountered impels the interns to continuously incorporate these strategies into their personalities. Nevertheless, it is necessary to provide interns with support when they feel incapable of meeting expectations. In such situations, interns can ask their academic advisor for assistance. Since the academic advisors have more maturity and experience, as well as being positioned outside the situation and knowing the student potential, they can suggest means of coping, alternative ways of thinking about problems, bibliographic resources or novel options that can at least aid interns in using their latent potential to develop and overcome difficulties.

The work term should be continuously assessed. The academic advisor can remain in touch with his student by electronic means. At least one visit to the workplace is recommended. For that visit, the academic advisor must plan to review all of the company processes related to the work term. The academic advisor should also meet with the human resources staff to learn about the overall performance of the student, focusing on positive points and identifying areas in which there is room for improvement. In addition, at this opportunity, the institutional relationship with the university, problems with the contract, the continuity of the program into the next work term and any other pressing issues should be discussed. Together with the advisor engineer, any differences between the original work term plan and the one actually practiced should be identified. This meeting can also be used to suggest new duties that could be assigned to the intern in subsequent work terms. In addition, identifying the strong and weak points in the performance of the intern serves not only to evaluate the student but also to collect important information for curricula and to improve the course syllabus. Furthermore, it is essential that the professor advisor organize a visit to the industrial plant together with the student. During this visit, the professor advisor can observe the degree to which interns interact with the processes that are the object of their activities. The professor advisor can also determine whether interns express ideas using the fundamental concepts learned during the academic term, as well as whether their understanding of the system is comprehensive enough to allow them to propose innovations that would improve upon the processes in which they are involved. The professor advisor should also take advantage of this opportunity to identify new activities that could be developed by the intern and suggest that the advisor engineer implement those changes in the next work term. It is important to show the engineer advisor that the workplace is an extension of the school and vice versa.

Finally, students should be instructed on how to create their work term reports, in which they should write objectively and concisely about their experiences. They should be encouraged to discuss how the knowledge gained during the academic term was utilized, including specifics

regarding the subjects and skills incorporated, as well as making suggestions to their successors as to how to make the best of the work term.

When student interns return to the university for a new academic term, it is advisable to organize a seminar involving all of students that completed the work term, together with their professor advisors, in which students can share experiences, highlighting strong and weak points, as well as making recommendations for course improvement.

CONCLUSION

Co-op courses present various administrative challenges. One such challenge is related to the fact that the administrative process is no longer completely under the control of school authorities. This paper shows how the *Escola Politécnica*, the engineering school of the University of São Paulo, meets this challenge. The steps herein described were gradually and steadily taken over the last sixteen years, and this process will never end, since this is a dynamic process.

We have described practical and proven methods for approaching the work term market, attaining the work term position and maintaining it into the next term, as well as strategies for monitoring and assessing the performance of student interns.

All of these measures are focused on the student. However, among all of the attitude adjustments seen in a given student over the course of a work term, the most pronounced one is undoubtedly the increased awareness of how much s/he does not know, and that the University, despite its imperfections and shortcomings, is the most appropriate environment in which to address this issue, as well as to gain motivation and maturity. When this lack of knowledge is brought to light, the ability of the student to work in groups emerges. Students are then able to take responsibility for their role in a job, fulfilling their commitments to those that depend on them. They learn to trust in the power of a team, the abilities of which synergistically surpass the sum of the abilities of its individual members, and are then able to tackle large and complex problems.

After a few academic and work terms, the transformation of a teenager into a YOUNG ADULT, with skills in engineering and the capacity to contribute to society can be clearly seen.

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