

***EARLY WORK OUTCOMES OF CO-OP AND NON-COOP ENGINEERS:
A COMPARISON OF EXPECTATIONS, JOB LEVEL, AND SALARY¹***

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Challenges press upon educators and program administrators in higher education, as more attention is given to program accountability through assessment of student outcomes, however defined. Co-op practitioners are no exception. Interest in assessment remains high as reflected by the number of articles, including thematic issues, appearing in JCE and participation at research-oriented sessions at conferences. Our colleagues are continually seeking evidence of co-op participation's impact on academic performance and related outcomes; even a small, specific study sheds light on intricately woven connections.

Wilson (1997) reviewed the status of assessment efforts over the past ten years. Two assessment areas have received coherent attention. The work by VanGyn, Ricks, and their colleagues have focused on the connection between student learning and practice; particularly the role of reflective practice (VanGyn 1995). This contribution is critically important in light of Kuhs (1996) call for seamless learning environments; environments that bind together in-class and out-of-class curricular and co-curricular experiences. These connections build upon a common language that can foster dialogue and acceptance with disciplinary faculty. Continued research in this arena will play a pivotal role in enhancing the credibility of co-op within the campus community.

The second area takes an external focus, dealing with career and workplace relationships. Historically, career development and workplace access have received a higher level of attention than student learning. Much of the research in the 1960's and 1970's established a positive connection between co-op and career development (see Wilson, 1961; Ducat, 1980). By the late 1980's, differences among co-op and non co-op students may have disappeared (Weston, 1986). This shift essentially captured the change in student orientation toward higher education as reported by Astin (for example, Dey, et al., 1993) whose annual freshman orientation has followed a dramatic shift from non-career focused education values to high career focus over three decades.

Exposure to the workplace through co-op has led to the contention that co-op graduates have advantages over other graduates in terms of access to jobs with higher responsibility, better pay, and wider opportunities for advancement. Repeated efforts have established that co-op participants have enjoyed a salary advantage over their peers (Seidenburg, 1990; Gardner, et al., 1992). Co-ops also appeared to practice different, but more efficient, learning strategies, during their early socialization into work (Gardner and Kozlowski, 1993). Beyond that little evidence is

available on job level, promotions, and other career dynamic measures though Wessels and Pumphrey (1995) have explored these issues among two-year college graduates.

The dearth of information on the connection between co-op and workplace/career outcomes comes at an awkward time. A time when many college students and their parents are basing their educational expenditures on an employment criterium. The value-added to their sons' or daughters' employability drives educational expectations. The commitment to co-op requires an investment; the return comes in the form of a "job of great potential" upon graduation. At this time, not enough information is available to confirm if co-op students' transition into these types of quality positions occur.

This article reports findings from a recent study that attempted to probe into the early career dynamics of a group of college graduates. Our intent was to compare career path benchmarks (job level, promotions, expectations, and salary) between co-ops, graduates who participated in other experiential learning options (for example, internships), and those who engaged in no career-related work as undergraduates. The results were mixed: co-op graduates do not always benefit over others. However, the lack of experiential experience can stall a career from the outset. More interesting perhaps, are the possible reasons for co-ops' early career movement: a salary effect that hinders promotions and the lag-effect of co-op which may materialize after seven years in the workplace. The more distressing news may be the wide gap in co-op student's expectations and job reality: a gap that appears slow to close.

Disclaimer

As with all cross-sectional research of a specific pool of subjectives, standard disclaimers apply. This study has only focused on engineers; many of whom work in the automotive industry. Thus, generalizations to broaden co-op populations are cautionary. The study is also limited by the investigators' limited creativity to identify and define appropriate outcome measures. Nevertheless, a read of this article should generate thoughts and ideas that can be shared with practitioners and other researchers who can venture forth with exciting new questions to investigate. In the end, we hope that your understanding of co-op will be enhanced and your opportunities to impact co-op programs expanded.

