Cooperative Education—Innovative Approaches for Partnerships between Universities and Industries and High Schools

Ali Kashef, University of Northern Iowa
Mark Rajai, Northern Kentucky University
Akbar Eslami, Elizabeth City State University
Ali Setoodehnia, Kean University

Abstract

Over the last few years, continuous learning has become an essential element of job success, and workplace learning linked to career development has become part of the educational system of the future. Today, many industries are increasingly depending on cooperative education (co-op) and internship programs with universities, colleges and sometimes with high schools. However, they do not perceive how to start one or what is expected from them. In some cases, high schools aren’t aware of how to establish good relations and better communication with the industry. Some department chairs or administrators don’t recognize the role of co-op in the academy, or else they decide to overlook it. Therefore, co-op with a clear expectation and assessment should be part of student educational experience. Educators, students and industries will all gain substantial benefits from their involvement in this process.

The objective of this paper is to make the university and high schools’ educators aware of the opportunities they could offer their students in industrial area. Students have the chance to experience the real world of industry with hands on experience simultaneously with the education they receive at school.

Introduction

Cooperative education (co-op) has come a long way since its inception in 1906, but this journey is far from over [1]. As our global market changes to more competitive state of affairs, the co-op educators need to encourage more employers to develop quality co-op programs. This can be done successfully with some innovative approach among high schools, universities and industries. The high school students or teachers can go for work-based learning experiences in industry and get credit during the summer. This could be through an internship/apprenticeship program at the universities or two-year colleges. This will help students make a better connection between what they learn at school (Math, science, communication, key engineering concepts, processes, etc.) and what they would do in the future at the job site. It also helps the educators/teachers themselves to up date their experience with the real world and at the same time they could get promotion with college credits. Industries, on the other hand, could use this
opportunity to enhance the productivity by obtaining help from the students and instructors to finish projects and etc. They also can look into some of the students as potential full-time employees for future.

This paper will discuss some innovative approaches and the evolution of the advantages of the co-op and collaboration between high schools, universities and industries. It also covers the co-op from traditional partnerships between academe at university level and industry to more highly structured and expanded collaborations between universities and high schools and industry. Some of perceived advantages and benefits of this extended co-op will also be presented.

**Cooperative Education Background**

In the past, some universities started internship programs with industries. This has offered the college students the opportunity to work closely in their field of study and gain valuable experience before their graduation. It also gives the students a perception of their future work place and makes them see if that’s really what they want to pursue and perform permanently. Today, many companies are increasingly depending on co-op and internship programs for assessing potential employees while providing meaningful work experiences. On the other hand, the students can get a chance to demonstrate their technical knowledge and enhance teamwork and personal skills. This is also an excellent chance for companies to interact and do collaboration work with the high school and two or four year colleges to gain advantage in this competitive global market place.

To start a co-op /internship program that can help students integrate academic study with work experience, the faculty or department head should start working with the university career placement or co-op office. This office may assist students to write resume, locate job, and arrange interview with employers. It is very important to have a faculty advisor in the department to grant the placement opportunity and all the arrangements, including the project to be completed. The faculty advisor should supervise and evaluate the students’ learning experience. It is also very crucial to work with the department advisory board that might arrange some interviews for students in their companies. Last but not the least, it is important to have a syllabus for the co-op to outline the expectations and assessment criteria from students and employers. The syllabus could include the following: department eligibility, procedure for involvement, prerequisites, academic requirements, internship proposal, internship paper, supervisor evaluation, grading criteria, and etc.

**Articulation**

One of the most important accomplishments that most universities have done over the years is articulation with state and, sometimes, out-of-state’s post secondary institutions. The articulation facilitates the smooth transfer of the graduate students of the two year colleges into four year programs at the universities. This allows the graduates of two-year colleges the opportunity to further their education in the future oriented discipline of industrial technology or engineering. In individual cases, some two years colleges or universities gave more credits to students based on their work experiences such as co-op and apprenticeships. Furthermore, just
in the past few years, two and four year colleges, high schools, and industries have used the same concept for the co-op to give college credit to high school students during the summer while they were training and working in industry. In reality, the high-school students work during the summer and at the same time earn college credits. This will help a smooth transfer from high school to two-year colleges and continuing to four-year colleges.

