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Socialization of undergraduate engineering students into work-experienced organizations and occupational roles through a cooperative education program

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SOCIALIZATION OF UNDERGRADUATE ENGINEERING STUDENTS INTO WORK-RELATED ORGANIZATIONS AND OCCUPATIONAL ROLES THROUGH A COOPERATIVE EDUCATION PROGRAM

by

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DEDICATION

This dissertation is dedicated to my wife, Janis, and my children, Samantha and Alexandre. As anyone who has ever made the decision to pursue a doctoral degree and write a dissertation knows, the process is long and, at times, all-consuming of time and energy. Throughout this process, they have been supportive and understanding. They also have been my inspiration and my motivation. The time spent writing this document was time they had to sacrifice by not having me around. Janis has been the glue that has kept us all together and moving forward as a family. I love each of you dearly and give you more credit for the completion of this degree process than anyone, including myself.

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ABSTRACT

This study investigated cooperative education as an organizational phenomenon using a qualitative approach. The objectives of this study were to 1) describe the experiences of students entering an organization through a cooperative education program; 2) describe the organizational processes used to introduce students into an organization and occupational roles through a work experience; 3) understand any common patterns or themes associated with these experiences; 4) develop a model or framework that describes the processes used in these settings; and 5) determine activities and processes that will better facilitate the student's movement from the education to the work environment through a cooperative education experience.

Engineering students participating in a mandatory cooperative education program within the School of Engineering (SOE) at Great Stateside University (GSU) were the target group for the study. Information about the cooperative education settings was obtained by compiling, summarizing, and evaluating data obtained from student and employer evaluation forms of each cooperative education semester for three cohort groups of students. Interviews were conducted with 22 students from one cohort group, three faculty/staff members, and 16 employer representatives. For confirmatory purposes, further investigation of student experiences was conducted by examining the contents of student field journals from cooperative education experiences.

Results and conclusions included:

1) Co-op programs work for effectively socializing engineering students to an engineering organization and engineering-related occupational roles and for sorting people in or out of engineering-related occupational roles.

2) A comprehensive five-stage model of the socialization processes was developed that can be used to better prepare engineering students, employers, and education organization members, with the potential for positively impacting retention in academic programs and persistence into early career.

3) Students who experience the socialization processes during the co-op program are likely to more efficiently and effectively navigate similar processes when moving to a new engineering organization or new occupational role.

4) Successful socialization to the engineering organization involves part custodial orientation and part creative individualism outcomes for larger employers and primarily creative individualism outcomes for smaller employers.

5) Successful socialization to engineering-related occupational roles results in creative individualism outcomes for most employers.

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CHAPTER 1: INTRODUCTION

Research Project Overview

This research project focused on understanding the experiences of students who engage in university-sponsored work activities related to the students' academic studies. Many names are associated with this concept, including experiential learning, internships, cooperative education, volunteer work, clinical rotations, student teaching, service learning, field experience, short projects, and job shadows. For this study, I specifically chose cooperative education (co-op) as a concept to refer to the university-sponsored work activities involving students. The focus of the research was the mandatory cooperative education program within the School of Engineering (SOE) at Great Stateside University (GSU). The purpose of the study was to understand cooperative education from an organizational and sociological perspective, and the research included an investigation of the structure, processes, and relationships among people associated with the SOE program at GSU. This was accomplished through review of artifacts/documents and interviews with participants of the cooperative education program. According to Hymes (1978), this type of study would be considered topic-centered ethnography.

Co-op has been defined in the literature in several ways. Collins (1971, p. 29) defined traditional co-op as having the following factors: (1) the student's off-campus experience is related as closely as possible to the field of study and individual interests within the field; (2) the employment is regular, continuing, and an essential element in the educational process; (3) a minimum amount of employment and minimum standard of performance are included in the requirement for the degree or certificate presented by the school; and (4) the work experience will ideally increase in difficulty and responsibility as the student progresses

through the academic curriculum and should parallel as closely as possible the progress through the academic phase. According to Ryder (1987), cooperative education is a particular application of learning that puts the student in touch with the realities being studied by integrating productive work into the curriculum and for which the institution assumes primary responsibility. For the purposes of this study, co-op was defined using Collins' (1971) definition.

Statement of the Problem

Cooperative education is an integral piece to many academic curricula in higher education. Educators within higher education typically reference the positive outcomes that can occur during academic-related work experience and the "head-start" it provides students in their postdegree completion employment search. Employers also tout the advantages of sponsoring students in cooperative education roles because of the long-term benefits in successfully hiring and retaining quality employees (Braunstein & Stull, 2001; Gardner, 2004; Sheetz, 1995).

One of the critical factors that determine the effectiveness of the work event from both the student and the employer perspective can be the pre-entry and socialization processes experienced by the student, whether planned/unplanned or intentional/unintentional. If the student does not effectively transition from the education (academic) environment to the employer (work) environment, learning outcomes will not likely be accomplished (at least to the intended level going into the experiential education work event), satisfaction with the experience is unlikely, potential for dissatisfaction with the chosen academic program and career increases, and self-esteem and confidence in the ability

to succeed may be negatively impacted (Chatman, 1991; Holland, 1985; Jurgenson, 1978; Rynes & Gerhart, 1990).

From the employer perspective, an ineffective pre-entry and/or socialization process can result in lower productivity from the student and negative morale, which could influence current full-time employees and other future students who may want to work for the employer organization (Bauer et al., 1998). This can greatly limit the potential for retention of the student after the experience, thereby minimizing the return on investment (Campion & Mitchell, 1983; Louis, 1980; Vandenberg & Scarpello, 1990).

The education organization is also impacted in this process as the risk of students leaving one academic program (or the education organization) for another increases after a negative or ineffective experience. This problem is even more critical if the academic program is one of limited interest to students or there is a demand/need from the community/society for more graduates/future employees in occupations related to studies in that academic program. Likewise, if there is a problem with attracting certain types of students into specific academic programs and/or occupational roles (e.g. men into nursing, ethnic minorities into the sciences), a poor work experience can exacerbate the issue through attrition of such students from those programs and roles. Finally, the education organization is potentially impacted through loss of support from the employer organization (financial or otherwise) due to poor student experiences, whether the responsibility of the education organization's training/efforts/influence or not.

Purpose of the Study

The purpose of this study is to better understand the experiences and socialization processes that students encounter in cooperative education experiences as they relate to entry

to an organization and entry to occupational role(s) within the engineering environment. For most students, a cooperative education experience is the first exposure to an engineering-focused organization and to engineering-related occupational roles. The objectives of this study are to 1) describe the experiences of students entering an organization through a cooperative education program; 2) describe the organizational processes/strategies used to introduce students into an organization and occupational roles through a student work experience; 3) understand any common patterns or themes associated with these experiences; 4) develop a model or framework that describes the processes used in these settings; and 5) determine activities and processes that will better facilitate the student's movement from the education to the work environment through a cooperative education experience.

The goal of this study is to better understand the processes that students experience when participating in cooperative education experiences so that the preparation of both student and organization will result in better, more meaningful, and effective experiences. More meaningful and effective experiences are experiences that help the student to better understand roles and the organization, that help develop the processes needed to cope with change/transition from one setting to another, that assist in making informed decisions about careers, and that allow for learning new skills or information to become better prepared for working in an engineering environment. This study will provide information that can result in better cooperative education programs for students from both the education organization (academic) and employer (worksite) perspectives.

This research project has characteristics of both applied research and general research, as it develops a conceptual framework that has analytic generalizability. Understanding the experiences of students participating in a cooperative education program

is an example of understanding human nature and will contribute to theories of socialization processes. This study has generalization capabilities and contributes to knowledge of existing theories with a goal of understanding human and societal issues. Conducting this study about socialization in cooperative education settings contributes valuable information to a body of research, organizational socialization to work environments for students as part of higher education academic programs, with limited current information.

Significance of the Study

This study investigated cooperative education as an organizational phenomenon (from an anthropological and sociological perspective), which has rarely, or incompletely, been done in the past. Most research in this area has focused on learning outcomes associated with cooperative education from an educational psychology perspective or lens. Only a few research studies (Finn, 1985; Garavan and Murphy, 2001; Brown, 1985a; Kirby, 1990; Major and Kozlowski, 1997; Nixon, 1989; Parsons, Caylor, and Simmons 2005) have used the organizational concept of socialization as it relates to cooperative education, but none provide an organizational-based conceptual framework of the cooperative education process. This research study developed a conceptual framework and modeled the phenomenon to help with understanding the experiences of the target group and also for the purpose of generalizing the framework to other studies and programs. The outcomes contribute new information to practitioners working with experiential education programs and can be used for new policy development by both education and non-education participants of such programs, in order to increase effectiveness and value of the programs in the educational process.

A positive experience during a cooperative education event is important to all three stakeholders: student, employer, and education organization. For the student, a positive experience can mean successful entry into occupational roles and the employer organization. Successful entry may result in retention within the employer organization, the academic major, and, ultimately, semi-professional (non-licensed practitioners) or professional (licensed practitioners) engineering roles. The employer, in many cases, desires to keep the student after the event in the form of a full-time, post-graduation employee because the employer has invested time, training, and money into the student. The costs of hiring and training a new employee through a cooperative education event, as compared to a recent graduate, are reduced because the employee is trained at a lower wage.

The education organization benefits from the retention of the student in the academic program. Wilson (1988) found that students in co-op programs persist to graduation more readily than students not in co-op programs. This results in continuation of classes taken and, ultimately, graduation with a degree, which can mean continued support through alumni donations. More important, for academic programs that generate graduates who are in high or critical demand within occupations in our society, retention in the occupation is essential. The same holds true for underrepresented groups within occupations. A positive experience can ultimately alleviate a strain on high-demand occupations in society. By understanding, improving, and training those involved with the socialization processes students encounter when beginning a cooperative education event, all stakeholders benefit by increasing the likelihood of a successful experience.

The factors indicated by employers as important in the success of students who participate in cooperative education programs may be explained through socialization

processes of students into employer organizations and organizational roles related to the area of academic training. Several studies (Laycock et al., 1992; Cutt & Loken, 1995; Hall et al., 1995; Apostolides & Looye, 1997; Coll et al., 1997; Van Gyn et al., 1997; Parks et al., 2001) have rated or measured variables typically associated with socialization of newcomers into an organization, but none relate the variables to socialization theories or models. In addition, only the studies by Garavan and Murphy (2001) and Kirby (1990) used qualitative methods to understand in-depth experiences of students. This study resulted in a better understanding of the experiences and processes that students encounter before, during, and after they begin a cooperative education event through qualitative methods.

Research Questions

The following research questions were developed, researched, and analyzed for this study:

- What are the daily experiences of a cooperative education student?
- What experiences and processes do students encounter when they move from the education organization (academic) environment to the employer (work) environment through a cooperative education program?
- What experiences and values do students have prior to entering the cooperative education event that are influential in the student's move from outside to inside the employer organization? the occupational role(s)?
- What strategies and/or processes (formal or informal) are used by employers to bring students from outside to inside the organization? the occupational role(s)?

- How are cooperative education students socialized to the employer organization? the occupational role(s)?
- Can the entry and socialization process for students into experiential education programs be predicted?
- What are the outcomes of the socialization process during the co-op experience?

Theoretical Framework

This study investigated cooperative education as an organizational phenomenon (from an anthropological and sociological perspective) which has rarely, or incompletely, been done in the past. The research study began with a qualitative approach, most closely following the symbolic interactionist tradition. Following Blumer's (1969) work on symbolic interactionism, interactions between the individual student and the social group (engineering workplace members) were the focus, with theory being developed from direct examination of the specific interaction.

The organizing conceptual framework was based on concepts and theories presented and developed by Greenspan and Shanker (2004), Homans (1950), Scott (2001), Schein (1971, 1978, 1990), Van Maanen and Schein (1979), and Wanous (1992). In addition, the concepts and model developed by Raschke (2003) proved useful for development of the conceptual model for this study.

Definition of Terms

In order to operationalize the phenomena investigated for this study, the following concepts are defined.

Anticipatory socialization: The degree to which an individual is prepared, prior to entry, to occupy organizational positions (Van Maanen, 1978).

Career: A series of separate experiences and adventures through which a person passes during his/her association with an organization. To the organization, a career is a set of expectations held by individuals inside the organization which guide their decisions about whom to move, when, how, and at what speed (Schein, 1968b).

Cooperative education: Cooperative education (co-op) has the following factors: (1) the student's off-campus experience is related as closely as possible to the field of study and individual interests within the field; (2) the employment is regular, continuing, and an essential element in the educational process; (3) a minimum amount of employment and minimum standard of performance are included in the requirement for the degree or certificate presented by the school; and (4) the work experience will ideally increase in difficulty and responsibility as the student progresses through the academic curriculum and should parallel as closely as possible the progress through the academic phase (Collins, 1971).

Culture: A pattern of basic assumptions, invented, discovered or developed by a given group, as it learns to cope with its problems of external adaptation and internal integration, that has worked well enough to be considered valid and therefore is to be taught to new members as the correct way to perceive, think, and feel in relation to those problems (Schein, 1990, p. 111).

Field: The existence of a community of organizations that partakes of a common meaning system and whose participants interact more frequently and fatefully with one another than with actors outside of the field (Scott, 1994, p. 207-208).

Newcomer: Individuals who are new to organizations or to a new role within the organization (Van Maanen & Schein, 1979).

Norms: Specify how things should be done; they define legitimate means to pursue valued ends (Scott, 2001, p. 55). Consist of expectations that define a range of tolerable behavior for a given social category of persons (Haas & Drabek, 1974).

Occupation: A homogeneous grouping of very particular jobs and positions (Moore, 1969).

Occupational Roles: Clusters of norms (Haas & Drabek, 1974) which pertain to a homogeneous grouping of very particular jobs and positions (Moore, 1969).

Organizations: Collectivities oriented to the pursuit of relatively specific goals, exhibiting relatively highly formalized social structures (Scott, 1998) and relatively complex interaction systems that persist over time (Haas & Drabek, 1974).

Organizational socialization: The process by which an individual acquires the social knowledge and skills necessary to assume an organizational role (Van Maanen & Schein, 1979).

Person-organization fit: The compatibility between people and organizations that occur when: (a) at least one entity provides what the other needs, or (b) they share similar fundamental characteristics, or (c) both (Kristof, 1996, p. 4).

Profession: A collective group that exercises control by defining social reality, by devising ontological frameworks, proposing distinctions, creating typifications, and fabricating principles or guidelines for action (Scott & Backman, 1990, p. 290). Professions construct cognitive frameworks that define arenas within which they claim jurisdiction and seek to exercise control (Scott, 2001, p. 129). Professional practitioners possess specialized, codified,

expert knowledge, acquired through years of training, guided practice, and induction; place the welfare of those they serve above other considerations; and assume collective responsibility for the definition, transmittal, and enforcement of standards of practice and norms of conduct (Sykes, 1999).

Roles: Conceptions of appropriate goals and activities for particular individuals or specified social positions. Beliefs are prescriptions of how the specified actors are supposed to behave (Scott, 2001, p. 55). Clusters of norms which pertain to a given unit of social interaction (Haas & Drabek, 1974).

Self-efficacy: A person's expectations that they can successfully execute the behavior required to produce the outcome (Bandura, 1977b, p. 192).

Semi-professions: Practitioners are more concerned with the communication and, to a lesser extent, the application of knowledge (as opposed to creation and application of knowledge for professions), are less likely to be guaranteed the right of privileged communications, and are rarely directly concerned with matters of life and death (Etzioni, 1969).

Socialization: The interaction between a stable social system and the member who enters it. Socialization refers to the process by which required behavior patterns of the society, organization, or group that he or she is entering are learned (Schein, 1970).

Transition: The psychological process individuals go through to come to terms with the new situation (Bridges, 1991).

Values: Conceptions of the preferred or desirable, together with the construction of standards to which existing structures or behaviors can be compared and assessed (Scott, 2001, p. 54-55).

CHAPTER 2: REVIEW OF LITERATURE

The literature and research review for this study will include discussion of four areas important to understanding the people, organizations, and processes involved in cooperative education research: (1) the educational and organizational functions of cooperative education; (2) occupational roles and profession/semi-profession as they relate to student entry to an engineering-related organization; (3) organizational structure and culture as they relate to education organizations and employer organizations in cooperative education settings; and (4) socialization processes of a student from outside to inside an organization and occupational roles.

Brief History of Cooperative Education

Cooperative education began in 1906 at the University of Cincinnati in the engineering department by Herman Schneider. He began the program to solve two problems: to add practical experience to the curriculum to aid in mastery of engineering principles and to help students work in meaningful jobs instead of unrelated and/or menial jobs during college (Wilson, 1971). The original plan was to alternate two groups of students on a weekly basis between academic work and off-campus employment. By 1920, nine other higher education institutions instituted cooperative education programs within engineering schools/departments. The first non-engineering cooperative education program was begun in the business school at the University of Cincinnati in 1919. In 1921, Antioch College in Ohio began the first co-op program in a liberal-arts institution. After World War II, the number of programs took off, and by 1960 there were 61 co-op programs at higher education institutions in the U.S. By 1987, it was estimated that there were more than 1,000 colleges and universities participating in co-op programs, more than 200,000 students, and more than

75,000 employer organizations (Ryder, 1987). The structure of programs changed over time, moving from a one-week alternating sequence to the structures witnessed most often today of an entire academic semester alternating sequence.

By 1962, the National Commission for Cooperative Education was formed and by 1964 was petitioning the federal government for support. Provisions within Title III of the Higher Education Act of 1965 financially helped institutions who wanted to begin co-op programs. In 1968, funding for co-op programs was moved to Title IV D during reauthorization of the Higher Education Act. This move helped co-op begin to flourish and grow, until it boomed in the 1970s. By 1976, funding for co-op programs was given its own line item, increasing stature and visibility. The funding was then available under Title VIII of the Higher Education Act – where many people associate federal funding for cooperative education programs. Federal funding ceased by 1996, causing both a slow-down in program growth across the country and abandonment of some 400 programs (Linn, 2004). Cooperative education at many higher education institutions around the world continues to be an integral piece to academic programs, with approximately 250,000 students participating each year (Pettit, 1998).

Defining Cooperative Education

It is believed that employers look favorably upon students who have completed experiential education activities when hiring college graduates (Braunstein & Stull, 2001; Gardner, 2004; Sheetz, 1995). Many names are associated with this concept, including experiential learning, internships, cooperative education, volunteer work, clinical rotations, student teaching, service learning, field experience, short projects, and job shadows. For this study, I have specifically focused on cooperative education (co-op) as a concept.

Co-op has been defined in several ways as well. Collins (1971, p. 29) defined traditional co-op as having the following factors: (1) the student's off-campus experience is related as closely as possible to the field of study and individual interests within the field; (2) the employment is regular, continuing, and an essential element in the educational process; (3) a minimum amount of employment and minimum standard of performance are included in the requirement for the degree or certificate presented by the school; and (4) the work experience will ideally increase in difficulty and responsibility as the student progresses through the academic curriculum and should parallel as closely as possible the progress through the academic phase. According to Ryder (1987), cooperative education is a particular application of learning that puts the student in touch with the realities being studied by integrating productive work into the curriculum and for which the institution assumes primary responsibility.

Ricks et al. (1993) found an absence of consistent operational definitions of cooperative education because no clear or consistent conceptualization was made. Several definitions are provided in the literature, but only a few provide operational definitions with some form of reference, including the one provided by Wilson and Lyons (1961):

> "The cooperative plan of education is defined as that educational plan which integrates classroom experiences and practical work experience in industrial, business, government, or service-type work situations. The work experience constitutes a regular and essential element in the educative process and some minimum amount of work experience (at least two different periods of work, totaling at least 16 weeks) and minimum standards of performance are included in the requirements of the institution for a degree. In addition, there must be a liaison between the administration of the institution and the employing firm. The essential criteria…are that the work experience be considered an integral part of the educational process, and that the institution take a definite responsibility for the integration" (p.19).

The National Commission of Cooperative Education (2004) defines cooperative education as:

> "Cooperative education is a structured educational strategy integrating classroom studies with learning through productive work experiences in a field related to a student's academic or career goals. It provides progressive experiences in integrating theory and practice. Co-op is a partnership among students, educational institutions and employers, with specified responsibilities for each party. These include: formal recognition by the school as an educational strategy integrating classroom learning and progressive work experiences, with a constructive academic relationship between teaching faculty and co-op faculty or administrators; structure for multiple work experiences in formalized sequence with study leading to degree completion of an academic program; work experiences which include both an appropriate learning environment and productive work; work experiences related to career or academic goals; formal recognition of the co-op experience on student records (e.g. grade, credit hours, part of degree requirement, notation on transcript, etc.); pre-employment preparation for students, as well as ongoing advising; agreement among the school, employer and the student on job description and new learning opportunities; specified minimum work periods (equivalent in length to an academic term (quarter, semester or trimester). In alternating programs, students work approximately 40 hrs/wk, full-time during the term. In parallel programs, students work approximately 20 hrs/wk, part-time during the term; work monitored by the school and supervised by employers; official school enrollment during employment; recognition as a co-op employee by the employer; evaluations by the student, the school, and the employer, with guided reflection by the student; remuneration for the work performed; provision for employer and school evaluation of quality and relevance of the work experience and curriculum; and, designed to maximize outcomes for students, employers and the school."

And the Canadian Association for Cooperative Education adheres to the following definition:

> "Cooperative education is the integration of classroom theory with practical experience in appropriate fields of business, industry, government, social services and the professions in light of the following criteria: the work situation is developed and/or approved by the educational institution as a suitable learning situation; the cooperative student is engaged in productive work rather than merely observing; the student receives remuneration for the work performed; the cooperative student's progress on the job is monitored by the educational institution and is evaluated by the employer; and the total work experience is normally fifty percent of the time spent in academic study, and in no circumstances less than thirty percent." (LeBold, Pullin & Wilson, 1990, p. 13)

Lentz (1980) and others argued that all off-campus work experience should be considered cooperative education, and other researchers have at times equated programs such as internships, experiential education, structured learning, field experience education, work-study programs, and cooperative education with similar educational experiences (Ricks et al., 1993). In reality, even those programs that claim to be cooperative education often: "vary in the degree to which the student is involved in productive work; the degree to which the student is involved in relevant work; how much remuneration the student receives for the work; if and how students' progress on the job is monitored; the quality of supervision the cooperative student is receiving from the cooperative employer; the way cooperative students' performance on the job is evaluated by the students' cooperative employer; the frequency of evaluation of student performance by faculty; the criteria used to evaluate students; and, the portion of time spent in academic study directed toward cooperative work experience" (Ricks et al., 1993, p.10).

For the purposes of this study, co-op will be as defined by Collins (1971) and will focus on the program within the School of Engineering (SOE) at Great Stateside University (GSU). The co-op program at GSU has a specific structure of a university-sponsored, credit-bearing, paid work experience related to the academic program of study consisting of multiple semesters of full-time work occurrences at the same organization alternating with semesters of full-time education semesters.

Theories/Frameworks/Models and Research Methods Associated with Cooperative Education

Ricks et al. (1993) wrote a very critical article about the history and status of research in cooperative education. Through a literature search, they argued that there has been limited theorizing of cooperative education. Ricks et al. pointed to Wilson and Lyon's (1961) theory as the sole effort worthy of actually being called a theory of cooperative education. Eight values statements were presented, and Ricks et al. transformed them into the following set of tenets of cooperative education, implicit in Wilson's values:

Cooperative work experience…

1. …results in students integrating theory and practice and finding greater meaning in their studies.
2. …increases student motivation.
3. …contributes to student responsibility, self-confidence, and maturity.
4. …develops greater understanding of other people and greater skills in human relations.
5. …enables students to understand and appreciate more fully the meaning of work and the function of occupation.
6. …enables students who might not be able to afford college a higher education experience, and assures skeptical families who are leary of book learning that education is job-related, practical and attainable.
7. …allows faculty to better plan a curriculum that contributes to greater educational vitality
8. …permits more efficient utilization of college facilities.

Several authors built on the work of Wilson and Lyon (1961) including Branton et al., (1990), Brown (1985), Fletcher (1990), Hartley (1978), Heinemann and DeFalco (1990), Giles (1991), Rowe (1970), Mann and Schleuter (1985), Weston (1986), and Williams et al. (1993). Ricks et al. (1993) argued that not all of these proposed a well-articulated theory, but simply linked two or more variables. They concluded that if the research has not been

grounded in theory, then the question should be raised "whether cooperative education is (1) a form of education that should be investigated in terms of theories of education and learning or (2) a program that provides an alternative structure in higher education that should be investigated by program evaluation strategies or (3) a combination of the above or (4) something else?" (p.7).

Continuing their review, Ricks et al. (1993) found no research-based dialectic between theory, practice, and research. The literature tends to demonstrate what is "believed" about cooperative education, and investigators have determined that "something happens" when students participate in cooperative education with ill-defined concepts and explanations. Most studies compare co-op and non-co-op students without matching for critical variables. The literature also does not adhere to conventional research standards or shift to alternate paradigms of research. Sometimes, studies reflect a "not really wanting to know" attitude. The research demonstrates an absence of testing and re-testing alternative hypotheses even in the face of conflicting results. Much of the outcome evidence has been supplied by self-report attitude questionnaires, which only show what students perceive of attitudes in themselves. Ricks et al. also noted a lack of critical analysis in research papers including reliance on rationales, descriptions, conversations, anecdotes, and rhetoric. Finally, there was little evidence of using qualitative methods rooted in disciplines such as holistic ethnography, cognitive anthropology, ethnography of communication, and symbolic interactionism (Ricks et al., 1993, p. 18).

In another review of literature, Ricks et al. (1990) stated that most studies of cooperative education have been evaluative in nature. Armstrong (1989) found three types of evaluation in cooperative education research: evaluation by objectives (Scriven, 1983; Tyler,

1980), an experimental approach, which emphasizes quantitative analysis of programs (Campbell & Stanley, 1963; Suchman, 1954), and a more holistic approach (Cronbach et al., 1980; Stake, 1976; Stufflebeam & Shinkfield, 1985). Outcome evaluations seek to determine if the co-op program causes the studied effect (outcome), but care must be taken not to generalize findings to other programs if the study is not replicated with matched program structure and functions and populations of student and staff. Also, an outcome evaluation study cannot determine whether a program or process is responsible for the effect or result if input (pre-co-op) conditions and variables are unknown (Ricks et al., 1990).

Wilson (1988) presented a review of research in cooperative education and found that most research was focused on program development, including topics of program administration and perceptions and attitudes held by institutional administrators and faculty, prospective employers, and students. He also found that research has focused on outcomes and benefits of cooperative education, including career development, academic progress, and personal growth. Most of the research, according to Wilson, has been applied and evaluative, survey-based studies. Wilson (1989) also summarized that cooperative education research measurement methods have consisted primarily of designed questionnaires, followed by single purposed scales, inventories, and finally tests. Unobtrusive data have been used only occasionally.

Coll and Chapman (2000a) conducted an analysis of research reports presented in the literature and found that during the 1990s, fewer than five percent of co-op research inquiries utilized qualitative means of inquiry. Similarly, only ten, or seven percent, of papers presented at the World Association of Cooperative Education (WACE) conference in Washington DC in 1999 used a qualitative or mixed methodological approach. Some of the

qualitative studies in Coll & Chapman's review included students' perceptions of the advantages and disadvantages of international placements (Coll & Chapman, 2000b), perceptions on whether the qualities needed for meaningful employment are provided by co-op (Huber & Tegart, 1996), articulated beliefs of changes accrued during co-op placements (Van Gyn & Hendy, 1999), employers' and students' perceptions of workplace performance (Hoskyn, 1999), perceptions of career direction (Comerford, 1999), characteristics of the mentoring process in co-op (Van Gyn & Ricks, 1997), mentors value in teacher training as a result of pre-service work experience (Thuynsma, 1999), and desired learning outcomes from work placements (Langford & Lockart, 1999).

Coll and Chapman's (2000a, p. 28) review also indicated that a number of studies employed a mixed-methodological approach, typically questionnaires accompanied by in-depth semi-structured interviews. Examples included Eames's (1999) study of learning as a social process based on situated social-cognition, co-op learning processes as a result of self-efficacy for graduates (Linn, 1999), and the identification of the crucial factors required to build a quality workforce from an examination of the important relationships between the students' industry experience, employer satisfaction, and career progression following graduation (Comerford, 1999).

Branton's Co-op Learning Model

Branton et al. (1990) presented a model for studying cooperative education from a learning process perspective combining Gagne's (1985) model of education and Foster's (1986) principles of education. Gagne's model consists of three interconnected components: (1) internal conditions – the learner's perspective and cognitive processes; (2) external conditions – the stimuli from the environment; and (3) learning outcomes – verbal skills,

intellectual skills, motor skills, and cognitive strategies. Foster's Ten Principles of Learning are:

(1) Practice: We learn to do by doing, by instruction in and by images of doing and through observation.

(2) Internal Context: We learn to do what we practice and this is a good predictor of what we will do in a similar situation.

(3) Reinforcement: Reinforcement is important in the mediation of learning but only to the extent that it is relevant to the individual and to the situation.

(4) Learning Styles: Sequential readiness to learn is important for simple tasks and for children, but the knowledge structures of adults may develop in a non-linear and uneven fashion.

(5) Self-Efficacy: What a person learns depends upon the person's perceptual organization of the situation and upon the person's perception of self.

(6) Modes of Practice: Practice is important to learning and learning is enhanced if the types of practice are varied so that they activate more than one brain center.

(7) Transfer: Transfer of learning increases with task similarity and the degree to which new learning may be anchored in existing cognitive structure.

(8) Learning to Learn: Learning can be intentional as well as incidental and includes the process of learning to reason intentionally which guides action and hence learning.

(9) Motivation to Learn: External incentives are only effective in mediating learning in relationship to their relevancy and value to the individual.

(10) Retention of What is Learned: The key factors in retention are practice and meaningfulness.

Original references for each principle in Foster's (1986) can be found within that article. Principles 2, 4, and 5 are evident within the Internal Conditions component; principles 1, 3, 6, 7, 8, 9, and 10 within the External Conditions component; principles 3, 5, 8, and 9 within the interaction of Internal and External Conditions; principles 8 and 10 within the interaction of External Conditions and Learning Outcomes; and principles 5 and 9 within the intersection of Internal Conditions and Learning Outcomes (Branton et al., 1990).

Fletcher's Self-Esteem and Co-op Framework

Fletcher (1990) found that co-op as an educational strategy has long been linked to enhanced self-esteem. Brockner (1988) summarized that adult self-esteem is enhanced by conditions that lead individuals to see themselves as competent, valued, or accepted, and in control of their environment. Another facet of self-esteem was identified by Miller (1984) as the conditions that lead individuals to see themselves as empowering or contributing to the welfare of others. Fletcher developed a theoretical framework (see Figure 1) based on these and other works.

Heinemann's Work-Experience Enriched Learning Model

Another model of cooperative education presented in the literature is the work-experience enriched learning model developed by Heinemann, DeFalco, and Smelkinson (1992). This model, while not referencing Kolb (1984), shares similar structures and processes to Kolb's work. The model is cyclical and has four elements: an applicable knowledge base, student inquiry while on the work assignment, analysis and reflection, and

Proposition I: Cooperative education influences the competency dimension of self-esteem through the construct of self-efficacy.

Corollary I-A. Cooperative education enhances self-efficacy by stimulating successful episodes of enactive mastery through activities that encourage person-job congruence.

Corollary I-B. Cooperative education enhances self-efficacy by stimulating successful episodes of enactive mastery through counseling interactions that generate persuasory efficacy information.

Corollary I-C. Cooperative education enhances self-efficacy by stimulating successful episodes of enactive mastery through activities that foster the setting and acceptance of challenging goals.

Proposition II: Cooperative education influences the acceptance dimension of self-esteem through counseling interactions that lead participants to view themselves as accepted and valued by significant others.

Proposition III: Cooperative education influences the control dimension of self-esteem through program structures and guidelines that 1) establish firm limits, 2) enforce standards, and 3) allow latitude and respect for individual decisions within those limits.

Proposition IV: Cooperative education influences the empowerment dimension of self-esteem through program activities that foster students' participation in the growth and development of others.

Figure 1: Summary of Co-op and Self-Esteem Propositions and Corollaries (Fletcher, 1990).

testing conclusions. The model attempts to integrate traditional classroom learning with learning in the workplace. Application, analysis, and knowledge base are developed through an integrated seminar, participant observation follows during the work experience, reflection is the next phase and happens during the work experience, and critical discourse concludes the cycle in an integrated seminar setting.

Heinemann et al. (1992) proposed that six principles were critical to work-experience enhanced learning: (1) integrated theory and application; (2) provision of an interdisciplinary perspective during the work assignment; (3) development and reinforcement of higher order cognitive skills such as analysis, problem solving, and decision making; (4) creation of an environment that encourages reflective learning by students; (5) aiding students to become

self-directed learners; and (6) achievement of academic, career development and personal growth objectives.

Bartkus' Social Skills and Cooperative Education Framework

Bartkus (2001) presented a framework focused on work-related social skills development through cooperative education experiences. Bartkus classified work-related social skills as strategic social skills (e.g. negotiating, team-building, leadership), facilitating social skills (e.g. appropriate listening and speaking skills), and supplemental social skills (e.g. handshakes, proper forms of address, and basic etiquette). The literature review about social skills generated six basic characteristics of skills used in an interpersonal environment, and constitute Bartkus' framework:

(1) Sensitivity: The ability of an individual to understand both the intrapersonal and interpersonal environment in which the person works.

(2) Knowledge: Includes the knowledge about the specific attributes or facts regarding a particular social skill category and the techniques and sequence of events that one would apply to a particular social situation in order to reach an objective.

(3) Intangibility: Individual behavior that is discretionary, not explicitly or directly recognized by the formal reward system, and that the aggregate promotes the effective functioning of the organization.

(4) Learning: Includes two concepts – learning from experience, and experiential learning. Learning from experience happens in everyday context and is rarely recognized, whereas experiential learning is a key element of a discourse that has its everyday process as its subject and constructs in a certain way.

(5) Listening: Includes marginal listening (hears words but is easily distracted), evaluative listening (hears what is said but does not process the non-verbal or subtle verbal cues of the message), and active listening (hears and processes all verbal and nonverbal information).

(6) Socialization: The process by which employees learn about and adapt to new jobs, roles, and the culture of the workplace.

Learning Theories Used in Cooperative Education Research

Most research studies of cooperative education programs have focused on the educational value or learning outcomes associated with the student co-op experience. Due to this focus, several student learning theories from the educational psychology field have been used in research studies to relate to the co-op experience. Linn (2004) and Cates and Jones (1999) provided overviews of several learning theories used in cooperative education research. The theories that were reviewed tended to be from a developmental psychology perspective and were used to view the cooperative education experience from the standpoint of student learning during progression from adolescence to adulthood. Other perspectives that could be relevant, though seldom used, include management theory, sociological theory, and organizational theory.

Linn (2004) provided a useful framework for categorizing the many learning theories associated with higher education research. The framework consists of three concentric "rings" consisting of different levels of analysis. The inner ring focuses on a single student work experience, the middle ring consists of viewing the experience of the student from the perspective of the entire college experience or lifespan, and the outer ring focuses on learning from the context of all schooling in general. The inner ring includes the most different theories and is the most researched. The middle ring looks at the cooperative education experience in the context of the student's entire college experience and life experience beyond higher education. The outermost ring moves from an individual student's perspective to a conceptual, collective educational viewpoint.

The inner ring includes theories about different dimensions of the human experience including learning styles, self-efficacy, practical intelligence, multiple intelligences, and

learning taxonomies. Theories discussed here include those presented by Kolb (1984), Schlossberg, Waters, and Goodman (1995), Atkinson (1964), Bandura (1986), Gagne (1985), Gardner (1983), Bloom (1956), and Sternberg and Wagner (1986). The middle ring includes theories that focus on the human function of cognition, which refers to thinking, learning, and memory. The theories discussed here include Piaget (1963, 1972), Perry (1970), Kegan (1982, 1994), Baxter Magolda (1992, 2001), and Costa and Garmston (1998). The outer ring views schooling in general and includes theories presented by Lave and Wegner (1991), Bowles and Gintis (1976), and Bourdieu (1977). Finally, Linn (2004) indicated that the works of Dewey (1958) (summarized by Archambault [1964]) intersect all levels of the framework and are central to any discussion of experiential learning.

While the selection of theories, models, and frameworks presented in this section provide some insight into theoretical/conceptual tools developed for cooperative education studies, I was unable to find any studies that tested or applied the models/frameworks other than the author's original work.

Summary of Research about Cooperative Education

Student Benefits/Outcomes

The results from studies investigating outcomes of experiential education activities have been mixed. Parks et al. (2001), in a study involving 2,309 students, found through survey research that 58% of the variability in student responses to questions pertaining to positive outcomes associated with the cooperative education experience was explained by three factors: work skills development, career development, and academic functions. However, Dawson (1989) reported that there is very little data to indicate that the student has learned from the work experience. Marini and Tillman (1998) determined that students

enhance their problem-solving, communication, critical thinking, and team work skills through cooperative education. Finally, Fletcher (1989), in her review of student outcomes from cooperative education, determined that career development, career progress, and personal growth are the primary benefits of cooperative education to students.

Ellis (1987) found that students were very positive about the professional, personal, and educational benefits of their co-op experience, with the top-ranked benefits being a better understanding of professional field, obtaining a job in field of study, improved self-confidence, clarification of career options, and better understanding of self. Improved career awareness and confidence in making a career choice is often cited (Brown, 1976; Deane, Frankel, & Cohen, 1978; Perloff & Sussna, 1978; Phillips, 1987; Weinstein, 1980; Wilson, 1974; Yencso, 1971). Ehrlich (1978) also reported that students in cooperative education programs develop attitudes toward work that are more mature than non-co-op students (p. 79).

Some have found that cooperative education results in improved academic performance (Davie & Russell, 1974; Gillin, Davie, & Beissel, 1984; Lindenmeyer, 1967; Loken & Cutt, 1986; Smith, 1965). Retention and completion of academic program are also higher among co-op participants (Gore, 1973). Wilson (1988) summarized co-op research that covered the prior twenty-five years and found that co-op helps students clarify realistic career goals, helps students persist through to graduation, results in students achieving better academically, and increases students' confidence and motivation.

Benefits to Graduates of Co-op Programs

Graduates from co-op programs tend to get jobs in their field of academic study more readily than those who do not participate in co-op programs (Brown, 1976; Deane et al.,

1978; Mann & Schlueter, 1985). Deane et al. also found that co-op graduates tend to find work related to their field of academic study more quickly and that co-op graduates are less likely to encounter a period of unemployment than non-co-op graduates (Brown, 1976; Deane et al., 1978; Yencso, 1971). Co-op graduates often receive jobs with higher levels of responsibility than first jobs for non-co-op graduates (Brown, 1976; Gillin et al., 1984; Yencso, 1971). Some research indicates that co-op graduates perform better initially and therefore initially advance more quickly (Deane et al., 1978; Ehrlich, 1978; Hayes & Travis, 1976; Phillips, 1987; Yencso, 1971). However, Brown (1976, 1985b) and Yencso (1971) found that this initial advantage was reduced or eliminated after some time (usually two to three years) in the workforce.

There have been many studies conducted regarding the pecuniary benefits of cooperative education, and Somers (1995) summarized the literature related to monetary issues. Three types of studies were identified: those with no statistical control, those with univariate statistical adjustment, and those using multivariate models. The studies with no statistical control predominantly showed increased salary offers to co-op graduates over non-co-op graduates (Edison, 1980; Epting, 1975; Kelly, 1985; Miller, 1967, 1968), with one study showing no difference (Gore, 1972). For those studies that used univariate statistical adjustment, there was a bigger dichotomy in results. Cash (1985), Jagacinski et al., (1986), Wilson & Lyons (1961), and Yencso (1971) all found there to be no significant difference between starting salaries of co-op and non-co-op graduates.

Alwell (1977), Brown (1976) Rogers & Weston (1987), and Rowe (1992) found there to be a significant difference in the starting salaries of co-op students versus non-co-op students. Brown (1976), Jagacinski et al. (1986), and Wilson and Lyons (1961) all found

there to be diminishing or no economic advantage over time after entry into the organization. Finally, Alwell (1977) and Davies (1985) both found that co-op graduates had lower levels of unemployment than non-co-op graduates. The studies involving multivariate models found mixed results: co-op had no direct effect on starting salaries (Gillin et al., 1984; Seidenberg, 1987), and co-op was significant, adding 1.9% to base salaries (Gardner, Nixon, & Motschenbacher, 1992).

Employer Benefits

Data indicate that when hiring college graduates, employers look favorably upon students who have completed experiential education activities (Gardner, 2004). Braunstein and Stull (2001) conducted a study with 300 employer participants with results indicating that 88 percent of respondents were more likely to hire students who had cooperative education experience versus those that did not, and 75 percent of respondents indicated that cooperative education students progress faster in the organization than those hired without cooperative education experience. The reasons that employers prefer college graduates with experience over those graduates without are typically explained in terms of the new hire's ability to more quickly make a contribution to the hiring organization and the ability to better retain employees after the hire.

From the employer's perspective, technical knowledge and technology skills were rated higher for employees who had cooperative education experience than those who had none, while "soft" skills (responsibility, customer service, leadership, training/facilitation, and integrity/honesty) were determined to be insignificantly different between employees with and without cooperative education experience. Also, Langford and Cates (1995) determined that communication and thinking skills are more sought after by employers than

technical capabilities and high grade point average. Braunstein and Stull (2001) concluded that employers hire students into cooperative education roles primarily to help increase quality and accuracy in hiring practices.

Hurd and Hendy (1997) conducted a review of literature regarding the benefits of cooperative education to employers. They determined that the literature on employer involvement in cooperative education consists mostly of employer perceptions, not experimental studies, and is dated (most studies conducted more than 10 years ago). They found that the ten most frequent reasons employers participate in co-op program are: (1) company image; (2) recruiting; (3) savings in time and dollars; (4) employee productivity; (5) cost in time and dollars; (6) retention rate; (7) position level; (8) career advancement; (9) affirmative action; and (10) new ideas. The review by Hurd and Hendy is summarized in the following paragraphs.

Hunt (1978) reported that Ford Motor Company believed co-op programs allowed them to demonstrate the company's role as a concerned citizen. Hunt also found that Chrysler Corporation claimed that co-op enhanced the company's recruiting effort by providing better recruiting results as to acceptance of offers and it permitted the evaluation of students before the company needed to make a permanent hiring decision. Also, Union Carbide indicated that co-op is the best recruiting tool, resulting in between 70 and 90 percent of co-op students accepting permanent positions with participating companies after completing their co-op work periods.

Chrysler Corporation found co-op to save time and dollars by lowering recruiting costs and providing trained graduates who are immediately productive (Demlow, 1977). Campbell (1974) indicated that Union Carbide saved time and money because they did not

have to expand their campus recruiting activities. Hayes and Travis (1978) reported that co-op students who become permanent employees are more productive and knowledgeable than new hires from traditional programs. Kramer (1977) claimed that co-op students were ready to accept full-time jobs and immediately became productive and contributing employees.

Smelt (1975) reported that co-op graduates progressed more quickly in their permanent positions than did new hires who did not participate in co-op.
Smelt found the cost of participating in co-op programs roughly comparable to the costs for the company's other training programs. Because co-op programs engaged with students earlier than other training programs, the students made better informed career decisions earlier, saving the company time and money later because the students tended to stay in the positions longer and were happier, more productive employees. Chrysler Corporation representatives stated that co-op provides better recruitment results in terms of employee retention (Demlow, 1977). Union Carbide found that 83 percent of co-op graduates were retained, compared to 55 percent for employees with no previous part-time work with the company (Campbell, 1974). Hayes and Travis (1978) reported that 90 percent of co-op students became permanent employees. Between 59 and 65 percent of co-op students wanted to join the company permanently (Smelt, 1975). Wooldridge (1976) and Phillips (1978) reported greater commitment to the employer in terms of staying longer than non-co-op graduates after initial hire.

A large percentage of Union Carbide's supervisory personnel at all levels were co-op graduates (Campbell, 1974). Many of Huntington Alloy's managerial and professional staff were co-op graduates (Wilson, 1977). Participation in co-op programs was generally perceived by employers to be an effective way of identifying and selecting future managers

(Hayes and Travis, 1978). After three years of permanent employments, co-op graduates were about one year ahead of non-co-op employees (Smelt, 1975). Smelt also found it took non-co-op employees nine years to reach the same point a co-op graduate was at after six years. Arthur Anderson and Company personnel reported that co-op students perform well in problem-solving situations, are flexible, and are people and service-oriented (Tammen, 1977). Travis and Hayes (1978) found in a survey of 70 employers that co-op provided an infusion of bright young people into the organization.

Finally, cooperative education can help with diversity efforts at organizations. Cooperative education contributed to the hiring of female and minorities at Chrysler Corporation (Demlow, 1977). Ford Motor Company also found that co-op programs helped provide exposure of their company to female and minorities that might not have had the chance otherwise (Peters, 1977).

Benefits to the Education Organization

Ellis (1987) included a survey of Canadian university personnel. The participants perceived a very substantial benefit to co-op programs, including improved quality of graduates, enhanced image with businesses, better learning processes, and enhanced image with applicants/easier to recruit students. Surprisingly, collaborations and joint research opportunities and consulting opportunities were not ranked as highly by the university personnel. Loken and Cutt's (1986) study also reported that co-op programs helped attract quality students and yielded stronger academic performance, improvement in faculty, and faculty awareness of current needs in industry. Finally, Somers (1986) found that co-op helps motivate students to complete their degree.

However, acceptance of cooperative education from the academic faculty and administration has many times been as large a barrier to successful programs as an attraction of students and employers to participate. Branton et al. (1990) stated that many practitioners in higher education do not consider cooperative education to be academically legitimate, but rather applied and training based. Heinemann et al. (1988) concurred with Branton et al.'s assessment and determined that the methodology of cooperative education for promoting learning lacked structure and was vague. To help the process of connecting cooperative education to the curriculum, several authors have begun to tie cooperative education experience to learning outcomes as assessed by engineering degree accreditation criteria (Canale et al., 2000; Cates & Jones, 1999; Hewitt, 1998; Nasr et al., 2004; Pierce, 1998; Shaeiwitz, 1996). Research has also begun into how what is learned in co-op can be integrated back into the classroom (Contomanolis, 2001).

Organization, Role, and Profession

For this study, organizations were defined as collectivities oriented to the pursuit of relatively specific goals, exhibiting relatively highly formalized social structures (Scott, 1998) and relatively complex interaction systems that persist over time (Haas & Drabek, 1974). A role was defined as conceptions of appropriate goals and activities for particular individuals or specified social positions. Beliefs are prescriptions of how the specified actors are supposed to behave (Scott, 2001, p. 55). A role consists of clusters of norms that pertain to a given unit of social interaction (Haas & Drabek, 1974). Moore (1969) defined an occupation as a homogeneous grouping of very particular jobs and positions that perform a precise set of compensated activities. A compound concept named "occupational role" is defined using the Haas and Drabek definition of role, and the Moore definition of

occupation: clusters of norms that pertain to a homogeneous grouping of very particular jobs and positions. The concepts of organization and occupational role are key to the development of the socialization framework developed in this study.

A profession is a specific type of occupation where the individual belongs to a group of workers who control information, ideas, and belief systems via cultural-cognitive and normative processes. The professions "construct cognitive frameworks that define arenas within which they claim jurisdiction and seek to exercise control" (Scott, 2001, p. 129). Sykes (1999) defined professional practitioners as those who possess specialized, codified, expert knowledge, acquired through years of training, guided practice, and induction; place the welfare of those they serve above other considerations; and assume collective responsibility for the definition, transmittal, and enforcement of standards of practice and norms of conduct. Etzioni (1969) defined semi-profession practitioners as those who are more concerned with the communication and, to a lesser extent, the application of knowledge (as opposed to creation and application of knowledge for professional practitioners), are less likely to be guaranteed the right of privileged communications, and are rarely directly concerned with matters of life and death.

Etzioni (1969) considered engineers, like nurses, social workers, and teachers, to be semi-professionals, while Sykes (1999) implies that engineering, like medicine, from a historical perspective was a "true" profession because science and service were valued, allowing practitioners to gain cultural authority and substantial autonomy. It could be argued that contemporary engineering practitioners can possess qualities that are considered either professional or semi-professional. Certainly, the group of engineers who become licensed by a state as professional engineers (a small percentage of all degreed engineers) meet the

criteria outlined by Sykes and Scott (2001) to be considered members of a profession. All other engineers likely would be considered members of a semi-profession. For this study, engineering students, working predominantly in manufacturing-based organizations, would be considered newcomers to occupational roles within a semi-profession.

Schein (1978) wrote that a career is a construct described as the way individuals provide for the survival of individual and the family unit through paid employment. Schein presented a nine-stage model of the career cycle. The nine stages are (1) growth, fantasy, exploration; (2) entry into world of work; (3) basic training; (4) full membership in early career; (5) full membership, midcareer; (6) midcareer crisis; (7) late career in leadership or nonleadership role; (8) decline and disengagement; and (9) retirement. The following summaries describe the roles, issues, and tasks associated with each of these stages (pp. 40-46).

> *Growth, fantasy, exploration:* Roles can include student, aspirant, or applicant. A person develops a basis for making realistic vocational choices, assesses realistic constraints based on socioeconomic level and family circumstances, obtains the appropriate training or education, and develops the basic habits and skills needed in the world of work. Tasks can include finding trial and part-time work opportunities to test early vocational decisions.
>
> *Entry into world of work:* Roles can include recruit or entrant. A person enters the labor market for a first job, negotiates a viable formal and psychological contract to ensure that one's own needs and those of the employer are met, and becomes a member of an organization or occupation by passing through the first major inclusion

boundary. The person learns how to look for and obtain a job, how to assess a job and organization, and how to make a realistic first-job choice.

Basic training: Roles can be trainee and novice. The person deals with the reality shock of work and membership in the organization, becoming an effective member as quickly as possible, adjusting to work routines, and achieving acceptance as a regular contributing member by passing through the next inclusion boundary. The person develops a sense of confidence, deciphers the organization's culture, learns to relate to other people in the organization, accepts and learns from initiation rites, and accepts the official signs of entry and acceptance.

Full membership in early career: Role is a new but full member. The person accepts responsibility and duties associated with the first formal assignment, develops and displays skills and expertise for growth into other areas, balances own needs for independence with organizational requirements, and decides whether to remain with the organization or occupation. The person in this role typically finds a mentor, reassesses the decision to pursue this type of work and/or organization, and prepares for long-range commitment or movement to another position/organization.

Full membership, midcareer: Roles include full member, tenured member, supervisor, or manager. The person chooses a specialty and decides how committed to become to it, remains technically competent, establishes a clear identity in the organization, accepts higher levels of responsibility, and develops long-range career plans. A person in this stage works through their relationship with mentors and prepares to become a mentor to others.

Midcareer crisis: When persons reach this stage, they begin a major reassessment of the progress they have made relative to their ambitions, dreams, and hopes, and decide how important work and career are to be in their total life. The person becomes aware of their career anchor – their talents, motives, and values as developed from actual work experiences – and assesses their future accordingly.

Late career in leadership or nonleadership roles: Roles are key member, member of management, senior staff, good contributor, or deadwood. The person in this stage typically becomes a mentor, broadens his/her interests and skills based on experiences, takes on more responsibility, uses skills and talents for the long-range welfare of the organization, and learns how to sell ideas in an internal entrepreneur role. The person in this role usually switches from a personal benefit to organizational welfare concern, and learns how to handle political situations in the organization.

Decline and disengagement: The person learns to accept reduced levels of power and responsibility, as well as new roles based on declining competencies. The person begins to manage a life less dominated by work, and finds new sources of satisfaction.

Retirement: This is passage out of the organization or occupation. The person uses his/her accumulated experience and wisdom on behalf of others in various senior roles.

When considering students at a university in a cooperative education role, any of the first four stages could be encountered at various levels of engagement.

Schein (1978) specified the importance of viewing entry into an organization from two perspectives: the individual and the organization. The individual tries to develop his/her own “life pattern of work or as an occupation, profession, or organization creating a path for people to follow” (p. 81). The organization sees the same events as teaching someone what the organization is about and getting work performed that nobody else can or wants to do. Wanous (1992) conceptualized the relationship between organizational choice and vocational entry, sometimes called the “exclusion process” (Crites, 1969). According to this model, a person begins with occupational entry at a young age where there are many choices; the choices gradually narrow as the person focuses on general occupational fields, chooses a specific occupation, and finally a job. When the person narrows his/her occupational choices to the point of considering job choices, he/she also is beginning the organizational entry phase. Wanous stated that the choice of a vocation typically precedes the choice of an organization; the entry into a vocation is a long, drawn-out process consisting of many small decisions and turning points, while organizational choice is more of a single event than a long process, and it is harder to change occupations than it is to change organizations.

Organizational Culture and Structure

Organizational Culture

The term *culture* has been applied to organizations for several decades, dating back to works by Arnold (1938) and Barnard (1938), and continued later by Selznick (1957). The use of the word *culture* as a descriptor of an organization stems from anthropological and sociological research about groups of people. Merriam-Webster (2002) defines *culture* a number of ways including (a) the integrated pattern of human knowledge, belief, and behavior that depends upon man's capacity for learning and transmitting knowledge to

succeeding generations, (b) the customary beliefs, social forms, and material traits of a racial, religious, or social group, and (c) the set of shared attitudes, values, goals, and practices that characterizes a company or corporation. The third definition applies the term culture to a non-human entity (a company or organization) in words that imply human influence and characteristics.

Although Merriam-Webster (2002) included a definition of culture that focuses on things that a group of people share or hold in common, researchers in organizational culture find this description limiting. Schein (1992, p. 12) defined the culture of a group as "a pattern of shared basic assumptions that the group learned as it solved its problems of external adaptation and internal integration, that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems." Morgan (1997) said that the word "culture" was derived metaphorically from the idea of cultivation or the process of tilling and developing land. According to Morgan, culture refers to the "pattern of development reflected in a society's system of knowledge, ideology, values, laws, and day-to-day ritual" (Morgan, 1997, p. 120). Bolman and Deal (1991) pointed out that culture has both a past and a present and therefore is both product and process. Culture is a current state of being for a group that is rooted in past knowledge and experience. Bower (1966) simply stated that culture is the way things are done by a group.

Schein (1992) questioned whether a large organization, such as a university or industrial company, could really have a single, designated culture that can represent the entire organization. Schein, Bergquist (1992), and Morgan (1997) emphasized that there are subcultures within cultures, with some organizations more fragmented than others. Schein

(1990) believed that “as cultures evolve and grow, two processes occur simultaneously: a process of differentiation into various kinds of subcultures that will create diversity, and a process of integration, or a tendency for the various deeper elements of the culture to become congruent with each other because of the human need for consistency” (p. 115).

Kuh and Whitt (1988) and Schein (1992) described institutional culture as having three layers: the outer layer consists of the organization’s artifacts, the middle layer consists of espoused values, and the inner core consists of underlying assumptions. Artifacts are visible activities, products, and processes. Examples include the physical layout of the organization, the dress code, stories, myths, symbols, the smell and feel of the place, records, and products (Schein, 1990). Espoused values are articulated beliefs about what is “good,” what “works,” and what is “right.” Schein (1990) stated that open-ended interviews are a useful way to study a culture’s espoused values, norms, ideologies, and philosophies. Underlying assumptions are the deepest ingrained assumptions that are rarely questioned and taken for granted. The underlying assumptions are often the most difficult to identify and hardest to articulate. Again, Schein (1990) indicated that underlying assumptions can be determined through intensive observation, focused questions, and intensive self-analysis by organizational members.

To assess the culture of an education organization, Eckel, Green, Hill, and Mallon (1999) first suggested describing institutional artifacts (insider language, myths, stories, published mission, observable rituals, and ceremonies). Eckel et al. suggested to, initially, think of several adjectives that could be used to describe the organization. How well outward signs (artifacts) match espoused values can aid in understanding an organization’s core culture (underlying assumptions). Schein (1992) indicated that the underlying assumptions

become inconspicuous if the espoused values and underlying assumptions are congruent. However, if inconsistencies exist between espoused values and underlying assumptions, disconnects between artifacts and espoused values become evident. When this occurs, both underlying assumptions and espoused values need to be investigated to determine the root cause of the inconsistency.

Culture is learned, but there are not many good models of how groups learn or create norms, beliefs, and assumptions (Schein, 1990). One mechanism explaining how norms and beliefs are developed is by studying how group members respond to critical incidents. Another means is modeling by leaders in the group that permits group members to identify with them. Socialization of new members into the group helps perpetuate and reproduce the culture of the organization. Schein stated that organizations begin the socialization process with recruitment and selection, because the organization is likely to look for new members who already have the right set of assumptions, beliefs, and values.

Organizational Structure

Organizational structure, based in organizational theory, is an important factor to consider when attempting to understand a person's experience and role as they relate to group(s) within structured settings. For example, a student involved in a cooperative education (co-op) experience associated with a university will be interacting with subcultures of select students within an engineering school that is a part of a university. In addition, the student will go to work for an organization outside of the university, which could resemble several different theoretical structures. Students who understand the various organizations and organizational structures they will encounter throughout this process (co-op) will be better suited to navigate their environment.

According to Barott (2002a), organizations are about people, not buildings or facilities. Further, Barott stated that an organization is not a physical entity but rather consists of relationships between and among people and the processes that are used to maintain the desired relationships. Based on the works of Parsons (1960) and Thompson (1967), organizations can be conceived of having three levels of responsibility and control: technical, managerial, and institutional. The technical level is the bias or operating core of the organization. It is what is considered central to the organization's being or purpose. The institutional level is the environment in which the organization exists. The relevant environment of an organization is other organizations, not people. The third level, managerial, services the technical core by "mediating between the technical core and those who use its products, and procuring the resources necessary for carrying out the technical functions" (Thompson, 1967, p. 11). The managerial level buffers the technical level from the environment so that the technical level can effectively perform its core functions. Management performs a boundary-spanning function to connect and facilitate the intersection of the core and the environment.

The technical rationality of an organization is concerned with how the organization performs its core function(s). It refers to how things are organized to achieve the people's goals and biases. Technical rationality can be evaluated by instrumental and economic criteria (Thompson, 1967). In other words, do the actions of the organization in fact produce the desired outcome, and does the organization obtain results with the most efficient use of its resources. Organizational rationality refers to how the organization operates to achieve desired outcomes. It implicitly involves three major component activities: inputs, technical activities, and outputs. Thompson stated that organizational rationality is a result of

constraints the organization faces, contingencies the organization meets, and variables the organization can control (p. 24). Institutional rationality refers to the logic of the environment. Management's function is to buffer the technical core from the environment while allowing the organization to operate and grow.

Levine and White (1961) stated that all organizations must establish a domain, defined as the claims the organization stakes out for itself in terms of the services/products offered, the population that is served, and the organization's role within the larger set of organizations. The organizational domain is the reason for the organization's existence. The task environment (Dill, 1958) or organizational set (Evan, 1966) denotes the parts of the environment that are relevant to goal setting and goal attainment. These include customers (distributors and users), suppliers, competitors, regulatory groups, and resource providers. Organizations are dependent on some elements of the task environment in proportion to the organization's need for the resources, and in inverse proportion to the ability of other elements to provide the same resources or performance (Emerson, 1962; Thompson, 1967). Resource dependency is inversely proportional to power. If the dependency on the resource is great, the level of power the organization possesses over its task environment is limited.

According to McKibbin (1981), classical organizational theory is based on six key assumptions: (1) a hierarchical organizational structure that systematically orders communication and authority among formally established positions; (2) a division of labor based on functional specializations; (3) a system of procedures, rules, and regulations covering the rights and duties of employees in work situations; (4) impersonality of interpersonal relations; (5) promotion and selection based on technical competence; and (6)

rational, systematic, goal-oriented organizational processes. McKibbin stated that this classical view is consistent with what many theorists call bureaucratic structure.

Mintzberg (1989) presented a model of basic structural configurations of organizations, consisting of six parts: (1) operating core, (2) middle line, (3) strategic apex, (4) technostructure, (5) support staff, and (6) ideology. The operating core consists of the people who perform the work of producing the products or providing the service. The strategic apex consists of a person or persons who oversee the entire system. The middle line is the connection between the strategic apex and the operating core and consists of a hierarchy of authority in the organization. The strategic apex, middle line, and operating core are connected in one uninterrupted sequence to indicate they are connected by a single chain of formal authority. The technostructure consists of staff members who plan and control the work, but outside of the line of authority. Internal support staff are needed to provide services necessary to maintain organizational functioning of the operating core. Finally, ideology encompasses the other five parts and represents the organizational culture.

In addition to the configuration of the organization, Mintzberg (1989) also identified six coordinating mechanisms of an organization. The mechanisms describe the fundamental ways in which organizations coordinate their work. Although many coordinating mechanisms coexist in an organization, most organizations tend to favor one over the others (Raschke, 2003). The six mechanisms are (1) mutual adjustment, (2) direct supervision, (3) standardization of work processes, (4) standardization of outputs, (5) standardization of skills, and (6) standardization of norms. Mintzberg defined mutual adjustment as informal communication between two operating employees. Direct supervision consists of one person instructing other members/people in what or how to do things. Standardization of work

processes involves development of standard work processes in the technostructure for execution in the operating core. Standardization of outputs occurs when the technostructure declares required results of the work to be carried out in the operating core. Standardization of skills involves training for the operating core by external sources. Standardization of norms occurs when a consistent set of beliefs is impressed onto the entire organization.

Mintzberg (1989) defined decentralization as the diffusion of the decision-making power. Centralized power occurs at a single point in the organization, while decentralized power is dispersed among more than one individual in different areas. Horizontal decentralization exists when power is dispersed out of the hierarchy to non-managers, such as operators or employees in the technostructure. Limited horizontal decentralization occurs when power is selectively shared with parts of the organization.

Figure 2 summarizes seven distinct forms of configuration of an organization according to three important aspects: prime coordinating mechanism, key part of the organization, and type of decentralization. For this study, the primary configuration that will be encountered is the professional organization. Higher education and many engineering work environments are focused on the technostructure of the organization and coordinated by a standardization of skills and knowledge. There also may be a need to understand machine organizations as some technical work environments that students in a co-op role may encounter are coordinated around a standardization of work processes (e.g. manufacturing environments).

Configuration	*Prime Coordinating Mechanism*	*Key Part of Organization*	*Type of Decentralization*
Entrepreneurial organization	Direct supervision	Strategic apex	Vertical and horizontal centralization
Machine organization	Standardization of work processes	Technostructure	Limited horizontal decentralization
Professional organization	Standardization of skills and knowledge	Operating core	Horizontal decentralization
Diversified organization	Standardization of outputs	Middle line	Limited vertical decentralization
Innovative organization	Mutual adjustment	Support staff	Selected decentralization
Missionary organization	Standardization of norms	Ideology	Decentralization
Political organization	None	None	Varies

Figure 2. Seven configurations of organizational structure. (Mintzberg, 1989, p. 110)

Machine Organizations

Morgan (1997) used the metaphor of a machine to describe organizations and noted that modern organizations operated as machines are typically called bureaucracies. One of the earliest contributors to this theory of organizations as machines was German sociologist Max Weber, who noted that "bureaucratic form routinizes the process of administration exactly as the machine routinizes production" (Morgan, 1997, p. 17). Classical management and scientific management theorists made major contributions to this way of thinking by providing detailed principles and methods to achieve the mechanistically structured organization. Jobs are precisely defined and ordered and organized in a hierarchical fashion through precisely defined lines of command and communication. The outcome is intentional top-down, well-defined control structures intended to make a process as efficient as possible.

As Morgan identified, this type of organizational structure is based on the belief of rational systems, and in as much as humans are not always rational, little attention is actually given to the people who make up the organization in classical and scientific management theory.

Mintzberg (1979) defined the coordination of machine bureaucracy through standardization of work processes. The technostructure designs the work standards for its operators and the line managers enforce them. The power of office is the basis for authority through a hierarchical structure. There is limited horizontal decentralization, meaning power is shared selectively through the technostructure over the operating core.

Frederick Taylor pioneered much of what is termed scientific management theory in the early 1900s, and his works have greatly influenced the way many organizations are run in modern-day work environments (Morgan, 1997). He advocated five principles for designing and running an organization: (1) place all responsibility for thinking related to planning and design of work on the manager and take those functions completely away from the worker; (2) use scientific methods to determine the most efficient way of doing the work and design the worker's task in precise ways to accomplish the work; (3) select the best person to perform the designed job; (4) train the worker to do the work efficiently; and (5) monitor worker performance to ensure that the designed work is carried out precisely and efficiently. This framework for work design can be found today to varying degrees in manufacturing facilities, banks, hospitals, educational institutions, governmental agencies, and service industries around the world.

Morgan (1997) summarized the strengths and limitations of the organization as machine approach. This approach works well under conditions where machines would work well, such as when there are straightforward tasks to perform, there is a stable environment,

the product being produced needs to be the same over and over again, precision is a premium, and human participants are compliant. Where this approach breaks down is when an organization needs to change to adjust to its changing environmental conditions. The organization is designed to achieve goals, not to innovate. In turn, workers can become mindless and unquestioning and are dehumanized, resulting in undesirable outcomes of apathy, carelessness, and lack of pride. In addition, Morgan concluded that this approach can lead to competition for scarce resources among workers, undermining the organization's ability to achieve its primary objectives.

Professional Organizations

Morgan (1997) defined bureaucracy as "rule exercised through use of the written word, which provides the basis for a rational-legal type of authority, or rule of law" (p. 157). A specific type of bureaucracy, the professional bureaucracy, is a structural configuration where the prime coordinating mechanism is the standardization of skills and knowledge, and the key component is the operating core. The main design parameters for such an organization include training, horizontal job specialization, and vertical and horizontal decentralization. Factors that typically must be present in order to achieve this type of organization are a complex and stable environment and a non-sophisticated technical system.

According to Mintzberg (1979), "the professional bureaucracy relies for coordination on the standardization of skills and its associated design parameters, training and indoctrination" (p. 53). Specialists, or professionals, are hired who are either properly trained and indoctrinated, or are trained by the organization to be a specialist. The professional is given considerable control over their work, working independently from co-workers but closely with clients who are served. Standardization of skills and knowledge accounts for the

necessary coordination among the operating professionals (i.e. everyone can count on what the others in the organization are doing). However, many judgments are required of the professional due to the complexity of the task, no matter how standardized the knowledge and skills.

An important and complex process for entering the professional bureaucracy is training and indoctrination of the specialist. According to Mintzberg (1979):

> The initial training typically takes place over a period of years in a university or special institution. Here the skills and knowledge of the profession are formally programmed into the would-be professional. But in many cases that is only the first step, even if the most important one. There typically follows a long period of on-the-job training, such as internship in medicine and articling in accounting. Here the formal knowledge is applied and the practice of the skills perfected, under the close supervision of member of the profession. On-the-job training also completes the process of indoctrination, which began during the formal teaching. Once this process is completed, the professional association typically examines the trainee to determine whether he has the requisite knowledge, skills, and norms to enter the procession. (p. 54)

While the professional bureaucracy is similar to the machine bureaucracy from the standpoint of both being coordinated from a designed, standardized process, the professional bureaucracy has the standards originating outside its own structure in self-governing associations of professionals. Authority takes the form of power in expertise, not hierarchical systems. Professional autonomy is necessary, and consultation with peers is as important as receiving managerial orders.

The operating core is the key to the professional bureaucracy, while the only other organizational part that is fully elaborated is the support staff. The support staff is focused on serving the operating core, to perform the formalized routine work needed to aid the professional in carrying out his/her work. There is little need for a technostructure, except in the case of some nonprofessional support staff, since formalized planning of the work is not

needed for professionals. Also, there is little need for operating managers, so the middle line is thin and the operating units within the core are large. The professional bureaucracy structure is highly decentralized in both the vertical and horizontal dimensions (Mintzberg, 1979).

The administrative structure of the professional bureaucracy is highly democratic, particularly for the professionals at the operating core. Not only do the professionals control their own work, but they attempt to control the administrative decisions that affect them by controlling the middle line of the organization through staffing key administrative positions. Many times, full-time administrators must be certified members of the profession in order to carry any power (Mintzberg, 1979). Because of the power the operating core professionals have, the organization is sometimes viewed as an inverse pyramid with the professionals at the top and the administrators at the bottom, serving the professionals. The support staff functions many times are much larger in worker numbers, and they are organized in a machine bureaucratic fashion within the professional bureaucracy. This organizational structure works parallel to the professional structure but in a standard pyramid shape with administrative power working from top to bottom. The parallel hierarchies of the professionals and support staff (or nonprofessionals) are kept independent of each other, since the differences in their approaches toward work can cause conflict in the organization.

Potential issues with the professional bureaucracy include problems with coordination, discretion, and innovation. The professional bureaucracy is a collection of individuals joined together to draw on common resources and support services. It is at best a loose coordinating mechanism and leaves the potential for coordination problems between professionals or between the professional and the support staff. The second problem is that

there are no good mechanisms that control for incompetent or unconscientious professionals. Professional organizations and professionals themselves are typically reluctant to censure their own. Finally, professional bureaucracies are inflexible and not structured to adapt and innovate in the face of change. Change does not result from new administrators taking office with reforms or from government technostructures, but rather from the slow process of changing the professionals through altering the patterns of who can enter the profession and through training (Mintzberg, 1979).

Institutions: Definition and Analytical Frameworks

The concept of institution has been described by Scott (2001) as

- social processes that have attained a high degree of resilience;
- composed of cognitive, normative, and regulative elements that, together with associated activities and resources, provide stability and meaning to social life;
- transmitted by various types of carriers, including symbolic systems, relational systems, routines, and artifacts;
- operating at multiple levels of jurisdiction, from the world system to localized interpersonal relationships; and,
- connoting stability but are subject to change processes, both incremental and discontinuous (p. 46).

Scott (2001) explained that institutions are "multifaceted, durable social structures (processes), made up of symbolic elements, social activities, and material resources" (p. 47). He further stated that "although rules, norms, and cultural beliefs are central ingredients of institutions, the concept must also encompass associated behavior and material resources" (p. 47). This means that the rules, norms, and beliefs are only as important as the activities that produce, reproduce, and give meaning to them, arising through human interactions, preserving and modifying them.

Scott (2001) categorized three elements (he termed pillars) of institutions that include regulations and rules, norms, and cognitive categories and scripts. Referencing Hoffman (1997, p. 36), Scott writes that these three elements form a continuum from conscious to unconscious and from legally enforced to taken for granted. A social framework is developed that is multifaceted in interdependent and mutually reinforcing ways that describe institutional processes. Figure 3, taken from Scott (2001, p. 52), displays the various dimensions of the three institutional elements.

	Pillar		
	Regulative	Normative	Cognitive
Basis of compliance	Expedience	Social obligation	Taken-for-grantedness Shared understanding
Basis of order	Regulative rules	Binding expectations	Constitutive schema
Mechanisms	Coercive	Normative	Mimetic
Logic	Instrumentality	Appropriateness	Orthodoxy
Indicators	Rules Laws Sanctions	Certification Accreditation	Common beliefs Shared logics of action
Basis of legitimacy	Legally sanctioned	Morally governed	Comprehensible Recognizable Culturally supported

Figure 3: Scott's (2001, p. 52) three pillars of institutions

The regulative processes include establishing rules, monitoring conformity to them, and manipulating sanctions (rewards or punishments) in an attempt to influence future behavior. The processes can be informal or formal and work through force, fear, and expedience to sanction the rules of the institution. The normative processes emphasize normative rules that "introduce a prescriptive, evaluative, and obligatory dimension into

social life" (Scott, 2001, p. 54). These systems include values – conceptions of the preferred or the desirable – and norms – how things should be done.

Normative processes "define goals or objectives…and designate appropriate ways to pursue them" (Scott, 2001, p. 55). They also confer rights as well as responsibilities, privileges as well as duties, and licenses as well as mandates. Norms and values can be applicable to some or all members of the institution, therefore giving rise to the concept of roles within the organization.

The cognitive categories recognize the "shared conceptions that constitute the nature of social reality and the frames through which meaning is made" (Scott, 2001, p. 57). Further, Scott writes that "symbols – words, signs, and gestures – shape the meanings we attribute to objects and activities. The meanings arise through interactions and are maintained and transformed as they are employed to make sense of the ongoing stream of happenings" (p. 57).

Figure 4 identifies a second dimension, carriers, to Scott's (2001) three-pillar framework describing institutions. Carriers are the processes that institutions employ to transmit their messages and can be thought of as orthogonal to the three pillars, permitting one to cross-classify them. Symbolic systems refer to conventional aspects of culture, including rules and values, as well as newer conceptions of symbolic schemata including models, classifications, representations, and logics. Relational system carriers "rely on patterned expectations connected to networks of social positions: role systems" (Scott, 2001, p. 79). Routines "are carriers that rely on patterned actions that reflect the tacit knowledge of actors: deeply ingrained habits and procedures based on inarticulated knowledge and beliefs" (p. 80). Artifacts are "material culture" (p. 81) and include complex technologies embodied

Carriers	Pillar		
	Regulative	Normative	Cognitive
Symbolic systems	Rules Laws	Values Expectations	Categories Typifications Schema
Relational systems	Governance systems Power systems	Regimes Authority systems	Structural isomorphism Identities
Routines	Protocols Standard operating procedures	Jobs Roles Obedience to duty	Scripts
Artifacts	Objects complying with mandated specifications	Objects meeting conventions, standards	Objects possessing symbolic value

Figure 4: Scott's (2001, p. 77) institutional pillars and carriers

in hardware and software. Artifacts accommodate process and action and are therefore both products of human action and, once created and deployed, a part of the objective properties of the situation.

Steinrock (2006), building on the work of Brandon (2004), presents a convincing argument that a fourth pillar, an affective pillar, should be added to Scott's (2001) three-pillar framework. Schein (1992) suggests that climate, defined as the feeling that is conveyed in a group by the physical layout and the way in which members of the organization interact with each other, with customers, or with outsiders, is an essential category of culture. Steinrock cites the work of Benjamin Bloom, who wrote that individuals learn both cognitively and affectively. Affect, or emotion, is a central element within cultural systems. Also, Steinrock wrote that "it is clear that affect is influenced by cultures in a similar fashion as values, beliefs and behaviors (p.15)."

Greenspan and Shanker (2004) suggest that affect plays a significant role in the development and maintenance of human groups. Homans (1950) discusses the involvement of affect, or sentiment, in influencing the human group. Homans defined sentiment, incorporating both interaction and activity:

> The use of the term 'sentiment'…implies not a psychological reality but a cultural reality; it describes a type of behavior, which can be observed, not a state of mind, which must be inferred. Inflections in the voice, the look of the eyes and carriage of the head, intimate little movements of the hands and arms, reactions to complex situations affecting the welfare of parent or child, utterances describing the imagined state of the internal organs – such are the phenomena which are classed together under the head of sentiment, the qualifying terms of affection, sadness, etc., being given on the basis of distinctions recognized by the natives themselves and embodied in their terminology. Such distinctions, broadly speaking, correspond to those distinguished in our own society (p. 241).

Homans suggests that the term "sentiment" be utilized to label a host of terms such as emotion, affect, attitude, and motive. He defines sentiment as the drive or motive that propels activity. "All sentiment seeks expression in action, and if the action is rewarding it will be repeated" (p. 118). Homans also suggests that sentiment influences the expression of norms and opinions.

Steinrock (2006) incorporated sentiment as a fourth pillar, added to Scott's (2001) three-pillar paradigm. "Culture is influenced by constructed sentiments with shared emotional norms. Sentiment isomorphism emerges as organizations facilitate the suppression of individual emotions and the display of organizationally acceptable feelings and motives" (p.17). This isomorphism is reflected in symbolic form (Merton, 1996; Greenspan & Shanker, 2004; Schein, 1992).

Organizational Entry and Socialization Processes

From the individual's point of view, entry into an organization "is a process of breaking in and joining up, of learning the ropes, of figuring out how to get along and how to make it" (Van Maanen, 1975, cited in Schein, 1978, p. 81). From the organization's point of view, this same process is marked by induction activities, basic training, and socialization of the individual to the norms and values of the organization (Schein, 1968a). The transition process of the person from occupational choice to organizational choice to first job can be summarized in three stages: (1) entry – individual preparation and training, recruitment and selection, hiring decisions, and initial job placement; (2) socialization – the early process of learning the ropes and finding out how to make it in the organization, mutual testing between the individual and organization; and (3) mutual acceptance – the processes of formally and informally obtaining and granting full membership in the organization (Schein, 1978).

This process has been conceptualized by several other researchers in similar fashion: Feldman's Three-stage Entry Model (Feldman, 1976) – anticipatory socialization or "getting in," accommodation or "breaking in," and role management or "settling in"; Buchanan's Three-stage Early Career Model (Buchanan, 1974) – basic training and initiation, performance, and organizational dependability; and Porter-Lawler-Hackman's Three-stage Entry Model (Porter, Lawler, & Hackman, 1975) – prearrival, encounter, and change and acquisition.

Research about newcomers' pre-entry and entry into a work environment has tended to focus on one or a combination of three conceptual areas: organization/profession socialization processes, newcomer proactivity/motivation/self-efficacy, and person-organization fit. The following sections describe the relevant research and theoretical

constructs associated with each of these areas. An understanding of the literature in these areas will provide a foundation for conducting the research for this study.

Organizational Socialization Processes

Socialization is the process by which a culture reproduces itself. Socialization by an organization is supported by rules and regulations, cognitive categories and schemes, and norms/values. Bauer, Morrison, & Callister (1998) provided an extensive review of literature and research pertaining to organizational socialization. From the organization's standpoint, they provided four primary reasons why organizational socialization is important to understand. First, unsuccessful socialization can result in higher employee turnover, which can be extremely costly to the organization (Campion & Mitchell, 1983; Louis, 1980; Vandenberg & Scarpello, 1990). Second, the results have "a strong and potentially lasting impact on the behaviors and attitudes of employees who remain with the organization" (Bauer et al., 1998, p. 150). A third reason to understand the socialization process is that it is one of the primary means by which organizational culture is passed along and maintained (Louis, 1980, 1990). Fourth, organizational socialization is a primary way employees learn about politics and power dynamics within the organization, and many scholars argue that organizations are political arenas (Ferris, Russ, & Fandt, 1989; Kotter, 1977; Pfeffer, 1992).

From the newcomer's perspective, there are several other benefits to understanding effective socialization processes, although this perspective has been much less studied than the organization's perspective. Ashforth and Saks (1996) looked at "person change" in the context of work adjustments and defined it as "alterations in an individual's values, attitudes, personality, and career plans" (p. 153). Socialization can impact an individual's attitudes toward career, profession, field, or organization. It can also shape the beliefs a person

develops about work, affect the career path a person takes, and impact career decisions (Chatman, 1991; Holland, 1985; Jurgenson, 1978; Rynes & Gerhart, 1990).

Schein (1968a) wrote that socialization is the process by which a new member learns the value system, the norms, and the required behavior patterns of the society, organization, or group which he/she is entering. This learning is the "price of membership" (p. 3). Schein defined the values, norms, and behavior patterns as

1. The basic goals of the organization.
2. The preferred means by which these goals should be attained.
3. The basic responsibilities of the member in the role which is being granted to him/her by the organization.
4. The behavior patterns which are required for effective performance in the role.
5. A set of rules or principles which pertain to the maintenance of the identity and integrity of the organization.

Fischer (1986) identified five types of learning and change that occur during socialization: (1) preliminary learning (understanding that learning is needed and what and from whom they need to learn); (2) learning about the organization; (3) learning to function in a workgroup; (4) learning to do the job; and (5) personal learning (learning about oneself). However, Fischer noted that there has been little empirical work performed to measure outcomes of these processes. Further, she identified four research types that have been focused on to study variables that influence the socialization process: anticipatory socialization, newcomer motivation, organizational structures and processes, and agents (organization members who interact with the newcomer).

Through her review of literature, Fischer (1986) identified three distinct phases of the socialization process:

> The first stage is one of "anticipatory socialization" (Brief et al., 1979; Feldman, 1976; Louis, 1980), when newcomers prepare themselves for entry into the organization. This is followed by an "accommodation" (Feldman, 1976) or "initial confrontation" (Graen, 1976) stage when newcomers first join the organization and begin to master their job, develop relationships with coworkers, and learn how the organization operates. The final stage of socialization, referred to as "role management" (Feldman, 1976), "mutual acceptance" (Schein, 1978), "adaptation" (Louis, 1980), or "metamorphosis" (Van Maanen, 1975), is when newcomers become fully accepted members of the organization. (cited in Bauer et al., 1998, p. 153).

Wanous (1992) integrated several earlier socialization models in developing his four-stage model of the socialization process. The first stage was confronting and accepting organizational reality, which included confirmation/disconfirmation of expectations, conflicts between personal job wants and organizational climates, and determining which personal aspects are reinforced or punished by the organization. The second stage is achieving role clarity, which includes being initiated to the tasks of the new job, defining one's interpersonal roles, learning to cope with resistance to change, and learning how to work within a given structure and ambiguity. Third, the newcomer locates him- or herself in the organizational context. This includes learning which modes of behavior are congruent with those of the organization, resolution of conflicts at work, commitment to work, and establishment of an altered self-image and adoption of new values. The fourth stage, detecting signposts of successful socialization, involves high satisfaction, feelings of mutual acceptance, job involvement, and achievement of organizational dependability. Fischer (1986) noted that there have been few direct tests of stage models such as Wanous' (1992) model.

Van Maanen (1978) identified five modes of organizational socialization: (1) training, (2) education, (3) apprenticeship, (4) debasement experiences, and (5) cooptation. The training process is "skill-oriented and directed toward imparting the abilities and knowledge

necessary for the new member to perform a designated organizational role" (p. 102). But as Caplow (1964) stated, "analysis of any particular training program always shows it to be concerned with the communication of values, the development of an ambiance, the rejection of prior affiliations and the development of an appropriate self-image" (p. 173). Education refers to the systematic teaching of values and skills required for participation in an organization. Apprenticeship is similar to training, but the responsibility for transforming the new member to full status is delegated to selected experienced organizational members, or sponsors, as Becker and Strauss (1956) refer to them. Debasement experiences aim to destroy old and create new behavioral predispositions in new members. Cooptation is "the process of absorbing new elements into the leadership or policy determining structure of an organization as a means of converting threats to its stability or existence" (Selznick, 1949, p. 13).

Most of the research in socialization processes has focused on the impact of organizational factors. The work of Van Maanen and Schein (1979) is most often cited related to this topic. They identified six tactics used to socialize newcomers: (1) formal vs. informal, (2) collective vs. individual, (3) sequential vs. random, (4) fixed timetable vs. variable timetable, (5) mentoring vs. sink-or-swim, and (6) self-enhancing vs. deconstructive. Van Maanen (1978) and Schein (1990) also identify a seventh tactic: (7) tournament vs. contest. These tactics can result in one of three outcomes for newcomers: (a) custodial orientation – total conformity to all norms and complete learning of all assumptions; (b) creative individualism – the newcomer learns all of the central and pivotal assumptions of the organization's culture but rejects peripheral ones, thus leading to creativity and role innovation; and (c) rebellion – total rejection of all assumptions (Schein, 1990).

Figure 5 provides a categorization presented by Jones (1986) of Van Maanen and Schein's (1979) six dimensions of organizational socialization processes of newcomers. The institutionalized category is one of the socialization spectrum that tends to produce newcomers who strictly conform to all organizational norms and values. The other end of the spectrum, individualized, produces newcomers who are creative individualists or, in extreme cases, rebels. Following is a brief discussion of the two extremes of each tactic from Van Maanen and Schein's (1979) work.

Tactics concerned with:	Institutionalized	Individualized
Context	(1) Collective (2) Formal	Individual Informal
Content	(3) Sequential (4) Fixed Timetable	Random Variable Timetable
Social Aspects	(5) Mentoring (6) Self-enhancing	Sink-or-Swim Deconstructive

Figure 5: A classification of socialization tactics (Jones, 1986, p. 263)

Collective vs. Individual: Collective, or group, socialization refers to taking a group of newcomers and putting them through a common set of experiences together. Examples of this include military training, fraternal organizations, and some management trainee programs. Individual socialization refers to processing the newcomer singly and in isolation from other newcomers. Examples can include apprenticeship programs and some internships. During collective processes, individual's thoughts, feelings, and actions tend to reflect the group's consciousness (Becker, 1964). Collective socialization many times promotes and intensifies the demands of the socialization agents. Individual strategies produce less

homogeneous outcomes and are usually associated with complex roles. Collective activities typically happen in organizations with large numbers of recruits to be processed, and individual processes take place when there are few incumbents for a given role. Individual processes are usually more expensive, and failures cannot be easily recycled or reassigned. Collective socialization is most likely to be associated with functional boundaries or with the external inclusionary boundary of a given organizational segment. Individual socialization is associated with hierarchical boundaries where the learning of complex skills, attitudes, or values is expected. It also would be expected to precede passage through the innermost inclusionary boundaries within an organizational segment. Collective tactics are most likely to produce a custodial orientation among newcomers and least likely to produce role-innovative outcomes. Finally, individual tactics are most likely to produce a specific outcome desired by the socialization agent(s).