METHODOLOGY

Participants. Subjects were recruited from a pool of engineers who had graduated from Michigan State University's College of Engineering between 1979 and 1989. To qualify, the respondents had to have provided starting salary information to the university's placement office; thus replicating the sample used by Gardner, Nixon and Motschenbacher in their examination of co-op and non co-op starting salaries (1992). In addition, graduates who had participated in co-op but were not found in this pool were included to maintain necessary sampling weights. A total of 1196 valid addresses were provided by the alumni office. A second subject pool was constructed from 1979 to 1989 graduates who had immediately pursued additional education upon graduation or had failed to respond to the graduation placement survey. All 1990 engineering graduates were also included. From this second pool, 910 valid addresses were obtained. The total number of potential subjects was 2106.

Instrument. Subjects were administered a survey adapted from Nicholson's and West's (1988) work on managerial job change. The instrument consisted of two parts: (1) a career evaluation, experiential learning activities, and demographic information; and (2) a work history diary that collected detailed information on the first job held after graduation and the participant's current position. The diary also sought less detailed information on three jobs or position changes (the respondents could select) that occurred between their first and current positions.

Typical questions included in Part 1 captured background information on career related work experiences (co-ops, internships and summer employment), including the length of engagement (months), number of experiences, and whether or not they were hired by the company that had provided the experiential learning opportunity; work expectations, a 14 item set of characteristics measured on a Likert scale ("1" - of no importance to "5" - very important); career evaluation, including a 14 item scale using disagree and agree anchors, as well as, additional questions dealing with the individuals' perceptions of their career progress (to date) and short-term career outlook; and life satisfaction measures in 15 areas and selected factors that may have influenced the development of their careers. This section concluded with a set of standard demographic questions and details on educational goals and attainment beyond the bachelor's degree and employment status of spouse or partner.

The employment diary focused on the individual's job description and in particular the level of the position within the organization. Several different formats were used to identify the position occupied in relation to entry level and various levels of management. Extensive questions covered the type of work the individual performed, the use of their education and skills, anxiety toward work, freedom to act independently within the parameters of the job assignment, and the role of mentors in their socialization into the workplace. Through a series of questions on various aspects of work, such as type of supervision and communications within the organization, individuals were asked about the surprises they found.

Only a subset of these measures will be employed in the analyses presented in this paper. Copies of the instrument can be obtained from the authors.

RESPONDENT PROFILE

A total of 609 work diaries were returned. Approximately 35% of subjects from the first pool responded while only 22% from the second pool. No differences were found between the two pools to warrant keeping them separate. Of the returned surveys, 600 contained complete data used in the following analyses. Missing data appeared to be random and did not inject bias into the analyses.

Sixty-eight percent (68%) of the respondents were men and the median age was 31, ranging from 25 to 40. Approximately 65% were married or living with a partner, 32% were single, and the remainder reported their marital status in transition (divorced or separated). Thirty-eight percent (38%) reported having children. Unfortunately, the number of multicultural graduates was quite low which did not permit the use of an ethnic/cultural variable in the analysis.

Mechanical engineers represented approximately 27% of the respondents with civil and electrical (16% each), chemical, engineering arts (general), and computer science (11% each), and a group from smaller programs, such as agricultural engineering (6%), comprising the remainder. This breakdown accurately reflected graduation patterns of the engineering college. For 70% of the graduates, their bachelor's degree in engineering was the highest degree they had yet attained. Approximately 17% had earned a master's in engineering, 10% an MBA, and 3% a professional degree (law or medicine) or a Ph.D.

Approximately 21% of the respondents indicated that they had not engaged in any engineering-related work experience during their undergraduate years. For those with work experience, 31% had gained experience through summer employment, 35% had been co-op participants, and 13% utilized internships. Seventy (70) respondents indicated that they had pursued multiple work experiences (co-op and summer employment). In coding these respondents, priority was given to co-op, followed by internships; thus, a respondent who had co-op and summer employment was classified as co-op.