Today, the concept of school-to-work is more interesting than before, because, the co-op, internship, or apprenticeship is one of the important components of it. Support for school-to-work programs or work-based learning experiences has grown since the 1994 legislation went into effect, and remains strong, particularly with businesses as they experience the positive benefits of partnerships with education [2]. Key competencies for success in work situations are the same as those for work-based learning experiences. Students are able to make a better connection between what they are able to use in a work-based learning environment and what they learn in the classroom. They are also motivated for higher academic achievement [3].

Employers and schools in Washington have formed partnerships to develop academic and skill standards that meet the needs of the workplace and link classrooms to those competencies [4]. The same concept has been applied between some local industries, the University of Northern Iowa, Northern Kentucky University, Kean University, and Elizabeth City State University in Iowa, Kentucky, New Jersey, and North Carolina. This is not a “pipeline” from school to industry or “escape hatch” for unmotivated students. This is a real world problem solving with hands on projects for the industry.

Indicators

Co-op, internship, and work-based learning are very valuable in the curriculum and have some common quality indicator that can be used between educational institutions and industry for students’ learning. The seven elements of quality in work-based learning experiences are as follows [5]:

1-Technical competence-based on both industry and academic standards to provide the best learning environment for students.

2-Breadth-the wide range of knowledge, skills, attitudes, and characteristic of the industry or business such as planning, management, finance, technology, technical skills, labor issues, community issues, health and safety, personnel habits, etc.

3-Personal and social competence such as: developing team building, better communication skills, individual accountability, and interpersonal skills.

4-Expectation and feedback-what students are expected to learn and why. The mentoring relationships have a better performance rather than evaluating the students with tests [4]. It provides a high degree of motivation and good feedback for the students. In some cases, students in work-based learning can get a supervisory responsibility [6].
5- Teaching roles- in learning model, traditional teachers often become facilitators, co-learners, or even students while experts from industry take an active role and participation in teaching. Success in these teaching roles dramatically improves learning [7].

6- Academic achievement- students will do better when they learn and apply it to the real world situations. A senior executive at Siemens stated that it is impossible to work at their facilities without a solid academic foundation [8]. This involves a partnership between teachers and industries to find creative ways to link learning between school and work.

7- Career paths- the understanding of how the learning fits into a broader career beyond just the immediate job being learned is a critical aspect [9].

**Conclusion**

In a rapidly changing world, learning becomes an essential element of job success, and workplace learning linked to career development becomes part of the educational system of the future. Therefore, co-op with a clear expectations and assessment will be a part of higher education because educators, students, and industries will gain substantial benefits from their involvement.

This paper, discussed the evolution of co-op from traditional partnerships between academe and industry to more elaborate and successful collaborations between universities and high schools and industry. Some of the advantages and benefits of this expanded co-op were also presented. It is perceived that informing students, especially at high school level, about benefits of co-op will give them ample opportunities and time to participate in this proven method of gaining work experience in their academic education.

**Bibliography**

ALI E. KASHEF
Ali E. Kashef is a Professor of Industrial Technology at the University of Northern Iowa. He also serves as a coordinator for the cooperative program. He is on the review board for the Journal of Industrial Technology. He received his B.S. in building Engineering and Design from Lincoln University, Missouri in 1980, M.S. in Industrial Management from Central Missouri State University, Missouri in 1981, and Ph.D. in Vocational Studies from the Southern Illinois University, Illinois in 1990.

MARK RAJAI
Dr. Rajai is currently a graduate faculty and researcher in College of Professional studies at Northern Kentucky University. He also serves as editor-in-chief of an international journal and is member of editorial board of several national and international journals. He has published several books and more than thirty articles and is recipient of several major grants and contracts. He is a nationally recognized researcher and major TV networks—including CNN, ABC, and BBC – and numerous newspapers and radio stations have interviewed him.

AKBAR ESLAMI
Dr. Eslami is Associate Professor in the Department of Technology at Elizabeth City State University in North Carolina. He also serve as the chair of the Department of Technology. He is member of several professional societies and has published several papers in ASEE and other national conferences.

ALI SETOODEHNIA
Dr. Setoodehnia is Assistant professor and program coordinator of Electronic Technology at Department of Technology, Kean University. He received Ph.D. in Electrical Engineering from University of Oklahoma, Norman, Ok, in 1995. His research interests are in the fields of Artificial Neural Network, Telecommunications Information System, Mathematical Modeling and Forecasting, and Fault Analysis and Control systems.