Formal vs. Informal: Formal tactics separate a newcomer from regular organizational members during the socialization processes. Examples include police academies, professional schools, some internships, and some apprenticeships where the apprentice's role is clearly defined. Formal processes are typically found in organizations where specific preparation is important so the newcomer learns the desired attitudes, values, and protocol associated with the new role. These processes concentrate more on attitude than application of skills. Formal processes also allow the organization to better judge the newcomer's ability to conform and perform. These settings are more likely associated with hierarchical and inclusionary boundary passages in the organization because the newcomer is expected to assume a rank or status. Formal processes typically are used in situations where the work performed or the values surrounding the work to be performed are determined to include high

levels of risk to the newcomer, the organization, or clients of the organization. Formal socialization typically produces a custodial orientation.

Informal processes do not distinguish the newcomer's role specifically, nor do they differentiate newcomers from more experienced organizational members. Examples include on-the-job-training programs and apprenticeships where the role is not tightly specified. Informal processes put the onus on the newcomer to select their own socialization agents, and therefore, greater expectations are placed on the agent of the organization to transfer relevant knowledge. This also assumes a level of proactivity in the newcomer to seek out socializing agents. Second, errors or mistakes by the newcomer in this setting must be regarded as more costly and serious since they have the responsibility of learning. Informal processes are most likely associated with functional boundary passages, such as learning new skills, methods, or practical abilities. Informal socialization has the potential for producing more extreme responses in newcomers in either custodial or innovative orientations than does formal socialization.

Sequential vs. Random: When the process of socializing a newcomer to an organization requires many steps or years of preparation to accomplish, the socialization process can take two forms: sequential and random. Sequential socialization is the degree to which the organization specifies a given sequence of discrete and identifiable steps leading to a target role. Random socialization occurs when the steps leading to the target role are unknown, ambiguous, or continually changing. Examples of sequential processes are those that someone trained in medicine might encounter, while random processes are many times seen in managerial positions.

Sequential strategies have the added characteristic of either building logically from one step to the next (i.e. simple to complex such as in technical training programs), or having no internal logic. The role of agents places an important part in sequential processes, because several agents may be responsible for different steps. The degree to which the agents are consistent with their messages is important. Merton (1957) and Glaser (1964) both pointed out that the transition from a sequential to a random socialization process can be difficult for newcomers. As an example, many science programs (including engineering) have a sequential training program on the academic side but typically have random processes once working in a job outside of the university. In sequential processes, there likely will be a strong bias in the presentation by the agent that the next step or stage is easier. Sequential socialization is typically associated with hierarchical boundaries, in part to preserve the image that the hierarchy itself is a valid base for distribution of authority. To pass through inclusionary boundaries may take a long time while the newcomer proves him- or herself. Sequential socialization also typically produces custodial orientation newcomers, while random processes can result in innovative orientations.

Fixed Timetable vs. Variable Timetable: This dimension is the degree to which steps involved in the socialization process have a timetable that is adhered to by the organization and communicated to the newcomer. Fixed timetable processes provide the newcomer with precise knowledge about the time to complete passage in the organization. This can be seen with some management trainee programs that specify the time it will take to be a trainee. Variable timetable processes provide fewer clues as to when a boundary passage can be expected. Variable tactics require the newcomer to search out clues to the future, and therefore what is true for one newcomer may not be the case for another. “Sidetracking” of

newcomers (to provide clues they are on a different path) who are not “cutting it” happens with both processes but more intentionally with fixed socialization. Variable processes are a powerful deterrent to the formation of group solidarity since there is not a cohort or cohesive group working together. These situations often produce either intentional or unintentional competition among newcomers.

Fixed timetable processes are most likely to be associated with hierarchical boundary passages and least likely with inclusionary boundaries. Also, fixed socialization is more likely to produce innovative responses, and variable processes lead to custodial responses. This happens because anxiety experienced with random processes typically motivates people toward conformity. It keeps people off balance and more prone to intentional socialization agents.

Mentoring vs. Sink-or-Swim: Mentoring socialization refers to having the experienced people in the organization groom the newcomers who will take their place, performing similar roles. An example of this tactic is used in police work, where rookies partner with a veteran officer to learn the ropes. Mentoring processes refer to those where a newcomer has nobody to follow in the footsteps of and there are no role models for the position that is being assumed. One example might be a female engineer entering an organization that has never had a female engineer before. Sometimes, a younger member of the organization progress faster than older, veteran members, and a situation develops where the younger member manages the older members. This can result in gapping, a historical, social or ideological distance between newcomers and agents. In this case, an intended mentoring process might become a sink-or-swim one.

Mentoring socialization is likely associated with inclusionary passages, and mentoring processes are likely found only at those functional or hierarchical boundary passages that are seen by those in control of the process as requiring a continuity of skills, values, and attitudes. Mentoring socialization is most likely to produce a custodial orientation, while sink-or-swim processes are most likely to produce an innovative orientation. A mentoring process risks stagnation and contamination, while a sink-or-swim process risks complications and confusion.

Self-enhancing vs. Deconstructive: This strategy concerns the degree to which a socialization process is constructed to either confirm or disconfirm the entering identity of the newcomer. Self-enhancing tactics ratify and document the viability and usefulness of personal characteristics brought to the organization by newcomers. The organization does not try to change the newcomer but to build upon the values, skills, and attitudes the newcomer already possesses. Deconstructive tactics attempt to deny and strip the newcomer of certain personal characteristics. These processes try and disconfirm the entering newcomer's self-image and rebuild it based on new assumptions. Examples include professional athletic teams, law enforcement agencies, military, and some elite law schools. Deconstructing tactics are most likely to be found at the point of initial entry into an organization or occupation and prior to crossing the major inclusionary boundaries. These processes most often lead to a custodial orientation, while self-enhancing tactics likely lead to an innovative orientation.

Tournament vs. Contest: This strategy is the degree to which each stage is an elimination tournament where one is out of the organization if one fails or a contest in which one builds up a track record and batting average.

In summary, a newcomer is most likely to respond with a custodial orientation as a result of socialization processes that are sequential, variable, mentoring, and involve deconstructing tactics. Content innovation most likely will occur through processes that are collective, formal, random, fixed timetable, and sink-or-swim. Role innovation will often occur when a socialization process is individual, informal, random, sink-or-swim, and involves self-enhancing processes (Van Maanen & Schein, 1979).

Bauer et al. (1998) summarized socialization research since the Fischer (1986) review. They identified several methodological advances, including the use of more quantitative studies and longitudinal studies. They also noted that while there has been a large number of different organizations studied, there has been a limited range of jobs and industries studied, limiting the generalizability of the findings. In particular, there have been few studies of blue-collar workers. The following studies were identified that involved degreed engineers or engineering students: Chao et al., 1994; Eden, 1992; Gundry, 1993; King & Sethi, 1992; Major et al., 1995; and Ostroff & Kozlowski, 1992, 1993. In addition, five other studies have been identified, investigating socialization processes of co-op students either missing from or conducted since the Bauer et al. (1998) piece: four doctoral dissertations (Brown, 1985a; Finn, 1985; Kirby, 1990; Nixon, 1989); a study by Garavan and Murphy (2001); and a study by Parson, Caylor, and Simmons (2005). In addition, Bauer et al. identified the following studies that involved interns or undergraduate college students within work environments: Bauer & Green, 1998; Blau, 1988; Enoch, 1989; Feldman & Weitz, 1990; and Major & Kozlowski, 1997. This research will be summarized in a subsequent section (Socialization Research Related to Engineers and/or Co-op).

Chao et al. (1994) developed an instrument that measures six content areas of socialization:

> (1) *performance* or task proficiency (Adkins, 1995; Morrison, 1993a); (2) *people*, which refers to the development of relationships (Blau, 1988; Major et al. 1995; Morrison, 1993a; Schaubroeck & Green, 1989); (3) *organizational goals and values*, which reflects acculturation or acceptance of the organization's culture (Morrison, 1993a); (4) *language* or mastering of slang, jargon, and technical language of the organization; (5) *politics* or learning about and being able to operate within the formal and informal power structure; and (6) *history*, which refers to learning about organizational customs, stories and rituals. (cited in Bauer et al., 1998, p. 159)

As reported by Fischer (1986), Bauer et al. (1998) also found that most empirical studies since 1986 have continued to assess secondary outcomes of socialization (attitudinal outcomes – job satisfaction, commitment, role stress, performance, intentions to quit), as opposed to primary outcomes (direct relationships to socialization theory – role innovation, acculturation, learning, and behavioral outcomes). Theoretical models proposed by Van Maanen and Schein (1979), Feldman (1976, 1981), Louis (1980), and Reichers (1987) have been used to study socialization outcomes such as role orientation, task mastery, role clarity, social integration, and acculturation (internalization of the organization's norms and values). According to Bauer et al., only a handful of studies have addressed learning-related outcomes, including Ostroff and Kozlowski (1992, 1993), and only a few have studied how newcomers learn about an organization's culture, including Chatman (1991) and Morrison (1993a). Ostroff and Kozlowski found that newcomers with mentors learn more than newcomers without mentors, and that over time newcomers' task and role-related knowledge increased. Chatman's study found that newcomers learned organizational values and culture if they attended social events and had a mentor, while Morrison found a modest relationship between cultural knowledge at six months and information-seeking at three months.

Bauer et al's. (1998) summarization of factors affecting socialization processes was divided into four areas – organizational structures and processes, interactions with agents, newcomer attributes, and newcomer behaviors. Organizational structures and processes included organizational tactics, job characteristics, and recruitment practices. Jones (1986) designed scales based on the organizational tactics identified by Van Maanen and Schein (1979). One end of the continuum represented a highly institutionalized approach where socialization takes place through formal settings in groups in which newcomers are given clear information about the sequence and timing of the socialization process. The other end of the continuum is a highly individualized approach, with informal processes including limited information provided about sequence and timing. Most empirical studies of Van Maanen and Schein's tactics have found that an institutionalized approach to socialization will most likely produce a custodial orientation, while individualized approaches lead to innovative orientation towards one's role (Ashforth & Saks, 1996; Jones, 1986; King & Sethi, 1992). However, Black (1992) found that collective (institutionalized) socialization was positively related to role innovation, although serial and fixed tactics (also institutionalized tactics) were found to be negatively correlated with role innovation.

Several studies have found positive relationship between institutionalized tactics and attitudinal outcomes such as organizational commitment (Ashforth & Saks, 1996; Jones, 1986; King & Sethi, 1992), job satisfaction (Ashforth & Saks, 1996; Jones, 1986), intention to remain (Ashforth & Saks, 1996; Jones, 1986), role clarity (Jones, 1986; King & Sethi, 1992), negative relationships with self-efficacy (Jones, 1986), and work/family conflict (Zaharly & Tosi, 1989). There have been limited studies relating effects of job variables to socialization, although Major and Kowalski (1997) did find some evidence that job

characteristics do matter for interns. Dean, Ferris, & Konstans (1988) found that job characteristics predicted reality shock, which then predicted job attitudes, performance, and intent to remain. Colarelli, Dean, & Konstans (1987) also found that autonomy, feedback, and job context were positively related to job satisfaction, organizational commitment, and performance, suggesting job design variables have a greater impact on newcomer performance than cognitive ability or career goals. Some studies also predict that recruitment practices may play an important role in newcomer expectations (Chatman, 1991).

Agents of socialization (peers, supervisors, and mentors) play an important role in newcomers' understanding of the organization and their role within it (Louis, 1980; Reichers, 1987). Agents can facilitate socialization by providing advice, job instructions, and social support (Louis, Posner, & Powell, 1983). The quality of newcomer-manager relationships positively influences job attitudes (Major et al., 1995) and moderates the relationship between newcomer role clarity and performance (Blau, 1988). Ostroff and Kozlowski (1993) determined that newcomers learned more about an organization if they had mentors. Also, work peers and supervisors provided comparable amounts of information about the task and organization, but supervisors provided more information about the organization and work roles, while peers provided more work group information (Ostroff & Kozlowski, 1992). The most common types of information received by newcomers from insiders pertained to organizational structures and policies, although newcomers preferred more information about performance and roles (Morrison, 1995). Finally, Sutton and Louis (1987) proposed that agents of the organization are also influenced by newcomers through acquisition of new skills, competitor information, and contemplation of new ideas.

Newcomer Attributes, Proactivity, Motivation, and Self-efficacy

Newcomer attributes that can impact the socialization process include prior work experience, values, personality, demographics, and relational effects. Prior work experience can influence newcomers' expectations and lessen entry shock (Jones, 1983), and increase understanding of political/power realities within organizations (Jones, 1983; Louis, 1980). Chatman (1991) determined that socialization is facilitated when newcomers' values are similar to the dominant values of the organization. Jones (1983) proposed that high self-efficacy and high growth need help a newcomer more easily assimilate role and cultural knowledge, and Saks (1995) found that self-efficacy was a moderator between training and adjustment. Jones (1986) found that newcomers with low self-efficacy would more likely adopt a custodial role orientation, and Major and Kozlowski (1997) determined that low self-efficacy was related to greater information seeking when task interdependence was high. However, Laker and Steffy (1995) and Waung (1995) found that self-efficacy was not a moderating link between socialization tactics and outcomes. Other personality variables such as self-monitoring, locus of control, desire for control and for feedback, and commitment propensity have also been studied. Chatman (1991) found self-monitoring unrelated to changes in person-organization fit, Zahrly and Tosi (1989) found self-monitoring negatively related to work-family conflict and internal locus of control related to lowered role ambiguity, and Black and Ashford (1995) found that desire for feedback and desire for control were related to changes in newcomers on the job.

There have been few empirical studies focusing on the effects of diversity, or differences associated with race, gender, or cultural origin. Gender results have suggested only slight or subtle differences between men and women, except women may have lower

self-efficacy than men (Bauer & Green, 1994) despite no difference in performance or mentoring availability (Bauer & Green, 1998), and women engage in more self-punishing behavior (Saks & Ashforth, 1996). Eden (1992) found that despite high job satisfaction in men and women engineers, the women were more likely to report they wanted to change careers because of perceived gender discrimination, occupational requirements, and work-family conflict. Gender differences between newcomers and insiders were found to result in lower job challenge (Kirchmeyer, 1995). Finally, Bauer et al. (1998) were unable to find any studies reporting effects associated with race.

Bauer et al. (1998) noted that most of the significant shifts in research from 1986 to 1998 involved how the newcomer acted upon their environment during socialization processes. Reichers (1987) was one of the first to acknowledge and present a conceptual model of the newcomer's proactive role during socialization. Miller and Jablin (1991) provided another conceptual model that included proactivity of the newcomer. They determined that newcomers seek information to reduce uncertainty, including the following tactics: referent or role-related information, appraisal or feedback information, and relational or social information. In addition to those three types of information, Morrison (1993a) investigated technical information and normative information about the behaviors and attitudes expected by organizations. Morrison (1995) also proposed that there are seven primary types of information newcomers need to acquire: technical, referent, social, feedback, normative, organizational, and political.

Morrison (1993a, 1995) determined that newcomers use direct tactics (inquiry) more than indirect (monitoring) to obtain technical information, but indirect tactics are used more often when seeking less urgent or more sensitive information (Comer, 1991). Newcomers

will also rely more on supervisors for technical, referent, and feedback information, and on peers for social information (Morrison, 1993a). Comer (1991) found that newcomers seek more technical information than social, and Morrison (1995) found that newcomers seek technical and referent information the most, and social and normative information the least. Ashford and Black (1996) found information seeking to be related to desire for control, and Major and Kozlowski (1997) found that task interdependence was related to greater information seeking. Morrison (1993a, 1993b) and Ostroff and Kozlowski (1992) found that proactive information seeking was positively related to newcomer's task mastery, role clarity, social integration, satisfaction, performance, commitment, and intentions to remain. However, Ashford and Black (1996) found information-seeking to be unrelated to performance and negatively related to satisfaction, and feedback-seeking to be unrelated to both of those outcomes. Also, Bauer and Green (1998) found that information-seeking did not relate to newcomers' perceptions of role clarity, efficacy, acceptance by managers, job satisfaction, or organizational commitment.

Raschke's Socialization Model

Raschke (2003) developed a framework used to describe socialization of new members into a professional field. Although this model was developed after studying a group of experienced business professionals in a K-12 education setting, there could be application to engineering co-op students. The categories used in the model of explanation were origin, pre-entry, offer and acceptance, inside, socialization, and outcome. Origin was defined as the originating situation of the individual defined in terms outside of the field, profession, and organization. Pre-entry included developmental activities for the individual, such as a need to develop knowledge and experience in a new profession, and the employer, such as vacancy

or purpose and expectations. Entry inside the new field, profession, and organization included an offer by the employer and acceptance by the individual. Socialization is the process by which individuals move from outside to inside the occupational field, from outside to inside the profession, and from outside to inside the specific organization. The intended outcome is creative individualism, for the individuals to accept the mission and objectives of the field, profession, and organization but innovate the content of the role within the organization (Schein, 1990).

Concepts of occupation and career were based on the works of Schein (1978) and Wanous (1992). The concept of organizational culture was based on the research of Schein (1990) and distinguished as observable artifacts, values, and basic underlying assumptions. The concept of organizational structure was based on Mintzberg's model of basic structural configurations (Mintzberg, 1989) and professional bureaucracy (Mintzberg, 1979). The concept of matching the individual and organization during entry was based on the research of Wanous (1992) and suggested that organizational entry is a two-sided process in which individuals choose organizations and organizations select individuals. The process of socialization and the tactics used in socialization were based on the work of Van Maanen and Schein (1979). Concepts of outcome were based on the work of Schein (1990).

Field was conceptualized as "an existence of a community of organizations that partakes of a common meaning system and whose participants interact more frequently and fatefully with one another than with actors outside the field" (Scott, 1994, pp. 207-208). Profession was a social construct of a "homogeneous grouping of very particular jobs and positions" (Moore, 1969). Profession consisted of two distinct elements: disciplinary knowledge and professional role. Disciplinary knowledge consisted of formal education,

skills, and experiences related to the profession. Organization consisted of organizational culture and role expectation. Organizational culture was framed by looking at "the way we do business around here" (Deal & Kennedy, 1982, p. 4). Role expectation was the type of work individuals were expected to perform within a specific organization.

Van Maanen and Schein (1979) identified tactical dimensions of the socialization process. Schein (1990) provided additional descriptions of the tactics that were particularly explanatory for Raschke's (2003) model. The tactics were 1) group versus individual, 2) formal versus informal, 3) sequential versus random, 4) fixed timetables versus open ended, 5) mentoring versus sink-or-swim, and 6) self-enhancing versus reconstructive. The outcome of the socialization process was defined in one of three ways: creative individualism, custodial, or rebellion. Creative individualism, as defined by Schein (1990), is an expectation to learn and accept the pivotal norms, mission, and objectives of the field, profession, and organizational culture but innovate the content of the role within the organization. The opposite extreme in outcomes is rebellion, where the person rejects the socialization to the field and organization. Outcomes can be evaluated in three ways: 1) achieving the intended outcome, 2) the actual outcome, and 3) dealing with mismatches.

Person-Organization Fit

Kristof (1996) defined Person-Organization (P-O) fit as the "compatibility between people and organizations that occurs when: (a) at least one entity provides what the other needs, or (b) they share similar fundamental characteristics, or (c) both (p. 4)." Schneider (1987) suggested that individuals and organizations are attracted to each other based on similar values and goals. P-O fit is a complimentary phenomenon to organizational socialization and influences the outcome of an experience between a person and the work

environment. Cable and Parsons (2001) concluded that attention paid to socialization tactics resulted in positive outcomes with regard to P-O fit. Similar to the work performed by Raschke (2003) for developing a model of newcomer socialization, Kristof (1996) suggested that three aspects of the employment experience (organizational entry, socialization, and long-term outcomes) are used as a framework for defining P-O fit literature and studies.

Kristof (1996) summarized that the literature conceptualizes P-O fit several ways, including two primary distinctions: (1) supplementary vs. complementary fit and (2) needs-supplies vs. demands-abilities. Supplementary fit is when a person "supplements, embellishes, or possesses characteristics which are similar to other individuals in an environment" (Muchinsky & Monahan, 1987, p. 269), and complementary fit is when a person's characteristics "make whole" the environment or add to what is missing (Muchinsky & Monahan, 1987, p.271). From the needs-supplies perspective, P-O fit "occurs when an organization satisfies individuals' needs, desires, or preferences," and the demands-abilities perspective "suggests that fit occurs when an individual has the abilities required to meet organizational demands" (Kristof, 1996, p.3).

Four operationalizations of P-O fit were identified by Kristof (1996). One is the congruence between individual and organizational values (e.g. Boxx, Odom, & Dunn, 1991; Chatman, 1991; Judge & Bretz, 1992; Posner, 1992), also described as person-culture fit by O'Reilly, Chatman, and Caldwell (1991). A second way P-O fit has been operationalized is focusing on individuals' goals congruence with organizational leaders and peers (e.g. Vancouver, Millsap, & Peters, 1994; Witt & Silver, 1995), based on the work of Schneider's (1987) attraction-selection-attrition framework. The third operationalization defines fit as the match between individual preferences or needs and organizational systems and structures

(e.g. Cable & Judge, 1994; Turban & Keon, 1993). The fourth operationalization describes P-O fit as a match between the characteristics of individual personality and organizational climate (e.g. Bowen, Ledford, & Nathan, 1991).

In addition to socialization tactics, Cable and Parsons (2001) suggested that P-O fit is influenced by newcomers' initial values congruence (Cable & Judge, 1996; Chatman, 1991; Schneider, 1987), their previous work experience (Feldman & Arnold, 1978), their number of job offers (O'Reilly & Caldwell, 1981), and their tenure with the organization. However, two studies (Adkins, 1995; Cable & Parsons, 2001) found that there was little effect of previous work experience on organizational adjustment. Cable and Parsons determined that newcomers are more likely to report positive P-O fit perceptions when they experienced sequential and fixed socialization (and also serial and investiture-oriented socialization) than when they experienced variable and random socialization.

Summary of Socialization Research using Co-op and/or Engineers

The factors indicated by employers as important in the success of students who participate in cooperative education programs may be explained through socialization processes of students into employer organizations and occupational roles related to the area of academic training. Other than studies by Finn (1985), Garavan and Murphy (2001), Jones (1985), Kirby (1990), Major and Kozlowski (1997), and Nixon (1989), and a recent study by Parsons, Caylor, and Simmons (2005), there is little research available that specifically targets socialization processes and the impact in measuring the success and benefits of cooperative education activities in higher education. Several studies (Laycock et al., 1992; Cutt & Loken, 1995; Hall et al., 1995; Apostolides & Looye, 1997; Coll et al., 1997; Van

Gyn et al., 1997; Parks et al., 2001) have rated or measured variables typically associated with socialization of newcomers into an organization, but none relate the variables to socialization theories or models.

The results of studies focusing on student outcomes associated with cooperative education, from both the student and employer perspectives, indicate that some work skills and career focus/success are improved through cooperative education experience. While several studies have attempted to better define learning outcomes associated with cooperative education, very few (including Finn, 1985; Garavan and Murphy, 2001; Jones, 1985; Kirby, 1990; Major and Kozlowski, 1997; Nixon, 1989; Parsons, Caylor, & Simmons, 2005) have focused on socialization of students into the profession or organization via cooperative education. In addition, only the studies by Garavan and Murphy and Kirby used qualitative methods to understand in-depth experiences of students.

Studies with Graduating or Practicing Engineers

Eden (1992) investigated socialization of women into male-dominated occupations. The study consisted of interviewing 29 female and three male engineers who worked in industrial settings in California. The study design was cross-sectional, the method used was personal interviews, and the data source was self-reported information. The results indicated that female engineers chose engineering because of the challenge, an interest in the profession, and strong parental influence. There were difficulties due to perceived gender discrimination, occupational requirements, and parenthood-career balance. Therefore, even though they liked their work, many wished to change careers to occupations that were more emotionally rewarding and offered more control over their working hours.

King and Sethi (1992) examined the impact of socialization practices on the nature of role adjustment in the context of high-technology firms. A total of 160 technology professionals from 51 different companies in a major Midwestern metropolitan area participated in the study. The study design was cross-sectional, the method used was surveys, and the data were self-reported. Results suggested that socialization practices affect professional role adjustment. Institutionalized socialization tactics led to a custodial role orientation and individualized socialization tactics produced an innovative role orientation. Also, similarities in demographics were found to moderate the socialization relationships.

Ostroff and Kozlowski (1992) investigated newcomers' information acquisition about organizational contextual domains from different sources, the relationship between information acquisition and knowledge of domains, relationships between information acquisition from sources, knowledge of domains and socialization outcomes, and shifts in these processes over time. The sample consisted of 86 engineering majors, 62 business majors, 3 from other majors, 88 male, and 63 female. The organizations the participants belonged to averaged 5,000 to 10,000 total employees. The study design was longitudinal (surveys conducted 2 months and 5month post-entry), the method used was surveys, and the data were self-reported. Results indicated that newcomers had different reliance on sources of gathering information and that different sources were of varying importance for gaining knowledge. Also, it was determined that supervisors, coworkers, task, and role mastery were positively related to the socialization process of new employees.

Gundry (1993) investigated the socialization of newly hired engineers to determine how they search for information about workplace norms and how they learn to fit into the organization. The sample included 149 newly hired engineers and 52 engineering managers

in twelve electronics manufacturing companies located in a metropolitan area of a Midwestern city. The study design was cross-sectional, with a comparison of views between newcomer and organization representative; the method was a survey; and the data self-reported by newcomers and managers. The engineers were 83% male and the managers were 96% male. Results indicated that newcomers believed their organizations support norms of competition and defensive interpersonal relations (security orientation), while managers believed the organization supported norms of achievement and collaboration (satisfaction orientation). Engineers reported less clarity and consistency in work-related expectations, less satisfaction with being a member, and less intention to remain in their organization than did the managers.

Ostroff and Kozlowski (1993) investigated the effects of mentoring relationships on the learning process of newcomers during early organizational socialization experiences. In particular, the researchers examined how newcomers acquired information about important content domains of the setting (task, role, group, organization) from information sources (mentors, supervisors, co-workers, observation, experimentation, and objective referents). The sample consisted of 188 males and 144 females, of whom 155 were business majors, 172 were engineering majors, and 5 were some other major. They were from a broad range of organizations with median size of total employees between 5,000 and 10,000 employees. Results indicated that those newcomers with mentors tended to rely on observation of others and their mentors to acquire information, while those without mentors relied on observation and co-workers to acquire information. Those newcomers with mentors were able to learn more about organizational issues and practices than their non-mentored counterparts.

Chao et al. (1994) investigated the relationships between learning particular features of a job/organization and the process and outcomes of socialization. The study was longitudinal, covering five years and involving engineers and managers who had graduated with an engineering degree from two sources: a large public university and a small private engineering college. Participants were solicited from a large cross-section of graduating classes ranging from 1956 to 1986. In year one of the study, 780 people participated (83% male, 64% engineers, 30% in management), while 432 of the same group participated by the fifth year of the study (84% male, 39% engineers, 53% in management). The survey study was conducted at three intervals over the five years of the study, and the data were self-reported. At Phase 1, six socialization dimensions were determined from a factor analysis – performance proficiency, politics, language, people, organizational goals/values, and history. Results at Phase 2 showed significant differences in the socialization dimensions as some people made no job changes, others made a moderate change within the same organization, and others made job changes to new organizations. The findings at Phase 2 supported an original hypothesis of Schein (1971), who believed that socialization occurs at all stages of an individual's career. People who were well socialized in their organizational roles had greater personal incomes, were more satisfied, were more involved in their careers, were more adaptable, and had a better sense of their personal identity.

Major et al. (1995) conducted a longitudinal study to examine moderating effects of role development on the link between unmet expectations and socialization outcomes. Two role-development constructs (leader-member exchange and team-member exchange) and three socialization outcomes (organizational commitment, turnover retention, and job satisfaction) were measured. Sampling was conducted prior to organizational entry after

graduation and then on average four weeks after employment began. The sample consisted of graduating seniors from a large Midwestern university, with 402 respondents to the original survey and 252 on the four-week follow-up survey. At four weeks, 84 respondents were male, 164 were female, and 14% were engineering and sciences positions. The research method used a survey that was self-reported data. Results indicated that met expectations, leader-member exchange, and team-member exchange were significant predictors of all outcomes. Also, leader-member and team-member exchange significantly moderated several relationships, such that favorable role development relationships with supervisors or work groups overcame the negative effects of unmet expectations.

Studies with Interns or Co-ops, but not with Engineering Students

Blau (1988) investigated organizational socialization of interns into an insurance company located in a large eastern city. Internships are typically one full year in duration (consecutive 12-month experience). Surveys were given to interns and managers, with 69 completed by interns and 64 completed by managers, resulting in 55 intern-manager matches. For the interns, 57% were female, while the managers were 66% male. The study was cross-sectional, and data were self-reported from the interns and managers. Results showed that intern-manager work relationships were found to have a direct and moderating effect on intern work outcomes. Quality work relationships were significantly positively related to intern-met expectations, role clarity, organizational commitment, and performance.

Feldman and Weitz (1990) used a longitudinal study to learn about the individual, interpersonal, and organizational factors leading to successful summer internships in a retailing setting. Participants included 72 students (29 male, 43 female) in an internship program between the junior and senior years at a large state university business school.

Internships were 10-12 weeks long, and the 72 supervisors were 53% male and 47% female, with a mean of 8 years supervising with the present company. Surveys were collected from both interns and supervisors prior to beginning the internship and at the end of the internship. The results showed that interns who had realistic and positive job expectations (anticipatory socialization) were more likely to have positive experiences. The recruitment process did not play a large role in the outcomes of the internship experience. Interns respond better to investiture than to divestiture, and they prefer formal, structured orientation and training programs. Recruitment, socialization, training, and orientation factors had a greater impact on the interns' general work attitudes than they had on attitudes toward the vocation.

Cable and Judge (1996) conducted a study to investigate P-O fit, job choice, and organizational entry in order to identify the determinants of job seekers' and new employees' P-O fit perceptions and the importance of P-O fit perceptions in job choice decisions and work attitudes relative to job attributes. The study was longitudinal and survey-based. Job applicants interviewing for both full-time and paid internship position with 35 different organizations at the industrial relations school of a large northeastern university were surveyed three times: immediately after their interview with the organization, after the end of the semester but before beginning the work at the organization, and six months after beginning the work experience. Also, 20 recruiters from 18 different organizations provided demographic information about their organizations. There were 320 surveys returned at time one (56% women, 70% Caucasian, mean grade-point average of 3.5, 51% undergraduates, 59% seeking internships), 129 returned surveys at time two (96 completed both the survey about themselves and about the recruiting organization), and 68 returned surveys at time three. All internships were completed by time three. The Organizational Culture Profile

(OCP; O'Reilly et al., 1991) was used to assess P-O fit. Results indicated that job seekers' perceptions of P-O fit can be predicted by the congruence between their values and perceptions of the recruiting organizations' values, but not by the demographic similarity with organizational representatives. Second, P-O fit perceptions predict both job choice intentions and work attitudes. And third, job seekers can manage future work attitudes by considering P-O fit in job choice decisions.

Finn (1985) conducted a study to determine the effect of organizational socialization as a component of cooperative education on the process of professional socialization in a baccalaureate nursing program. The upperclass students in the College of Nursing at Northeastern University (655 students) were surveyed during the fall quarter 1984, and the effect of the independent variables – year and division (school or work) – on the dependent variables – role concept, role conflict, role certainty, and choice of role model – was investigated. A total of 457 students (70% of the population) returned the questionnaire. Results indicated that professional role concept increases and bureaucratic role concept decreases from sophomore to senior year, with no difference by division. Role conflict also increases, with students in school more likely than students on co-op to express role conflict. Role certainty increases from sophomore to senior year, with no difference by division. Students, regardless of year, overwhelmingly chose a work-centered role model. However, students who chose a school-centered role model were more likely to be in school, while students who chose a work-centered role model tended to be on co-op.

Studies that Included Engineering Students in Co-op Settings

Brown (1985a) studied the relationship of co-op to organizational socialization, with a focus on perceptions of power in the first job after graduating from college. The researcher

wanted to determine the realism of expectations upon entering the job, congruence of job with need, relevance of job to career goals, and commitment to the organization. A survey was conducted of 225 employees in one organization, 49 who had performed a co-op with the organization, 65 who had performed a co-op but with another organization, and 111 with no co-op experience. Results indicated that employees who participated in co-op with or without the organization had more realistic expectations of the job. Co-op was not directly linked to any other socialization or power variable, but the data indicated a direct relationship among socialization and power variables with an indirect effect of co-op on those variables.

Nixon (1989) investigated the influence of co-op on college graduates' first job after college by measuring newcomers' perceptions of career-related and organizational socialization variables. A three-part survey was used with new employees on their first full-time job since graduation. The study consisted of 102 respondents from one public organization in Alabama, including 51 who had undergraduate co-op experience, 63 who had worked for the organization prior to starting full-time work, and 78 who were male. Results indicated that former co-op students had more realistic expectations about their first job, regardless of whether they were with the company that employed them as a co-op, than did non-co-op employees. Co-ops had higher scores (although not statistically significant) than non-co-ops on job congruence, job relevance, and organizational commitment, but when adjusted for time spent with the current employer, co-ops actually lagged behind non-co-ops on these scores. This indicated that time spent with the organization was the overriding factor influencing early career outcomes – not co-op. The total amount of work experience did not impact the comparison, while current employer experience did. Co-op participants who stay

with their employer reported higher scores on career-related variables. Also, data indicated that effective organizational socialization leads to organizational commitment.

Kirby (1990) researched the effects of co-op on the transition to work for graduates from engineering programs at three Canadian universities and working at Ottawa-area companies. The purpose was to determine whether co-op resulted in a higher level of socialization to the organization than it did to the profession or to academia. The research model was based on a three-period process of input (pre-university), throughput (during university), and output (post-university). The methodology was primarily qualitative, using structured interviews with 103 participants: 34 co-op students in an engineering program, 24 non-co-op students from engineering programs, 12 company employees who had participated in a co-op program, 17 company employees who had not participated in a co-op program, 6 company personnel managers, 9 company line managers, 2 faculty members, 2 deans, and 2 professional society members. Participants, both co-op and non-co-op, ranged from students in their last semester to employees five years after graduation. A structured questionnaire was also given to participants to collect descriptive statistics. Results indicated that co-op students are better prepared for the transition from academia to work. Co-op and non-co-op respondents indicated a greater commitment to their own career development than to the organization, profession, or to academia. Pre-university influences tend to influence socialization from structured work experiences. Co-op tends to reinforce traits that were already present in the student, including drive for achievement.

Major and Kozlowski (1997) studied situational and individual variables (self-efficacy and task interdependence) and their influence on newcomers' proactivity in information-seeking. A survey was conducted of students who were involved in a co-op

program consisting of alternating 12-weeklong school-work semesters over a total of five years. The sample included 421 respondents (295 male, 126 female, 364 engineering majors, 56% seniors, 12% juniors, 16% sophomores, 16% recent graduates fulfilling their final internship requirements) who had been on the job for 4.5 weeks. Results indicated that conditions of high task interdependence and accessibility resulted in individuals with low self-efficacy proactively seeking task-related information more frequently than high self-efficacy individuals. Also, low self-efficacy newcomers were more apt to feel anxious and may use proactive information-seeking to overcome the surprise associated with the socialization process.

Garavan and Murphy (2001) conducted a qualitative study to determine student perceptions of the effectiveness of cooperative education on the socialization into professional organizations. Individual, unstructured interviews were conducted with six students at a university in Ireland from three academic disciplines: business studies, humanities, and engineering. Data were self-reported and triangulation was not used to corroborate the data. The interviews revealed three distinct stages to the socialization process: getting into the organization, breaking into the organization, and settling into the organization. Results indicated the co-op socialization process is complex, individualistic, and is influenced by variables within the organizational setting, as well as cognitive and affective issues. Realistic job previews play a significant role in providing the student with accurate perspectives on job expectations. The recruitment process plays an important role in communicating initial job expectations. Systematic orientation was emphasized, and the value of training processes (formal or informal) in motivating high performance and contributing to competency was highlighted. A student's need for control and feedback

shapes the perceptions of the experience, and relationships with and support from supervisors and peers also influences the student's perceptions.

Parsons and Caylor (2004) and Parsons, Caylor, and Simmons (2005) conducted a study of engineering co-op students at a midsized Southeastern university to determine the effects of motivation anxiety and socialization tactics on person-organization fit, job satisfaction, and organizational commitment. A two-stage survey method was used with 132 participants (72% male, 28% female, 74% white, 5% black, 16% Asian) who were in their first semester of employment in majors including engineering, management, and sciences. Students were surveyed prior to starting their work assignment, and then again five to seven weeks after starting the assignment. Results indicate that organizational socialization tactics and motivational anxiety both contribute to early job satisfaction in an interactive manner. Proactive behaviors are somewhat related to socialization practices and anxiety, in particular when attempting to build a good relationship with one's supervisor. Proactive behaviors and socialization tactics also contribute to person-environment fit. Also, early fit indices are predictive of eventual organizational commitment. Finally, university career counselors and organizations are both important for establishing procedures to help obtain better fit among new employees.

Social Identity Theory

Tajfel and Turner (1979) introduced the term "social identity theory" to understand the psychological basis of intergroup discrimination. Social identity is the individual's self-concept derived from perceived membership of social groups (Hogg & Vaughan, 2002). Social identity theory asserts that group membership creates ingroup/ self-categorization and enhancement in ways that favor the ingroup at the expense of the out-group. Turner and

Tajfel (1986) showed that the act of individuals categorizing themselves as group members was sufficient to lead them to display ingroup favoritism. After being categorized of a group membership, individuals seek to achieve positive self-esteem by differentiating their ingroup from a comparison outgroup on some valued dimension. On assignation to a group, people automatically think of that group as better for them than any alternative outgroup.

Social identity is composed of three elements:

1) Categorization: People often put themselves into categories. Labeling someone is a way of saying other things about that person. Similarly, one finds out things about himmself/herself by knowing what categories he/she belongs to. People define appropriate behaviour by reference to the norms of groups they belong to, but people can only do this if they can tell who belongs to their group.
2) Identification: People also associate with certain groups (ingroups), which serves to bolster self-esteem. Sometimes people think of themselves as group members and at other times they think of themselves as unique individuals. This varies situationally, so that one can be more or less a group member, depending upon the circumstances. Thinking of oneself as a group member and thinking of oneself as a unique individual are both parts of self-concept. The first is referred to as social identity, the latter as personal identity.
3) Comparison: People compare ingroups with other groups (outgroups), seeing a favorable bias toward the group to which one belongs. The idea of social comparison is that in order to evaluate oneself, a person compares oneself with similar others. Group members compare their group with others in order to define their group as positive and, therefore, by implication see themselves in a positive way. That is,

people choose to compare their groups with other groups in ways that reflect positively on themselves.

This section provides a very cursory discussion of social identity theory. Much has been written about this topic, and the reader is encouraged to read some of the referenced authors in this section to learn more if using or citing this topic in future research.

CHAPTER 3: RESEARCH METHODS

Self as Instrument

When a person begins the process of developing a research project, many social scientists recommend "starting where you are – to use you current situation or past involvement as a topic of research" (Lofland & Lofland, 1995, p. 3). The primary justification of this method is that the researcher can collect the richest data because it is most immediate and accessible. In the field of qualitative research, two common terms for data collection are "participant observation" and "ethnographic interviewing." Participant observation is the process of establishing a "relationship with a human association in its natural setting for the purpose of developing a scientific understanding of that association" (Lofland & Lofland, 1995, p.18). According to Spradley (1980), with this technique the researcher uses oneself as a research instrument through introspection. Ethnography involves the work of describing a culture through fieldwork, by learning from people rather than studying people (Spradley, 1979). Ethnography can never be objective because every researcher brings with him/her into the research process predisposed views and biases (Ely et al., 1991).

Personal Perspectives

As the director of career services at a midsized, regional, public university, I am responsible for helping students transition from academic training into the field of work. I act as a liaison between students and the organizations outside of the university who want to hire them. Internally, I advise students on how to conduct successful career exploration efforts along with job searches. Included in this role is assisting students looking to participate in a job shadow with an employer, helping a student understand the educational background,

skills, and experiences he or she possesses and how to package them for maximum appeal to employers, and working with students in finding opportunities for experience in their chosen academic field while in school and for realization of career goals. Externally, I assist potential employers interested in connecting with students/graduates/alums and market students and programs to businesses/organizations to generate future opportunities for students/alums.

The purpose of the career services office is to assist students and graduates with obtaining meaningful employment during and after graduation. This is important since the dominant bias of the university I work for is to academically prepare people from a regional area for specialized/semi-professional work or further graduate education in healthcare, business, education, social science, physical sciences/mathematics, technology, and arts/humanities for that regional area. Therefore, my position's purpose and the purpose of the career services office is to assist with the output functions of the university (employment), which is essential for maintaining the functionality of the technical core of the institution.

In addition to helping students and employers connect for work experiences/opportunities, I have also been responsible for overseeing the day-to-day functions of the university's mandatory cooperative education program for the school of engineering. This program begins with a co-op preparatory class (at one time, taught by me in an adjunct faculty role) in the fall semester prior to the first co-op semester. I oversaw the placement and evaluation portions of the program, although I do not act as faculty advisor or grade all students during a co-op semester. Typically I would advise and grade approximately ten of the students (out of 60-70) in a given semester in an adjunct faculty role. Therefore,

the success of the engineering co-op program reflected very closely on my ability to prepare students for the workplace, develop relationships with employers for appropriate student work experiences, and maintain a system of operation that functionally allows students, employers, and faculty to achieve the goals of the program.

As mentioned earlier, my role within the career services office closely connects me with students, faculty, and employers I work with in the realm of cooperative education. The current study is being conducted at the university I work for, and therefore I am very near to the situation. These are all points that must be considered when evaluating the information and feedback I received from the students, employers, and faculty involved in this study. It must be recognized that data I collected directly from any of the study participants may contain slightly skewed or biased information because of the influence of my role in the co-op process at the university.

Personal Interests

I have been involved with internship and cooperative education programs for the past nine years, since I began my role in the career services office. I believe in the value of such experiences as an integral piece to a student's learning and development in the higher education environment, as well as the function of assisting the student in achieving meaningful career opportunities after matriculation. For seven years I was an active member of the state's council for cooperative education, serving as chair of the organization for the 2001-2002 year. As the lead member of the co-op awareness committee, I annually petitioned the governor of the state to declare February as cooperative education month. Also, I have presented a paper about how industry and education can collaborate through a

co-op program to enhance the academic experience at a 2004 national cooperative education conference for engineering educators.

Personal Biases

Geer (1964) stated that "field workers are not free of prejudice, stereotypes, or other impediments (p. 149)" to the understanding of people or groups. Therefore, the researcher should identify personal biases and their sources in order to better understand the role they play in one's research (Agar, 1980). Berg and Smith (1988) noted that self-scrutiny provides information about "the intellectual and emotional factors that inevitably influence the researchers' involvement and activity (p. 31)." To become aware of personal reactions and related values and emotions is crucial when engaging in research (Heshusius, 1994). Jansen and Peshkin (1992) summarized that qualitative researchers are "so palpably, inescapably present that they cannot delude themselves that who they are will not make a difference in the outcomes of their study (p.720)."

Ginsberg and Matthews (n.d.) noted that researchers need to explore their own feelings toward people to distinguish between real observation and interpretation and personal bias. LeCompte (1987) used the term "disciplined subjectivity" (p. 43) to describe the practice of determining conscious and unconscious sources of bias. Hansen (1983) advocated analyzing process, structure, context, and history as well as relationships between biological and cultural variables (cited in Jansen & Peshkin, 1992, p. 706).

LeCompte (1987) claimed that bias is located in the researcher's personal history and professional training. I am an educator and therefore view the world through a lens that focuses my attention on the value of learning in all settings. Because of this perspective, I have a bias towards having a positive outlook on the educational benefits of situations. In

addition, I am particularly enthusiastic about experiential education activities. Therefore, I was very diligent about not letting my personal lens cloud the picture of the phenomena I researched. A natural tendency for me would have been to search out the reasons why work experiences have educational benefit to students. In order to avoid this predisposition, I paid particular attention to how I analyzed and interpreted the information I gathered, to ensure the identified conclusions were based on the facts that are presented.

A second bias results from my background as an engineer and my past role as coordinator of the co-op program for the engineering school at the university. Because I have been trained as an engineer and have worked as a consulting engineer prior to my work in a university, I have knowledge and understanding of the engineering work environment that, if unchecked, would have allowed me to read into situations more than what is presented by the facts.

Third, I have a strong interest and belief in the value of cooperative education as it supplements the educational process. Therefore, I naturally want to see the good and positives in the experiences of students in this setting and could have read too much into positive facts and too little into non-supportive data. In addition, the work I do is grounded in various experiential education programs, and without them I may not be needed by the organization I work for. The idea that my livelihood is currently connected to the success and continuation of such programs inherently produces a personal bias. Each of these facts provided reason to closely self-monitor my reaction to, and interpretation of, the research I conducted in this area. Data, interpretation of data, findings, and results were documented completely and cross-checked by participants in the study and by a third-party professional in order to ensure limitation of bias in the study.

In order to account for my personal biases so that they are identified, addressed, and corrected for in the research, the following measures were taken:

- Field notes were kept for all work that was performed, including review of historical documents and personal interviews.
- After information was gathered, transcribed, documented, and analyzed, the informants were re-contacted to review my written discussion and conclusions of the event to corroborate the information as consistent with the informant's thoughts and intentions.
- Multiple data sources were used to ensure it was accurate, consistent, and corroborated. This was accomplished by using the following different sources of data: student journals, student evaluations, employer evaluations, faculty notes, interview and observation field notes, recordings of interviews, and worksite documents. Also, different methods of data collection – historical documents, personal interviews, observation – were used.
- Disconfirming evidence and outliers found during the study were identified, investigated, and documented to determine the meaning they had in relation to the other findings of the research.
- A conceptual framework was developed throughout the process of the research in order to generalize the framework of this study. The framework was fluid and changed as more evidence and information was gathered and analyzed. All information was accounted for during the production of the framework, and modifications were made accordingly.

- My committee chair was consulted throughout the research process to identify any biases/problems in my data collection, field notes, and journal, and to provide outside perspectives on my analyses, discussion, and conclusions.

Moral, Ethical, and Legal Issues in Qualitative Research

As a professional involved in a research project, I faced many obligations and expectations of how to conduct the research when human subjects are a part of a qualitative study. As stated in the American Psychological Association's preamble to their professional ethical principles, "the [researcher] carries out the investigation with respect and concern for the dignity and welfare of the people who participate and with cognizance of federal and state regulations and professional standards governing the conduct of research with human participants" (Committee on Scientific and Professional Ethics and Conduct, 1981, p. 633). Therefore, there are personal, professional, and legal aspects to consider when conducting research: one must be true to personal morals and beliefs, collegial ethics, and rules established to protect the public.

Moral Issues

Moral issues are defined as those that are motivated by ideas of right and wrong. Morals are based on personal beliefs and experiences and, therefore, decisions made in research focused on morals are made from a personal standpoint. Making a moral decision in research means remaining true and consistent with one's personal belief system in what is right and wrong. While moral issues are personal, ideas of right and wrong as they relate to human interactions tend to follow common systems and themes. I treated people in this research project with dignity, fairness, and honesty.

Ethics in Educational Research

When groups of people, for instance those who belong to a profession, come to agreement on a common set of beliefs of right and wrong, ethical canons are created by which those in the profession agree to abide. My personal ethical approach is based in the teleological ethic theory proposed by May (1980), as summarized in Deyhle, Hess, and LeCompte (1992). My purpose for conducting research is using the process of academic inquiry to discover the truth in a situation/phenomenon. May (1980) stated, "Knowledge is a fundamental good in that it is so basic to the human enterprise that it does not have to be justified by virtue of its contribution to some other good" (p. 358). The outcomes of research will result in a better understanding of the world we live in. According to May, truth is the goal and therefore deception (an immoral behavior) is not an appropriate means of obtaining information. Deyhle et al. (1992) indicated that it is difficult to address the questions of ethics in educational research from teleological moral stance since most educational research is applied in nature. I disagree with this stance and would argue that even when studying an application of a fundamental concept, new knowledge is gained and therefore constitutes a body of evidence for understanding new truths.

Codes of Ethics

The Council of the American Anthropological Association has adopted ethical principles that state that anthropologists "must do everything in their power to protect the physical, social, and psychological welfare and to honor the dignity and privacy of those studied" (Gleshne & Peshkin, 1992, p. 111). This code contains five points that are consistent with codes developed in other professional areas that study human subjects, and which I adhered to throughout this study. First, the rights, interests, and sensitivities of those being

studied were safeguarded. Second, the informant was aware of the aims of my investigation. Third, informants have had their identities protected. Fourth, informants were not exploited for personal gain. Finally, I took seriously my obligation to the general public for foreseeable repercussions of my research and publication.

Two factors are involved in the protection of individual privacy: the consent of the individual as to what will be disclosed to the researcher, and the confidential use of research data collected on individuals (Borg & Gall, 1989). The informants were presented with their rights and their role in the research project by the researcher and were asked to sign an informed consent agreement (an example can be found in Appendix D). The informant received a copy of the signed informed consent agreement that included information about how to contact me if needed.

All research that involves human subjects is required to protect the identity of the informant, as well as keep confidential the information that is gathered on an informant during and after the research project. In order to maintain confidentiality, I used pseudonyms and aliases for informants, organizations, and other identifiable information in my transcripts and in this report (Borg & Gall, 1989; Deyhle et al., 1992; Douvanis and Brown, 1995). After information was collected, I took preserved the confidentiality of the informants by keeping data in a secure location and destroying records that were no longer being used.

Finally, several authors discuss the ethical considerations of deception in research with human participants (Borg and Gall, 1989; Deyhle et al., 1992; Gleshne & Peshkin, 1992). In the general sense, deception in a research study is wrong. At no time during this research study did I misrepresent myself, my intentions, or the purpose of the involvement of

the informants in the research to the informants or anyone else associated with the research project.

Legal Issues in Human Research

The Family Educational Rights and Privacy Act (FERPA) of 1974, also known as the Buckley Amendment, exists to protect the privacy of students' educational records. Following the primary requirement of FERPA, no individually identifiable information about student informants (or any informant or organization) is included in this research report. Also, the purposes of the research were made known to the student informants (and other informants), and information that identifies individuals will be destroyed when no longer needed.

The National Research Act of 1974 provides for review of behavioral research involving human subjects by an Institutional Review Board (IRB). The primary function of this act is to provide a mechanism for reviewing research proposals from the standpoint of protecting human participants (Borg & Gall, 1989). Ultimately, even if research is believed to be exempt from approval, a review by the IRB is required to confirm or verify the research project's status. An important provision within this act that followed was to obtain an informed consent of subjects to participate in the research project. A human subjects review form, along with informed consent documents, approved by the Eastern Michigan University and Great Stateside University IRBs are included in Appendix D.

Research Tradition

Qualitative Research Traditions and Research Paradigms

Bogdan and Biklin (1992) defined qualitative research as the strategies that result in collected data that is soft, or "rich in description of people, places, and conversations" (p. 2). My research questions were not framed by operationalizing variables but were formulated to investigate topics in context. Phenomenological research attempts to understand the meaning of events and interactions to ordinary people in particular situations (p. 34). Ethnography is the description of culture or aspects of culture. Another qualitative viewpoint, ethnomethodology, is the process of understanding how people go about seeing, explaining, and describing order in the world (p. 40). For this study, I approached the research in a manner consistent with Bogdan and Biklin's five features of qualitative research: 1) the natural setting is the direct source of data and the researcher is the key instrument; 2) the research is descriptive; 3) researchers are concerned with process rather than outcomes or products; 4) researchers tend to analyze their data inductively; and 5) meaning is of essential concern to the qualitative approach.

Wolcott (1992) stated that all research, including qualitative research, consists of two facets: ideas that drive the work and the inquiry procedures with which the researcher pursues them. Paradigms, according to Wolcott, are appropriate for concept-driven research as they "provide categories that lend conceptual order to the world" (p.13). My research focus was concept-driven as I was interested in developing interpretations for the naturally occurring data I collected.

Jacob (1988) developed a taxonomy that listed dominant traditions in educational research, including symbolic interactionism. Jacob (1987) provided an overview of the

symbolic interactionism qualitative research tradition, derived from the disciplines of anthropology, sociology, and psychology, and used in educational research. Symbolic interactionism was developed by Herbert Blumer and his colleagues and draws primarily from the work of G.H. Mead, Charles H. Cooley, John Dewey, and W.I. Thomas (Manis & Meltzer, 1978; Meltzer, Petras, & Reynolds, 1975). Symbolic interactionism is the process of verbal and social interaction through which meaning and identity arise (Blumer, 1969). According to Reichers (1987), "meaning arises in the relationship between an act, the response to that act by a second person, and the result of that act-react interaction" (p. 279). This tradition views reality and meaning as social constructions from which individuals are not separable from their environments. Individuals' experiences "are mediated by their own interpretations of experience" (Jacob, 1987, p. 27).

Symbolic interactionists view human behavior as caused by "a reflective and socially derived interpretation of the internal and external stimuli that are present" (Meltzer et al., 1975, p. 2), not by forces within a person or by external forces. The focus for this tradition is in understanding the processes by which points of view develop in participants. The methodology consists of describing processes of symbolic interaction in order to understand behavior, with the goal of making society intelligible, as opposed to testing relationships between variables (Blumer, 1969). Research design is emergent, and data analysis and collection is done sequentially.

The research study began with a qualitative approach, and I most closely followed the symbolic interactionist tradition described by Manis & Meltzer (1978) and Meltzer, Petras, & Reynolds (1975). Attempting to understand the cooperative education experience and how students enter and are socialized to the engineering organization and occupational roles was

best determined by following the methodological goals of the symbolic interactionist tradition. I was interested in describing the experiences of students, including interactions with their environments and other people, in order to understand student behaviors and the meaning made of the experiences. My research design was constructed as data were collected and analyzed (Blumer 1969; Schatzman & Strauss, 1973). Ritzer (1980) clarified the use of sensitizing concepts, in contrast to operational definition of concepts (presented by Blumer, 1954, cited in Meltzer et al., 1975). I used sensitizing concepts to provide only enough structure to suggest where I should look (Ritzer, 1980, p. 108, cited in Jacob, 1987), thereby not operationalizing a concept until after I had been in the field and learned the meanings attached to the concept by the subject and processes being studied (Denzin, 1978, p. 16, cited in Jacob, 1987).

Personal Research Tendencies

Research paradigms "define for inquirers [researchers] what it is they are about, and what falls within and outside the limits of legitimate inquiry" (Guba and Lincoln, 1994, p.108). Guba and Lincoln defined three underlying fundamental assumptions associated with paradigms: ontological assumptions, epistemological assumptions, and methodological assumptions. Burrell and Morgan (1982) included views on human nature as a fourth underlying assumption of research or inquiry paradigms. Ontology refers to how the nature of reality is viewed, epistemology refers to the inquirer's assumptions about the nature of knowledge and relationship between knower (or would-be knower) and what can be known, and methodology refers to how the inquirer would go about finding out whatever he or she believes can be known. Methodological assumptions often define the proximity of the

researcher to what is being researched. Finally, human nature describes the inquirer's assumptions about causality.

My research assumptions, ways of making meaning, and biases most closely resemble those of the postpositivism tradition. My ontological assumptions are on the objective end of the continuum, but I feel that current understandings of reality must be continually examined to continually improve our imperfect models of reality. How I construct knowledge out of reality tends to follow quasi-positivistic epistemological views. I believe in trying to maintain objectivity in research and that replicated findings are likely true but are subject to falsification. My views of human nature, or assumptions of causality, balance between determinism and voluntarism. While I believe that behaviors are results of various stimuli, I also think that an individual's experiences and knowledge of situations helps him/her to construct meaning of the world around them.

The methodological assumptions that I adhere to most closely align with those of the positivism tradition. Coming from an engineering background, I have been trained to think in an experimental way where hypotheses are tested empirically to verify them. However, since I have worked in an educational environment for the past nine years and am participating in a doctoral program in education, I have started to move my thinking to more of the postpositivist school of thought that includes inquiry methods that are qualitative in nature. Because of this, my assumptions are closer to the nomothetic end of the methodology continuum than the ideographic. The purpose of inquiry and research for me is to explain the world around me and to predict phenomena. Good criteria for judging the quality of the research are internal and external validity, reliability, and objectivity. Personal values play an important role in how one approaches and conducts research, so taking proper care and

implementing appropriate controls will minimize influences of the researcher's values on the object of the research. This is essentially a postpositivist viewpoint but borders on subjective ideals.

Research Design

Miles and Huberman (1994) define qualitative analysis as consisting of three concurrent flows of activity: data reduction, data display, and conclusion drawing/verification. In order to get to the point where data is analyzed, the researcher needs to make design decisions about what data will be collected and how it will be collected. According to their research sourcebook, *Qualitative Data Analysis*, research designs can be loose or tight. Historically, qualitative researchers have tended to approach study design loosely with minimal initial structure defined. Miles and Huberman, in Chapter 2 of their sourcebook, tend toward more structured research design, and define five initial steps for focusing and bounding the collection of data. The five steps are building of a conceptual framework, formulating research questions, defining the case (bounding the territory), sampling (bounding the collection of data), and determining instrumentation. The following sections provide the approach I tool to focusing the design for this study, using Miles and Huberman's suggestions.

Research Purpose

There are five general types of research: basic research, applied research, summative evaluation, formative evaluation, action research. Basic research has a purpose of discovering knowledge and truth for the sake of knowledge itself. The research purpose is to understand questions that are important to one's discipline and the desired results are contribution to theory. Results are generalizable across time and space. Applied research has a purpose of

understanding the nature and sources of human and societal problems. The research focus questions things that are deemed important by society and the desired results are to contribute to theories in order to formulate problem-solving programs. Summative evaluation is used when trying to determine the effectiveness of human interventions and actions with the goals of the intervention as the focus. Formative evaluation is somewhat different in that its purpose is in improving interventions and the focus is on determining strengths and weaknesses of a specific program, policy, or product. Finally, action research is used when trying to solve problems in a program, organization, or community. The focus is on organization or community problems, with the desired results of solving problems as quickly as possible.

This research project has characteristics of both applied research and general research, as it develops a conceptual framework that has analytical generalizability. Understanding the relationships between the cooperative education program within the School of Engineering (SOE) at Great Stateside University (GSU), the engineering academic program, and the workplace is an example of understanding human nature and contributing to theories of organizational processes and development in work environments and in higher education. This study has generalization capabilities, and contributes to knowledge of existing theories with a goal of understanding human and societal issues. Conducting this study about socialization in cooperative education settings contributes valuable information to a body of research, organizational socialization to work environments for students as part of higher education academic programs, with limited current information.

Defining the Case: Bounding the Territory

A research study consists of investigating a phenomenon occurring in a bounded context. Miles and Huberman (1994) contended that there is a focus to a study and a somewhat indeterminate boundary that defines the edge of the case. The defined boundary of a study is as important for determining what will not be studied as for what will be studied. By defining the boundary of the study, the generalizability of the results is also defined. In educational research, the phenomenon being studied is almost always the relationship between people or a person and their environment. The phenomenon can consist of any social unit, known as the target, existing on a continuum that includes a behavior, an individual, interpersonal relationships, a group, intergroup relationships, an organization, interorganization relationships, and the institution or environment (Barott, October 11, 2003). Werner and Schoepfle (1976) pointed out that a case can be defined both spatially and temporally. The target is placed into context, which defines the unit of analysis and therefore the boundaries of the study.

This study had a target of understanding the activities of a group. The group in question was engineering students participating in a cooperative education program within the SOE at GSU. Cooperative education at GSU is mandatory for engineering students and consists of each student working full-time for three separate four-month long semesters (total event equivalence of one year of work). The student works with the same organization for each of the three semesters. The semesters are not successive, but rather rotate with semesters of full-time academics. The cooperative education event happens during the last two years of the academic program (junior and senior year).

In addition, other actors in the study included faculty and staff at GSU and supervisors, mentors, and co-workers in employer organizations participating in the cooperative education program. The study focused on student socialization processes and included interactions with university and employer personnel. The unit of analysis was the State of Great Lakes. Almost all of the students in the engineering program originate from the State of Great Lakes and, up until the present, all but six students (out of over 350 total students) completed their cooperative education experience in the State of Great Lakes.

Overview of GSU Engineering Co-op Program

The SOE at GSU offers undergraduate and graduate degrees in engineering. At the undergraduate level, a bachelor of science in engineering degree is offered with emphases in computer, electrical, interdisciplinary, manufacturing, and mechanical engineering. At the graduate level, master of science degrees in mechanical and manufacturing engineering are currently offered. There are approximately 650 undergraduate and 50 graduate students in SOE, and 19 terminal-degreed faculty.

The undergraduate degree is a secondary-admit program with approximately 75% of students advancing to major standing, when comparing admits to applicants (approximately 50% when comparing admits to freshman year enrollment). Secondary admission requires that a student complete all courses in the engineering fundamentals with a grade of “C” or better in each course and with an overall grade point average of 2.50 or better in the engineering fundamentals sequence. In addition, the student must complete a cooperative education preparation course and successfully secure a cooperative education placement for full admission to SOE. Once admitted, in order to maintain good academic standing and be

able to participate in cooperative education, a student must continue to achieve a “C” or better in classes along with maintaining a grade point average of 2.50.

The program is accredited as a co-op program through the Accreditation Board for Engineering and Technology (ABET). All admitted undergraduate students participate in a mandatory cooperative education program, for a total of twelve months of work experience, during the junior and senior year of the academic program. Greater than two-thirds of the courses have hands-on laboratory components, of which many contain industry-sponsored projects. All students complete an industry-sponsored senior design project in teams consisting of students from different engineering disciplines.

The cooperative education program is an alternating semester program that the student participates in during the last two years of the academic curriculum. Students work with the same company/organization for each of three four-month-long semesters. A typical sequence for a student is shown in Figure 6. Minimum requirements include 1,500 hours of work experience, while most students acquire approximately 2,000 hours during the twelve months at the work site. New work sites are visited and approved by the university prior to a student beginning his/her first co-op semester. Objectives for the initial semester are evaluated, and plans for the subsequent two work semesters are discussed. Students are hired through a standard application/interview/offer-of-position process. Students are not placed at predetermined work sites but are responsible for obtaining a co-op position. Some find their own position at sites that are evaluated for appropriateness and approved by the university, while others utilize leads developed through the university.

	Fall	Winter	Spring/Summer
	(Sept.-Dec.)	(Jan.-April)	(May-Aug.)
Year 1			
Year 2			Co-op I
Year 3		Co-op II	
Year 4	Co-op III		
		= Engineering Fundamentals Coursework	
		= Engineering Upper Division Coursework	

Figure 6: Academic/co-op sequence at GSU SOE

Students come to the university from their home communities where they bring with them prior experiences from traditional K-12 education settings, work experiences, extracurricular activities, and family interactions, and are influenced by various demographic and environmental factors. Approximately 96% of students are from the State of Great Lakes, with the tri-county area surrounding Forde Junction accounting for 51% of enrollees. In total, southwest State of Great Lakes accounts for 66%, southeast State of Great Lakes 20%, and northern State of Great Lakes 10%. The remaining 4% of students come from other states (primarily one large city approximately two hours away) and other countries.

At the university, the student engages in activities that occur in the presence of various people, including faculty, staff, and other students, and in various settings, including classroom, laboratories, one-on-one meetings, different organizations, and social activities.

SOE at GSU has a mandatory cooperative education program during the last two academic years of the bachelor of science in engineering degree. In this program, the student is re-introduced to communities outside of the university through various types of companies/organizations that employ engineers. Over the past five years, approximately 99% of the students worked for an organization within the State of Great Lakes, with approximately 95% working in western State of Great Lakes (approximately 50 mile radius of Forde Junction).

Students receive three credits for each semester of co-op, for a total of nine co-op credits applied towards graduation. The student receives a letter grade for each co-op semester. A student's grade is determined by taking into account the evaluations provided by the work supervisor, the accuracy and quality of their written work, and the feedback from the site visit. Each semester the work supervisor completes an evaluation of the student provided by the university that is structured to provide direct feedback addressing the assessment goals of the degree programs. Thus, every co-op placement provides assessment data reflecting the sophomore, junior, and senior level preparation for the student as reflected by the data provided by a major stake-holder in the assessment process. In addition, the student and supervisor are visited each semester by a member of the SOE faculty. The faculty member has a chance to see the work of the student and discuss the work and progress with the student and work supervisor. The faculty member gains a greater insight into the work the student performed, which helps in grading the student for the semester.

The requirements for a student when participating in a co-op semester include reading and writing assignments, participation in cultural and/or civic activities, and analyses/discussion of an ethical issue. The content of the readings addresses the relationship

between technology and society and, usually, its relationship to ethical decision-making. Students are required to write a summary of the reading material each semester. In addition, students must keep a written journal of their weekly activities to be submitted and reviewed by their supervising faculty member. The student is encouraged to not only document their day-to-day activities but also to reflect on their learning and observations of the work environment including the professionals they work with. Each co-op semester, the entire group of co-op students comes together for a meeting to discuss their co-op experiences and reflect on an ethics case study. Because students work with the same organization throughout the co-op program, they become well acquainted with the company and type of industry in which they are involved, providing a depth in their experience.

Students take a cooperative education preparation course as part of the curriculum prior to beginning the first semester of co-op. This is a one-credit course for which the students receive a grade. There is a dual purpose to the course. First, the course is used as a method to assist students in applying for major standing (secondary admission process) with SOE. Second, and most important, the course is used to assist students in securing a co-op work site and preparing them for working in a professional, technical environment. To help prepare for securing a co-op work site, students are taught about resume and cover letter writing and required to produce a resume that is critiqued for further development. Students are also taught about job interviews and skills that can be practiced to improve effectiveness in an interview. Outside of the classroom, each student participates in a taped, simulated interview with the instructor. The student is given individual feedback on his/her interview strengths and weaknesses and encouraged to develop areas of deficiency. In addition, each student participates in a minimum of two simulated interviews with industry representatives

outside of the classroom. Industry representatives consist of engineering professionals who have mentored GSU co-op students or human resources personnel who hire technical people for organizations that have participated in the GSU co-op program in the past. The industry representatives are encouraged to provide an accurate experience of an actual interview and provide constructive feedback to the student. The industry representative also fills out an evaluation of the practice interview that is used as part of the student's evaluation during secondary admission.

A third objective of the cooperative education preparation course is to prepare the students for working in a professional environment. Tied closely with this objective is the discussion and development of non-technical work-place skills and qualities. These include ethical decision-making, leadership development, interpersonal skills, and professional writing skills. To help students better understand the engineering work environment, various co-op scenarios and types of work environments are discussed. In addition, a panel of representative co-op employers is brought in to discuss their organizations and expectations and to answer student questions. A presentation is given by an engineering manager from a participating co-op company about the business aspects of and influences on engineering work.

Background Information of the GSU Environment

West Great Lakes Region:

The West Great Lakes region contains 11.1% (approximately 1,100,000 people) of the total population in the State of Great Lakes. The State of Great Lakes is located in the Midwest. The region is 84.4% Caucasian while the U.S. population is 69.1% and the State of Great Lakes is 78.6% white. The second greatest ethnic background is black, which is 7.3%

of the population for the West Great Lakes region, although this is only about one-half of the State of Great Lakes total of 14.2%. The West Great Lakes region is 6.3% Hispanic, which is almost double the average of the State of Great Lakes population but only half of the national average.

Religion is an important attribute of the culture in the West Great Lakes region. According to a 2001 Community Research Institute survey, 68% of people indicated that they attend a church at least once per week and another 12% (or a total of 80%) indicate that they attend church at least twice per month. This contributes to the very dominant conservative nature of the area that is evidenced by the existence of several "dry" communities and the Republican political prevalence (George Bush won 62% of the vote in the last Presidential election in West Great Lakes). The religious focus of the area contributes to the high concentration of private K-12 schools (21% in the region) and the reason for the presence of the large number of private, religious (Christian) affiliated colleges in the area that GSU competes with.

The West Great Lakes region is a family-oriented area. Approximately 70% of people live in a family household (as opposed to a single person living alone or non-married people living together), and 55-60% of people are married. The divorce rate is less than 10%, which is well below the national average. About 75% of people live in a house they own, which is about 10% higher than the national average. The predominant household income is in the $50,000 to $75,000 range (approximately 23%), which is middle to upper-middle class. However, there is a large disparity as approximately 36% of people earn below $35,000 per year (lower-middle to lower class) and about 24% earn more than $75,000 per year, which is upper-middle to upper class.

The West Great Lakes region is well-educated according to national averages. Approximately 85% of people have a high school degree or higher while approximately 26% have a bachelors degree or higher, as compared to national averages of 80% and 24% respectively. The dominant industry in the West Great Lakes region is manufacturing, at approximately 26% of the total economy.

During the time of this study, the economic conditions in the United States and the State of Great Lakes were poor. According to a 2005 report by the W.E. Upjohn Institute for Employment Research, there was a loss of approximately 800,000 jobs nationally between 2001 and 2002. As recent as the second quarter of 2003, there was still an estimated 250,000 additional jobs lost. In the State of Great Lakes, employment was down approximately 50,000 people in 2001, another 125,000 people in 2002, 40,000 people in 2003, and 25,000 people in 2004. The unemployment rate rose from a low of 3.6% in 2000 to 7.0% in 2004 (Erickcek et al., 2005).

Forde Junction:

The City of Forde Junction is a large city of approximately 200,000 people, and the dominant city within the West Great Lakes region.

Great Stateside University (GSU):

GSU is a mid-size (greater than 20,000 students), public university located in the West Great Lakes region. The “main” campus is located in a small farming community approximately 15 miles outside of downtown Forde Junction, while a recently developing campus in downtown Forde Junction has become a secondary ‘main’ campus. The education organization originated in the early 1960s. GSU offers educational programs in various

liberal arts and semi-professional disciplines resulting in both bachelor's (predominantly) and master's degrees. Most of the professional and semi-professional academic programs are located on the Forde Junction campus, including the School of Engineering (SOE).

Sixty-one percent of the students are female and thirty-nine percent are male. Sixty-six percent of the students are from the West Great Lakes region, ninety-six percent are from the State of Great Lakes and less than one percent are from other countries. Almost 72% are full-time students, almost 86% are undergraduate, and more than 89% are white (not of Hispanic origin). Sixty-four percent of GSU's 45,205 alumni reside in West Great Lakes (52.4% in the tri-county area) and 82.7% reside in the State of Great Lakes. Although there are some upper class students, few attend GSU as they can afford the Christian-based private school alternative or the more expensive in-state or out-of-state alternatives. Most students come from a religious upbringing and are fairly conservative.

Formulation of Research Questions

Whether a researcher formulates research questions as part of a study before or after a conceptual framework of the study is generated is an item of debate between advocates of deductive and inductive research. Deductivists generate a conceptual model and then generate research questions from their preliminary understanding of the phenomena. Inductivists counter that the preliminary concepts may be wrong or faulty and therefore questions and methodologies formulated from them would therefore be wrong or faulty. An inductivist would contend that a researcher has to have an implicit question(s) in mind before starting and would begin data collection in order for the conceptual model to develop. Miles and Huberman (1994) argued that even an inductive approach begins with a question that

serves to bound and focus a study, thereby including a measure of deductive thought. In either case, the conceptual framework and research questions affect each other.

Miles and Huberman (1994) recommended starting with general questions so that the vision of the project remains clear and does not become limiting. After general questions are determined, more specific questions should be developed to support the ideas in the general question. It was also recommended that more than a dozen research questions is too large for a manageable study. Finally, it was stated that determining whether each question is actually researchable is also important.

The following research questions were a result of the qualitative, inductive research process. The questions were identified through reviewing literature and from personal experience, developed through exploratory fieldwork, refined throughout the data collection and reduction process, and researched and analyzed for this study:

- What are the daily experiences of a cooperative education student?
- What experiences and processes do students encounter when they move from the education organization (academic) environment to the employer (work) environment through a cooperative education program?
- What experiences and values do students have prior to entering the cooperative education event that are influential in the student's move from outside to inside the employer organization? the occupational role(s)?
- What strategies and/or processes (formal or informal) are used by employers to bring students from outside to inside the organization? the occupational role(s)?

- How are cooperative education students socialized to the employer organization? the occupational role(s)?
- Can the entry and socialization process for students into experiential education programs be predicted?
- What are the outcomes of the socialization process during the co-op experience?

Sampling: Bounding the Collection of Data

Unlike quantitative research designs, qualitative studies tend to work with small samples of people in their natural context and studied in-depth (Miles & Huberman, 1994). Kuzel (1992) and Morse (1989) noted that qualitative samples tend to be purposive rather than random and are not typically prespecified, but evolve while conducting fieldwork. Miles and Huberman identified two critical actions as part of qualitative sampling: setting boundaries (to define the case(s) and connect it to the research questions) and creating a frame (to understand the basic processes and constructs of the study). Finally, qualitative sampling is often theory-driven and involves both within and across case techniques.

As a starting point, Erickson (1986) suggested a funneling sampling sequence that involved working from the outside to the core of the setting. Within-case sampling consists of making decisions such as which activities, processes, events, times, locations, and role partners will be used (Miles & Huberman, 1994). There are three major points regarding within-case sampling: it is almost always nested; it must be theoretically driven; and it has an iterative quality. Within-case sampling helps the researcher see local configurations in depth. Multiple-case sampling adds confidence to findings; helps in understanding the how, where,

and why an individual case occurs; and strengthens the precision, validity, and stability of the findings through replication. Multiple-case sampling typically needs an explicit sampling frame, and does not incorporate randomness.

The following questions, formulated by Miles and Huberman (1994), were used to develop the sampling plan:

- Is the sampling relevant to your conceptual frame and research questions?
- Will the phenomenon you are interested in appear? In principle, can they appear?
- Does your plan enhance generalizability of your findings, either through conceptual power or representativeness?
- Can believable descriptions and explanations be produced, ones that are true to real life?
- Is the sampling plan feasible, in terms of time, money, access to people, and your own work style?
- Is the sampling plan ethical, in terms of such issues as informed consent, potential benefits and risks, and the relationship with informants?

For this study, the following sampling took place:

1) Students were grouped according to the year (and in most cases, the summer semester) they began their first co-op semester. Students who began their first co-op semester in the summers of 2000, 2001, and 2002 were chosen as the subjects of this initial part of the study. These three groups of students were chosen because they were the most recent students for which complete information was available. Complete information included data for students

from their start at the university through their academic program (including the co-op program) to, ultimately, graduation from the education organization and employment after graduation.

2) Initially, data were collected and analyzed to determine from an organizational viewpoint, what happened to students once they entered the engineering program courses at GSU. The three target student co-op groups (years 2000, 2001, 2002) were identified, and then it was determined when each group of students would have started in their academic program. The majority would have started taking engineering courses two years prior to beginning their first co-op semester. Therefore, starting with those freshman courses, an approximate number of students in a beginning class were identified through university enrollment records. Course enrollment records were reviewed and documented to determine numbers of students in key courses throughout the program.

3) Key courses were identified as those that are required by all students seeking to obtain a degree in engineering. For the starting point, the course was the freshman-level computer aided design (CAD) course, E101. The next course was the co-op preparatory course, E201, typically taken in the second year of the program. All three co-op courses (E299, E399, and E499) were tracked and analyzed using university co-op records for each student. All students completed a capstone course, E401, during their last year to complete their studies prior to graduation. This course was used to identify graduates of the program. Finally, employment data of graduates, collected by the university, was used to determine where students went after they graduated.

4) It was determined that all three years of students were similar in most respects. The study was narrowed to include one of the yearly cycles, the summer of 2001 sample. This sample was chosen because it was representative of the group, the diversity in types of student and employer organizations was equal to or greater than the other two sample years, and the student informants were the most accessible to me (both for individual contact as well as records from the co-op experiences).
5) Purposeful sampling was used to learn in-depth information about representative individual cases. Twenty-two students were used for this part of the investigation. After approximately ten interviews, patterns and themes were evident, but the additional interviews were already scheduled, so the additional interviews were conducted and the information included in the results. A summary of the student informants is provided in Tables 1 and 2.
6) Faculty from SOE at GSU were be sampled to provide information about the student preparation in the academic environment and to determine expectations of the co-op experience. Snowball sampling was used beginning with the Dean of the College of Engineering and Computing. Two additional faculty members of the GSU SOE were interviewed, including the chair of the electrical and computer engineering emphases, and a long-time member of the mechanical engineering emphasis-area who was also the faculty co-op coordinator. After talking with the three faculty members, I identified clear patterns and themes. A description of the three faculty informants is provided in the next section.
7) Representatives from employer organizations participating in the cooperative education program were sampled to learn about the work environment aspect. Purposeful sampling was used based on the information gathered in the student portion of the study. Sixteen company representatives were used for

this part of the investigation. As with the student interviews, patterns and themes were evident prior to interviewing all sixteen employer informants, but information from all interviews is included in the results. A summary of employer representative informants is provided in Tables 1 and 3.

Determination and Description of Target Group

The graduates from the GSU engineering program who began the first co-op semester in the summer of 2001 were selected as the target group for this study. The three groups of students (those who began their first co-op semester in 2000, 2001, and 2002) were similar in many ways, as evidenced from the data in Table 5, page 148. However, different from the groups in 2000 and 2002, there was the greatest amount of post-graduation employment information available for graduates in the 2001 group. This was important because it helped with finding a large number of the graduates to interview for the detailed information needed for this study.

Of the 60 students that were eligible to begin their co-op in summer of 2001, 55 were men and five were women; 58 were white, one was black, and one was Asian; and 52 were from the greater Forde Junction area, four were from the State of Great Lakes about one hour from Forde Junction, and four were from the State of Great Lakes in a major city about two to three hours from Forde Junction. All students but one were in their early 20s at the time of participation in the co-op program and at graduation from the academic program. Purposeful sampling was used to identify twenty-one students who began the first co-op semester in summer of 2001, sixteen company representatives, and three university faculty members to be interviewed for this study. Table 1 provides the relationships among the students and employers who were interviewed (names of all informants and organizations are pseudonyms

Table 1
Summary of Interview Subjects and Student/Employer Relationships

Student Interviewed	Year of E101 course	Year of First Co-op	Year of Graduation	Co-op Compan(ies)	Co-op Supervisor Interviewed	Post-Graduation Employer
Abner, Victor	Fall '99	Summer '01	Summer '03	TP Inc. BR Inc.	Murphy, Vince (TP Inc.)	IG Inc.
Arnold, Paul	Fall '99	Summer '02	Summer '04	MC Inc. CP Inc. AS Inc.	Tollen, Walter (AS Inc.)	AS Inc.
Dews, Wendell	Winter '99	Summer '01	Summer '04	IWG Inc.		GBA Inc.
Dorale, Henry	Fall '99	Summer '01	Summer '03	GSU		AS Inc.
Evans, Barry	Fall '99	Summer '01	Summer '03	DM Inc.	Mitchell, Larry	AS Inc.
Jeffers, Steve	Winter '99	Summer '01	Summer '03	TP Inc.	Jackson, Peter	AS Inc.
Jillet, Eric	Fall '99	Summer '01	Summer '03	GI Inc.		GI Inc.
Jolley, Brent	Fall '97	Summer '01	Summer '03	CRCP Inc.		ARJ Inc.
Juniper, Wesley	Fall '98	Summer '01	Winter '03	MH Inc.	Elmore, Glen	TG Inc.
Kelly, Keith	Summer '00	Summer '01	Summer '03	AS Inc.	Nelson, Sally Bonds, Brad	AS Inc.
Koontz, Doug	Fall '99	Summer '01	Summer '03	IS Inc.		ARJ Inc.
Kline, Gloria	Fall '99	Summer '01	Summer '03	IS Inc.	Blanchard, Gary Dillenger, Jeff	IS Inc.
Kraft, Keri	Winter '01	Summer '01	Summer '03	VK Inc.	Mills, Homer	ST Inc.
Kroll, Fred	Fall '99	Summer '01	Summer '03	VPA Inc.		AS Inc.
Martins, Seth	Fall '98	Summer '00	Summer '03	AS Inc.		AS Inc.
Molner, Hank	Fall '99	Summer '01	Summer '03	IT Inc. GI Inc.		GI Inc.
Morrison, Liam	Summer '99	Summer '01	Summer '03	GBA Inc.	Reynolds, Grant	GBA Inc.
Prather, Nick	Fall '99	Summer '01	Summer '03	LWBL Inc. PD Inc.		TPT Inc.
Randall, Greg	Fall '99	Summer '01	Summer '03	AS Inc.	Williams, Kyle	AS Inc.
Rosey, Bill	Fall '99	Summer '01	Summer '03	ARJ Inc.		ARJ Inc.
Slater, Zack	Fall '98	Summer '00	Summer '03	GSU		AS Inc.
Vilma, Mike	Fall '99	Winter '02	Summer '03	ARJ Inc.	Karlson, Bob Campbell, Brian	ARJ Inc.

to ensure anonymity).

Sixteen of the students interviewed began the first co-op semester in the summer of 2001. All but one graduated with a degree in engineering – one graduated with a degree in business. All but one graduated on schedule in August of 2003 – one graduated one year later in August of 2004. Another five students who were affiliated with this group were interviewed. Four students graduated with this group in August of 2003 but came in from out of sequence (began their first co-op semester other than in the summer of 2001). The other student graduated in August of 2004, but began his first freshman engineering course (E101) the same year that those who started in their first co-op semester in summer of 2001 did (i.e., this student took one year longer to graduate than the majority who graduated on schedule).

Of the 21 students who were interviewed, 21 different co-op organizations were represented. Three of the students performed co-op assignments at two different organizations, and one student performed co-op assignments at three different organizations. Four of the students completed the third and final co-op assignment at the same organization, and four sets of two students completed the final co-op assignment at the same organization. Nine different organizations were represented when reviewing the companies at which the 21 subjects hired on with full-time after graduation. Eight subjects hired on full-time after graduation with the same organization with which all three co-op assignments were completed. An additional two subjects hired on full-time with the company where the third co-op assignment was completed (these two students had moved companies from the original co-op assignment because of poor economic conditions at the company). Ten graduates went to work for a company other than the one where any of the co-op assignments were

performed. One student did not graduate from the engineering program but did complete one co-op assignment before switching majors.

A total of fifteen co-op worksite supervisors were interviewed. One supervisor supervised two of the students at the same organization. In three situations, the student rotated through more than one department within an organization as part of the co-op sequence, and therefore two different work supervisors were interviewed at those organizations. Additionally, one company co-op coordinator was interviewed who did not supervise any students but was the frontline person responsible for hiring co-op students for the organization. In total, nine different organizations were represented by the sixteen total company representatives that were interviewed.

Three different faculty members were interviewed from the SOE. One, the dean of the college of engineering at GSU, was the director of the SOE during the years this study spans. He had been director of the SOE for more than ten years at the time of this study. A second faculty member was a tenured, full professor in mechanical and manufacturing engineering, who was with GSU for sixteen years. She had been the coordinating faculty member for the co-op program at GSU for the past ten years. The third faculty member was a tenured, associate professor and program chair for the electrical and computer engineering programs. He also was the co-op supervisor of two of the students interviewed for this study, both of whom performed the co-op assignments in a research role with the school of engineering at GSU.

Informant and Workplace Descriptions

Informants:

Table 2 provides the profiles of each of the student informants who were interviewed as part of the study. Table 3 provides the profiles of each of the co-op supervisors or company representatives who were interviewed as part of the study. Appendix A includes brief biographies of each of the informants in the study: students, employer representatives, and faculty.

Table 2
Interview Subjects: Student Profiles

Student	Engineering Emphasis	GPA[1]	Gender	Ethnicity	Age	Origin[2]
Abner, Victor	Mechanical	3.65	Male	White	Mid-20s	West Great Lakes region
Arnold, Paul	Computer	3.14	Male	White	Mid-20s	Suburb of Forde Junction
Dews, Wendell	Electrical	3.58	Male	White	About 40	Suburb of Forde Junction
Dorale, Henry	Electrical	3.75	Male	White	Mid-20s	Forde Junction
Evans, Barry	Electrical	3.6	Male	White	Mid-20s	West Great Lakes region
Jeffers, Steve	Electrical	3.65	Male	White	Mid-20s	Suburb of Forde Junction
Jillet, Eric	Mechanical	3.88	Male	White	Mid-20s	Suburb of Forde Junction
Jolley, Brent	Mechanical	2.68	Male	White	Mid-20s	Suburb of Forde Junction
Juniper, Wesley	none - business degree	3.04	Male	White	Mid-20s	West Great Lakes region
Kelly, Keith	Electrical	3.28	Male	White	Mid-20s	West Great Lakes region
Koontz, Doug	Mechanical	3.71	Male	White	Mid-20s	Suburb of Forde Junction
Kline, Gloria	Mechanical	3.32	Female	White	Mid-20s	State of Great Lakes
Kraft, Keri	Mechanical	2.77	Female	Asian	Mid-20s	Forde Junction
Kroll, Fred	Electrical	3.76	Male	White	Mid-20s	Suburb of Forde Junction
Martins, Seth	Computer and Electrical	2.98	Male	White	Mid-20s	State of Great Lakes
Molner, Hank	Electrical	2.96	Male	White	Mid-20s	West Great Lakes region
Morrison, Liam	Electrical	2.98	Male	White	Mid-20s	Suburb of Forde Junction
Prather, Nick	Electrical	3.26	Male	White	Mid-20s	State of Great Lakes
Randall, Greg	Electrical	2.94	Male	White	Mid-20s	West Great Lakes region
Rosey, Bill	Computer	3.39	Male	White	Mid-20s	Suburb of Forde Junction
Slater, Zack	Computer	3.14	Male	White	Mid-20s	Suburb of Forde Junction
Vilma, Mike	Mechanical	2.73	Male	White	Mid-20s	Suburb of Forde Junction

[1] GPA = grade point average, using a 4.0 scale
[2] Origin is where the student is from. If State of Great Lakes is identified, then the student is from the state but outside of the West Great Lakes region.