Within the summer employment group were a group of engineers who had participated in a special program sponsored by the automotive industry. This program was terminated in the early 1980's. About this time, internships began to be more common. These informal arrangements between employer and student which were usually brokered by a faculty member or through the career center were particularly popular among computer scientists, civil engineers, and mechanical engineers.

Using this information, a work experience variable was created with five categories. Co-op participants were separated into two groups based on the significant co-op findings reported by Gardner, et al. (1992): (1) less than two quarters of co-op and (2) three or more quarters of co-op. Thus, the variable contained these classifications: no experience, <2 co-op, 3 or more co-op, summer employment, and internship.

While time in the labor market (based on graduation date less time taken to complete a degree) was controlled in all the ANOVA and regression analyses, graduation dates were grouped corresponding to transition in the economy. Those who graduated between 1979 and 1982 (30%) entered the workplace prior to restructuring and encountered an hierarchical structure in both the organization of work and their career paths (for an explanation of the changing structure of the workplace see Gardner, 1996, and Gardner, 1997). Graduates who entered between 1983 and 1986 (28%) faced an economy undergoing change; but was often unnoticed by the very strong economy during this period. Only a few companies were restructuring at this time. For those entering the labor market between 1987 and 1990 (42%), downsizing/restructuring was increasing; influencing hiring decisions as well as career opportunities. This labor market variable would serve to capture changes in workplace dynamics; specifically, tenure in a position and job changes.

RESULTS

First Position. Nearly 80% of the respondents were in engineering positions – the most common being industrial engineer. An additional 9% were computer or systems analysts; 5% were involved in sales; 4% as managers; and 2% in a variety of positions including economist, teacher, health technologist, and lawyer. Correspondingly, 56% were employed by manufacturing firms, 13% by professional service firms (manufacturing services, for example), 10% by consulting firms, and 9% by government agencies. The remainder were spread over a variety of different companies. The size of their companies also varied, ranging from 50 to over 100,000. Nearly a quarter (23%) were employed by companies with less than 250 employees while 15% were working in companies of more than 100,000. In between, these engineers were in firms of 251 to 1,000 (13%), 1,001 to 5,000 (20%), and 5,000 to 100,000 (29%).

By connecting students with employers through co-op, a common assumption is that upon graduation the co-op students will be employed by their co-op employers. In this study, however, only 33% of co-ops went to work for their co-op employer. Three specific reasons were given for not being employed at their co-op site:

- Lack of interest by the graduate in their co-op company – they sought a better fit with another company.
- Co-op experience changed their career interests which could not be satisfied by their co-op employer.
- Their interest in the company was strong, but no positions were available when the student graduated. This reason was the most frequently mentioned.

Were co-op engineers hired at a higher level within the company than other engineers? The majority of engineers, 58%, started at the entry level, equivalent to assistant engineers; another 22% were hired as associate engineers. The remaining 20% occupied positions defined as senior engineer, supervisor, manager, and in a few cases, owner. When placed on an organizational grid that identified their positions within their companies' hierarchies (entry level to CEO), co-ops (>3) were more likely to enter at the level immediately above the entry level: 29% compared to approximately 20% for the other groups. However, only 14% of co-ops (>3) were hired at higher levels compared to 20% for the other groups.

Their first position was also examined in relationship to management by asking respondents to indicate the levels of management between your position and entry level and the

highest level of management. Slightly over 70% reported no level of management below them within the company; 18% reported one level and 11% at least two. Co-ops from both groups were more likely to find themselves at the bottom with respect to management than other groups. The relationship between point of entry (level) and management appears to be one of distance. An engineer can begin employment above the entry level yet be removed some distance from management functions.

Two factors contribute to the explanation of these patterns of organizational entry: engineering discipline and size of firm. Co-ops (>3) who were heavily concentrated in mechanical, electrical and chemical engineering disciplines were hired by firms with 1,000 or more employees. In fact, nearly 70% of these co-ops worked in companies with more than 5,000 employees. In firms with 5,000 or more employees, only 37% of the new employees were hired above the entry level. For civil engineers, engineering arts, and computer scientists who primarily engaged in internships and summer employment to gain experience, the firms that they enter had fewer than 1,000 employees. However, 50% of the graduates entering these firms were placed in positions above the entry level.

A three-way comparison, using engineering major, work experience, and entry level, revealed one important finding. Engineers who had not gained any career-related work experience prior to graduation found themselves employed at the entry level (65% to 75%). The exception was chemical engineers who may have faced some anomalies in their labor market (insufficient number of engineers to meet demand) that altered their pattern.

What is the tenure in their first position? If the initiation experience, articulated by Schein (1978 and 1992) and Cowan (1992), is true, the length of tenure in one's first position should be similar for all engineers. However, this rational could be influenced by: (1) changing dynamics within the workplace; and (2) the placement of co-op graduates in more challenging positions that will keep their interest longer.

Results showed that the average time new employees stayed in their first positions was 26.5 months – just over two years. For employees who have only held one position, their average tenure was 40.5 months. If an employee was promoted or changed jobs within the company, this action took place after approximately 22 months. Engineers accepting a position in a new company stayed with the company that originally hired them for about 25 months.

Significant tenure differences were found among the work experience groups. Those graduates with no work experience stayed in their first job approximately 33 months; nearly a half-year longer than engineers in other groups. Among those with work experience, co-ops had tenures of just over two years: 26.5 months for <2 co-ops and 28.5 for >3 co-ops. For graduates with internship and summer experiences, their tenure was slightly less than two years at 23 months.

Members of the no experience group who were still in their first job had been in this position for four and a half years (54 months). This figure exceeded all other groups by nearly a year. Co-ops who have held only one position have also experienced long tenure in positions: 39 months (>3 co-ops) and 46 months (<2 co-ops). Internship and summer employment group members reported tenure of 29 and 36 months, respectively.

Movement to a new position with the company occurred between 18 and 25 months. Those employees with no experience and co-ops (>3) remained the longest before moving to a new position, 25.5 and 24 months respectively. For those changing companies in order to make a job move did so shortly after those who made internal moves, approximately 19 to 30 months. Again, those with no previous experience and co-ops (>3) made their moves after those with internships and summer employment.

Dynamic workplace changes which have occurred throughout the economy during the 1980's were reflected in first position tenure. For those who entered the labor market between 1979 and 1982 the average time spent in the first position was 33 months; this average has decreased by nearly a year over the decade with 29 months and 21 months for 1983-86 and 1987-90, respectively.

This shift affected everyone, regardless of work experience. Significant differences in tenure did appear by work experience group for those entering prior to 1982: no experience spent significantly more time in their first position than all the other groups and both co-op groups held significantly longer tenure than the internship and summer employment groups. These significant differences disappeared in the two recent time periods: all groups experienced marked declines in tenure. Tenure for co-op (>3), for example, dropped from 34 to 30 and finally 23 months over the decade. Even though those with no experience remained in their first position the longest, their tenure dropped nearly two years over the decade.

Focusing only on those who had changed their position, the interaction of work experience group and date of labor market entry was examined. For those entering the workforce prior to 1982 and staying with their hiring employer, average tenure was approximately 24 months. Co-ops (>3) in this group had longer tenure of 29 months. Individuals who changed companies during this period, their first position tenure was approximately 27 months. The exception was co-op (>3) who stayed in their initial position nearly 12 months longer than the other groups.

Between 1983 and 1986, movement within the same organization occurred at 24 months and a change to a new company at 28 months. Co-ops from both groups moved at the same time as the reported averages for everyone. These figures represented, however, a drop of approximately 12 months from the 1979-1983 group.