Table 3
Interview Subjects: Co-op Supervisors/Employer Representatives

Co-op Supervisor	Company	Title	Gender	Ethnicity	Years with Organization
Arbor, Scott	GSU	associate professor	Male	White	6
Blanchard, Gary	IS, Inc.	director of department	Male	White	18
Bonds, Brad	AS, Inc.	lead engineer	Male	White	25
Campbell, Brian	ARJ, Inc.	department manager	Male	White	24
Dillenger, Jeff	IS, Inc.	senior design engineer	Male	White	12
Elmore, Glen	MH, Inc.	engineer	Male	White	8
Jackson, Peter	TP, Inc.	lead engineer	Male	White	17
Karlson, Bob	ARJ, Inc.	engineering manager	Male	White	15
Mills, Homer	VK, Inc.	senior project engineer	Male	White	23
Mitchell, Larry	DM, Inc.	engineering manager	Male	White	16
Murphy, Vince	TP, Inc.	lead engineer	Male	White	17
Nelson, Sally	AS, Inc.	technical manager	Female	White	20
Reynolds, Grant	GBA, Inc.	group leader	Male	White	10
Schmidt, Carol	AS, Inc.	employment representative	Female	White	7.5
Tollen, Walter	AS, Inc.	Program manager	Male	White	24
Williams, Kyle	AS, Inc.	department manager	Male	White	24

Workplace Organizations:

Table 4 provides categories that were developed to establish a consistent nomenclature throughout the study. The values were assigned based on a review of typical sizes of companies, cities, and high schools. These value descriptions are used when identifying subjects' backgrounds and the places where they have worked.

Table 4
Organization Size Categories

Size (people)	**Organization**		
	Company	**City**	**High School**
Small	<250	<10,000	<300
Medium	>250 and <1,000	>10,000 and <100,000	>300 and <1,000
Large	>1,000	>100,000	>1,000

Appendix B includes a brief description of each of the organizations referred to in this study. Twenty-four unique organizations were identified, with the following characteristics:

- 17 manufacturing- and product-based employers

  employee sizes: 7 – large (1,000+ employees), 5 – mid-size (250 to 1,000 employees), 5 – small (250 employees or less)

- 4 engineering design or engineering service-provider employers

  employee sizes: 3 – small (8, 65, and 80 employees); 1- mid-size (300 employees)

- 1 governmental entity

  large city of more than 100,000 people

- 1 higher education institution

  more than 20,000 students (mid- to large-size)

- 1 transportation company

  more than 500 employees (mid-size)

Data Collection and Instrumentation

Instrumentation helps the researcher determine how the information will be obtained. In turn, the instrumentation chosen constrains the analyses that can be done (Miles & Huberman, 1994).

Review of Artifacts/Documents

The evaluations completed by students and worksite supervisors, and journals written by students, were reviewed and analyzed. Some portions of the evaluations were presented as ratings, using a Lickert scale. These data were evaluated using nonparametric statistics. Comments from the students and employers and journal entries were summarized, coded, and reduced to find patterns and themes. A research notebook was kept to include thoughts and ideas throughout this process, in order to help in the data reduction process and to serve as a check for bias.

Interviewing

According to Lofland and Lofland (1995), the first step in intensive interviewing is to produce an interview guide. The guide consists of questions or probes that are generated through various resources, including review of the research concept map, general observation, insight from personal experience and the experience of others, and curiosity due to lack of understanding. Typically, the guide is ordered to group questions and probes in a manner that is logical when used in discussing the topic with the informant. Often open-ended questions are used in order to obtain narratives and accounts in the person's own terms. Probes are used strategically to get at deeper meanings and understandings of

feedback obtained from the informant. The guide will document gross factual data detailing information about the informant and setting. Appendix C provides sample interview guides that were used for this study. Fieldnote pages were used to help document information provided by the informant during the interview itself, and included in the research notebook. The interviews were tape recorded in order to help with reviewing information and making more complete field notes after the interviews were completed. Permission was obtained from the informants and assurances were made about the use and confidentiality of the recordings.

When conducting the interview, I started by honestly and clearly identifying what would be asked of the informant. The purpose and nature of the study was explained and assurance of anonymity was provided. Also, the informants were told that they could choose not to answer questions and they could ask for clarification if appropriate. Questions were asked in a format based on the interview guide, and leading questions were avoided. Notes were taken throughout the interview to document not only the words that were spoken but to record nonverbal information that was observed. After the interview was completed, the information was gathered from the tape recording including taking notes, coding appropriate material, analyzing what was said, and reflecting on personal responses to what was said through journaling.

Observation Field Notes

In observational research, notetaking is an essential aspect of the work. Lofland and Lofland (1995) referred to three types of notes: mental notes, jotted notes, and full field notes. Mental notes include consciously becoming aware of the people and the environment

and noting physical aspects of the situation. Jotted notes are written fragments, ideas, key phrases, quotes, and other bits of information that can be quickly written down and serve to jog the memory later when reflecting on the experience. If something that occurred brought back a memory of something else that happened earlier or at a different time, this was noted and marked as such (a memory). Notes were jotted inconspicuously when possible and at moments of withdrawal or when shielded. Fuller jottings were recorded when there was time immediately after the event.

Spradley (1980) found it important to identify the language used for each fieldnote entry. Equally important is that data recordings should reflect language usages as heard and understood in the actual field situation. Data were recorded verbatim to remember exact situations and language usage. In addition, concrete language was used when possible to provide as much detail as possible (i.e. I avoided condensing and summarizing, which would sacrifice potential meaning and result in information loss).

Minimal time was allowed to elapse before sitting down to write up and reflect on the event. The field notes consisted of a running description of events, people, things heard and overheard, conversations among people, and conversations with people. Notes were concrete and accurate and verbatim accounts were noted as such. As notes were recorded, I began to form analytic ideas and inferences. These were recorded and noted as such, as they helped in checking beginning assumptions and conceptual frameworks, and they allowed me to create a future direction of the work (Ely et al., 1991). Finally, the field notes and journaling were used to record my personal feelings and impressions of what I heard and observed.

Following is a summary of the instrumentation that was used:

- Information about the cooperative education settings was obtained by compiling, summarizing, and evaluating data obtained from student and employer evaluation forms of each cooperative education semester for the samples of students starting in summer 2000 through 2002. The purpose of this exercise was exploratory in nature.
- Based on the information obtained from the above exercise, focused interviews were conducted with students, faculty/staff, and employer representatives (supervisors/mentors/managers). Sampling was purposeful and the purpose was both exploratory and confirmatory in nature.
- For confirmatory purposes, further investigation of student experiences was conducted by examining the contents of student field journals of their cooperative education experiences. This was done for those students who were interviewed above, and were able to produce the co-op journal for review.

Data Analysis

As recommended by Ely et al. (1991), lines were numbered in the entries of the log when useful and appropriate. This provided a way to cross reference logs and cite material while building a case. When reviewing the field notes, I wrote notes in the margins of the pages to start categorizing ideas and analyzing meanings in the observations. Strauss and Corbin (1990) and Ely et al. (pp. 87-88) suggested naming and labeling categories and then studying the "meaning units" that have been created to begin grouping ideas together so that ideas can be compared and contrasted. Strauss and Corbin (1990) referred to the process of

naming and categorizing phenomena through close examination of data as “open coding.” These meanings can then be applied to future observations, tested against the new observations to determine consistency and validity, and then modified as needed to incorporate new information. This process of conceptualizing the data becomes the first step in analysis (Strauss & Corbin, 1990, p. 63). In order to establish trustworthiness in the data, data were obtained and checked using multiple methods to determine if there was a convergence of meaning that could provide validation. The processes of open coding and using multiple types of data, data sources, and collection methods was used for this study.

The thirteen tactics for making meaning from data provided by Miles and Huberman (1994) were used to analyze the data. The first was noting patterns and themes. There were patterns in “variables involving similarities and differences among categories, and patterns of processes involving connections in time and space within a context” (Miles & Huberman, 1994, p. 246). Second was seeing plausibility, or drawing attention to a conclusion that may have merit but needed further analysis and verification. A third tactic is termed clustering, which simply means grouping like items together and conceptualizing objects that have similar patterns or characteristics. Clustering was applied at many levels including events or acts, individual actors, processes, settings/locales, or sites or cases. The fourth tactic, making metaphors, is a data-reducing device because metaphors make generalities out of particular phenomena. They are also pattern-making devices, decentering devices, and a way to connect findings to theory. Miles and Huberman stated that a metaphor “is halfway from the empirical facts to the conceptual significance of those facts” (p. 252). Counting is the fifth tactic and was important when determining the frequency of occurrences of categories, variables, or processes.

Making contrasts and comparisons helped to test conclusions. The seventh and eighth tactics presented by Miles and Huberman (1994) are partitioning variables and subsuming particulars into the general. These are opposite tactics of making subcategories for variables to determine more detail (partitioning), and taking several categories and making larger, more general categories (subsuming particulars). Factoring is a third method for determining themes or patterns and helps determine second-order variables. A fourth tactic is starting to note relationships between variables. This is the first step in refining conceptual frameworks and moving towards making conceptual or theoretical coherence of data. Four methods that were used to help avoid jumping to causal determinations were checking out rival explanations, ruling out spurious relations, using extreme cases, and finding intervening variables. The latter refers to determining whether there is another variable acting as an intermediary between the two variables being examined. The final two tactics offered by Miles and Huberman are building a logical chain of evidence and making conceptual and theoretical coherence of the data. These steps further develop relationships between variables that are more complete and defensible. These final steps move the "interrelationships to constructs and from there to theories" (p. 261).

Validity and Reliability of the Research

There are several ways in which research is evaluated, including validity, reliability, confirmability, generalizability, authenticity, and credibility (Eisenhart & Howe, 1992; Guba & Lincoln, 1989; Miles & Huberman, 1994; Anfara et al., 2002). As Miles and Huberman note, how will you or anyone else know if your findings are "good?" Examples of "good" were given as possibly or probably true, reliable, valid, dependable, reasonable, confirmable, credible, useful, compelling, significant, and empowering (Miles & Huberman, 1994,

p. 277). These concerns have been the focus of much debate, particularly in the qualitative research tradition, where conventional statistical analyses are either impossible or inappropriate due to the nature of the data collected. Unlike quantitative data, descriptions and observations cannot easily be boiled down into numerical figures, graphs, and correlations. This section describes some of the measures taken to ensure that "good" results were obtained.

Validity

Eisenhart and Howe (1992) defined validity as the trustworthiness of inferences drawn from data. Kvale (1989) emphasized that validation is the issue of choosing among competing and falsifiable explanations. Conventionally, conceptions of validity have been discussed from two perspectives: internal and external validity (Campbell & Stanley, 1963). Internal validity "pertains to the credibility of inferences that experimental treatments cause effects under certain well-defined circumstances" (Eisenhart & Howe, 1992, p. 644). Miles and Huberman (1994) referred to internal validity as "truth value" – do the findings make sense and are they credible to the people studied or to the reader? They also correlated the terms credibility, authenticity, apparency, plausibility, and adequacy with internal validity.

The reflective queries provided by Miles and Huberman (1994) proved useful when testing for internal validity. This study contains descriptions that are context-rich and meaningful. The accounts make sense and seem plausible. Use of multiple data sources and complementary methods produced converging conclusions. Alternative explanations were actively considered and were either disconfirmed or incorporated into the conceptual model. The accounts were comprehensive and the data were linked to existing conceptual theories. The findings emerged from multiple data sources. Finally, disconfirming evidence was

sought, and factors other than the ones being studied but could have caused the noted effect(s) were ruled out.

External validity "pertains to generalizing the effects observed under experimental conditions to other populations and contexts" (Eisenhart & Howe, 1992, p. 644). According to Guba and Lincoln (1989), external validity is defined as the causal relationship generalized to and across alternate measures of the cause and effect and across different types of persons, settings, and times (p. 234). According to Campbell and Stanley (1963), the researcher must prove that variables that might affect the interpretation of the results are controlled for in the research design and characteristics of the people, settings, and variables that define the experimental conditions are unlikely to matter when applied to other populations or situations (Eisenhart & Howe, 1992, p. 645). This study has analytic generalizability using the conceptual model developed from the data.

Reliability

Reliability refers to the consistency of a given inquiry and is a precondition for validity (Guba & Lincoln, 1989). Miles and Huberman (1994) equated reliability with dependability and auditability. They stated that the issue is whether the process of the study is consistent, reasonably stable over time and across researchers and methods (p. 278). Again queries provided by Miles and Huberman were used to determine reliability in this study. Research questions were clearly identified, and the features of the study design were congruent with them. My role and status within the study was explicitly described. The basic paradigms and analytic constructs were clearly specified. The findings had meaningful parallelism across cases. Finally, data were collected across a full range of appropriate respondents and data quality checks were made.

Objectivity

Objectivity evolves from the positivist demand for neutrality (Guba & Lincoln, 1989). Miles and Huberman (1994) indicated that objectivity, or confirmability, is related to neutrality and is concerned with minimizing research biases. As suggested by Miles and Huberman, the following means were used to determine objectivity in the study. The study's general methods and procedures were described explicitly and in detail. There is a record of the study's methods and procedures, detailed enough to be followed as an audit trail. Competing hypotheses or rival conclusions were considered. Study data have been retained in an organized manner and are available for reanalysis by others. I described how the conclusions were explicitly linked to the data. Finally, I maintained explicit self-awareness of my personal assumptions, values, biases, and influences during the study.

Methods for Obtaining "Goodness" in Research

Miles and Huberman (1994, pp. 263-277) discussed tactics for verifying conclusions from qualitative research studies. Following is a brief synopsis of the tactics and their application to this study:

- I was engaged with the informants over the course of multiple years, allowing for in-depth knowledge of people and events;
- I checked that sampling of informants was representative, making sure generalizations were not made from nonrepresentative information;
- I avoided biases that I may have projected on the site and checked for the effects of the site on me during the research;
- I contrasted and compared several types of results, attempting to corroborate findings/conclusions;

- I weighed the evidence to determine if some was stronger or weaker than others based on issues such as when the data were collected, how they were collected, or the type of respondent/informant;
- I checked the meaning of outliers;
- I used extreme cases (e.g. informants with strong biases);
- I investigated things that happened outside the range of my expectations;
- I looked for negative evidence, trying to find data or conclusions that refuted those found;
- I ruled out spurious relations by determining whether something else could be an intermediary cause of the findings;
- I provided rich detail so that the study and/or findings can be replicated or reproduced;
- I checked out rival explanations to determine if something completely different from the conclusions found could be causing the phenomenon; and
- I received feedback from the informants.

Summary of Strategies and Tactics used for Validity and Reliability

The following tactics and strategies were incorporated or implemented to achieve validity and reliability in the study:

- Researcher biases were clearly identified so the reader can evaluate information accordingly;
- Questions, methods, and data collection techniques were clearly defined so that results and conclusions can be tied back to the design of the study;

- Complete details regarding the students and their work settings were included so that readers of the study can appropriately determine the generalizability of the data and results;
- Informants were asked to review, provide feedback, and verify the accuracy of the field notes and outcomes from the analysis. Following were comments made by some of the informants after reviewing the information I wrote about them from their interview: “everything sounds right” – Keith Kelly; “everything looks good” – Gary Blanchard; “everything looks OK” – Greg Randall; “your evaluation of the interview and my past experiences is pretty accurate” – Gloria Kline; “I don't see anything grossly incorrect in your interview write-up…the general ideas seem essentially correct” – Kyle Williams; “the summary sounds good” – Mike Vilma; “the information all looks accurate” – Barry Evans; “I edited your text a little bit” – Sally Nelson; “most of what you wrote looks right” – Vince Murphy; “the write-up looks very good so far…the content is accurate” – Glen Elmore; “looks fine to me” – Liam Morrison; “I read your summary of the interview and everything seems in order” – Paul Arnold;
- Several methods of data collection were used in order to corroborate the data that was obtained. This was accomplished through the use of data collected through historical student data, personal interviews, evaluations, and journal entries; and
- Data that have been collected over the course of a student’s complete co-op experience were used, providing aspects of a longitudinal study. Information

from evaluations and journal entries starting with the student's first co-op experience after the sophomore year through their third co-op experience in the senior year was evaluated. In addition, data from three samples of students were compared.

Limitations and Delimitations

The delimitations of this study that limit the generalizability include

- the use of students from one academic program (engineering);
- the use of students from one institution (GSU); and
- the selection of students, faculty, and employers to interview for the study.

Limitations of the study include

- the demographics of the students in the engineering program and the employer representative respondents;
  - there was a lack of racial, gender, and age diversity in the student informant group (was primarily 22-25 year-old, white, male);
  - there was a lack of racial and gender diversity in the employer informant group (was primarily white, male);
- the backgrounds and experiences that students brought with them to GSU;
- all of the employers and the majority of the students were from one geographic area of one state;
- the academic training (quality and quantity) students had prior to the cooperative education event;

- the accuracy of respondents recollections of events/experiences during the interview process; and
- the consistency of processes students experience in both the academic and employer settings.

CHAPTER 4: RESULTS

There are three groups of people who are involved with a cooperative education experience (co-op) sponsored by a college or university. The first group, and the focus of this study, is the students who participate in the work experience. The second group is the employers who hire the students to work within their organization. The third group is the faculty and administrators at the university who train the students from an academic standpoint and coordinate and oversee the co-op. The results of this study recount the experiences of students participating in a co-op program along with viewpoints from employers and university faculty/administrators, with a purpose of identifying patterns or themes that can be used to create an explanatory model of the events.

Summary of Engineering Academic Program Data

To begin this investigation, data about students who take classes with the School of Engineering (SOE) at Great Stateside University (GSU) were collected and analyzed to determine how the system is organized in relation to the students who are enrolled for classes with the academic program. This is important because, as will be shown later, the educational process is a key component for a person in the entry into a professional or semi-professional career field.

Figures 7-9 were developed to describe the organization of students in the engineering program at GSU. The larger boxes in the flow chart represent the number of students who participated in those key identifier stages of the engineering program. The arrows indicate the movement of students from one stage or status to another. The smaller boxes with a number in them on the arrow lines indicate the number of students who moved to that stage or status within the engineering program. The identifier stages (boxes) and the

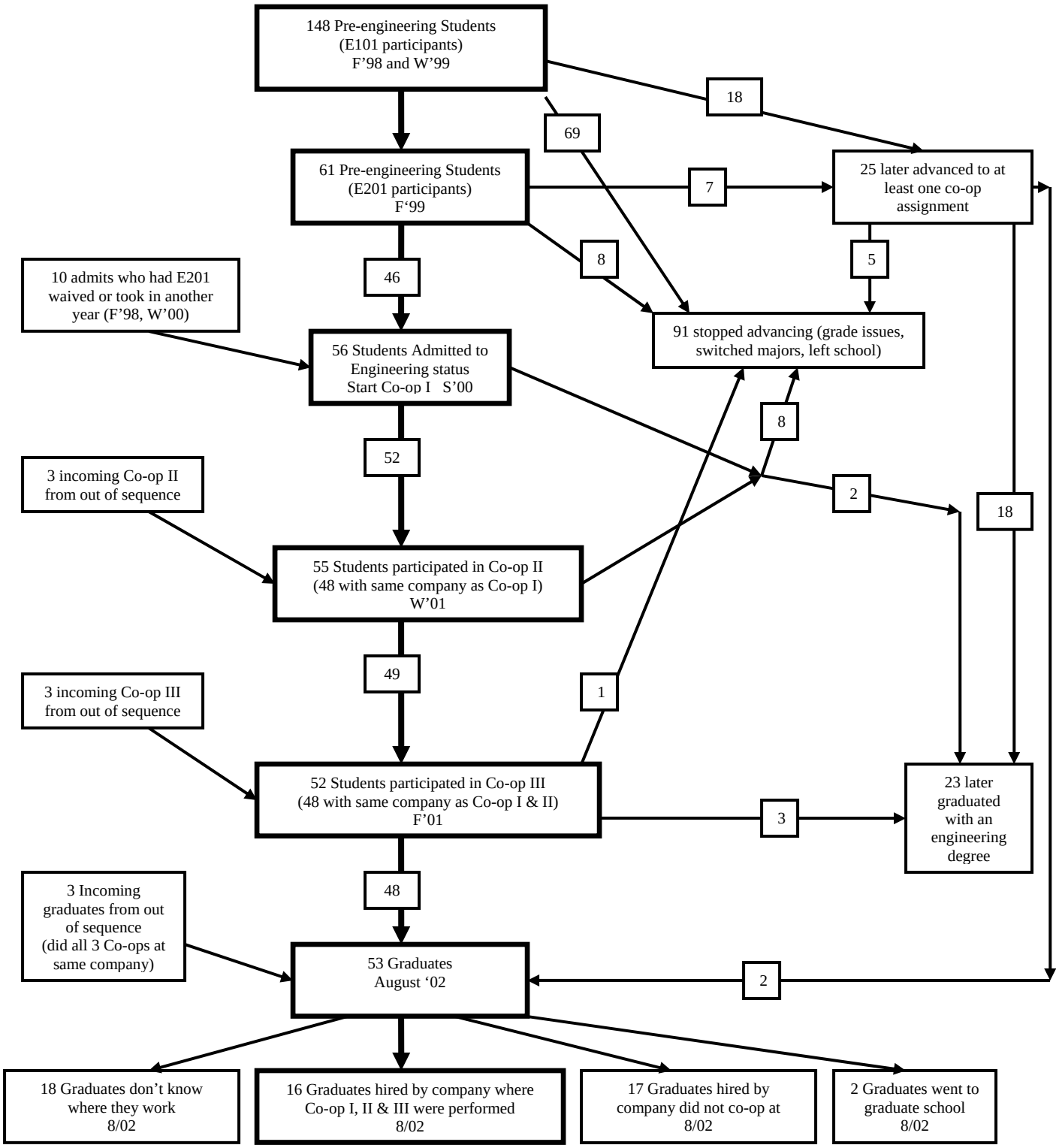


Figure 7: Summer 2000 co-op start group

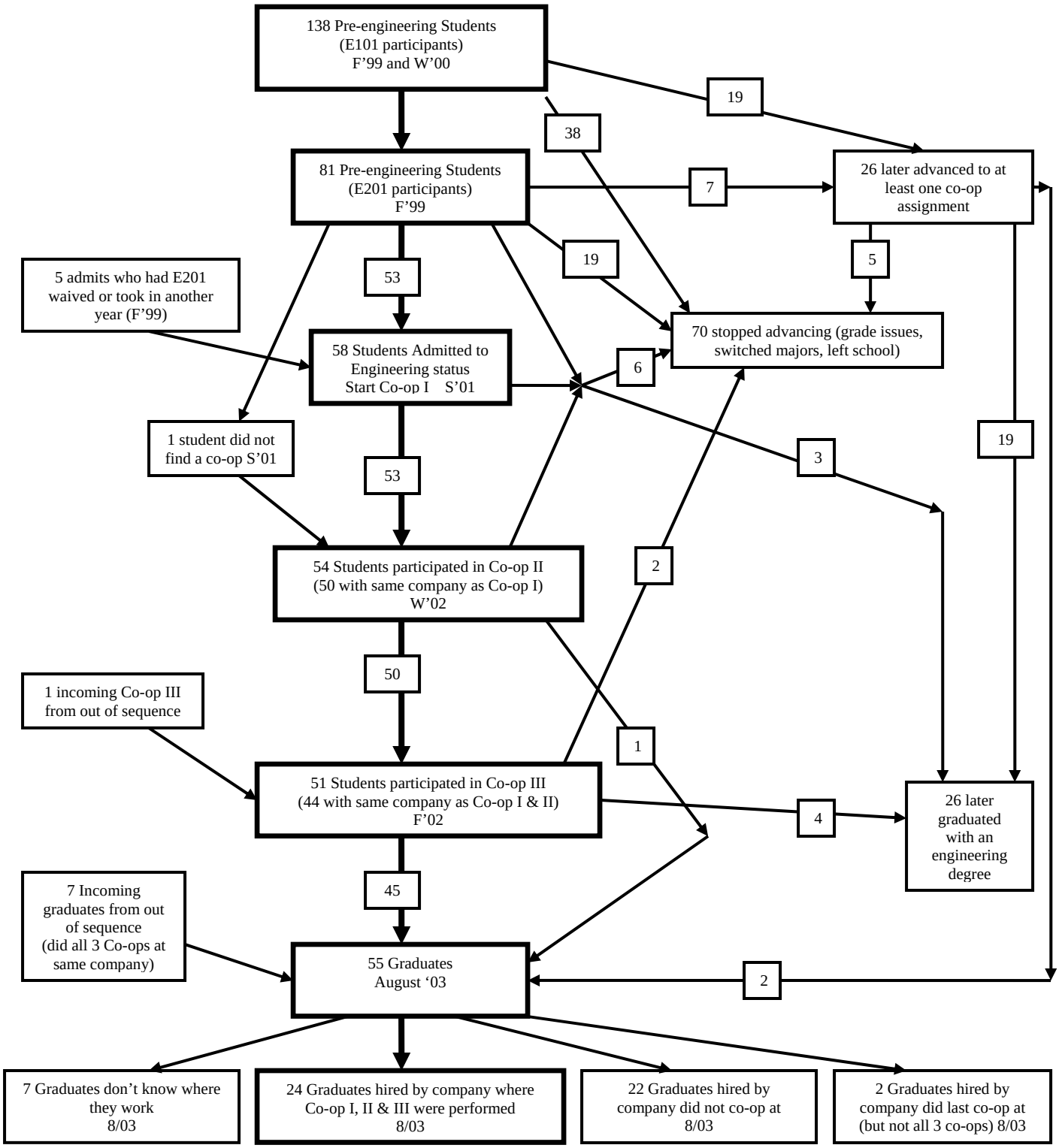


Figure 8: Summer 2001 co-op start group

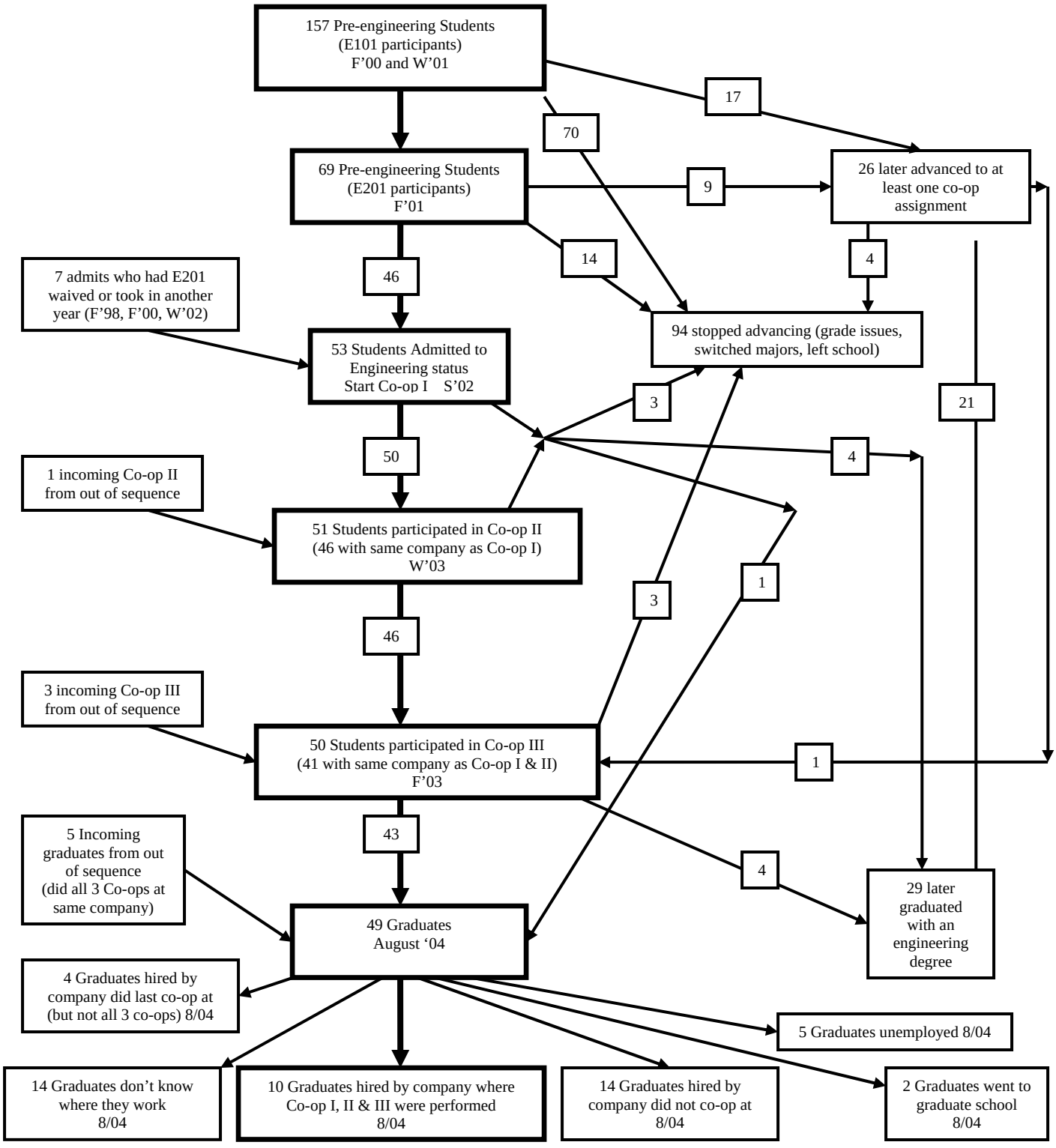


Figure 9: Summer 2002 co-op start group

arrows with heavier-lined borders indicate the movement of students who progress through the engineering program on a plan that is preferred by the academic department, and represents the most efficient path to graduation with an engineering degree.

For example, looking at Figure 7, of the 148 students that started in the introductory engineering course (E101), 61 progressed in the expected timeframe to the co-op preparatory course (E201) in their second year of the program, 69 students stopped progressing in the program at all (switched majors, flunked out of the program, left GSU, etc.), and 18 students deviated from the expected progression through the program (due to inadequate grades in a course, taking longer to complete required courses, etc.) but did end up advancing to at least one co-op assignment in the engineering program.

Table 5 summarizes the data presented in Figures 7-9. Three groups of students are represented, based on the summer the students began their first co-op semester. The three major categories identified are “entry to program,” “in program,” and “exit from program.” Within the “entry to program” category, two sub-categories are the group that “started in E101” – the freshman introductory course, and the “total students entering” – the student from the E101 course along with several students who entered various co-op levels from “out of sequence.” “Out of sequence” refers to students who started their first co-op semester in a group other than the one tracked for the figure but for various reasons have re-entered in a co-op semester included with the group tracked for the figure.

“In program” refers to the required courses and co-op semesters that the students participated in while they were pursuing their degree. “Exit from program” includes both those students who graduated with an engineering degree and students who left the program without completing the degree. There were various reasons for leaving the program,

Table 5
Summary of Student Movement through the GSU Engineering Program

	Student Groups		
Category	**Summer 2000 co-op start**	**Summer 2001 co-op start**	**Summer 2002 co-op start**
ENTRY TO PROGRAM			
Starting in E101	148	138	157
Total students entering	167	151	173
IN PROGRAM			
Progressed to E201 on schedule	61 (41.2%)	81 (58.7%)	69 (43.9%)
Progressed to E299 (Co-op I) on schedule	56 (35.4%)	58 (40.6%)	53 (32.3%)
Progressed to E399 (Co-op II) on schedule	55 (34.2%)	54 (37.8%)	51 (30.9%)
Progressed to E499 (Co-op III) on schedule	52 (31.7%)	51 (35.4%)	50 (29.8%)
EXIT FROM PROGRAM			
Did not graduate from program	91 (55.5%)	70 (48.6%)	94 (56.0%)
Graduated on schedule	53 (31.7%)	55 (36.4%)	49 (28.3%)
Graduated, but later	23 (14.0%)	26 (18.1%)	29 (17.3%)
Total that graduated	76 (45.5%)	81 (53.6%)	78 (45.1%)
Hired by company where conducted at least one co-op	16 (45.7%)	26 (54.2%)	14 (40.0%)
Hired by company where did not conduct any co-op	17 (48.6%)	22 (45.8%)	14 (40.0%)
Went to graduate school	2 (5.7%)	0 (0.0%)	2 (5.7%)
Unemployed	0 (0.0%)	0 (0.0%)	5 (14.3%)
Graduate employment status is unknown	18 (34.0%)	7 (12.7%)	14 (28.6%)

including transferring to a different academic program, transferring to a different college/university, and flunking out of courses or the academic program completely.

The number for each student group in Table 5 refers to the number of students in each category. The percentage in parentheses next to each number indicates the percentage of students out of the total possible for each category. This varies slightly for each category and is based on the combination of students that started in E101 along with any students that may

have entered from “out of sequence” within and prior to the category in question. For example, the group starting their first co-op in the summer of 2000 had 61 students, or 41.2% of those who started in E101 (148 students), progressed to E201 on schedule. In the same group, 56 students, or 35.4% of those who started in E101 plus 10 additional students entering from ‘out of sequence’ (a total of 158 students), progressed to E299 on schedule.

Reviewing the data, it is evident that the groups beginning in the summer of 2000 and 2002 are similar, while the group beginning in the summer of 2001 is slightly different. There was a dip in the number of students in the 2001 group; however, numbers of participants in the various categories was fairly consistent (if not slightly higher) with the groups in 2000 and 2002. Because of the lower number of students starting in 2001, percentages were slightly higher in most cases, as compared to the 2000 and 2002 groups.

While approximately 40-50% of students who started in the freshman introductory engineering course continued to the co-op preparatory course (E201), only about one-third of the students actually started their first co-op semester on schedule. That ratio stayed fairly consistent through the end of the third co-op semester and to graduation. Approximately 30-35% of students who started in the freshman engineering course graduated with an engineering degree on schedule. That percentage increased by an additional 15% to a total of 45-50% when considering every student who graduated with an engineering degree from the group that started in the freshman engineering course. Those 15% of students took longer to get through the program due to additional preparatory courses needed, including mathematics (specifically, calculus) readiness courses, the need to repeat courses that were not successfully passed, or simply the need to take less than a full schedule of courses because of academic ability or non-university-affiliated work schedules. Some students needed to work

part-time to help pay for the cost of tuition and/or room and board, while a small number of others were nontraditional students who worked full-time while attending school part-time.

Among the three groups, there were some strong consistencies including the number of students who progressed to the co-op program (low- to mid-50s), the number of students who graduated on schedule (low- to mid-50s), and the number of total graduates from the original number who started in the freshman engineering course (approximately 80 students). While the total numbers of students who did not graduate from the program varied by 24 students, the percentage that did not graduate compared to the original freshman number each year was approximately 50-55%.

Approximately 40-50% of those students who graduated became employed with the company for which they performed their co-op, while another 40-50% went to work for a company for which they did not co-op while in school. A small percentage (less than 15%) of graduates continued their education by going to graduate school or were unemployed. Note that the students who were listed as unemployed for the 2002 year may currently be employed, but were not within 3-4 months of their graduation when the employment survey was conducted. One reason for this unemployment could be the poor state of the economy in West Great Lakes region during the year the students graduated, as described previously in the *Background Information of the GSU Environment* section (page 116). The economy was in a recessed state throughout the graduation years of each of the three groups (2002-2004), which may have impacted the employment situation for all groups.

Concept Development

Before developing the concepts identified in this study and in order to operationalize the phenomena that were investigated, the following concept definitions are revisited. According to Schein (1978), a *career* is a construct described as the way individuals provide for the survival of individual and the family unit through paid employment. An *occupation* represents a homogeneous grouping of very particular jobs and positions that perform a precise set of compensated activities (Moore, 1969). A *profession* is a specific type of occupation where the individual belongs to a group of workers who control information, ideas, and belief systems via cultural-cognitive and normative processes. The professions "construct cognitive frameworks that define arenas within which they claim jurisdiction and seek to exercise control" (Scott, 2001, p. 129). *Field* is a social construct defined as "the existence of a community of organizations that partakes of a common meaning system and whose participants interact more frequently and fatefully with one another than with actors outside of the field" (Scott, 1994, pp. 207-208). Finally, *organizations* are collectivities oriented to the pursuit of relatively specific goals and exhibiting relatively highly formalized social structures (Scott, 1998).

As identified at the beginning of this chapter, there are three groups of people involved with a cooperative education experience (co-op) sponsored by a college or university. The first group is the students who participated in the work experience (identified in Table 2, page 127, of Chapter 3). The second group is the employer representatives who hired the students to work within their organization and supervised them (identified in Table 3, page 128, of Chapter 3). The third group is the faculty and administrators at the education

organization (university) who train the students and coordinate and oversee the co-op assignment, from an academic standpoint.

The employer organization is where the respondent worked. In this case, the employers of each of the students (with two exceptions) had a specific goal of designing, developing, and/or producing some product to sell and make money (e.g. a manufacturing company), providing some service to consumers in order to make money (e.g. an engineering design or engineering service-providing company), or supporting some public service (e.g. a governmental agency providing an engineering-related service).

For this study, manufacturing companies were the dominant type of workplace and included the following: ARJ, Inc.; AS, Inc.; BR, Inc.; CP, Inc.; CRCP, Inc.; DM, Inc.; GBA, Inc.; GI, Inc.; IG, Inc.; IS, Inc.; IT, Inc.; IWG, Inc.; MC, Inc.; MH, Inc.; TP, Inc.; VK, Inc.; and VPA, Inc. Engineering design or engineering service-providing companies included the following: HCTF, Inc.; PD, Inc.; ST, Inc.; and TPT, Inc. Governmental entities providing an engineering service included LWBL, Inc. The two exceptions included a transportation company, TG, Inc., where Wesley worked after graduating with his business degree, and an education organization, GSU, where all student respondents received their engineering degree and where two student respondents conducted their co-op assignment.

The education organization referred to in this study is GSU, the university where the student respondents completed their engineering degree and where two student respondents conducted their co-op assignment.

Stage 1: Pre-Entry

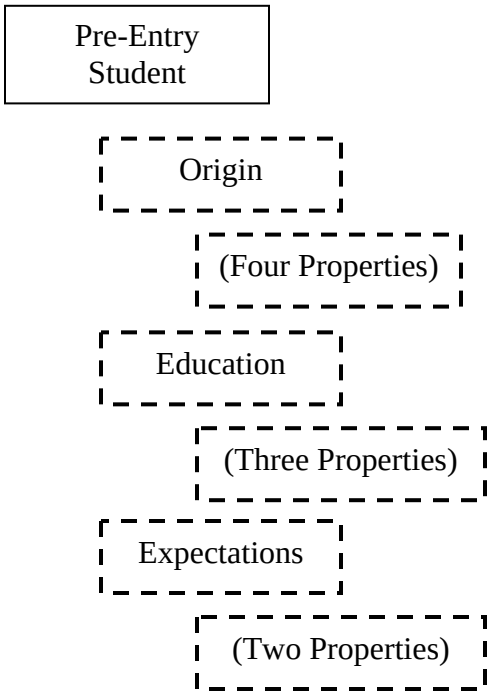
The first stage identified was *pre-entry*. Pre-entry is defined as those activities or events that precede the student's introduction to the employer organization and impact the process in a significant manner. Parts of the pre-entry stage are consistent with what Fischer (1986) referred to as anticipatory socialization (summarized from the works of Brief et al., 1979; Feldman, 1976; Louis, 1980), when individuals prepare themselves for entry to the organization. Raschke (2003) identified pre-entry as a key category in her socialization model and defined it as the developmental activities for the individual, such as a need to develop knowledge and experience in a new profession, and the employer, such as vacancy or purpose and expectations. For this study, pre-entry existed for each of the three groups of people, including student, education organization, and employer.

Pre-Entry Student – Education Organization –Employer

A pre-entry stage was identified for each of the three entities of people involved. The pre-entry stage for each group contains specific categories and properties that will be explained separately; however, some of the categories are created jointly. In particular, education and student preparation exist as categories created through joint student and education organization activities. Other student and education organization categories occur independently, while employer pre-entry categories all occur independently of the student and education organization. Raschke (2003) also concluded that employer pre-entry activities occur independently of prospective employee pre-entry activities.

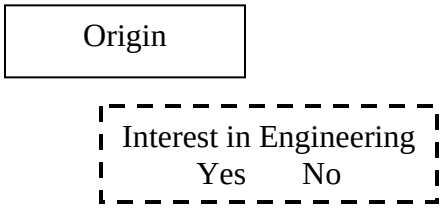
Pre-Entry: Student

Student pre-entry refers to the backgrounds and activities, developed and experienced prior to the beginning of the co-op search process, which were determined to impact the co-op experience for the student. Pre-entry for the student contains three categories: 1) *origin* (including four properties); 2) *education* (including three properties); and *expectations* (including two properties).



Origin:

The first category identified as part of student pre-entry stage is the *origin*. The origin refers to the where the students came from and what background they brought with them prior to beginning their academic studies. The origin contains four properties: 1) *interest in engineering*; 2) *location*; 3) *related prior experience*; and 4) *related network*.



The interest in engineering property was determined to have dimensions of yes or no. Each student interviewed for this study demonstrated an interest in the topic of engineering, implied from their pursuit of an engineering degree, and therefore was considered to be established or "in" for this property. A person with no interest in the topic of engineering would be considered "out." The timeframe of when the student developed the interest in the topic, and the question of why the student developed the interest in the topic, varies by individual cases. Although this question was not asked specifically of the informants, comments from the informants and over eight years of personal experience of advising engineering undergraduate students with career issues provides some insight.

For some students, a parent, sibling, or other relative is/was an engineer and therefore the student's interest reflects learned behavior and/or projected values from the relative. This was the case for Keith Kelly, Doug Koontz, Wesley Juniper, Fred Kroll, Seth Martins, and Nick Prather who all had family members in the engineering field. For others, including Victor Abner, Wendell Dews, Barry Evans, Liam Morrison, Greg Randall, and Mike Vilma, there was a personal interest in technical activities (such as tearing apart a radio as a child or maintaining personal vehicles as a teenager) that manifested in technical work experiences prior to attending the university.

A third reason a person develops an interest in engineering is due to suggestions of career paths by family or educators (teachers and guidance counselors) who see skills the student has in mathematics or science. This interest is typically developed in the teenage

years. Some believe they have the skills to be an engineer and determine that the engineering career path is desirable because of the outcomes of entering the field including good income, ample employment opportunities and employment stability, prestige, and work environment. Finally, for a few students (none of which were identified in this study), the interest in pursuing an engineering degree develops after entering a college or university and taking a course in the topic.

Location
Local Non-local

Location was determined to be a key property of the student respondents in regard to both the education organization they chose to pursue their degree, and more importantly for this study, where they went to work for their co-op experience. Therefore, location contained properties of local and non-local. All but three of the 22 student respondents attended high school in the West Great Lakes region, with 13 of them originating from Forde Junction or one of its suburbs. Each of the three who did not attend high school in the West Great Lakes region came from another part of the State of Great Lakes. In this case, all three came from approximately a one- to two-hour drive to the east of Forde Junction. In this study, all 22 student respondents ended up completing all or some of their co-op assignments in the West Great Lakes region, and no co-op assignments took place further than one hour's drive from Forde Junction.

Related Prior Experience
Some None

Related experience in an engineering-related field prior to beginning the initial co-op assignment was also determined to be a key property of the student respondents. Dimensions of the related prior experience property were some and none. Of the 22 student respondents,

five had some experience in an engineering-related role prior to beginning their first co-op position, and an additional eight students had some prior experience working in a manufacturing or technical environment. Nine students had no prior engineering-related or technical experience. According to Brown (1985a), prior work experiences are the only directly linked variable to successful socialization to a new organization or role, and the prior experiences lessen entry shock to new organizations (Jones, 1983).

Of the five students who had prior engineering experience, one, Wendell Dews, went to work for the company where he had gained the experience (IWG, Inc.). Three of the students with engineering experience (Barry Evans, Keith Kelly, and Seth Martins) were able to secure a co-op position at the company of their choice. Seth Martins did receive a co-op offer from the company he had worked for previously, but decided to take a more appealing position to him. The fifth student, Wesley Juniper, was able to secure a co-op assignment despite struggling academically during his engineering studies.

Those students who had some hands-on experience did not fare much differently in their search for a co-op position than those students who had little or no technical experience prior to the search for a position. Victor Abner had some prior experience working in a manufacturing environment, and he ended up receiving three co-op interviews and three offers of employment. Bill Rosey had worked in a technical (non-engineering) role prior to beginning his co-op search, and he participated in three co-op interviews and received two offers of employment. Keri Kraft had worked manual labor in a manufacturing facility, and she was invited to five co-op interviews. She received only one offer of employment.

By comparison, Brent Jolley had no technical experience prior to beginning his co-op search, but participated in two co-op interviews and received offers of employment from

both. In addition, both groups with and without experience had examples of students with multiple interviews and a single employment offer (no experience – Greg Randall, Fred Kroll, Mike Vilma, Paul Arnold; some technical experience – Eric Jillet, Henry Dorale, Nick Prather).

Related prior experience was important from three different perspectives. First, the prior experience impacted the student's expectations and outlook regarding what to look for in a co-op assignment. For example, Liam Morrison stated that he "knew he wanted to work there" when he interviewed at GBA, Inc., Barry Evans had offers for co-op employment at his previous place of work, but he knew he wanted to do something different than the engineering work he had been doing. He also pursued DM, Inc., because of his knowledge of the engineering environment and where he envisioned he wanted to work. Doug Koontz interviewed at IS, Inc., and knew "he really wanted it" because it was a big company where he could "try different areas of engineering."

Eric Jillet went to GI, Inc., for a day, was able to meet people and see projects, and said it "looked interesting." Henry Dorale had conducted some research with faculty members and it was attractive to him to continue to do so for his co-op within GSU. Other interviews he had with companies were "not as attractive" to him as working with faculty. Finally, Victor Abner noted that he "had worked at a factory for a couple of months prior" to looking for a co-op and therefore knew he did not want to work for two of the small companies he interviewed with.

Second, the student with prior related work experience can be more attractive to some employers because they can bring additional skills, not possessed by other students, to the workplace. Responses from employer supervisors about the value of prior work experience

were inconsistent. Gary Blanchard from IS, Inc., stated that one can identify someone with the skills he looks for "based on their history and work experience." However, he also stated that exact engineering experience is not as important. Glen Elmore at MH, Inc., indicated that they like to hire co-op students with basic electrical/industrial knowledge. Larry Mitchell at DM, Inc., said that when looking at a resume he looks for a student who worked a lot during high school and college.

Bob Karlson at ARJ, Inc., said he looks for mechanical knowledge by reviewing work experience. In contrast, Sally Nelson from AS, Inc., said that she does "not have a lot of expectations as far as previous work experience." Also, Grant Reynolds of GBA, Inc., stated that "past work experience is not a benefit" when seeking a co-op candidate. Finally, Peter Jackson at TP, Inc., indicated that "on-the-job experience is okay, but not that important."

Third, prior related work experience sometimes resulted in personal workplace contacts that were resources for gaining similar employment either in that organization or others. This concept is developed further in the following section.

Related Network
Developed None

The student's related work-search network was another property of the origin that influenced the co-op experience and contained dimensions of developed and none. A network is determined to be personal contacts that a student has obtained or developed that result in an advantage for the student in gaining access to the organization, potentially leading to employment. Prior to beginning the search for a first co-op position, eight students indicated having a personal resource that might provide an advantage in pursuing a co-op position with an organization. Six of the eight students ended up completing at east one co-op

assignment with the employer where they had a network resource. Some of the network resources were family or friends, and some were developed through previous work experiences – particularly if the previous work experience was in a technical or engineering-related field.

Wendell Dews began work as an engineer part-time at IWG, Inc., when he began pursuit of his engineering degree. He eventually completed all three of his co-op assignments with IWG. Barry Evans pursued work at DM, Inc., and indicated that he got in "through word of mouth." Barry completed all three co-op assignments at DM, Inc. Eric Jillet had a close friend who graduated from the GSU engineering program and worked at GI, Inc. Eric completed all three co-op assignments at GI and hired on full-time after graduation. Keith Kelly had a close relative who worked in engineering management at AS, Inc., and his grandfather was an engineer for a large material handling company in Forde Junction. Keith was hired by AS, Inc., for his co-op assignments and now works there full-time.

Nick Prather's father is an engineer for LWBL, Inc., and Nick hired on and completed his first co-op assignment at LWBL. Wanting to get out from working in the same department and organization as his father, Nick used a contact from his uncle, an engineer and part-owner of an architectural and engineering firm in Forde Junction, to secure his second and third co-op assignments at PD, Inc., a firm located in Forde Junction and similar to his uncle's firm. Doug Koontz had an uncle and a high school classmate who went through GSU's engineering program and both worked at SI, Inc., where Doug ending up getting hired and completing all three of his co-op semesters.

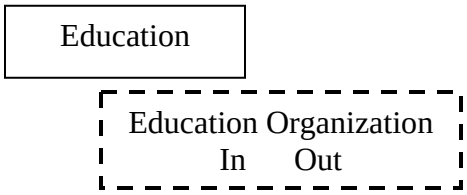
Wesley Juniper's father is an engineer for a company in Wesley's hometown, where he worked part-time prior to his co-op assignment in an engineering role. This contact did not

result in a direct hire for his co-op assignment; however, the prior experience Wesley gained in an engineering role provided him with skills that were identified by the employer where he conducted his co-op assignment as a positive factor in their selection process. Finally, Seth Martins had worked in an engineering role prior to beginning his first co-op experience, but network resources he gained through that experience were not beneficial in securing his co-op assignment. Like Wesley, his prior experience may have been a positive factor in being hired by his co-op employer.

A network resource provided more than a personal contact for some students. It also influenced the student's desire to potentially work at the network resource organization, because the student knew the organization better than others, leading to a feeling of familiarity and comfort. Eric Jillet talked to his cousin who worked at GI, Inc., and was a GSU engineering alumnus, and therefore Eric wanted to pursue a co-op opportunity at GI, Inc.

Education:

Education is a second category of pre-entry and is a key concept that connected all of the respondents in the study. The GSU-facilitated co-op program was the focus of the study and therefore a common referent for many of the respondents, in particular the student respondents. Three properties within education were identified: 1) *education organization*; 2) *degree program*; and 3) *co-op preparation*.



Pursuing a degree in engineering through GSU was a core activity to a student being involved in a co-op experience. In order to pursue the degree, the student had to first be admitted to the education organization, GSU. Therefore, part of the process of each of the students getting to the point of beginning the co-op assignment, is admission to the education organization during the pre-entry stages. All students interviewed for this study were admitted; and, therefore, "in" the education organization. The other dimension of education organization, "out," refers to those students who are not admitted to the education organization.

The engineering degree program at GSU has two phases for students: pre-engineering and engineering status. A student can enter the education organization and declare a pre-engineering student status. After successfully completing the core engineering courses specified by the academic program, the student can gain admission to engineering status through an application and review process. Admission to engineering status is required before a student can begin the first co-op assignment. Therefore, another property of pre-entry for the student is degree program admission. All students interviewed for this study completed at least one co-op semester and therefore were "in" the degree program. The other dimension of degree program, "out," refers to those students who were not admitted to the engineering degree program.

Another requirement of the academic engineering program at GSU is that the student maintains adequate academic progress after admission to engineering status. This includes maintaining a minimum 2.5/4.0 grade point average and attaining a grade of "C" or higher in each engineering course. All students interviewed for this study except one, Wesley Juniper, graduated with an engineering degree and therefore remained "in" the degree program until they were finished. Wesley Juniper struggled through all four core mathematics courses, including the one taken prior to his first co-op semester. Instead of continuing to retake courses, Wesley decided to switch majors to a business degree program, at which point he was considered "out" of the engineering program. As shown in Table 2, approximately 45-50% of those students who made it into the education organization and were in a pre-engineering status eventually made it into the degree program and graduated with an engineering degree.

E201 – Co-op Preparation is a required course of all students trying to enter the engineering degree program. Co-op preparation exists to accomplish two goals: serve as a point of entry to the upper division courses in the academic program by admitting or denying students to "engineering status"; and prepare students needing to obtain their first co-op assignment. Approximately 45-50% of students who begin taking classes in the engineering academic program are admitted to engineering status through the co-op preparation course. The preparation includes assisting students with resume and interview preparation, including simulated interviews with university staff and practice interviews with representatives from companies that have participated in the co-op program in the past. In addition, topics are

discussed including what to expect in the workplace, engineering organizations' structures, ethics in the workplace, and leadership. Finally, a panel of senior-level co-op students participating in the third co-op assignment, along with several company supervisor representatives, present their experiences to the E201 students and answers their questions.

The course was completed by all students who were interviewed in this study, except Wendell Dews, who had the course waived because he was working in an engineering role that he committed to staying at for his co-op assignment. It also was instrumental in providing some level of preparation for students as they began the process of obtaining a co-op position and developing some employment connections for students. Several students developed direct contacts through the course's practice interviews and presentations that led to actual co-op interviews, and in some cases, a co-op position.

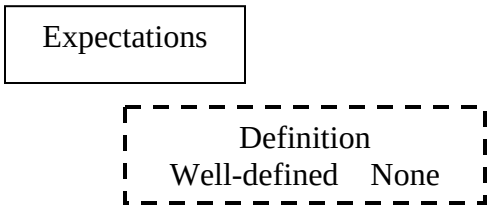
Keith Kelly stated that he liked the E201 course because he was able to "find out what you don't know about preparing for the job search." Victor Abner, Gloria Kline, and Wesley Juniper conducted practice interviews during the E201 course and eventually hired on as co-op employees at an organization they interviewed with as part of the course. After class, Greg Randall introduced himself to an engineering manager at AS, Inc., who was giving a presentation for the E201 course. The manager gave Greg a business card and Greg followed up with him by sending a resume. It eventually led to an interview and a co-op position with that manager at AS, Inc.

Gloria Kline did not interview anywhere formally other than IS, Inc., shortly after her practice interview with them through the E201 course. When offered a co-op position early on in the process by IS, Inc., she "jumped on it quickly." Nick Prather noted that he had a practice interview with MH, Inc., in the E201 course, which was followed by a formal

interview later that semester. He thought he was going to get hired by MH, Inc., and was "bummed" when he did not get hired there.

Expectations:

A third identified category of the pre-entry stage was student expectations. Students had various understandings and thoughts of what the co-op experience would be and should be, prior to beginning the co-op assignments. Some students had well-defined preconceptions, while others had no idea what to expect. In some cases, students with well-defined expectations found that the co-op experience was different than they thought it would be, while others were satisfied that what they experienced was consistent with their expectations. The expectations category was determined to have two properties: 1) *definition* and 2) *accuracy*.

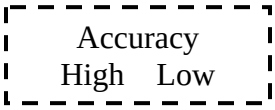


The property of definition referred to whether, and to what extent, the student had developed any expectations prior to beginning the co-op experience. The dimensions of the definition property are well-defined and none. Some students had no expectations before beginning the co-op assignment, while others had fairly well-defined expectations based upon prior experience working in an engineering or technical role.

Paul Arnold, Brent Jolley, and Greg Randall had no prior technical work experience and indicated they had no real expectations. Greg stated that before his co-op experience, he "didn't know what to expect." Paul said he "had no clue" what to expect. Mike Vilma, Gloria

Kline, Hank Molner, Victor Abner, Doug Koontz, Henry Dorale, Keri Kraft, and Bill Rosey all had no prior experience working in an engineering environment but indicated they thought they knew what the work would be like. Fred Kroll and Zack Slater had no prior technical experience, but said that they had a general idea of what the workplace was like before starting co-op.

Wendell Dews, Nick Prather, Seth Martins, and Liam Morrison had worked in a technical environment and had some expectations of their engineering co-op assignments, but the expectations would not be considered well-defined. Keith Kelly, Barry Evans, and Wesley Juniper had prior engineering-related experience and claimed to have well-defined expectations prior to their first co-op assignment.



The property of accuracy refers to whether the expectations a student had prior to the first co-op assignment were consistent with what was actually experienced during the assignment. The dimensions of accuracy are high and low. Most students who had no prior experience had low accuracy with their expectations. Those who had some prior engineering-related experience typically were more accurate with their expectations. Similar to what Nixon (1989) determined about the benefits of co-op and the realistic expectations it provides students, accurate expectations of the co-op experience occur when a student has had other related engineering experiences prior to beginning the co-op assignments. Also, Feldman and Weitz (1990) found that interns with positive and realistic job expectations were more likely to have positive experiences.

Mike Vilma thought engineering would be more paperwork, like in his academic courses. Gloria Kline noted that she thought engineering would be similar to what you are taught in school, with a lot of calculations and well-defined projects. She found that not to be the case at all. Hank Molner said his perception was that engineers "sat behind a desk all day doing CAD work," and he hoped that was not all it was. He did not want to be stuck behind a desk and found that you are not, in the organization he hired into.

Victor Abner shared similar thoughts as offered by Gloria and Hank. He stated that he thought engineering was really mostly CAD designing. He also said that he found communication skills to be very important, and he did not expect that. Wendell Dews found that engineering work involved a lot less math than he expected. Otherwise, he found engineering work to be similar to his expectations. Before co-op, Doug Koontz indicated he had the wrong perception of what engineering was. He knew he liked math and science, but he "had no idea what engineering really was." Nick Prather said he did not know there was such a drastic difference in the types of work you can do from one type of industry to another with an electrical engineering degree.

Henry Dorale said that before his co-op experience, he had no appreciation for the expectations of a team effort and the need for interaction with people. In the academic side of the program, there is a strong emphasis on individual work. "Faculty expect it," and it makes for a competitive environment with your classmates. Keri Kraft said that she has a different understanding now of what it means to be an engineer. The academic training is much more theoretically-based. Liam Morrison stated that he became more jaded about engineering work the more he worked through his co-op assignment. He was much more optimistic at first. He found change in organizations is hard to accomplish, and there is a lot more office politics

than he had envisioned. Bill Rosey thought engineering environments would be very professional, and while he said that was not completely inaccurate, he also said it is “not as perfect a world as he thought.”

Seth Martins’ father is an engineer, and he conducted two summer internships in engineering environments with a large, automotive manufacturer prior to beginning his co-op assignments. Yet he “was terrified” before he started his first co-op position and wondered “would they see through me” in terms of his ability. Wesley Juniper also has a father who is an engineer and had been through an internship prior to his co-op experience. He indicated that his expectations before he started his first co-op assignment were pretty consistent with what he experienced. Zack Slater has a brother-in-law who is an engineer and therefore stated he was fairly familiar with engineering work. Keith Kelly had a grandfather who was an engineer, had conducted a job shadow at AS, Inc., prior to working there, and had worked in engineering-related internships prior to beginning his co-op. Still, he said that the other jobs he had and his co-op assignments were different. Barry Evans had conducted two internships prior to co-op and stated that his co-op was pretty similar, and “nothing was too shocking.”

Summary:

The student component of pre-entry contains three categories: origin, education, and expectations, summarized in Figure 10. Origin consists of four properties: interest in engineering, location, related prior experience, and related network. Interest in engineering is the “why” and “when” a student made a decision (conscious or unconscious) to pursue engineering training toward a career as an engineer. Location refers to where the student was from and is important because of the connection to where the student went to college and

chose to work for his/her co-op assignments. Related prior experience referred to whether the student had any engineering or technical work experience before starting the co-op assignment. This property impacted the student's perspective on the ensuing work experience as well as the student's potential attractiveness to employers. Related network is the contacts a student may have with potential employers prior to starting the search for a co-op position.

Education for the student includes properties of education organization, degree program, and co-op preparation. The student was admitted to the education organization, GSU, and the degree program, engineering, prior to beginning the search for a co-op position. All students but one took the co-op preparation course that prepares students for the workplace and begins to connect students with employers. The students also had a category of expectations. Expectations for a student are developed either through experience or network, or they do not exist. Properties of student expectations are definition (how defined the expectations are) and accuracy (how accurate the expectations are).

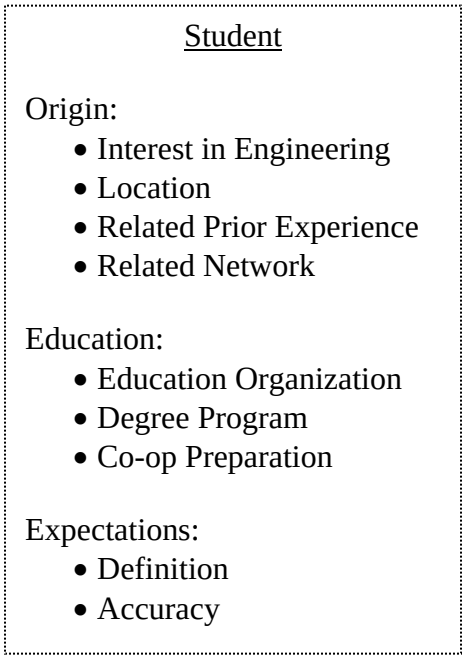
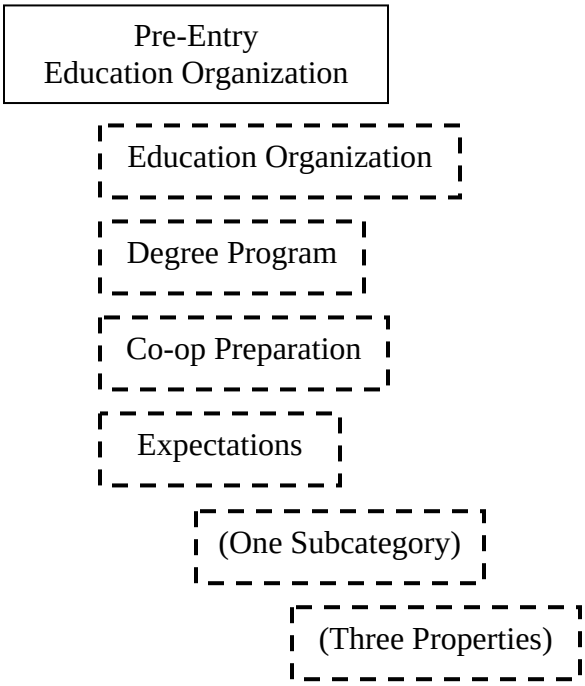


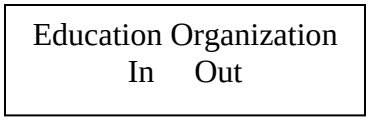
Figure 10: Student pre-entry stage

Pre-Entry: Education Organization

Pre-entry from the education organization perspective involves four categories: 1) *education organization*; 2) *degree program*; 3) *co-op preparation*; and 4) *expectations*. The first three categories are the counterparts to the education category within student pre-entry. The student and education organization experience those three concepts together, as this is where they come together organizationally prior to the onset of the co-op experience. The two (student and education organization) do approach the three categories described from different perspectives. The co-op experience does not happen, as related to this study, without the student making it into the education organization, into the education organization's degree program, and completing the education organization's co-op preparation course. The fourth category, expectations, is different for the education organization than it is for the student.

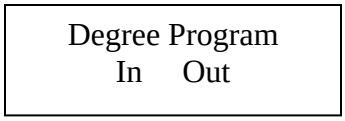


Education Organization:



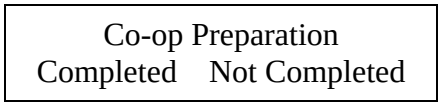
As described in the Pre-entry: Student – Education Organization section, students need to be admitted to the education organization before they are able to pursue their engineering degree. In this case, all students were students at GSU and were therefore "in" the education organization.

Degree Program:



As described in the Pre-entry: Student – Degree Program section, students must be admitted to engineering status within the academic degree program before they are able to pursue a co-op position. Therefore, all students interviewed were "in" the degree program at some point since all students completed at least one co-op assignment. The only student who did not stay "in" the degree program until graduation was Wesley Juniper, who switched to a business degree program after the first co-op assignment.

Co-op Preparation:



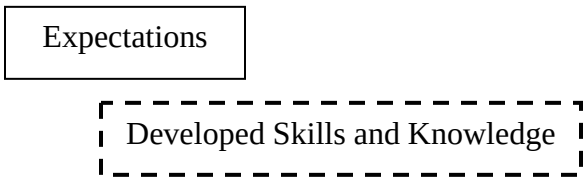
The co-op preparation course is required of all students prior to beginning the first co-op assignment. The course introduces students to aspects of the work environment, including introduction of each student to various company representatives. This is the first exposure

many students have to the workplace via senior-level, third-semester co-op students and employer representatives through practice interviews, panel discussions, and presentations.

Expectations:

GSU places a high value on cooperative education as an integral piece of the engineering program. It is one of the few universities in the country that require all students to participate in such a program as part of successful completion of the engineering degree. There is an expectation that all engineering students secure their own co-op site, with assistance from university staff and with use of university resources. Ultimately, the student is responsible for obtaining a co-op position. The student is expected to work for a degreed engineer at the worksite. The co-op experience should involve progressively more responsible work assignments in engineering functions as the student continues through the program. The student is expected to complete three co-op assignments, all with the same organization, unless there are extenuating circumstances causing the student to either work only two semesters (a minimum requirement) or with more than one organization.

Expectations for the education organization consist of one subcategory, *developed skills and knowledge*. Developed skills and knowledge are those things the faculty and staff at the education organization expect the student to learn and acquire while on the co-op assignment.



The subcategory of developed skills and knowledge contains three properties: 1) *technical*; 2) *personal*; and 3) *organizational*.

Technical skills and knowledge acquisition is a property of education organization pre-entry and has dimensions of well-developed and none. Faculty within the SOE at GSU stated that they expected engineering task knowledge acquisition to be moderate to low during the co-op assignments. The co-op experience for a student is not about developing stronger engineering skills, although that is the feeling from most students (i.e. the students feel primarily they are going to better learn how to do engineering tasks while on a co-op assignment). When Dr. Phil Parker, Dean of the College of Engineering, was asked "What do you expect a student to learn or what skills should they acquire while on a co-op?" he did not respond with better technical or engineering abilities. He did comment that "some of it is technical."

Dr. Felicia Short, a professor in mechanical engineering and the longtime faculty coordinator of the co-op program at GSU, stated that students will learn some technical skills. She also said that students think they should be getting design experience on their co-op assignments, but that is not the purpose or the focus of the co-op program.

The faculty members expect the students to mature and to develop greater communication and interpersonal skills as a result of participating in the co-op program. Personal skills has dimensions of well-developed and none. Dr. Short pointed out that the

purpose of the co-op program is to teach students professionalism. Co-op gives the student "walking around skills." The student experiences how to work as an engineer in the world. Dr. Scott Arbor, the chair of the electrical and computer engineering programs at GSU and supervisor of Henry Dorale and Zack Slater during their co-op experiences at GSU, views the co-op program as an extended laboratory for the student and an important component of the engineering program. He indicated that the modern engineer needs both theoretical and "soft" skills. The soft skills are learned primarily through the co-op program and include interpersonal skills, managing people, interacting with clients, running meetings, and so on. Dr. Arbor said that students are exposed to a wide variety of stimuli while on a co-op assignment, and that "gaining experience is the bottom line."

An increase in maturity level was also cited by faculty respondents as an expectation of the co-op experience. Dr. Parker mentioned that the co-op program serves as a maturing and motivational agent for the students. It helps to reinforce to the students why they are doing what they are doing (pursuing an engineering degree). Dr. Short stated that co-op "gives students the opportunity to develop a professional lifestyle while still in school." Students will learn how to balance their personal life with work. Similar to Dr. Parker, Dr. Short stated that students develop a greater level of maturity and poise, and they are a lot more enthusiastic about their engineering courses after completing a co-op assignment. Like Dr. Parker and Dr. Short, Dr. Arbor felt that students develop a greater maturity through co-op and do a lot of growing up. He also said that co-op has a strong psychological effect on a student, because they are treated as an engineer. There is a feeling of "I am one of them." The statements about personal skills development as an expectation of what is acquired

during co-op are consistent with what Fletcher (1989), including personal growth as one of three primary benefits of co-op.

A third property was identified as organizational knowledge acquisition. This property also had dimensions of well-developed and none. GSU faculty felt that developing knowledge of organizations was an important expectation of the co-op program. Dr. Phil Parker stated that students should better "understand organizational structures," "how to get things done in an organization," and "understand the roles of different people in the organization and how they contribute to the overall organization." Dr. Parker said that the co-op program exists to help a student "learn what engineers do in the real world." Finally, he commented that "some of it is technical, but much of it is organizational." This is consistent with what Parks et al. (2001) found when they determined that "work skills" development was one component of what is learned during a co-op assignment.

Summary:

The education organization component of pre-entry contains three categories (education organization, degree program, and co-op preparation) that are identical to the properties contained in the student education category because the student and education organization need each other to engage in education. The education organization pre-entry stage is summarized in Figure 11. Both student and education organization components also have a property of expectations, but in this case they are different. For members of the education organization, the expectations are that the student will develop skills and knowledge of how to function in an engineering work environment, not to gain engineering

design experience as most students expect. Properties of the expected skills and knowledge developed by students, from a faculty and staff of the education organization perspective, are technical skills, personal skills, and organizational skills.

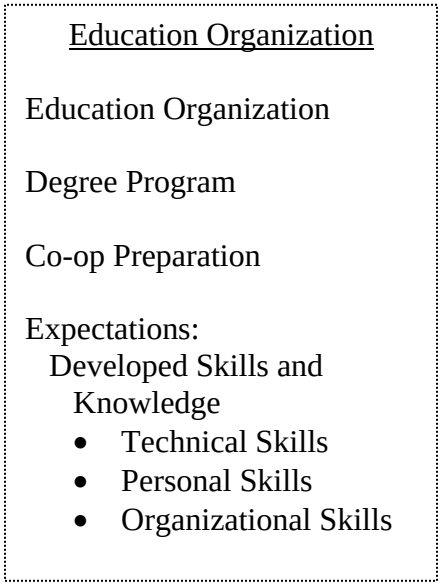
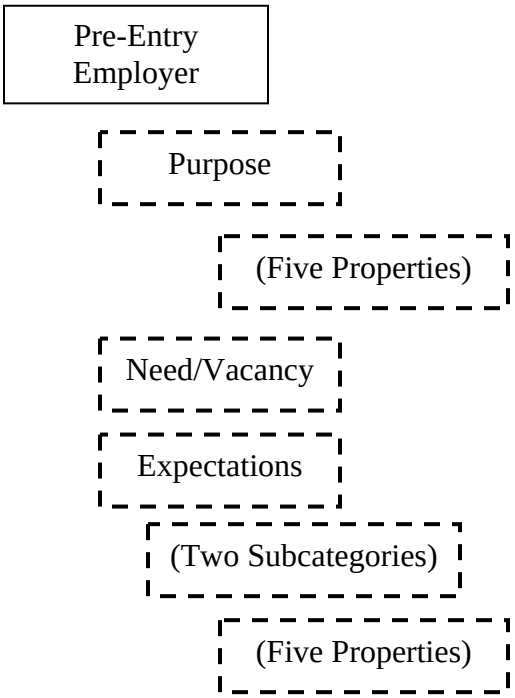


Figure 11: Education organization pre-entry stage

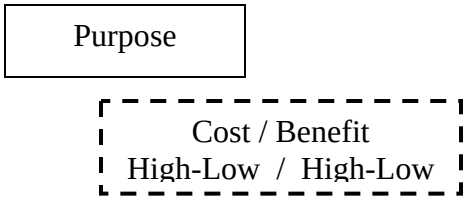
Pre-Entry: Employer

Pre-entry for the employer happens separately from the student and education organization. While the student and education organization share some common characteristics and experiences during the pre-entry stage, the employer's pre-entry categories and properties exist apart from the student or education organization. Pre-entry for the employer contains three categories: 1) *purpose,* 2) *need/vacancy,* and 3) *expectations*. These three categories are described below.



Purpose:

The first concept identified for the pre-entry category for the employer was purpose. Purpose was defined as the reason an employer chooses to participate in a co-op program. Purpose was determined to have five properties: 1) *cost/benefit*, 2) *recruiting*, 3) *screening*, 4) *altruism*, and 5) *control of academic training*.



One of the recurring responses by employer respondents regarding the purpose of the co-op program at their organization was the need to get work completed that the organization did not have the time and/or money to address. The benefit property has dimensions of high and low, with the hope of most employers to gain high productivity from the student's work

and, therefore, high benefit. The complimentary cost property also has dimensions of high and low, with the hope by employers to have a low cost for the student's work. Kyle Williams of AS, Inc., said that one reason they participate in a co-op program is to "obtain temporary, semi-skilled assistance with day-to-day job functions." Sally Nelson of AS, Inc., said one purpose of the co-op program is to realize productivity and get low-level projects completed at a low cost. Walter Tollen, also of AS, Inc., also stated that co-op students provide a means to get very good entry-level type work completed at a good price.

Peter Jackson of TP, Inc., said one purpose of their co-op program is to gain knowledgeable, young employees to assist the engineering staff. Vince Murphy, also of TP, Inc., said a secondary purpose is to get work done by a student, which can be accomplished at a pay rate less than a full-time engineer. Larry Mitchell of DM, Inc., said the purpose of their co-op program is "to take entry-level students, give them entry-level tasks, and reap the benefits of entry-level work" in their engineering department. Glen Elmore of MH, Inc., said the purpose of their co-op program is "to fill in jobs that engineers cannot get done due to lack of time." Gary Blanchard of IS, Inc., simply stated one of their objectives is to "get work done."

A second theme that was evident regarding the purpose of a co-op program at an organization was to assist in the recruitment of new engineering full-time hires. Employers desire an effective recruiting effort through the co-op program in order to increase the hiring of desirable employees. Kyle Williams said one purpose of their co-op program is to gain exposure to potential personnel for longer-term employment. Carol Schmidt of AS, Inc., also stated the purpose of their co-op program is to be "a feeder for full-time hires." Sally Nelson

said the co-op program helps with getting an early look at graduating engineers. Grant Reynolds of GBA, Inc., indicated that the purpose of their co-op program is to "find the brightest talent, and keep and retain them." Bob Karlson and Brian Campbell stated that other purposes of their program are to hire good new employees, "look at the pipeline for future hires," and provide a trial period for young engineers to prove themselves.

Peter Jackson said another reason for their co-op program is to hire the student for full-time employment if the need exists. Jeff Dillenger also stated that IS, Inc., participates in the co-op program to possibly hire new full-time engineers. Homer Mills of VK, Inc., said they "are looking to hire quality entry-level people."

Screening
Effective Ineffective

Another property of the employer pre-entry purpose category is screening. Like the recruiting property, screening has dimensions of effective and ineffective. Where recruiting focuses on bringing desirable candidates to the employer's organization, screening aims to evaluate the student once through their work and personal interactions within the organization. Vince Murphy stated the primary purpose of their program is "to be able to take a great look at someone to see if they would be worth hiring full-time when they graduate." Bob Karlson and Brian Campbell also said that another purpose of their program is to provide a trial period for young engineers to prove themselves.

Altruism
High Low

Fourth, several organization representatives thought one purpose of their company's co-op program was to help young engineers, the education organizations they attended, or the

local community. Brad Bonds of AS, Inc., said that the co-op program is a way for a student to learn how engineering is done in the world of industry. Walter Tollen said one purpose of their co-op program is to give a student an opportunity to learn about the real world work environment and a chance to preview a company. Gary Blanchard said another reason for their program is to provide experience for the student so they can relate their school experiences to the workplace. Bob Karlson and Brian Campbell of ARJ, Inc., both said one reason for their co-op program is to teach young engineers real-life situations and to let them apply their knowledge.

A fifth property, control of academic training, was only mentioned specifically by one employer but considered important enough to include. Two other employers mentioned a connection to the university as part of the purpose of the co-op program. Sally Nelson also indicated one purpose of their co-op program is to maintain good relationships with universities and help fine-tune curriculum at the universities. This could be considered a means of controlling the training process for engineers prior to entry to the organization. Peter Jackson stated that his company is involved with GSU's co-op program to support GSU and the West Great Lakes region. Jeff Dillenger of IS, Inc., said they participate in the co-op program to help the university.

Need/Vacancy:

The next category identified for pre-entry for the employer was need/vacancy. Need/vacancy refers to the employers' need to fill a position, either immediately or in the future, at a student engineer level. A short-term need is identified for work to be completed

or there is a projection that there will be a potential need for hiring full-time engineering employees in the next couple of years. The employers in this study all identified a need to hire a co-op student or a vacancy that could be filled by a co-op student, in advance of the student respondent getting hired at that company. The need or vacancy was predicated on one or more of the purposes identified in the previous section.

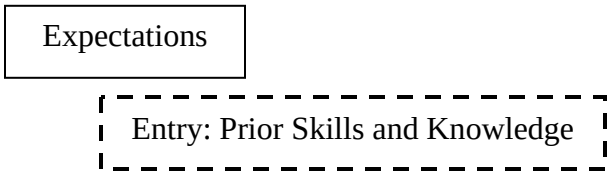
Need/Vacancy

Before being able to search for a co-op student, Glen Elmore of MH, Inc., stated that his department has to get buy-in from management in order to proceed. Kyle Williams at AS, Inc., said that at his organization a department manager determined the need for a co-op. "There must be an amount and a level of work commensurate with the time available and skill level of the co-op student." Sally Nelson, also a technical manager at AS, Inc., said that she will identify the need for an intern and then open a requisition to begin the hiring process.

Gary Blanchard at IS, Inc., said long-term hiring is one reason for hiring a co-op, but there "needs to be an opening, or some planning for attrition." According to Gary, having a vacancy for a co-op will depend on full-time openings now and in the near future, headcount and business conditions. In some organizations, like IS, Inc., corporate management identifies the long-term hiring needs and then approaches engineering managers or leaders about "taking on" a co-op in their group, as was the case with Jeff Dillenger. At GBA, Inc., Grant Reynolds indicated that he thinks of projects that need to be done in their group before identifying the need for a co-op student.

Expectations:

As with the student and education organization pre-entry properties, the employer also has expectations before beginning to work with a co-op student at their organization. The expectations fell into two subcategories: 1) *entry: prior skills and knowledge* and 2) *exit: developed skills and knowledge*. Entry: prior skills and knowledge refers to those skills and abilities the employer expects a student to come to their organization with. Exit: developed skills and knowledge refers to the skills and abilities the student should acquire while working with the organization during the co-op assignments.



The various supervisors interviewed for this study all had different viewpoints about what prior skills and knowledge they expected a student to have before starting their co-op assignment. The responses can be divided into two properties: 1) *technical skills* and 2) *personal skills*. Technical skills refer to engineering-related skills in order to accomplish work in the employer's organization. These may have been developed prior to or during the student's educational training. Personal skills refer to skills the student possesses that relate to how the student handles or manages himself/herself, or the work he/she does for the employer. Personal skills were mentioned predominantly over technical skills as desirable in a candidate by the employer respondents.

The primary technical skills employers expected a student to have prior to beginning a co-op assignment were computer-related. These skills included computer programming

ability and computer-aided drafting (CAD) software knowledge. In addition, a few employer respondents mentioned grade point average (GPA) and mathematical or engineering theory-based knowledge as desirable. At AS, Inc., software writing ability, strong mathematics background, and circuit and digital design background were mentioned as desirable to Brad Bonds, Sally Nelson, Kyle Williams and Walter Tollen. Bob Karlson and Brian Campbell of ARJ, Inc., noted that prior experience with specific CAD software and mechanical knowledge of how things work are important to them. Peter Jackson of TP, Inc., expects general math and computer skills, but not necessarily specific engineering knowledge.

Gary Blanchard of IS, Inc., "does not expect the student to know much," but does look for a mechanical aptitude. Similarly, Vince Murphy of TP, Inc., has "low expectations" of co-op candidates, but looks for a good mechanical aptitude and basic CAD skills. Jeff Dillenger of IS, Inc., also looks for basic theoretical mechanical knowledge and CAD experience. Glen Elmore of MH, Inc., expects students to have basic electrical and industrial knowledge and computer/CAD skills.

Sally Nelson specifically said that a strong GPA is important. Grant Reynolds of GBA, Inc., said a solid GPA of above a 3.5 on a 4.0 scale was important. Peter Jackson does also look for a GPA of about 3.0, and said he does not want someone who is "too smart." Bob Karlson noted GPA is not always that important to him.

The personal skills and knowledge most often desired by the employer respondents were communication (written and oral), initiative, critical thinking, interpersonal skills, and maturity. Brad Bonds seeks students with a sense of inquiry and the ability to think logically

and write and speak well. Walter Tollen also pointed to written and oral communication skills as being important. Grant Reynolds looks for someone who is a self-starter, relates well to others, is energetic, is willing to learn, has confidence but is not too full of himself/herself, and is mature. Bob Karlson and Brian Campbell look for good communication skills in candidates. Brian also mentioned that good social skills are desirable.

Peter Jackson likes students with good problem solving skills, social skills, maturity, and sense of responsibility. Kyle Williams looks for students with an ability and desire to apply their skills to the solution of real world problems. Carol Schmidt of AS, Inc., expects a student to be able to interact well with others, and have the skills to think in a technical environment. Gary Blanchard also seeks candidates with the ability to think, common sense, self-motivation, good organizational skills, and a personality that can handle difficult situations. Jeff Dillenger looks for a strong work ethic and the ability to think analytically.

Homer Mills of VK, Inc., expects a student to come to him with some analytical and problem-solving skills, and well as communication and people skills. The student should also demonstrate an eagerness to learn. Larry Mitchell of DM, Inc., stated that he is “very finicky” when looking for a co-op employee. He wants a specific personality that includes being highly self-motivated and having the ability to pick up things quickly. Larry wants to know “what makes a kid tick” and if they have a “deep underlying passion” for electronics. Sally Nelson finds a student’s attitude to be very important. Desirable students are expected to be flexible, have good problem-solving skills and good written and oral communication skills, be able to work on a team, possess time management skills, and be able to deal with frustration. Finally, Glen Elmore said he expects the student to be able to get along with people.

The large amount of feedback regarding the desire for a student to possess strong personal skills is consistent with what Langford and Cates (1995) found. They determined that employers desire communication and thinking skills over technical skills and a high grade point average when seeking a co-op student.

Exit: Developed Skills and Knowledge

The skills a student is expected to develop when they participate in co-op assignments, according to the employer informants, include three properties: 1) *technical*, 2) *personal*, and 3) *organizational*.

Technical Skills
Well-Developed None

Technical skills were identified by several employer respondents as skills a student should develop while completing a co-op assignment. After completing the co-op assignment, Brad Bonds believes a student should possess proficiency in writing software. Homer Mills stated that co-op students should gain better CAD skills and an ability to analyze stresses and deflections and to design complex parts. Bob Karlson expects students to develop sound design practices. Brian Campbell wants a student to leave with a good knowledge of how to do a job and what is required to complete a successful design. He also thinks the student should gain an understanding of how to research a whole design process and be able to come up with the best concept. Peter Jackson expects co-op students to learn the use of engineering tools such as CAD, gain some software development skills, and learn good documentation practices. Vince Murphy said students will learn CAD systems and proper industrial machine design.

Glen Elmore pointed to mostly technical knowledge that a student would gain: machine electrical knowledge, ability to analyze electrical diagrams, and how to program a programmable logic controller and human-machine interface. Larry Mitchell also spoke of technical abilities as the tools students gain from their co-op experience, including software design skills and printed circuit board layout, other software programs usage, how to solder and build prototypes, and good engineering practice.

Personal Skills
Well-Developed None

A couple of employer respondents mentioned that students will develop personal skills during a co-op assignment. Personal skills refers to both self-management and interpersonal skills. Brad Bonds expects students to gain an ability to work in a team setting. Jeff Dillenger believes most students will also gain confidence in themselves and in their engineering judgment. Bob Karlson said he expects co-op students to learn how to interact with other engineers and customers. Peter Jackson expects co-op students to learn good work ethics and how to work with fellow employees. Finally, Vince Murphy said co-op assignments teach students thoroughness, accuracy, and how to pay attention to detail.

Organizational Skills
Well-Developed None

A third characteristic that was identified was the expectation that students will develop a better understanding of how an organization works and their place within the organization. Brad Bonds stated that a student should gain knowledge of how an organization works. Kyle Williams stated that the exposure a student gets to the work environment helps prepare him/her for the transition into the working world. Gary Blanchard said co-op students should learn “how we do things” and “how a plant runs.” Jeff Dillenger believes students

leave with a deep understanding of the roles and responsibilities of an engineer in the workplace. Students gain an understanding of the inner workings of a team and an organization. Homer Mills also believed that students gain a realization of how an organization works. Peter Jackson said students gain an understanding of company systems and procedures.

Summary:

The third component of pre-entry is the employer and includes three categories: purpose, need/vacancy, and expectations. The employer pre-entry stage is summarized in Figure 12. The purpose of the co-op program for employers is one or a combination of five properties: cost/benefit, recruiting, screening, altruism, and control of academic training. Cost/benefit refers to getting work completed at a low cost, recruiting means the co-op program is a way to hire full-time engineering talent, screening helps determine if the student is suitable for the organization, altruism is the term used to describe employers' interest in helping engineering students and the local community, and control of academic training refers to input employers have in the curriculum development process. Need/vacancy simply refers to the concept that each employer identified a need or vacancy prior to connecting with students for co-op positions.