For entrants since 1987, tenure patterns have noticeably changed. Movement within the company occurred within 10 to 15 months for all groups except co-ops (>3) who averaged 19 months. Switching to a new company even occurred much sooner, dropping to between 14 and 17 months. Both co-op groups stayed in their first position slightly longer, averaging approximately 24 months. For the first time, those with no work experience were making job changes as quickly as other groups: generally around 14 months.

Did co-op graduates receive higher starting salaries than non co-ops? Gardner, et al. (1992) established, using the original population base, that co-ops (>3) held a salary advantage over other engineers. While the respondents to this study were pulled from the same population base, there was enough variation to warrant re-examining starting salaries. Salaries (without bonuses and commissions) were first adjusted by indexing to 1979 dollars which controlled for inflation between the different graduation dates. Co-ops (>3) were found to have the highest starting salaries at \$20,170. This salary was significantly higher than those with no experience (\$18,610) and summer employment (\$18,800). Co-ops (>3) maintained more than a \$1,000 advantage over internships (\$18,910) and co-ops (<2) (\$19,200).

In a regression with starting salary serving as the dependent variable, the difference in salary was largely explained by engineering major. Mechanical, chemical, and electrical engineers enjoyed the highest salaries. After controlling for major and other individual variables

(for example, gender), co-op (>3) still contributed significantly to explanation of the difference ($p < .10$).

When salaries were examined by labor market entry date, the largest difference between co-op participants and non co-ops occurred in the 1979 to 1982 period. Their advantage continued into the 1983 and 1986 period, but the size of the differential decreased. Since 1987 salaries across all the work experience groups were comparable; no group held an advantage. This disappearance of the co-op salary advantage among recent graduates was also observed by Gardner, et al. (1992).

How well did graduates' first job match their pre-graduation employment expectations?

Fourteen work and organizational characteristics were rated as to their importance in the job desired after graduation. These characteristics were rated similarly by all work groups, engineering majors, and date of entry into workforce. (Efforts were also made to reduce potential recall bias which proved to be minimal). The six highest rated desired characteristics included: opportunity to improve knowledge/skills; challenging work; advancement opportunities; high earning potential; appreciation for individual accomplishments; and friendly co-workers.

For most respondents, their expectations after entering their first position were unmet on a number of characteristics. Six characteristics produced significant differences when the mean comparisons were made. In two cases, good fringe benefits and fit with outside interests, their expectations were actually exceeded – the job provided more than they expected. However, for seven characteristics their first position failed to meet their expectations: (1) challenging work; (2) opportunity to improve knowledge/skills; (3) advancement opportunities; (4) higher earning potential; (5) appreciation for accomplishments; (6) performance feedback; and (7) creativity. Co-op participants were not spared from unmet expectations. Even with their experiences, co-ops expressed a high level of frustration in that their jobs failed to meet their pre-graduation expectations.

CURRENT POSITION:

To be included in this set of analyses, respondents were required to have been involved in at least one job change, either within or external to the initial hiring company. Approximately,

126 individuals (21%) were still in their first position and had not experienced any major changes in their work assignments. Approximately 48% (283) were working for the same company but had moved into another position(s); the remaining 31% (191) had changed companies for a new position. For the job changers, 55% were currently employed in the manufacturing sector and an additional 16% were now with consulting/professional service companies. A shift had occurred in job responsibilities, as reflected in their job titles and description of their responsibilities: 61% remained in engineering positions (22% as industrial engineers); 22% held managerial responsibilities (including 10 who owned their own companies); 8% computer analysts; 5% sales; and 4% in various fields, including attorneys, teachers, health service professionals, economists, statisticians, and financial analysts.

A shift was observed toward smaller companies. Those graduates working for companies with fewer than 250 employees grew by 4%. Most of this gain was a result of engineers leaving the largest companies, greater than 1,000, who lost 5%.