The final category of employer pre-entry is expectations. Employer expectations consist of two subcategories. The two subcategories are entry: prior skills and knowledge and exit: developed skills and knowledge. Prior skills refers to those skills and abilities an employer expects a student to have prior to entering their organization. Developed skills refers to the skills and abilities a student is expected to gain during their co-op experience, from the employer's perspective. Prior skills consists of properties of technical and personal

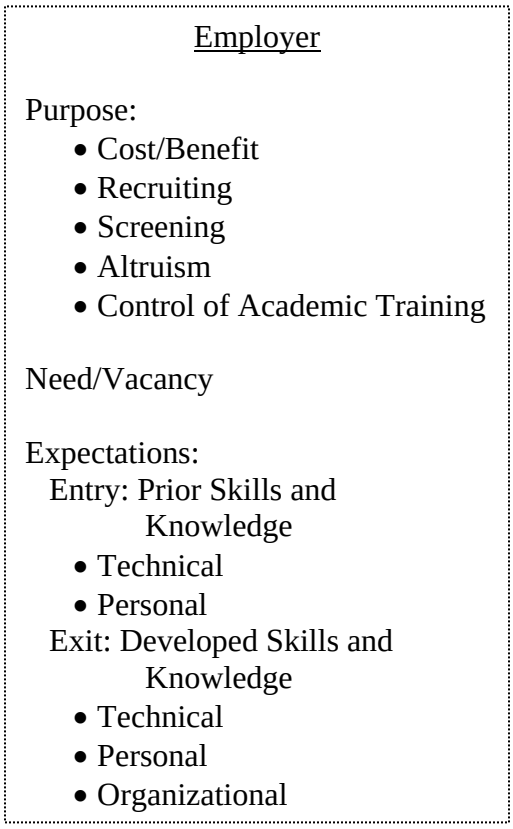


Figure 12: Employer pre-entry stage

components. Finally, developed skills consists of properties of technical, personal, and organizational components.

Pre-Entry Stage: Summary

Pre-entry was identified as the first stage of the phenomena examined for this study. Pre-entry is defined as those activities or events that precede the student's introduction to the employer organization and impact the process in a significant manner. There were three components of pre-entry identified that represented the people involved: student, education organization, and employer. Figure 13 below displays the three components of student, education organization, and employer along with the categories and properties that comprise those components. The three components are shown in separate boxes at this stage because

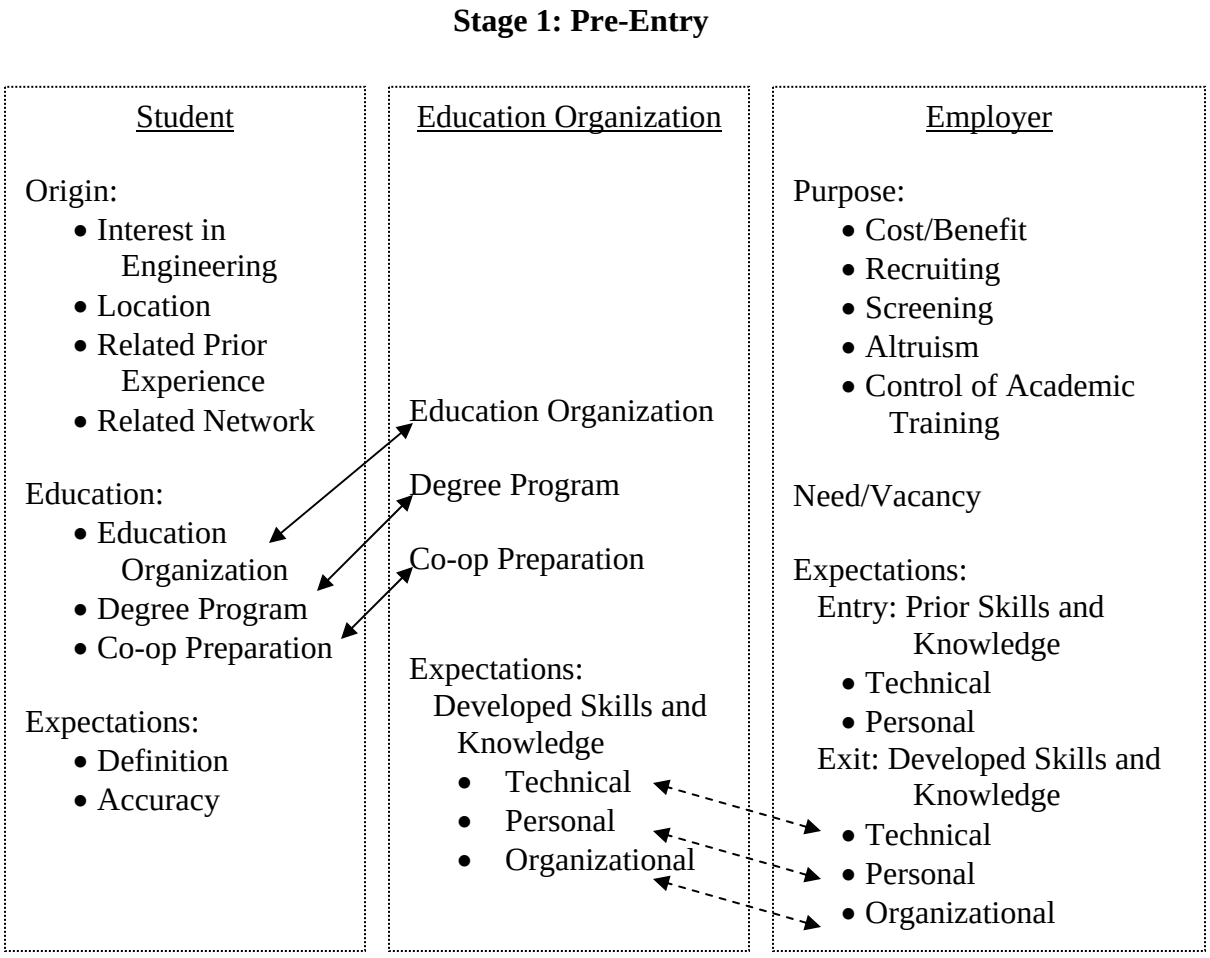


Figure 13: Pre-entry for student, education organization, and employer

the properties of the components are independent of each other. The exception is the education portion for the student that takes place within the education organization, and therefore the arrows connect student and education organization at those points. There are also dashed arrows connecting education organization expectations and employer expectations of what the student should leave the co-op experience with, because the expectations are very similar. However, those properties occur independent of one another.

The student component of pre-entry contains three categories: origin, education, and expectations. Origin consists of four properties: interest in engineering, location, related prior experience, and related network. Interest in engineering is the "why" and "when" a student made a decision (conscious or unconscious) to pursue engineering training toward a career as an engineer. Location refers to where the student was from and is important because of the connection to where the student went to college and chose to work for their co-op assignments. Related experience referred to whether the student had prior engineering or technical work experience before starting the co-op assignment. This property impacted the student's perspective on the ensuing work experience as well as the student's potential attractiveness to employers. Related network is the contacts a student may have with potential employers prior to starting the search for a co-op position.

Education for the student includes properties of education organization, degree program, and co-op preparation. The student was admitted to the education organization, GSU, and the degree program, engineering, prior to beginning the search for a co-op position. All students but one took the co-op preparation course that prepares students for the workplace and beings to connect students with employers. The education organization component of pre-entry contains three categories (education organization, degree program, and co-op preparation) that are identical to the properties contained in the student: education category because the student and education organization need each other to engage in education.

Both student and education organization components have a property of expectations, but in this case they are different. Expectations for a student are either developed through experience or network, or they do not exist. Properties of student expectations are definition

(how defined the expectations are) and accuracy (how accurate the expectations are). For members of the education organization, the expectations are that the student will learn to function in an engineering work environment, not, primarily, to gain engineering design experience as most students expect. Properties of education organization expectations are development of technical, personal, and organizational skills and knowledge.

Pre-entry for the employer includes three categories: purpose, need/vacancy, and expectations. To employers, the purpose of the co-op program consists of one or a combination of the following five properties: cost/benefit, recruiting, screening, altruism, and control of academic training. Cost/benefit refers to getting work completed at a low cost, recruiting means the co-op program is a way to hire full-time engineering talent, screening helps determine if the student is suitable for the organization, altruism is the term used to describe employers' interest in helping engineering students and the local community, and control of academic training refers to input employers have in the curriculum development process at the education organization. Need/vacancy is the concept that employers identify a need or vacancy prior to connecting with students for co-op positions.

As with the student and education organization components, the employer component of pre-entry includes expectations as a category. Employer expectations consist of two subcategories – entry: prior skills and knowledge and exit: developed skills and knowledge. Prior skills and knowledge are what the employer expects a student to be able to do and to know prior to entering the organization in a co-op role. Developed skills and knowledge are what the student is expected to gain during the co-op experience, from the employer's perspective. Prior skills has properties of technical and personal. Developed skills has properties of technical, personal, and organizational. The developed skills and knowledge are

consistent with the education organization's faculty expectations, but they are not created in an intentional, joint manner.

Stage 2: Match-Making - Co-op Position

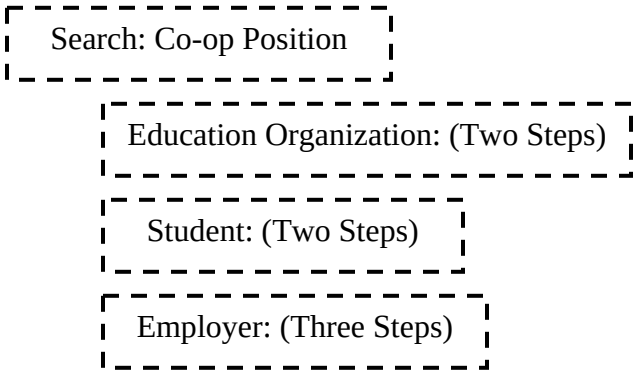
The second identified stage was *match-making*. Match-making refers to the process of students and employers finding each other regarding employment as a co-op employee and ultimately agreeing to enter into a work relationship in the form of an engineering co-op role. The match-making process involves both the student and the employer seeking the best opportunity and fit for them, and then selecting the best option with the "partner" who has mutual interest. The match-making stage acts as a boundary-spanning activity between the pre-entry and entry stages.

Match-Making: Co-op Position Student – Education Organization – Employer

A match-making stage was identified for the co-op position for each of the three entities of people involved including student, education organization, and employer. The match-making stage for each entity contains specific steps, categories, and properties, which will be explained separately; however, some of the categories are created jointly while others occur independently. Match-making was determined to have two substages: 1) *search* and 2) *selection.*

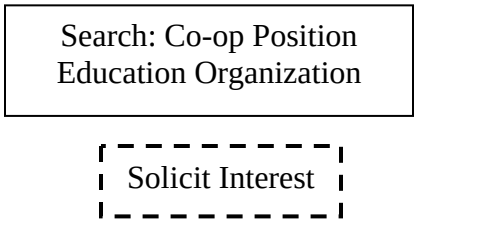
Match-Making Co-op Position: Search

Search refers to the phenomenon of students and employers seeking one another to identify if they have a mutual interest in one another, with a purpose of entering into an employment arrangement in a co-op role. All three entities – student, employer, and education organization – are involved in the search process. Search for the education organization consists of two steps. The student is involved in two steps of the search process, and the employer has three steps in the search process.

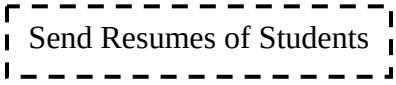


Education Organization:

The match-making stage for the co-op position from the education organization's standpoint has one substage, search, and two steps. Because of the compulsory nature of the co-op program at GSU, the education organization assumes a role in the search process for the co-op position that might not exist, or exist to a lesser extent, at another education organization. The education organization plays a role early in the search substage but not the selection substage. The successful outcome of the match-making stage is an offer of employment that is accepted by the student, absent of involvement by the education organization at that point. The education organization is also involved with the practice interview program that is part of the co-op preparation course described in the education organization and student components of the pre-entry stage. This program allows employers and students to connect and is referred to in this match-making stage as well, although it is attributed to the pre-entry stage and therefore not considered a step in this match-making stage. The two steps for the search substage for the education organization are 1) *solicit interest* and 2) *send resumes of students*.



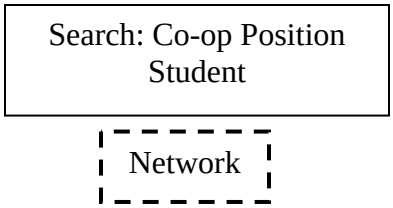
GSU staff solicit interest in engineering co-op employees from employers who have hired an engineering co-op student in the past or who might hire a co-op student in the future. Letters and emails are sent to prospective employers approximately six months prior to the beginning of the students' first co-op semester, asking about the employer's interest and determining the demand for the new co-op students.



During the co-op preparation course, staff at GSU secure resumes from all students who are admitted to the upper division, and therefore to the co-op phase, of the engineering program. From the information gathered by the education organization during the solicitation of interest step, resumes of qualified students are sent to the employers who indicated an interest in co-op students with like training and backgrounds.

Student:

Both the student and employer use several ways to find each other as a part of the process of "match-making" for a co-op hire. The search substage for the co-op position from the student's standpoint has two steps: 1) *network* and 2) *submit resumes*.



The first step in the student search process for a co-op position is network. The student relies on personal contacts as well as university contacts. Some students have network contacts from previous experiences, practice interviews through the co-op preparation course, family members, or friends. Barry Evans pursued DM, Inc., by using his network contacts to request an interview. Eric Jillet's cousin worked at GI, Inc., and was also a GSU engineering program alumnus. Eric's cousin performed his co-op at GI, Inc., before accepting a full-time position with them upon graduation. After talking with his cousin, Eric performed a one-day job shadow at GI, Inc.

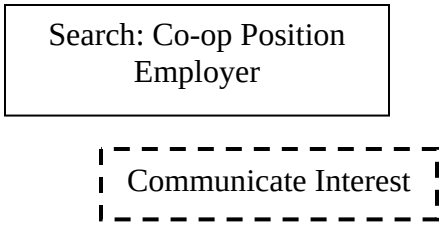
Wendell Dews had an inside connection at IWG, Inc., because his father-in-law knew the owner of the company. Seth Martins met an engineering manager from AS, Inc., at a presentation at GSU and he had a chance to talk with him after the presentation. They had similar past experiences, so they had a lot to talk about. Greg Randall also met an engineering manager from AS, Inc., at a GSU presentation to the co-op preparation class.

Most students do not have many contacts and rely on submitting resumes to prospective employers, either solicited on their own or referred by the faculty and staff at the education organization. Resumes are submitted via mail, email, or in-person at the employer location or through other face-to-face means such as an education organization-sponsored, on-campus career fair. Barry Evans pursued DM, Inc., by submitting his resume a couple of

times. Greg Randall emailed a copy of his resume to the technical manager at AS, Inc., after he met and talked with him during a presentation to GSU's co-op preparation class.

Employer:

The employer component of the search process contains three steps: 1) *communicate interest*, 2) *network*, and 3) *receive/review*.



The first step in the employer search process for a co-op position is to communicate interest. Typically a representative from the employer organization contacts the education organization to inquire about the availability of engineering co-op student candidates in the near future. This can be an engineering manager or, more frequently, a human resources representative. The contact is sometimes initiated by the employer and at other times is a response to a solicitation of interest by the education organization. The communication can be in person to an education organization representative or can be written in the form of a position description. Sometimes the written communication appears only within the employer's environment, such as a position posting on a website or an internal email sent to employees to indicate the need for a co-op student. At IS, Inc., Gary Blanchard said that the company has an internship/co-op coordinator in their human resources office who solicits interest and collects resumes of student candidates.

Another step that can begin the process, or be used in conjunction with the communication of interest step, is networking. With this step, representatives from the employer organization use personal resources to identify potential student for a co-op position. Sometimes this is a student who has already worked within the employer organization, while other times an employee refers a student they know, or are aware of, to the hiring managers. Occasionally an employer representative will initiate a personal contact to a resource they have within the education organization, such as a faculty member, to identify potential students. Also, previous interactions with a student through classroom presentations, on-campus visits, or practice interviews could precipitate a contact to the student from the employer representative.

Carol Schmidt coordinates the hiring process for co-op students at AS, Inc. She participates in the practice interviews at GSU in the fall semester, provides an information session each year to meet students, and attends all job fairs as well.

After one, or both, of the first two steps are initiated, the next step involves receiving and reviewing resumes from students. Resumes are collected from students through direct submission by students, through referral by education organization agents acting on behalf of the student, or through referral by an employee or other person connected with the employer organization. Review of resumes can assume several formats. Depending on the size of the employer organization, human resources representatives may filter resumes and select the top student candidates to pass along to a technical/operations manager (typically done in larger

employer organizations), or the technical/operations manager may receive and review all resumes (sometimes directly). In all cases, the technical supervisor of the co-op student candidate will review resumes prior to selecting students for formal interviews.

Larry Mitchell reviews resumes for the key criteria they are seeking in a student employee, including a focus on extracurricular activities. Through the practice interview program, classroom presentations, and career fairs, Carol Schmidt identifies students she is interested in, and when resumes are submitted, some resumes get "put on top of the stack" based on those prior interactions. At AS, Inc., Sally Nelson and Kyle Williams both said that a requisition is first opened, and then the human resources office facilitates the collection of resumes and organization of interviews. Sally does a lot of pre-screening of student resumes with the assistance of the human resources office. Walter Tollen at AS, Inc., goes through resumes on file in the human resources office and selects the best student candidates. When Gary Blanchard has an interest or a need for a co-op student, he works with the human resources office to receive pre-screened resumes of acceptable students for IS, Inc.

Summary:

The first substage of the match-making stage is the search process. The search process involves all three groups: students, education organization, and employers. Figure 14 displays the relationship among the three groups for the search process. The arrows signify the direction of movement in the process, with a one-headed arrow indicating moving from one step to another, while a two-headed arrow indicates movement in both directions during that step. A solid line indicates the singular option of completing that step.

The search process can begin with any of the three groups: education organization, student, or employer. The education organization can begin the process through coordination

of the practice interview program or by soliciting interest from the employer. The employer can begin the process by communicating interest to the education organization or student or through networking with the education organization or student. Finally, the student can begin the process by networking with the employer or by submitting resumes to the employer. The result of the initial actions is for resumes to either be requested from the education organization or student by the employer or for the education organization or student to submit resumes to the employer for consideration. The employer then reviews the resumes and, in combination with the networking activities, considers which student candidates to pursue further. This ends the search substage and begins the selection substage.

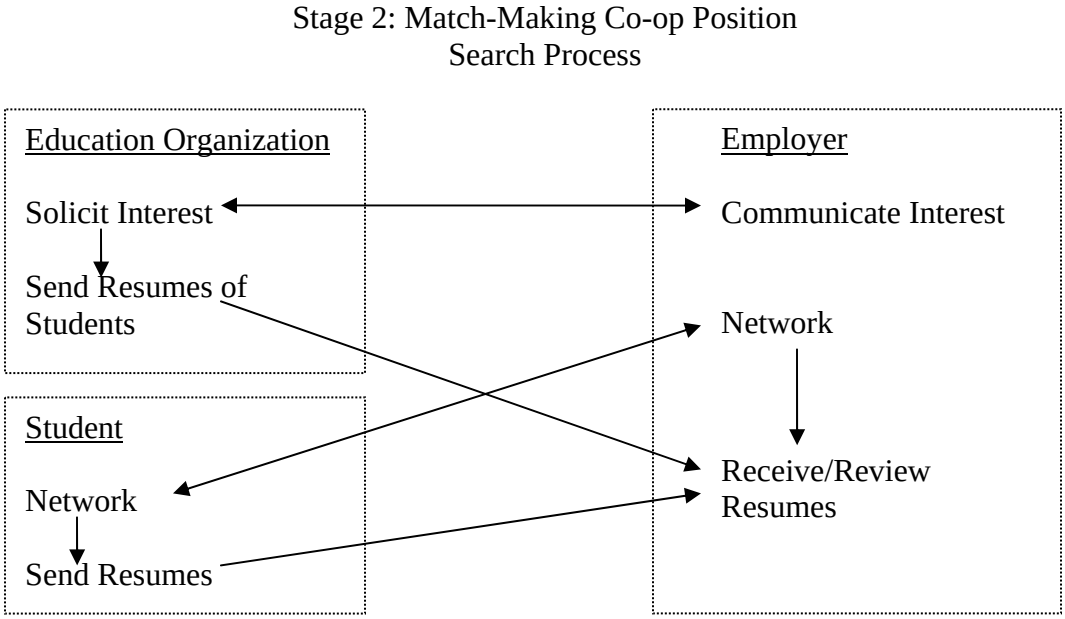
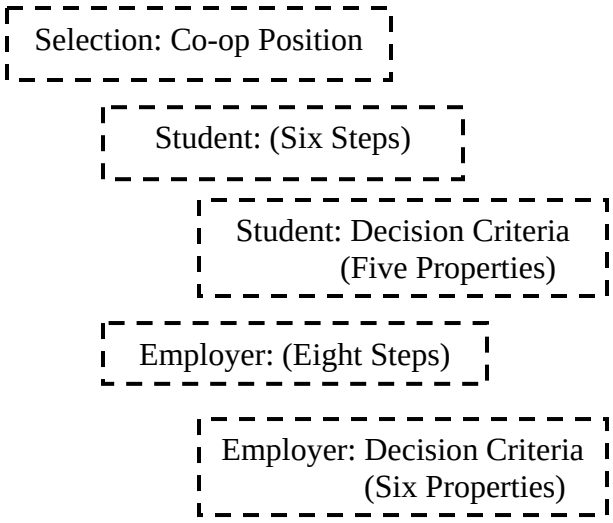


Figure 14: Search process for the co-op position

Match-Making Co-op Position: Selection

Selection refers to the phenomenon of students and employers choosing one another and mutually agreeing to enter into an employment arrangement in a co-op role. The

selection substage follows the search substage as part of the match-making stage for the co-op position. The student and employer groups are involved in the selection substage. The education organization does not have a role in the selection process. There are six potential steps involved in the selection process along with one category, *decision criteria*, from the student's perspective. For the employer, there are eight potential steps in the search process, along with one category, *decision criteria*. Decision criteria contains five properties for the student and six properties for the employer.

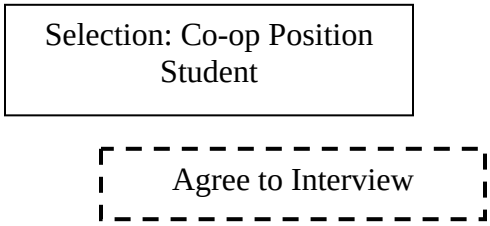


Student:

After the search substage for the student is completed, the student enters the selection substage. There is no absolute distinction between when the search substage ends and the selection substage begins. In fact, activities that constitute both substages occur simultaneously as the student progresses toward making a decision about the employer they will ultimately work for in a co-op role. Even though there is no absolute distinction between search substage ending and selection substage beginning, for purposes of analysis, the two substages will be separated and diagrammed as in the prior and subsequent sections.

Student Steps

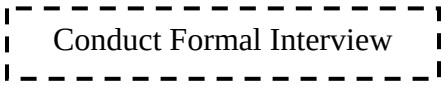
The student selection process potentially contains six steps: 1) *agree to interview,* 2) *conduct screening interview*, 3) *conduct formal interview,* 4) *receive offer(s) of employment*, 5) *evaluate offer(s),* and 6) *agree to employment*. Not all steps are experienced by all students. For instance, some students will participate in both screening interviews and formal interviews as part of the selection process, while others will participate only in formal interviews. Also, some steps are conducted jointly with the employer due to the nature of the activity, such as screening interview, formal interview, and agreement to employment.



Once the search process reaches a point where the employer has reviewed the student applicants, the selection process begins with the employer offering to interview the student. The first student step within the selection process is agreeing to interview with the employer for the co-op position. All students seeking a co-op position in this study agreed to interview with the employer in order to obtain a position. The only occasions when a student may have declined an interview offer from an employer was when the employer was located a significant distance from the student's home, or if the student had already accepted an offer of employment from another employer.

After making contacts and sending resumes to employers, students receive an interview with a potential employer. In some cases, a shorter, screening interview is

conducted first. This may consist of a telephone conversation, a practice interview on-campus, or a casual conversation with a member of the staff at the employer organization, as was the case for Seth Martins and Greg Randall through the co-op preparation class. Some employers also conduct short on-campus interviews outside of the co-op preparation practice interview program to determine the candidates they would like to bring to the organization to meet more formally with staff. Barry Evans received a telephone interview first. Doug Koontz and Gloria Kline met IS, Inc., through the practice interview program at GSU. Wesley Juniper also had a practice interview with MH, Inc., during the co-op preparation course at GSU.



In all cases, some form of formal on-site interview at the organization's facilities was conducted prior to any student receiving an offer of co-op employment. The on-site interview can consist of many formats including short (one hour) or long (all day), individual or group (interview with several people at once), and singular or multi-phased (meet with people separately throughout the interview). Some students also had multiple interviews on-site prior to receiving an employment offer. Most students received interview opportunities with multiple employer organizations, including Greg Randall, Brent Jolley, Fred Kroll, Mike Vilma, Paul Arnold, Victor Abner, Eric Jillet, Keri Kraft, Henry Dorale. Nick Prather, Bill Rosey, Seth Martins, Barry Evans, and Welsey Juniper.

Barry Evans' telephone interview led to a formal interview with Larry Mitchell at DM, Inc., in the Research and Development engineering area. Eric Jillet's one-day job shadow at GI, Inc., led to an interview on-site. Wendell Dews interviewed with the owner of IWG, Inc., who was a "super guy" who knew of his background working with electronics.

Doug Koontz' and Gloria Kline's practice interview through the co-op preparation course at GSU led to a full day-long interview at IS, Inc. Wesley Juniper received a follow-up, on-site company interview at MH, Inc., after his practice interview at GSU. Keith Kelly found out about AS, Inc., through a family member who worked there.

Seth Martin's discussion with an engineering manager at GSU during the co-op preparation course led to a short on-site interview at AS, Inc. Greg Randall's follow-up via email with an engineering manager at AS, Inc., led to an on-site interview. Through his connection with a family member who worked at AS, Inc., Keith Kelly was able to secure a formal interview at the company location.

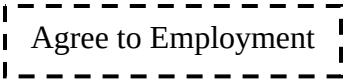
Receive Offer(s) of Employment

In all cases, the students interviewed for this study all received at least one offer of co-op employment, since they each conducted at least one co-op assignment. Primarily due to the economic conditions in the West Great Lakes region during the time of this study, there were not many opportunities for hiring into positions. Therefore, some students received only one offer of employment.

GWI, Inc., had some jobs that Wendell Dews could work on; therefore, he was offered a position of part-time employment that eventually led to his co-op assignment. Doug Koontz and Gloria Kline obtained offers of employment after their formal, day-long interview on-site at IS, Inc. Seth Martins was able to receive an offer of employment the day of his formal interview at AS, Inc., since the engineering manager "had a lot of pull" within the organization.

Some students were able to evaluate multiple offers of co-op employment. Brent Jolley, Victor Abner, Bill Rosey, Seth Martins, and Barry Evans all received multiple offers of employment. Other students were so convinced of the merits of working for a particular employer that they did not wait for other offers of employment before accepting the offer from the desired employer. Doug Koontz strongly considered his offer of employment from IS, Inc., partly because of his knowledge of IS through his uncle who worked there and a high school friend who was an engineer at the company.

Several students stated that they accepted positions with the only company that offered them a co-op position, or they quickly accepted a position that was offered to them in fear that there would not be another offer coming. Brent Jolley interviewed late in the process after everyone else already had secured a position. He did receive two employment offers and accepted the one with CRCP, Inc. Liam Morrison interviewed with GBA, Inc., and no other employers before quickly accepting their offer of employment. Mike Vilma had no employment leads come out of his practice interviews. He had three actual interviews, but no offers other than from ARJ, Inc., which he accepted because he needed a co-op position. This was also the case with Hank Molner and Keri Kraft.

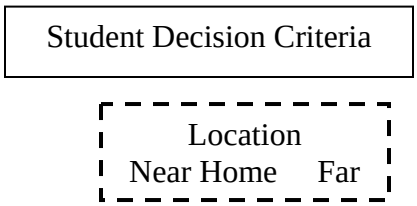


All students who were part of this study eventually agreed to work for an employer for at least one co-op assignment as part of the co-op program at GSU. Wesley Juniper completed only one co-op semester and was the only student not to complete the the three-semester co-op program. Some students began work with their co-op employer prior to the

official start of the co-op program. For instance, Wendell Dews was hired part-time "as a favor," at which time he decided to begin work towards his second bachelor's degree, this one in engineering.

Student Decision Criteria

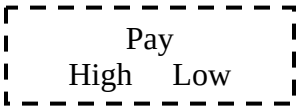
The one category identified as part of the student selection substage for the co-op position was decision criteria. Decision criteria refers to the reasons a student decided to select an employer with whom to conduct their co-op assignment. Five properties were identified for the decision criteria: 1) *location*, 2) *pay*, 3) *company/work type*, 4) *the people at the organization*, and 5) *number of employment offers*. In some cases multiple properties were given as reasons for selecting an employer.



One of the criteria identified by students for selecting a co-op employer was location. In most cases, when location was referenced, the student was interested in working near to his/her home if possible. Mike Vilma needed a co-op position to continue in the program, and although he thought the company was too far from home (about an hour's drive), he accepted the position at ARJ, Inc. When offered a position to stay at GSU for his co-op, Henry Dorale accepted it, in part, because "the location was right." Nick Prather ended up taking a position at LWBL for his first co-op semester, which "worked out well because it was close to home and convenient." For his second co-op semester, Nick could have gone back to LWBL but he wanted to find a position in Forde Junction so he could take classes

during his co-op semesters. He interviewed at a company about an hour's drive from Forde Junction but it was too far for the pay being offered. He received an offer from PD, Inc., and it was within walking distance from his apartment, so he accepted it.

Hank Molner accepted an offer at GI, Inc., which was okay since, in part, it was close to home. Seth Martins had job offers that were from companies located out-of-state, but he could not justify taking them while being in school in Forde Junction. Bill Rosey said one other company was in consideration during his co-op employer search and he was interested because it felt more comfortable and was closer to home. Bill did accept an offer at another organization that was further from home but within driving distance.



A second property of the decision criteria for students when selecting a co-op employer was pay. In most cases, students were interested in an employer who paid higher wages than others. Bill Rosey chose ARJ, Inc., for his co-op over another company (that was closer to home), in part, because "it paid more money." Brent Jolley accepted his co-op position at CRCP, Inc., after receiving an employment offer from them and one other company. He accepted at CRCP because, in part, the pay was higher. Barry Evans was asked to work at the organization at which he conducted an internship prior to beginning the co-op program (the position was engineering-related); however, he indicated one reason for not accepting the position was that it did not pay well.

Wesley Juniper had a job offer at MH, Inc., and he accepted it because "pay was a factor." Another reason that Henry Dorale accepted the position at GSU was "the money wasn't bad." For his second co-op semester, Nick Prather interviewed at a company about an hour's drive from Forde Junction but it was too far for the pay being offered. He received an

offer from PD, Inc., and even though the pay was not good, “time was running out without many opportunities” so he accepted the position.

A third property of the decision criteria for selecting an employer was the company/work type. This property refers to whether the type of company, or the work assignment offered, was closely aligned with the interests of the student. If company/work type was a criterion for the student, they typically chose an employer who was more closely aligned with their work interests. Bill Rosey chose ARJ, Inc., for his co-op over another company because he felt it was the best opportunity to learn and provided more challenge. One other company was in consideration and he was interested because it felt more comfortable and was closer to home, but the position was “limited.” However, Bill never received an offer of employment from the company. Brent Jolley accepted his co-op position at CRCP, Inc., after receiving an employment offer from CRCP and one other company, in part, because he was interested in the company’s specialized product.

Barry Evans was asked to work at his internship workplace, which was engineering-related; however, he was not interested long-term in the type of work they did. Doug Koontz accepted his position at IS, Inc., because it was a large company where he thought he could try out different areas within engineering which was appealing to him. Therefore, he accepted the employment offer early in the process before taking any additional interviews. Gloria Kline also accepted a co-op employment offer with IS, Inc., without interviewing anywhere else. She had no experience in engineering and had nothing with which compare IS, Inc., but she “had a good idea of what [she] was getting into” and “thought it was a good company.”

Seth Martins chose to work for AS, Inc., over a couple of other opportunities because he liked what he had heard about the company, including their mentoring program. Also, he was very interested in the industry of which AS, Inc., was a part. Like Seth, Greg Randall pursued AS, Inc., because of the industry in which the company was involved, as well as the company's reputation. Before his interview, Greg knew he would accept the position at AS, Inc., if it was offered to him. He quickly accepted the position when it was offered without interviewing anywhere else.

Mike Vilma needed a co-op position to continue in the program, and although he thought the company was too far from home (about an hour's drive), he accepted the position at ARJ, Inc., because he "thought it was a cool place," and he "liked what they did." Hank Molner said accepting a position at IT, Inc., worked out well because the work he would do at IT, Inc., was the type of work he was interested in.

Paul Arnold accepted his initial co-op position at MC, Inc., because he could not find a position related to his field of study, it was his only offer, and the semester had already begun. For his second co-op semester, Paul did not have as many interviews, and he needed the hours so he quickly accepted the offer from CP, Inc., even though the position again was not related to his field of study (computer engineering). For his third co-op semester, Paul had a couple of employment offers after interviews, and accepted at AS, Inc., because it was a more flexible position and involved work in computer engineering.

Victor Abner interviewed at three different companies for his first co-op assignment, in addition to a telephone interview at a fourth company. He had worked at a factory prior to his co-op search, so that helped him rule out one company offer. Anther offered him a position, but the company was too small. TP, Inc., offered him a position that he accepted

because the position dealt with more design engineering activities. After being let go from TP, Inc., due to a slowdown in the workload, Victor interviewed at four new companies. He accepted a position at BR, Inc., because he thought it was a “big, stable company,” and he was not going “to get burned” like he did at TP, Inc.

A fourth property was identified that involved the people at the organization with whom the student interacted with during the search process. Several students indicated that part of their decision to work with an employer was based on their “like” for the people they met who already worked for the employer. Doug Koontz accepted his position at IS, Inc., in part because he knew of the company through his uncle who worked there and a high school friend who worked there and had gone through GSU’s engineering program and performed his co-op at IS, Inc. Eric Jillet had two interviews in addition to the one at GI, Inc., but no other employment offers. His comfort with the knowledge of GI, Inc., through his discussions with his cousin who worked there were enough for him to accept the position.

Fred Kroll said that VPA, Inc., seemed most interested in him and during his interview he thought the people at VPA would be good to work with. Wesley Juniper’s decision to accept the position at MH, Inc., was in part made because he liked the people he met during the interview process. Seth Martins chose to work for AS, Inc., over a couple of other opportunities because the company had a lot of older engineers working there, which was appealing because of their perceived knowledge level. Mike Vilma said part of his decision was based on the fact he liked his supervisor after “chumming together” with him during the interview process.

Zack Slater was emailed about the co-op position available within the SOE at GSU and set up an interview. When he was offered the position, he accepted it because he said “it was hard to say no because it was being offered by a professor and the Director of Engineering.” Henry Dorale had worked for two prior summers on research projects with faculty at GSU. Therefore, when offered at position to stay at GSU for his co-op, he accepted because he “liked working with faculty.” Liam Morrison said he clicked right away with the people he interviewed with at GBA, Inc., and knew he wanted to work there. Nick Prather had worked at LWBL as an intern the prior two summers, so it was familiar and Nick liked the experience that his mentor provided. Hank Molner eventually accepted an offer at GI, Inc., “which was okay since it seemed like the people would be cool to work with.”

The fifth property of the decision criteria for students when selecting a co-op employer was the number of employment offers a student received. The dimensions of this property are one and multiple. Most important, several students received only one employment offer and therefore were obligated to take the position. Eric Jillet had two interviews in addition to the one at GI, Inc., but no other employment offers. His comfort with the knowledge of GI, Inc., through his discussions with his cousin who worked there were enough for him to accept the position.

Fred Kroll interviewed at VPA, Inc., and at three other companies. When he received VPA’s offer, it was his first one, but he accepted it because “he was not being picky,” but rather “taking what he could get.” Wesley Juniper had a job offer at MH, Inc., but only had one other interview and no job offer from that organization. His decision to accept the

position at MH was in part made because students were having difficulty finding co-op positions, and he did not want to miss the opportunity.

Keith Kelly said finding a co-op was difficult because there were not a lot of opportunities. His only offer was from AS, Inc., and although he was excited about working there, “there was no question about taking the offer” since it was “getting late in the game” and there were not a lot of jobs due to an economic recession. Mike Vilma needed a co-op position to continue in the program, and although he thought the company was too far from home (about an hour’s drive), he accepted the position at ARJ, Inc.

Hank Molner said “it was hard to find a co-op” and his only interview was with IT, Inc., where he was offered and accepted a co-op position because “it was his only option.” Likewise, Keri Kraft accepted a co-op offer from VK, Inc., because it was her only offer after interviewing at five different companies, and she “was just trying to get a position” and did not know what her interest areas were yet.

Paul Arnold accepted his initial co-op position at MC, Inc., because he could not find a position related to his field of study, it was his only offer, and the semester had already begun. For his second co-op semester, Paul did not have as many interviews, and he needed the hours so he quickly took the offer form CP, Inc., even though the position again was not related to his field of study (computer engineering).

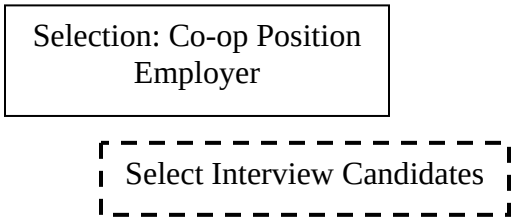
Employer:

As with the student component, the selection substage of the match-making stage follows the search substage. Also consistent with the student selection search and selection substages, there was no absolute distinction between the ending point of the search substage and the beginning of the selection substage. However, for the sake of analysis, the search and

selection steps were separated as identified in the employer search substage and in the following section.

Employer Steps

The selection substage for the co-op position from the employer's standpoint potentially has eight steps: 1) *select interview candidates*, 2) *request interviews*, 3) *conduct screening interview*, 4) *conduct formal interview*, 5) *check references*, 6) *select candidate(s)*, 7) *make offer*, and 8) *agree on employment*. As with the student selection substage, some steps are not conducted by all employers such as conducting screening interviews and checking references. Also, the steps of conducting screening interviews, conducting formal interviews, and agreement on employment happen jointly with the student.



The first step of the selection process is to select candidates to interview. This sometimes involves input from human resources personnel and technical managers/representatives. Final selection of candidates to interview almost always includes input from the technical supervisor of the co-op candidate. Selection criteria are consistent with the properties described for the decision criteria category described later in this employer selection section. At IS, Inc., Gary Blanchard said the human resources office schedules interviews of selected candidates, and the group manager makes the decision on whom to hire.

Request Interviews

After students are selected to interview, the students are contacted and a request is made to interview them. The student can accept the offer to interview or refuse it. If accepted, an interview is arranged. If denied, the employer may adjust their candidate pool and include additional students not originally selected, or they may proceed with only those students from the original pool who accepted the invitation to interview.

Screening Interview

The first joint step of the selection process for students and employers is the interviewing step. As mentioned in the student selection substage, a screening interview may be conducted initially. The screening interview can be conducted through a telephone conversation between the student and an employer representative. Another method used is to conduct short interviews at the education organization, either as part of the practice interview program in the co-op preparation course, or after students have been identified by the employer. The on-campus interviews are conducted face-to-face, and typically last no longer than one hour. The purpose of a screening interview is to reduce the number of student candidates to a manageable amount, usually five or less.

Vince Murphy and Peter Jackson of TP, Inc.; Glen Elmore of MH, Inc.; Carol Schmidt of AS, Inc.; Larry Mitchell of DM, Inc.; and Grant Reynolds of GBA, Inc., all participate in the co-op preparation practice interview program, and then bring students they are interested in to their company for a second interview. Glen said he and another engineer get together after the practice interviews and rank the students. Peter Jackson at DM, Inc., sometimes participates in the practice interview program. At DM, Inc., Larry Mitchell has a

two-stage interview process, including an initial interview at the education organization. A department manager at AS, Inc., performs a telephone interview with selected students after reviewing resumes. Brad Bonds of AS, Inc., stated that first he receives a list of student candidates and their resumes, and then the department manager performs phone interviews with selected students.

Formal Interview

The formal interview step is another joint step between the student and the employer. A formal interview typically takes place on-site at the employer's workplace and can involve anywhere from one person to several people. Some employers skip the screening interview step and proceed directly to a formal interview step with a few selected students. This happens particularly when networking resources have been used to identify potential student candidates. Formal interviews can assume many structures, ranging from one-to-one interviews to group interviews, from a singular question-and-answer session to multiple sessions in one day, from formal presentations to informal facility tours with employee introductions. Some employers may require more than one formal interview for students. During the formal interview step, expectations about the work requirements are communicated to the student, and the student is asked questions by the employer to determine if the student is willing and able to follow through with the work requirements. The student is also being evaluated to determine if he/she is a "fit" with the employer organization and the work group(s) and people with whom he/she will interact.

Glen Elmore said the top couple of student candidates are brought to the company for a second interview, to meet others in the department and to get a company tour. At DM, Inc., if Larry Mitchell and his team like the students after the screening interview, they bring them

back for a second, “less stuffy” interview on-site at the company location. This interview includes tours and demonstrations. Bob Karlson and Brian Campbell of ARJ, Inc., interview about twelve students for three positions. They look not only at prior experiences and schooling but the “way they interact during the interview. A positive interview goes a long way in our book.” After a telephone screening interview AS, Inc., schedules on-site interviews with the best student candidates. The on-site interviews last up to two hours and include an interview with Carol and with the engineering department team.

During the interview process, Sally Nelson uses open-ended questions to determine the attributes that she seeks in a co-op employee. According to Brad Bonds, those students who are of interest after a phone interview are then brought to the company for an interview with three or four department members. They decide on a candidate to hire by asking questions such as “What problems have you come across in the past, and how did you solve them?” Walter Tollen said that those students who are identified after reviewing resumes are invited for a half-day interview on-site. Through the campus visit and review of resumes, Peter Jackson selects two or three students to interview on-site. Sometimes a second on-site interview is conducted, and then an offer is made in writing through the personnel department.

Check References

The next step for some employers is to check references of the student candidate. References are requested of, and provided by, the candidate, and an employer representative contacts the reference to solicit additional information about and feedback on the student. The reference check can be conducted by human resources personnel or by the technical supervisor of the co-op position. At AS, Inc., interview logs are kept, and managers check

references on the top student candidates before final student candidates are selected and offered positions.

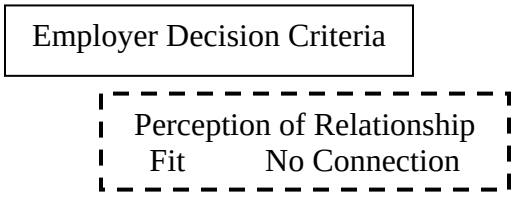
After conducting the formal interview(s) and possibly checking references, a final student candidate (or candidates if hiring for multiple co-op position) is selected. The supervisor of the co-op position almost always selects the student or has substantial input in the selection step. Again, the criteria used to decide which student is best are described in the decision criteria category following this employer selection process discussion. At the end of the interviews, Walter Tollen and the group that interviewed the students get together to compare notes, select the best student candidates, and then make offers of employment.

After a student is selected, an offer of employment is made to the student by the employer. Again, the action of this step is sometimes carried out by a human resources representative or by a technical supervisor or manager. Making an offer of employment typically involves communication to the student about specific information related to work expectations (start time, hours, location, assignment duration, etc.) and pay.

The final joint step in the selection process is to agree on employment. The student has been offered the position, and if they accept, the employer and student agree to work within the boundaries of their pre-defined arrangement. If the student declines the offer of employment and does not agree to work with the employer, then the employer either makes an offer of employment to additional student candidates until one agrees on employment with the employer, or the employer declines to hire a co-op student altogether.

Employer Decision Criteria

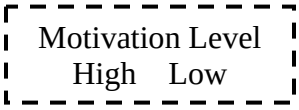
Like the student selection substage, decision criteria was identified as a category of the co-op position selection substage for the employer. As with the student selection substage, the decision criteria are important for deciding whether to interview or make an employment offer to a student co-op candidate. Decision criteria are the reasons an employer decides to select a student to conduct his/her co-op assignment. Six properties, consistent with the prior skills and knowledge properties of the employer expectations in the pre-entry stage, were identified for the decision criteria: 1) *perception of relationship*, 2) *motivation level*, 3) *interpersonal skills*, 4) *demeanor*, 5) *ability*, and 6) *location*. Again, as with the student selection decision criteria, in some cases multiple properties were given as reasons for selecting a student.



One property of the employer decision criteria was identified as the perception of a relationship between the student and members of the employer organization. Several employer representatives referred to whether they saw the student as a "fit" with themselves, the group, or the employer organization. The dimensions of perception of relationship development range from no connection to fit. The reasons a student candidate might be perceived to be a fit could include any and all of the other properties identified in this section, which could be summarized as the student displaying similar values to those held by the employer representative or the employer organization in general.

Glen Elmore at MH, Inc., stated he wanted to see whether the student will "fit in the group." Similarly, Homer Mills at VK, Inc., said that during the interview "you try to make a

visual fit" with the student and see if his/her personality will mesh with the group. Vince Murphy at TP, Inc., said he is not as thorough interviewing co-op candidates as he is with full-time hires. He does determine whether he and the student "had any rapport."



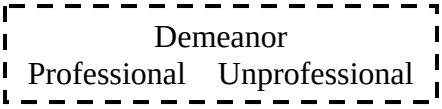
Another criterion used by employers for selecting students to interview and/or hire for a co-op position is motivation level. This property has dimensions of high and low. Employers desire students who demonstrate a high level of motivation in pursuit of an engineering degree, in seeking an employer organization at which to work and in the approach to conducting work. At DM, Inc., Larry Mitchell tries to determine "what makes a kid tick" during the first interview, and he and his team look for a "deep, underlying passion" for engineering during the second, on-site interview at the company before making an offer of employment. He also stated that he is "very finicky" when looking for a co-op employee. He wants a specific personality that includes being highly self-motivated and having the ability to pick up things quickly.

Greg Randall had worked at AS, Inc., already in another department in a co-op role. However, Kyle Williams had never worked with a co-op student in his group before so he was apprehensive when Greg asked to work in his group. He saw it as a potential burden that would take up his time. Kyle agreed to allow Greg into his group, though, because he saw that "he was motivated and interested in the work the group was doing." Kyle also stated that he looks for students with an ability and desire to apply their skills to the solution of real world problems. Sally Nelson at AS, Inc., said it was important for a student to have a "go-getter mentality." Grant Reynolds looks for someone who is a self-starter and is energetic.

Gary Blanchard looks for students who are self-motivated. Homer Mills thinks a student should also demonstrate an eagerness to learn.

Another property the employer may seek when selecting a co-op student is interpersonal skills. This refers to the student's ability to communicate and relate to others in the employer organization. This property has dimensions ranging from none to developed. An employer prefers the student to have well developed interpersonal skills. Vince Murphy said he looks at whether the student communicated well. Sally Nelson said she looks for a student's ability to work on a team. Grant Reynolds wants a student who relates well to others. In addition, Peter Jackson looks for someone with good social skills.

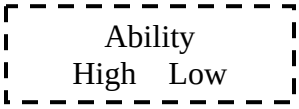
Brad Bonds seeks students with the ability to write and speak well. Walter Tollen also pointed to written and oral communication skills as being important. Similarly, Bob Karlson and Brian Campbell look for good communication skills in candidates. Brian also mentioned that good social skills are desirable. Peter Jackson likes students with good social skills. Carol Schmidt of AS, Inc., expects a student to be able to interact well with others. Homer Mills of VK, Inc., expects a student to come to him with some communication and people skills. Finally, Glen Elmore said he expects the student to be able to get along with people.



The student's demeanor was referenced as a trait that was important when determining which student candidate to select for a co-op position. The demeanor refers to whether the students present themselves professionally and with a positive, mature attitude. Vince Murphy looks at the way the student carries himself/herself and if he/she seemed

prepared. Glen Elmore stated that MH, Inc., has an instrument they call “evaluating alternatives” that is used as a tool for helping select students for employment. When deciding on a student candidate, Glen said that attitude is a major factor, along with the demeanor of the student. Wesley Juniper came out as the top candidate through this process and was therefore offered the co-op position.

Sally Nelson said a positive attitude, along with flexibility, was important in a student. Grant Reynolds looks for someone who is willing to learn, has confidence but is not too full of himself/herself, and is mature. Peter Jackson likes students with maturity and a sense of responsibility. Gary Blanchard also seeks students who have good organizational skills and a personality that can handle difficult situations. Jeff Dillenger of IS, Inc., looks for a strong work ethic.



Ability is a property with dimensions of low to high, which employers use to assess students when making a selection of whom to interview or hire. Ability refers to the students’ technical and academic skills and background and how well they match the needs or desires of the employer organization. The descriptions that support this property are consistent with the pre-entry expectations of the employer, described under prior technical skills and knowledge, and presented again below.

At AS, Inc., software writing ability, strong mathematics background, and circuit and digital design background were mentioned as desirable to Brad Bonds, Sally Nelson, Kyle Williams, and Walter Tollen. Bob Karlson and Brian Campbell of ARJ, Inc., noted that prior experience with specific CAD software and mechanical knowledge of how things work are

important to them. Peter Jackson of TP, Inc., expects general math and computer skills, but not necessarily specific engineering knowledge.

Gary Blanchard of IS, Inc., "does not expect the student to know much," but does look for a mechanical aptitude. Similarly, Vince Murphy of TP, Inc., has "low expectations" of co-op candidates, but looks for a good mechanical aptitude and basic CAD skills. Jeff Dillenger of IS, Inc., also looks for basic theoretical mechanical knowledge and CAD experience. Glen Elmore of MH, Inc., expects students to have basic electrical and industrial knowledge and computer/CAD skills.

Sally Nelson specifically said that a strong GPA is important. Grant Reynolds of GBA, Inc., said a solid GPA of above a 3.5 on a 4.0 scale was important. Peter Jackson does also looks for a GPA of about 3.0, and said he does not want someone who is "too smart." He looks for someone who likes to work with his/her hands and has good problem-solving skills. Bob Karlson noted GPA is not always that important to him.

Brad Bonds seeks students with the ability to think logically and a sense of inquiry. Carol Schmidt expects a student to have the skills to think in a technical environment. Gary Blanchard seeks students with the ability to think with common sense. Jeff Dillenger also looks for a student with the ability to think analytically. Homer Mills expects a student to come to him with some analytical and problem-solving skills.

As with the student candidates, one employer stated that location was a factor that influenced the selection of student candidates. Similar to the student, the employer sometimes prefers students who live near to the employer workplace. Peter Jackson looks at where the student's home is, noting that if he/she is from the West Great Lakes region it is a

benefit. He said that after graduation it is more likely that someone who is from the area will stay in the area to work for them full-time.

Summary:

The selection substage of the match-making stage refers to the phenomenon of students and employers choosing one another, and mutually agreeing to enter into an employment arrangement in a co-op role. The selection substage follows the search substage, but there is often an overlap of activities between the search and selection substages. The selection substage, unlike the search substage, involves only the student and employer. The education organization is not involved.

Like the summary figure for the search substage (Figure 14), Figure 15 displays the interaction of steps summarized for the selection substage. Again, a solid line indicates movement from one step to another in a manner that is expected to occur. A dashed line indicates that the movement between steps sometimes occurs but may or may not occur for in all cases. A box with a dashed border that connects the student and employer areas indicates that the step occurs jointly between the student and employer.

The employer, after reviewing the resumes that have been submitted in combination with the networking activities, selects students to interview. Decision criteria, identified in Figure 16 and marked in Figure 15 by a superscript “DC,” are used by the employer to determine the students to interview. The employer then requests an interview from the selected student(s) and the student agrees (or declines) the employer’s request.

The first joint step occurs next and involves a screening interview, a formal interview, or both. Some employers conduct a brief telephone or on-campus interview with student candidates first, then reduce the number of students they would like to bring to the workplace

Stage 2: Match-Making Co-op Position
Selection Process

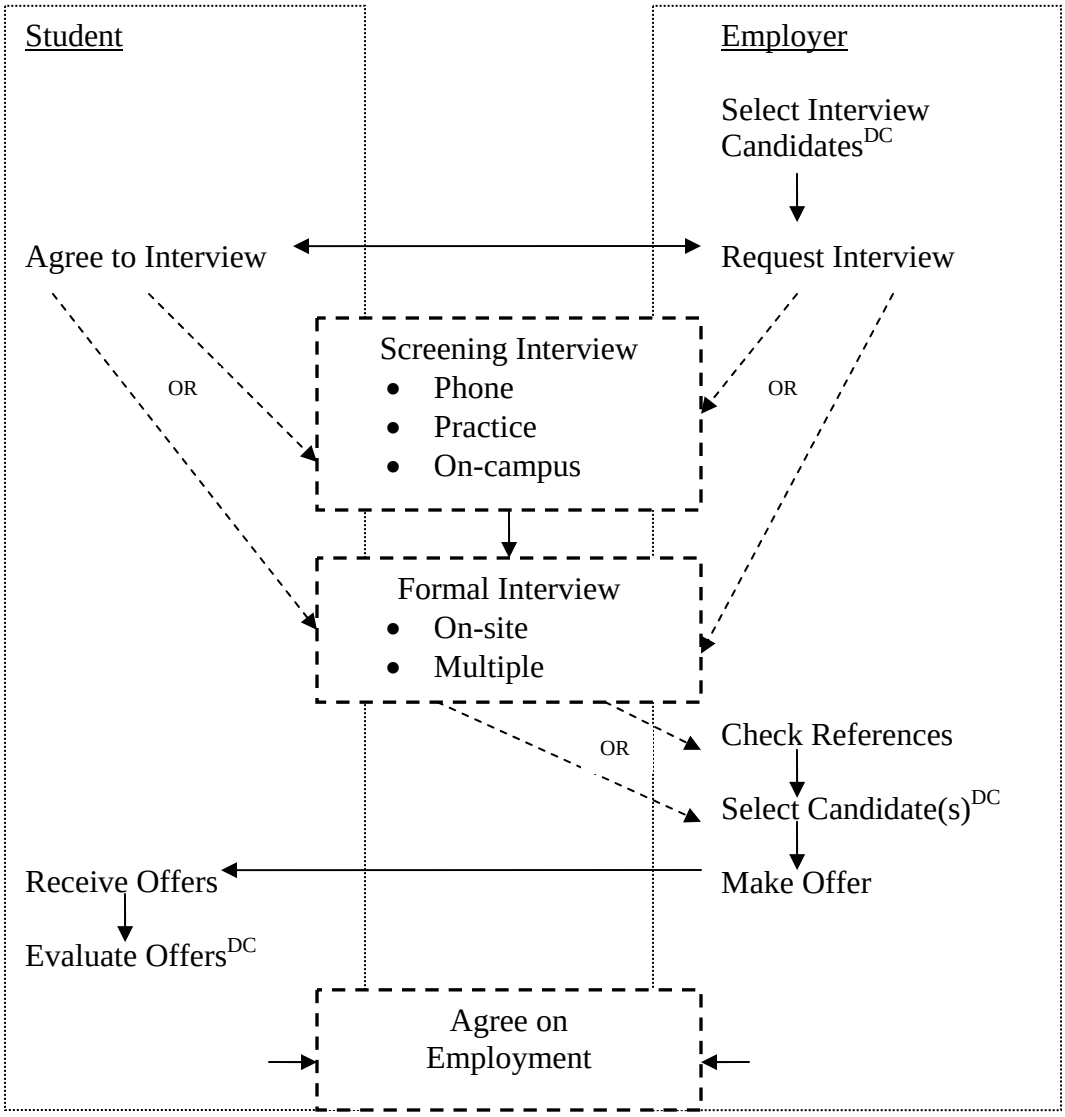


Figure 15: Selection process for the co-op position

for a formal interview. Some employers choose to move directly to the formal interview step after requesting an interview. In some cases, more than one formal interview is conducted. After the interviews are completed, some employers elect to check student references before choosing students to hire, while other employers move directly to a student selection step.

Stage 2: Match-Making Co-op Position
Selection Decision Criteria

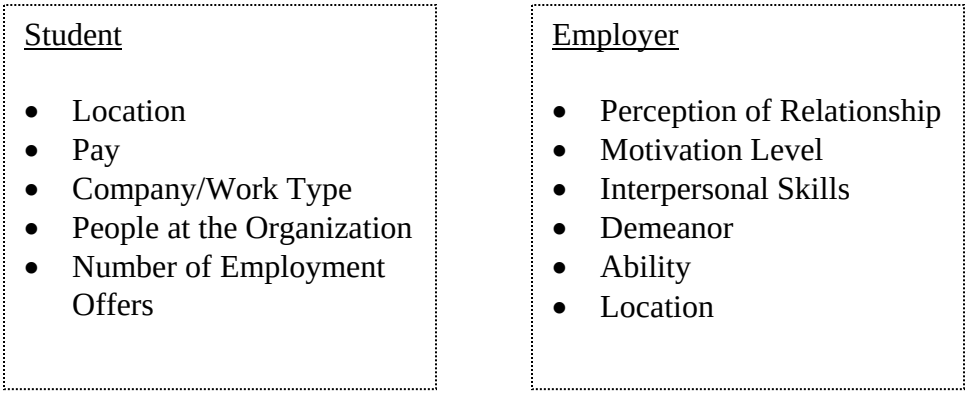


Figure 16: Selection decision criteria for co-op position

Again, Figure 16 identifies decision criteria that employers use when choosing a student to hire.

When a student (or students) is identified, an offer of employment is made to the student by the employer. The student receives one or more offers of employment and then must evaluate the offer(s) based on the decision criteria identified in Figure 16 (again, marked in Figure 15 with a "DC"). Once the student makes a final decision, a joint step occurs between the student and employer, termed "agree on employment," which concludes the selection substage.

The decision criteria for students typically included one or a combination of the following items: location, pay, company/work type, the people at the organization, or the number of employment offers received. Because of the recessed economic conditions in the West Great Lakes region, co-op opportunities were scarce in some fields and therefore students had to struggle to receive a single offer of employment, which they were then obligated to accept. Employers' decision criteria were based on the expectations identified in

the pre-entry category for employers, and included the student's technical and personal skills. More specifically, properties included motivation level, interpersonal skills, demeanor, ability, and location. In many cases the employer used these criteria to identify candidates to interview from the resumes reviewed, but reverted to whether the students would 'fit' in terms of personality with the group following the interview process.

Match-Making Co-op Position: Summary

The match-making stage is a boundary spanning phenomenon between the pre-entry and entry stages. It is a process of students and employers connecting with each other regarding employment as a co-op employee and ultimately agreeing to enter into a work relationship in the form of an engineering co-op role. In many cases, the education organization acts as a facilitator for connecting the students and employers.

Aspects of the match-making stage occur for the entities of education organization, student and employer. The match-making process can be explained metaphorically as a dating process. Two substages compose the match-making stage: search and selection. Search refers to the seeking out of a suitable partner for the employment arrangement, by both the student and employer. Selection is the "courting" activity that occurs when students and employers identify potential partners and then begin to evaluate whom they will ultimately date (enter into an employment arrangement with). The conclusion of the match-making stage is the agreement between the partners (student and employer) to begin dating exclusively (enter into an agreement to begin an employment relationship in the form of an engineering co-op role).

Figure 17 is a pictorial display of the match-making activity that occurs as part of stage 2. The figure is separated into education organization, student, and employer activities,

Stage 2: Match-Making Co-op Position

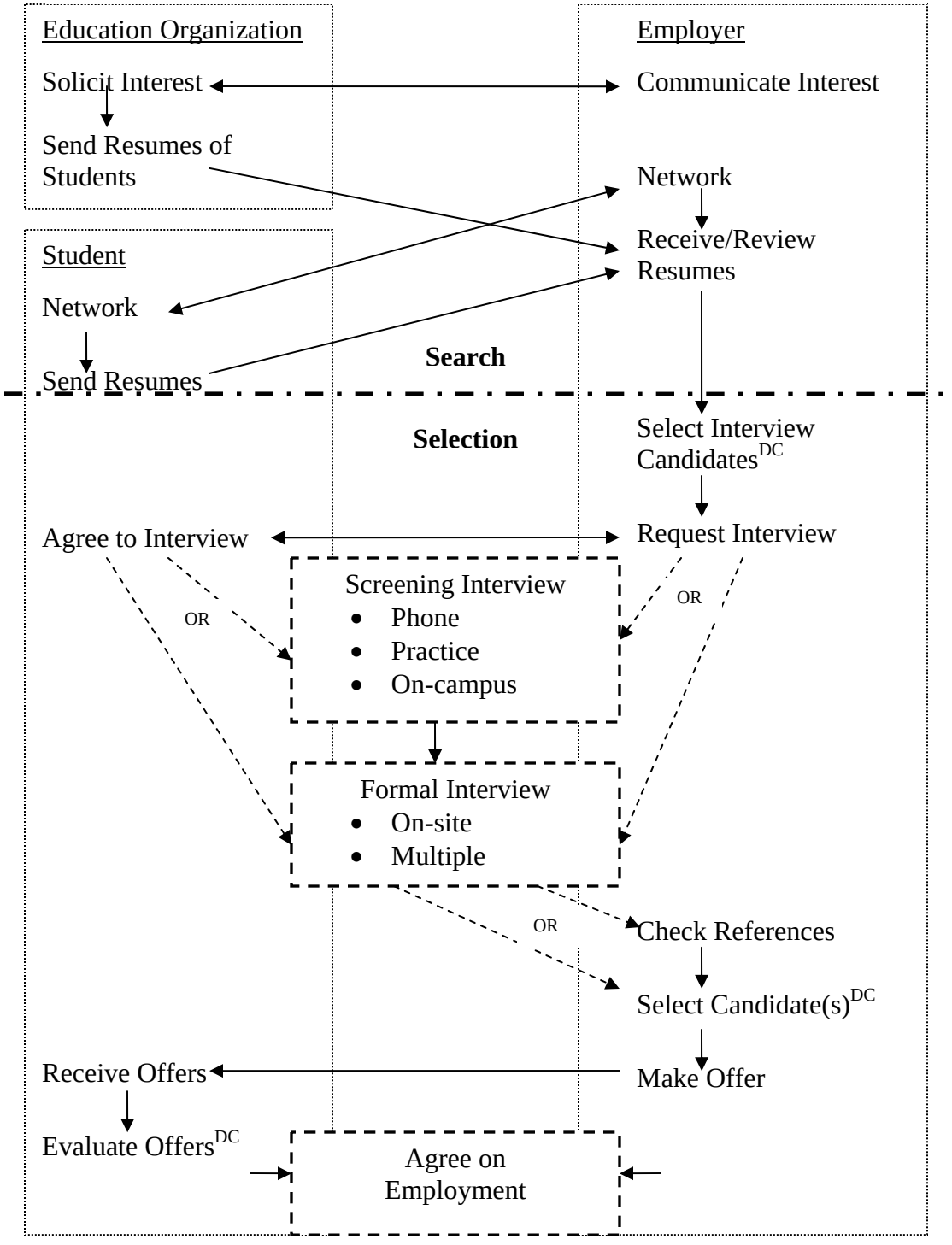


Figure 17: Match-making for the co-op position

as well as some jointly conducted activities. The figure is also separated from top to bottom by a dashed line that demarcates the search and selection substages. Figure 17 combines the activities displayed in Figure 14 (the search substage) and Figure 15 (the selection substage). As with those figures, solid lines indicate movement between and among activities, while dashed lines indicate a movement between activities that occur in some cases but not all. A box with a dashed border is a step that occurs jointly between two entities – in this case between the student and employer.

The education organization is involved only in the search substage and constitutes two steps: soliciting interest from qualified employers and sending resumes of qualified students to qualified employers. Qualified refers to the idea that the education organization admits the student to upper division standing within the engineering academic program and approves (qualifies) employers as a suitable workplace for a co-op assignment, prior to introducing the student and employer to one another. In many ways, the education organization assumes the role of a match-maker – a third party assisting two interested people (or groups of people) in getting to know one another. After the student and employer are introduced, the education organization is not involved again until the co-op assignment begins.

The student component of the match-making stage contains both substages, search and selection. The student search process contains two possible steps: networking with potential employers and submitting resumes to potential employers. The selection process contains six potential steps, including agreeing to interview with interested employers, conducting a screening interview, conducting a formal interview, receiving offer(s) of employment, evaluating offers of employment, and agreeing to employment. The student

uses decision criteria (identified in Figure 16) to evaluate offers of employment. The decision criteria, marked in superscript “DC” on Figure 17, contains five properties: location of the workplace, pay, company/work-type congruency with student interests, positive relationship with people at the organization, and number of employment offers.

The employer component of the match-making stage also contains both substages, search and selection. The employer search process contains three possible steps: communicating interest to the education organization and students, networking with potential student candidates, and receiving/reviewing resumes. The selection process contains eight potential steps, including selecting student interview candidates, requesting interviews of the student, conducting a screening interview, conducting formal interviews, checking student references, selecting student candidate(s), making an employment offer, and agreeing to employment. The employer uses decision criteria (identified in Figure 16) when reviewing student resumes and deciding whom to interview and when selecting a student to offer the co-op employment role. The employer decision criteria (marked with a superscript “DC” in Figure 17) contains six properties: perception of the relationship between the student and the members of the employer organization, motivation level of the student, interpersonal skills of the student, demeanor of the student, the ability (technical and personal) of the student, and location (where the student is from).

The match-making stage can begin with any of the three entities: education organization, student, or employer. The education organization can begin the process through coordination of the practice interview program or by soliciting interest from the employer. The employer can begin the process by communicating interest to the education organization or student or through networking with the education organization or student. Finally, the

student can begin the process by networking with the employer or by submitting resumes to the employer.

The result of the initial actions is for resumes to either be requested from the education organization or student by the employer or for the education organization or student to submit resumes to the employer for consideration. The employer then reviews the resumes and, in combination with the networking activities, selects students to interview. Decision criteria are used by the employer to determine the students to interview. The employer then requests an interview from the selected student(s) and the student agrees (or declines) the employer's request.

The first joint step occurs next and involves a screening interview, a formal interview, or both. Some organizations conduct a brief telephone or on-campus interview with student candidates first, then reduce the number of students they would like to bring to the workplace for a formal interview. Some employers choose to move directly to the formal interview step after requesting an interview. In some cases, more than one formal interview is conducted. After the interviews are completed, some employers elect to check student references before choosing which student(s) to hire, while other employers move directly to a student selection step.

When a student (or students) is identified, an offer of employment is made to the student. The student receives one or more offers of employment and then must evaluate the offer(s) based on the decision criteria. Once the student makes a final decision, a joint step occurs between the student and employer, termed "agree on employment," concluding the match-making stage.

Because of the recessed economic conditions in the West Great Lakes region, co-op opportunities were scarce in some fields, and therefore students had to struggle to receive a single offer of employment, which they were then obligated to accept. The concept of resource dependency and the relationship to power advanced by Emerson (1962) and Thompson (1967) can be applied in this instance. Co-op students are a needed resource to the employer in the form of specially-trained technical labor. Likewise, students in the engineering program at GSU are required to complete co-op assignments in order to successfully complete an engineering degree. In a recessed economy, many employers do not have as strong a need for the specially-trained technical labor due to lesser sales of product or services and therefore do not have as strong a need for co-op students. The scarcity of opportunities for the co-op students places the power with the employer in the employer-student relationship, as the employer can be selective when deciding whether to hire a co-op student, while the student is left with little choice but to follow the employers' decisions.

Employers' decision criteria were based on the expectations identified in the pre-entry category and included the student's technical and personal skills. In many cases the employer used these criteria to identify candidates to interview from the resumes reviewed but reverted to whether the students would "fit" in terms of personality with the group following the interview process. As Schein (1990) wrote, the socialization process for an organization begins with recruitment, as the organization looks for new members who already have the assumptions, beliefs, and values that are congruent with those who already belong to the organization. These decision criteria identify those key characteristics the employer seeks in a new hire. Again, the employer could be selective because the balance of

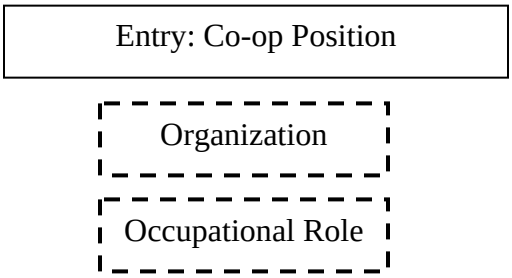
power was in the employer's favor in terms of the employer's resource dependence on co-op student labor.

Stage 3: Entry - Co-op Position

The third stage that was identified was *entry*. The match-making stage resulted in agreement between the employer and student for co-op employment. After agreement to enter into an employment arrangement, the student began work at the employer organization for the first time. The one exception was Wendell Dews who had been working at IWG, Inc., for three years prior to beginning an official co-op assignment with them as part of his engineering degree. Van Maanen and Schein (1979) referred to such individuals as newcomers to the organization: those individuals who were new to an organization or to a new role within the organization.

Newcomers move from the education organization to the employer organization to begin the entry process. Socialization occurs when an individual joins a new group or organization and ultimately determines if the newcomer will be accepted or rejected by the group. Socialization is defined as the process by which required behavior patterns of the society, organization, or group that an individual is entering are learned (Schein, 1970). Further, Schein wrote that socialization is the interaction between a stable social system and the member who enters it.

Entry was determined to have two categories: 1) *organization* and 2) *occupational role*. The two categories each have two properties: *outside* and *inside*. The student begins on the outside of the organization and occupational role and attempts to move inside through the experiences of the co-op assignment.



Organization and occupational role were defined earlier in Chapter 1 and discussed in Chapter 2**.** These two social constructs can be explained as follows: a specific company for whom a student works would be considered the organization; the student's occupational role begins as a newly hired engineering student, often without any prior related work experience in an engineering-related organization, and changes as the employer and student interact and modify or change the shared expectations of the student within the organization.

Entry to organization and occupational role(s) happens, in many cases, in that order for an engineering co-op student. The socialization processes are often influenced by the same group of people – the workgroup within the employer organization that hired the student and with whom the student works throughout the co-op assignment. Other agents within and outside of the employer organization also play important roles in the socialization of the student, but to a lesser extent than the workgroup. Included but much less influential than employer workgroup members are educators from the university who have requirements of the student in order for the student to receive academic credit during a co-op assignment. As an example, after the first week of the first co-op assignment GSU requires each co-op student to submit an organizational diagram that outlines the organizational structure of the company at which the student works, including where the student fits in the structure.

The categories used to understand the entry process for co-op students are the three pillar paradigm described by Scott (2001) and affective processes described by Greenspan and Shanker (2004) and Homans (1950), summarized in Chapter 2 of this study. In Scott's paradigm, the three pillars include regulative elements, normative elements, and cognitive elements. The tactics used to teach these elements can include formal and informal processes. Scott identified indicators for each element including rules, laws, and sanctions for the

regulative pillar, certification and accreditation for the normative pillar, and common beliefs and shared logics of action for the cognitive pillar. Indicators for the affective elements include expression of sentiment, emotion, attitude, and motive.

Entry - Co-op Position: Organization

The student begins on the outside of the organization at the beginning of the co-op assignment. When the student is hired, he/she begins to move inside the organization. There are various levels of being inside the organization. When a student is hired by the employer but prior to the beginning of the work assignment, he/she is just inside the organization as little as can be evaluated, because they have been accepted by the employer at the most basic level. After beginning work, the student can gain greater access to the inside of the organization through time, effort, proving oneself, and acceptance. One could argue that you can continue to become more inside the organization until you reach executive management or ownership levels within the organization.

This concept is consistent with Schein's (1978, p. 37-39) description of the career cycle and its three dimensions represented by an inverted cone: 1) movement in a hierarchical fashion (i.e. vertical career growth, or moving "up" in the organization); 2) movement in a functional or technical fashion (i.e. horizontal career growth, or lateral movement); and 3) movement toward the inner circle (i.e. another horizontal career growth, this one focused on greater levels of inclusion or membership in the organization "core").

Outside:

The first experience the student has once the co-op assignment begins is entry to the organization. At the start of the first co-op assignment, the student begins outside of the

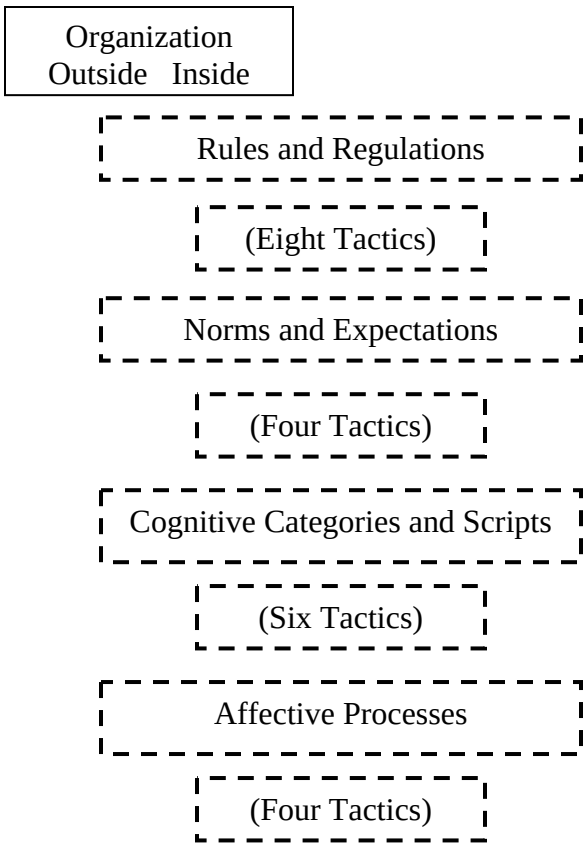
organization. All students, except Wendell Dews, were not a part of the company with whom they began the co-op work assignment and therefore began outside of the company. Wendell Dews already worked as an engineer apprentice for IWG, Inc., before beginning his co-op assignment. Therefore, he began his co-op assignment inside the organization.

What is Learned and How it is Learned:

The organization category has four subcategories that describe what students need to learn in order to move from outside to inside the organization and tactics that identify how the employer teaches and manages (formally or informally, consciously or taken-for-granted) what the student needs to know in order to be accepted into the organization. Throughout the entry process, the student is being evaluated by the members of the employer organization for fit with the organization – again, both formally and informally, consciously and taken-for-granted. Likewise, the student evaluates whether or not he/she fits with the organization. The four subcategories were established following the pillar paradigm of Scott (2001) and the discussion of affect by Greenspan and Shanker (2004) and Homans (1950): 1) *rules and regulations,* 2) *norms and expectations,* 3) *cognitive categories and scripts,* and 4) *affective processes*.

Tactics, used here in a consistent manner as described in Van Maanen and Schein (1979), are used by the employer and/or student to figure out what needs to be known in order to make it inside the organization and occupational role. Few organizations used all, or the majority of, the tactics described in this entry stage for the co-op position, but each tactic was identifiable through analysis of the data. Also, some tactics are multidimensional and can be used to communicate to the student multiple meanings including rules, norms, information, and feelings/emotion. The manners in which the tactics are enacted are

consistent with what Van Maanen and Schein termed dimensions. The seven dimensions of socialization processes are 1) *individual vs. group*, 2) *sequential vs. random*, 3) *formal vs. informal*, 4) *self-enhancing vs. reconstructive*, 5) *mentoring vs. sink-or-swim*, 6) *fixed timetable vs. variable timetable*, and 7) *tournament vs. contest*.



The culture of the organization is something that is encountered immediately by the student upon entering the organization and includes the processes and experiences encountered during orientation programs. In fact, Schein (1990) stated that organizations begin the socialization process with recruitment and selection, because the organization is likely to look for new members who already fit the company culture in terms of having the right set of assumptions, beliefs, and values. The culture of the organization includes the

accepted attitudes of employees (affect), how things are done, and what type of work environment is communicated and valued.

Culture consists of environmental factors, workplace attitudes (affect)**,** cognitive or language categories, and student-workgroup activities. The environmental factors, workplace attitudes, and student-workgroup activities properties are ways that the employer organization's culture is presented, taught, or transferred to the student. The student either learns and accepts or rejects none, some, or all of the cultural properties of the organization.

In several cases, both student and employer respondents indicated that the organization provides a general orientation for students when they begin the co-op assignment. Orientation programs are typically formalized strategies to teach new employees (in this case, co-op students) rules and norms important to the organization. Most orientation components involve tactics to communicate and teach rules and regulations and norms and expectations. The purpose is to introduce the student to company policies, procedures, and systems, while providing an overview of company facilities, resources, and, in some cases, values.

Orientation processes are typically carried out by the human resources office and are structured. Within the engineering group the student begins with, there may be a limited orientation, or many times there are no formal orientation programs or processes. It is expected the student will learn by watching others and asking questions in a sink-or-swim environment. Most components designated as workgroup-level orientation involve tactics to teach norms and expectations, cognitive categories and scripts, and affective processes. Because there were variations between the types of tactics used, a separate component was designated to differentiate *company-wide* and *workgroup-level* orientation tactics.

The first semester in a manufacturing facility was “all brand new” for Gloria Kline because she had never been in one before. The whole first semester, she soaked things in. She was not expected to know a lot, and people were helpful because she was a student. There was a three- or four-day orientation that was general for all IS, Inc., employees. She followed people around a lot the first semester and was trying to get acclimated to the organization.

Working in an engineering environment was very new to Keri Kraft. This was her first time going out and working as a student engineer. There was an orientation in the first couple of days. In his co-op journal for his third co-op semester starting at BR, Inc., Victor Abner wrote that “the first week consisted of a lot of orientation and training. There is a lot to learn here and I’m trying to take it all in. I have begun to tackle some projects.” Wesley Juniper said there was a two-day orientation that took place about two weeks after he had started the position at MH, Inc. Hank Molner also indicated he had an orientation when he began at GI, Inc., for his third co-op assignment.

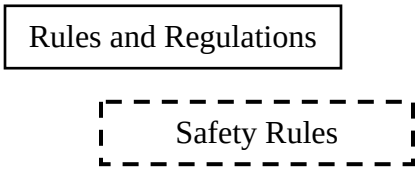
The company-wide orientation is typically coordinated through the human resources office, which is a person (or group of people) charged by the organization to maintain and perpetuate company policies, rules, values, and norms, as well as act as gatekeeper, controlling who is allowed to be employed by the organization. Company-wide orientations are often structured and planned, and contain some mandatory components to adhere to company policies or state/federal regulations.

Rules and Regulations

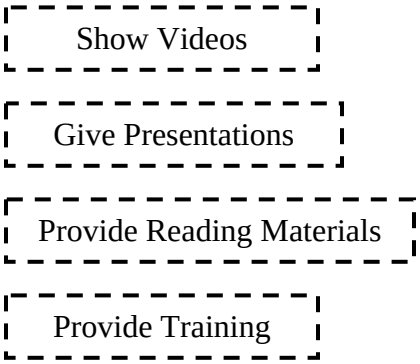
Scott (2001, p. 52) said that “regulatory processes involve the capacity to establish rules, inspect others’ conformity to them, and, as necessary, manipulate sanctions – rewards

or punishments – in an attempt to influence future behavior." Classical organization theory typically includes an assumption that there are systems of procedures, rules, and regulations in an organization covering the rights and duties of the employees (McKibbin, 1981). The processes can be diffuse and informal or highly formalized and assigned to specialized actors. Therefore, the dimensions for the organization's rules and regulations range from 1) *informal* to *formal* and 2) *conscious* to *taken-for-granted*.

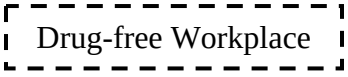
The rules and regulations taught during the company-wide orientation include 1) *safety rules*, 2) *drug-free workplace*, 3) *compensation measures*, 4) *disclosure of background information*, and 5) *knowledge of external regulations*. At least one tactic was identified to communicate to the newcomer each of the rules and regulations important to the organization.



The first item identified was safety rules. The intent is to teach the newcomer the required way to do things in order to maintain safe work practices in the organization and to comply with external regulatory requirements. This may be done in order to ensure that people are not hurt in the workplace and/or to avoid downtime in production, having to pay a worker while not being productive, and having to pay money for insurance claims and lawsuits. This rule is formally and consciously enacted by the employer. Four tactics were identified for communicating safety rules: 1) *show videos*, 2) *give presentations*, 3) *provide reading materials*, and 4) *provide training*.



A number of employers provide the student with mandatory safety training. This training is often a result of state, federal, or industry regulations requiring all employees to be trained on company safety policies before working in that environment. This tactic is conducted in a formal, individual, random, and variable timetable manner by the employer. When Bill Rosey started at ARJ, Inc., he said he watched a safety video, but there was no other formal training. It was “trial by fire” learning. At DM, Inc., the human resources office conducts the company orientation and it involves conducting safety training. According to Gary Blanchard at IS, Inc., the student watches a safety video as part of the company orientation. Doug Koontz corroborated this notion by stating that “safety training was conducted” as part of his orientation. Brad Bonds at AS, Inc., said an orientation takes place that involves the formalities of hazardous materials and static electricity training. At ARJ, Inc., new hires go through a general company orientation conducted by the human resources office, which includes watching a safety video. At ARJ, the student is also offered hi-lo training and overhead crane training.



Some employers have drug policies in order to enforce lifestyle characteristics on employees. Reasons an employer might enact such rules include keeping a safe workplace, reducing the chances for time away from work, and communicating to employees that

everyone must conform to management's ideas and recognize management's authority. This rule can also be used to screen applicants and new hires before allowing them inside the organization. This rule is both formally and consciously enacted by the employer. The tactic used to enforce this rule was to *test for drugs*.

Test for Drugs

A couple of employers mentioned that students, like any other employee who begins work with them, are required to submit to drug testing. This was not widely mentioned, but two employers did refer to it. This tactic is enacted individually, formally, randomly, and on a variable timeframe, with the purpose of being reconstructive for those students who do (or did) take drugs. At ARJ, Inc., when the student starts, he/she has to take a physical and consent to drug testing. MH, Inc., has a class that all new hires go through at the company headquarters that involves learning MH, Inc., policies and submitting blood and urine samples for drug testing.

Compensation Measures

Another rule identified was compensation measures. The intent of the employer organization was to teach the co-op student about important means for compensating employees, as part of the company-wide orientation. This rule is both formally and consciously enacted by the employer. The tactic used to communicate compensation measures is to *review benefits with manager*.

Review Benefits with Manager

Although most students do not receive benefits outside of a wage from the employer in exchange for work performed during the co-op assignment, there are a few organizations that provide additional benefits. Those that do also provide an overview of those benefits as a

part of the orientation process. This tactic is individually and formally enacted. According to Homer Mills at VK, Inc., the student will receive a company orientation when he/she starts work from human resources personnel that includes payment systems and benefits. Brad Bonds of AS, Inc., said an orientation takes place that involves the formalities of time card training, which relates to the systems used to compensate the student.

Disclosure of Background Information

Another rule requested newcomers (co-op students) to share background information, thereby recognizing the authority of the management at the employer organization. This communicates to those inside and outside of the organization that the organization is consistent in their hiring practices and documents and verifies the worthiness of employees when first hiring them. This rule is both formally and consciously enacted by the employer. There was one tactic used for teaching the student the rule of having to disclose background information: *fill out paperwork*.

Fill Out Paperwork

Many employers have students fill out paperwork when they begin work in order to maintain consistency with company hiring and documentation policies. This tactic is enacted individually, formally, randomly and in a variable timeframe. Carol Schmidt said when a student starts their first co-op assignment they meet with human resources the first day and sign off on paperwork. At DM, Inc., the human resources office conducts the company orientation and helps the student understand all of the paperwork and systems they need to know in order to negotiate the company infrastructure. According to Gary Blanchard at IS, Inc., the student goes through a standard company orientation when he/she starts, which includes signing standard employee forms and signing a confidentiality agreement. When a

new co-op student starts at ARJ, Inc., the human resources office has each co-op student go through some basic company information, fill out a standard job application, and sign a job description.

Knowledge of External Regulations

Many employer organizations are required to comply with a variety of external regulations that govern the way the organization is allowed to carry out the work. Information about external regulations that is essential for all employees to know is communicated to the co-op student during the orientation activities. These regulations are formally and consciously communicated by the employer. One tactic was identified for teaching the co-op student information about external regulations: *train for specific tasks*.

Train for Specific Tasks

In addition to training for safety procedures, some employers also provide other forms of training to students as part of the orientation process. For example, at ARJ, Inc., the student is given ISO training (a quality certification program) and other apprenticeship programs if the programs are of interest or need to the student. The trainings exist as outward signs to the internal and external people who associate with the organization, demonstrating compliance with regulative rules or laws. This tactic is enacted in an individual, formal, random, and variable timeframe manner.

Norms and Expectations

"Norms and expectations" refers to the conceptions of the preferred or desirable and how things should be done, and "define goals or objectives…[and] appropriate ways to pursue them" (Scott, 2001, p. 55). Like the rules and regulations, the properties for the norms and expectations are twofold: 1) *informal* to *formal* and 2) *conscious* to *taken-for-granted*.

Unlike the rules and regulations, teaching norms and expectations occurs both in the company-wide and workgroup-level orientation. In addition, teaching students about norms include environmental factors as well as some student-workgroup activities.