Have co-op graduates moved to higher organization levels? Results from ANOVA's, comparing work group by level in the organization, revealed no significant differences. Co-ops (>3) had moved to the third level or senior engineer; other groups had achieved similar results, except for the internship group which lagged almost one level behind. When time in the labor force was controlled, co-ops still failed to stand out; however a separation between co-op and non co-op participants for those entering the workplace between 1979-1982, was observed. The one characteristic that distinguished co-ops (>3) from the other groups was the high percentage (50%) who worked for the largest companies.

Factors that did affect level within the organization were engineering major and number of positions held. Mechanical and electrical engineers were more likely to appear at lower levels than other engineering majors ($F = 4.15, p < .003$). This pattern held regardless of the year when the engineers entered the labor force. Organizationally, size again played an important role as mechanical and electrical engineers tended to be concentrated in the largest companies.

Making job changes does result in higher placement on the organizational ladder. For example, if an engineer was in his or her second position, they were generally at the senior engineer or third level. However, those engineers who had moved 4 or 5 times were into management level positions.

Did the salary advantage remain with co-ops as length of time in workforce increased? Co-ops (>3) received higher salaries in their current positions (\$48,610 average) than all other groups. The differences in average salary between co-ops (>3) and co-ops (<2) and no experience, where the averages were \$45,570 and \$44,900, respectively, were significant. While slightly more than \$1,000 ahead of internships (\$47,420) and summer employment (\$47,380), these differences were not statistically significant.

Using the starting salary regression model, several changes occurred. First, engineering discipline no longer produced a dominating influence in the model. Chemical and civil engineers made nice gains to catch and surpass mechanical and electrical engineers. Engineering arts (general engineers) and computer scientists only lagged slightly more than \$1,000 behind electrical and mechanical; narrowing the gap by half. Gender which was unobserved in the starting salary model played a more significant role in current salaries. In developing a more elaborate salary model (Gardner and Motschenbacher, 1994) found that co-op remained significant in determining men's salaries but not women's salaries.²

The relationship between current salary, adjusted to 1979 dollars, and starting salary for the group that entered the labor force between 1979 and 1982 provided insights into salary growth over the decade. Over the time period, co-ops (>3) salaries grew 41% or 4.3 annually. Graduates with no work experience grew at 28% or 3% annually. The other groups grew at a more robust pace: co-ops (<2) at 62% or 6.5 annually; summer employment at 51% or 5.4% annually; and internships at 82% or 8.6% annually. However, the internship group which is very small reported widely distributed salaries that may have produced misleading figures. Holding internships aside for this period, co-ops (>3) still led in salary though the gap had narrowed.

Did moving into a new job result in a better alignment of expectations? A better match between expectations and actual work characteristics were anticipated as engineers moved into new positions; moves which are often predicated on maximizing desired work characteristics. Repeating their ratings on the 14 job characteristics, respondents reported that their current positions continued to provide more than they expected in fringe benefits and fit with outside interests, as well as improving opportunities to express their creativity and greater interactions with quality upper management. While the number of unmet expectations decreased, these key

expectations were still not being met; challenging work; advancement opportunities; and ability to obtain higher earnings.

Co-ops (<2) and internships appeared to make better adjustments with more of their expectations being met in their current positions. Co-ops (>3) reported more unmet expectations, in particular: unfilled higher earnings; lack of challenging work; few advancement opportunities; and little feedback on performance. The slower growth in pay, observed above, contributed to the perception of lagging earnings; the remaining unmet expectations were inherent in their positions.

Comparisons among engineering majors and workforce entry produced interesting results. Civil engineers were better able to bring their expectations into alignment with their position while mechanical engineers, computer scientists, and engineering arts graduates had the most difficulty. Mechanical engineers, in particular, found their work unchallenging and without advancement opportunities.

Graduates who had been in the workforce longer had made more positive adjustments; but still remained unfulfilled in terms of advancement opportunities and higher earning potential. The newest entrants were still having problems matching their expectations to their work environment.