Two groups of norms and expectations were identified as part of the company-wide and workgroup-level orientation tactics: 1) *physical work environment* and 2) *preferred way to work.*

Norms and Expectations

Physical Work Environment

One norm that the organization communicated to students was information about the physical work environment. This includes the layout of the workspace and where different tasks are performed and who resides in those spaces to conduct the tasks. Learning about the work environment takes place on a macro- and micro-level; co-op students learn about the company work environment as well as the workgroup environment where the student will spend most of his/her time. The workgroup environment consists of office/desk space and where the student is situated in relation to other members of the workgroup. Teaching about the work environment consisted of two tactics: 1) *tour facilities* and 2) *observe physical workgroup setting*.

Tour Facilities

Students are almost always given a tour of the facilities when they begin the co-op assignment. Tours are sometimes conducted formally and consciously as part of the company-wide orientation process, while other times they are conducted more informally, but yet still consciously, by members within the student's workgroup. Tours are sometimes conducted with a group of other new co-op students, but are often performed individually

with workgroup members. This tactic could be classified as a mentoring act since it attempts to purposefully show the newcomer where people and places are and where people and places fit within the organization.

Most organizations make a point of showing the student around the immediate facilities and surroundings within which the student will work. Some employers will also tour the student through other facilities that are a part of the organization. Working in an engineering environment was new to Keri Kraft. There was an orientation in the first couple of days that included showing her around the facilities. She was “amazed seeing the office work area.” At first it was tough for Liam Morrison finding his way around the very large facility in which he worked, and he even got lost a couple of times. Carol Schmidt at AS, Inc., said when students start their first co-op assignment, they meet with human resources the first day and are given a facility tour. Similarly, Sally Nelson of AS said the human resources office helps the student transition into the company. The human resources office holds orientation sessions that include tours of departments for the co-op students and other interns. Therefore, Sally “does not worry about the student’s acclimation.”

Doug Koontz noted that IS, Inc., had an “unbelievable” orientation when he started. The orientation covered one week and included tours of all the company plants, offices, and other resources. Jeff Dillenger concurred and indicated that the company has some formal orientation processes, including tours of the facilities. At GBA, Inc., there is a formal orientation program for the students coordinated by the human resources office when they begin. There is a “basic overview” for a half-day, which includes a tour of the facilities.

If a company-wide orientation did not include a tour of the facilities that the student will navigate, then the workgroup typically performed that function. In addition, all students

were shown around the immediate environment within which the workgroup operates, in order to familiarize the student with the work environment.

Kyle Williams at AS, Inc., said when a co-op student first arrives, time is spent getting the student familiarized with the specific environment of the department. Kyle's group did not have any specific orientation program targeted at co-op students. Jeff Dillenger of IS, Inc., will "show [students] around the facilities" since they are in a new environment.

Observe Physical Workgroup Setting

The physical workgroup setting is an environmental factor that communicates organization values and norms to those who view and observe it. The work environment can be accessible or inaccessible, referring to how well the physical setting is organized to allow the student access to people and information. Observing the work setting happens, for the most part, informally and individually, and the clues that are communicated to the student are done so in a taken-for-granted manner. Unlike touring the facilities, this tactic occurred with a sink-or-swim purpose, because the student was expected to figure the important aspects out on his/her own. Nick Prather commented how the office layout at PD, Inc., was different than what he had experienced at other organizations. It consisted of open tables, not cubicles. It is an open office environment where the student has easy access to interact with others in the department. Gary Blanchard said it is expected that once hired, the student will "learn how we do things" including processes and systems and how a plant runs.

Preferred Way to Work

Another important set of norms and expectations that are communicated to the co-op student during the orientation is grouped into a concept called "preferred way to work." This

concept refers to the information the organization teaches to the newcomer co-op student about how work should be carried out within the organization. Ways to work include workplace ethics, company values, company mission and vision, and overview of company history, among other items. The norms and expectations are formally and consciously taught to the students through three tactics: 1) *provide presentations*, 2) *assign a mentor*, and 3) *learn in groups*.

Provide Presentations

Many employers have an individual or set of presentations for the newly hired co-op student(s), which include an overview of the company history or the company's values. Some employers also present information about special topics such as workplace ethics. These presentations are meant to formally and consciously teach the students the company's values. This tactic occurs in group settings that would be considered mentoring activity. At DM, Inc., the human resources personnel provide a presentation to help the student learn the history of the company. This orientation also used to include training on the company values, but this is no longer done. It helps the student understand all of the paperwork and systems they need to know in order to negotiate the company infrastructure. At GBA, Inc., there is a formal orientation program for the students coordinated by the human resources office when they begin. There is a "basic overview" for a half-day where they explain the vision of the company, among other things. Brad Bonds at AS, Inc., said an orientation takes place that involves business ethics training.

Assign a Mentor

The most frequent response to the type of activity that takes place within workgroups to help a student understand the preferred way to do things was to assign a mentor to the

student. Not all employers assigned a designated mentor to each student, but several did. When a mentor was assigned, he or she was purposefully selected by the organization as someone who could effectively teach the student both what is important to the organization as well as how to get things done in the proper way. In essence, the mentor is seen by the organization as a knowledgeable and key carrier of organization values and norms who behaves in a proper manner and is therefore formally and consciously assigned the task of teaching the new student member.

For those who did not assign a mentor, it was expected that the student would learn from either the workgroup leader or from the workgroup members collectively. In this case, the organization trusts that current workgroup members are knowledgeable carriers of organization norms and, in an informal and taken-for-granted manner, assume the collective will effectively teach the new student member how to do things, and what is important and valued. This tactic was enacted individually with a focus on mentoring the student.

Carol Schmidt of AS, Inc., stated that after the company-wide orientation process, the student is released to the department manager, and it is up to him/her to give the student guidance and to assign a mentor. Within the department, Sally Nelson of AS, Inc., tries to focus on getting the student up to speed on projects. She does this by assigning the student a mentor right away. Grant Reynolds at GBA, Inc., said having a good mentor is the key to student success in the program. A poor mentor will leave the co-op student “dead in the water.” Therefore, GBA requires that mentors complete a two-hour online program about how to be a good mentor. Picking out projects that will bring added value to the company is also a key step. Without a mentor who picks out good projects, the student may not perform well in the eyes of management and therefore not have the opportunity for full-time

employment later on. Walter Tollen at AS, Inc., stated that “after the initial training, all other training is done via mentoring.”

When a new co-op student starts at ARJ, Inc., he/she is assigned to work with a current co-op student, in a mentoring role, who will be transitioning back to school. In this way, ARJ can cross-train the co-op students and pass off a project so there is little interruption in the progress of the project.

Learn in Groups

This tactic often is focused on student-to-student contact but includes interactions with other members in the organization as well. This was accomplished both formally and consciously through planned gatherings coordinated by the organization and, informally, either consciously or in a taken-for-granted nature, by the students themselves. The purpose in both cases is to have students learn together in group settings and to teach each other what they have learned, either on their own or from permanent members of the organization (workgroup members, managers, or other company leaders). This tactic would also be considered a mentoring activity.

At GBA, Inc., the students interface with the other co-op/interns frequently throughout the semester, so they get to know each other pretty well. At AS, Inc., Carol Schmidt shared that there are several programs coordinated that are geared towards acclimating the co-op students to the company. Periodically, all co-op and intern students get together for brown bag “lunch and learn” sessions and technical tours of the facility and individual groups. The lunch sessions typically consist of presentations by various experts from across the company. There also are sessions covering the history of the company, the history of aviation, and marketing of AS, Inc., products. At ARJ, Inc., co-op students are

encouraged to interact with other employees regularly. The company keeps a database of employees with pictures on the intranet so that new hires can learn the people in the organization. The co-op student is introduced to key people in the department and across the company.

Cognitive Categories and Scripts

Cognitive categories and scripts are learned by observing, listening, and being taught how to do certain activities. According to Scott (2001), "internal interpretive processes are shaped by external cultural frameworks. Symbols have their effect by shaping the meanings we attribute to objects and activities. Meanings arise in interaction and are maintained and transformed as they are employed to make sense of the ongoing stream of happenings" (p. 57).

Like the rules and regulations and norms and expectations categories, the properties of this information are twofold: 1) *informal* to *formal* and 2) *conscious* to *taken-for-granted*. As with the norms and expectations, cognitive categories and scripts learned about the organization gets taught through both the company-wide and workgroup-level orientation tactics. In addition, cognitive categories and scripts get taught to students through interaction with environmental factors as well as some student-workgroup activities. Two groups of cognitive categories and scripts were identified: 1) *how to act/personal traits to emulate* and 2) *important tools/resources to perform work*.

Cognitive Categories and Scripts

How to Act/Personal Traits to Emulate

One set of scripts that are taught are how to act and behave as a person who is acceptable within the employer organization. This information is typically communicated to the student through the employer, by providing examples of personal traits to emulate. This is sometimes performed in both formal and informal ways, but often consciously enacted. Most of the tactics used to teach this information are employer-driven, but tactics can be student-driven as well. Four tactics were identified to teach (learn about) cognitive categories and scripts about how to act and how to communicate as an employee in the organization: 1) *assign a mentor*, 2) *introduce to people*, 3) *provide organized meals*, and 4) *understand employee demographics*.

Assign a Mentor

As identified in the norms and expectations section above, assigning a mentor is also important for teaching the student cognitive scripts and the language important within the organization. The most frequent response to the type of activity that takes place within workgroups to help a student learn key information is to assign a mentor to the student. As mentioned, not all employers assigned a designated mentor to each student, but several did. When a mentor was assigned, he/she was purposefully selected by the organization as someone who could effectively teach the student both what is important to know about the organization and how to act within the organization.

Introduce to People

One tactic used in both company-wide and workgroup-level orientation processes is to introduce people to the new co-op student. This provides the student with resources to

learn the organization culture. This tactic is enacted in an individual, informal, but conscious manner with the purpose of mentoring the student by knowledgeable employees. Most employers use some time in the beginning period of the co-op assignment to introduce the student to other members of the organization, outside of the group of people they will work directly with. At IS, Inc., Doug Koontz mentioned that introductions were made of many new people. Jeff Dillenger at IS agreed by saying “the company also has some formal orientation processes, including introductions to people during the first few weeks.” At AS, Inc., the students get together regularly with each other as part of the orientation process. Likewise, at GBA, Inc., the co-op students also have a half-hour introduction meeting where they meet the other co-op/intern students for that semester.

Similar to the company-wide orientation process, workgroups typically spend some time initially introducing the student to members of the group he/she will be working closely with, as well as to people outside of the workgroup. The people outside of the workgroup many times consisted of other engineering teams within the organization, factory-floor workers, machinists, managers, and business office employees.

When a student begins with Jeff Dillenger, he will “make introductions to people the student will work with.” According to Glen Elmore, within the engineering group at MH, Inc., the process is much less formal. It is more of just a familiarization to the people and the work that is done. Sally Nelson introduces the student one by one to members of the team. At first, the student is “pretty shell-shocked” and overwhelmed. Slowly walls are broken down and the student gets to know faces and gets more comfortable.

Kyle Williams said that Greg Randall was introduced to the people he would work with within the first couple of days. Homer Mills said the students are like “puppy dogs the

first few weeks. You bring them to meetings to meet people, to understand the organization, and introduce them to people around the company." Informally, the student is introduced to people within the department and other key areas of the company, according to Brad Bonds.

Participate in Organized Meals

Some employers make a point of having some formal meal with the new co-op student or students, typically involving lunch and possibly dinner. The purpose is to have the student interact with, observe, and learn from the model employees the organization wants the student to act like and behave like. It also allows the student to learn the type of behavior that is valued by the organization. The meals are formally and consciously organized to serve the purpose of having groups of students and other employees interface in a mentoring environment.

Doug Koontz noted that IS, Inc., treated all new co-ops (there were about 30 of them) to lunch, and the students were taught proper dining etiquette. Sally Nelson at AS, Inc., said the human resources office holds orientation sessions for the new co-op students. At GBA, Inc., there is a formal orientation program for the students coordinated by the human resources office when they begin. In addition, there is a rotated sponsored lunch by all of the divisions within GBA once per week where all co-op students are invited to see and learn about other parts of the company. Managers also attend these lunches in order to field questions from the students.

Understand Employee Demographics

Information about workplace employee demographics can be important for the student. This refers to the makeup and backgrounds of the people in the work environment. This property has dimensions of similar or different. If the demographics of the workers in

the employer organization are different from the student's background, then there is a potential for lack of acceptance of the student. The student would have to "win over" the people by convincing them that their background is valuable and/or acceptable to the organization. This tactic is student-driven and occurs individually, informally, and in both a conscious and taken-for-granted manner.

Greg Randall did indicate that one of the largest social adjustments was when they recently brought in a "young female" to the department. You really have to be "careful with the guy talk." He also indicated that "25 years ago it wouldn't have been that big of a deal [the guy talk with a woman around in the workplace], but a lot of things [are] going on these days [and] you have to be very careful." With Keri Kraft, Homer Mills noted that there were issues with her usage of the English language. She was hard to understand, although that got better with time. Homer had worked with at least two other GSU co-op students prior to working with Keri and one of them was female, so when he hired Keri he was already "comfortable with a woman" because the first female co-op student "worked out."

Important Tools/Resources to Perform Work

The second grouping of cognitive categories and scripts identified was called "important tools/resources to perform work." This information refers primarily to technical tools and resources the student is expected to learn in order to work within the organization. This information is formally and informally transmitted to the student, but always in a conscious manner. There were two tactics used to teach the student about the important tools and resources needed to effectively perform work in the organization: 1) *overview of office systems/tools* and 2) *train on computer systems*.

Overview of Office Systems/Tools

The student is often provided an overview of some of the systems and tools they will use during their work assignments. These systems and tools are artifacts that represent the work that is done at the organization and communicates what is valued and how things are done. This overview is typically accomplished in an individual, informal or formal manner that is consciously enacted with a purpose of mentoring the student. According to Larry Mitchell, within the engineering group, they start by teaching how the office works. They are aggressive in training and teaching but sometimes leave the student on their own to work independently. When a student begins with Jeff Dillenger, he gives them a lot of little tasks because they are new, such as email and voicemail training. Glen Elmore tries to informally familiarize the student with the work that is to be done, including small things, such as "where the copy machine is. It is an adjustment period for the first three weeks or so." Sally Nelson said a student is trained early on how to set up accounts and charge time to projects.

Train on Computer Systems

One tactic that was identified to teach cognitive categories and scripts was training on computer systems, which Scott (2001) described as "an object possessing symbolic value." Scott described technology as an important artifact within many organizations, and in engineering-related organizations this is particularly true. In many cases, training for specific computer software (in particular, CAD software) was mentioned as one of the first tasks a co-op student was given.

During company-wide and workgroup-level orientations, most students are provided some training on the computer-based tools they will be using. This introduces the student to key artifacts essential to the organization's existence. It also is a signal to the student that

they are being asked to join the organization in a more full manner, since the student is typically given access to organization data and systems that are essential to the organization's existence. Computer training is conducted in an individual, formal, and mentoring manner.

Most employers assign a new co-op student sign-on privileges to the employer's computer systems, including training on specialized software that the student would be expected to use. At DM, Inc., the human resources office conducts the company orientation, which involves learning the company network system and getting access to it. According to Gary Blanchard at IS, Inc., the student "gets set up on" and learns the company email system. When students begin with Jeff Dillenger at IS, Inc., he gives them a lot of little tasks because they are new, such as email, voicemail, and computer access training.

Again similar to the company-wide orientation process, many times the workgroup orientation would include training on the computer systems that the student will use. Sometimes this involved gaining access to company intranet systems (if this was not a part of the company-wide orientation), and other times it involved learning the specific computer programs the workgroup uses in their day-to-day activities and in which the student would be expected to become proficient.

Walter Tollen at AS, Inc., said the engineering manager has a standard set of items that are covered in a couple of hours, and then the student is signed up for any hardware/software specific training he/she may need. At MH, Inc., Glen Elmore said orientation within the engineering group "is much less formal." Larger process items, such as how computer network files are stored and organized, are new concepts that take time to learn for the student.

Affective Processes

The fourth type of information communicated during entry to the organization is affective processes. Affect can refer to attitude, emotion, sentiment, and behavior. Many times, understanding affect within the organization is a student-driven process. Unlike other groups of information (rules and regulations, norms and expectations, and cognitive categories and scripts) the employer organization does not provide orientation programs to teach affective processes to the student. As part of entry to the organization, one type of affective processes was identified: *how to be liked/accepted by others*.

Affective Processes

How to be Liked/Accepted by Others

There were several instances where it was evident that the student was trying to fit in and learn how to be accepted by others in the organization. The student had to gather information and learn what it took for others to like him/her, which in turn provided clues to the student about potential long-term fit with the organization. Affective processes was almost always individually and informally gathered by the student, in a sink-or-swim, taken-for-granted environment supported by employer members. Four tactics used by students were identified to learn affective processes: 1) *observe workplace atmosphere*, 2) *learn workplace personalities*, 3) *eat together*, and 4) *play games together*.

Observe Workplace Atmosphere

The workplace atmosphere is a property of the environment, and includes dimensions of familiar and unfamiliar. If the atmosphere was familiar and/or consistent with the student's expectations of what the atmosphere would be like, then the student noted a positive feeling about his/her surroundings. Conversely, workplace atmosphere was referenced as negative if

it was unfamiliar. This tactic occurred informally and both consciously and in a taken-for-granted manner (from the student's perspective), in a sink-or-swim environment.

Keith Kelly enjoyed the fact that he was given a lot of freedom right from the start and was not strapped down or "looked over." It was a "typical office atmosphere" with people joking around with each other. Mike Vilma noted that the people were very good to work with and the company had "a small town feel." Hank Molner stated that IT, Inc., was laid back, and he got along with all the people. For his third co-op semester at GI, Inc., Hank said the people were cool to work with, and the company was where he was from. Sally Nelson said the environment at AS, Inc., is very laid back.

Wesley Juniper said it was "intimidating" at first, being the new guy working with many people who had been there awhile. Doug Koontz also stated that it was intimidating at first not knowing what to expect. Bill Rosey noted that he was uncomfortable when he began because he was unfamiliar with his new work environment. Eric Jillet said during his first few days it took a lot of getting used to as this was his first manufacturing experience. Even at the beginning of his second co-op semester, he said he was a little apprehensive even though he "knew the basic company culture" at that point. His mentor/coach helped "get him up to speed with the company culture." At first at ARJ, Inc., the student experiences a hectic and overwhelming environment. According to Brian Campbell, the first semester usually "is laced with a little uncertainty and apprehension on [the student's] part as they get a feel for their career choice."

Learn Workplace Personalities

One property of workplace attitudes is personalities. The students encountered various personality types when they began the work experience, and how similar or different

the personalities were to ones they were familiar with was a factor in the entry process to the organization. If the personalities were very different, then the student had to adjust or spend more time learning how to cope with different personalities than his/her own. Learning workplace personalities occurred informally and both consciously and in a taken-for-granted manner.

Paul Arnold felt awkward at first until he got to know people. He received a tour of the facilities a little later and he felt that the people he met made AS, Inc., a friendly place. Victor Abner connected with few people at the company, although some people became more of a friend later on. Everyone at the company was friendly and he did get along well with everyone with whom he interacted. Hank Molner said one difference moving to GI, Inc., from IT, Inc., was that it was a lot easier to fit in at GI because the people were friendly and did not have large egos like some of the people at IT.

Larry Mitchell stated that the student is on his/her own to interact with people after an initial introduction by their mentor, and the student needs to understand quickly how to prioritize and get things done with people in the organization. This is the main reason why Larry looks for self-motivated and self-confident students. Nick Prather was told by coworkers when he started at TPT, Inc., that he spent too much time working and that behavior “ticked people off.” It was viewed as antisocial, but he saw it as demonstration of a hard-working ethic.

At TP, Inc., Vince Murphy said students meet the manufacturing floor people including welders and machinists. Students are sent on “missions” aimed at encouraging interaction with various people in the organization. It is not easy meeting “55-year old grumpy machine guys” when you are not used to that environment. Students are always

prepped about people's personalities. Once they experience getting along with various types of people, it gives the students confidence.

For Glen Elmore at MH, Inc., the first semester is about learning about the people in the organization and about the organization itself. The student needs to know "how to get around" and the basics of their job functions. In Glen's co-op assignments when he was a GSU co-op student, he learned a lot of "social stuff." There were a lot of existing relationships and he needed "to break in." That was the biggest issue for him. There was a lot of talking and more social interaction.

Normally, Glen works closely with the co-op student, so there are naturally a lot of questions he answers in the early stages. Since it is important that the students learn how to figure things out on their own, Glen and other engineers will purposefully "make themselves scarce." A balance of challenging and supporting the student is key. The student is encouraged to make a list of questions instead of coming to an engineer with many individual questions, as this is more efficient. The questions become fewer and fewer as the student progresses through the co-op assignment. Early on, the student has a lot to learn about dealing with many types of personalities. Interacting with maintenance personnel, machine operators, and manufacturing engineers are all separate "culture shocks." Over time, the students develop relationships with all of the different groups, which is essential for getting work completed effectively and efficiently.

Eat Together

A common tactic identified by both students and employer representatives for breaking-in to the organization was eating together, most typically lunch. Eating together happens informally, primarily at the workgroup-level. The act is consciously performed, but

the resulting values transference (what it takes to be liked) between employees and the new co-op student occurs in a taken-for-granted manner. As with sharing norms and expectations and cognitive categories and scripts, many times the mentor was involved with the affective process of eating lunch together to show acceptance of the student. The student feels liked and a sense of belonging from the mentor and other workgroup members.

Mike Vilma ate lunch with his supervisor and the engineering manager often, so he got to know them well. Victor Abner said most people went to lunch together to "get that connection" and he did not want to go to lunch with his coworkers everyday. Brian Campbell at ARJ, Inc., said the students eat lunch and take breaks with the managers and other employees. The ability to network and connect with other employees is left up to the student, in a process that is really "trial by fire." At AS, Inc., periodically all co-op and intern students get together for brown bag lunch and learn sessions. Sally Nelson takes the co-op student out to lunch the first day or within the first week to meet people and make contacts.

Play Games Together

A second tactic identified was the student playing games with members of the workplace, either at work or after work. Playing games together also happens informally, primarily at the workgroup-level. Playing games is consciously enacted, but learning what it takes to fit in occurs in a taken-for-granted manner. Nick Prather joined a hockey team with other guys with whom he worked. He played computer-based video games with others over the company intranet. After a game, all of the players would congregate to talk about the game. He felt left out if he did not play the game. At GBA, Inc., there are a number of extracurricular activities sponsored by the company for the co-op/intern students, including

baseball games, a picnic with all of the mentors, golf outings in some departments, bowling nights. The co-op students are also welcome to use the company's fitness facilities.

Inside:

Going from outside to inside the organization can happen fairly quickly for many students. Being selected through a competitive hiring process to be a co-op student for an organization is the first major step in getting inside the organization. Typically after the orientation process within the first couple of weeks, the student is considered inside the organization, as they have been given access to the company's computer systems and had the company's internal processes, procedures, and systems shown and explained to them. Sometimes, mostly based on economic factors impacting the organization, a student found him- or herself moving back outside of the organization after having been inside for some time. The student has moved inside the organization when he/she becomes a functioning employee in the employer organization. Following are indicators of gaining access inside the employer organization, with separate comments provided by both students and employer representatives.

Student Perspectives

Keri Kraft stated that stepping back in to work during the second and third co-op semesters was easier to do than when she first started work. In his end-of-semester evaluation for his third co-op semester at AS, Inc., Paul Arnold wrote that he had "no problem interacting with anyone in the company." For Victor Abner, starting at BR, Inc., in the fall of 2002 was "pretty similar to starting at TP, Inc., but he caught up to speed quicker. He "knew what to expect more" and he was "confident in [himself]." Bill Rosey said he felt

comfortable at ARJ, Inc., after his co-op began. Brent Jolley said it did not take much time to fit in, as he would go out to lunch with people from work. Fred Kroll hung out with the engineers both inside and outside of work, including playing hockey with them at lunch. Eric Jillet stated that by the end of his co-op he knew GI, Inc., made him happy, he liked what he did, and "knew that I fit."

Because of a downturn in the workload at TP, Inc., which was economy-driven, Victor Abner was told he would not have a position to come back to for his third and final co-op rotation. It "was a shock at first" to Victor. He had wanted to go back to the company and he thought they wanted him back as well, but there was no work for him. For his last co-op semester, he ended up choosing to work for BR, Inc., because he thought "it was a big, stable company" and he was not going to "get burned" like he did at TP, Inc.

Employer Perspectives

Kyle Williams indicated that, overall, Greg Randall was able to function in the work environment good-to-excellent because he had worked at AS, Inc., previously and he was familiar with the environment. Kyle wrote in Greg's evaluation that he "demonstrated a previously gained savvy for the organizational structure."

By the end of the first co-op semester, Carol Schmidt said the organization decides if they like the student or not. Some of this is determined by the technical managers who determine if they see the student as a fit in their group or somewhere in the organization. They want to see that the student has ability to grow, improve, and succeed. Another aspect that is evaluated is whether the student regularly attended the lunch sessions and tours, demonstrated a genuine interest in the company and their work, and was excited to come to

work. Whether a co-op student is hired comes down to “a fit thing,” according to Carol. The student needs to have a “go-get ’em attitude.”

At GBA, Inc., most times the company knows after one semester whether the student will be invited back or not. It is evident in the end-of-semester presentation whether the student is prepared or is confused about what they are presenting. In Liam’s case, his mentor was very impressed with his performance throughout the co-op program. He presented himself very well, and when the final semester ratings were compiled for the co-op/interns, Liam was rated the second highest of all students. “He wowed everyone” he worked with in the organization.

At the end of the first co-op semester, Liam’s mentor wrote that “Liam exceeded my expectations” and “in most cases performed very well on his own.” Also, Liam’s mentor wrote that Liam was “required to work on his own much of the time…did very well in getting along with others…and built on the successes of the last semester.”

Bob Karlson stated that most students start out reserved, but eventually acclimate to the environment. Many times the group will play cards or go outside and throw a Frisbee around at lunchtime. Also, Brian Campbell said after the first co-op semester, the student is much more comfortable with everything. They already have a working relationship with many of the same people that they will work with. Paul Arnold also indicated that his group leader took him out to lunch on the first day and picked up the bill, making him feel a part of the organization.

Summary of Tactics Used to Socialize Students to the Organization During Co-op:

Van Maanen and Schein’s (1979) and Schein’s (1990) dimensions (or tactics) used to socialize newcomers is the framework used to evaluate the socialization processes identified

in this study. The dimensions are (1) formal vs. informal, (2) group vs. individual, (3) sequential vs. random, (4) fixed timetables vs. variable/open-ended, (5) mentoring vs. sink-or-swim, (6) self-enhancing vs. reconstructive, and (7) tournament vs. contest. According to Schein (1990), these dimensions can result in one of three outcomes for newcomers: (a) custodial orientation – total conformity to all norms and complete learning of all assumptions; (b) creative individualism – the newcomer learns all of the central and pivotal assumptions of the organization's culture but rejects peripheral ones, thus leading to creativity and role innovation; and (c) rebellion – total rejection of all assumptions.

Employers used both formal (intentional) and informal methods to socialize the student newcomers to the organization. Some tactics were also consciously and some unconsciously (or taken-for-granted) enacted by the employer representatives. The employer provided resources or purposefully provided a means for the student to learn some of the values and norms of the organization, while other times no formal or conscious effort was made by the employer. The student was expected to learn what to do, or what is valued, in order to fit in on his/her own through observation, informal interactions with employer representatives, and unintentional actions, activities, or events presented by the employer organization representatives.

Approximately one-half of the tactics were planned by the employer, while others were unplanned or left to the student to identify and navigate on his/her own. The planned tactics were largely a part of either a company-wide or workgroup-level orientation program. Approximately one-half of the socialization activities were employer-driven, and the other one-half were student-driven.

Formal vs. Informal Tactics

The following tactics were performed in a formal manner by the employer organization: 1) train for safety, 2) test for drugs, 3) review benefits, 4) fill out paperwork, 5) train for specific tasks, 6) tour facilities, 7) assign a mentor, 8) provide presentations, 9) overview of office systems/tools, 10) introduce people (sometimes), 11) train on computer systems, and 12) participate in organized meals. The first five tactics teach rules and regulations, while touring facilities and providing presentations teaches norms and expectations. Assigning a mentor, introducing people, participating in organized meals, providing an overview of office systems and tools, and training on computer systems teaches cognitive categories and scripts.

The following tactics designed to teach norms and expectations were performed in an informal manner by the employer organization: 1) observe physical workplace setting, and 2) group gatherings (sometimes). Additional informal tactics that students used to learn about the cognitive and affective processes included 1) introduce people (sometimes), 2) understand employee demographics, 3) observe workplace atmosphere, 4) learn workplace personalities, 5) eat together, and 6) play games together.

Group vs. Individual Tactics

Most of the activities and tactics used to socialize students to the organization by the employer were individual-based, including 1) train for safety, 2) test for drugs, 3) review benefits, 4) fill out paperwork, 5) train for specific tasks, 6) review expectations, 7) assign a mentor, 8) give overview of office systems/tools, 9) introduce people, and 10) train on computer systems. Student-driven actions that were individual included 1) observe physical work setting, 2) observe workplace atmosphere, 3) learn workplace personalities, and 4)

understand employee demographics. All tactics used to teach rules and regulations were enacted in an individual manner, some tactics designed to teach norms and expectations and cognitive categories and scripts were individually enacted, and all tactics used to learn affective processes were individually enacted.

Group actions included 1) provide presentations, 2) learn in groups, and 3) participate in organized meals. Eating together, playing games together, and touring facilities were conducted in both individual and group settings. Providing presentations, learning in groups, and touring facilities teach norms and expectations, while participating in organized meals teaches cognitive categories and scripts, and eating and playing games together help the student learn affective processes.

Sequential vs. Random Tactics

The tactics associated with socialization to the organization are primarily random activities; that is, there is no sequencing of activities so that the next step builds on the prior step. Some activities occur earlier in the socialization process than others. Tactics to teach rules and regulations, including training for safety, testing for drugs, reviewing benefits, filling out paperwork, and training for specific tasks are used earlier than the tactics to teach norms and expectations, cognitive categories and scripts, or affective processes. Also, touring of facilities and introductions to people happen early in the process. However, these activities are not sequenced with one another to build a logical progression of higher-order learning.

One exception that is sequential in nature is the teaching of norms and expectations, and cognitive categories and scripts, relating to student-mentor relationships, early in the socialization process to the organization. Typically, a student would be assigned a mentor who then introduces the student to people in the organization, possibly provides a tour of the

facilities, provides an overview of office systems/tools, and gets the student started on their first assignments, which are typically training on computer systems. This set of activities is sequential, but taken as a whole with the other tactics used to socialize a student to the organization, the set of activities is randomly applied.

Fixed Timetables vs. Variable/Open-ended Tactics

There was no indication from either the student or employer informants that there was a fixed timetable for completing any of the aspects of the socialization processes during entry to the organization. The rules and regulations related to training for safety, testing for drugs, reviewing benefits, filling out paperwork, and training for specific tasks all occurred within the first week or two of the first co-op assignment. Also, the normative and cognitive activities of learning about the facilities through tours and observations of the work setting, learning how to act through a mentor or being introduced to other people, and obtaining an overview of office systems and tools and computer systems occurred early in the first co-op semester. However, there was no indication that timetables were set for students to achieve milestones of being socialized to the organization.

Mentoring vs. Sink-or-Swim Tactics

Aspects of both mentoring and sink-or-swim environments and the tactics that support them were evident for entry to the organization. Tactics that can be classified as having mentoring characteristics include 1) assign a mentor, 2) train for specific tasks, 3) learn in groups, 4) give overview of office systems and tools, 5) tour facilities, 6) provide presentations, 7) introduce people, and 8) participate in organized meals. Most of the tactics that taught norms and expectations and cognitive categories and scripts include mentoring

characteristics, while this was true for only one tactic used to teach rules and regulations (train for specific tasks), and no tactics to learn affective processes.

The tactics that would be considered sink-or-swim were primarily those that communicated affective processes to the student, including 1) observe workplace atmosphere, 2) learn workplace personalities, 3) eat together, and 4) play games together. One tactic to teach norms and expectations (observe physical work setting) and one tactic to teach cognitive categories and scripts (understand employee demographics), also would be considered sink-or-swim tactic. These activities are all student-driven, meaning the student is responsible for learning organization information on his/her own. Those students who are proactive will likely "swim" while those who do not learn the valuable information obtained from these activities will "sink" and not become fully socialized to the organization. The result could mean failure to advance within, or remain with, the organization.

Self-enhancing vs. Reconstructive Tactics

There were few tactics identified that would be classified as reconstructive – teaching students the values of the organization while making the student change his/her values to match the organization's. One tactic would be "test for drugs." If a student was apt to take drugs, he/she would need to cease that behavior or not be allowed to continue employment with the employer. The only other examples that would imply a student would need to change values or habits would be each of the tactics used to teach affective processes: hazing the student, isolating the student, eating together, playing games together, learning workplace personalities, and observing workplace atmosphere. If the student was not interested in changing to match the affective knowledge learned about the existing employees, he/she may not gain the acceptance needed to remain with the organization long-term.

The other tactics would not be considered self-enhancing on their own, but because they do not require the student to leave his/her values behind and change to what the organization desires, by default the organization is exhibiting self-enhancing behavior. Students are not forced to change all of the characteristics and values they bring to the organization, but rather are allowed to keep them and build upon them based on what is learned at the organization.

Tournament vs. Contest Tactics

The only tournament-style tactic identified was "test for drugs." If a student failed to pass a drug test, he/she would be eliminated from the organization. All other tactics would be considered contest-style tactics. The student is evaluated as he/she encounters and progresses through the process of learning various rules and regulations, norms, cognitive categories and scripts, and affective processes. After completing all (or most) of the tactics, a student is evaluated to determine how he/she has fared. If the student has satisfactorily proven himself/herself when considering all of the various activities (contest-like), the student is allowed to continue within the organization and gain acceptance as an "insider."

Outcomes of Socialization of a Co-op Student to the Organization:

The objectives of the student were to get hired by an engineering-related employer organization and eventually make it inside the organization (gain acceptance by members of the organization). The employer sought to hire an engineering student in a co-op program and move the student inside the organization with the student learning and accepting the important rules and regulations, values and norms, and cognitive and affective processes of the organization. By doing so, the student could be a suitable candidate for a full-time

engineering-related occupational role after graduation. The co-op program would allow the employer to determine the value of the student to the organization in a less expensive manner than hiring an unknown graduate who may or may not end up fitting into the organization. Successful socialization to the organization from the employer's point of view would have an outcome of either custodial orientation or creative individualism, and the student would be retained for all three co-op assignments. Either custodial orientation or creative individualism is acceptable to the employer at the organization level because while the employer wants the student to conform to all (or most) of the values and norms of the organization, creative individualism is the desired outcome in terms of the role the student assumes.

Creative individualism, according to Schein (1990), results when a newcomer learns and accepts all central and pivotal norms and expectations of the organization but rejects all peripheral ones. The student is permitted "to be creative with respect to the organization's tasks and in how the organization performs them (role innovation)" (p. 116). According to Schein, the combination of socialization tactics most likely to produce creative individualism include informal, self-enhancing, random, sink-or-swim, fixed in terms of timetables, and contest-like. Custodial orientation typically occurs through formal, reconstructive, mentoring, sequential, variable timetable, and tournament-like tactics and processes. Either group or individual tactics can result in a custodial outcome or creative individualism, depending on the orientation of the student mentor.

For this study, aspects of all types of tactics were identified for socialization processes during entry to the organization. Although both group and individual tactics were identified, the tactics were more individual than group. Likewise, more formal tactics than informal, more random tactics than sequential, and more self-enhancing tactics than

reconstructive were identified. Equal amounts of mentoring and sink-or-swim tactics were used by the employers. Variable timetable tactics were used rather than fixed timetables, and the process was contest-like versus tournament-based. Therefore, some tactics thought to create a custodial outcome (formal, mentoring, variable timetable) were dominantly identified, while other tactics common to creative individualism (self-enhancing, random, contest-like) were also identified.

Twelve of eighteen employers were successful in creating either a custodial or creative individualism outcome with the co-op student and retained the student for all three co-op assignments. Those employers included ARJ, Inc.; AS, Inc.; CRCP, Inc.; DM, Inc.; GBA, Inc.; GI, Inc.; GSU; IS, Inc.; IWG, Inc.; TP, Inc.; VK, Inc.; and VPA, Inc. In fact, AS, Inc., was able to achieve success with all three students who were interviewed, while ARJ, Inc., GSU, and IS, Inc., were able to achieve the same with both students interviewed from each of those employer organizations. Four employers produced an outcome of rebellion (CP, Inc., LWBL, MC, Inc., and MH, Inc.) since the students who performed a co-op with those organizations left for either another career area (changed academic majors – the case at MH, Inc.) or for another co-op employer. Two employers (IT, Inc., and TP, Inc.) had the co-op student leave for another employer to complete the co-op assignments; however, both employers had to release the student due to economic conditions at the time within the organization. These cases were not a result of rebellion to the socialization process.

Of interest are employers AS, ARJ, and IS, who were able to successfully socialize multiple students to the organization without a case of rebellion. GSU is excluded because it is an education organization. With these three employers, AS and IS were both larger employers, while ARJ was a small employer. AS and IS both used similar tactics to socialize

students: some group and some individual, some formal and some informal, some sequential and some random, some mentoring and some sink-or-swim, variable, self-enhancing, and contest-like. On the other hand, ARJ primarily used individual, informal, random, sink-or-swim, variable, self-enhancing, and contest-like tactics to successfully socialize the student to the organization. This would suggest a possible difference in how a student is successfully socialized based upon the size of the organization and/or the number of students the organization is attempting to socialize. The larger employers used some custodial and some creative individualism strategies to produce aspects of both a custodial orientation and creative individualism, while the smaller employer used strategies that primarily produced a creative individualism outcome.

Organization – Summary:

The organization category of the entry stage describes the student's movement from outside to inside the organization. The employer and student jointly participate in the process. Figure 18 is a pictorial display of the entry stage for the organization category. There are four subcategories associated with the organization category consistent with the three pillars of institutions outlined by Scott (2001) — rules and regulations, norms and expectations, and cognitive categories and scripts — and affective processes, developed from the work of Greenspan and Shanker (2004) and Homans (1950). Chong (2005) wrote that regulative elements refer to how organizations adopt procedures because they are forced to do so, such as laws or rules. Normative elements refer to how organizations adopt procedures because they are assumed to be superior to other ways of doing things. These processes take

Stage 3: Entry – Co-op Position
Organization-Level

What is Taught and Tactics Used

Location:
Outside
Target
Organization

Student Role:
New Hire

Rules and Regulations:

- Safety Rules
  - Show videos, give presentations, provide reading materials, provide training
- Drug-free Workplace
  - Test for drugs
- Compensation Measures
  - Review benefits with manager
- Disclosure of Background Information
  - Fill out paperwork
- Knowledge of External Regulations
  - Train for specific tasks

Norms and Expectations:

- Physical Work Environment
  - Tour facilities
  - Observe physical workgroup setting
- Preferred Way to Work
  - Provide presentations
  - Assign a mentor
  - Learn in groups

Cognitive Categories and Scripts:

- How to Act/Personal Traits to Emulate
  - Assign a mentor
  - Introduce to people
  - Participate in organized meals
  - Understand employee demographics
- Important Tools/Resources to Perform Work
  - Overview of office systems/tools
  - Train on computer systems

Affective Processes:

- How to be Liked/Accepted by Others
  - Observe workplace atmosphere
  - Learn workplace personalities
  - Eat together
  - Play games together

Location:
Inside
Target
Organization

Student Role:
Functioning
Employee

Figure 18: Entry at the organization-level for the co-op position

into account organization values and norms. With cognitive elements, organizations copy or mimic other ones, often because of uncertainty. Shared conceptions constitute the nature of social reality and the frames through which meaning is made. Culture is treated as symbolic systems. Homans suggested that the term “sentiment” be utilized to label a host of terms such as emotion, affect, attitude, and motive.

Aspects of all four subcategories were identified as part of the entry process to the organization. This is partially supported by the work of Garavan and Murphy (2001), who found that socialization is influenced by variables within an organizational setting, as well as cognitive and affective issues. There were relatively equal numbers of tactics noted for each of the four subcategories: five for rules and regulations, five for norms and expectations, six for cognitive categories and scripts, and four for affective processes. Communication of rules and regulations by organization members is an important first step when students enter the organization. This process is often formal and planned and occurs within the first two weeks of starting work at the organization. Many of the rules and regulations are communicated by people in central management functions within the organization (human resources personnel, department managers, etc.). The purpose is for everyone in the organization to have the same set of rules and regulations by which to abide.

Norms and expectations and cognitive categories and scripts are also an integral part of the entry to organization process. The student is expected to learn how to act and what is acceptable or unacceptable behavior within the organization. The student is introduced to the use of important symbolic artifacts and resources, such as computer technology and other machinery in the facility. Affective processes that were identified tended to be fairly generalized and symbolic. The result is that the student does experience affect associated

with the organization, but it is not as strong an emotional connection, particularly when compared to the affective processes that are described in the following “entry to occupational role” section.

The information taught (learned) has dimensions that range from being formally or informally, and consciously or unconsciously (taken-for-granted) enacted. Within the tactics, there were several components identified that described groups of activities including orientation programs, student-workgroup activities, and other cultural elements, including observing the workplace environment and workplace attitudes. Many organizations had orientation programs for new hires that included both formal and informal elements. Orientation programs refer to the processes, programs, and tactics that the employer uses to initiate the student to the basic knowledge needed to survive within the organization. Culture includes the process of the employer presenting, exhibiting, sharing, or teaching the organization values, beliefs, and customs, and the student learning and accepting, or rejecting, the organization culture.

The orientation tactics contain two properties: company-wide and workgroup-level. Company-wide orientation includes the tactics coordinated by employer representatives, typically human resources personnel, for all new co-op students. The tactics used for company-wide orientation range from filling out paperwork to participating in organized meals to testing for drugs. These tactics are typically planned and formally enacted. The workgroup-level orientation tactics include those activities that introduce the student to those people with whom he/she is assigned to work. These tactics include assigning a mentor, introducing people, touring facilities, and reviewing expectations. These tactics are more

informal and may or may not be planned. A complete list of tactics, grouped by the institutional pillars, is shown in Figure 18.

Mentors were identified as important people within the entry to the organization process, as the mentor communicates various norms and expectations, types of information, and affective processes to the student. This is consistent with the findings of Louis (1980) and Reichers (1987) who determined that mentors are an important agent of socialization. Ostroff and Kozlowski (1993) also found that newcomers learn more about an organization if the newcomer has a mentor. Blau (1988) determined that an intern-manager relationship (similar to co-op/mentor relationship) has a direct effect on socialization outcomes for a newcomer. The organization assigns the mentor as a person trusted to help the student learn and understand many of the various key aspects of the organization. The mentor is a critical agent of organization culture, values, and information.

Culture was determined to consist of three properties: environmental factors, workplace attitudes (affect), and student-workgroup activities. Environmental factors refer to the type of atmosphere within the organization and the physical setting of the workplace. The student learns about the important aspects of the workplace environment primarily through observation and self-directed information-seeking. The workplace attitudes property has subproperties of personalities and demographics. Personalities and demographics refer to the different types of people whom the student will encounter and how the student fits with those different types within the employer organization. This involves learning some cognitive categories and scripts but relies more heavily on affective processes.

Several students talked about the process of eating lunch with coworkers and playing games either during breaks at work or after work and the way it made the student feel

accepted and a part of the group. These are important affective processes that connect the student to the organization, more so than any other tactic used during the entry to organization substage. These activities are sometimes the foundation of workgroup connections that occur more deeply during the entry to the occupational role substage.

The result of the entry processes and tactics for the organization category is to move the student from outside to inside the target organization. The student goes from being a new hire to a functioning employee. The role of a functioning employee is to be knowledgeable about the people, systems, and processes so that work can be accomplished in an effective manner. The student is accepted as a member of the organization if he/she gains access to "inside."

There was evidence that most students learned various aspects of technical, personal, and organizational skills and knowledge as a result of being socialized to the organization. This satisfies the expectations of the education organization and the exit (developed skills and knowledge) expectations of the employer, as identified in stage 1: pre-entry. Therefore, from the perspective of satisfying expectations of the co-op program, both education and employer organizations would indicate the co-op program is successful.

Entry - Co-op Program: Occupational Role

The second category identified for the entry stage was occupational role. The student begins as a newly-hired engineering student within an organization that employs people who work in engineering-related roles.

Outside:

At the start of the first co-op assignment, most students begin outside of an occupational role that would be considered engineering-related. Most students had never worked in an organization that performs engineering-related work prior to beginning their co-op and therefore did not have experiences being in an engineering-related occupational role. The exceptions were Wendell Dews, Barry Evans, Keith Kelly, Seth Martins, and Wesley Juniper, who had worked in a student-level engineering position prior to beginning co-op, and therefore had likely been in an engineering-related occupational role at one time. However, even these students experienced feeling outside of the engineering-related occupational roles at their new co-op organizations, with the exception of Wendell Dews, who remained with the same organization he worked with prior to co-op.

What is Learned and How it is Learned:

The occupational role category has four subcategories that describe what the student is taught by (learns from) the organization members as the student moves from outside to inside occupational roles. The subcategories summarize what the student needs to know in order to be accepted into the various occupational roles. The workgroup members teach and manage (formally or informally, consciously or taken-for-granted) what the student needs to know. Throughout the entry process, the student is being taught and evaluated by the members of the workgroup for fit with the occupational role. Similar to the analysis of the organizational entry, the paradigm presented by Scott (2001) and the concept of affect, advanced by Greenspan and Shanker (2004) and Homans (1950), were used to organize the information students learn upon entry into the occupational roles into subcategories as follows: 1) *rules and regulations,* 2) *norms and expectations,* 3) *cognitive categories and*

scripts, and 4) *affective processes*. Also similar to the organization category, the dimensions for the components of these subcategories are twofold: 1) *informal* to *formal* and 2) *conscious* to *taken-for-granted*.

Entry to occupational role(s) includes two components: 1) *workgroup interactions* and 2) *work assignments*. Workgroup interactions refers to the various ways that students learn about occupational roles within engineering and workgroup culture, and gain acceptance to inside an occupational role through planned or unplanned interactions with members of the workgroup or other groups in the organization. The interactions are sometimes constructive and other times testing in nature. Many interactions involve supportive conversations and behaviors from mentors, supervisors, and coworkers. Other times, the behavior of the coworkers of the student is very challenging, including teasing and poking fun at the student, leaving the student on the outside of the groups or teams until a time period has passed when the group members relent and allow the student inside.

The workgroup interactions component contains two properties: 1) *employer-driven* and 2) *student-driven*. Employer-driven workgroup interactions are those activities or actions initiated or enacted by employer representatives with the co-op student as the target. The employer-driven interactions had dimensions of challenging and supporting. Some employer-initiated actions challenged the students to determine their abilities and/or worthiness of inclusion. Other employer-initiated actions or activities supported the students in their efforts to move inside an engineering-related occupational role. Student-driven workgroup interactions is the second property and refers to those activities or actions initiated or exhibited by students as they attempt to break into the workgroup and a new occupational role. The student-driven interactions had dimensions of proactive and reactive. Some

students used proactive measures to learn and become a member of the group. The student initiated action or interaction. Other students were satisfied to wait for things to happen to them and/or to be asked and assigned to them. These students were reactive to the employer-initiated actions.

The second component identified as part of the entry to the occupational role is the work assignments that the students are given. In most cases, the students indicated that the first couple of weeks were slow in terms of work that was assigned to them. It was very common for a student to be given manuals to read or computer tutorials to practice with for the first week or two before ever being given a productive work assignment. In all cases, students were given small tasks to complete to prove their ability and then built on those tasks as they were able to prove to their team that they could accomplish more. This period of being outside of an engineering-related occupational role also involved the student, either proactively, asking a lot of questions of their coworkers to build understanding, or being asked questions to determine the student's level of understanding.

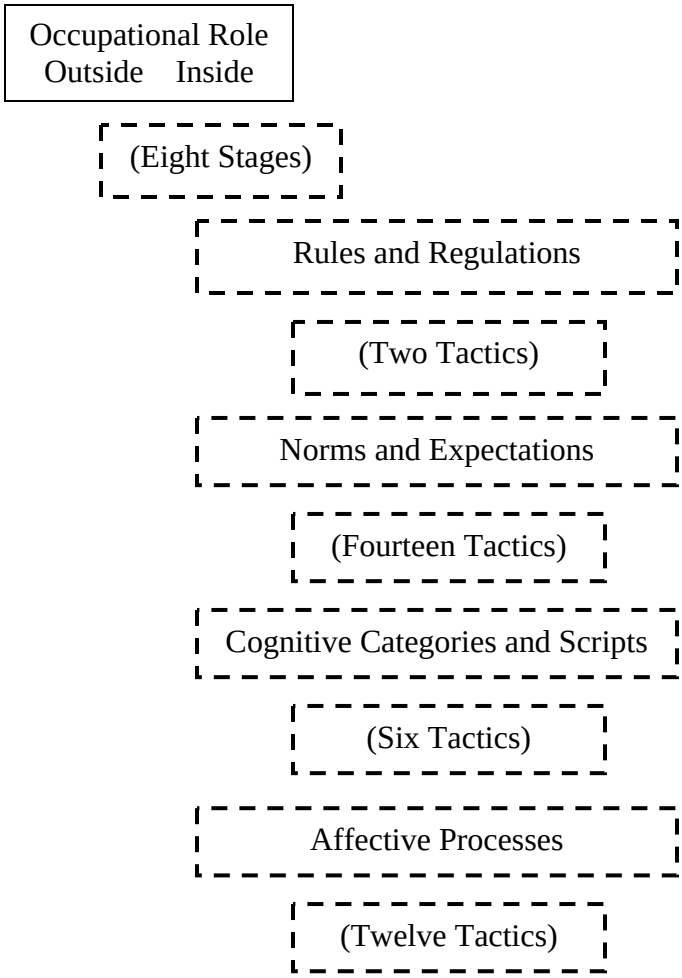
Development Stages

As noted earlier, the occupational role involves both the type of work the student gets as well as the student's knowledge of, and recognition for, getting work done specific to the engineering training they have received. Role development was determined to consist of an eight-stage process. The process is a growth and acceptance process that moves the student from outside to inside more progressively responsible occupational roles within the engineering-related organization. The student begins with theoretical engineering knowledge and limited application ability and typically progresses to a new or junior-level engineer occupational role with the ability to make some engineering-level analytical judgments. This

happens through greater acceptance of the student by the engineers within the employer organization, thereby exposing the student to more and more of the engineer's craft and allowing the student into their semi-professional group.

The development stage concept explained in this section is consistent with what Schein (1978) called dimensions of the career cycle. Schein identified three dimensions of the career cycle: a hierarchical dimension, a functional or technical dimension, and an inclusion or membership dimension. The hierarchical dimension (movement up) refers to the promotions and raises a person achieves in order to reach a certain level within the occupation and organization. The functional or technical dimension refers to the special expertise or talents and skills the person acquires to get better at his/her craft (a horizontal or lateral movement in career). The inclusion dimension refers to movement toward the inner circle or core of the occupation or organization. The employee gains greater membership as a trusted person within the occupation or organization. Schein's inward and upward movement during the career cycle parallels the role development stages discussed in this section.

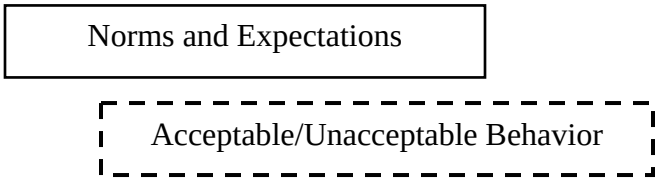
The process is not necessarily linear or sequential. Some students bypass certain stages, while others experience each stage in different orders. However, the stages are cumulative and progressive in that they move the student from a student role to a new or junior-level engineer occupational role. The process includes the following eight stages: 1) *unsure student hire*, 2) *aware student employee*, 3) *functioning technical employee*, 4) *aspiring apprentice engineer*, 5) *new apprentice engineer*, 6) *advanced apprentice engineer*, 7) *new engineer*, and 8) *junior engineer*.



Unsure Student Hire: The "unsure student hire" stage is typically the first step toward entering an engineering-related role for a student who has no prior engineering experience. This stage includes the student not being very sure of himself/herself and not knowing what to do because of the newness of the work environment. This also can result in the student feeling as if he/she does not know as much as he/she thought based on the academic training completed to this point. The employer has hired the student and provided an orientation to move the student inside the employer organization.

Rules and regulations. There were no rules and regulations identified with the "unsure student hire" stage.

Norms and expectations. The "unsure student hire" stage consists of learning norms and expectations as the student attempts to understand and define his/her identity in relation to the organization, entered as an engineering co-op student. The norms and expectations taught (learned) is identified as: *acceptable/unacceptable behavior*. These norms are similar to one aspect of the norms learned during the entry to the organization, meaning that learning about entering the organization and the occupational role have some common aspects, and therefore some tactics used by the employer have a dual purpose.



Students learn from other members of the workgroup what behavior is acceptable and unacceptable for the new occupational role. This concept relates to the information students seek about their new environment due to the uncertainty of the occupational role and how the student fits within the workgroup. This information is informally, individually, and consciously taught to/learned by the new co-op student. Two tactics were identified used by workgroup members and students to acquire norms and expectations: 1) *observe others* and 2) *converse informally*.

Observe Others

One tactic students will use in their workgroup interactions is to observe what is happening around them to learn what they should be doing or determine acceptable and unacceptable behavior. This is not necessarily a reactive tactic. It is often used to determine what the first proactive actions should be. At TP, Inc., early on the co-op student will walk around with a floor engineer to meet the shop employees and see the problems that occur during the build phases of a project. When Nick Prather at PD, Inc., started his first co-op experience, he followed around an experienced person with more than thirty years of experience. He worked closely with others because he needed to figure out what they wanted him to do. The second semester started not unlike the first for Gloria Kline at IS, Inc., when she spent time just following around her supervisor to watch how different tests were set up. Brad Bonds at AS, Inc., stated that when the student starts at the company, he/she is asked to watch another engineer in the group for awhile.

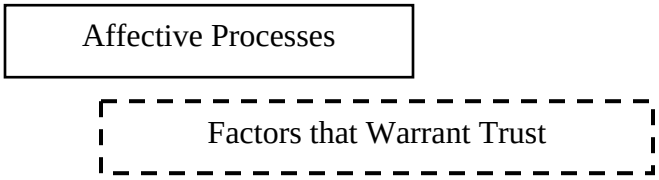
Converse Informally

Informal conversations between the student and the employer representative(s) are another tactic to socialize the student to the engineering-related workgroup. Some employers reported that they had frequent informal conversations with the student throughout the assignment, some related to the work tasks and others more social in nature. When supervising Gloria Kline, Jeff Dillenger at IS, Inc., would ask how things were going on an informal basis to make sure things were progressing well. He sat in close proximity to Gloria so there was regular communication and interaction and less need for formal meetings. There were a few one-to-one formal meetings, but most of it was impromptu and informal. Vince Murphy at TP, Inc., said some weeks he will work right with the student, and others he might

just see them in normal interactions in the department. In addition, Vince talks with the students about the appropriate amount of socializing versus working that is expected. Brad Bonds at AS, Inc., tends to be laissez-faire; if there are no problems, he may not talk to the student for a couple of days.

Cognitive categories and scripts. There were no cognitive categories and scripts identified with this occupational role stage.

Affective processes. A second subcategory identified during the "unsure student hire" stage is affective processes. This subcategory includes both student and workgroup members "sizing up" the other, trying to determine if the other is worthy of his/her trust. This stage also includes the student not being very sure of himself/herself and not knowing what to do because of the newness of the work environment. This also can result in the student feeling as if he/she does not know as much as he/she might have thought based on the academic training completed to this point. This component of affective processes has two components that are termed 1) *factors that warrant trust* and 2) *how to be liked/accepted by others*.



The "factors that warrant trust" component refers to two people cautiously learning about each other through both spoken and unspoken means to determine what information to share and trust the other with. This information is gathered in an individual, informal, taken-

for-granted manner, resulting in a sink-or-swim situation. One tactic was identified to determine factors that warrant trust: *privately question worthiness*.

Privately Question Worthiness

This tactic was identified from both the student and the employer perspective. Primarily, the student is often unsure of his/her ability to break-in to the new occupational role once confronted with the reality of beginning work in a new setting with new expectations. This concept relates to the student wondering whether he/she will be accepted in the new environment due to the uncertainty of the occupational role and how the student will relate to or fit with members of the workgroup. The employer also is aware that the student is an unknown when starting out and therefore sometimes questions the student's ability to succeed in the occupational role. This tactic is typically not vocalized to someone else but rather conducted in an informal and taken-for-granted manner, internally by the actors.

When Liam Morrison started at GBA, Inc., he stated he was "coming in as a greenhorn" and he "didn't know much." Gloria Kline at IS, Inc., wrote in her journal that she "didn't feel like I made a difference since it's such a big company." Keith Kelly at AS, Inc., said it was "quite humbling" to work with such knowledgeable people when he had such little experience. Kyle Williams of AS, Inc., indicated there is initially some reluctance by the student because they do not feel up to the level of performance expected of them. Gary Blanchard at IS, Inc., stated that, "geez, they don't know anything" when asked how students are prepared to begin their first professional work experience. He indicated that students are not prepared at all and that they are still figuring out what they want to do.

How to be Liked/Accepted by Others

The “how to be liked/accepted by others” component refers to processes that students use to determine how to fit in with others in the workgroup and how to become accepted and liked by others. These processes happen in an individual, informal, taken-for-granted manner, resulting in a sink-or-swim situation. Two tactics were identified to determine how to be liked/accepted by others: 1) *meet people* and 2) *connect with peers*.

Meet People

One tactic students use to learn about engineering-related occupational roles is reaching out to people within the workgroup and employer organization to get to know people better and figure out what to do to be accepted. As with most of the student-driven tactics, students take either a proactive or reactive approach to meeting people at their new workplace. This tactic is enacted randomly on a variable timetable in a sink-or-swim manner. Barry Evans at DM, Inc., took a reactive approach. He felt that those he worked with did not want to spend much time with him. Barry was not proactive and waited for others to introduce themselves to him, which resulted in not talking to many people the first couple of weeks. However, by the third week of the first co-op semester, he started to feel more important and people were starting to interact with him more. Wesley Juniper at MH, Inc., wondered if people were going to help him out or not at first, as many of the departmental staff were very busy and often needed to be out on the manufacturing floor.

Gloria Kline at IS, Inc., said that by the third week of the second co-op semester she was getting to know many of the people well in her area. When he started, Liam Morrison at GBA, Inc., did not know anyone in the organization, and he was the youngest person in his

department. This was not that uncomfortable for Liam because he grew up with two siblings who were quite a bit older than he, so he was comfortable communicating with his coworkers. Bill Rosey at ARJ, Inc., said he was proactive and tried to make relationships at ARJ, Inc., early in his first semester. Brent Jolley at CRCP, Inc., also stated that he took initiative to ask a lot of questions of people on the project teams he was assigned to. He said the organization was small enough that he got to know everybody pretty quickly.

Homer Mills at VK, Inc., said the student is on his/her own to develop relationships, which, according to Mike, is the most important thing. They need to demonstrate initiative. Likewise, Brad Bonds of AS, Inc., stated the student is expected to interact with any appropriate person in the organization as is needed to complete his/her work effectively. Meeting the other engineers in the company is not a problem for a student at TP, Inc. The student is typically expected to meet people in all departments. The co-op student gets to know others in the mechanical department easily as they have to work with everybody on projects.

Connect with Peers

A related tactic to meeting people that was mentioned by some students and employers was connecting with peers in a positive manner. Typically this was mentioned as interactions between co-op students, but it also could include a student showing respect for his/her mentor and other coworkers in order to make the workgroup interactions positive and help with acceptance within the workgroup. For instance, Gloria Kline at IS, Inc., said she respected and looked up to her supervisor and did not feel intimidated because of it. This is consistent with Garavan and Murphy's (2001) work that found relationships with and support from supervisors and peers influences student perceptions.

A GSU engineering student was working part-time in the department in between his normal co-op semesters, and he helped Wesley Juniper out a lot when he started at MH, Inc. Starting out at ARJ, Inc., Bob Karlson said the co-op students are rather reserved, but by mid-semester the students have warmed up to their surroundings. They develop friendships with a lot of the younger engineers who are more their peers. They also interact more with some of the older engineers who Bob believes influences them a great deal. According to Brad Bonds at AS, Inc., some students are more social than others. Keith Kelly was fairly social. He ate lunch at the group's table early on, and later developed another group of friends in the organization (mainly other interns and co-op students).

Aware Student Employee: The second stage that can occur is one where the student begins to acclimate to the work environment and becomes aware of what little one knows about the application of engineering theoretical knowledge to practical problems. The employer workgroup will begin by testing and evaluating the student's readiness and worthiness of inclusion in group work or activities. The employer may feel that the student is not prepared to begin the engineering-related work that will eventually be expected of him or her.

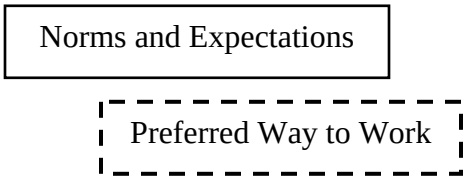
Aware Student Employee

The second stage involves learning *norms and expectations, cognitive categories and scripts,* and *affective processes*. Some of the information taught during this stage is done so in a formal, conscious manner while other information is taught (learned) informally, in a taken-for-granted manner. All information is acquired in individual settings. Norms and expectations and affective processes use employer-driven tactics to accomplish the learning

objectives, while some cognitive categories and scripts are taught through employer-driven tactics and others through student-driven actions.

Rules and regulations. There were no rules and regulations identified with the "aware student employee" stage.

Norms and expectations. The norms and expectations for the "aware student employee" stage were grouped into one component: *preferred way to work*.



The "preferred way to work" information is similar to the like-titled information in the entry to organization discussion. The workgroup members attempt to communicate to the student how work should be performed in order to be accepted within this role. The workgroup provides a member (or members) as a model of what is acceptable, and expectations are communicated. The information is individually enacted, sometimes formally and other times informally, in both conscious and taken-for-granted manners. Most of the tactics use a mentoring approach to teach the norms and expectations. Three tactics were identified in this study for teaching students norms and expectations for an "aware student employee" role: 1) *assign a mentor*, 2) *review expectations*, and 3) *work on the floor with others*.

Assign a Mentor

As noted in the entry to the organization section, assigning a mentor to the student is a key tactic for communicating norms, information, and emotions to the student. This is true for entry to occupational role as well. In this case, assigning a mentor is important for communicating norms and expectations. As described in the entry to the organization section, the mentor is someone purposefully selected by the organization to effectively teach the student both what is important to the organization as well as how to get things done in the proper way. The mentor is seen by the organization as a knowledgeable and key carrier of organization values and norms and is therefore formally and consciously assigned the task of teaching the new student member.

Carol Schmidt of AS, Inc., stated that it is up to the department manager to give the student guidance and to assign a mentor. Within the department, Sally Nelson of AS, Inc., tries to focus on getting the student up to speed on projects. She does this by assigning the student a mentor right away. Grant Reynolds at GBA, Inc., said having a good mentor is the key to student success in the program. Walter Tollen at AS, Inc., stated that “after the initial training, all other training is done via mentoring.” When a new co-op student starts at ARJ, Inc., he/she is assigned to work with a current co-op student, in a mentoring role, who will be transitioning back to school. In this way, ARJ can cross-train the co-op students and pass off a project so there is little interruption in the progress of the project.

Review Expectations

Within the first few days of the first co-op assignment, an employer workgroup member – either a supervisor or mentor – shares the expectations the employer has for the student. This is an individual means of formally and consciously communicating the

company's expectations of the student, while unconsciously (or taken-for-granted), values of the company are communicated to the student. Within the communicated expectations are inferred values that the organization desires or prefers. Gary Blanchard and the engineering team leader at DM, Inc., meet with the student to go over expectations for the semester. He makes it clear that the student is there to learn and to get things done. At the end of a semester, the student prepares and gives a presentation to demonstrate what they learned and accomplished. When a co-op student begins, Grant Reynolds of GBA, Inc., said the formal mentor who is assigned to the student develops a plan with objectives and desired outcomes.

Work on Floor with Others

Although it was only mentioned by one student and one employer as a tactic for initial work assignments, working on the manufacturing floor (for organizations that are manufacturing-based) is sometimes used by employers to acclimate the student to the products that the organization makes. Personal experience verifies that this tactic is used by several employers within the first co-op assignment. When Barry Evans returned for his second co-op semester, the first week he "did some hands-on work." According to Homer Mills, the students at VK, Inc., are assigned to work in the manufacturing areas of the plant in the first couple of weeks to become familiar with products and processes.

Cognitive categories and scripts. The cognitive categories and scripts for the "aware student employee" stage was grouped into two components: 1) *basic information to perform work* and 2) *relevance of academic training*.

Cognitive Categories and Scripts

Basic Information to Perform Work

The “basic information to perform work” consists of the first workplace languages and scripts the student must learn in order to perform the work expected of him/her. The student is given reading materials or computer tutorials in order to learn this information. The information is communicated in an individual, formal, and conscious manner. Two tactics were identified in this study for teaching students cognitive categories and scripts for an “aware student employee” role: 1) *read materials* and 2) *learn software*. The initial assignments are artifacts, or outward visible manifestations, of the conventions and standards that the organization uses, communicated to the new student in the co-op role.

Read Materials

One common tactic used by employers for initial work assignments is to give the student materials to read to learn about specific projects, to understand documentation of projects, and to learn how to navigate software programs. At AS, Inc., Greg Randall was “stuck in a cube” for the first week and read a lot of documentation and manuals. Barry Evans read books the first few days. Keith Kelly was given a book to read for the first week on a common programming language used for the projects he would work on. Paul Arnold spent time sitting and reading manuals during his first co-op semester at MC, Inc. Similarly, when he began his third co-op semester at AS, Inc., a new company for Paul, there were a lot of manuals to read initially, and the information was much more complicated.

Bill Rosey at ARJ, Inc., was handed a stack of papers his first day and was told to come back with questions once he read through them. At GBA, Inc., the first week or two on

the job is spent going through tutorials and reading. Vince Murphy said the first few days of the co-op semester are “total training.” The student learns the two-dimensional CAD system used by TP, Inc. This is done primarily by giving the student a training book and using tutorials. Carol Schmidt said “the first couple of days are usually pretty boring and involve a lot of reading.”

Learn Software

The second common tactic used by employers is to have the student learn software used by the employer organization and important for successful completion of subsequent student work projects. Barry Evans learned how to operate software the first few days of his first co-op assignment. Again, after beginning his second co-op semester, Barry spent the first week learning to use some software. During the first week, VK, Inc., let Keri Kraft “play around” with engineering drafting software in order to learn it. Early on, Liam Morrison was asked to learn a new piece of software to use in programming and testing electronic components. He started by going through a two-week tutorial on his own.

At GBA, Inc., many times the student goes through software tutorials with their mentor. Sometimes there is a two- or three-day off-site training for the students on special software or tools they will be expected to use. According to Jeff Dillenger, Gloria Kline was asked to learn some engineering software. Similarly, at ARJ, Inc., Bob Karlson said the student is assigned to go through some CAD tutorials on the company network as part of the training program when they begin their co-op assignment.

Homer Mills at VK, Inc., said students have computer aided drafting software training. As Homer put it, “here is something to keep you busy.” In the beginning the student gets a “big dose of solid modeling” on the computer. The student works through tutorial

programs and demonstrates knowledge and ability using examples. Vince Murphy said that during the first few days of the co-op semester, the student learns the two-dimensional CAD system used by TP, Inc. This is done primarily by giving the student a training book and using tutorials. The student also has one day of training by the personnel department.

Relevance of Academic Training

The second cognitive categories and scripts-type communicated during the "aware student employee" stage relates to the student's attempt to connect or compare his/her academic training background with what is expected of the student in terms of work in the co-op organization. Some students question whether their academic training has been worthwhile or relevant since it is not the same as what is experienced in the workplace. This process happens in an individual, informal, and conscious manner, potentially causing the student to feel disillusioned. One student-driven tactic was identified to process this cognitive categories and scripts: *compare school to work.*

Compare School to Work

The "compare school to work" tactic is student-driven and occurs privately, but consciously, as the student attempts to reconcile the scripts he/she has learned in school for solving problems with what is expected in the workplace. Many times, prior to entering the work environment, the student has developed a mental map of what engineering-related work assignments will be like, but finds differences from that mental map upon entering the workplace. Also, the cognitive capital the student had built in the education environment no longer has the same value in the workplace, and the student is forced to start anew, building new cognitive categories and scripts to be successful in this new role.

In his semester evaluation, Greg Randall at AS, Inc., indicated that he "did not get into a lot of technical aspects" when responding to whether his academic program had prepared him for the technical aspects of the co-op semester. In his journal summary and end-of-semester evaluation, Keith Kelly at AS, Inc., indicated that the first co-op term was "challenging to say the least" in part because of the limited software background he had academically at this point. His software experience was limited to three courses taken to that point in his academic program. Gary Blanchard at IS, Inc., said the materials that students are learning in school (theoretical concepts) are not used at all in the work assignments.

Some students indicated that what they encountered in the workplace could not be taught in a classroom setting – one has to experience it to learn it. This is consistent with the student having to learn new information from the individuals in the organization's engineering workgroup. Gloria Kline at IS, Inc., stated that "you can't really teach how to function at work – it's helpful just to be there and learn as you go."

Affective processes. The activities identified as part of the "aware student employee" stage include affective processes – they attempt to communicate to the newcomer that the newcomer is in a different environment than an academic one, and now the newcomer has to learn what needs to be done and prove himself/herself before getting further into the engineering work at the organization. The student feels shunned and either decides to learn what it takes to connect to workgroup members or not, thereby signaling to the workgroup members an interest (or lack thereof) in joining the group. The information is typically informally and unconsciously communicated, in a taken-for-granted manner. The affective processes identified are termed 1) *need for acceptance* and 2) *difference of academic/work environments*.

Need for Acceptance

The “need for acceptance” consists of information about the workgroup members’ values and behaviors compared to those of the student, and whether those values and behaviors are consistent or different. If consistent or different, the student affectively determines if he/she desires acceptance from the workgroup members, thereby conforming to the workgroup members’ values and behaviors. Two employer-driven tactics were identified for communicating affective processes: 1) *haze the student* and 2) *isolate the student*. Both of these tactics intend to force the student to conform his/her behavior to the group’s behavior and consciously, or in a taken-for-granted manner, reach out to the workgroup members for acceptance. These tactics are used to test the student’s mental fortitude and willingness to conform, and result in a sink-or-swim situation.

Haze the Student

The first tactic observed was called hazing. Hazing refers to the challenging behavior or actions of the employer representatives toward the newcomer student, including teasing, joking with, and making fun of the student. This tactic is similar to, but usually not as intentional as, what a pledge might experience when trying to join a fraternity/sorority on a college campus. The intent is to determine how serious the student is about joining and becoming a member of the engineering group.

When Greg Randall at AS, Inc., first began his co-op, he felt intimidated, and some people in the department knew that and would use that against him. They would “just try to have fun” with him if he did something wrong. They would point out what he was doing

wrong and try to "jerk you a little bit." According to Greg, it was "just the way for them to have fun until you got used to it." People would ask him questions to make him feel "stupid." When Greg experienced this initially, he thought "this is a total crappy feeling, and I'm really stupid." He then stated that "once you get used to the people and start knowing them on a personal basis better, you know they're just doing it for that comic relief, not just to put somebody down. It's kind of a game we play…just taking your turn in the barrel. It is a little bit of comic relief. Once you realize that…you head back into the game and get back at them as well. I haven't seen it affect anybody negatively." Greg also said, "I guess we all know we make mistakes and stuff like that…[it is] fun to point out other people's mistakes. We do it internally to the department…we don't do it to people from outside of the department."

Hank Molner also said there was one manager in his organization who picked on the co-op students. Bill Rosey said at ARJ, Inc., some of his coworkers see the new guy come in, and they "laugh at what they don't know." Bob Karlson, a manager at ARJ, said "at first there is a lot of ribbing the student takes from their coworkers." Brent Jolley noted that there was some "kidding around" with him as the new co-op when he started at CRCP, Inc. Doug Koontz stated he was "given a hard time" by his coworkers in the beginning of his first co-op semester, and after going back to IS, Inc., for his second semester but in a new work area, he again was "razzed up to see what he could handle. They were feeling me out."

Isolate the Student

Another tactic identified that would be categorized as challenging, regulative activity was isolating the student from members of the group or activities of the group. Barry Evans felt that those he worked with did not want to spend much time with him. In fact, he ate lunch by himself, and "felt he was being left out on a lot of things." He struggled to find

things to do. He kept himself busy and wondered what others thought of him and his abilities. Paul Arnold's interaction with other people in the organization was minimal. He felt "isolated," and many people were "sort of on their own." He did not talk to many people and "nobody reached out" to him to make him feel part of the organization. Eric Jillet noted that it was hard asking questions of busy people when he was trying to figure out what to do early in his first co-op semester.

Difference of Academic/Work Environments

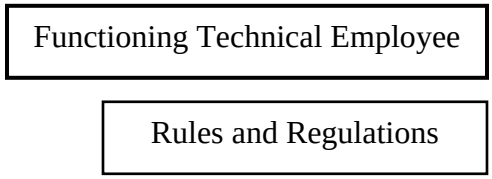
This process is associated with, and results from, the cognitive activity of trying to reconcile the differences between what has been learned in the classroom and academic environment and what is encountered and expected in the work environment. One student-focused tactic was identified, termed *feel confusion/resentment*.

Feel Confusion/Resentment

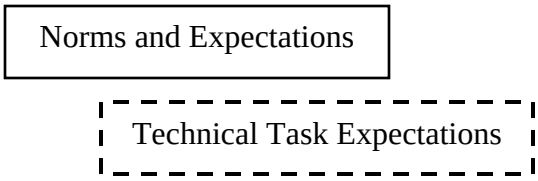
The student perceives a disconnect between the academic training received and the work being assigned. The student may even experience feelings of resentment toward the academic program for not properly preparing him/her for the engineering work environment. At this point, the student begins to change his/her social identity. When entering the co-op position, the student identifies with the academic social group (faculty and students). As the student moves into the engineering work environment, the social identity begins to shift. During this stage, there is evidence that the student is starting to change the ingroup from the academic members to the workgroup members. Comparisons begin to be made in terms of the workgroup being favored – where the student feels accepted and seeks positive feedback – and the academic group is seen as the outgroup.

Functioning Technical Employee: In the next stage, often occurring after the student becomes aware of the differences between the academic training received and the engineering work environment, the student moves into a work-mode where technical work is accomplished. The student is trained on engineering-related computer software and applications, along with other technical skills. The student is asked to make contributions to the employer's workload needs, often in the form of manual labor, CAD drafting, or paperwork and documentation. The student is often carried on overhead budgets as they are not contributing at a level worthy of billing to a client as an engineer. The student sometimes views the work he/she is performing as busy work. The employer conveys work expectations to the student and provides technical assignments to test the student and determine his/her capabilities. The third stage consists of learning *norms and expectations,* and the tactics used are typically employer-driven.

Rules and regulations. There were no rules and regulations identified for the "functioning technical employee" stage.



Norms and expectations. The norms and expectations for the "functioning technical employee" stage were grouped into one component: *technical task expectations*.

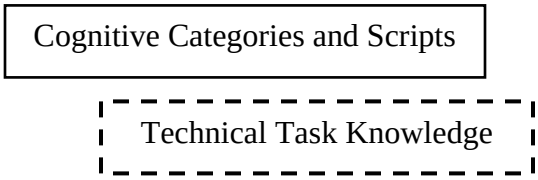


Technical task expectations refer to how the student is expected to perform technical assignments within the occupational role. Most of the "functioning technical employee" stage is spent learning the occupational role of a technical employee within the organization. The student is taught how to effectively function in a technical environment, within a technical-type workgroup. At this stage, the student has not been taught how to be an engineer. These tactics are individually and consciously enacted, with either a formal or informal delivery, and a mentoring approach. One tactic was identified in this study to teach norms and expectations associated with the functioning technical employee role: *provide initial assignments*.

Provide Initial Assignments

An initial step in teaching the student about technical occupational roles is for the employer to provide initial work assignments. For many students, the workload was very limited in the beginning and the days were slow as they learned the expectations of the position and as the employer learned what the students could do. For Barry Evans, the work was slow at first. When he started his first co-op, there were no projects for Keith Kelly initially. At MC, Inc., Paul Arnold indicated that he did not do much initially, as the person who was supposed to train Paul was gone on vacation. He did a lot of odd jobs for various people – it was very slow. Similarly, when Paul began his third co-op semester at AS, Inc., a new company for Paul, he said "it was a slow first week." For his first co-op semester at IT, Inc., Hank Molner stated he did not have a whole lot to do right away. He sat in his office some and followed his supervisor around. Brad Bonds of AS, Inc., stated that it is ideal to have an assignment to give to the student when he/she starts, but that is not always the case.

Cognitive categories and scripts. The cognitive categories and scripts for the "functioning technical employee" stage were grouped into one component: *technical task knowledge*.



Technical task knowledge refers to initial technical information the student is taught in order to perform basic assignments within the workgroup. These tactics are individually and consciously enacted with either a formal or informal delivery and a mentoring approach. Two tactics were identified in this study to teach norms and expectations associated with the functioning technical employee role: 1) *teach initial tasks* and 2) *assign simple projects*.

Technical tasks are given to the student to teach him/her important information for performing basic assignments within the workgroup. The initial tasks also help the workgroup members understand the student's abilities. After establishing what the student knows, the workgroup members can determine what to teach the student to further engage him/her in work projects. For Greg Randall at AS, Inc., his first co-op assignment involved a lot of documentation and paperwork. The engineering etiquette that Keith Kelly gained from his part-time engineering position prior to his first co-op at AS, Inc., was helpful in making the transition. The first semester of Mike Vilma's co-op at ARJ, Inc., started rather slowly with limited engineering-related work. He worked in the documentation department, scanning drawings for a week. Since he was their first co-op student, they "were not sure if

[he] was capable" of doing engineering work. Therefore Mike continued to clean out offices and organize catalogs.

Jeff Dillenger of AS, Inc., said there is formal communication beforehand with the student about the set of expectations for the semester. Within the first few weeks, Sally Nelson of IS, Inc., said the co-op student is carried on an overhead budget while he/she is being trained for technical needs early in the process. Many times this is accomplished through computer tutorials. Kyle Williams at AS, Inc., said the group tends to "pass the student around like a rag doll" and everyone has the student involved with their projects.

Assign Simple Projects

A second tactic identified as part of the initial work assignments is termed "assign simple projects" and refers to a variety of small work assignments given to students to either bide time until larger projects were available or to test the student's ability and initiative. These assignments help develop a routine of work for the student that acclimates them to the new occupational role. After awhile Barry Evans was given some simple tasks that he referred to as "really simple tests…more like busy work." At MC, Inc., Paul Arnold did a lot of odd jobs for various people when he started. Similarly, when he began his third co-op semester at a new company, during the first day, he was given a small project to "test him out." He was given random things to do to learn the place and to meet people. At first, Wesley Juniper was asked to update prints in the CAD system that MH, Inc., used. To him it was busy work. Hank Molner was asked to do some CAD work when he began at IT, Inc.

According to Kyle Williams at AS, Inc., Greg Randall was given some lab assignments that started fairly simply (collecting data). Jeff Dillenger at IS, Inc., said there is "filler" work given so the students have things to do between assignments to keep them from

getting bored. Homer Mills at VK, Inc., stated that in the beginning the student gets a “big dose of solid modeling” on the computer. The student works through tutorial programs and demonstrates knowledge and ability using examples. After he/she has demonstrated an understanding of how the software works, the student is given bits and pieces of projects. They help with data acquisition and analysis, but they also do a lot of “grunt work.” Homer said during the first couple of weeks, “we start out easy” and “give easy assignments to test their ability.” Once it is determined he/she can function, Vince Murphy of TP, Inc., lets the student try a small example project. The student spends a week or two practicing CAD design work. Then Vince will “throw some drawing changes at them” until he/she proves his/her abilities.

About ninety percent of the work Victor Abner did at TP, Inc., was working at the computer on CAD drawings. Wesley Juniper’s previous experience with machines and floor layouts from his earlier internship helped him adjust quickly at MH, Inc. Brent Jolley stated that CRCP, Inc., had no program set up for him when he arrived, so he stood around a lot with not much to do, or was given “dumb assignments.”

Affective processes. There were no affective processes identified for the ‘functioning technical employee’ stage.

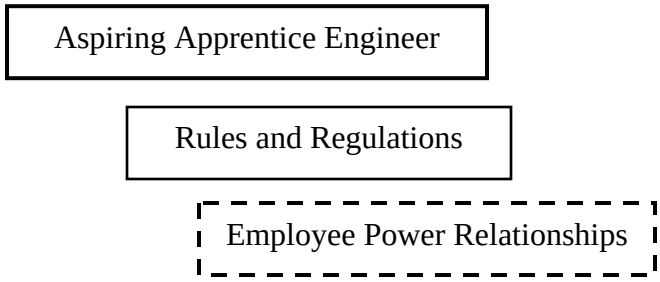
Affective Processes

Aspiring Apprentice Engineer: The fourth stage is one where the student seeks to move beyond the technical role and into an engineering-related role. The proactive student will attempt to prove his/her ability and ask for opportunities to work on engineering-related

tasks or projects. During this step, the employer often lets the student prove his/her interest and ability and therefore provides little training or guidance.

The fourth stage consists of teaching *rules and regulations* and *norms and expectations* and learning *cognitive categories and scripts* and *affective processes*. The rules and regulations are typically taught through employer-driven tactics, while the normative, cognitive, and affective elements are acquired through students' actions.

Rules and regulations. The process of moving from a technical employee to an apprentice engineer role involves some regulative activities enacted by the workgroup to communicate to the student that the apprentice engineer role is again a different level of being inside the engineering-related roles within the organization. The student has to learn what needs to be done and prove himself/herself again before moving further into the engineering work at the organization. One type of information related to rules and regulations was identified, termed here as *employee power relationships*.



The type of information communicated to the student by the workgroup members was the knowledge of power relationships within the workgroup and the organization as a whole. The student needs to understand that there are hierarchies within the workgroup, and therefore the student needs to understand his/her "place" within the employee power relationships. This information is communicated in an individual, formal or informal, and

conscious or taken-for-granted manner. One tactic was identified to communicate employee power relationships: *meet formally*.

Meet Formally

One regulative tactic is to have regular or scheduled meetings with the student to discuss projects, workload, or just how things are progressing. This is a routine that is set up to teach students the hierarchical, power structure of the organization and the workgroup. The message that is communicated is that the student needs to check in with a more experienced person to approve actions and completed work assignments. Meeting formally happens because of a conscious decision by workgroup leaders. There were a few occasional one-on-one formal meetings between Gloria Kline and Jeff Dillenger at IS, Inc., but most of it was impromptu and informal. At AS, Inc., Walter Tollen spends a couple of hours with the student on the first day going over general administrative information, and then he meets with him/her about once per week to see how he/she is doing. The student attends weekly meetings at TP, Inc., and is typically expected to meet people in all departments except the sales department.

Norms and expectations. As part of the "aspiring apprentice engineer" stage, norms and expectations were communicated to the student by the workgroup members. One type of norm was identified as part of this stage, termed *initiative and proactivity*.

Norms and Expectations

Initiative and Proactivity

The "aspiring apprentice engineer" role takes place during a time when activities are employed by the workgroup to test the worthiness of the student to make the next step toward

inclusion in the engineering profession. Becoming an apprentice engineer moves the student beyond performing simply technical assignments to seeking more analytical and problem-solving freedom in the work performed. The workgroup regulates who is allowed to perform that type of work by testing the newcomer to see if the student has the initiative and drive to do what it takes to learn and seek out appropriate information. This is consistent with Morrison's (1993a, 1993b) and Ostroff and Kozlowski's (1992) findings that proactive information-seeking was positively related to newcomer's task mastery, role clarity, social integration, satisfaction, performance, commitment, and intentions to remain. Reichers (1987) and Miller and Jablin (1991) also found the newcomer's proactive role to be a positive factor in successful socialization. Finally, Parsons et al. (2005) found that proactive behaviors contribute to person-environment fit.

Many times these actions are communicated in an individual, informal, taken-for-granted manner, but they can be formal and consciously enacted as well. One employer-driven tactic and one student-directed tactic were identified for teaching students about initiative and proactivity during the "aspiring apprentice engineer" stage: 1) *expect without guidance* and 2) *find things to do*. These tactics have sink-or-swim properties.

Expect without Guidance

A tactic that was referenced by one student and two employers was the idea of expecting students to know or do things in the workplace while the employer representatives provide little or no guidance. This would be considered a challenging tactic to see what the student could and could not do, in order to determine their worthiness to become a member of the group in an engineering-related occupational role. This is an informal tactic that is often taken-for-granted, but can also be enacted consciously.

Wesley Juniper believed that the engineering group thought he was more ready than he was, so he was often just put in situations without much direction. Fred Kroll at VPA, Inc., said he started out in a "go-fer" role, and as he learned he gained more responsibility. Bill Rosey at ARJ, Inc., said he was asked to learn in a trial-by-fire manner, including limited training initially.