An interesting relationship was found upon comparing individuals who changed employers and those who have remained with their first employer. Simply changing positions did not ensure an improvement in work environment (better fit with expectations). Those engineers who moved internally did not appreciably improve the match between their desired and actual work characteristics. For those who changed companies, their expectations were fulfilled in most areas; especially for more challenging work; clearly specified tasks; and higher quality in senior management.

DISCUSSION

This study was designed to probe into the early career paths of engineers with the intention of comparing the outcomes of co-op participants with other engineers. As the various layers enveloping these careers were pulled back, co-op experiences apparently had little influence on career progress in comparison to other career-related experiential experiences (internships and summer employment) obtained while an undergraduate. Co-op graduates entered at the same level and were promoted at approximately the same pace as other engineers

with the exception of those graduates who had not obtained career-related experiences prior to graduation. Cowan's and Schein's initiation system for engineers may well be accurate. However, co-ops find themselves caught in several "catch-22" situations that may influence their abilities to enhance their careers: salary advantage versus movement and loyalty versus exit. Over-riding individual change is the dissolution of the hierarchical economic (hence workplace) system; regenerated as a more open, inter-related (web) system (see Gardner, 1996).

Co-ops enjoyed a salary advantage from the start and have been able to maintain it over their early career though the gap had narrowed. This salary advantage may actually be affecting the co-op's ability to move to another position within the company or exit to another firm. Lawler (1983) in his study on pay and performance suggested that a change between 10% to 15% in base salary was necessary to energize an individual sufficiently to select a new job, relocate, or change their performance. Individuals with lower salaries will, however, be more sensitive to meaningful salary adjustments and willing to accept a smaller percentage in additional salary to change jobs.

As co-ops (>3) scan their companies for a new position, salary requirements must exceed that of other engineers from between \$1,000 and \$2,000 (1987 index) based on a 10% income adjustment. Positions that offer that salary usually require more accumulative experience than co-ops have. Other engineers, meanwhile, see a different array of options, especially those who may be willing to accept less than a 10% change, which match their qualifications, including accumulative experience. Co-ops (>3), though staying in their entry positions longer, experience larger salary gains (incremental change) because the percentage increase is based on a higher base figure. Progress can be visualized as a series of steps where the initial step for co-ops (>3) has a long level surface before reaching the next step; as future steps are reached the step surface distance may actually decrease. For non co-ops the step surfaces are initially much shorter until they face position requirements which force them to remain longer before obtaining further salary enhancements. Co-ops (>3) are able maintain their salary advantage, with some narrowing; they simply do not initially move ahead as rapidly. Lawler's rationale offers a reasonable explanation: those with higher initial salaries will not move to another position as soon as those individuals with lower salaries.

The initiation process appeared to be evident among these engineers; affecting all regardless of pre-graduation experience. It is not uncommon to hear employers talk about

“molding” new graduates into “real engineers.” Thus, engineers progressed through very similar experiences during the first years in a company. There was very little to differentiate these engineers even after five years in the workplace. Upon closer examination of those who entered the labor force between 1979 and 1982 co-ops (>3) appeared to be separating from other engineers, as they took on more management level responsibilities. This pattern may be an anomaly of this particular group of engineers; but it may suggest that between seven and ten years, after graduation when companies begin to select their management staff, co-ops are being tapped more often. An initial assumption of this study was that career paths would be different in early careers; however, the career path divergence may occur later than expected and future efforts need to examine mid-career outcomes.

Confounding the entire situation has been the emergence of new economic patterns, particularly during the late 1980's. The loss of the hierarchical organization, replaced by a web of interlocking smaller firms, has not easily translated into recognizable career paths. In order to advance one's career in a web system, a worker needs to change positions on a more frequent basis. This is especially true if the goal is to receive higher pay, to gain new skills, and to be more creative. Employment contracts have been altered regarding longevity, unemployment, and team membership with the introduction of temporary and contractual employment. Team membership requires a change in perspective from strictly technical, functional activities to a broader range of processes and functions within the company, as people representing different areas interact to produce and provide goods and services to customers.

Engineers who graduated between 1979 and 1982 reported careers that mirrored the hierarchical system. They have steadily moved up, after several years in each position, and have assumed management responsibilities. They have changed companies much more slowly and less frequently than those engineers graduating later. This period preceded the major period of organizational restructuring that began in the mid-1980's. The group from 1983 to 1986 reported mixed experiences; some were obviously caught up in restructuring, commenting how they had to make fairly rapid job changes while others were nestled in hierarchical organizations with career moving along in the traditional fashion. For those graduating from 1987 to 1990 when restructuring gained momentum, careers were swirling – in constant motion. Movement to new positions was much faster; expectations and reality were separated by a wide chasm and

uncertainty about employment was paramount. For this group, the world was changing and they were caught up in it.

This new economic structure presents two major problems for engineers and co-ops in particular. First, new employee-employer arrangements challenge a deeply valued characteristic of co-ops: their loyalty to their employer. Many companies no longer place a high value on loyalty nor do they reward it. A new employee who brings a strong sense of loyalty to the company, strengthened through several co-op experiences, needs to know explicitly how loyalty will be treated. If not properly understood, a loyal employee can remain in a position or with a company to the detriment of his or her career.

Even without the shift in the economy; a gap between expectations and job characteristics has existed. The new economy has simply widened the gap. What is troubling in these findings is the persistently wide gap found among co-ops (>3). Past research has demonstrated that co-op participants have higher career maturity, have better developed career plans, and a greater understanding of the workplace (Wilson, 1961; Ducat, 1980). This exposure to and practice with work contributes to a high set of expectations which obviously can not be found by many of them in their first position. Their attempts to navigate the web or move along hierarchical paths appears not to ameliorate the gap. Those engineers who have moved to a new company reported a better fit. Movement, however, compounds the problem for co-ops who must deal with the issue of loyalty (their tendency to remain in a position longer than others) and the limitations their higher salaries impose. Nevertheless, unmet expectations among co-ops warrants more attention to determine its persistence and possible mitigation strategies.

The most disadvantaged group in the labor force are those graduates who had not obtained career-related work experiences prior to graduation. Their salaries are lower at the start and continued to lag; they stayed in their first position nearly a year longer than the other respondents, adjusting to the world of work; and promotions were less frequent. These results serve as a testimonial to experiential learning, regardless of the form it takes. Even though students work, in restaurants, at summer camp, or in libraries, the type of experience they gain is critical to success in early careers.

Co-op practitioners who are engaged in outcome assessments may face a major challenge as a result of the new workplace. Traditional employment benchmarks, such as job level and promotion rate, may no longer be appropriate assessment indicators. A promotion once assumed

a higher level of responsibilities; today responsibilities are taken or assigned without movement to a new position. Thus, the challenge is to identify measures that define what is actually occurring in the workplace.

CONCLUSION

This study, despite its limitations, presents useful insights into the early career experiences of engineers. Clearly, an experiential experience is an asset during the formative first years in the workplace. Co-ops, who hold an advantage in salary, did not, however, differ on other possible workplace status indicators. Their salary advantage may preclude them from moving into new positions early in their careers. These findings provide an agenda for additional research, using a wider spectrum of co-op students and employing new measures of workplace success. Particular attention on expectation formation and finding fit with a position is deemed warranted on co-ops who struggle with a wide gap between expectations and practice.

FOOTNOTES

1. Funding for this project was provided by the Michigan Council for Cooperative Education. Their continued, enthusiastic support has been deeply appreciated.
2. Work continues on modeling salary progression during early. A final report is expected by the end of 1997. Draft of working paper available from the first author.

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