Homer Mills at VK, Inc., said that after some initial introductions, "the student is on their own to develop relationships," which, according to Mike, "is the most important thing." Informally, the student is introduced to people within the department and other key areas of the company, according to Brad Bonds at AS, Inc. The student is expected to interact with any appropriate person in the organization as is needed to complete his/her work effectively.

Find Things to Do

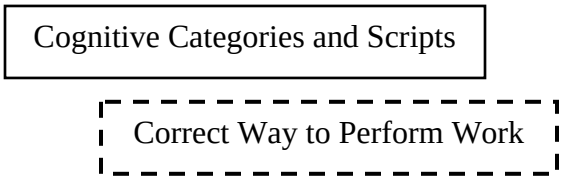
In some employer organizations, the student is provided little or no work to do initially. This is sometimes intentional and other times unintentional. The employer will not know what the student is capable of doing at first and therefore may not provide a sufficient number of tasks to keep the student busy. The proactive student will then search out things to do to keep busy and, in effect, prove themselves to those in the workgroup. The reactive student will sit and wait for work assignments to be given to him/her, even if he/she is bored. This tactic can be used by employers to test a student's initiative. Barry Evans at DM, Inc., struggled to find things to do. Brad Bonds at AS, Inc., said students are given technical training as needed, but if they show a good aptitude, he lets the student "go learn it."

Brent Jolley at CRCP, Inc., indicated he had to look for work to do when he started. It was up to Greg Randall at AS, Inc., to utilize the resources around him and to figure out what needed to be done. There was "not a lot of clear direction…you had to go out and find out."

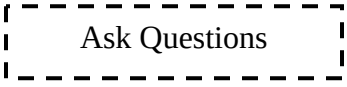
There were a couple of other co-ops that started when he did, and they did not aggressively seek out answers and projects, instead deciding to sit in their cubicle a lot. “They’re not here anymore either,” according to Greg.

It was awhile before Wesley Juniper at MH, Inc., could go out on the floor to get some hands-on experience. On a Saturday, something broke down and he was forced to go out and help try to fix the problem. After that he was more involved with manufacturing floor engineering support. He was involved with some troubleshooting, machine programming, and machine repair, including wiring of controls for a welding machine. It was good experience, but it did not involve any design work, which disappointed Wesley because he was looking forward to getting involved with some design work in his co-op assignment.

Cognitive categories and scripts. The fourth stage also includes learning cognitive categories and scripts as the student attempts to move into more of an engineering-related occupational role. The cognitive category is called *correct way to perform work.*



One student-driven tactic was identified for acquiring cognitive categories and scripts related to the correct way to perform work during this stage: *ask questions*. This tactic occurs individually, consciously, and in an informal manner.

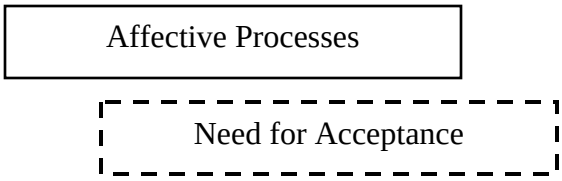


Asking questions is one of the steps identified by a couple of the students as a means to learn what they need to do and how to do their work. Students sometimes asked questions before they began in order to understand how to do things before they started their work. In

addition, students often asked questions after beginning their work assignments to clarify information they were unsure of and to develop professional judgment skills.

When Greg Randall started he asked a lot of questions in order to figure out what was expected and what he should be doing, because he “didn’t know what to do.” After he read some documentation or manuals, he would go to people and ask a lot of questions because he didn’t know if his ideas were good or bad and he wanted to “get a feel for it” from his coworkers. VK, Inc., let Keri Kraft “play around” with engineering drafting software in order to learn it. She asked a lot of questions when she was trying to learn the software. Bill Rosey at ARJ, Inc., was handed a stack of papers his first day and was told to come back with questions once he read through them. According to Brad Bonds, Keith Kelly was good at asking questions, which was not the case with some co-op students. Victor Abner wrote, about mid-semester of his third co-op semester at BR, Inc., that “I contribute to the team by asking the dumb questions and getting everybody to rethink issues that were thought to have been resolved.”

Affective processes. The fourth stage includes learning affective processes as the student attempts to become accepted in a deeper way by the workgroup members. The affective processes are called *need for acceptance*. This is the same type of information communicated in the “aware student employee” stage, and is a manifestation of the student need to feel accepted by other workgroup members.



Two student-driven tactics were identified for acquiring the information needed to feel accepted by the workgroup during this stage (and subsequent stages): 1) *eat together* and 2) *wonder what others think.* While joining others in the workgroup for lunch is a tactic that is often driven from the student's perspective, the student is also invited to join others for lunch as well. It is always the student's directive to choose to join the others even if invited. Students wonder what others think of them as a private, internal process. These tactics occur individually or in a group, consciously, and in an informal manner.

Eat Together

As with the orientation process and learning company culture during the entry stage for the organization, the social interaction associated with eating together, typically at lunch, is an important tactic in continuing to move the student from outside to inside the workgroup. The student learns how to act with others in the workgroup, but also attempts to gain acceptance from the workgroup members. The hope is the workgroup members will like the student more if the student spends more social time outside of work projects.

Paul Arnold said his supervisor during his second co-op semester, a GSU engineering alum, took him to lunch and helped Paul blend in from the start. According to Kyle Williams, "social interactions are important." The relationships that develop typically happen by eating lunch together and joking around with each other. At TP, Inc., the department goes out to lunch together once per week. Liam Morrison said he did eat lunch with other coworkers, which helped him be connected to others in the department.

Wonder What Others Think

As students are given initial technical tasks and assignments, there is an internal process that several students mentioned of wondering what others think of them and their

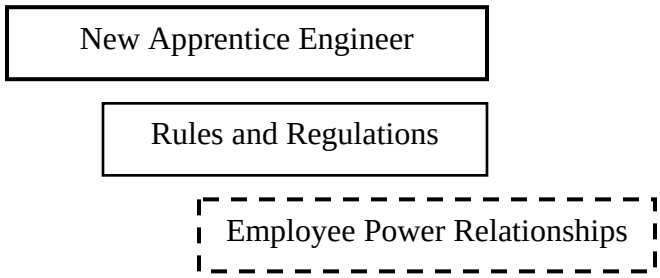
abilities. This is a situation where the student wants to gain acceptance from the workgroup members but does not know how the workgroup members feel about him/her, which may cause anxiety.

Wesley Juniper at MH, Inc., wondered if people were going to help him out at first, as many of the departmental staff were very busy and often needed to be out on the manufacturing floor. He was anxious to get the experience he needed so that he could be out there (on the floor) as well. Wesley was surprised at how much the maintenance staff knew and the fact that they do "all the work." Wesley believed that the engineering group thought he was more ready than he was to perform technical tasks and assignments. By the third week of the first co-op semester, Barry Evans started to feel more important, and people were starting to interact with him more. He kept himself busy and wondered what others thought of him and his abilities.

New Apprentice Engineer: The fifth stage is termed the "new apprentice engineer" stage, and is the point where the student is accepted by an engineer, or the engineering group, to begin training as an engineer. Slowly, Mike Vilma at ARJ, Inc., began to show what he was capable of, and one day a woman pulled him aside and told him he would "do good here – people have been impressed with you." This stage is marked by the student receiving mentoring from an experienced engineer and working on engineering-related projects with engineers. The student's ideas are valued by the engineers in the organization, and the student is often encouraged to ask questions about the way things have been done by the employer organization. At this point, the employer can begin to bill time of the student towards projects because the student is positively contributing to the project's goals. The fifth

stage consists of the employer teaching the student more *rules and regulations* and *norms and expectations*.

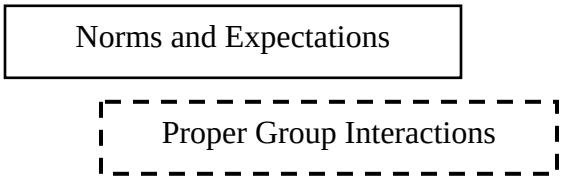
Rules and regulations. Similar to the rules and regulations communicated in the "aspiring apprentice engineer" stage, with the "new apprentice engineer" stage the student continues learning about the power relationships within the workgroup and the organization. This is accomplished by creating a reporting structure of the student to his/her mentor. The information for this is again termed *employee power relationships*.



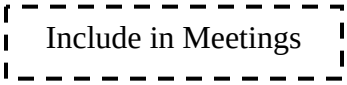
The student learns the proper channels to communicate information in order not to disrupt hierarchical structures within the workgroup. This information is communicated in an individual, formal or informal, and conscious or taken-for-granted manner. One tactic was identified to communicate employee power relationships: *meet formally*.

Meeting formally is a tactic that the employer will use to control the student's activity once the student has been accepted into an apprentice engineer role. Grant Reynolds at GBA, Inc., said the student is expected to report in to his/her mentor frequently, and once per month the group leader meets with both the student and mentor to see how things are progressing.

Norms and expectations. Most of the activities in the "new apprentice engineer" stage are considered normative processes employed by the workgroup to teach the newcomer how to be an engineer. Two groups of norms and expectations were identified for this stage: 1) *proper group interactions* and 2) *ways to perform engineering work.*



Proper group interactions refers to the information a student learns about how to perform effectively in a work-team environment to accomplish goals that are for the good of the entire workgroup (and ultimately the organization). This information is communicated in a formal, conscious, and individual (not all co-op students are included together) manner with a mentoring purpose. One tactic was identified to communicate norms and expectations to a student engaging in group activities as part of the new apprentice engineer stage: *include in meetings*.



One tactic to allow the student to view the inside activities of the workgroup is to include them in staff or project meetings. This allows the student to share in conversations and learn important information about larger group projects and issues. It also provides the student with role modeling for how to act and conduct oneself in a group meeting. This tactic happens because of a conscious decision to include the student and can be considered formal since the student must be invited in order to attend meetings.

Keith Kelly's adjustment to the workplace, and the demeanor of his group, was easy-going. He was brought into meetings from the start to get to know the people on his projects.

Homer Mills at VK, Inc., said the students are like “puppy dogs the first few weeks. You bring them to meetings to meet people and to understand the organization of work in the department.” Sally Nelson at AS, Inc., said the student is included in department meetings, and Brad Bonds also of AS said the student is brought into meetings to see how work is done in the department. This includes both status meetings and design review meetings. The students at TP, Inc., attend weekly meetings as well.

Ways to Perform Engineering Work

The second type of information communicated in the “new apprentice engineer” stage is how to perform engineering work. Prior to this stage, the student has learned preferred ways to perform technical work that may be a part of the work of the engineer, but does not include the full scope of engineering work. This includes information about how to solve problems without being told what to do or how to do it. Information in this component is communicated in an individual, formal or informal, and conscious manner. The tactics used to communicate this information are mentoring and self-enhancing, although not necessarily sequential or on a fixed-timetable. Two tactics were identified: 1) *mentor the student* and 2) *support/assist with work.*

Mentor the Student

As has been mentioned in several tactical discussions previously, several employers assign a designated person to oversee the student’s activities and to teach the student what he/she needs to know to be effective in his/her work. This person designated by the employer is a mentor, and assignment often occurs during the student’s first work semester. This person could be the student’s supervisor or someone else. Some employers are not intentional about assigning a person to mentor the student, but a single mentor relationship, or multiple

mentors, develops regardless within the workgroup if the student successfully moves into an apprentice engineer role. For example, when Nick Prather started his first co-op experience, he followed a person with more than thirty years of experience. He worked closely with others because he needed to figure out what they wanted him to do. At first he did not know enough to get his own work.

Keith Kelly was assigned a mentor who was a young engineer, only three years out of school. It was an easy relationship to begin with. He also worked directly with the technical lead in the department, Brad Bonds. A GSU engineering student was working part-time in the department in-between his normal co-op semesters, and he helped Wesley Juniper out a lot. Glen Elmore, Wesley's supervisor, was also good about sitting down with him to explain things. He was willing to take extra time, whereas other departmental staff helped out where they could but did not spend as much time.

Bob Karlson at ARJ, Inc., said that the co-op students interact more with some of the older engineers once they get comfortable, and he believes they influence the students a great deal. During the first couple of weeks, Bob works with the co-op student quite a bit. At TP, Inc., early on the co-op student will walk around with a floor engineer to meet the shop employees and see the problems that occur during the build phases of a project. Early on, Vince Murphy at TP, Inc., has more direct interaction with the co-op student, and he assigns the student to one of the full-time engineers.

With Walter Tollen at AS, Inc., a new co-op student has an engineer assigned to him/her that he/she will work with on a project. The student is given the necessary background materials, and then expected to start reading and asking questions. After a week or so, the student starts working with the full-time engineer on a project. Most of the training

is done one-on-one with an engineer. The second co-op semester Keri Kraft at VK, Inc., was involved on a modeling project with other engineers. She was helping out on projects managed by other engineers.

Support/Assist with Work

Another tactic identified as part of the workgroup interactions component to teach norms and expectations is a general item called supporting/assisting with work. This tactic refers to actions of the employer representatives that are supportive of the student in his/her ability to manage day-to-day work assignments or workplace expectations. When workgroup members assist the student with work, values and norms are shared that teach the student how to do things the way the organization prefers them to be done.

For example, the people at VK, Inc., were nice to Keri Kraft and were open to answering her questions. She stated that the people at VK, Inc., were very good at training her and showing her step by step how to do things. Several people were willing to help out with Keith Kelly's adjustment to the workplace at AS, Inc., and the demeanor of his group was easy-going. At first he did not understand the hierarchy in his group, which was a result of how open and friendly all of the people were.

Kyle Williams at AS, Inc., said everyone is willing to help out. The student is not treated as a "co-op guy" but is looked at as a peer, and the type of things the student does is limited by the student's ability. After they begin on projects, Sally Nelson, also of AS, Inc., indicated that students bill their time to projects and then do not cost the company money, or at least as much money.

Cognitive categories and scripts. There were no cognitive categories and scripts identified for the “new apprentice engineer” stage.

Cognitive Categories and Scripts

Affective processes. There was one example of affective processes for the “new apprentice engineer” stage. The type of process is similar to that identified in prior stages: *need for acceptance*. The need for acceptance is a student-driven process but is impacted by workgroup member activities.

Affective Processes

Need for Acceptance

There were two tactics identified for this stage for affective processes: 1) *include in meetings* and 2) *mentor the student*. Being included in meetings and mentoring of the student are also part of the norms and expectations subcategory of this stage. These tactics occur in both formal and informal ways, and in a conscious manner with the purpose of creating a mentoring relationship.

Include in Meetings

When students are allowed to participate in meetings, they develop a sense of belonging to the group. It is a signal of acceptance to the student from the workgroup that the student is worthy of hearing and participating in the discussions of the engineering members.

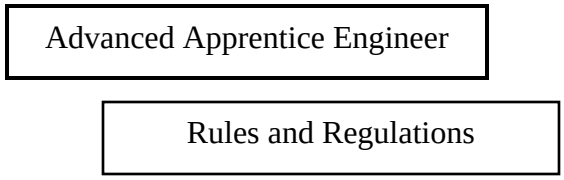
Mentor the Student

As with the “include in meetings” tactic, the mentoring of a student by a senior workgroup member accomplishes more than providing the student with norms and

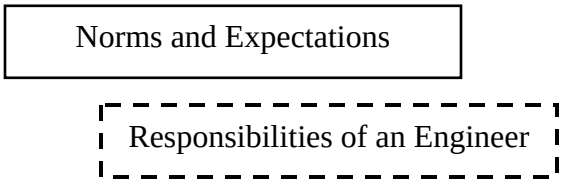
expectations of the workplace. The student looks to the mentor as the key person from whom to gain acceptance in order to feel wanted and have a sense of belonging to the workgroup. The mentor provides clues and feedback that will let the student know that he/she is being accepted.

Advanced Apprentice Engineer: The next stage is a continuation of the fifth stage but includes growth of the student through continued and advanced engineering training from their engineer mentors. The student is still in a training mode but requires less supervision. The student also knows where to go to find answers to questions that occur. The workgroup members (engineers) accept the student as a contributor to projects. Some students may end their co-op assignments at this stage, while others will advance from this point. The sixth stage consists primarily of teaching *norms and expectations* and *affective processes*.

Rules and regulations. There were no rules and regulations identified for the "advanced apprentice engineer" stage.



Norms and expectations. One type of norms and expectations was identified as part of the "advanced apprentice engineer" stage: *responsibilities of an engineer*.



Some of the information taught in the "advanced apprentice engineer" stage is considered to be norms and expectations associated with the responsibilities of an engineer.

The learning occurs through both formal and informal mechanisms and is mostly enacted in a conscious, mentoring manner. One tactic was identified that was used to communicate the responsibilities of being an engineer: *provide more responsibility*.

Provide More Responsibility

A tactic used to teach norms and expectations that has symbolic value is to provide more responsible work to the student as the organizational leader determines that the student is both capable and worthy of being given more work. This happens as the student demonstrates his/her ability and proves trustworthy. Once the student reaches a level of comfort with the work requirements and the workgroup members become more comfortable with the student and his/her abilities, additional activities are used to further teach the student the responsibilities of an engineer. More responsible work assignments are given to the student, and the student's role is further defined.

At VK, Inc., Keri Kraft said by the second week she started doing two-dimensional drawings, helping other engineers on projects. Liam Morrison at GBA, Inc., mastered the computer program he was given and soon created a tester that was viewed as extremely useful for the department's work. After Victor Abner completed each CAD tutorial he was given, he went to different product engineers to get his drawings critiqued. He had to prove himself to the staff. He got more responsibility based on showing what he could do.

According to Kyle Williams, Greg Randall was given some lab assignments that started fairly simply (collecting data) and escalated as he was able to demonstrate his abilities. Kyle wrote in Greg's final co-op semester evaluation that Greg was "able to take on tasks and solve internal issues with little or no prompting. He needed minimal supervision and responded well to the responsibilities of his assignments." Kyle said the student begins to

answer more questions than he/she asks. Greg eventually started to get integrated into tasks and then given bigger projects. Greg wrote in his evaluation, “the more trust you earn, the more responsibility you get.”

Jeff Dillenger at IS, Inc., said work is gradually fed to the student, and he/she gets into projects that help him/her understand the type of work and the expectations. The student grows into larger tasks and projects as he/she shows ability. Homer Mills at VK, Inc., said during the first couple of weeks, “we start out easy” and “give easy assignments to test [the student’s] ability.” The students are given more responsible work as they show they can do it.

At TP, Inc., once it is determined the student can function effectively, Vince Murphy lets the student try a small example project. Then Vince will “throw some drawing changes at them” until they prove their abilities. Eventually small design tasks are given to the student, including learning to develop a bill of materials for a project and what the machine shop capabilities are for actually making what is designed.

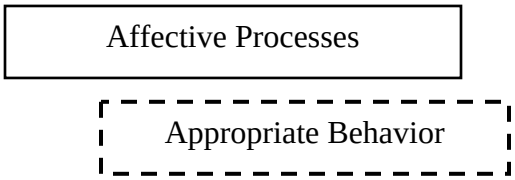
The second co-op semester at CP, Inc., for Paul Arnold was more constructive than the first one at MC, Inc. There was work that needed to be done from the first day. That work was clearly laid out and there was little training involved. There were always at least two coworkers close by, watching and giving directions. It was much more structured than at MC, Inc., which he liked better. He knew the people to go to when he had questions.

Bob Karlson of ARJ, Inc., said that the student is given more freedom as he/she progresses and proves him- or herself. Walter Tollen of AS, Inc., said at first the student does small tasks for the engineer, and then gets increasingly larger tasks as the student proves his/her abilities. According to Larry Mitchell of DM, Inc., the students become more independent as they progress through the co-op sequence to the point that they are “almost

indispensable" during their third co-op semester. Brian Campbell of ARJ, Inc., stated the student will leave the company with a good knowledge of how to do a job, what to expect, and what is required to complete a successful design. They learn how to research the whole process and come up with the best concept. By the third co-op semester, Vince Murphy of TP, Inc., said the student is given tougher tasks, and the student typically can do most things asked of him/her.

Cognitive categories and scripts. There were no cognitive categories and scripts identified for this stage.

Affective processes. The second type of information shared for the "advanced apprentice engineer" stage is affective processes. The affective processes that are communicated are called *appropriate behavior*.



Appropriate behavior refers to the type of behavior that is acceptable to members of the engineering workgroup. This behavior includes characteristics that are more specific than acceptable behavior for acceptance into the organization. Being an engineer within the organization means something different than being an accountant or machinist. The characteristics for appropriate behavior of an engineer are individually and consciously communicated in both formal and informal ways.

One tactic was identified that was used to transfer information from the workgroup members to the student to provide the student with information about his/her progress within the new role: *accept more fully into workgroup*. This is a self-enhancing tactic.

Accept More Fully into Workgroup

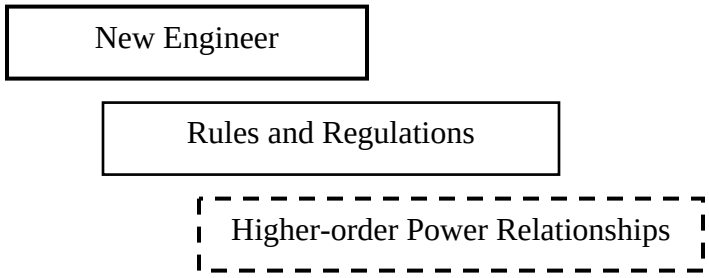
Over time, workgroup supervisors and other workgroup members indicate positive traits displayed by the student, signaling that the student has learned how to behave properly in the workgroup. The student gains a deeper level of acceptance from the workgroup members as the student demonstrates the traits, characteristics and abilities to work as an engineer within the organization.

In Victor Abner's end of semester evaluation for his third co-op semester at BR, Inc., his supervisor wrote that Victor was "very self-directed, picked things up quickly, and was very thorough in his work. He was well accepted by all team members. Victor always conducted himself in a professional manner. He got along with and was liked by all associates in the department. He asked good questions and helped others when possible." Kyle Williams said that Greg Randall's confidence grew in his abilities as he was able to accomplish the work assigned to him on smaller projects. Kyle wrote in Greg's final co-op semester evaluation that Greg thought of himself as more of a contributor and "not a load." Greg wrote in his evaluation that "the more trust you earn, the more responsibility you get." Vince Murphy stated that the student gets more comfortable the longer he/she is at the company.

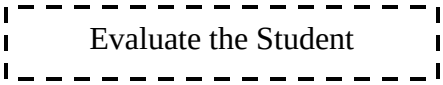
New Engineer: The "new engineer" stage is the point where the student begins to be treated as an engineer within the group. The student is given his/her own projects to lead. The

student may also be asked to give presentations. The freedom the student receives to engage in the work that is required increases, and the student demonstrates a greater maturity level. The employer organization views the student as they would a newly hired, degreed engineer. At this stage, the student has made it inside the same level of occupational roles as other newly degreed, full-time engineers in the workgroup. The seventh stage consists primarily of teaching *rules and regulations* and *norms and expectations*.

Rules and regulations. Some of the activities in the "new engineer" stage are considered regulative and are employed by the workgroup members with the purpose of ensuring only that acceptable newcomers (in this case, students) gain the status of engineer. The information is considered a higher-order level of the *power relationships*.

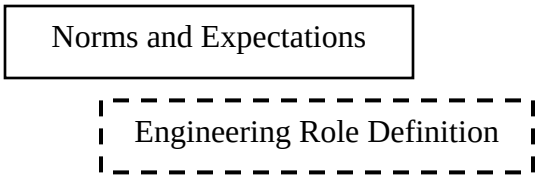


The higher-order power structure is concerned with not only maintaining hierarchies of rule and responsibility within the workgroup, but also establishing the hierarchy. The student learns that people higher up the hierarchy than himself/herself hold power over advancement opportunities, project assignments, and raises. Communication of these power relationships occurs through both formal and informal mechanisms and is mostly done in a conscious manner. One tactic used to transfer information from the workgroup to the student in order to provide the student with information about his/her progress within the workgroup was identified: *evaluate the student*. Depending on how this tactic is conducted, it can have either self-enhancing or deconstructing properties.



As the student becomes accepted at a “new engineer” level, there again are rules and regulations taught by the members of the engineering workgroup in the form of evaluation of the student’s work. This is a formal and conscious activity that designates whether the student is worthy to enter and continue within the workgroup as an engineer. Grant Reynolds of IS, Inc., stated that the student is required to give an evaluated, formal presentation to company personnel and management at the end of each co-op semester. Before this, the student also presents to his/her peers in the co-op program. A full evaluation process takes place at the end of each semester, with the mentor writing the performance review. Before they leave for the semester, the co-op student conducts an exit interview with a member of the human resources staff to determine what did and did not go well.

Norms and expectations. Along with teaching rules and regulations, the workgroup also teaches additional norms and expectations to further communicate with the student inclusion in the “new engineer” role within the organization. This information is called *engineering role definition*.



Once the student reaches the level of an engineering role, information is communicated to further define the student’s role as an engineer. This is done in either an informal or formal and conscious or taken-for-granted manner. Two tactics were identified that transferred information from the workgroup members to the student about the norms and

expectations of the "new engineer" role: 1) *provide more responsibility* and 2) *acknowledge student abilities*.

Provide More Responsibility

If a student makes it to the new engineer stage, the transition is typically indicated by giving the student more responsibility than was expected of him/her as an apprentice engineer. As an apprentice engineer, the student was expected to assist engineers on technical and engineering-related projects. As a "new engineer," the student is usually given his/her own projects to manage and provided much less support from other engineers within the workgroup in carrying out the work of the project. This tactic can be formally enacted, but is often communicated in an informal, yet conscious, manner.

By the third co-op semester, Keri Kraft at VK, Inc., had her own project and needed to contact people in other departments to accomplish goals on the project. It was about halfway through the first semester before Gloria Kline at IS, Inc., got her own project to work on. Paul Arnold wrote in his evaluation after his third co-op semester that he "was challenged by the work" and that he "felt more like an engineer at AS, Inc."

Acknowledge Student Abilities

The second tactic that symbolically communicates to the student their inclusion in the workgroup and the organization as a new engineer is by acknowledging the student's abilities and contributions to the workgroup in an engineering-related capacity. This again can be accomplished in a formal manner (for example, through a written evaluation) or can occur informally in a conscious effort to let the student know they have succeeded and are meeting or exceeding expectations.

After the third co-op semester, Carol Schmidt of AS, Inc., said the student is doing the job of an entry-level engineer. Jeff Dillenger of IS, Inc., found that the co-op program helps a student to learn the role of an engineer and to know his/her situation. Students are leveraged to do real engineering work with a big value in the end if the student is hired, because the new hire is already "an engineer" and can "hit the ground running" with a much smaller learning curve. Glen Elmore of MH, Inc., stated that in the third semester, the hope is that it is "all payoff" for the employer in terms of the student performing all the functions of a full-time engineer, just on a smaller scale.

Cognitive categories and scripts. There were no cognitive categories and scripts identified for the 'new engineer' stage.

Cognitive Categories and Scripts

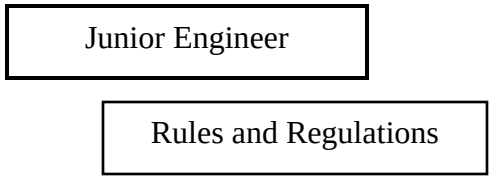
Affective processes. There were no affective processes identified for this stage.

Affective Processes

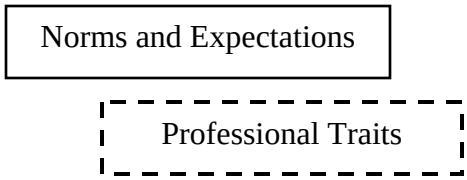
Junior Engineer: The final stage reached during the co-op experience, by some students, is the "junior engineer" stage. This stage is marked by continued growth as a new engineer. The student, already accepted by the engineers within the workgroup, continues to move more inside engineering-related roles through increased acceptance, responsibility, and expectations from the workgroup members. The student is asked to interact directly with customers outside of the employer organization. The student also recognizes, and becomes involved with, political issues in the workplace. Finally, the student begins to develop a

greater level of engineering professionalism. The eighth stage, “junior engineer,” consists primarily of learning more *norms and expectations* and *cognitive categories and scripts*.

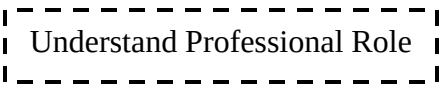
Rules and regulations. There were no rules and regulations identified for the “junior engineer” stage.



Norms and expectations. As part of the “junior engineer” stage, students experience tactics used to teach them additional norms and expectations. The norms and expectations taught during this stage are termed *professional traits*.



Professional traits include understanding and learning more about engineering responsibilities, development of a maturity level to understand work/life balances, and expert knowledge of an engineering-related topic(s). The activities are communicated through informal mechanisms and are mostly taken-for-granted although consciously-recognized. One student-focused experience was identified: an understanding by the student of the student’s place within the workgroup and the expectations of being professional, termed *understand professional role*.



Some students were able to progress within the role of an engineer far enough that they could see the true value and worth of their contributions to the workgroup. The student

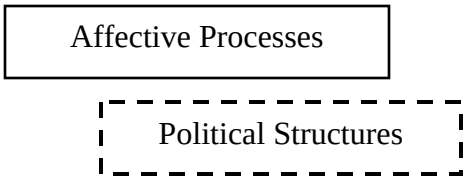
could also grasp his/her place within the larger semi-profession of engineering and begin to understand responsibilities associated with the new role. During the third co-op semester, Barry Evans felt he was a very important contributor to the team and made a true difference. He “gained a deep understanding of professional activities and responsibilities.” He also learned how to balance his work and personal life. His presence was highly sought after graduation, and he considered the co-op experience to be the most beneficial time spent during his engineering education.

Liam Morrison at GBA, Inc., became the department’s expert with designing, testing, and using the computer program and has been advancing to his current full-time role focused on that knowledge and expertise. His technical and personal growth and connection within his department continued through the second co-op semester. In fact, things were going so well that at the end of his journal he noted that “I have received kudos from many of my higher-ups and am not quite sure how to take it. Chances are, I will have a job when I am done with school.”

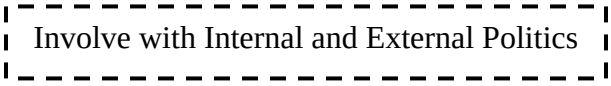
Greg Randall at AS, Inc., indicated that he learned more practical ways of engineering and how to work with customers and people in general. By the end of the semester, Keith Kelly at AS, Inc., was left on his own to develop a program. He wrote that he “learned a good deal on both the technical and social aspects.” Larry Mitchell of DM, Inc., said that co-op students can hit the ground running, add to productivity immediately, are a valuable contributor from the start, and are already groomed to begin work as a mature engineer.

Cognitive categories and scripts. There were no cognitive categories and scripts identified for this stage.

Affective processes. The information taught that indicates movement to the "junior engineer" stage is partially concerned with the values of the engineering semi-profession, communicated by the workgroup members. This set of affective processes is termed *political structures*.



Information about political relationships and competing values are communicated through informal mechanisms and are mostly experienced through consciously-enacted activities or events. One tactic was used to communicate political information to the student, indicating further acceptance and involvement in the workgroup as a junior engineer: *involve with internal and external politics*. This tactic is a mentoring process.



If the student advanced to the "junior engineer" stage, he/she was able to move further into the realm of learning aspects of occupational roles of an engineer. The student becomes involved in greater issues within the engineering profession, including political activity and working with external clients. The workgroup members trust the student to represent the group to outside interests.

Barry Evans at DM, Inc., noted in the second co-op semester that he was being treated like an engineer, unlike other interns who were getting mundane, repetitious work. During the semester he was allowed to take a week off for vacation. By the end of the semester Barry had his own research and projects, but he also was being involved in "political stuff" with clients, which he did not enjoy. Barry learned more of the political aspects of employment, and he witnessed the negative impacts of downsizing within an organization. Greg Randall also indicated in his evaluation of the third and final co-op semester that he could have been better prepared for the political side of things, although he also noted that "this is hard to teach and might just be one of those things you have to learn for yourself."

Inside:

Indicators of whether a student has been accepted into an engineering-related occupational role include whether the student is being included in group practices and activities and whether they are being allowed more responsible and unsupervised work. In some cases this includes the student moving from a person who receives challenging and testing behavior to the person who is giving it to others. Inside the occupational role for this study means becoming an accepted member of an engineering-related workgroup.

At some point, the student is given his/her own projects, develops his/her own work, and is provided less supervision. The student has demonstrated the ability to perform both the technical and management aspects of a project, which include the proper interactions with others in the organization. The student moves further inside occupational roles, gaining more responsibility and greater access to workgroup information and acceptance until potentially reaching a new or junior-level engineer role. Following are student and employer comments

that indicate movement to inside engineering-related occupational roles for the student. Some comments are repeated from the eight-stage discussion above.

Student Perspectives

Greg Randall at AS, Inc., said the teasing he experienced when he started does not happen as much anymore. In fact, Greg now does it to others who are new to his work group. “I guess we all know we make mistakes and stuff like that…[it is] fun to point out other people’s mistakes. We do it internally to the department…we don’t do it to people from outside of the department.” He then indicated that “once you get used to the people and start knowing them on a personal basis better, you know they’re just doing it for that comic relief, not just to put somebody down. Once you realize that…you head back into the game and get back at them as well. I haven’t seen it affect anybody negatively.”

Greg really enjoyed the work he did in his second and third co-op semesters, and he also enjoyed the people he worked with, in particular his mentor. There was no indication of the breaking-in process within his new group, although Greg did mention that he now “turns the tables” on the new people who come into his group. During the second semester, Greg gained a “better understanding of the engineering environment at large.”

Greg eventually started to get integrated into tasks and then given bigger projects. It was up to him to utilize the resources around him and to figure out what needed to be done. There was “not a lot of clear direction…you had to go out and find out.” There were a couple of other co-ops that started when he did, and they did not aggressively seek out answers and projects, instead deciding to sit in their cubicle a lot. “They’re not here anymore either,” according to Greg. He indicated that he learned more practical ways of engineering and how

to work with customers and people in general. Finally, he wrote in his evaluation, “the more trust you earn, the more responsibility you get.”

Barry Evans at DM, Inc., was being included on more projects and was asked to join the team at a meeting, which made him feel like an important part of the team. He finally connected more with his supervisor because he was able to work directly with him on a project. By the end of the first co-op semester, Barry was feeling “more mature now.” He indicated that he learned a lot on his own, but he was very satisfied with the experience. He became more confident and capable because he felt he was treated like a permanent employee. Barry was doing productive work and starting to get to know his coworkers better. He was “talking and having fun with them.”

Barry noted in the second co-op semester that he was being treated like an engineer, unlike other interns who were getting mundane, repetitious work. By the end of the semester Barry had his own research and projects, but he also was being involved in “political stuff” with clients. During the third co-op semester, Barry felt he was a very important contributor to the team and made a true difference. He “gained a deep understanding of professional activities and responsibilities.” His presence was highly sought after graduation.

Keri Kraft at VK, Inc., wrote that she learned how to communicate with people without being afraid. By the third co-op semester, Keri had her own project and needed to contact people in other departments to accomplish goals on the project. Paul Arnold wrote in his evaluation after his third co-op semester that he “was challenged by the work” and that he “felt more like an engineer at AS, Inc.” Paul wrote in his evaluation at the end of his first co-op semester at MC, Inc., that he “got along well with everybody” and that he “found out how things work…and how engineers function in a work environment.”

In her co-op journal, Gloria Kline wrote that midway through her second co-op semester was the point where she felt she didn't need as much supervision and help with everything. By the end of the semester, Keith Kelly at AS, Inc., was left on his own to develop a program. He wrote that "he learned a good deal on both the technical and social aspects."

Liam Morrison at GBA, Inc., became the department's expert with designing, testing, and using the computer program and advanced to his current full-time role focused on that knowledge and expertise. Liam's technical and personal growth and connection within his department continued through his second co-op semester. At the end of his journal he noted that "I have received kudos from many of my higher-ups. Chances are, I will have a job when I am done with school."

Employer Perspective

After the third co-op semester, Carol Schmidt of AS, Inc., said the student is doing the job of an entry-level engineer. According to Larry Mitchell of DM, Inc., the students become more independent as they progress through the co-op sequence to the point that they are "almost indispensable" during their third co-op semester. Co-op students can hit the ground running, add to productivity immediately, are a valuable contributor from the start, and are already groomed to begin work as a mature engineer.

Jeff Dillenger of IS, Inc., found that the co-op program helps a student to learn the role of an engineer, and to know his/her situation. Students are leveraged to do real engineering work with a big value in the end if the student is hired, because the new hire is already "an engineer" and can "hit the ground running" with a much smaller learning curve. According to Jeff, the co-op students develop relationships with other employees as well. In

particular, the co-op students form sort of a tight group together. They are more comfortable soliciting advice from their peers. Early in the process, the co-op student always would come to him as the supervisor to ask questions, but as the student gets more comfortable and gains confidence, he/she goes directly to the source of information to get answers.

As part of Gloria's formal evaluation of the third and final co-op semester at IS, Inc., Jeff wrote that she "has a great personality and quickly fit in to our department. She has good communication skills and was able to work well with contacts internal and external to IS, Inc." He also wrote that she "conducts herself in an appropriate manner. She manages herself well…she fit in well with the environment she was working in."

Glen Elmore at MH, Inc., stated that in the third semester, the hope is that it is "all payoff" for the employer in terms of the student performing all the functions of a full-time engineer, just on a smaller scale. Glen said the student has to earn the other employees' respect first, and they do this by doing jobs that will help them in some way, such as troubleshooting a machine breakdown for the machine operators. Having a good social personality also helps a student break down those barriers more quickly.

Kyle Williams said that after the first semester of co-op, the student returns with more confidence. He/she is familiar with the surroundings and is more comfortable dealing with their coworkers. After one co-op semester, "you know what they are capable of," according to Homer Mills.

Gary Blanchard wrote in his end-of-semester review that Gloria Kline was very involved with her projects and willing to "get her hands dirty" to investigate problems. He also indicated that Gloria was friendly and liked by the people she worked with. She received many positive comments from production workers in the manufacturing facility.

Liam Morrison's mentor wrote in his semester evaluation that "Liam had a very easy time in getting along with others and was very good in communications with necessary people." After the third and final co-op semester, Liam's mentor wrote, "Liam works very well in an environment where he does not know the colleagues he is working with very well."

At ARJ, Inc., Bob Karlson said the student learns over the course of the semester whom they need to talk with to get answers to questions. They learn to work with a lot of unique and different personalities and how to handle them in order to get projects done. They look at when someone makes a mistake and then learn how to do it better next time.

During his end-of-semester evaluation, Vince Murphy wrote that Victor Abner "picked things up fast…he did a great job technically… he appears to be well grounded, trustworthy, and responsible. He is fairly quiet, but asks questions when necessary."

Summary of Tactics used to Socialize Students to the Occupational Role During Co-op:

Tactics used by the employer to socialize students to various occupational roles during the co-op assignments are summarized according to the types of tactics presented by Van Maanen and Schein (1979) and Schein (1990). Approximately one-quarter of the tactics were planned by the employer, while the rest were unplanned or left to the student to identify and navigate on his/her own. The planned tactics were associated with the mentor/student relationship and included learning new skills (through reading materials and learning software), discussion of expectations, assignment of initial work tasks and projects, and formal meetings and evaluations. Between one-half to two-thirds of the socialization

activities were employer-driven, and the other one-third to one-half were student-driven or student-initiated.

Formal vs. Informal Tactics

The majority of the tactics used to socialize the student to engineering-related occupational roles were informal. Two tactics used to teach norms are encountered early in the socialization process and are formally enacted: 1) read materials and 2) learn software. Later, two tactics used to teach rules and regulations are used in a formal manner: 1) meet formally and 2) evaluate the student. Other tactics that may have some formal nature to them include mentoring the student, providing initial assignments, and assigning simple tasks. However, Schein (1990) states that individual coaching by a superior in an apprentice program would be considered informal actions, so these three tactics are actually informally enacted (the tactics are not pre-defined as part of a training program).

The rest of the twenty-five tactics/activities/actions are informally enacted. Many of them are student-driven or introspective from the student's perspective as he/she moves through the various engineering-related occupational roles.

Group vs. Individual Tactics

Socialization to occupational roles is primarily accomplished through individual-based activities. According to Van Maanen and Schein (1979), this is typical of apprentice programs and some internships (i.e. co-op programs). The only tactics identified that could be considered group-based were 1) work on floor with others, 2) haze student, 3) isolate student, 4) eat together, and 5) include in meetings. All other tactics involved individual

activities or one-to-one interactions between the student and a mentor or another workgroup member.

Sequential vs. Random Tactics

While an eight-stage process of occupational role development was identified for an engineering student moving into more responsible engineering-related occupational roles during the co-op program, the process was not presented as such by the employer organization to the co-op student. Milestones that indicated movement from one occupational role to another were noted in this study; however, those role changes were almost never explicitly communicated by the employer to the student. Therefore, the process of socializing the student to the engineering-related occupational role(s) would be considered random. Again, this is consistent with the work cited by Merton (1957) and Glaser (1964).

The activities and tactics did possess a sequential patterning in terms of the order and level of complexity associated with the tasks and expectations. For example, almost all students were isolated early in the process and expected to learn through reading materials and software programs key to the employer's work. From that point, students were typically assigned small tasks to test ability and knowledge. Once the student demonstrated competence, more demanding tasks were assigned, and/or more responsibility was expected. This pattern continued as the student advanced through new occupational roles. The type of work assigned was patterned and ordered, but the socialization process was not intentionally sequential, nor was it evident to the student as he/she progressed through the co-op program that sequential activities were occurring.

Fixed Timetables vs. Variable/Open-ended Tactics

As with the socialization to the organization, there was little evidence of fixed timetable activity from the employer when socializing the student to the engineering-related occupational role(s). The students were not provided with information that would indicate that certain milestones would be achieved in given timeframes. Within one organization, different students moved from one occupational role to another in different timeframes, yet both students were effectively socialized to engineering-related occupational roles within the employer organization. One example is that of Greg Randall, Keith Kelly, and Seth Martins compared to Paul Arnold at AS, Inc. Greg, Keith, and Seth all conducted three co-op semesters at AS, Inc., while Paul conducted only one. All four students were hired full-time into AS, Inc., in similar roles, albeit different departments, after graduation. It is noted that Paul did complete two other co-op semesters (for a total of three) at other employer organizations prior to joining AS, Inc.

Mentoring vs. Sink-or-Swim Tactics

Both mentoring and sink-or-swim tactics were used to socialize students to engineering-related occupational roles. In almost all cases, a mentor was assigned to the student early in the first co-op assignment, and the student was then expected to be groomed to mimic the style and work habits of the mentor (if socialization was effective). In addition to the official mentor, other members of the workgroup routinely assisted the student with work projects in the early phases of the co-op assignments (see the ‘new’ and ‘advanced apprentice engineer’ stages).

On the other hand, there were both observations of a sink-or-swim environment with many students and comments from students indicating the presence of such an environment.

In the “aware student employee” stage, students were both hazed and isolated from the core engineering team. These are clear examples of expectations from the employer that the student proves himself/herself to the workgroup members without support from the workgroup members. Again, in the “aspiring apprentice engineer” stage, the employer sometimes expected the student to act without providing adequate guidance, and the student was expected to find things to do. In addition, students made comments such as Bill Rosey’s at ARJ, Inc., where he was asked to learn in a “trial-by-fire manner,” including limited training initially. Employers, such as Homer Mills at VK, Inc., also commented that after some initial introductions, “the student is on their own to develop relationships.”

Self-enhancing vs. Reconstructive Tactics

The tactics used by the employer to induct the student into engineering-related occupational roles would predominantly be considered self-enhancing. Although students were taught the values and norms of the engineering workgroup and were expected to learn them, it was not required that students shed the characteristics with which they entered the organization and be built back up in the likeness of the current workgroup members. To the contrary, some students were expected to challenge existing norms as part of their occupational role. As an example, Victor Abner wrote, about mid-semester of his third co-op semester at BR, Inc., that “I contribute to the team by asking the dumb questions and getting everybody to rethink issues that were thought to have been resolved.”

However, there were examples of reconstructive tactics as well, just not as dominant as the self-enhancing tactics. The processes of hazing and isolating the student are examples of reconstructive processes. The workgroup members attempt to break down the student’s self-esteem in order for the student to realize the need to be like, and be liked by, the

workgroup members in order to be successful in the endeavor of entering the engineering occupational roles.

Tournament vs. Contest Tactics

Much like the socialization to the organization, socialization to the occupational role utilizes contest-type tactics. The students are given numerous opportunities to prove their ability to fit in and their worth to the workgroup before the employer decides whether to make a longer-term commitment to the student. This is indicative of a contest where several pieces of information can be used to evaluate the student's case for admission to a full-time engineering-related occupational role. A tournament environment would have the student evaluated for fit after every assignment or activity, which was not the case during the co-op assignments.

Outcomes of Socialization of a Co-op Student to Engineering-related Occupational Role(s):

Successful socialization to engineering-related occupational roles from the employer's point of view would have an outcome of creative individualism, the student would be retained in a full-time position after graduation, and the hiring process would be more cost-effective than without a co-op program. For this study, aspects of most of these types of tactics were identified for socialization to the engineering-related occupational roles. Although both group and individual dimensions were identified, the majority of the strategies and tactics were individual. Individual approaches to socialization tend to produce innovative orientation (Ashforth & Saks, 1996; Jones, 1986; King & Sethi, 1992). Likewise, the majority of the tactics were informal, random, variable-timetable, self-enhancing, and contest-like. Equal amounts of mentoring and sink-or-swim tactics were used by the

employers. The dominant strategies used by most co-op employers resulted in creative individualism (use of informal, individual, self-enhancing, mentoring, random, and contest-like strategies). The only evidence of typical custodial-oriented strategies was the use of some sink-or-swim tactics and fixed timetables for activities.

All but one student was successfully socialized to an engineering-related occupational role by the end of the co-op program. Twenty of the 21 students interviewed were working in engineering-related positions two years after graduation. By including retention of the student in a full-time position after graduation in the definition of success, the following employers were able to successfully socialize students to a continuing engineering-related occupational role within the organization: ARJ, Inc.; AS, Inc.; GBA, Inc.; GI, Inc.; and IS, Inc. This indicates that all but one student were successfully socialized to the engineering-related occupational roles within all organizations. In every case where a student did not get hired by the company where the last co-op assignment was completed, the student indicated an offer of employment would have been welcome. This is consistent with the work of Nixon (1989), who found that effective socialization leads to organizational commitment.

Because of economic issues and the inability to hire a graduating engineer (i.e. at GSU) with many of the employer organizations, employment offers to co-op students were not possible. This was true for seven of the ten employers who did not retain the co-op student after graduation, but indicated they would have if the opportunity had been present. In one other case (Fred Kroll at VPA, Inc.), the student was retained after graduation for a short time period, but then the student left for another employer after wage freezes and workforce cutbacks with the co-op employer, postgraduation. In another of the cases (Wesley Juniper at MH, Inc.), the student left the engineering academic program, and therefore there

was no opportunity to hire him into a postgraduation engineering role. Finally, there was one case (Keri Kraft at VK, Inc.) where the student claimed she was provided an employment offer postgraduation that was unacceptable to her, while the employer claimed the student was not offered a position because she was not a fit.

As with socialization to the organization, three employer organizations were successful in retaining multiple co-op students in full-time, postgraduation occupational roles: ARJ, Inc. (2 students), AS, Inc. (3 students), and GI, Inc. (2 students). ARJ, Inc., and AS, Inc., both were successful with socializing the students to the organization and the occupational role during the co-op program by retaining each student worked with through all three co-op semesters and in full-time occupational roles after graduation. Some of the success of those two organizations' experience can be attributed to good economic business conditions in an environment that was generally poor (or stagnant) in terms of economic conditions for engineering-related employers.

ARJ is a smaller employer while AS is a larger employer. Both organizations used similar techniques to socialize to the occupational role (individual, informal, random, variable-timetable, self-enhancing, and contest-like). The one difference was that ARJ used more sink-or-swim tactics while AS used more mentoring tactics, although both cases included examples of the opposite dimension at some points within the process. One could argue that the smaller employer used some sink-or-swim tactics out of necessity due to heavy workloads and smaller number of workers to accomplish getting the work completed. Therefore, the co-op students were expected to jump in and contribute immediately.

Occupational Role – Summary:

The occupational role category of the entry stage for the co-op position describes the student's movement from outside to inside an engineering-related occupational role. The employer and student jointly participate in the process. Figure 19 is a pictorial display of the entry stage for the occupational role category. There are four subcategories associated with the occupational role category consistent with the three pillars of institutions outlined by Scott (2001) – rules and regulations, norms, and cognitive (language/scripts) – and the concept of affect advanced by Greenspan and Shanker (2004) and Homans (1950). Tactics were identified that the employer members used to teach newcomers (co-op students) the information grouped according to the four subcategories. The tactics had properties of being formally or informally and consciously or unconsciously (taken-for-granted) enacted.

Aspects of all four subcategories were identified as part of the entry process to the occupational roles. However, unlike the entry to the organization process, the predominant subcategories identified were norms and expectations (fourteen tactics) and affective processes (twelve tactics). There was very little indication of rules and regulations discussion for entry to the occupational role, although rules and regulations were an important aspect of the entry to the organization. This indicates that the process of entering the occupational role is different from entry to the organization, even though there are overlapping and multidimensional tactics used to communicate socialization activity for both categories. Entry to the occupational roles is much more concerned with learning how things are done, how to act within the workgroup, and gaining acceptance from the workgroup members.

Within the tactics, there were two components identified that described groups of activities including workgroup interactions and work assignments. Workgroup interactions

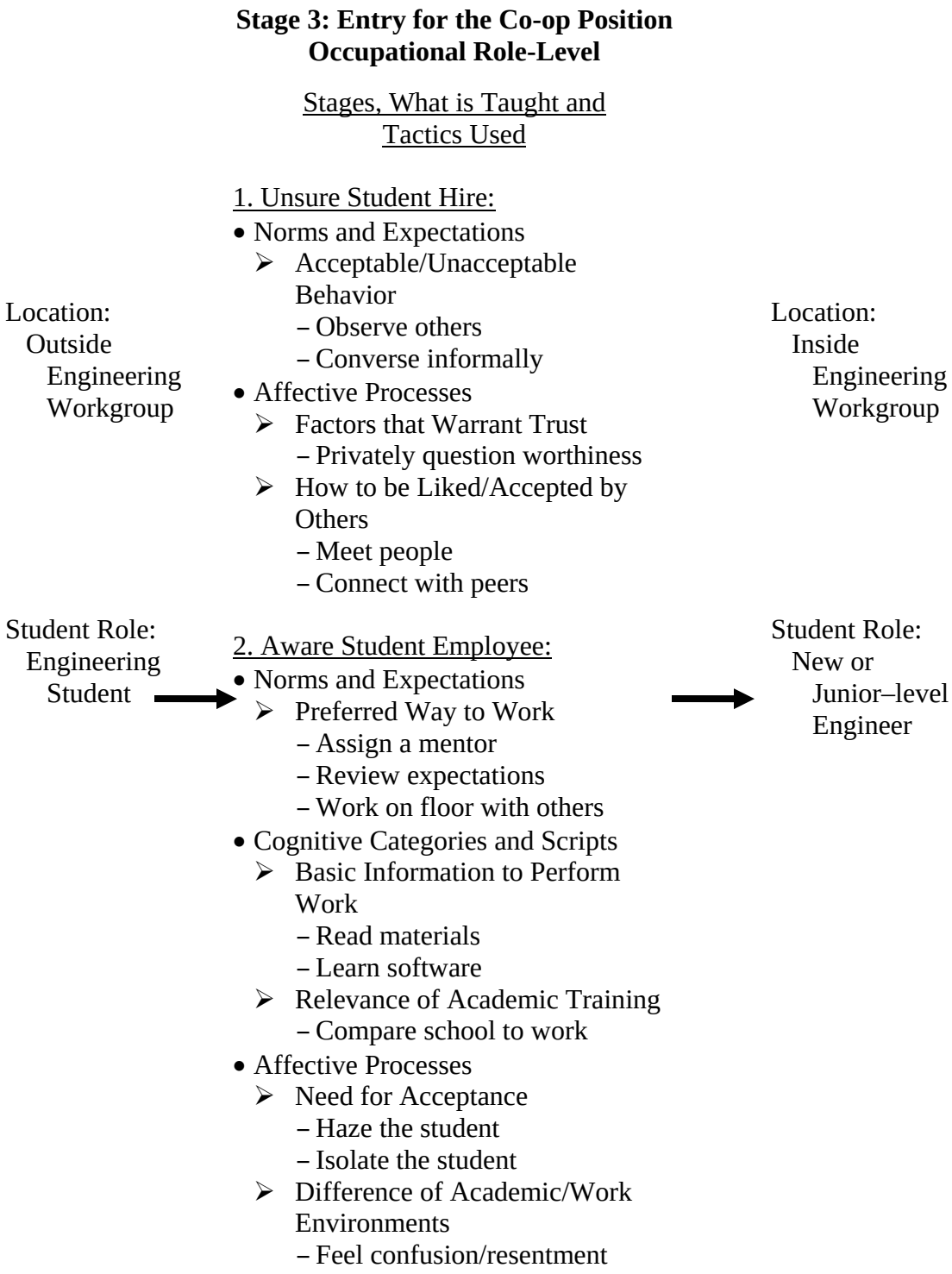


Figure 19: Entry at the occupational role-level for the co-op position

Stage 3: Entry for the Co-op Position
Occupational Role-Level (continued)

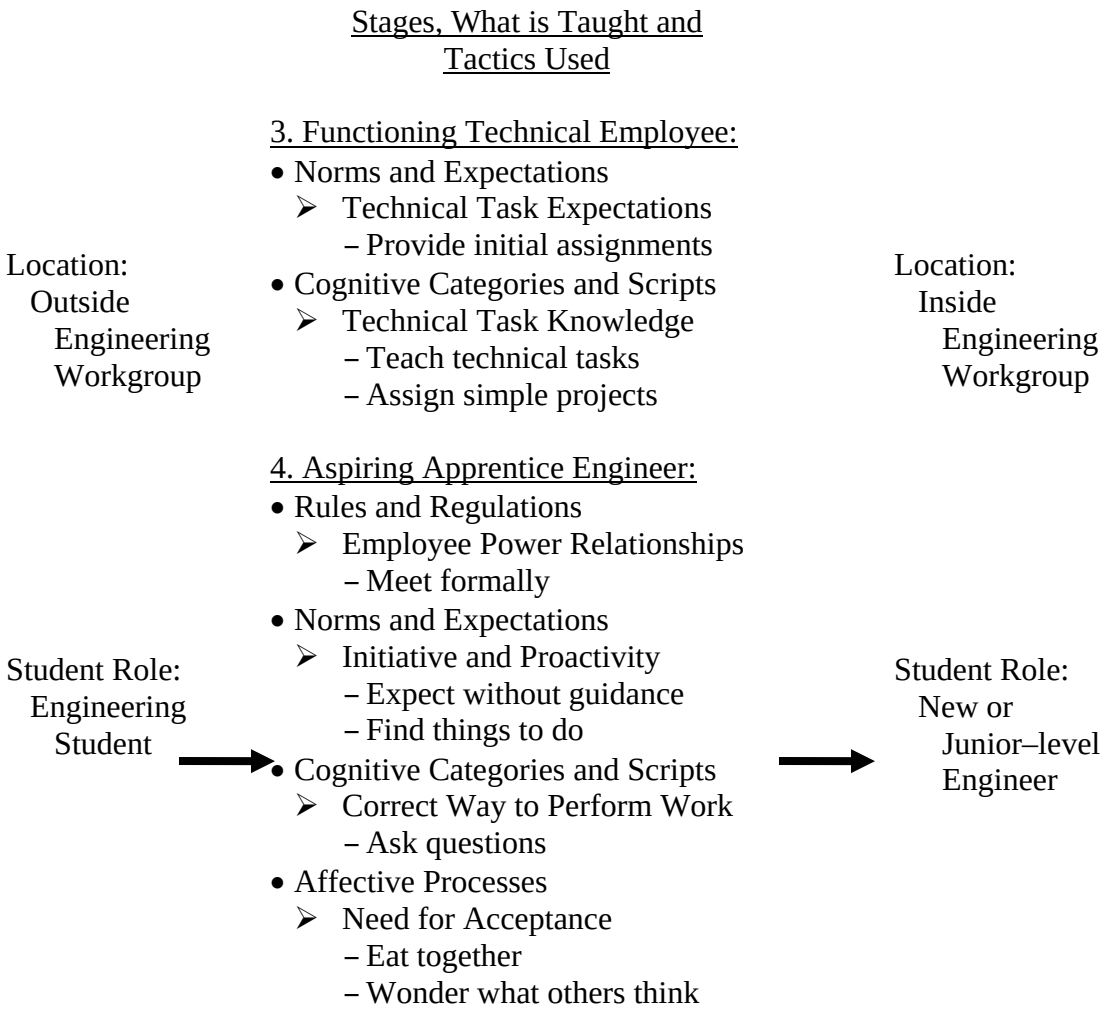


Figure 19: Entry at the occupational role-level for the co-op position (continued)

Stage 3: Entry for the Co-op Position
Occupational Role-Level (continued)

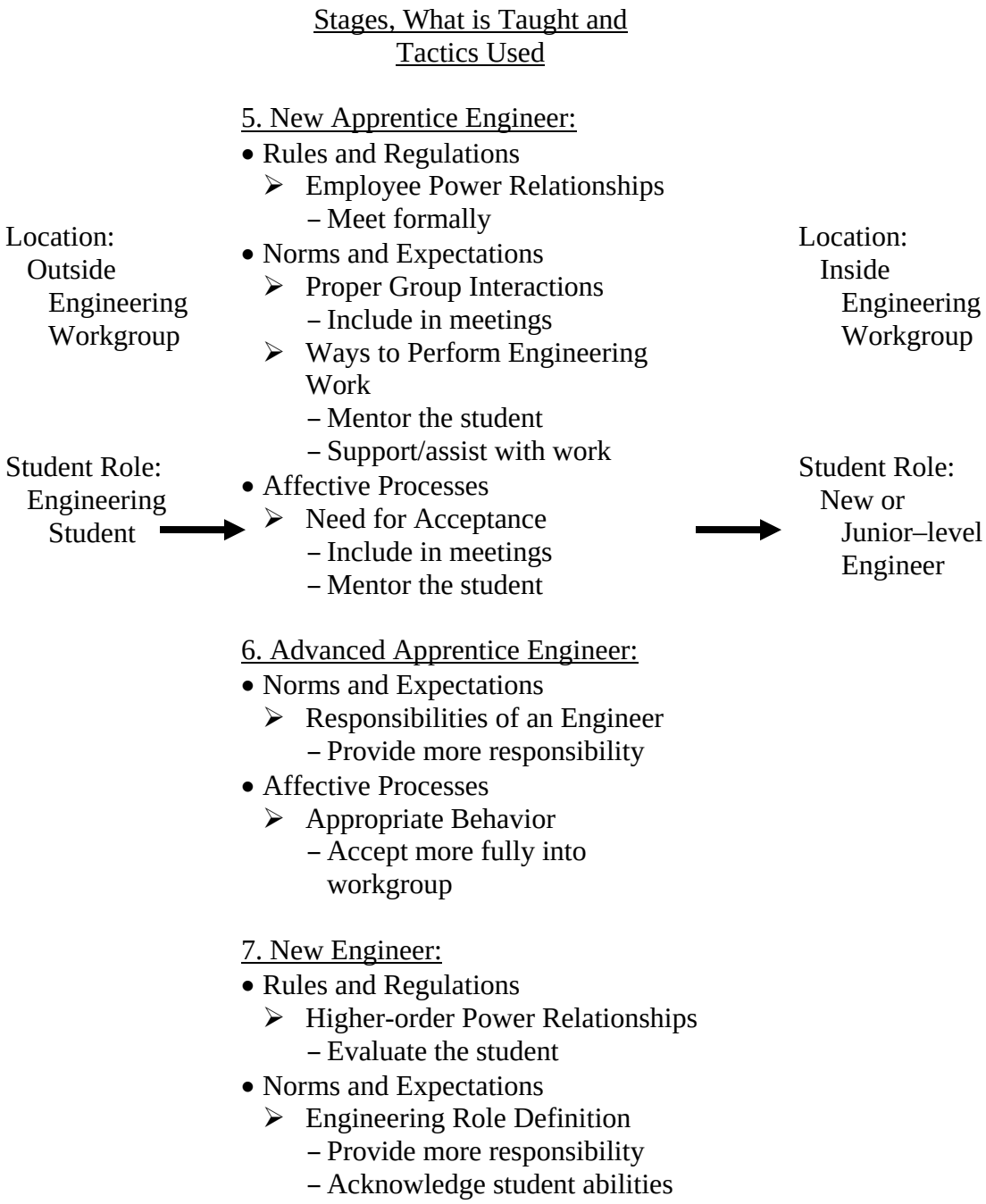


Figure 19: Entry at the occupational role-level for the co-op position (continued)

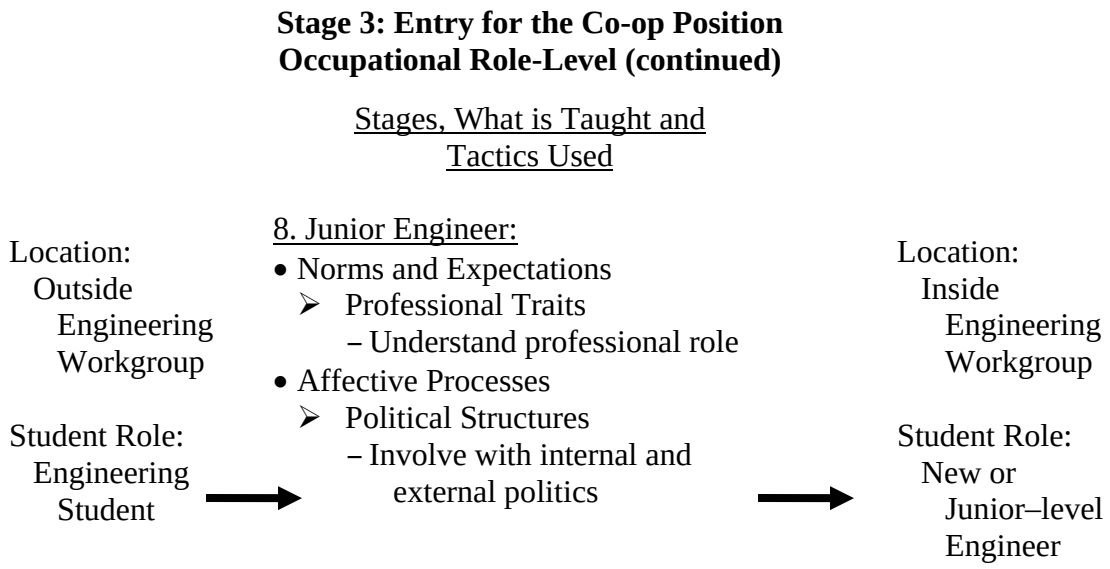


Figure 19: Entry at the occupational role-level for the co-op position (continued)

refers to the various ways that students learn about engineering-related occupational roles and gain acceptance into an occupational role through planned or unplanned interactions with members of the workgroup or groups they are asked to work with. Work assignments refers to the actual tasks that the student is given by the employer following orientation to the employer organization and the workgroup but before the student receives engineering-level tasks.

Within workgroup interactions, it was determined that some tactics were employer-driven while others were student-driven. Employer-driven workgroup interactions are activities or events targeting the student and resulting from employer representative action (or non-action). The employer-driven interactions had dimensions of challenging and supporting, meaning some actions inhibited the student from moving into a given occupational role until the student proved themselves, while other actions assisted the student move inside given engineering-related occupational roles. The student-driven workgroup

interactions consist of those activities resulting from student-initiated actions that help the student move into an engineering-related occupational role. The dimensions of this property are proactive and reactive. They describe whether the student initiated the action or responded to workplace stimuli.

The result of the entry processes and tactics for the occupational role category is to move the student from outside to inside a given occupational role within the engineering-related organization. The student goes from being an engineering student outside of an engineering workgroup to being a new or junior-level engineer inside an engineering workgroup. The role of a member of an engineering workgroup is to know the people, processes, and work requirements well enough to effectively manage personal and work-related activities in an engineering environment. The student is accepted as a member of the workgroup in an engineering-related role.

There is an eight-stage process associated with the occupational role category that moves a student from outside to inside of various engineering-related occupational roles. The eight-stage process consists of the following student-centered role phases: unsure student hire, aware student employee, functioning technical employee, aspiring apprentice engineer, new apprentice engineer, advanced apprentice engineer, new engineer, and junior engineer. Not all students begin at the same stage, nor do all students progress through each stage. Some students even move forward and backward in the stages, particularly after starting the second or third co-op semester and having gone back to the university between co-op semesters. Finally, not all student progress to the same final stage, although no students interviewed for this study progressed further than the eighth stage. A complete depiction of

information taught and tactics used, grouped by the student role-development stages, and including the pillars they fit into, is shown in Figure 19.

Initially, most students move from being a new hire (stage 1) to a functioning technical employee (stage 3), completing technical tasks such as CAD work, machine maintenance, and paperwork/documentation. In between, the student goes through a stage named “aware student employee” that consists of the student becoming aware of the difference between his/her academic training and the application in the work environment. This stage includes indications that the student is changing his/her social identity from one of academic people (faculty and students) to that of the employer organization. Implied is that the academic group starts to become the outgroup as the student feels resentment toward the academic members for not properly preparing (in the student’s estimation) the student for the work environment. Merton (1996) refers to this phenomenon as changing reference groups, meaning the student compares himself/herself to members of the groups that are encountered and identifies himself/herself with the members of the group.

At some point, the student desires to move beyond (or the employer pushes them to move beyond) the technician stage to one of apprentice engineer. If the student proactively seeks this role, the student goes through an “aspiring apprentice engineer” stage (stage 4) where engineering-related work is sought out.

Once the engineering personnel in the employer organization are comfortable with the student and his/her abilities, the student is moved into a “new apprentice engineer” role (stage 5) where he/she is mentored by the engineering staff and works on engineering-related projects. Stage 6, the “advanced apprentice engineer” role, consists of the student gaining more confidence from the engineers and therefore more responsibility with less supervision.

At some point, the student proves his/her ability to the engineers in the organization and is given his/her own projects. At this point, the student becomes a "new engineer" (stage 7). Many students reach this stage by the end of the three-semester co-op experience. Some students move further and enter stage 8, a "junior engineer" role. At this stage, the student functions as an engineer in the organization, gaining responsibility for external correspondence with customers and becoming involved as an equal in internal group politics.

Within the eight stages, the student learned to become an engineer primarily through understanding norms and expectations and through affective processes. Scott (2001) notes that tactics that teach norms involve defining expectations and developing jobs and roles – all tactics important for teaching a newcomer (student) about entering new engineering-related occupational roles, as well as the workgroup evaluating the student and ultimately accepting the student into the workgroup. The importance of affect with entry to the occupational role was evident, more so than with entry to the organization. The student connects to the workgroup more so than to the organization through acceptance into an engineering-related occupational role. The student develops affect towards the occupational role through task development within the workgroup, and that set of feelings is then generalized to the semi-profession as the student connects to being an engineer.

Learning rules and regulations was not prevalent within the entry process to occupational roles, but when identified, there seemed to be a connection between learning rules and regulations prior to the student moving from one new occupational role to another. For example, before moving from a technical role (stage 3) to an engineering apprentice role (stages 4, 5, and 6) and from being in an engineering apprentice role to an engineer role (stages 7 and 8), rules and regulations were taught to act as a sort of gate-keeping function,

allowing a student to advance (or not) to the new occupational role. Once in the new role, the student was expected to learn norms and expectations and cognitive and affective processes to develop him/her within the role until it was deemed appropriate to evaluate the student for advancement to the next, progressive occupational role.

The result of the entry process for the occupational role category is to move the student from outside the engineering environment as a student pursuing an academic degree to inside engineering-related occupational role(s) within an engineering-related organization. The student goes from being a new hire in a technical role to being a new or junior-level engineer. A new or junior-level engineer is accepted by the established engineering personnel internal and external to the organization, and the student is expected to perform engineering-related tasks or functions on behalf of the employer organization. The student has autonomy to conduct and manage engineering-related projects, including the people, processes, and work requirements associated with such projects.

As with the entry to the organization processes, there was evidence that most students learned additional aspects of technical, personal, and organizational skills and knowledge as a result of being socialized to the occupational roles(s). This satisfies the expectations of the education organization and the exit (developed skills and knowledge) expectations of the employer, as identified in stage 1: pre-entry. Both education and employer organizations would indicate that the co-op program is successful in developing technical, personal, and organizational skills and knowledge.

Entry - Co-op Position: Summary

The third stage identified was entry to the co-op position. Socialization includes the process of the student breaking into (entry to) the organization and an engineering-related

occupational role. The two primary properties of entry were outside and inside. The student began the co-op experience on the outside of the organization and an engineering-related occupational role, unless he/she had already worked in an engineering-related role or within the organization prior to beginning the co-op. During the co-op experience, the student moved from outside to inside, specifically during the hiring process, the orientation activities when the student began the co-op assignment, and by learning the company culture. The student moved from outside to inside an engineering-related occupational role through interactions with coworkers within the workgroup and through work assignments. The students also entered occupational roles by learning from mentors and engineer coworkers, gaining more engineering-related assignments and responsibilities, and proving technical and personal abilities to successfully manage engineering projects and interpersonal relationships within the workgroup.

The entry stage consists of teaching the student what needs to be known in order to successfully enter the organization and occupational role. There is a “feeling out” process between the student and the groups of people the student interacts with in the employer organization, with both student and members of employer groups trying to identify a fit both short-term and long-term with each another. The expectation is that the student will learn rules and regulations, norms and expectations, cognitive categories and scripts, and affective processes by means of tactics that can be employer-driven or student-driven. What is learned is consistent with the elements of the three-pillar paradigm of Scott (2001) and the work of Greenspan and Shanker (2004) and Homans (1950) on affect.

Rules and regulations rely on laws and power systems to coerce people into conforming. Norms and expectations teach norms and help define roles and jobs. Cognitive

categories and scripts rely on mimetic mechanisms and a person learning by copying and/or adopting the behaviors, actions, and beliefs of others. Affective processes/activities refer to emotion, sentiment, and motive. The tactics have properties ranging from formally to informally communicated or presented, and consciously enacted to taken-for-granted. The properties define how the organization members display, project, communicate, and teach information to the student and evaluate worthiness of the student for acceptance into the organization and occupational role(s).

Figure 20 presents a summary of the entry stage for the co-op position, focusing on the role of the student before (outside) and after (inside) entry, what is taught, and the tactics used to move the student from outside to inside the organization and an engineering-related occupational role. Rules and regulations, norms and expectations, cognitive categories and scripts, and affective processes are taught by the employer (learned by the student) using various tactics. The types of tactics were categorized using Van Maanen and Schein's (1979) seven "dimensions" of socialization: formal vs. informal, group vs. individual, mentoring vs. sink-or-swim, random vs. sequential, self-enhancing vs. reconstructive, fixed timetable vs. variable timetable, and tournament vs. contest.

Entry to the organization contained aspects of all four subcategories of "what was learned." Rules and regulations were an important subcategory, including many of the first tactics used by the organization upon entry after hiring the student. Tactics used to communicate norms and expectations and cognitive categories and scripts were also evident in similar numbers for entry to the organization. Affective processes were identified but were not as prominent as the other subcategories of elements. All four subcategories were also identified for entry to the occupational role. However, there was a different composition

Stage 3: Entry – Co-op Position

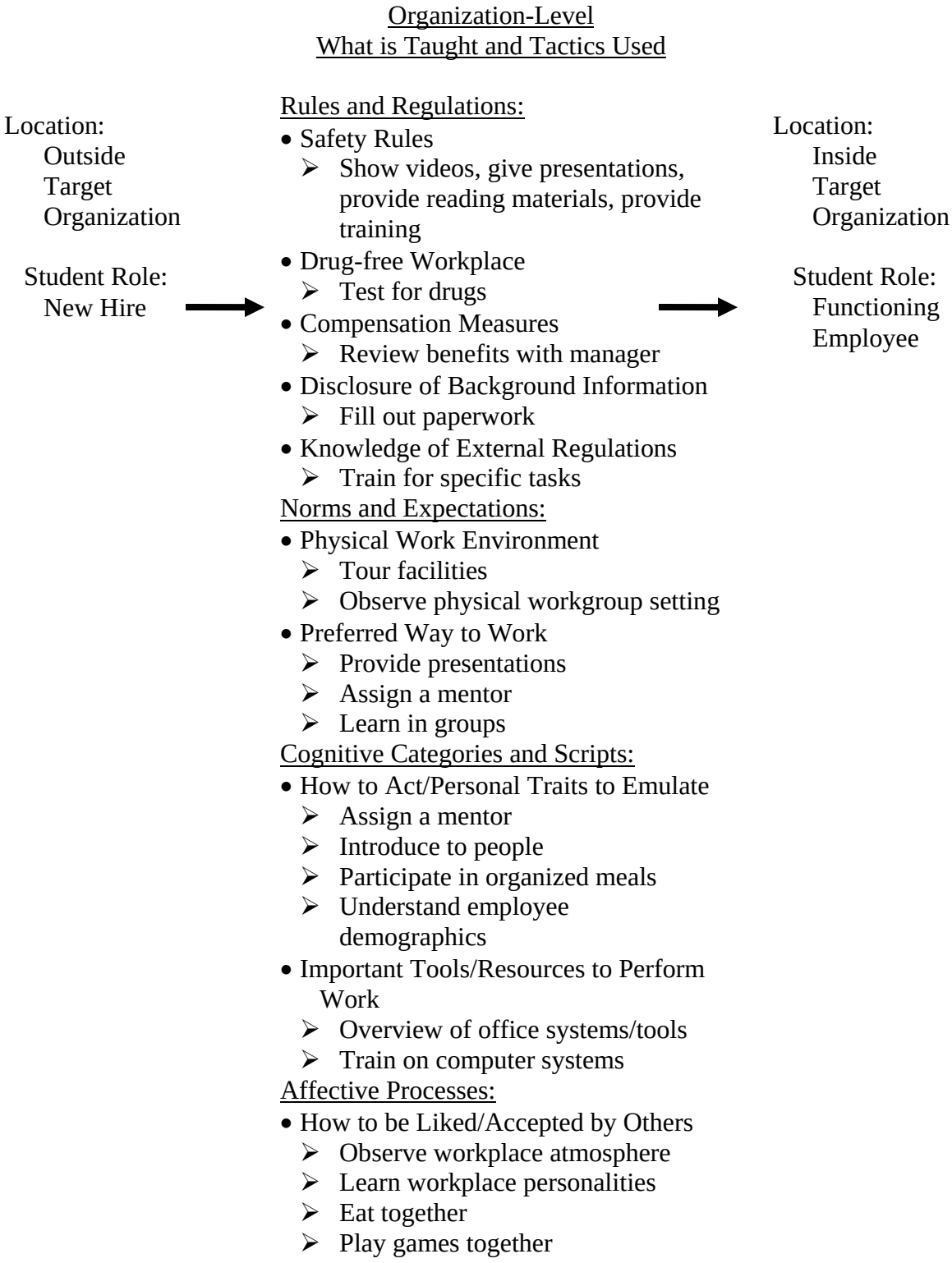


Figure 20: Entry for the co-op position

Stage 3: Entry for the Co-op Position

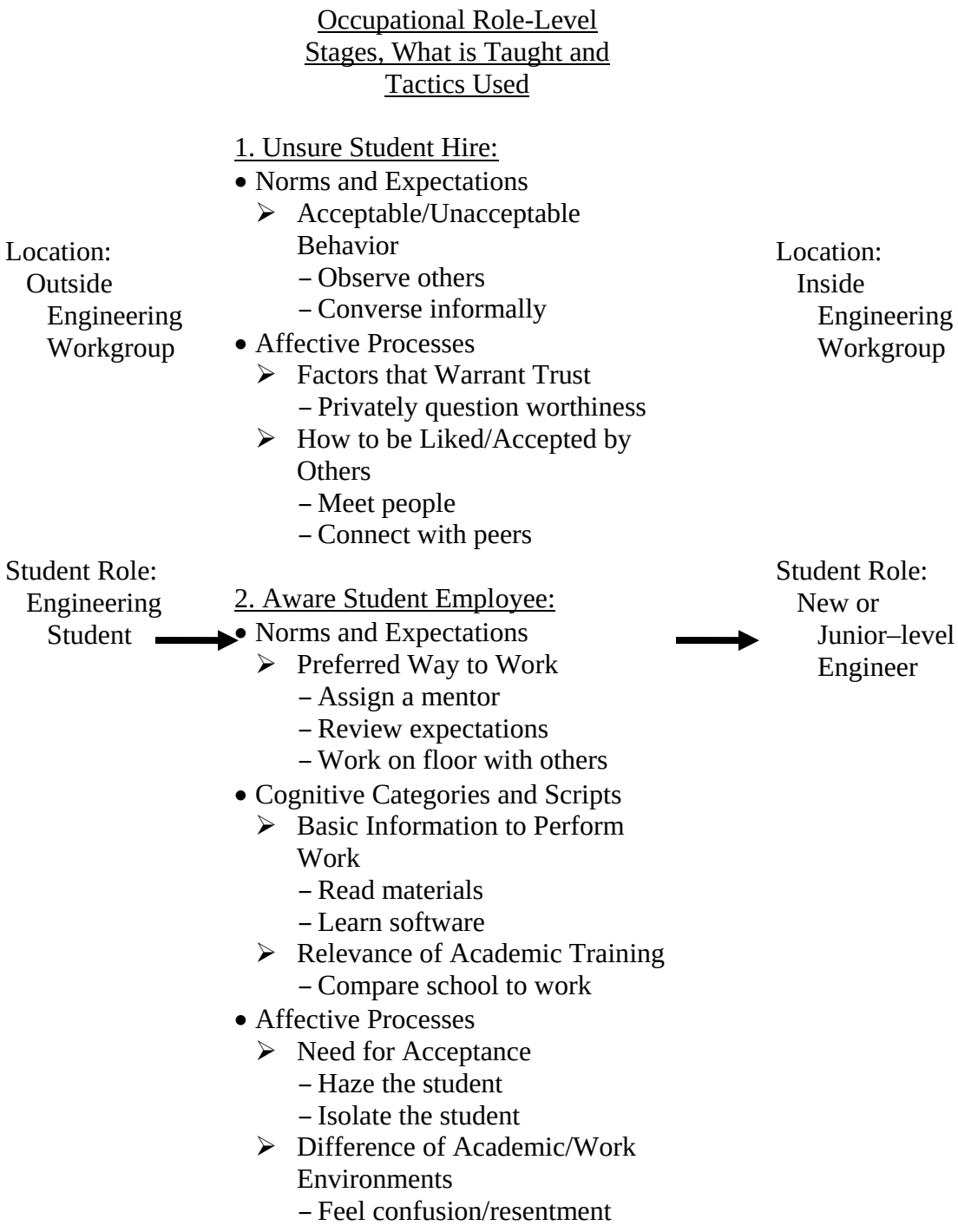


Figure 20: Entry for the co-op position (continued)

Stage 3: Entry for the Co-op Position

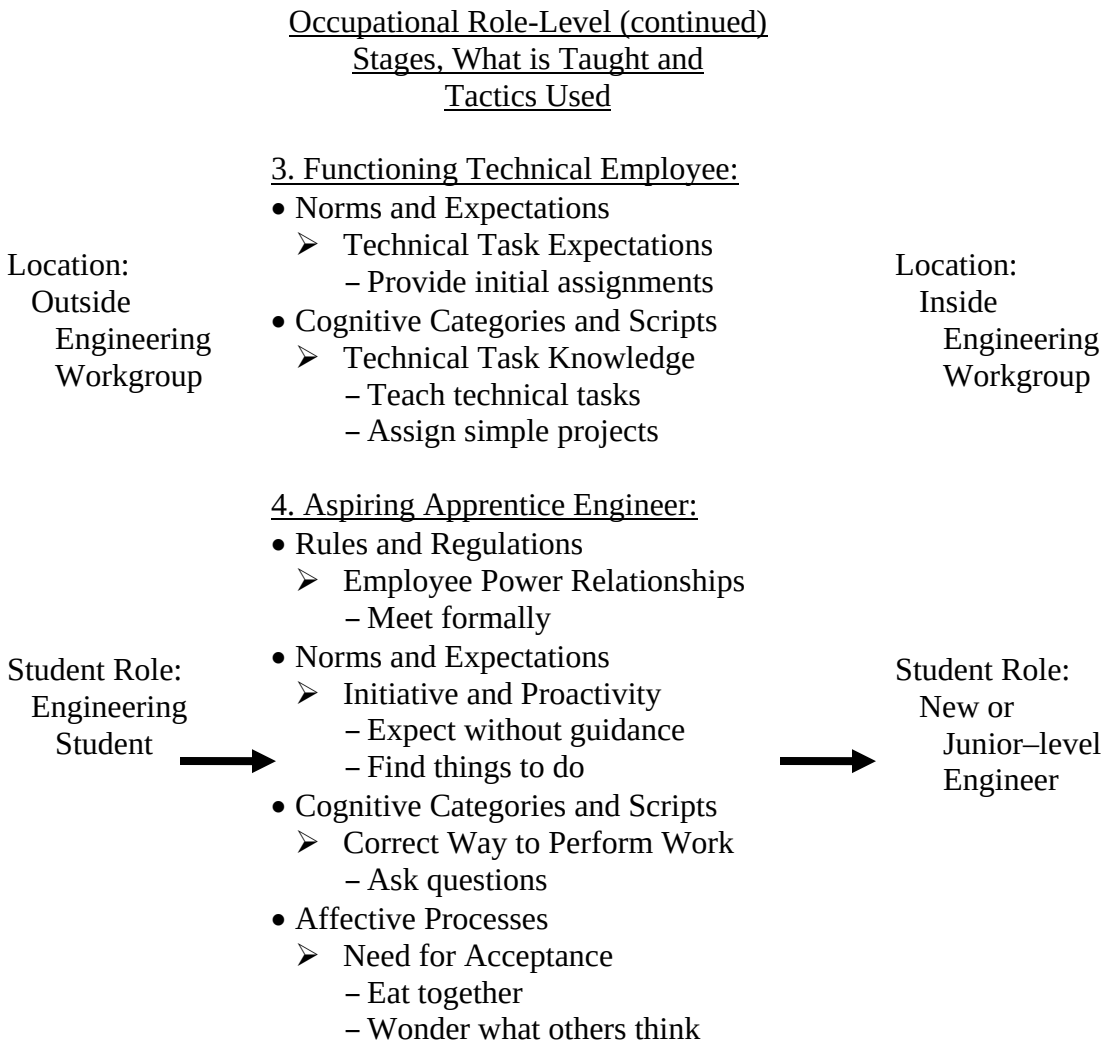


Figure 20: Entry for the co-op position (continued)

Stage 3: Entry for the Co-op Position

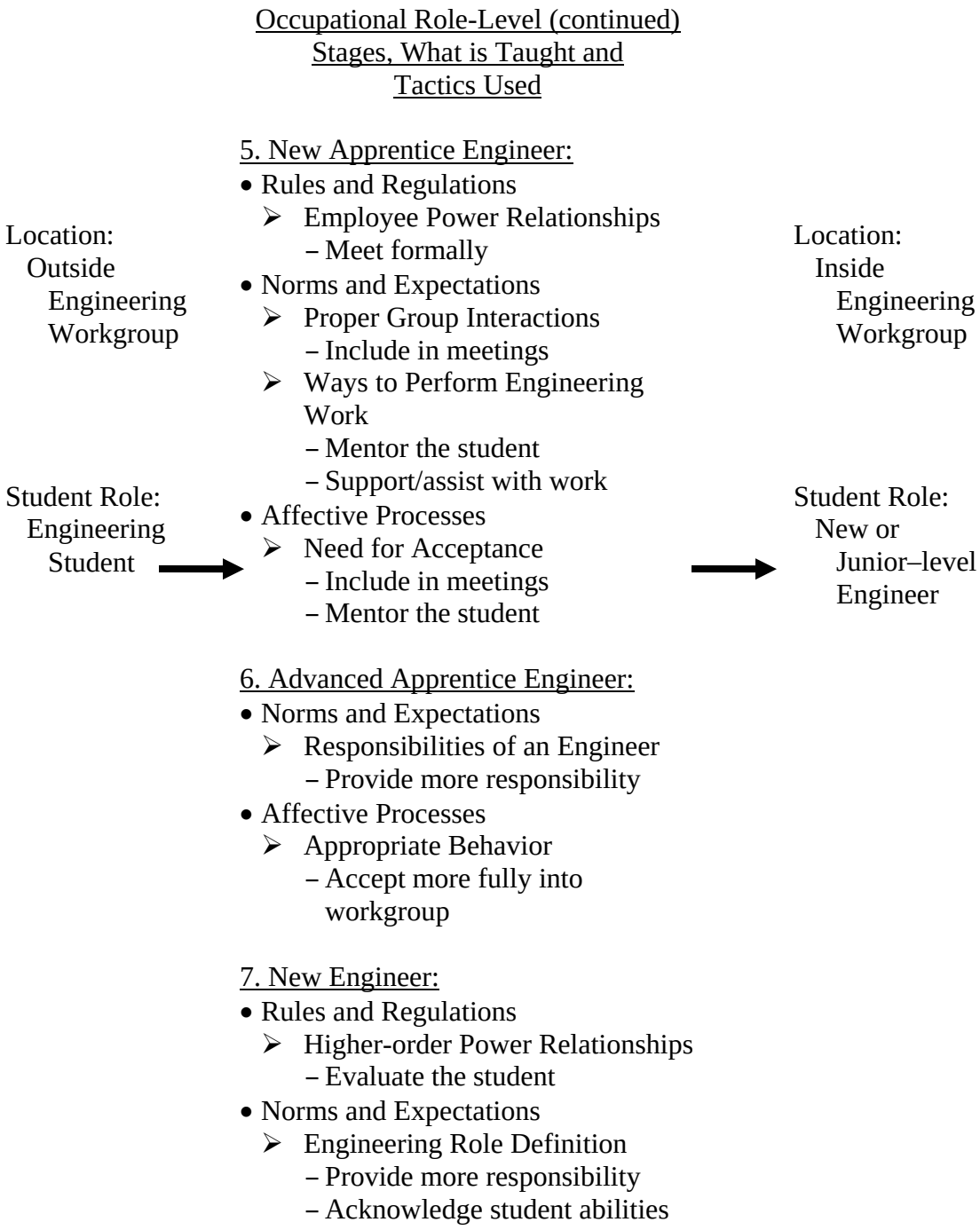


Figure 20: Entry for the co-op position (continued)

Stage 3: Entry for the Co-op Position

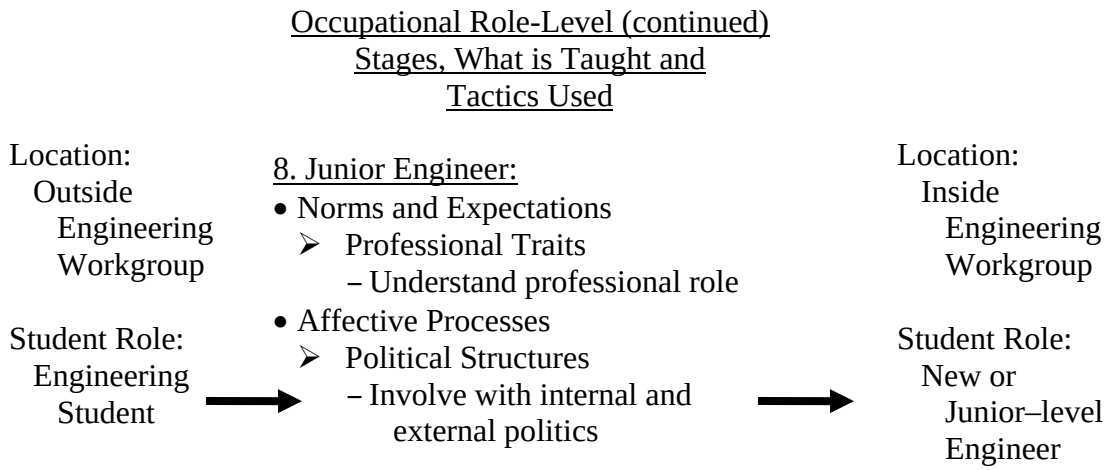


Figure 20: Entry for the co-op position (continued)

of the four types of elements learned as compared to entry to the organization. There were very few rules and regulations being taught for the entry phase to the occupational role(s). There were predominantly tactics used to teach norms and expectations and affective processes. This indicates that the two entry processes are different and that students are socialized to the organization in a different manner than to the occupational role.

The difference in the composition of the four types of elements indicates that the two entry processes are different and that students are socialized to the organization in a different manner than to the occupational role. Entry to the organization focuses on teaching the student what all employees need to know, regardless of what group, or subgroup, the employee belongs to in the organization. Therefore more (but not only) formal tactics are used in order to ensure consistency organization-wide with certain elements important to the organization, most often in the forms of rules and regulations and cognitive categories and scripts. Entry to the occupational role is concerned with the student learning about what to do

and how to behave and act (norms) within expectations of defined jobs and positions. It is a much more narrowly focused process and therefore relies on more individual and informal tactics enacted by a person (a mentor) or smaller group (subset) of the organization, most often in the forms of norms and expectations and affective processes. The two entry categories contain some common tactics used to teach both similar and different things, but the two processes are distinctly separate and identifiable, with distinctly different purposes and desired outcomes.

Company-wide and workgroup-level orientation processes, and other tactics used to transfer information about employer organization culture, were used to move the student from a new hire role to a functioning employee role. Various employer-driven and student-driven workgroup interactions and work assignments were used to move the student from being an engineering student to a new or junior-level engineer within the employer organization. An eight-stage process was identified that moved a student to a new or junior-level engineer role through engineering personnel using various methods of showing acceptance to, sharing knowledge with, and adding responsibility to the student.

Making it inside the organization included learning all four subcategories, and the subcategories contained two general components: orientation tactics and other cultural/environmental tactics. Many of the organizations had some form of company-wide orientation program for new hires that was typically coordinated by the human resources office. This program often includes an overview of company policies or procedures (such as filling out timecards), an overview of company systems (such as computer login and intranet usage), and training (such as safety in the facility). More elaborate orientation programs existed at some organizations and included facility tours, presentations by group and

company leaders, and lunch gatherings. There was also evidence of orientation taking place within the workgroup or departments for which the co-op student worked. However, these were more often unplanned and less formal and involved getting to know the people, places, and tools the student would be working with.

More often than not, students gathered information about company culture through observation and talking with their coworkers and/or mentors. Some organizations were very fast-paced and the people were driven by production goals, while others were “laid-back” environments and people were more easy-going. Getting to know and understand the employer organization culture involved environmental factors, peoples’ attitudes, and student-workgroup activities. The environment consisted of the type of atmosphere (easy-going, professional, etc.) and the physical setting (office layout, where things are, etc.).

Kuh and Whitt (1988) and Schein (1992) concluded that culture consists of three layers: artifacts, espoused values, and underlying assumptions. In this study, the student learned important information about, primarily, the organization, but also the occupational role, through artifacts of the organization. This included observation of the workplace environment, including the people in it, and learning the tools to complete work successfully. Espoused values were communicated first in the orientation programs upon entry to the organization, but were largely learned by the student through interactions with the workgroup, including the mentor, during entry to the occupational role. Finally, underlying assumptions were learned during the entry to the occupational role, often through affective processes experienced between the student and the workgroup members.

In most cases, the students moved to inside the organization in the first few weeks of the first co-op semester, and always by the time the first co-op semester was completed.

There were a couple of instances where a student moved from inside to outside of the organization after being laid-off due to lack of work or economic conditions facing the organization, and then had to begin the process of moving inside a new organization again, with a new employer.

The students learned about, and gained access to, various occupational roles within the engineering-related organization through interactions with members of the workgroups and through work assignments, progressing through various stages of an eight-stage process. Some workgroup interactions were employer-driven (originated from employer action or activities) and others were student–driven (proactive actions or activities by the student). Several of the students experienced forms of testing and challenging by their coworkers before they were allowed inside the workgroup or team. These activities included making fun of the new person because of the lack of knowledge of what was supposed to be done and questioning the student's understanding and ability. There also was evidence that many coworkers were friendly and helpful to the co-op students and were able to assist the students with understanding how to cope and manage in the new engineering-related occupational roles.

Students were expected to prove their knowledge of and ability to perform engineering-related work by first demonstrating the ability to learn and accomplish small tasks. Many of the students were simply given reading assignments or computer tutorials to complete during the first few days. The student was either encouraged, or expected, to ask questions in order to learn what to do. Eventually the student was given assignments to demonstrate the ability to handle more responsibility. More increasingly complex and meaningful assignments were given to the student until he/she was accepted as part of the

work team and had regular responsibilities like other members of the workgroup. The student had moved from outside to inside the workgroup in an engineering-related occupational role.

There were indications throughout the entry to the occupational role that the student changed his/her social identity from one of academic people (faculty and students) as the ingroup to that of the employer organization workgroup as the ingroup. Implied is that the academic group starts to become the outgroup as the student feels resentment toward the academic members for not properly preparing (in the student's estimation) the student for the work environment. The student compares himself/herself to members of the groups that are encountered and identifies himself/herself with the members of the group. Students, through the co-op program, begin to change reference groups from people in academic settings (faculty, classmates) to workgroup members at the employer worksites.

The student began in a student role that provided technical tasks and social activities that were general and non-engineering in complexity, breadth, or scope. The student was working in an environment with engineering work being conducted by coworkers, but the student had not yet been accepted by the group to share in the engineering work because the ability to perform various aspects of the work had not been demonstrated. After mentoring by coworkers and through demonstration of the ability to accomplish relevant work tasks, students were provided more responsible pieces of engineering projects. After awhile, some students were given engineering-related projects to manage. The student moved from a student technical employee role to inside the engineering-related roles and became a new or junior-level engineer.

Aspects of all types of tactics (Van Maanen and Schein, 1979) were identified for socialization processes during entry to the organization. Although both group and individual

tactics were identified, the tactics were more individual than group. Likewise, more formal tactics than informal, more random tactics than sequential, and more self-enhancing tactics than reconstructive were identified. Equal amounts of mentoring and sink-or-swim tactics were used by the employers. Variable timetable tactics were used rather than fixed timetables, and the process was contest-like versus tournament-based. Therefore, some tactics thought to create a custodial outcome (formal, mentoring, variable timetable) were dominantly identified, while other tactics common to creative individualism (self-enhancing, random, contest-like) were also identified.

Twelve of eighteen employers were successful in creating either a custodial or creative individualism outcome with the co-op student and retained the student for all three co-op assignments. Four employers produced an outcome of rebellion since the students who performed a co-op with those organizations left for either another career area (changed academic majors) or for another co-op employer. Two employers had the co-op student leave for another employer to complete the co-op assignments; however, both employers had to release the student due to economic conditions at the time within the organization. These cases were not a result of rebellion to the socialization process but rather a result of resource dependency with a power structure in favor of the organization.

There was evidence that there may be a difference in how a student is successfully socialized to the organization based upon the size of the organization and/or the number of students the organization is attempting to socialize. The larger employers used some custodial and some creative individualism strategies to produce aspects of both a custodial orientation and creative individualism, while the smaller employer used strategies that primarily produced a creative individualism outcome.

Aspects of most of the types of tactics were identified for socialization to the engineering-related occupational roles as well. Although both group and individual dimensions were identified, the majority of the strategies and tactics were individual. Likewise, the majority of tactics were informal, random, variable-timetable, self-enhancing, and contest-like. Equal amounts of mentoring and sink-or-swim tactics were used by the employers. The dominant strategies used by most co-op employers resulted in creative individualism (use of informal, individual, self-enhancing, mentoring, random, and contest-like strategies). The only evidence of typical custodial-oriented strategies was the use of some sink-or-swim tactics and fixed timetables for activities.

All but one student was successfully socialized to an engineering-related occupational role by the end of the co-op program. Twenty of the 21 students interviewed were working in engineering-related positions two years after graduation, indicating that all but one student were successfully socialized to the engineering-related occupational roles after completion of the co-op program.

Referring to the metaphor of two people going through a dating process, the entry stage for the student and employer is similar to the process of getting to know each another through dating and determining if there is value in continuing the relationship through further dating. As the dating progresses, the two parties get to know each other better over time, and they learn more and more about the other person. Eventually, each person lets the other "inside" aspects of their outer and inner world more and more, until they eventually agree to an exclusive, monogamous relationship where everything (or nearly everything) is shared between the two people. This process would be consistent with movement from outside to inside in relation of the student to the organization and engineering-related occupational role.

Stage 4: Match-Making - Postgraduation

The fourth stage that was identified was *match-making* for the postgraduation position. Match-making was identified as a repeat stage and occurred for the student following graduation with their engineering degree in a very similar manner to that experienced during the match-making process for the co-op position (stage 2). Similar to stage 2, match-making for the postgraduation position refers to the process of students and employers finding each other regarding employment and ultimately agreeing to enter into a work relationship in the form of a full-time engineering occupational role. The match-making process involves both the student and the employer seeking the best opportunity and fit for them and then selecting the best option with the "partner" that has mutual interest.

Although the two match-making stages are similar, they do have some differences. Unlike during the co-op position search, students after completing their co-op assignments had many more resources for seeking out employment, including the organization(s) with which they completed their co-op assignments. In addition, the students had classmates with whom they graduated who had each completed a series of co-op assignments and therefore also were a network resource for employment contacts at various organizations.

The student subjects had a profile similar to the entire class (sample) of students, in terms of those students who chose to work for the company at which they completed the co-op assignments. Approximately 43% of the students interviewed went to work for the company where the final co-op assignment was completed. This is similar to the entire class of students, which had a rate of 47% of students who went to work for the co-op company after graduation. Paul Arnold, Eric Jillet, Keith Kelly, Seth Martins, Hank Molner, Liam Morrison, Greg Randall, Bill Rosey, and Mike Vilma each hired on with the company where

they conducted their last co-op assignment. In addition, one student, Gloria Kline, hired back into the organization she conducted her co-op with a little over a year after taking a position with another company out of college. Five students — Paul Arnold, Keith Kelly, Hank Molner, Greg Randall, and Mike Vilma — did not interview anywhere before accepting the offer of employment at the co-op organization.

For those who did not hire into the co-op company after graduation, two (Fred Kroll and Keri Kraft) chose another organization despite having the offer to stay with the company where the last co-op assignment was completed. The others were not extended an offer of full-time employment primarily because the organization did not have an open position at the time. In large part this was due to the effects of poor economic conditions at the organization. This situation is similar to the resource dependency phenomenon identified during the match-making process of Stage 2. The employer could be selective because the balance of power was in the employer's favor in terms of the employer's resource dependence on co-op student labor and the oversupply of the labor in comparison to demand for the labor.

Two exceptions, Henry Dorale and Zack Slater, conducted the co-op assignment at GSU and obviously had no ability to hire into the organization as a practicing engineer after graduation. Five students — Barry Evans, Gloria Kline, Doug Koontz, Fred Kroll, and Nick Prather — would have accepted an offer at their co-op company if one had been extended.

Of those who hired into a new organization after graduation, seven of the twelve students made a connection to the new organization through a classmate or alumnus of the GSU engineering program, or through an industry-sponsored project for course at GSU. Those subjects included Wendell Dews, Henry Dorale, Barry Evans, Steve Jeffers, Brent Jolley, Fred Kroll, and Zack Slater. In the cases in which a student went to work for a new

organization, the student submitted a resume for consideration, received an interview, and ultimately received an offer of employment.

Match-Making Postgraduation
Student – Education Organization – Employer

A match-making stage was identified for the postgraduation position for each of the three entities of people involved including student, education organization, and employer. The match-making stage for each entity contains specific steps, categories, and properties that will be explained separately; however, some of the categories are created jointly while others occur independently. Match-making for the postgraduation position, like match-making for the co-op position, was determined to have two substages: 1) *search* and 2) *selection.*

Match-Making Postgraduation: Search

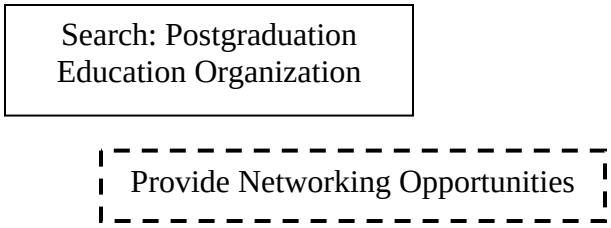
Search refers to the phenomenon of students and employers seeking each another to identify if there is a mutual interest in entering into a postgraduation employment arrangement in an engineering-related occupational role. All three entities (student, employer, and education organization) are involved in the search process. Search for the education organization consists of two steps. The student is involved in two steps, and the employer in three steps, of the search process.

Search: Postgraduation Position

- Education Organization: (Two Steps)
- Student: (Three Steps)
- Employer: (Four Steps)

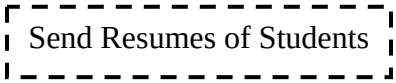
Education Organization:

The match-making stage for the postgraduation position from the education organization's standpoint has one substage (search) and two steps. The education organization plays a role early in the search substage, but not the selection substage. The successful outcome of the match-making stage is an offer of employment that is accepted by the student, absent of involvement by the education organization at that point. The two steps for the search substage for the education organization are 1) *provide networking opportunities* and 2) *send resumes of graduates*.



GSU faculty and staff provide networking opportunities to engineering graduates in the forms of career fairs, on-campus recruiting events, and hosting company-sponsored classroom projects. Career fairs host a number of employers each year that include many companies that seek engineering graduates to hire. Through career fairs at GSU, Victor Abner said that he obtained interviews at a small automotive parts manufacturer and a large automotive parts manufacturer.

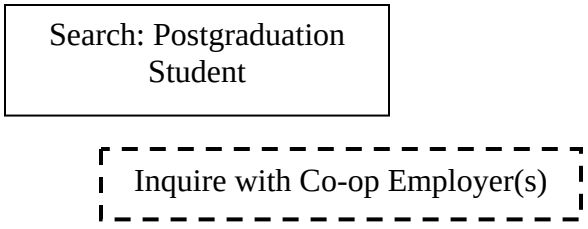
Likewise, on-campus interviewing schedules are coordinated, including employers seeking to hire engineering graduates. A third resource for students that is provided by the work of the education organization is classroom projects that are company-sponsored. In particular, the required senior projects for engineering students are predominantly company-sponsored and allow students to work with engineers from the host company on the projects.



Staff at GSU secure resumes from engineering students who are seeking employment postgraduation. Web-based tools are used to post student resumes for interested employers to view, and for employers to post job openings suitable for engineering graduates. In addition, employers will request the resumes of graduating engineering students that the GS staff will send to the interested employer for review.

Student:

Both the student and employer use several ways to find each other as a part of the process of "match-making" for a full-time, postgraduation hire. The search substage for the postgraduation position from the student's standpoint has three steps: 1) *inquire with co-op employer(s)*, 2) *network*, and 3) *submit resumes*.



The first step in most students' job search, when graduating with their engineering degree, is to inquire with their host co-op employer(s) about employment options. This step assumes that the student has an interest in continuing employment with the host co-op employer, which is often the case. However, not all students are interested in working for the co-op employer, and sometimes the employer is also not interested in the student as a full-time hire, for several reasons to be described under the decision criteria within the *selection* substage. For those who do find an interest from the host employer in hiring them full-time,

the student may or may not conduct any further job search before committing to work for the host co-op employer.

For those who did not hire into their co-op company after graduation, two (Fred Kroll and Keri Kraft) chose another organization despite having the offer to stay with the company at which they conducted their last co-op assignment. Five students — Barry Evans, Gloria Kline, Doug Koontz, Fred Kroll, and Nick Prather — would have accepted an offer at their co-op company if one had been extended.

Doug Koontz talked to his manager at IS, Inc., about a full-time position, but there was a hiring freeze in effect at the time. Gloria Kline encountered the same situation at IS. IS was going through a rough time, and there were massive lay-offs within the existing workforce. Between 2000 and 2005, IS reduced its workforce from more than 10,000 employees to just over 5,000 employees. Gloria would have hired on at IS if a position had been open and an offer made. After his third co-op semester, Nick Prather asked the people at PD, Inc., if they would hire him full-time, but they indicated they could not commit at that point because the company workload was not sufficient. Although Nick would have hired into PD if he received an offer, he was encouraged to look elsewhere for employment.

Brent Jolley said it was “terrible looking for work” after graduation. He tried to work at CRCP, Inc., where he had conducted his co-op, but they were not interested. Wendell Dews said he talked with the owner of IWG, Inc., about job options approximately nine months prior to graduating. He “was put off” at that point by the owner, so he started looking at other options. After completing his co-op, Mike Vilma did not conduct a job search. About two months before graduation he asked the engineering manager about a job offer. His manager said yes, and Mike accepted the position.

The second step in the search process for most students is to utilize a vastly expanded network, developed through interactions with classmates, coworkers, customers, and contacts from the co-op assignments. This can also include contacts developed through classroom projects. The student relies primarily on personal contacts but can utilize university contacts as well. All students have engineering-related network contacts from the prior co-op experiences, as well as from their now equally-connected classmates.

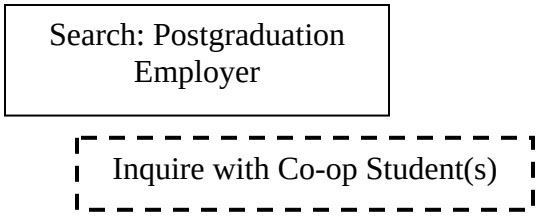
Eight students interviewed for this study developed a contact with their eventual employer through networking with a classmate, including Wendell Dews, Henry Dorale, Barry Evans, Steve Jeffers, Brent Jolley, Doug Koontz, Fred Kroll, and Zack Slater. Barry received an interview via "word of mouth" through efforts on his behalf by a GSU classmate who worked at AS, Inc. Through word-of-mouth and networking, Victor Abner obtained interviews at a small engineering design firm and a mid-sized local office of a large, national mechanical equipment manufacturer.

A coworker at DP, Inc., mentioned Nick Prather was seeking work to a colleague at TPT, Inc., and he eventually received an interview and accepted the position. Brent Jolley's friend, a GSU engineering program alum, passed along Brent's resume to some managers at ARJ, Inc., where the friend worked. He received an interview and a job offer, which he accepted. Fred Kroll worked full-time at VPA, Inc., for about six months and then "business got slow." He decided to send a resume to AS, Inc., because he knew some classmates there and his brother had conducted his co-op there as well through GSU's program.

Through networking efforts, students will submit resumes to employers who have been contacted and show an interest in the student. In addition, some students will submit resumes to prospective employers, either self-selected or referred by the faculty and staff at the education organization. Resumes are submitted via mail, email, or in person at the employer location or through other face-to-face means such as an education organization-sponsored, on-campus career fair. For example, Brent Jolley applied for several jobs after not gaining an offer of employment from his host co-op employer.

Employer:

The employer component of the search process contains four steps: 1) *inquire with co-op student*, 2) *communicate interest*, 3) *network*, and 4) *receive/review resumes*.

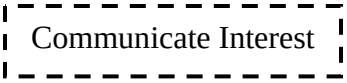


As with the student search process, the first step in the postgraduation job search from the employer perspective is to inquire with the co-op student about the student's interest in continuing with the employer in a full-time role. This assumes that the employer has both the need and the interest to hire the former co-op student, which for this study occurred in about one-half of the cases. As referenced at the beginning of the match-making postgraduation section, approximately 43% of the students interviewed for this study went to work for the company where the final co-op assignment was completed. This is similar to the entire class of students, which had a rate of 47% of students who went to work for the host co-op

company after graduation. The rate of hiring co-op students into full-time roles postgraduation is again dependent on a number of factors, including the decision criteria presented in the *selection* substage.

In particular, AS, Inc., hired into full-time, postgraduation roles four students who had conducted at least one co-op semester with AS, Inc. Likewise, ARJ, Inc., and GI, Inc., hired two of their co-op students for full-time positions. Finally, GBA, Inc., hired their co-op student full-time after he graduated with his degree.

Eric Jillet received an offer of employment from his co-op company, GI, Inc., but he did not accept it right away. He looked around at other options but did not receive any interviews. He eventually accepted the offer of employment at GI. Fred Kroll received an offer of employment from VPA, Inc., his co-op company, but he still interviewed at two or three other companies before accepting the VPA offer.



If the employer had a co-op student, an interest in hiring an engineering graduate, but was turned down by the co-op student, then the employer begins an external search process very similar to that of the search process for the co-op position. One of the first steps is to communicate interest. Typically a representative from the employer organization contacts the education organization to inquire about the availability of engineering graduate candidates. This can be an engineering manager or, more frequently, a human resources representative. The contact is often initiated by the employer. The communication can be in person to an education organization representative or can be written in the form of a position description. Sometimes the written communication appears only within the employer's environment, such

as a position posting on a website or an internal email sent to employees to indicate the need for a co-op student.

Network

As with the student search process, a primary means for searching for a new engineering full-time hire is networking. With this step, representatives from the employer organization use personal resources to identify potential students for a co-op position. Sometimes students who have already worked within the employer organization in a co-op role refer classmates they know, or are aware of, to the hiring managers. Occasionally an employer representative will initiate a personal contact to a resource they have within the education organization, such as a faculty member, to identify potential graduates. Also, previous interactions with a student through classroom presentations, on-campus visits, or employer-sponsored projects could precipitate a contact to the student from the employer representative.

Three employers interviewed for this study hired eight students (who were also part of this study) through networking efforts with the co-op students who worked for the host organization. AS, Inc., hired five engineering graduates through such networking efforts (in addition to the four that were hired through the co-op process); ARJ, Inc., hired two (in addition to the two that were hired through the co-op process); and GBA, Inc., hired one (in addition to the one that was hired through the co-op process).

Receive/Review Resumes

After communicating interest and networking, the next step involves receiving and reviewing resumes from students. This step is identical to the like-names step in the match-

making stage for the co-op position. Resumes are collected from students through direct submission by students, referral by education organization agents acting on behalf of the student, or referral by an employee or other person connected with the employer organization. Review of resumes can assume several formats. Depending on the size of the employer organization, human resources representatives may filter resumes and select the top student candidates to pass along to a technical/operations manager (typically done in larger employer organizations), or the technical/operations manager may receive and review all resumes (sometimes directly).

Search – Summary

The first substage of the match-making stage is the search process. The search process involves all three groups: students, education organization, and employers. Figure 21 displays the relationship among the three groups for the search process. The arrows signify the direction of movement in the process, with a one-headed arrow indicating moving from one step to another, while a two-headed arrow indicates movement in both directions during that step. A solid line indicates the singular option of completing that step.

The search process typically begins with either the student or employer. The employer can begin the process by offering the co-op student a full-time position, communicating interest to the education organization or student, or networking with the education organization or student. The student can begin the process by inquiring with the co-op employer about full-time employment opportunities after graduation, networking with the employer through personal or university resources, or by submitting resumes to the employer.

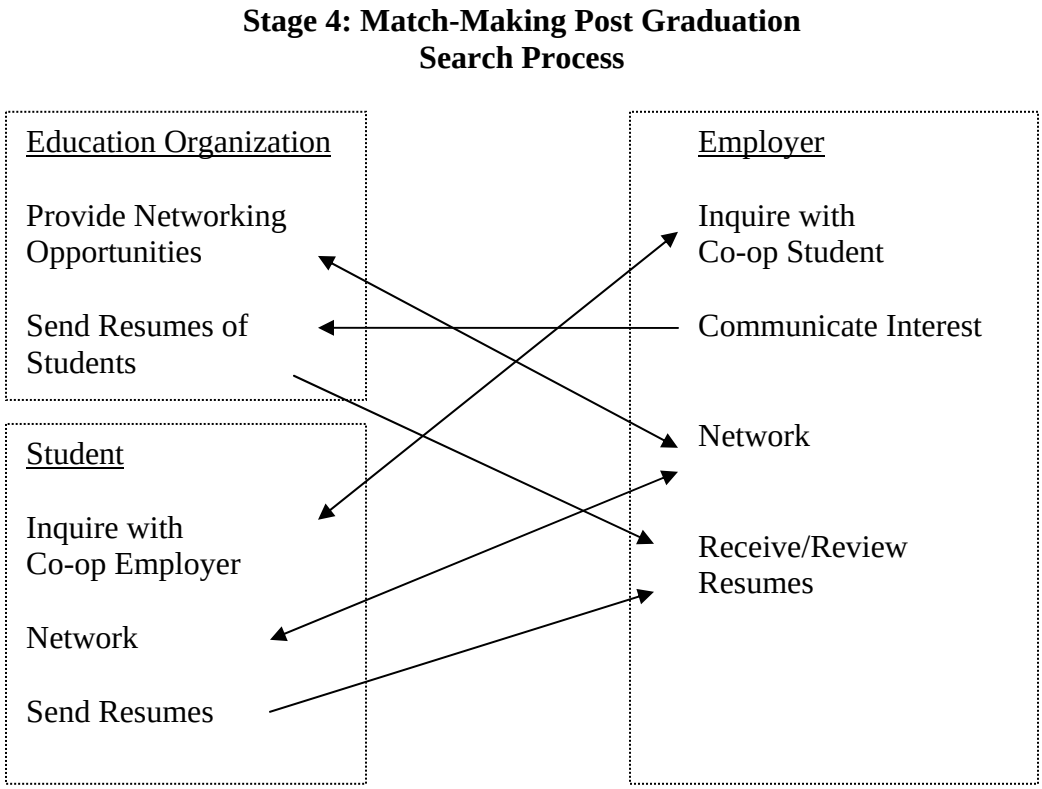


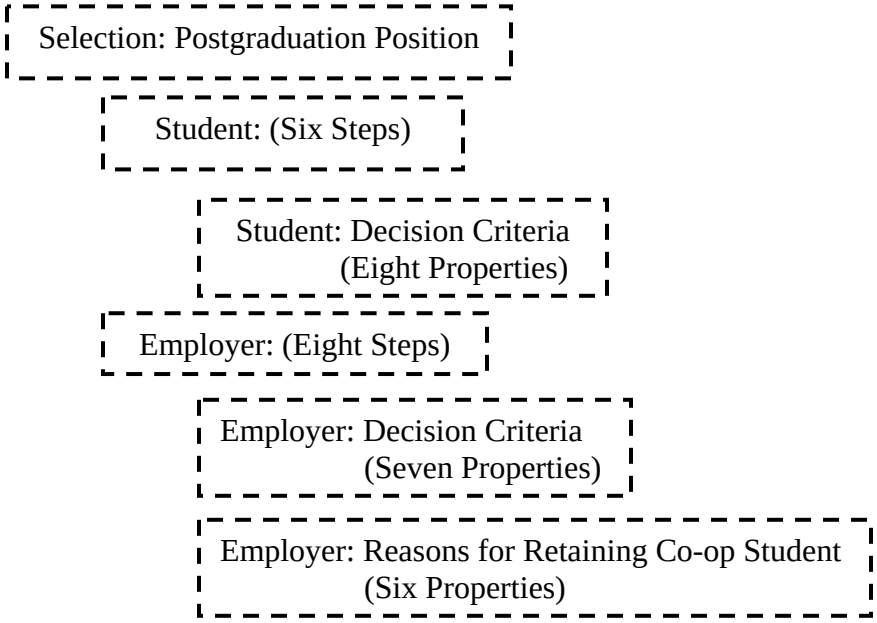
Figure 21: Search process for the postgraduation position

The result of the initial actions is for the student to receive an offer of employment from the co-op employer, for resumes to either be requested from the education organization or student by the employer, or for the education organization or student to submit resumes to the employer for consideration. If resumes are submitted, the employer then reviews the resumes and, in combination with the networking activities, considers which candidates to pursue further. This ends the search substage and begins the selection substage.

Match-Making Postgraduation: Selection

Selection refers to the phenomenon of students and employers choosing one another and mutually agreeing to enter into an employment arrangement in a full-time,

postgraduation role. The selection substage follows the search substage as part of the match-making stage for the postgraduation position. The student and employer groups are involved in the selection substage. The education organization does not have a role in the selection process. There are six potential steps involved in the selection process along with one category, *decision criteria,* from the student's perspective. For the employer, there are eight potential steps in the search process, along with two categories, *decision criteria* and *reasons for retaining a co-op student*. Decision criteria contains seven properties for the student and seven properties for the employer. There were also six reasons for retaining a co-op student identified by the employers.



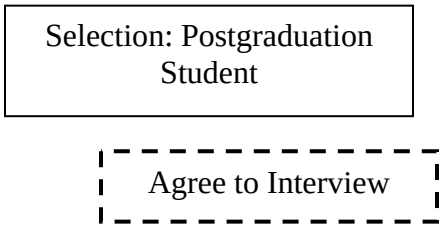
Student:

After the search substage for the student, when networking with and submission of resumes to employers is completed, the student enters the selection substage. There is no absolute distinction between when the search substage ends and the selection substage begins. In fact, activities that constitute both substages occur simultaneously as the student

progresses toward making a decision about the employer for whom he or she will ultimately work in a full-time role. Even though there is no absolute distinction between search substage ending and selection substage beginning, for purposes of analysis, the two substages will be separated and diagrammed as in the prior and subsequent sections.

Student Steps

The student selection process potentially contains six steps: 1) *agree to interview*, 2) *conduct screening interview*, 3) *conduct formal interview*, 4) *receive offer(s) of employment*, 5) *evaluate offer(s)*, and 6) *agree to employment*. Not all steps are experienced by all graduating students. For instance, some students will participate in both screening interviews and formal interviews as part of the selection process, while others will participate in only formal interviews. Also, some steps are conducted jointly with the employer due to the nature of the activity, such as screening interview, formal interview, and agreement to employment.



As with the match-making process for the co-op position, once the search process reaches a point where the employer has reviewed the graduating student applicants, the selection process begins with the employer offering to interview the student. The first student step within the selection process is agreeing to interview with the employer for the full-time, postgraduation position. All students seeking a full-time position in this study agreed to interview with the employer in order to obtain a position. The only occasions when a student may have declined an interview offer from an employer was when the employer was located

a significant distance from the student's home, or if the student had already accepted an offer of employment from another employer. For example, Doug Koontz interviewed at five different companies after his co-op assignment was completed at IS, Inc.

Conduct Screening Interview

After making contacts and sending resumes to employers, students receive an interview with a potential employer. In some cases, a shorter, screening interview is conducted first. This may consist of a telephone conversation, an interview on-campus, or a conversation with a member of the staff at the employer organization, as often happens through the employer-student interactions during the senior design projects. Some employers conduct short on-campus interviews to determine the candidates they would like to bring to the organization to meet more formally with staff.

Conduct Formal Interview

In all cases when a co-op student was not offered a position by their host employer, some form of formal on-site interview at the organization's facilities was conducted prior to any student receiving an offer of full-time employment. The on-site interview can consist of many formats including short (one hour) or long (all day), individual or group (interview with several people at once), and singular or multiphased (meet with people separately throughout the interview). Some students also had multiple interviews on-site prior to receiving an employment offer. Most students who searched for a postgraduation position received interview opportunities with multiple employer organizations, including Seth Martins, Victor Abner, Wendell Dews, Doug Koontz, Fred Kroll, Gloria Kline, and Keri Kraft. For example, Gloria Kline interviewed with three different companies in the West

Great Lakes region: a small manufacturing company, a mid-sized manufacturing company, and a mid-sized architectural and engineering consulting firm.

Receive Offer(s) of Employment

In all cases, the students' interviewed for this study all received at least one offer of full-time, postgraduation employment, since they each were working at the time of the interviews. One student, Wesley Juniper, was working full-time, but in a non-engineering role at TG, Inc., since he did not graduate with an engineering degree. Primarily due to the economic conditions in the West Great Lakes region during the time of this study, there were fewer opportunities for hiring into positions than in previous years. Therefore, some students received only one offer of employment, or struggled to find postgraduation employment. This was the case for Brent Jolley, who eventually found work at ARJ, Inc.

Gloria Kline received an offer from the small manufacturing company and the mid-sized architectural and engineering consulting firm and had a call-back for a second interview at the mid-sized manufacturing company. Wendell Dews interviewed at two places and received job offers from both. Wendell accepted the position at GBA, Inc. Doug Koontz received offers of employment from three of five companies he interviewed with, eventually accepting the offer at ARJ, Inc.

Evaluate Offer(s)

Some students were able to evaluate multiple offers of full-time, postgraduation employment. Victor Abner, Wendell Dews, Doug Koontz, Gloria Kline, and Keri Kraft all received multiple offers of employment. Other students, including Keith Kelly, Liam Morrison, Mike Vilma, Paul Arnold, Bill Rosey, Eric Jillet, Greg Randall, and Hank Molner,

were so convinced of the merits of working for their co-op employer that they did not wait for other offers of employment before accepting the offer from the host co-op employer.

Several students stated that they accepted positions with the only company that offered them a full-time position, or they quickly accepted a position that was offered to them in fear that there would not be another offer coming. Brent Jolley did not receive an offer for a full-time engineering position until approximately six months past graduation, and therefore took the position with ARJ, Inc., when offered. Gloria Kline decided to take the position at the mid-sized architectural and engineering consulting firm, even though she had never worked in that industry before.

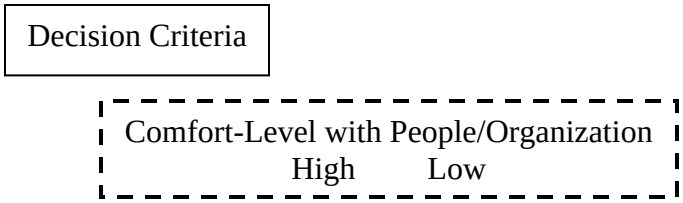
Agree on Employment

All students who were part of this study eventually agreed to work for an employer full-time, postgraduation. As mentioned, Wesley Juniper did not graduate with an engineering degree and was the only student not to hire into an engineering role. Barry Evans did not send a resume or interview anywhere but AS, Inc., prior to completing his full-time job search by accepting the position at AS.

Decision Criteria

The one category identified as part of the student selection substage for the postgraduation position was decision criteria. Decision criteria refers to the reasons a student decides to select an employer to work for after graduation. Seven properties were identified for the decision criteria: 1) *comfort level with people/organization*, 2) *easier not to look elsewhere*, 3) *location*, 4) *pay/benefits*, 5) *interest in company/work type*, 6) *stability of the*

employer, and 7) *number of employment offers*. In some cases multiple properties were given as reasons for selecting an employer.



One of the criteria identified by students for selecting an employer was the comfort-level felt with the people within the organization, developed through working at the employer organization during the co-op assignments or through attending school with fellow graduates of the engineering program at GSU. Several students commented that they accepted offers of employment from their co-op employer in part because they felt comfortable with the people with whom they worked. In other cases, when a graduating student mentioned reasons why he/she accepted a position at an organization other than the employer at which they conducted their co-op assignments, comfort-level with fellow graduates from GSU who worked at the offering organization was a primary reason for accepting the employment offer.

Wendell Dews, Paul Arnold, Brent Jolley, Barry Evans, Fred Kroll, and Henry Dorale all networked into positions at new organizations for full-time work with the help of GSU classmates who worked at those organizations. They also mentioned the comfort level of knowing those classmates as reasons for pursuing employment at those locations. In addition, Keith Kelly, Liam Morrison, Nick Prather, Paul Arnold, Bill Rosey, Eric Jillet and Greg Randall all mentioned that the comfort level felt with the people and the organization they worked at was a reason for accepting the postgraduation position.

Greg Randall accepted the full-time position at AS, Inc., because he liked the work he was doing and "half of it was the people [he] worked with." Kyle Williams was always very helpful and there was a lot of knowledge of the aerospace field he was able to access. The environment was attractive because the people were friendly, and Kyle "shielded [him] from a lot of the political stuff, so that [he] could concentrate on the real issues." Kyle was not like a boss, but more like "a person in the department" of whom Greg did not feel intimidated to ask any question.

Keith Kelly liked AS, Inc., and the people, the atmosphere, and the freedom on projects he had there. It was really comfortable, "laid-back" environment and was not as "high strung" of an atmosphere as other industries that his friends had talked about. There were "super intelligent" people to work with who were "down-to-earth and not standoffish." Liam Morrison said he already knew the people at GBA, Inc., and he knew his way around the organization. It was the same area (group) he had worked in as a co-op student, so there was a comfort level associated with that. If he had to uproot, "it might have ended up being harder." Paul Arnold liked the environment, the people he worked with, and the flexibility in the work schedule. The department he performed his co-op in "fit perfectly."

Barry Evans pursued AS, Inc., because he knew other classmates who were graduating from his program who completed their co-op at AS and were hiring on full-time after graduation. There were other GSU current or former students in the department Paul Arnold hired into, so "it was nice to know people" as well. Wendell Dews interviewed at two companies for a full-time position and received offers of employment from both. He decided to accept the position at GBA, Inc., because he knew it was a great place to work from talking with his neighbors. Fred Kroll took the position at AS, Inc., because he had always

heard good things about the company and knew it was a great place to work. In addition, it was helpful that there were already a couple of students with whom he had graduated in the department he hired into, and he knew them and fit in well with them.

A second decision criterion mentioned by graduating students for selecting the organization to hire into for the full-time, postgraduation position was the ease of looking for and securing a position. This criterion was given most often for those students who remained with the employer with whom they conducted the co-op assignments. It was easier to accept something that was familiar and did not require as much effort to secure.

Eight students — Paul Arnold, Eric Jillet, Keith Kelly, Hank Molner, Liam Morrison, Greg Randall, Bill Rosey, and Mike Vilma — did not interview anywhere before accepting the offer of employment at their co-op organization. Arnold, Kelly, Molner, Randall, and Vilma did not even investigate other opportunities prior to accepting full-time positions with their co-op employer.

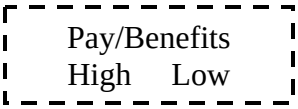
Greg Randall said that in the end, “it was nice that [he] didn’t have to worry about looking for a job that last semester [of school].” Seth Martins said that AS, Inc., offered him a full-time position during school, so that “was easier to take” than looking for something else. Bill Rosey stated that staying at ARJ, Inc., was “comfortable” and he thought he “had a good thing going,” so why change. Hank Molner was excited to accept his offer of employment immediately from GI, Inc., because it was a place at which he really wanted to work, and it was “nice to know what he was going to do” before graduation.

Similar to the decision criteria identified for selecting the co-op position, one of the criteria identified by students for selecting a postgraduation employer was location. In most cases, when location was referenced, the student was interested in working near to their home. Wendell Dews, Keith Kelly, Mike Vilma, Doug Koontz, Hank Molner, Henry Dorale, and Keri Kraft all specifically mentioned location (the position was close to home for them) as an important factor in accepting their postgraduation position.

Since he grew up around the area, Keith Kelly "wanted to stay around here." Mike Vilma liked ARJ, Inc., and did not feel the need to look elsewhere. He really wanted to be in the Forde Junction area, and ARJ was within an hour's drive. Keri Kraft had two interviews and a job offer with an engineering lab with offices two and three hours north of Forde Junction, but she turned it down because it was too far away. Next she had an interview and a job offer from a company located in a major city four hours to the southwest, but again she declined the offer because of the distance from her home-base in Forde Junction. Finally, Keri received an interview for a small engineering test lab, ST, Inc., located in a Forde Junction suburb. She was offered a part-time position, which she took, and after a couple of weeks was converted to a full-time employee. She liked the position because it was close to home.

Gloria Kline decided to take a position at a mid-sized architectural and engineering consulting firm after graduation over a small manufacturing company because the latter required a minimum of 50 hours of work per week, and it was further from where she lived. Doug Koontz accepted a position at ARJ, Inc., indicating that the one negative was the

distance from his home in Forde Junction (about 30 minutes). Henry Dorale said he accepted the full-time position at AS, Inc., in part, because it was close to home.



Another property of the decision criteria for students when selecting a postgraduation employer was pay and benefits. In most cases, students were interested in an employer that paid higher wages and provided more comprehensive benefits (health insurance, retirement compensation, etc.) than others. Wendell Dews, Liam Morrison, Doug Koontz, and Henry Dorale all mentioned that higher pay and/or good benefits were reasons they accepted full-time, postgraduation positions.

Wendell Dews interviewed at two companies for a full-time position and received offers of employment from both. He decided to accept the position at GBA, Inc., in part because it offered more money and better benefits than the other choice. Doug Koontz had job offers from three companies. Accepting the position at ARJ, Inc., "was an easy decision" because it was the best offer financially. Henry Dorale said he accepted the full-time position at AS, Inc., in part, because they offered a good financial package.

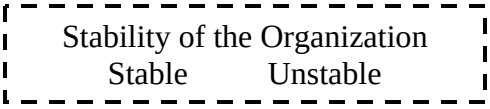
Close to graduation, VK, Inc., offered Keri Kraft a full-time position. However, "the position wasn't right and the pay was too low." Gloria Kline decided to take a position at a mid-sized architectural and engineering consulting firm after graduation over a midsized manufacturing company, even though she had never worked in that industry before. One reason she gave for her decision was that the midsized manufacturing company position she was offered was a second shift position and it did not pay well.

A fifth property of the decision criteria for selecting an employer was the interest in the company or the type of work conducted at the company. This property refers to whether the type of company, or the work assignment offered, was closely aligned with the interests of the student. If company/work type was a criterion for the student, they typically chose an employer who was more closely aligned with their work interests. Wendell Dews, Keith Kelly, Paul Arnold, Brent Jolley, Eric Jillet, Greg Randall, Gloria Kline, Hank Molner, and Keri Kraft all mentioned that a reason for choosing to work for the company that was selected was an interest in the type of work that could be performed at the company. Five of those students (Kelly, Arnold, Jillet, Randall, and Molner) remained at the company where the co-op assignment was conducted.

Greg Randall accepted the full-time position at AS, Inc., because he "liked the work he was doing." Keith Kelly did not pursue employment anywhere else before accepting the full-time position with AS, Inc. He really liked the company and the type of work he did as a co-op student. There was very limited opportunity to conduct the type of work he was doing at AS anywhere else in the West Great Lakes region. Paul Arnold never interviewed anywhere else for a full-time position. He liked the work he did as a co-op student at AS, and he did not want to go anywhere else.

Eric Jillet "knew that he fit" at GI, Inc. He liked what he did, he liked the values of the company, and he knew working there would make him happy. Keri Kraft accepted the position with the small test lab that offered her a position because she "was interested in the very hands-on work she was doing." Wendell Dews interviewed at two companies for a full-

time position and received offers of employment from both. He accepted the position at GBA, Inc., in part because it was a better work environment for him (in research and development), and "it looked like a great company." Doug Koontz had job offers from three companies, and accepting the position at ARJ, Inc., was done, in part, because he "liked the type of work he would do." Henry Dorale said he accepted the full-time position at AS, Inc., in part, because the position was challenging.



Another criterion that students mentioned as reasons they selected an employer for the full-time, postgraduation position was the perceived stability of the organization. Because the economy was in a recessed state, many companies were in the process of laying off employees or "freezing" the hiring plans that may have been in place. In some cases, the company was even closing portions, or all, of local facilities and/or divisions within the organization. In such cases, the student was not offered a position of full-time employment, even if the student had performed well and was interested in remaining. The student then sought organizations that were perceived to be more stable and not in the process of downsizing. Victor Abner, Brent Jolley, Barry Evans, Doug Koontz, and Gloria Kline all were forced to leave employers with whom they completed their co-op assignment because of hiring freezes or downsizing. Abner and Evans specifically commented that they choose their postgraduation employer because they perceived the new company to be more stable than the employer they left.

When it came time to start looking for a full-time position, Victor Abner was greeted with another shock. BR, Inc., the company he chose for his third co-op semester because it was big and stable, decided to close its plant in Forde Junction and move elsewhere.

Therefore, a hiring freeze was in effect in the central engineering offices, and no job offer would be forthcoming. Victor eventually accepted the IG, Inc., offer over a small engineering design firm because he felt there was “more stability” with IG, more opportunity to move up, and he liked the job description. Barry Evans considered the outlook for his co-op company to “be unstable,” which did not appeal to him. He perceived there to be more options and better job security at AS, Inc.

The seventh property of the decision criteria for students when selecting an employer was the number of employment offers a student received. The dimensions of this property are one and multiple. Most important, if a student received only one employment offer, he/she were left without much choice but to accept the position. Although Brent Jolley knew former GSU engineering students at ARJ, Inc., and liked the type of work conducted at ARJ, it was still the only offer of employment he received within six months postgraduation, and therefore he was given little option but to accept the position. Seth Martins had four interviews, but received only one full-time employment offer from AS, Inc., so he accepted the offer.

Liam Morrison noted that he did not look around at other options (separate from the existing offer from his co-op employer, GBA, Inc.) because the economy was not good. Bill Rosey, Eric Jillet, Fred Kroll, and Henry Dorale looked for other opportunities but did not find any interest from other employers and therefore took their initial employment offer. One factor that influenced Liam Morrison to accept the full-time position offer at GBA included the fact that “the economy was not doing great and jobs were scarce.”

Much like the decision criteria for the student in the selection process of a co-op employer, the concept of resource dependency and the relationship to power can be applied in this instance. The economy was still in a recessed state, much like when the student was seeking a co-op position. In a recessed economy, many employers do not have as strong a need for the specially-trained technical labor due to lesser sales of product or services, and therefore do not have as strong a need for engineering graduates. The scarcity of opportunities for the engineering graduates places the power with the employer in the employer-student relationship, as the employer can be selective when deciding whether to hire a student, while the student is left with little choice but to follow the employers' decisions.

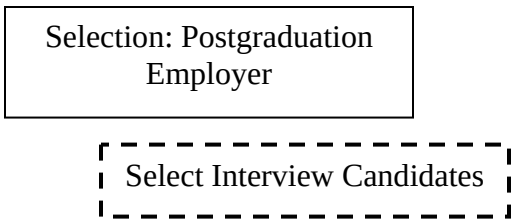
Employer:

As with the student component, the selection substage of the match-making postgraduation stage follows the search postgraduation substage. Also consistent with the student selection search and selection substages, there was no absolute distinction between the ending point of the search substage and the beginning of the selection substage. However, for the sake of analysis, the search and selection steps were separated as identified in the employer search substage and in the following section.

Employer Steps

The selection substage for the postgraduation position from the employer's standpoint has the same eight steps identified as with the employer co-op position selection substage: 1) *select interview candidates*, 2) *request interviews*, 3) *conduct screening interview*, 4) *conduct formal interview*, 5) *check references*, 6) *select candidate(s)*, 7) *make offer*, and 8) *agreement*

on employment. As with the student selection substage, some steps are not conducted by all employers, such as conducting screening interviews and checking references. Also, the steps of conducting screening interviews, conducting formal interviews, and agreement on employment happen jointly with the student.



The first step of the selection process is to select candidates to interview. This sometimes involves input from human resources personnel and technical managers/representatives. Final selection of candidates to interview almost always includes input from the technical managers. Selection criteria are consistent with the properties described for the decision criteria category described later in this section.

After students are selected to interview, the graduating students are contacted and a request is made to interview them. The student can accept the offer to interview or refuse it. If accepted, an interview is arranged. If denied, the employer may adjust their candidate pool and include additional students not originally selected, or they may proceed with only those students from the original pool who accepted the invitation to interview.

The first joint step of the selection process for students and employers is the interviewing step. As mentioned in the student selection substage, a screening interview may be conducted initially. The screening interview can be conducted through a telephone

conversation between the student and an employer representative. Another method used is to conduct short interviews at the education organization, after students have been identified by the employer. The on-campus interviews are conducted face-to-face and the purpose is to reduce the number of student candidates to a manageable amount.

Formal Interview

The formal interview step is another joint step between the student and the employer. A formal interview typically takes place on-site at the employer's workplace and can involve anywhere from one person to several people. Some employers skip the screening interview step and proceed directly to a formal interview step with a few selected students. This happens particularly when networking resources have been used to identify potential student candidates. Formal interviews can assume many structures ranging from one-to-one interviews to group interviews, from a singular question-and-answer session to multiple sessions in one day, from formal presentations to informal facility tours with employee introductions. Some employers may require more than one formal interview for students. During the formal interview step, expectations about the work requirements are communicated to the student, and the student is asked questions by the employer to determine if he or she is willing and capable to follow through with the work requirements. The student is also being evaluated to determine if he/she is a "fit" with the employer organization and the work group(s) and people with which they will interact.

Check References

The next step for some employers is to check references of the student candidate. References are requested of and provided by the candidate, and an employer representative

contacts the reference to solicit additional information about the student. The reference check can be conducted by human resources personnel or by the technical supervisor of the co-op position.

Select Candidate(s)

After conducting the formal interview(s) and possibly checking references, a final graduating student candidate is selected. The technical manager almost always selects the student or has substantial input in the selection step. Again, the criteria used to decide which graduating student is best are described in the decision criteria category following this selection process discussion.

Make Offer

After a student is selected, an offer of employment is made to the student by the employer. Again, the action of this step is sometimes carried out by a human resources representative or by a technical supervisor or manager. Making an offer of employment typically involves communication to the student about specific information related to work expectations (start time, hours, location, assignment duration, etc.), pay, and benefits.

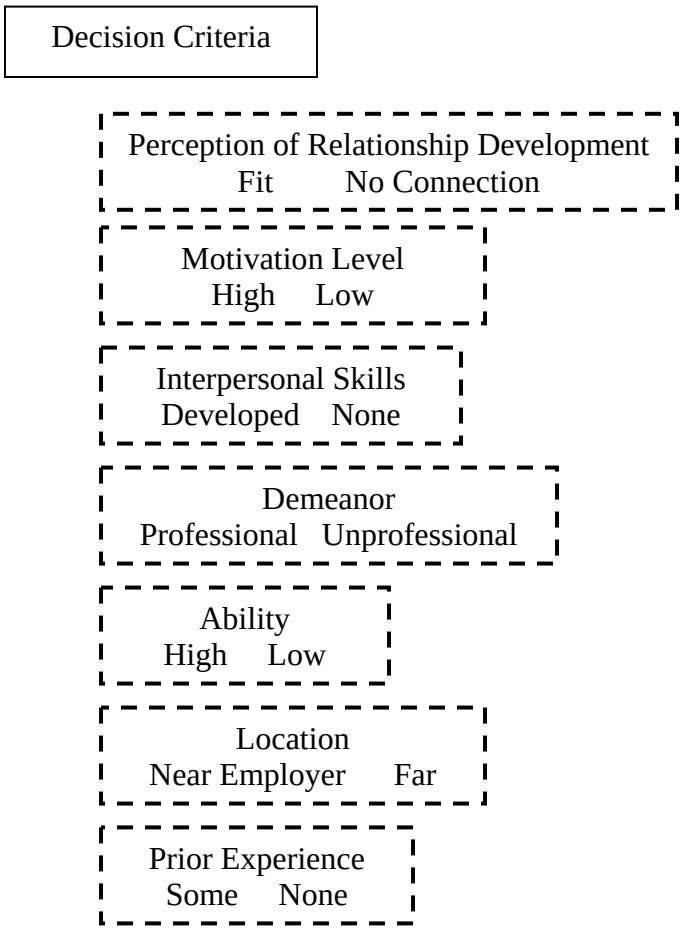
Agree on Employment

The final joint step in the selection process is agree on employment. The graduating student has been offered the position, and if he/she accepts, the employer and student agree to work within the boundaries of their predefined arrangement. If the student declines, then the employer either makes an offer of employment to additional candidates until one agrees on employment, or the employer declines to hire altogether.

Employer Decision Criteria

Similar to the student selection substage, decision criteria was identified as a category of the postgraduation position selection substage. Similar to the selection process for a co-op student, the employer uses decision criteria to select graduating students for interviews and when making a decision to hire a student for a postgraduation position. Because this study focused on a group of engineering students and how the co-op program impacts the students' ability to gain work in their chosen profession, employers were not queried on the specifics of hiring engineering students postgraduation who did not complete a co-op assignment as a student with the employer organization. However, it is reasonable to speculate that the properties determined in this study for employer pre-entry expectations and employer decision criteria for selecting a co-op student would be consistent with the decision criteria the employer would use when hiring a new, postgraduation engineering student.

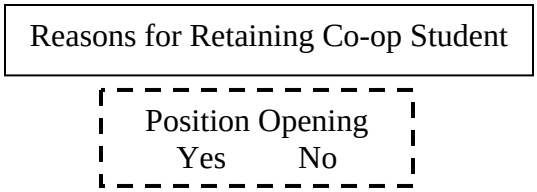
The six properties identified as the employer decision criteria for the co-op position were 1) *perception of relationship development*, 2) *motivation level*, 3) *interpersonal skills*, 4) *demeanor*, 5) *ability*, and 6) *location*. A seventh property, *related prior experience*, is included, based on the interest that employers showed in retaining co-op students, in part because of the experience the students possess. It is then logical to predict that employers desire prior work experience in candidates for postgraduation positions. Because these properties were not targeted within the scope of this study, no further discussion is provided here. See the discussion of these criteria in the "Match-Making Co-op Position: Selection – Employer Decision Criteria" section for more information about each criterion.



Reasons for Retaining Co-op Student

For the scope of this study, the focus of the discussion with the employer informants was on hiring (or choosing not to hire) co-op students. As with the student selection substage, the reasons to hire the co-op student are important for deciding whether to offer a position of full-time employment to a student who conducted co-op assignments with the employer. Six properties were identified for the reasons to retain a co-op student: 1) *position opening*, 2) *student fit with organization and occupational role* (including four "fit" factors), 3) *student knowledge of organization and occupational role*, 4) *lower start-up costs*, 5) *greater return*

on investment, and 6) *lower cost of hiring process*. In some cases multiple properties were given as reasons for selecting a co-op student to retain in a full-time role.



The first property identified was whether there was a position opening in the employer organization. This was dependent on economic conditions, as the stagnant economy did not allow some employer organizations the opportunity to grow the workforce even if there was a co-op student who had performed well and was accepted by the employees of the employer organization. If the employer had an opening for a full-time hire in an engineering role, the employer had the option to offer the co-op student a full-time position or to choose to search for another candidate. For this study, approximately 43% of the time, the employer hired the co-op student.

Victor Abner, Wendell Dews, Henry Dorale, Barry Evans, Steve Jeffers, Brent Jolley, Wesley Juniper, Doug Koontz, Gloria Kline, Nick Prather, and Zack Slater were not extended an offer of full-time employment primarily because the organization did not have an open position at the time. In large part this was due to the effects of poor economic conditions at the organization. Three exceptions were Henry Dorale and Zack Slater, who conducted their co-op assignment at GSU and obviously had no ability to hire into the organization as a practicing engineer after graduation, and Wesley Juniper, who did not complete the engineering program.

Prior to graduating with his bachelor's degree, Barry Evans conducted a limited, full-time job search for an engineering position. He liked working at DM, Inc., and would have liked to continue working for them after graduation, but they did not offer him a position. His

supervisor, Larry Mitchell, indicated that they were very satisfied with Barry's ability and he tried to create a position for Barry upon graduation, but economic and company conditions did not allow for that to happen. Larry "prefers to hire co-op students when they graduate with their degree," but "there has not been the ability to hire many students the past couple of years."

When it came time to consider offering Keri Kraft a position near graduation, Homer Mills stated that there was nothing open (a position) to offer her. This is in contrast to what Keri indicated. She claimed that she was offered a position but that is was not attractive or well-paying, so she turned it down.

Student Fit with Organization and Occupational Role
Fit No Fit

Another criterion used by employers for retaining co-op students for a full-time position is the outcome from the socialization process during the co-op assignments: the student is, or is not, a fit with the organization and occupational role. This property has dimensions of fit and no fit. The employer has a high degree of familiarity with the co-op student because of hosting the student for one full year of co-op work; and therefore knows the student well, including the student's positive and negative qualities. The employer was able to determine if the student had learned (or had the ability to learn) the rules and regulations, norms and expectations, and cognitive and affective processes that are important for success within the organization and occupational role.

When looking to hire a full-time employee, Kyle Williams stated that given two candidates, he would go with the co-op student if [the student] wasn't "dead wood." Co-op experiences provide a much longer and more rigorous evaluation period than a standard

interview process. The company gets to see how a person actually behaves under real conditions. Whether a co-op student is hired comes down to “a fit thing,” according to Carol Schmidt. Jeff Dillenger at IS, Inc., wrote in Gloria Kline’s end-of-semester evaluation that she “quickly fit in to our department.”

According to Brad Bonds, it is a positive to hire a co-op student after graduation because the company has “some idea of the strengths and weaknesses” of the student. You are “getting a known quantity, which is nice.” When it came to hiring Mike Vilma on full-time, Brian Campbell also said it was a case of someone who had worked out extremely well during his co-op assignment. “We were able to learn what he was capable of.” Finally, as Vince Murphy commented, the benefit is that there are “no shocking things” when hiring someone you know who performed a co-op with the company. These comments parallel the findings of Braunstein and Stull (2001) and Hurd and Hendy (1997), who found that employers are more likely to hire a co-op student than someone who did not complete a co-op experience with the organization, because the co-op program increases the quality and accuracy of the hiring process. The employer knows what they are getting.

Key indicators were identified that reflected whether the student had demonstrated the characteristics of a person who fit with the employer, mirroring many of the “entry expectations” discussed in the pre-entry stage (stage 1). Four “fit” factors were identified: *intelligence*, *self-motivation, ability to get along with people*, and *work ethic*.

When deciding to hire a co-op student after graduation, Gary Blanchard stated that if students are smart but cannot work with people or are too amiable, he would not hire them. On the other hand, if he sees problem-solving ability or intellectual capacity along with self-

motivation, the ability to work with people, the ability to get things done in a timely manner, and the potential for growth, he would consider hiring them. Jeff Dillenger indicated that Gloria Kline "was a sharp girl, who could pick up on new ideas and topics and learn them." According to Brad Bonds, one factor that was a positive indictor for hiring a co-op student after graduation was the ability to follow directions and ask questions when the student was stuck.

Self-Motivation
High Low

Gary Blanchard stated that if he identifies evidence of self-motivation in the student (along with some of the other qualities listed) he would consider hiring the co-op student. Carol Schmidt said the student needs to have a "go-get 'em attitude."

Ability to Get Along with People
High Low

Gary Blanchard stated that if students are smart but cannot work with people or are too amiable, he would not hire them. On the other hand, if he sees the ability to work with people he would consider hiring them. As part of Gloria Kline's formal evaluation of the third and final co-op semester at IS, Inc., Jeff wrote that she "has a great personality. She has good communication skills and was able to work well with contact internal and external to IS." He also wrote that Gloria "conducts herself in an appropriate manner. She manages herself well…she fit in well with the environment she was working in."

Work Ethic
Good Bad

When it came time to offer Paul Arnold full-time employment, Walter Tollen did so because Paul demonstrated excellent work and work ethic. Gary Blanchard stated that he

looks for the ability to get things done in a timely manner. Jeff Dillenger said of Glora Kline that she had a decent mechanical background (both in her formal training and in her work at IS, Inc.), but not as strong as some other students he worked with. However, he liked her "work ethic and how she conducts herself, how she solves problems." She would "do what it takes to get the job done." When hiring a new employee, Bob Karlson indicated he would much prefer hiring a co-op student over a non co-op student because he knows their work ethic and the student understands what is expected of him/her at ARJ, Inc. According to Brad Bonds, when it [hiring a co-op student after graduation] does work, it usually is because the student demonstrated the ability to complete a good quantity of work and to follow directions. When it does not work, the student typically did not demonstrate the ability to ask questions when he/she was stuck.

A third reason that an employer may or may not hire a co-op student is the student's knowledge of the organization and the occupational role. This property has dimensions of high and low and refers to the student's higher level of understanding of the organization, the work performed at the organization, and the people within the organization. Because the co-op student has a year of experience with the employer organization, the knowledge that the student has gained is more beneficial to the employer in many cases than the prospect of hiring another unproven engineering graduate.

Homer Mills commented that even if there were a position open, he was not sure if he would have offered Keri Kraft a full-time employment. She was not at the same stage or level skill-wise as the previous two co-op students. She did not progress to as difficult

assignments as the previous co-op students. It is noted, however, that in her third co-op assignment evaluation, the engineering manager who mentored her (not Homer) wrote that "unfortunately company circumstances did not provide enough opportunities for expanded responsibilities." According to Homer, she was well-liked, but there were some language issues, and she was not as technically strong as the others.

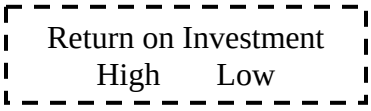
Glen Elmore said hiring a co-op student for a full-time position is a definite benefit because he/she already has some experience. The student knows how to get along in the organization both technically and relationally (socially). There is less familiarization to do with the co-op student. Many times co-op and non co-op students can do similar things coming in if the "upbringing" of the students is similar. Grant Reynolds commented that the student knows the company already, so there is little or less training needed. According to Vince Murphy, having co-op experience is important when hiring a full-time person, because the person can "walk in the door knowing the basics. [Co-op students] know how to work, who the people are, and the applications of products the company is involved with."

The timing of the work contributions a new hire can make to the employer is another property identified by the employer informants. Most co-op students can make valuable contributions to the employer's work needs more quickly than a new hire who had not already worked at the employer organization. This property is closely related to the student knowledge property. Because the student is knowledgeable of the employer organization, work, and people, he/she can make contributions more quickly than a graduate who has not conducted a co-op assignment with the employer. The result of the student's ability to be more productive more quickly means lower start-up costs to the employer (investment in

training and development of the new hire) and quicker time to adding economic value to the employer. This reason is consistent with what Braunstein and Stull (2001) found, noting that co-op students make a quicker contribution to the organization. Hurd and Hendy's (1997) findings also indicate that employers benefit from increased productivity if hiring a co-op student.

Larry Mitchell said that co-op students can hit the ground running, add to productivity immediately, are a valuable contributor from the start, and are already groomed to begin work as a mature engineer. According to Sally Nelson, a co-op student "does not even need a tour of the building when they start; they can hit the ground running." The student is already comfortable with the office environment and procedures. Co-op students typically "come out running; there is no ramp-up time," according to Carol Schmidt. The co-op student outperforms other new graduates and does not need to learn the ins and outs of working at AS, Inc.

Bob Karlson said the co-op student "is familiar with most of the employees already, and it takes them much less time be productive for the company." Vince Murphy said that many of the things one would do when training a new employee can be glossed over if the person has co-op experience with the organization. In fact, an internal co-op candidate would not need training in most cases. They know the basics but still would need to cover new information that was not expected of them as a co-op student.



Return on investment is a property with dimensions of low to high, which employers use to assess students when making a selection of whom to retain of the co-op students who

have worked for them. Return on investment refers to the employer's wish to hire the co-op student after graduation to recoup more of the time, money, and training that has been invested in the student during the co-op program. This is desirable if the student has been evaluated and determined to be of further value to the employer organization in a full-time engineering role. Grant Reynolds stated "there is time and money invested into the co-op student, so it is of value to retain the strong candidates."

The final property identified for retaining the co-op student in a full-time postgraduation role is the cost of the hiring process. The dimensions of this property are higher and lower, and the employer prefers to have lower hiring costs. The costs for hiring the co-op student are much lower than for hiring another person from outside the organization. An offer can be made directly to the co-op student, which costs nothing, while advertising and the interview process for a new hire will require some monetary expenditures. There are some costs involved with recruiting a co-op student, but those costs are typically much smaller than recruiting a full-time, postgraduation employee.

Sally Nelson said the hope is that the co-op student performs because it makes the hiring process cheaper. If the co-op student is performing and the department has an opening, the student can simply be offered a position without having to interview. In Hurd and Hendy's (1997) review of the co-op literature, they too found that one common theme as a benefit to employer in hiring a co-op student was savings in time and money.

Selection – Summary:

The selection substage of the match-making postgraduation stage refers to the phenomenon of students and employers choosing one another and mutually agreeing to enter into an employment arrangement in a postgraduation engineering role. The selection substage follows the search substage, but there is often an overlap of activities between the search and selection substages. The selection substage, unlike the search substage, involves only the student and employer. The education organization is not involved.

Like the summary figure for the search substage (Figure 21), Figure 22 displays the interaction of steps summarized for the selection substage. Again, a solid line indicates movement from one step to another in a manner that is expected to occur. A dashed line indicates that the movement between steps sometimes occurs, but may or may not occur for in all cases. A box with a dashed border that connects the student and employer areas indicates that the step occurs jointly between the student and employer.

The employer, after reviewing the resumes that have been submitted in combination with the networking activities, selects students to interview. Decision criteria, identified in Figure 23 and marked in Figure 22 by a superscript "DC," are used by the employer to determine the students to interview. The employer then requests an interview from the selected student(s) and the student agrees (or declines) the employer's request. The first joint step occurs next and involves a screening interview, a formal interview, or both. Some employers conduct a brief telephone or on-campus interview with student candidates first, then reduce the number of students they would like to bring to the workplace for a formal interview. Some employers choose to move directly to the formal interview step after requesting an interview. In some cases, more than one formal interview is conducted. After

Stage 4: Match-Making Postgraduation Selection Process

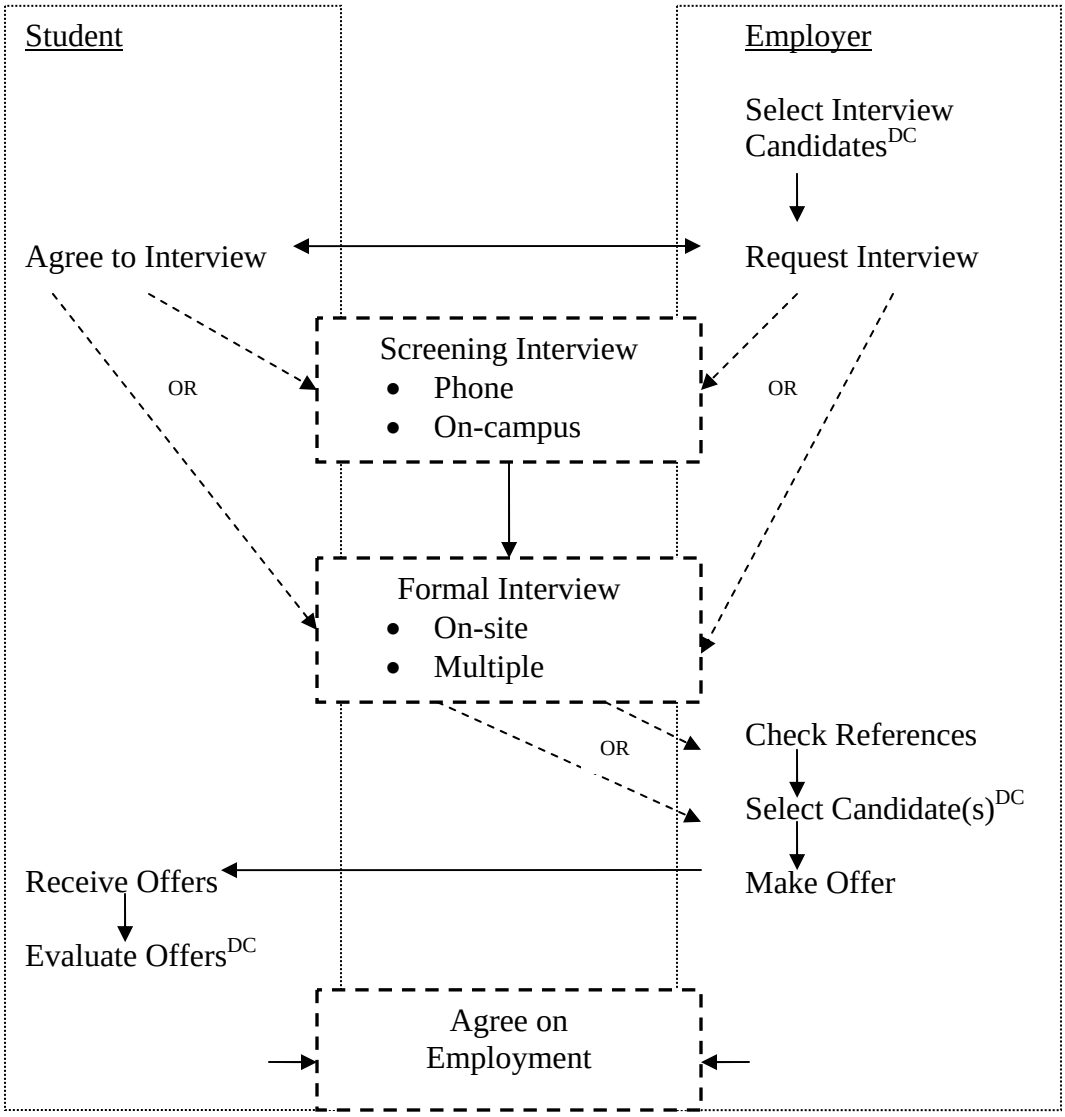


Figure 22: Selection process for the postgraduation position

the interviews are completed, some employers elect to check student references before choosing students to hire, while other employers move directly to a student selection step. Again, Figure 23 identifies decision criteria that employers use when choosing a student to hire.

Stage 4: Match-Making Postgraduation
Selection Decision Criteria and Reasons for Retaining a Co-op Student

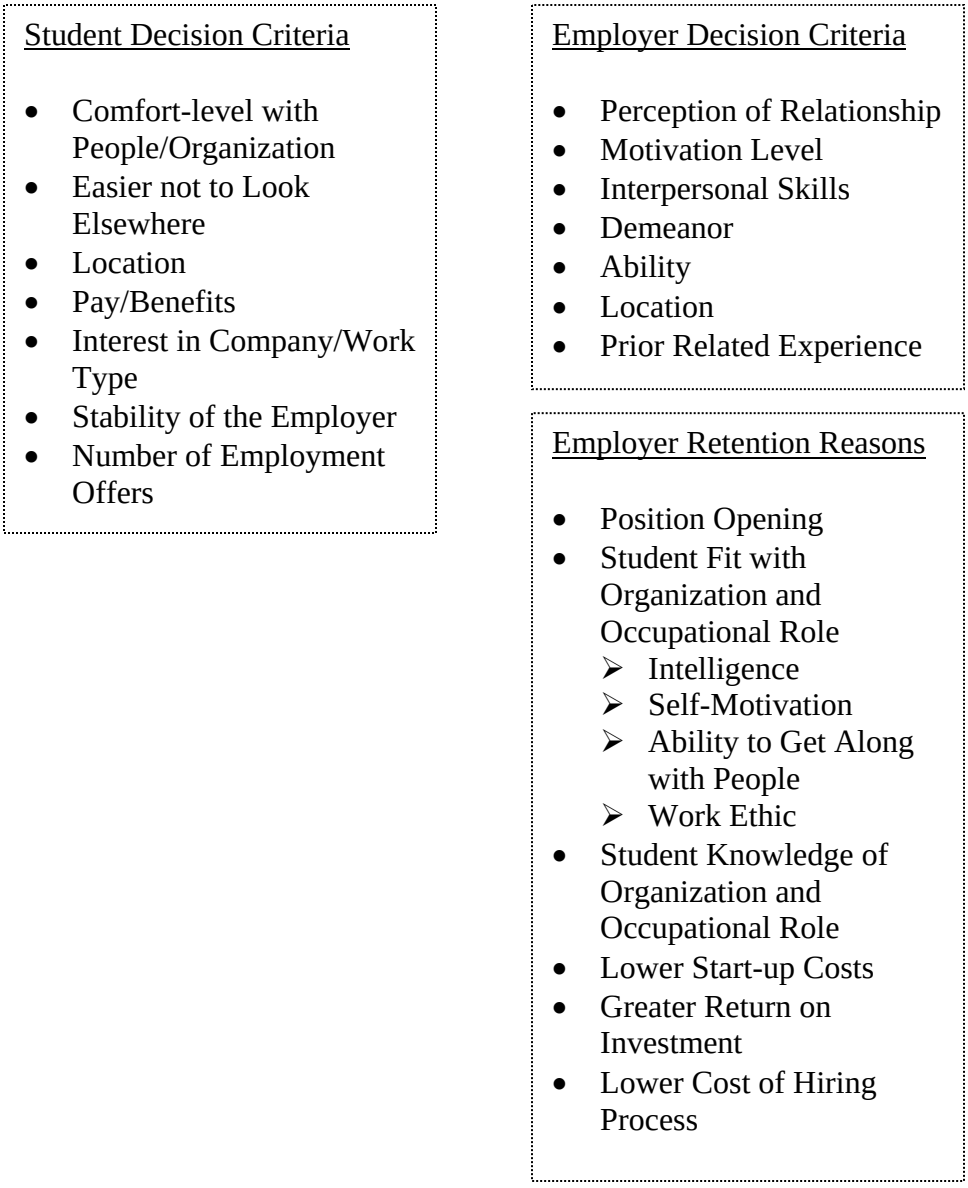


Figure 23: Selection decision criteria and reasons for retaining a co-op student for postgraduation position

When a student (or students) is identified, an offer of employment is made to him/her by the employer. The student receives one or more offers of employment and then must evaluate the offer(s) based on the decision criteria identified in Figure 23 (marked in Figure

22 with a “DC”). Once the student makes a final decision, a joint step occurs between the student and employer, termed agreement on employment, which concludes the selection substage.

The decision criteria for students typically included one or a combination of the following items: comfort-level with people/organization, easier not to look elsewhere, location, pay/benefits, interest in company/work type, stability of the employer, and number of employment offers. Because of the recessed economic conditions in the West Great Lakes region, co-op opportunities were scarce in some fields, and therefore students had to struggle to receive a single offer of employment, which they were then obligated to accept. This is consistent with the power distribution, in terms of resource dependency, that favors the employer organization in terms regarding supply and demand of labor.

Employers’ decision criteria were based on the expectations identified in the pre-entry category for employers and included the student’s technical and personal skills. More specifically, properties included perception of the relationship between the student and employer, motivation level, interpersonal skills, demeanor, ability, location, and prior related experience. In many cases the employer used these criteria to identify candidates to interview from the resumes reviewed, but reverted to whether the students would “fit” in terms of personality with the group following the interview process.

There were six reasons identified related to why (or why not) an employer would decide to retain a co-op student: whether there was a position opening, student fit with the organization and occupational role (including traits of self-motivation, intelligence, work ethic, and ability to get along with people), student knowledge of the organization and

occupational role, reduced start-up costs (students are able to add value to the organization more quickly), greater return on investment, and lower cost of the hiring process.

Match-Making Postgraduation: Summary

The match-making postgraduation stage is a process of students and employers connecting with each other regarding employment as a postgraduation, full-time engineer and ultimately agreeing to enter into a work relationship. In some cases, the education organization acts as a facilitator for connecting the students and employers.

Aspects of the match-making stage occur for the entities of education organization, student, and employer. The match-making process can be explained metaphorically as a dating process. Two substages compose the match-making stage: search and selection. Search refers to the seeking out of a suitable partner for the employment arrangement, by both the student and employer. Selection is the "courting" activity that occurs when students and employers identify potential partners and then begin to evaluate whom they will ultimately date (enter into an employment arrangement with). The conclusion of the match-making stage is the agreement between the partners (student and employer) to begin dating exclusively (enter into an agreement to begin an employment relationship in the form of an engineering co-op role).

Figure 24 is a pictorial display of the match-making activity that occurs as part of stage 4. The figure is separated into education organization, student, and employer activities, as well as some jointly conducted activities. The figure is also separated from top to bottom by a dashed line that demarcates the search and selection substages. Figure 24 combines the activities displayed in Figure 21 (the search substage) and Figure 22 (the selection substage). As with those figures, solid lines indicate movement between and among activities, while

Stage 4: Match-Making Postgraduation Position

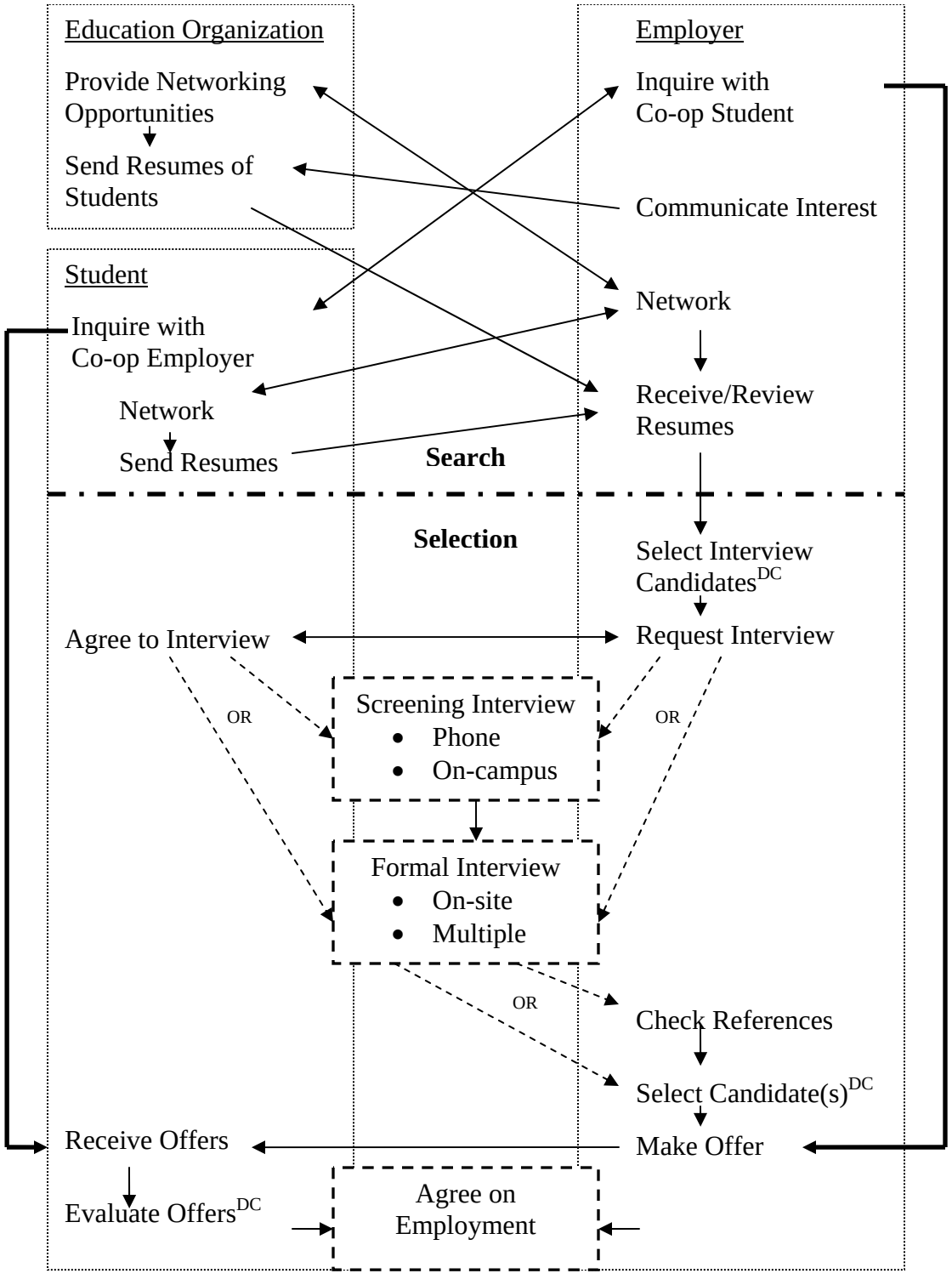


Figure 24: Match-making for the postgraduation position

dashed lines indicate a movement between activities that occur in some cases, but not all. A box with a dashed border is a step that occurs jointly between two entities – in this case between the student and employer.

The education organization is involved only in the search substage and constitutes two steps, providing networking opportunities for students and employers and sending resumes of students to employers. In many ways, the education organization assumes the role of a match-maker – a third-party assisting in two interested people (or groups of people) getting to know one another. After the student and employer are introduced, the education organization is not involved again.

The student component of the match-making stage contains both substages: search and selection. The student search process contains three possible steps: inquiring with the co-op employer about full-time opportunities, networking with potential employers, and submitting resumes to potential employers. If the student inquires about full-time opportunities with the employer, and the employer agrees to offer a position of full-time employment, the student moves directly to evaluating the offer to decide whether to work for the employer.

The selection process contains six potential steps including agreeing to interview with interested employers, conducting a screening interview, conducting a formal interview, receiving offer(s) of employment, evaluating offers of employment, and agreeing to employment. The student uses decision criteria (identified in Figure 23) to evaluate offers of employment. The decision criteria, marked in superscript “DC” on Figure 24, contains seven properties: comfort-level with people/organization, easier not to look elsewhere, location,

pay/benefits, interest in company/work type, stability of the employer, and number of employment offers.

The employer component of the match-making stage also contains both substages, search and selection. The employer search process contains four possible steps: inquiring with the co-op student about a full-time position, communicating interest to the education organization and students, networking with potential student candidates, and receiving/reviewing resumes. The selection process contains eight potential steps including selecting student interview candidates, requesting interviews of the student, conducting a screening interview, conducting formal interviews, checking student references, selecting student candidate(s), making an employment offer, and agreeing to employment.

The employer uses decision criteria (identified in Figure 23) when reviewing student resumes, deciding whom to interview, and selecting a student to offer the co-op employment role. The employer decision criteria (marked with a superscript “DC” in Figure 24) contains seven properties: perception of the relationship between the student and the members of the employer organization, motivation level of the student, interpersonal skills of the student, demeanor of the student, the ability (technical and personal) of the student, location (were the student is from), and prior related work experience.

The match-making postgraduation stage can begin with either of two entities: the student or the employer. The employer can begin the process by inquiring with the co-op student about a full-time position, by communicating interest to the education organization or student, or through networking with the education organization or student. Six reasons (displayed in Figure 23) were identified for an employer wanting to retain a co-op student for full-time hire after graduation. Finally, the student can begin the process by inquiring with

the co-op employer about a full-time position, networking with the employer, or by submitting resumes to the employer.

The result of the initial actions is for the co-op student and employer to agree about entering into full-time, postgraduation employment, for resumes to either be requested from the education organization or student by the employer, or for the education organization or student to submit resumes to the employer for consideration. The employer then reviews the resumes and, in combination with the networking activities, selects students to interview. Decision criteria are used by the employer to determine the students to interview. The employer then requests an interview from the selected student(s) and the student agrees (or declines) the employer's request.

The first joint step occurs next and involves a screening interview, a formal interview, or both. Some organizations conduct a brief telephone or on-campus interview with student candidates first, then reduce the number of students they would like to bring to the workplace for a formal interview. Some employers choose to move directly to the formal interview step after requesting an interview. In some cases, more than one formal interview is conducted. After the interviews are completed, some employers elect to check student references before choosing which student(s) to hire, while other employers move directly to a student selection step.

When a student (or students) is identified, an offer of employment is made to the student. The student receives one or more offers of employment, and then must evaluate the offer(s) based on the decision criteria. Once the student makes a final decision, a joint step occurs between the student and employer, termed agree on employment, that concludes the match-making stage.

Employers' decision criteria were based on the expectations identified in the pre-entry category and included the student's technical and personal skills. In many cases the employer used these criteria to identify candidates to interview from the resumes reviewed, but reverted to whether the students would "fit" in terms of personality with the group following the interview process.

Stage 5: Accelerated Entry - Postgraduation (Postscript)

A fifth stage, *accelerated entry* for the postgraduation position, is included as a part of the model as a postscript item. Although this study focused on understanding the processes encountered during the co-op experience, some information was obtained regarding the experiences encountered immediately after graduation. This was possible since all student respondents had graduated one to two years prior to the time of the interviews and were therefore able to share some information about their experiences moving into full-time positions postgraduation. The information is more limited than that collected for the entry stage for the co-op position but is included since the information is sufficient to suggest the existence of such a stage.

The fifth stage is identified as accelerated entry, and it relates to the experiences a student encounters after hiring into an organization after the student moved from a co-op occupational role to a full-time engineer occupational role, postgraduation. Chao et al. (1994) and Schein (1971) found that socialization happens at all stages of a career, validating the existence of a second occurrence of socialization when students move from the co-op role to a full-time, postgraduation engineering role. Much like the entry stage during the co-op program, the entry stage evident during the postgraduation phase has two categories: 1) *organization* and 2) *occupational role*.

Entry during the postgraduation phase happens at an accelerated rate compared to during the co-op program. The new graduate may or may not have to move from outside to inside the organization, depending on whether or not the student left the co-op organization for a new organization. In most cases, there is some degree of socialization to a new occupational role since the student has completed his/her engineering degree and is starting

out with the title of “engineer” without ever holding that title until that point, despite possibly being a new or junior-level engineer (in occupational role) as a co-op student.

The student goes through the entry phase at an accelerated rate when beginning the full-time, postgraduation position because the student has already experienced the process of entry during the co-op program. The student not only knows what to expect, but the fact that he/she knows one has to go through various steps before being allowed “inside” helps the student find his/her way more quickly. The student knows what to look for and how to cope. The accelerated entry postgraduation stage contained two components: 1) *staying with the same employer* and 2) *joining a new employer*.

While it is clear this stage exists, future research would more fully develop the tactics used to move the student inside the organization and occupational role during the postgraduation experience. The identification of key information and tactics used to teach the information is neither comprehensive nor well-developed, but the information is provided as support for a fifth stage (accelerated entry postgraduation). Therefore, stage 5 is not presented with great detail as was the case with the entry for the co-op position (stage 3).

Staying with Same Employer

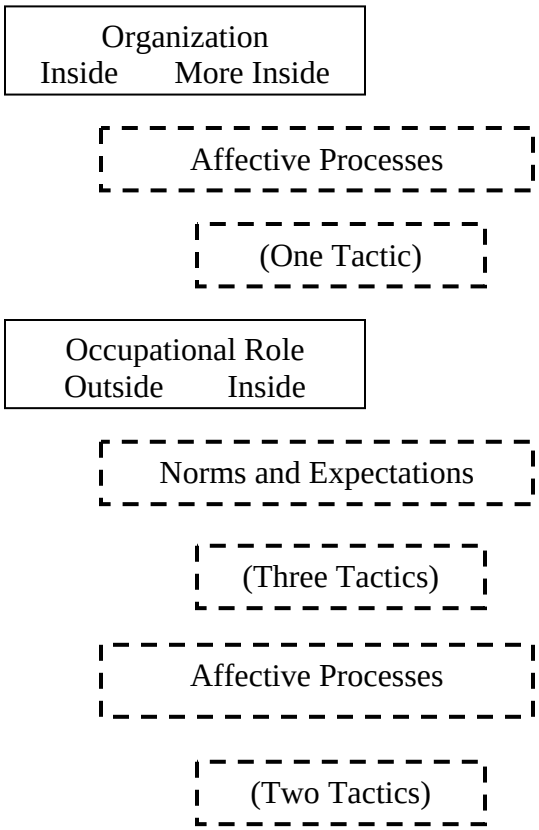
For the student who went to work full-time for the same organization at which he/she had conducted the co-op assignment(s), there was no move from outside to inside the organization. The student already was inside due to the experiences in the co-op program. However, there was some evidence of moving *more* inside the current organization, consistent with Schein’s (1978) concept of moving inward and upward within an organization and role throughout the career cycle. A few of the students did find that the level of work responsibilities and expectations from coworkers increased after accepting a

full-time position. This indicates a further shift within the level of acceptance or recognition from members of the organization. Students moved from a co-op-level engineering-related occupational role to a full-time, degreed engineer occupational role. While both are "inside" the engineering-related role structure, the full-time engineer occupational role is more inside than the co-op engineer occupational role.

Again, because the processes and tactics for this stage were not investigated in depth for this study, general subcategories consisting of Scott's (2001) three pillars (rules and regulations, norms and expectations, and cognitive categories and scripts) and Greenspan and Shanker's (2004) and Homans' (1950) concept of affect are identified along with some possible tactics. Some references to Van Maanen and Schein's (1979) types of tactics are made but are not discussed in detail or analyzed for this study.

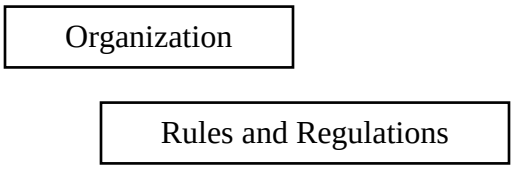
Organization:

There was little evidence of entry processes to move the graduate inside the organization since the graduate already worked at the employer organization during the co-op assignments. There was only one indication a student made of moving more inside the organization, through acquisition of additional *cognitive categories and scripts*. Evidence of communicating *norms and expectations* and *affective processes* was found for entry to the new occupational role of full-time engineer, postgraduation. Although further investigation might identify some rules and regulations and cognitive categories and scripts that are taught by the employer workgroup when the student moves into the new occupational role, there was no indication of rules and regulations being taught in this study. Most likely, this was the case because the student had already moved into a new or junior-level engineer occupational role through the co-op experiences with the same employer.



Rules and Regulations

There were no rules and regulations identified for entry to the organization, postgraduation, for the student staying with the same employer where co-op assignment(s) was/were completed.



Norms and Expectations

There were no norms and expectations identified for entry to the organization, postgraduation, for the student staying with the same employer where co-op assignment(s) was/were completed.

Norms and Expectations

Cognitive Categories and Scripts

There were no cognitive categories and scripts identified for entry to the organization, postgraduation, for the student staying with the same employer where co-op assignment(s) was/were completed.

Cognitive Categories and Scripts

Affective Processes

Staying with the same organization in a full-time occupational role after completing the co-op assignments presents different dynamics than when moving to a new organization. The student is already inside the organization but is taught new information as a full-time employee to move more inside the organization. The information taught in this one situation was considered affective processes and was termed *politics of office environment*.

Affective Processes

Politics of Office Environment

One student commented that some of the most critical information he learned was how to deal with people and the various levels of values each possessed. Some of the values were in conflict with his own or with those he thought were important to the entire

organization. Managing information of office, or organization-level, politics is an important skill when moving further inside the organizational structure and hierarchy. This information is individually, informally communicated in either a conscious or taken-for-granted manner, resulting in a sink-or-swim environment. The tactic identified in this situation is termed *involve with organization-level value conflicts*.

Involve with Organization-level Value Conflict

As Liam Morrison has progressed through his transition from new co-op student to new full-time engineer, he has gotten more jaded. He was very optimistic at first when starting co-op. After awhile he was hit with reality; a lot of what takes place in an organization is not progress but status quo and maintenance. Dealing with the office politics and with different people was one of the hardest adjustments to make, and was “one of the biggest things he learned” through co-op. Liam has learned to take the emotions out of situations, and “that is something you cannot teach in a class.” Learning to work is one thing, but learning to deal with people and different personalities is one of the most important skills he learned.

Occupational Role:

Rules and Regulations

There were no rules and regulations identified for entry to the occupational roles, postgraduation, for the student staying with the same employer where co-op assignment(s) was/were completed.

Occupational Role

Rules and Regulations

Norms and Expectations

When entering a new occupational role with the same organization, new norms and expectations are communicated to the student. These new norms and expectations are termed *expectations and responsibilities*.

Norms and Expectations

Expectations and Responsibilities

When the student moved into a full-time role, there was a noticeable difference in the level of expectations and the amount of responsibility given to the student. When the student was a co-op employee, workgroup members did not have as high expectations and did not give as much responsibility as when the student became a full-time hire. There also was not as much training (if any) since the student had already been working at the organization as a co-op student. This information was individually, formally or informally, and consciously communicated in a sink-or-swim manner. Three tactics were identified: *communicate greater expectations*, 2) *provide more responsibility*, and 3) *provide less training than co-op*.

Communicate Greater Expectations

Making the transition to a full-time position from being a co-op student was not hard for Keith Kelly. The people did treat Keith somewhat differently, however. Early on in the co-op process there were not as many expectations, but “now there are higher expectations and more responsibilities.”

Provide More Responsibility

Transitioning to a full-time role was not a lot different from what Mike Vilma had been doing since his last co-op assignment. He was already functioning as an entry-level

engineer would. He was put in charge of some jobs and he had more responsibility. Similarly, Hank Molner said he had “more responsibility thrown at him” and had longer work days, but there was no difference observed in how he was treated.

Provide Less Training than Co-op

Mike Vilma said there was no real training since he had been working with ARJ, Inc., for a couple of years in his co-op role.

Cognitive Categories and Scripts

There were no cognitive categories and scripts identified for entry to the occupational roles, postgraduation, for the student staying with the same employer where co-op assignment(s) was/were completed.

Cognitive Categories and Scripts

Affective Processes

There was evidence that the student encountered affective processes that were new to him/her during the transition from a co-op student to a full-time engineer occupational role within the same organization. The affective processes identified occurred in both a reinforcing and a conflicting manner. The type of information is termed here as *emotional outcomes of new role.*

Affective Processes

Emotional Outcomes of New Role

Two types of outcomes were experienced in an affective sense when the student moved from a co-op to a full-time engineer occupational role. First, the student felt he/she was treated differently by peers. The experience was a positive feeling for the student

because it included a sense of belonging and equality with others he/she worked with. However, there was also a negative feeling associated with being treated like a peer. Higher expectations from peers and supervisors left the student feeling a greater pressure to perform. Both types of information are communicated in individual, informal, and taken-for-granted manners. Following are two tactics identified to be affective experiences for the new graduate when moving into a full-time engineer role within the employer organization where the graduate conducted a co-op assignment: 1) *treat like peer* and 2) *feel pressure of increased expectations.*

Treat Like Peer

Keith Kelly at AS, Inc., stated that it was more of a mentor/mentee relationship during the co-op program and now he feels he is treated more as a peer. Seth Martins at AS, Inc., also said he feels he is now doing more "real work," and senior people come to him now for information. Eric Jillet stated that there was not much of a transition to full-time work from co-op since he continued working with the same group of people. He also said he did not feel he was treated any differently once he became full-time employed. Bill Rosey also said he felt very comfortable from the start transitioning from a co-op to a full-time engineer at ARJ, Inc.

Feel Pressure of Increased Expectations

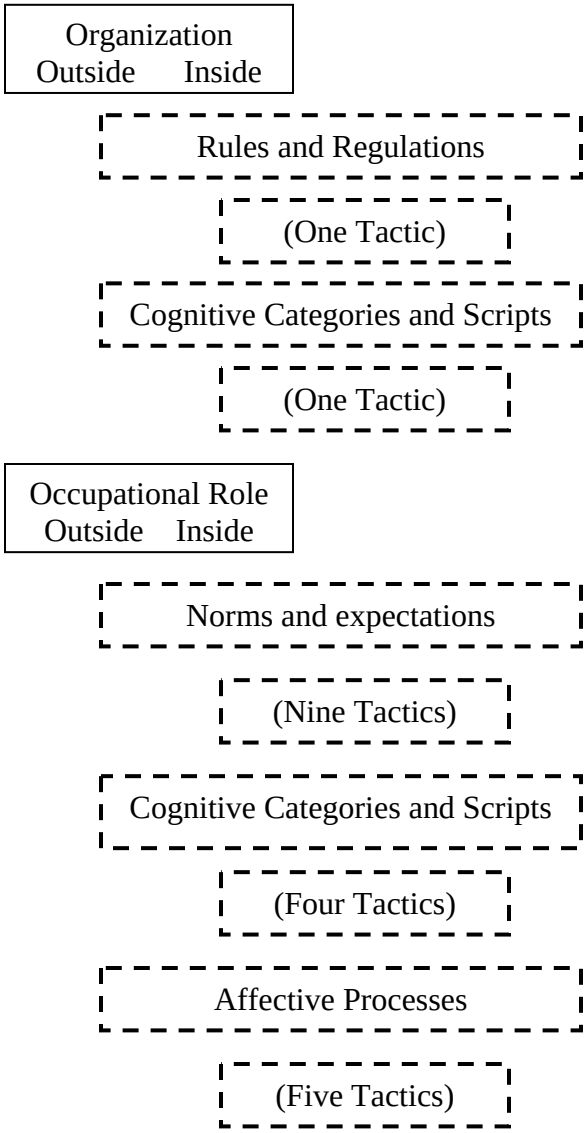
Paul Arnold's interaction with people at first was different, as he was a bit reluctant and afraid to make a mistake. Being a full-time employee, he found that the people were not as relaxed around him as when he was a co-op student. It was more intense as he had greater expectations and responsibilities. Now he feels more comfortable and knows he is there for a reason.

Joining a New Employer

When moving to a new organization after graduation, the student does have to move from outside to inside both the organization and occupational role, as he/she did during the co-op program. The outcomes of the entry processes typically occur in a quicker manner than during the co-op experience, especially if the student moved to an organization that was in a similar engineering field to the organization left after the co-op experience.

There was some evidence of formal entry processes to move the graduate inside the new organization, but it was not spoken of by most informants. Gloria Kline stated she went through a basic orientation process, given to all new employees, when she started at HCTF, Inc. The lack of reference to this type of experience possibly indicates that the movement into a new organization after already working in an engineering-related organization was less of an issue to the new graduate because the graduate knew how to cope based on prior experience from the co-op assignments. This could be an area to gather more information in future research. One tactic was identified for teaching *rules and regulations* and *cognitive categories and scripts* for entry to the organization with a new employer.

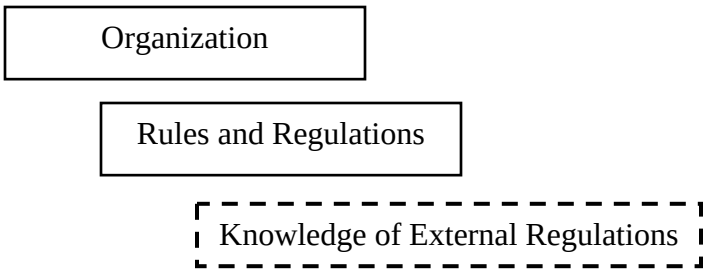
Evidence of learning *norms and expectations*, *cognitive categories and scripts,* and *affective processes* was found for entry to the new occupational role of full-time engineer, postgraduation, when the graduate moved to a new employer. Again, further investigation might identify additional strategies used by the employer workgroup when the student moves into the new occupational role, particularly those that are regulative.



Organization:

Rules and Regulations

One type of rules and regulations was identified for entry to the organization: *knowledge of external regulations*. The information is communicated individually, formally, and in a conscious manner.



The tactic identified to teach rules and regulations in this case was 1) *train for specific tasks.*

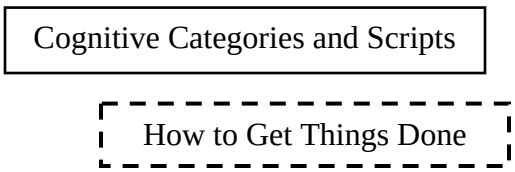
Nick Prather at TPT, Inc., said that he did have some quality system training as part of his orientation to his new position.

Norms and Expectations

There were no norms and expectations identified for entry to the organization, postgraduation, for the student joining a new employer.

Cognitive Categories and Scripts

One type of cognitive categories and scripts was identified for entry to the organization when moving to a new employer: *how to get things done.* The information is communicated in an individual, informal, and conscious manner.



One student-driven tactic was identified to communicate cognitive categories and scripts as part of the entry to the organization for graduates who moved into a new organization: *observe others and ask questions.*

Observe Others and Ask Questions

Wendell Dews said that beginning work at GBA, Inc., was a lot different than what he was used to at IWG, Inc. He had to learn the "pecking order" in the organization and the processes for getting things done. According to Wendell, learning how things work was very time-consuming.

Affective Processes

There were no affective processes identified for entry to the organization, postgraduation, for the student joining a new employer.

Affective Processes

Occupational Role:

Rules and Regulations

There were no rules and regulations identified for entry to the occupational roles, postgraduation, for the student joining a new employer.

Occupational Role

Rules and Regulations

Norms and Expectations

Much of what was discovered as information taught and the tactics used to communicate the information during the accelerated entry to occupational roles stage for post graduation employment was consistent with the tactics identified for the entry stage for the co-op occupational role(s). There were six types of information considered norms and expectations identified for entry to the occupational role when joining a new organization, postgraduation: 1) *basic information to perform work*, 2) *preferred way to work*, 3) *technical task expectations*, 4) *ways to perform engineering work*, 5) *responsibilities of an engineer*, and 6) *initiative and proactivity*.

Norms and Expectations

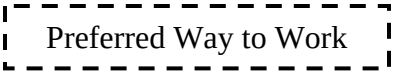
Basic Information to Perform Work

There were two tactics identified that were used to teach new employees the basic information needed to perform work: 1) *read materials*, and 2) *learn software.* These tactics are individually, formally, and consciously enacted.

Read Materials

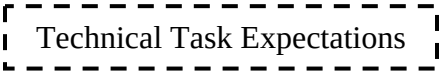
The beginning of Barry Evans' experience at AS, Inc., was similar to his experience at DM, Inc. His first week was spent reading materials. Henry Dorale said he sat for a week and a half, reading up on things when he started at AS, Inc. This was the first job Henry had ever held outside of an academic organization. Fred Kroll was asked to read through documents at first.

Brent Jolley said that on the first day, he was given the task of learning CAD software used by the company.



The second type of information about norms and expectations identified for this stage was termed “preferred way to work.” The tactic used to teach new hires this information was *provide a mentor*. This tactic is individually, formally, and consciously enacted in a mentoring environment.

Gloria Kline indicated that she followed some engineers around for a time and then was given small projects until she proved she could take on larger ones. The person Henry Dorale worked for initially was very knowledgeable and an incredible mentor. For the first few weeks, his mentor sheltered him from things until he was up to speed on the work needs, and by then he was treated as an equal.



A third type of information about norms and expectations identified for this stage was termed “technical task expectations.” The two tactics identified were 1) *assign simple tasks* and 2) *assign small projects*. These tactics are enacted in an individual, informal, and conscious manner.

Assign Simple Tasks

At AS, Inc., Barry Evans spent the first week doing menial tasks. The work load was very slow at first even though the company was extremely busy with projects. Fred Kroll said he performed odd jobs the first couple of weeks.

Assign Small Projects

Barry Evans indicated that he was slowly given more work as he showed his abilities. He did not know what they wanted him to do at first but then decided what he could help with and started into some projects.

Ways to Perform Engineering Work

Another type of information about norms and expectations is termed “ways to perform engineering work.” One tactic was identified that was used to teach new hires ways to perform engineering work: *support new hire work*. This tactic is enacted in an individual, informal, and conscious manner.

Support New Hire Work

Kerri Kraft at ST, Inc., said that if you have questions, people are willing to help out. Although it was hard to get time from other engineers to ask them questions, Brent Jolley said that everyone was welcoming right from the beginning and tried to help where they could.

Responsibilities of an Engineer

“Responsibilities of an engineer” is another group of norms and expectations taught to new hires in the accelerated entry to the occupational role stage. One tactic was identified

that was used to teach this information: *provide more responsibility*. This tactic is individually, informally or formally, and consciously enacted.

Provide More Responsibility

When Victor Abner started work at IG, Inc., it was different than starting at his co-op sites. He was integrated into the workload immediately. He was treated differently than he was as a student, but the co-op semesters "definitely prepared [him]" for this new experience. He had specific responsibilities and a well-defined role with the company. He showed he could handle the responsibility and, within two years of graduating, is managing millions of dollars in company business/projects. After the first few weeks, Henry Dorale gained more responsibility.

Initiative and Proactivity

The last group of norms and expectations identified is called "initiative and proactivity." This group of norms and expectations had two tactics associated with it: 1) *provide minimal support/guidance* and 2) *seek out work/projects*. The first tactic is employer-driven and is individually, informally enacted in a taken-for-granted manner. The second tactic is student-driven and is individually, informally, and consciously enacted.

Provide Minimal Support/Guidance

Nick Prather stated that it was not a big transition to his new workplace, because TPT, Inc., was a similar company to his co-op employer. His new boss was lenient and did not work very hard. Therefore he learned trial by fire and did jobs on his own. Brent Jolley said the position he hired into at ARJ, Inc., was very different than his position at CRCP, Inc., where he conducted his co-op assignments. The first day he was given the task to learn

CAD software used by the company. The second day, he was asked to design his own machine. It was hard to ask questions and figure out processes because everyone knew what to do and did not communicate things. Doug Koontz said it was like "being thrown into a lake and told to try and swim" when he began at ARJ, Inc.

Seek Out Work/Projects

Unlike he did at his co-op experience, Barry Evans was proactive and went out to ask for work and projects, which impressed people. Gloria Kline said it was easier to learn things from people by jumping in and doing them at the consulting firm. The very small engineering test lab Keri Kraft works for is "totally different from VK, Inc.," and it "is much better at ST, Inc.," because she was not sitting at a computer all day long. At ST, Inc., "you get to design and build equipment and then see how it works. Also because the company is so small, if you need something, you can do it right away. You don't have many barriers." Nick Prather said his new full-time position was a good experience and he got to run with a job on his own. Zack Slater said the first few days he didn't know what to do, it was hard to get tasks to work on, and he felt he had to beg for work.

Cognitive Categories and Scripts

There are two types of cognitive categories and scripts identified as part of the accelerated entry process for the post graduation position, when a student is joining a new employer and entering an occupational role: 1) *how to act/traits to emulate* and 2) *correct way to perform work.*

Cognitive Categories and Scripts

How to Act/Traits to Emulate

One type of cognitive categories and scripts identified was termed “how to act/traits to emulate.” This type of information has three different tactics associated with it: 1) *meet people (on own)*, 2) *connect with a mentor*, and 3) *connect with former classmates.* These tactics are all student-driven, and are individually, informally, and consciously enacted.

Meet People (on own)

Barry Evans’ proactive behavior allowed him to meet more people early on than he had during his co-op assignments. The consulting firm Gloria Kline went to work for was a lot smaller than the large manufacturing company (IS, Inc.) at which she performed her co-op, and so it was not as hard to get to know the people at the consulting firm, nor to learn the processes for how to get things done. Nick Prather was impressed that a board member from his new company stopped by his cubicle early in his tenure to see how he was doing. This made him feel welcome and wanted. Also, he was working with younger people compared to his co-op employer, which made him feel more comfortable.

Connect with a Mentor

One engineer “took [Barry Evans] under his wing,” and they would hang out.

Connect with Former Classmates

Henry Dorale stated that it helped for his transition that he was one of five GSU engineering graduates working at AS, Inc., at the time. Doug Koontz did know Mike Vilma, another GSU graduate from his program, which helped him make the transition to ARJ, Inc. Fred Kroll found it helpful that he knew a few former classmates at AS, Inc., when he

started. There were very few resources for Wendell Dews other than Liam Morrison, with whom he graduated, to help him figure things out.

Correct Way to Perform Work

A second type of cognitive categories and scripts taught during this stage is termed "correct way to perform work." One tactic was identified for acquiring this type of information: *ask questions*. This tactic is student-driven and is individually, informally, and consciously enacted.

Ask Questions

Nick Prather said he needed to ask a lot of questions to understand what he needed to do. Henry Dorale had a lot of people to ask questions of, and it seemed to go well interacting with other people as well.

Affective Processes

Three types of affective processes were identified as part of this stage: 1) *need for acceptance*, 2) *self-worth and awareness of ability*, and 3) *emotional outcomes of new role*.

Affective Processes

Need for Acceptance

Need for acceptance was identified as a type of affective process communicated during the accelerated entry stage for the postgraduation position when joining a new employer in a new occupational role. Two tactics were identified that were used to teach (or learn about) this information: 1) *isolate the new hire* and 2) *eat together.* These tactics are informally enacted in a taken-for-granted manner.

Isolate the New Hire

The cubicle setup at ARJ, Inc., made Doug Koontz feel isolated. He had to go into the hallway to find someone to talk with. Fred Kroll was put off in a corner as his workspace and was asked to learn the ropes the first couple of weeks.

Eat Lunch Together

Fred Kroll went out to lunch with coworkers when he started, which helped him interact with new people.

Self-Worth and Awareness of Ability

A second type of affective process identified for this stage was termed “self-worth and awareness of ability.” There was one tactic identified that was used by the student: *exhibit greater confidence.* The student exhibited greater confidence as he/she realized self-worth and developed a sense of awareness of his/her abilities and contributions to the workgroup. This tactic is informal and enacted in a taken-for-granted manner.

Exhibit Greater Confidence

Barry Evans was much more confident early in his work experience with AS, Inc., than with DM, Inc., and was not afraid to approach new people at work.

Emotional Outcomes of New Role

The third and final type of affective processes identified was termed “emotional outcomes of the new role.” The student experienced a sense of increased pressure associated with the new occupational role and a feeling of being scrutinized by workgroup members.

The two tactics associated with this information are 1) *experience pressure of increased expectations* and 2) *feel more scrutinized by workgroup.*

Experience Pressure of Increased Expectations

At VK, Inc., during her co-op, Keri was told what to do and then later worked her way to the point where she could think about how to solve a problem and implement it. She worked with a senior engineer who approved everything before she did it. At ST, Inc., the company was small and she had direct access to the owner, so it was different. She was expected to contribute and make things happen. Starting at ARJ, Inc., was "more intimidating" than at his co-op site, according to Doug Koontz. He was expected to produce right away and felt pressure to do so because he was getting a salary. Zack Slater had an adjustment to make because people expected him to be an expert; however, the first couple of months he did not have much interaction with seasoned people in the organization.

Feel More Scrutinized by Workgroup

At first people watched to see how Barry Evans would act in meetings, and some people verbally expressed their nervousness with him as part of the team when assigned to new projects. But this changed rather quickly as he was able to prove his value to the project team.

Accelerated Entry Postgraduation: Summary

Although postgraduation experiences were not a focus of this study, socialization processes were identified for entry to both the new organization and the occupational role of the new graduate. This information was obtained because the student informants were all interviewed postgraduation in their new roles as full-time engineers, and some shared

information about their new experiences and how they compared to the experiences during the co-op assignments. Because postgraduation activities were not the focus, this stage is not fully developed yet is included because enough evidence was gathered to provide useful information to build on the model.

Aspects of the entry stage occur for students postgraduation when the student begins a full-time position either with the organization that hosted him/her during the co-op program or with a new organization. The socialization process happens at an accelerated rate because the student knows what to expect and has already experienced the process during the co-op program. A student who stays with the organization that hosted him/her during the co-op program typically encounters some level of change in status as it relates to being inside a new engineering role. More responsibilities and expectations are realized by the student once he/she accepts a full-time position. There is very little socialization for entering the organization since the student had already worked for the employer during the co-op experience. The only identified socialization to the organization in this scenario was moving more inward within the organization, similar to what Scott (1978) referred to when he discussed moving more inward and upward within an organization during a career cycle.

For a student who begins at a new organization, there is a re-experiencing of moving from outside to inside the organization and engineering occupational role. The acceptance into the organization can be quick, especially if the organization is in a similar engineering field as the organization that the student left after the co-op assignment. The same is true for moving into the new engineering occupational role, because the new graduate has learned from the co-op experience what to expect and how to manage the tactics enacted by the employer that he/she will encounter when beginning in the new occupational role.

Figures 25 and 26 include summaries of the information related to the accelerated entry activities for the postgraduation position. The accelerated entry summary contains two components: one for the student who continued working with the same organization where the co-op assignment(s) were completed (Figure 25), and the other for the student who went to work for a new employer (Figure 26). According to these preliminary findings, the student who stayed with the same employer experienced very little additional socialization to the organization since he/she had been working there for at least four months already. However, there were some tactics and activities noted for movement into the new occupational role within the workgroup that consisted of learning both norms and expectations and affective processes. Most of these tactics were related to the student having greater expectations and responsibility from the workgroup, and the pressures the student felt were associated with those expectations and responsibilities.

For the student joining a new employer organization, there was some (very little) evidence of socialization to the new organization, including one tactic for learning new rules and regulations and one tactic for learning new cognitive categories and scripts. The tactics noted were similar to those experienced during the co-op assignments, but there were fewer of them mentioned by the informants. This would be consistent with the student either perceiving fewer issues related to negotiating those tactics because of the experiences from the co-op assignment, or the student actually encountering fewer socialization tactics since the student was able to prove acceptable much more quickerly due to his/her knowledge of negotiating those tactics.

The socialization to the occupational role included learning norms and expectations, cognitive categories and scripts, and affective processes. The lack of identifiable tactics for

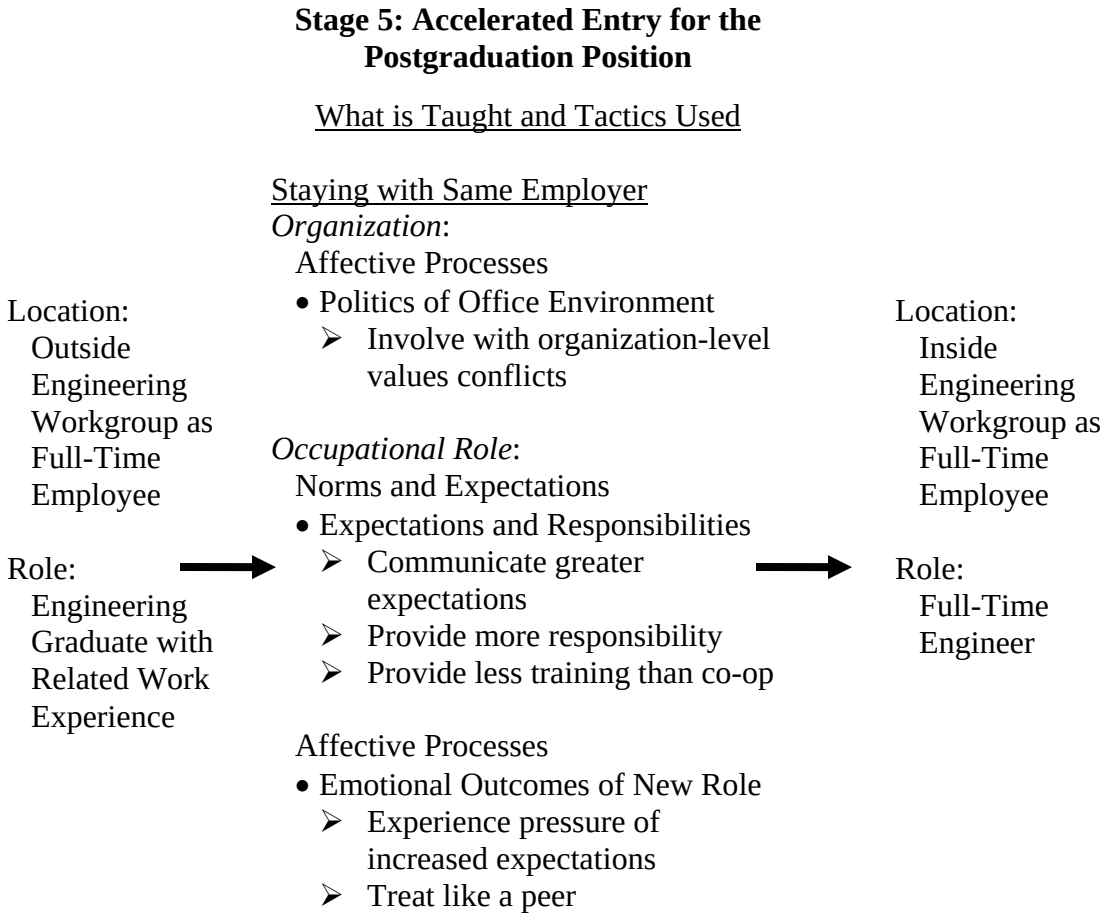


Figure 25: Accelerated entry for the postgraduation position: Staying with same employer

learning new rules and regulations during this process could be related to the student having the knowledge to negotiate and prove himself/herself more quickly to the workgroup. However, it does not imply that new rules and regulations are not associated with the process. The tactics for teaching (learning) norms and expectations, cognitive categories and scripts, and affective processes were similar in many ways to those experienced during the co-op assignments, with a few differences. Most students indicated encountering a lesser

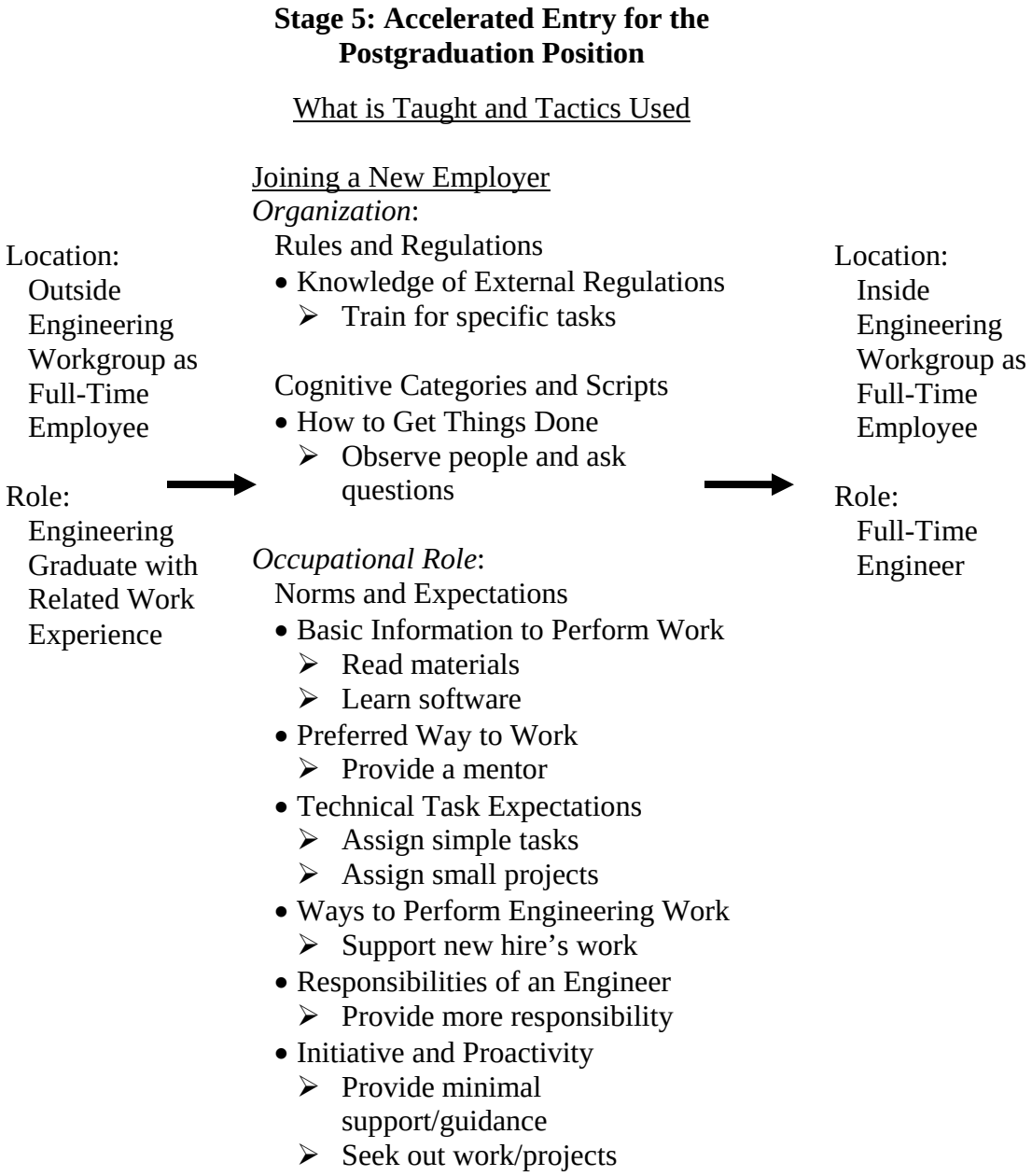


Figure 26: Accelerated entry for the postgraduation position: Joining a new employer

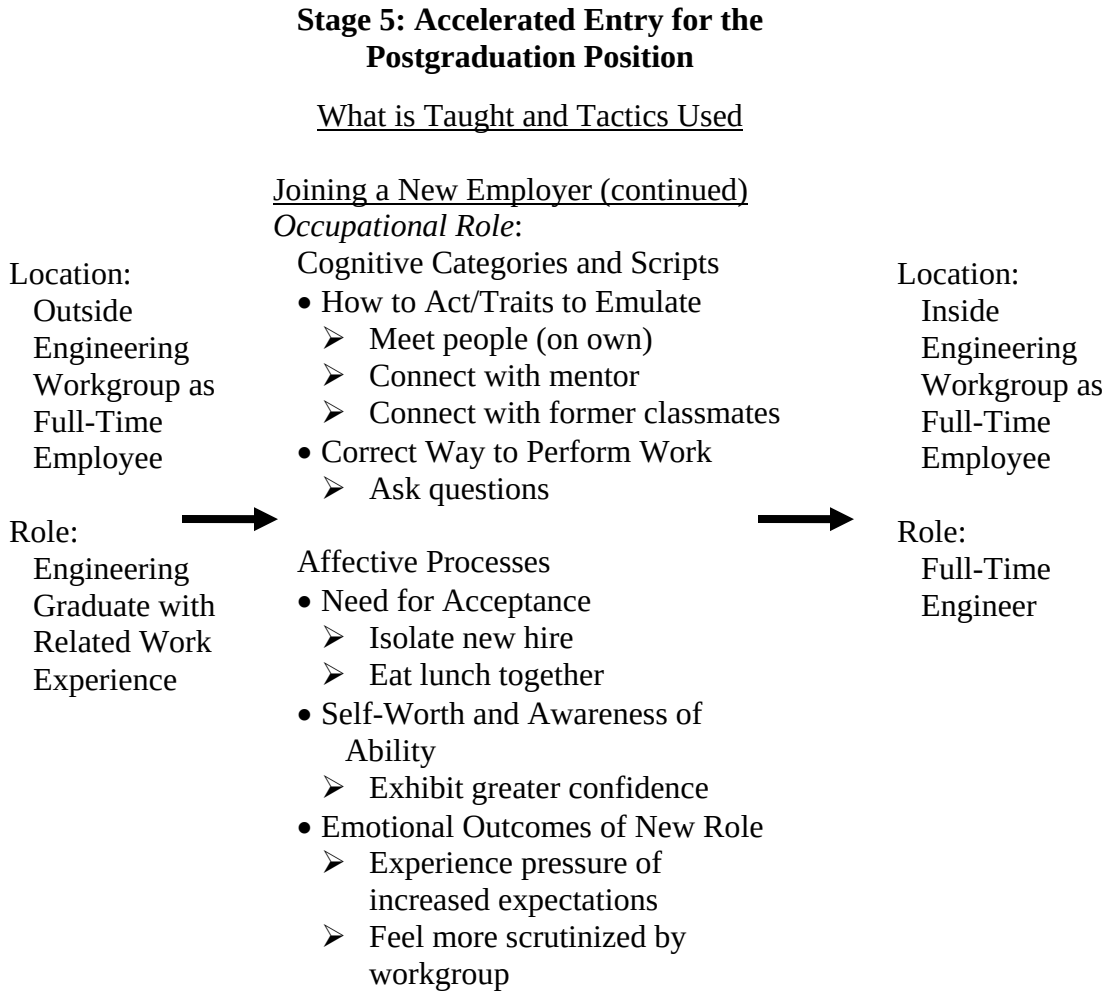


Figure 26: Accelerated entry for the postgraduation position: Joining a new employer

number, or a shorter duration, of the tactics as compared to during the co-op assignments. The students indicated feeling greater expectations from the employer workgroup more quickly than experienced during the co-op assignments. However, the students also felt more confident to navigate the processes and were more proactive in managing the transition.

Following the dating metaphor established with the first four stages of the model, this accelerated entry stage would be equivalent to the person who is either deepening his/her relationship with another person or is ending one relationship and beginning another one. If

the student stayed with the same organization postgraduation, it is similar to two people who have made a full commitment to one-another, which in some cultures could equate to marriage. The two are joined more formally and deeply in some way. For the student who joined a new organization, it is similar to a person breaking off one relationship and then beginning another one with a new partner. The student has been through at least one prior relationship and therefore is savvier at negotiating the process of getting to know the new partner, which can result in a shorter transition process of moving the relationship to a deeper level.

CHAPTER 5: CONCLUSION

This dissertation began with an introduction to the research in Chapter 1, and was followed by a review of the literature and research in Chapter 2. Chapter 3 provided the research methodology, presented background information collected as part of the exploratory research phase, and introduced the research questions used to focus the study. In Chapter 4, the findings of the study were presented, including development of concepts through grouping of like data and identification of patterns in the data. Chapter 5 summarizes the research project and discusses the findings in terms of the theoretical constructs and historical research presented in Chapter 2. Finally, Chapter 5 provides a summary of the conclusions for the study, including an explanatory model, implications of the study, and suggestions for future research.

Summary of the Research

The purpose of this study was to understand and explain how an academic engineering program with a mandatory cooperative education component is organized, relative to the students involved, to move the students from outside to inside the semi-profession of engineering. I wanted to understand the experiences and processes that students encounter in cooperative education programs as they relate to entering an organization and occupational role. The goal was to better understand the processes that students experience when participating in cooperative education experiences so that the preparation of both student and organization will result in better, more meaningful, and effective experiences. The intended outcome of this study was to provide information that can result in better cooperative education programs for students from both the academic and organizational (worksite) perspectives.

The objectives of this study that were accomplished included 1) to describe the organizational structure of the academic program, including the cooperative education program, as it relates to a student moving from outside to inside the semi-profession (as defined by Etzioni, 1969) of engineering; 2) to describe the experiences of students entering an organization through a cooperative education program; 3) to describe the organizational processes/practices, and the factors that influence them, used to introduce students into an organization and occupational role through a student-work experience; 4) to describe common patterns and themes associated with these experiences; 5) to develope a model or framework that reflects the nature of the processes used in these settings; and 6) to determine tools/processes that will increase the impact of the cooperative education experience on the student and enable the student to successfully move from the educational to the work environment.

The focus of the research was the cooperative education program offered through the School of Engineering (SOE) at Great Stateside University (GSU). The study focused on understanding cooperative education from an organizational and sociological perspective, and included an investigation of the structure, processes, and relationships among people associated with the SOE program at GSU. This was accomplished through review of artifacts/documents and interviews with participants in the cooperative education program. According to Hymes (1978), this type of study would be considered topic-centered ethnography.

This research study began with a qualitative approach grounded in organizational sociology and social psychology and most closely followed the symbolic interactionist tradition as coined by Blumer (1969) and described by Manis & Meltzer (1978) and Meltzer,

Petras, & Reynolds (1975). Understanding how students make meaning of the process of entering a cooperative education experience and the subsequent meaning made of entry to an organization and occupational roles is successfully determined by following the methodological goals of the symbolic interactionist tradition. I described the experiences of individuals (students) and their interactions with other groups of people associated with their work environments, in order to understand how a cooperative education program within an academic degree program is structured to organize individuals into (and out of) an organization and occupational roles.

The study of interest had a target consisting of understanding the activities of an organizational field. The group in question consisted of engineering students participating in a cooperative education program within the SOE at GSU. The study focused on student socialization processes and included interactions with university and company personnel. Socialization was explored in relation to entry to an organization and occupational roles. Organizations were defined as collectivities oriented to the pursuit of relatively specific goals, exhibiting relatively highly formalized social structures (Scott, 1998) and relatively complex interaction systems that persist over time (Haas & Drabek, 1974). Occupational roles were defined as clusters of norms (Haas & Drabek) that pertain to a homogeneous grouping of very particular jobs and positions (Moore, 1969).

The unit of analysis was an organizational field focused on a cooperative education program that encompasses multiple actors (students, faculty, staff, mentors, supervisors, coworkers), multiple settings (classroom, laboratory, company/work site), and multiple contexts (present and past educational environments and influences, present and past work environments and influences). Almost all of the students in the engineering program at GSU

originate from the State of Great Lakes and, up until the present, all but seven students (out of more 350 total students) have completed their cooperative education experience in the State of Great Lakes.

Exploratory fieldwork was conducted, which included informal interviews with students, observation in classrooms, and preliminary review of academic and student records. An organizing conceptual framework based on the concepts and theories forwarded by Homans (1950), Mintzberg (1979, 1989), Moore (1969), Raschke (2003), Schein (1971, 1978, 1990), Scott (1994, 1998, 2001), Van Maanen and Schein (1979), and Wanous (1992) was applied to the exploratory fieldwork. In addition, cooperative education, as defined by Collins (1971), was used as a referent. Research questions and a focus group were identified based on the preliminary data that were gathered.

Formal interviews were conducted with 22 students, 16 workplace informants (predominantly the students' supervisors during their student work assignments), and three faculty member from GSU. Artifact data, including student academic records, student and workplace supervisor evaluations of the work experience, and student journals written during the work experience, were analyzed in conjunction with the interview results. Summarized information from the data collection process was presented to the informants for corroborative purposes.

Field notes and other data were reviewed according to the processes presented by Strauss and Corbin (1990) and Ely et al. (p. 87-88). As suggested, categories were named and labeled, and then "meaning units" were studied that had been created to begin grouping ideas together so that ideas could be compared and contrasted. The data were found to be patterned and, therefore, a number of categories, properties, and components common to the

participants in the study were identified. The reduced data related to the students' experiences were organized according to the conceptual framework, outcomes were identified, and a model of explanation was developed.

The concepts and frameworks that were used to analyze and explain the findings were similar to those outlined in Raschke (2003). The concept of career was based on the work of Schein (1968b), while occupation was grounded in the works of Moore (1969) and, later, Wanous (1992). The social construct of organization was based on the work of Scott (1998) and occupational role on the research of Haas & Drabek (1974) and Moore (1969). The conceptualizations of institutions consisting of rules and regulations, norms, and cognitive categories and scripts presented by Scott (2001) and the concept of affect presented by Greenspan and Shanker (2004) and Homans (1950) were used to frame the socialization tactics. Organizational culture was based on the research of Schein (1990). The works of Mintzberg on organization structural configurations (1989) and professional bureaucracy (1979), and of Morgan (1997) on machine organizations, were helpful in understanding the work environments of the student.

Schein's (1978) and Wanous' (1992) research on recruitment and selection, in addition to the primary research of Crites (1969), was key to understanding and conceptualizing the occupation and organization selection and the dualistic matching process involved with individuals and organizations choosing/selecting each another for employment/work purposes. The concept and properties of socialization were based on the works of Schein (1968), Van Maanen (1978), and Wanous (1992), while the tactics of socialization were based on the research of Van Maanen and Schein (1979). The concept of self-efficacy was grounded in the work of Bandura (1977b) and applied from the perspective

of Jones (1983, 1986). Person-organization fit, operationalized by Kristof (1996) and formulated by the works of Schneider (1987) and Muchinsky and Monahan (1987), was used to understand the compatibility between people and organizations. Finally, outcomes of the socialization process reflected the research of Schein (1990).

Five stages of socialization were identified in this study: 1) pre-entry, 2) match-making co-op position, 3) entry co-op position, 4) match-making postgraduation, and 5) accelerated entry postgraduation. Pre-entry was common to all participants in the study. It refers to those activities and experiences that happen prior to the co-op experience and impact and influence the co-op process and experience. For the individual student, pre-entry consisted of properties of origin (with influential properties of interest in the topic of engineering, location — where they were from, prior work experiences, and their network), educational experience (with properties of acceptance into a higher education institution and an engineering degree program, and participation in a cooperative education preparatory course), and expectations. The higher education institution was involved in the pre-entry category as a compliment to the individual in relation to the acceptance into the institution and degree program and presentation of the cooperative education preparatory course. The employer also had a pre-entry category and it consisted of properties of purpose (with components of productivity, recruiting, and altruism), need/vacancy, and expectations (with components of prior skills and developed skills).

The second stage of match-making for the co-op position included properties search, selection, and decision criteria. The decision criteria were unique to both individual student and the employer, but the search and selection processes brought the two together (with some facilitation by the education organization) and resulted in mutual agreement to participate in

a work experience. The third stage, entry to the co-op position, had properties of outside and inside, which referred to the individual's movement outside to inside the workplace organization and engineering-related occupational roles. Organization entry involved orientation processes and transfer of knowledge about organizational culture. Occupational role entry involved workgroup dynamics and interactions as well as work assignments. Occupational role entry consisted of an eight-stage role development process from an unsure student hire to a new or junior-level engineer.

The fourth stage was a second match-making stage and primarily described the activities of the one-half of the student informants who left their co-op employer for a new employer, postgraduation. Consistent with the match-making category for the co-op position, match-making postgraduation had properties of search, selection, and decision criteria. While the process was similar for the employer, the individual was able to rely much more heavily on networking resources in the postgraduation search than in the co-op search. Likewise, decision criteria for the individual during the postgraduation job search were somewhat different than those criteria identified during the co-op position search. Individuals were more interested in organization stability and people they would work with during the postgraduation search, although pay and location were still primary factors in decision-making. Employer decision criteria were similar for the co-op position and the postgraduation position; however, additional criteria were identified that described the reasons an employer retained a co-op student in a full-time engineering-related position after graduation.

The fifth stage identified was accelerated entry for the postgraduation position. If the individual remained at the same company at which he/she conducted the co-op assignments,

entry to the organization included minimal socialization activity. Most individuals at the same company did experience an accelerated socialization process to the occupational role as he/she moved from an advanced apprentice engineer or new engineer position to a junior-level engineer position, typically including more responsibility and greater expectations. Those individuals who did change organizations went through an accelerated entry process to both the organization and the occupational role. The processes were accelerated because the individual knew what to expect and had already experienced the process before during the co-op program.

Planned tactics for socialization were experienced by most students when entering the organization at the beginning of the co-op assignment. This was also the case for most of those individuals who moved from one organization to another postgraduation. Some of the students were also formally assigned a mentor that helped, in part, socialize the students to the organization and occupational role. To a large extent, the students were not provided planned tactics for socialization to the occupational role, particularly if they were not assigned a mentor in the workplace. Despite this lack of planned efforts, all but one of the students were socialized to an engineering-related occupational role as an advanced apprentice engineer or new engineer during the co-op process.

Summary of Findings

The findings for this study consisted of an initial analysis of the organization of the education-portion of the engineering program at GSU, including the co-op program. The analysis consisted of reducing the data about the number of students involved in the engineering program at GSU, sampled according to the year three groups of students began the first co-op assignment: 2000, 2001, and 2002. The data are summarized in Table 5 on

page 148 and are conceptualized below in a metaphorical description called the “leaky funnel.” The second piece to the analysis consisted of developing organizational concepts to describe the engineering co-op program at GSU in terms of students moving into engineering-related organizations and occupational roles.

Leaky Funnel Metaphor

Figure 27 is a pictorial depiction of a metaphor for the entry of a person into a semi-professional occupation. While this study uses engineering (defined in this study as a semi-profession) as a focal point, the metaphor could be used for entry into any semi-professional or professional occupation, which traditionally includes such occupations as education practitioners, social workers and nurses (examples of semi-professions), and law and medicine (examples of professions). The common denominator for applying this metaphor is that the occupation requires at least a four-year degree and, typically, some form of licensure or certification to practice at the highest level of the occupation. The engineering data presented in Table 5 and the concepts developed from the participant interviews provide the foundation for construction of the figure.

The figure is a funnel designed to move materials from the outside (the area outside of the cross-hatched container boundaries at the bottom as well as outside of the funnel) to the inside (the area inside the cross-hatched contained boundaries at the bottom). This metaphor can be thought of as pouring liquid of some sort into a confined area or container through one entry point by means of a funnel. For example, one can envision pouring the old oil after changing a car’s oil from an oil pan into a small

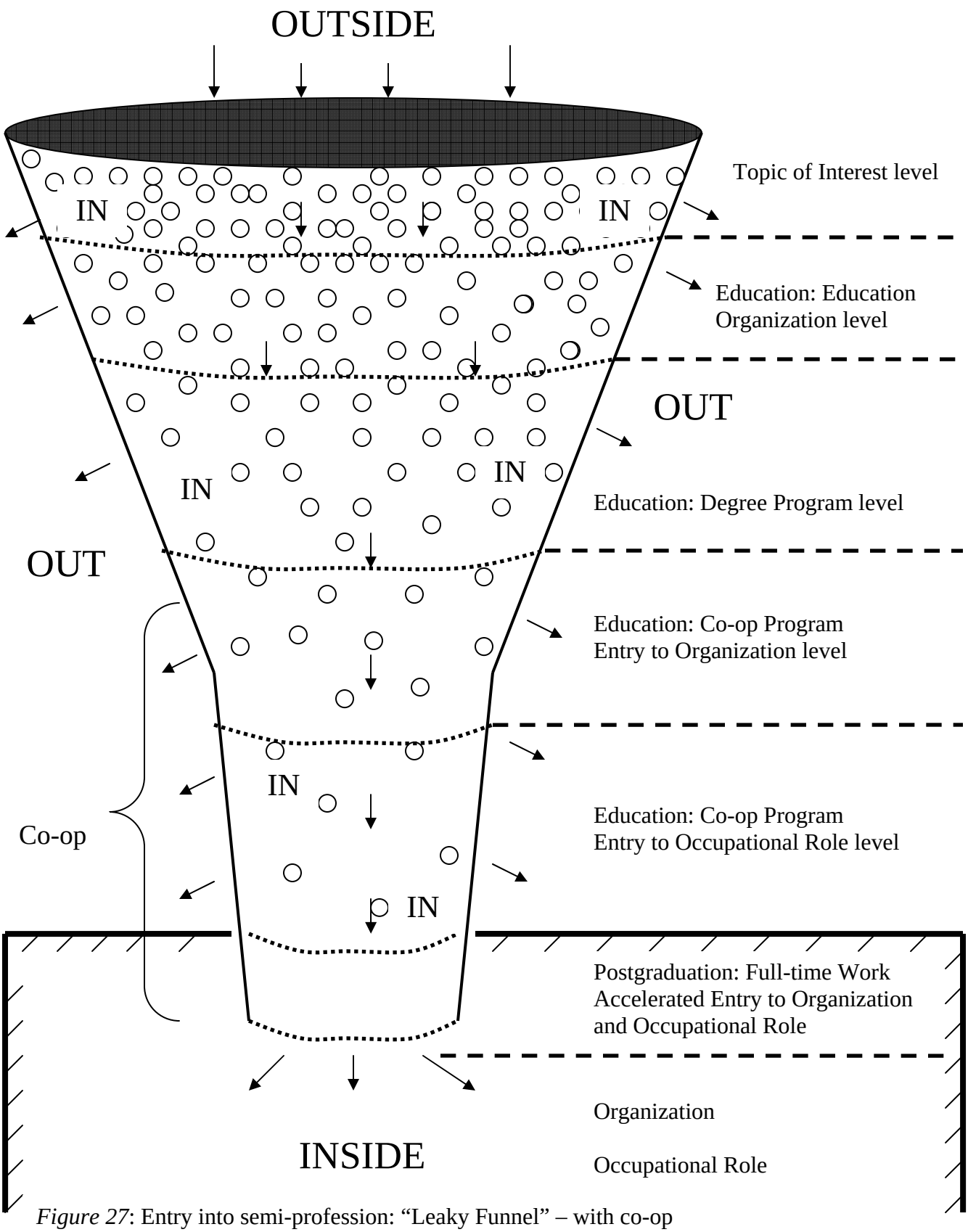


Figure 27: Entry into semi-profession: "Leaky Funnel" – with co-op

1-gallon capped container for safe-keeping when finished. To do this, a person would place a funnel into the entry to the container so that the liquid could be directed into the container in an efficient and “clean” manner. The container would have only one opening, as with a plastic milk jug.

This metaphor is similar to people attempting to enter the semi-profession of engineering (and possibly other semi-professions and professions as mentioned previously). The occupation requires successful completion of a higher education program and, in many cases, professional licensure or certification prior to practicing. The educational and licensure/certification processes can be viewed as restrictions to entry to the semi-profession, much like the single entry point to the container in the metaphor. The funnel can be thought of as the educational and licensure/certification processes, as they direct the candidates into the container, or the semi-profession.

A funnel has a wider opening at the top and then narrows (often called the neck of the funnel) to the entry point where it would be inserted into the container’s opening. The shape of the funnel equates to the number of candidates trying to enter the semi-profession. At the top of the funnel, the opening is wider and therefore holds a greater volume of liquid than towards the bottom, or neck, of the funnel. Likewise, in the process of attempting to enter the engineering semi-profession, there are more people who are interested in joining than who eventually are able to enter as a practitioner.

The funnel continues to narrow from the top, or mouth, to the neck, and eventually the exit opening. The narrowing phenomenon equates to the process of progressing from being interested in the semi-profession, to entering a university to pursue a degree, to entering an academic program, to completing the academic program successfully, to

completing any licensure/certification requirements before entering the semi-profession. Each stage of this process typically results in fewer candidates in the process. Therefore, the funnel is narrower during the “education: education organization level” where a candidate is admitted to an education organization of higher education than the “topic of interest level” because there are fewer people admitted to a college/university than those that have initial interest in the engineering semi-profession. The reduction in candidates could be due to such things as lack of motivation, lack of knowledge, lack of financial resources, lack of ability, or lack of opportunity.

After entering the “education: education organization level” a candidate can progress to the next stage of entering the “education: program instruction level.” This happens sooner or later during the educational experience depending on the program and the education organization. In the case of an undergraduate program, a person may begin instruction in his/her academic field soon after being admitted to the education organization, while in other cases one has to meet certain requirements or achieve a predefined level of academic standing prior to being admitted into an academic program leading to an engineering degree. For most graduate programs, the movement from education organization level to program instruction-level is immediate as a person is admitted to a graduate program after careful screening has already taken place.

The next levels of progression into the engineering semi-profession are stages that may or may not take place as part of the educational process. For some engineering academic programs, work related to the semi-professional field is required as part of the academic training. This is also true of clinical experiences in the health-related fields, student teaching in the education field, and internships or co-ops in various other fields, including some

engineering programs (like GSU's program). These two levels are consistent with the two phases of socialization encountered in the co-op program: entry to the organization and entry to the occupational role. The levels relate to the experiences a student has while working in an organization and being socialized to the occupational roles while working toward a degree.

The entry to organization and occupational role levels allow a student to gain an understanding of the occupation and the work environment as well as to begin the acceptance process into a particular organization and occupational role. In academic programs that require field-based work experiences, the neck of the funnel represents the consistent transition into the organization and occupational roles through graduation. If no field-based work experiences are part of the academic program, essentially there is no neck to the funnel prior to entry into the organization and occupational role.

In the case where no field-based work experience occurs (depicted in Figure 28), the upper part of the funnel either rests on, or is held above, the opening to the container leaving the chance for some liquid (graduates) to leak out and not make it into the container. This is equivalent to graduates who do not know what to expect when it comes to working in the field of their academic studies and who determine early on that they are not a fit for the semi-profession and therefore leave the semi-profession early in the process. With field-based work experiences providing "a neck" to the funnel that protrudes down into the container (inside the organization and occupational role), there is less likelihood that liquid (graduates) will leak out after exiting the funnel (graduation) and attempting to make it "inside" the organization and occupational role, thereby increasing retention in the semi-profession.

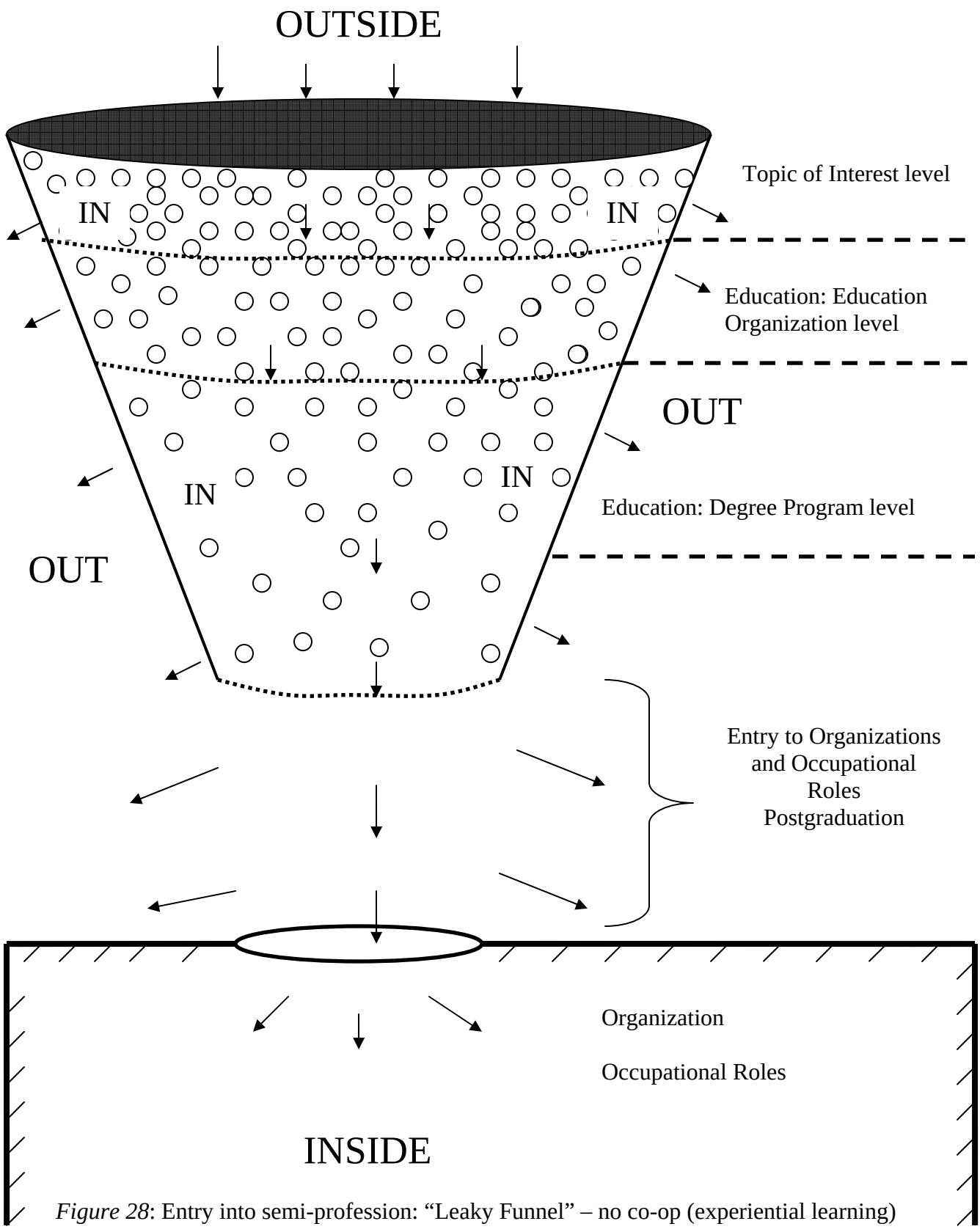


Figure 28: Entry into semi-profession: "Leaky Funnel" – no co-op (experiential learning)

The last level within the funnel is the bottom part of the neck that protrudes into the container. This level represents the accelerated entry process that takes place after a student has completed the co-op program and graduates with a degree. When the graduate enters an organization after completing a degree, even if it is the same organization where a co-op assignment was completed, there is an abbreviated socialization process that moves the student from outside to inside (or further inside if staying at the same organization) the organization and occupational roles. The result of this process is entry into the container or, metaphorically, entry to inside the organization and occupational roles within the semi-profession.

The difference between an ordinary funnel and the one depicted in Figure 27 is the funnel in Figure 27 has holes in it to represent that it is "leaky." The holes depict the general number of students who leave the process (working their way through the funnel) during the pursuit of entry to the engineering semi-profession. There are more holes in the funnel toward the top where a greater proportion of students that enter the stage leave, and fewer as one progresses down through the various stages in the funnel. The holes are required of the metaphorical funnel because, unlike a traditional funnel, not all of the liquid (people) that enters the funnel eventually makes it into the container (the engineering semi-profession). The further one progresses into the funnel, the more likely he/she is to make it through to the container (inside an engineering-related organization and occupational roles). In particular, once one reaches the field-based work experience (clinicals, co-ops, internships, etc.), it becomes very unlikely that he/she will leave the process before entry into a postgraduation engineering-related occupational role. Once someone leaves the funnel, he/she is considered

outside of the path to making it inside the engineering semi-profession and very rarely returns and/or makes it inside.

The data collected and analyzed for the engineering program at GSU, presented in Table 5, verifies the usefulness of the “leaky funnel” metaphor. Between 140 and 160 students took the introductory course in the engineering academic program indicating at least an interest in the subject matter, or idea of pursuing further training or knowledge of the subject matter, leading to entry to occupational roles within the engineering semi-profession. Only about one-third of the students who took the freshman engineering course ended up graduating on schedule from the academic program and entering an engineering-related occupational role. An additional 15-20 percent of the students (for a total of 45-50% of first-year students) took longer to make it through the various stages within the funnel, but eventually did enter an occupational role within the engineering semi-profession. This is consistent with the narrowing of the funnel. The holes in the funnel allow for students to exit the pathway through the funnel before entering the a full-time, postgraduation engineering-related occupational role.

Once students began the co-op stage (field-based work experience) of the academic program, very little change was identified in the number of students beginning this stage and exiting the funnel after graduation. The neck of the funnel represents the co-op portion of the engineering academic program at GSU. It is a period of little variation in the number of students from start to finish and, therefore, has few “holes” in the funnel for students to leave the pathway.

Several observations can be made regarding the “leaky funnel” metaphor. If this metaphor is accurate, and it were determined that a neck to the funnel is desirable to facilitate

the transition through the funnel into the semi-professional organizations and occupational roles (the container), then one should determine how to create a neck. Are field-based work programs, such as internship or co-op programs, the best, or the only, means to create this phenomenon? If so, can these programs be implemented into other academic degrees/programs that desire the outcome of facilitated transition into the semi-profession (or profession)? If so, can the outcomes and benefits of such programs be maximized to provide the most efficient entry process? If not, what are other means to create an efficient entry and transition process?

If it were determined that it was desirable to have more people successfully enter the semi-profession (or profession), then it would follow that a better-designed funnel might facilitate this process. One way that the funnel could be improved from its current depiction might involve making the funnel bigger, thereby allowing more people to start and, ultimately, exit the funnel into the organizations and semi-professional occupational roles. A second way to improve the funnel might be to plug some, or all, of the holes. This would provide a means for all or most of those who enter the funnel to exit the funnel into the semi-profession. This remedy may not be desirable, as it would allow some who potentially are not suited for the work related to the semi-profession to enter, or not allow those on the pathway towards the entry to the semi-profession to exit if there is no longer an interest in or passion for pursuing the career.

A third hypothetical possibility is to change the opening to the funnel so that it is less restrictive to entry into the funnel. This could be accomplished by greater promotion of the semi-profession (or profession) in order to encourage more able people to gain an interest-level. Finally, another remedy might include making additional entry points to the container

(semi-profession occupational roles), thereby allowing alternative means to enter (i.e. more funnels).

Five-Stage Socialization Model for Co-op Programs: Overview

A five-stage socialization model was developed that explains the movement of students from outside the engineering education program to inside an engineering organization and occupational role. This process is consistent with the metaphor of entering the funnel (Figure 27) and progressing through it until entry into the engineering organization and the full-time, postgraduation engineering occupational role. The five stages of the model are Stage 1 – Pre-Entry; Stage 2 – Match-Making for the Co-op Position; Stage 3 – Entry for the Co-op Position; Stage 4 – Match-Making for the Postgraduation Position; and Stage 5 – Accelerated Entry for the Postgraduation Position. The five-stage socialization model is consistent with aspects of the first four stages of Schein's (1978) nine-stage model of the career cycle: (1) growth, fantasy, exploration; (2) entry into world of work; (3) basic training; and (4) full membership in early career.

Figure 29 and Figure 30 show the relationships among the stages and categories. The first stage was pre-entry and included student, education organization, and employer components. Properties of pre-entry for the student are origin, education, and expectations, which identified such influences as the student's interest in the topic of engineering, where the student was from, prior work experiences, prior connections to the engineering field or profession, educational training, and expectations developed prior to beginning the co-op program.

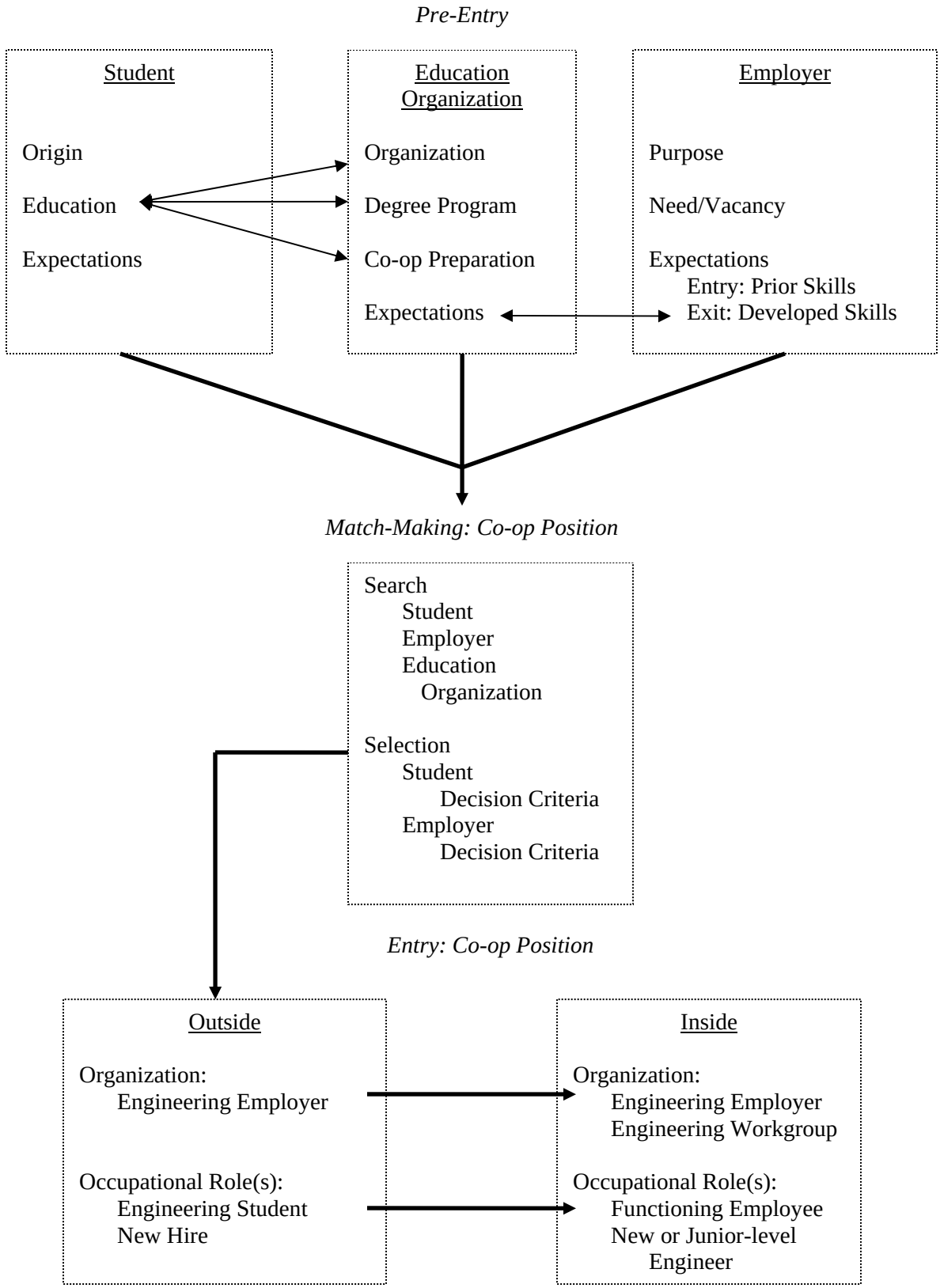


Figure 29: Organizational overview of the co-op process

The education organization acts as a training and screening agent of students prior to entry into an engineering-related organization and an engineering-related occupational role. The cooperative education program acts as the vehicle for moving a student inside the engineering-related organization and occupational role, while the student is completing a degree. The education organization has properties of education organization, degree program, co-op preparation, and expectations. A student has to make it inside the education organization, then the degree program, and through the co-op preparation course, in order to progress to entry into an organization at the beginning of the co-op program. The expectations of the education organization are that the student learns about engineering organizations and experiences working in an engineer-related occupational role at an engineering organization.

For the employer, properties of pre-entry consist of purpose, need/vacancy, and expectations. Employers indicated five reasons for participation in a co-op program: to get work done at a reasonable cost, to hire new talent, to screen future full-time hires, to help students in the community, and to control the academic training. The employer identifies a need for a co-op student in order to fill a vacancy in the organization. As with the student, the employer has expectations of the co-op experience, including skills and abilities the student should come to the organization already possessing (specific technical skills and personal characteristics) and what the student should leave the experience with (additional technical skills and personal characteristics, as well as organizational knowledge).

The second stage identified during this study was match-making as part of the co-op program. Match-making consists of two substages: search and selection. Both search and selection have a student and an employer component. For some students, the process consists

of networking with contacts who are either family-related or developed through prior work experiences or university programs. For others, it is a process of identifying potential employers, submitting resumes, following up with the employers, securing an interview, and ultimately, receiving an employment offer. For the employer, the process typically consists of an engineering group or manager identifying a need/vacancy, working through the human resources office to solicit and collect resumes, conducting one-on-one or group interviews with the candidate, identifying the top candidate or candidates, and extending an employment offer. The outcome of the search and selection substages is an agreement between the student and employer to enter into an employment arrangement in a co-op capacity.

The decision criteria for students typically include one or a combination of the following items: location, pay, company/work type, the people at the organization, or the number of employment offers. Because of the recessed economic conditions in the West Great Lakes region, co-op opportunities were scarce in some fields and therefore students had to struggle to receive a single offer of employment, which they were then obligated to accept. This phenomenon is consistent with a power advantage in favor of employers, resulting from a resource dependency of students on employers. Employers' decision criteria included perception of relationship, motivation level, interpersonal skills, demeanor, ability, and location. In many cases the employer uses these criteria to identify candidates to interview from the resumes reviewed but reverts to whether the students would "fit" in terms of personality with the group following the interview process.

The third stage identified was entry to the co-op program. This stage consists of the properties outside and inside. The two primary components of outside and inside are organization and occupational role. At the onset of the co-op program, the student begins

outside of the organization and occupational role and by the end of the program has gained some level of inclusion in each group or construct.

Moving from outside to inside the organization begins during the match-making process and continues in the early phases of the co-op program through various company and workgroup orientation processes. Company-wide orientation processes are typically more formal than the workgroup orientation processes. However, organizational culture is shared and learned more readily in the initial workgroup interactions. A student is shown the company processes and systems, communicated the expectations, and is allowed to participate in company activities within the first semester of the co-op program. These are indicators of moving inside the organization for the student.

As the student begins to interact with the workgroup, there is a testing and "feeling out" process that takes place through personal interactions with members of the workgroup and through the types of work assignments given to the student. For some students, this is the first work experience in a technical environment, while for others it is simply a new application in a new environment. In either case, the student is often teased or joked with in some other way to communicate to the student by the workgroup that the student does not yet know as much as they do and to signal the student's place in the group. The student is almost always given reading assignments or computer tutorials the first few days or weeks in the workplace before given any real work. Work assignments typically begin very basic or small and build as the group gains more knowledge and trust in the student. The student eventually is not teased anymore and given productive work assignments, which indicates acceptance and movement to inside an engineering-related occupational role.

The student begins in an occupational role with the organization that provides general technical and social activities that are non-engineering in complexity, breadth, or scope. While the student works in an environment where engineering work is being conducted by others, the student does not typically share in the engineering work because he/she has not demonstrated the ability to perform the various aspects of the work. Through mentoring by supervisors and other coworkers and demonstration of an ability to accomplish relevant work tasks, students are provided more responsible pieces of engineering projects. After awhile, some students are given their own engineering-related projects. This often involves not only being allowed to work on the technical aspects of projects with a level of complexity that would indicate engineering work, but also being trusted to manage the social, political, and interpersonal aspects of project work. This is an indicator that the student has moved from a student technician occupational role to inside the engineering workgroup as an apprentice-level or new engineer occupational role.

The fourth stage (see Figure 30) was identified as taking place either late in the co-op program or after the co-op program was completed and near graduation from the engineering academic program. This category, match-making for a postgraduation engineering position, is similar to the match-making category for the co-op position for those students who looked for a position outside of the company where the co-op assignments were completed. While some of the search processes are similar between the postgraduation position and co-op position for those students who have to seek a new employer after their co-op assignment, the resources are different. Most students are able to rely on network resources that were established through the co-op assignments or through classmates who also had completed work assignments. Almost half of the students choose to continue working full-time for the

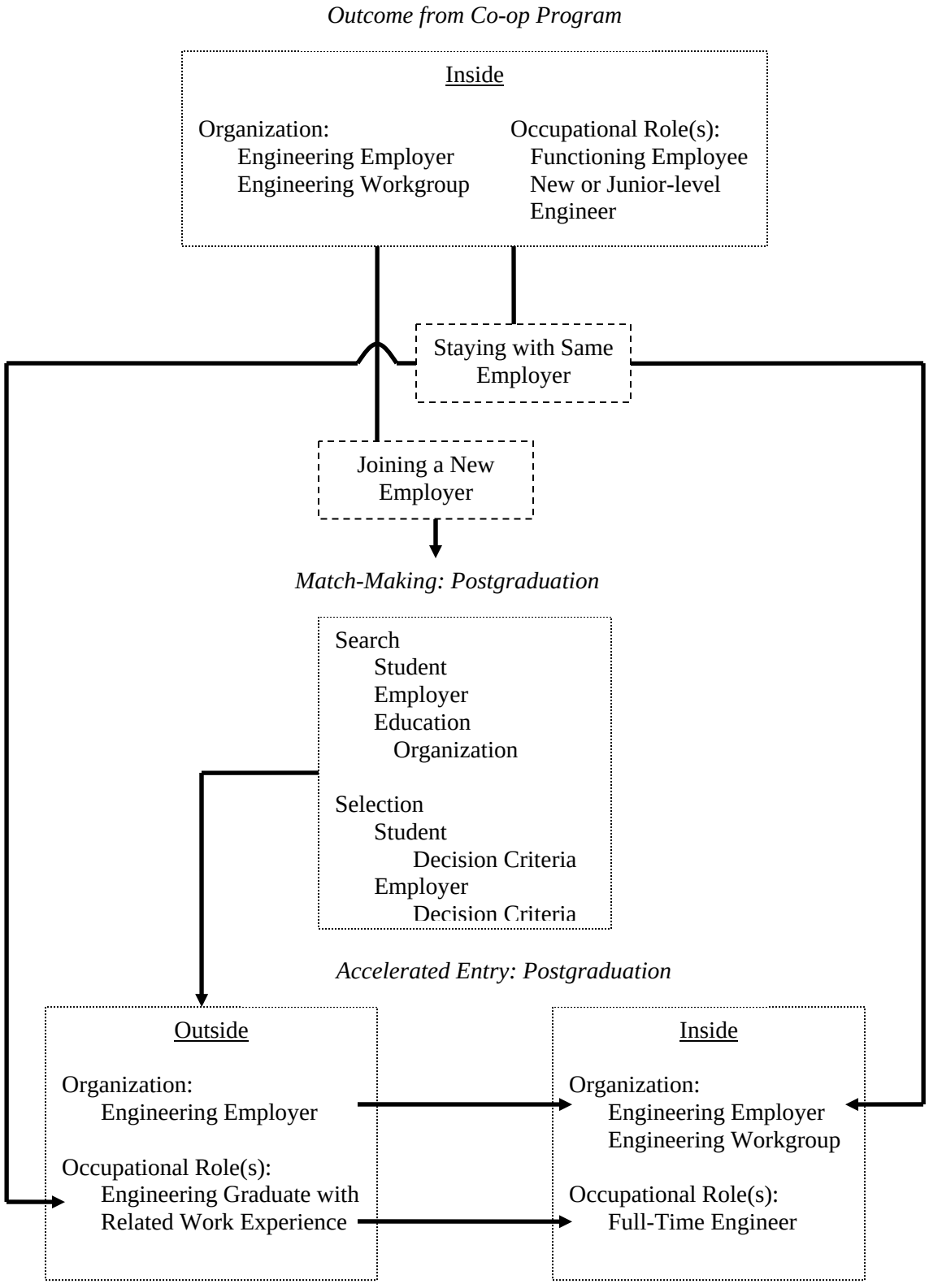


Figure 30: Organizational overview of beginning postgraduation employment following a co-op program

host co-op employer after graduation.

The criteria that students use when deciding to stay at the company where the co-op assignment was completed included comfort level with the people and the organization, ease in not having to look for other employment, location (close to home), favorable pay, and familiarity and interest in the type of work. For those who take positions other than at their co-op employer, the most frequent responses for selecting the employer are stability of the company, good pay and benefits, location (close to home), interesting work, familiarity with the people who worked for the organization, and number of employment offers.

When hiring a co-op student for a full-time postgraduation position, the employer most often cites the student fit with the organization and occupational role including the following positive characteristics: intelligence, self-motivation, ability to get along with people, and work ethic. Assuming there is a position opening, the employer also likes that the student already knows the organization and the occupational roles, there are lower start-up costs, a lower cost to the hiring process, and a greater return on investment. For the employer who hires a new college graduate for an engineering-role (not a student who conducted a co-op assignment at the organization), the employer decision criteria for selecting a candidate were perception of relationship, motivational level, interpersonal skills, demeanor, ability, location, and prior related experience.

The fifth stage identified is accelerated entry for the postgraduation, full-time employment position, whether with the organization that hosted the co-op student during the co-op program or with a new organization. The socialization process happens at an accelerated rate because the student knows what to expect and has already experienced the activities and processes during the co-op program. A student who stays with the host

organization typically encounters some level of change in status as it relates to being inside a new engineering occupational role. There are typically more responsibilities and expectations of the student once accepting a full-time position. For a student who begins at a new organization, there is a repeat experience of moving from outside to inside the organization and a full-time engineering occupational role. The acceptance into the organization usually happens quickly, especially if the organization is in a similar engineering field as the organization that the student left. Acceptance into the full-time engineering-related occupational role may take somewhat longer, but almost always happens more quickly than if a student had no prior engineering-related work experience.

Aspects of four of the co-op frameworks and models discussed in Chapter 2 were evident in the five-stage socialization model developed here. Fletcher's (1990) co-op and self-esteem framework identified how a co-op student sees himself/herself as valued or accepted in the work environment. This relates to the third stage of the five-stage socialization model developed here – entry during the co-op experience. Heinemann et al. (1992) developed principles of work-experience enhanced learning, and one of the principles was that co-op/internships aided students to become self-directed learners. This too relates to stage 3 of the five-stage socialization model. Bartkus' (2001) social skills and cooperative education framework included socialization as one of the key processes, which relates to the five-stage socialization model in general. Finally, Linn's (2004) three concentric ring framework of learning theories included several theories with connections to the model developed for this study, including learning about the human experience (inner ring – self-efficacy), human cognition (middle ring – thinking, learning, memory), and schooling in

general (outer ring – social identity). This is related to the work performed here for development of stage 3, in particular entry to occupational roles.

Five-Stage Socialization Model for Co-op Programs: Individual Stage Summaries

Figure 31 provides a detailed overview of the five-stage socialization model for a co-op program. The following sections describe each stage in more detail.

Stage 1: Pre-Entry

Pre-entry was the first category used to describe the experiences related to the socialization of students into engineering-related organizations and occupational roles during the co-op program. The three groups of people associated with this study — student, education organization, and employer — each had a pre-entry category. Pre-entry for the student occurred independent of pre-entry for the employer. Pre-entry for the education institution had some common elements with pre-entry for the student but was independent of the employer's pre-entry.

The pre-entry category is similar to anticipatory socialization as described by Van Maanen (1978). Van Maanen defined anticipatory socialization as the degree to which an individual is prepared, prior to entry, to occupy organizational positions. Schein (1978) presented a nine-stage model of the career cycle that included a first stage of growth, fantasy, and exploration. This first stage also contains aspects of the pre-entry category. Schein wrote that during this initial stage a person develops a basis for making realistic vocational choices, obtains appropriate training or education, and develops basic habits and skills needed in the world of work. This stage can also include trial or part-time work opportunities to test early vocational decisions.

Stage 1: Pre-Entry

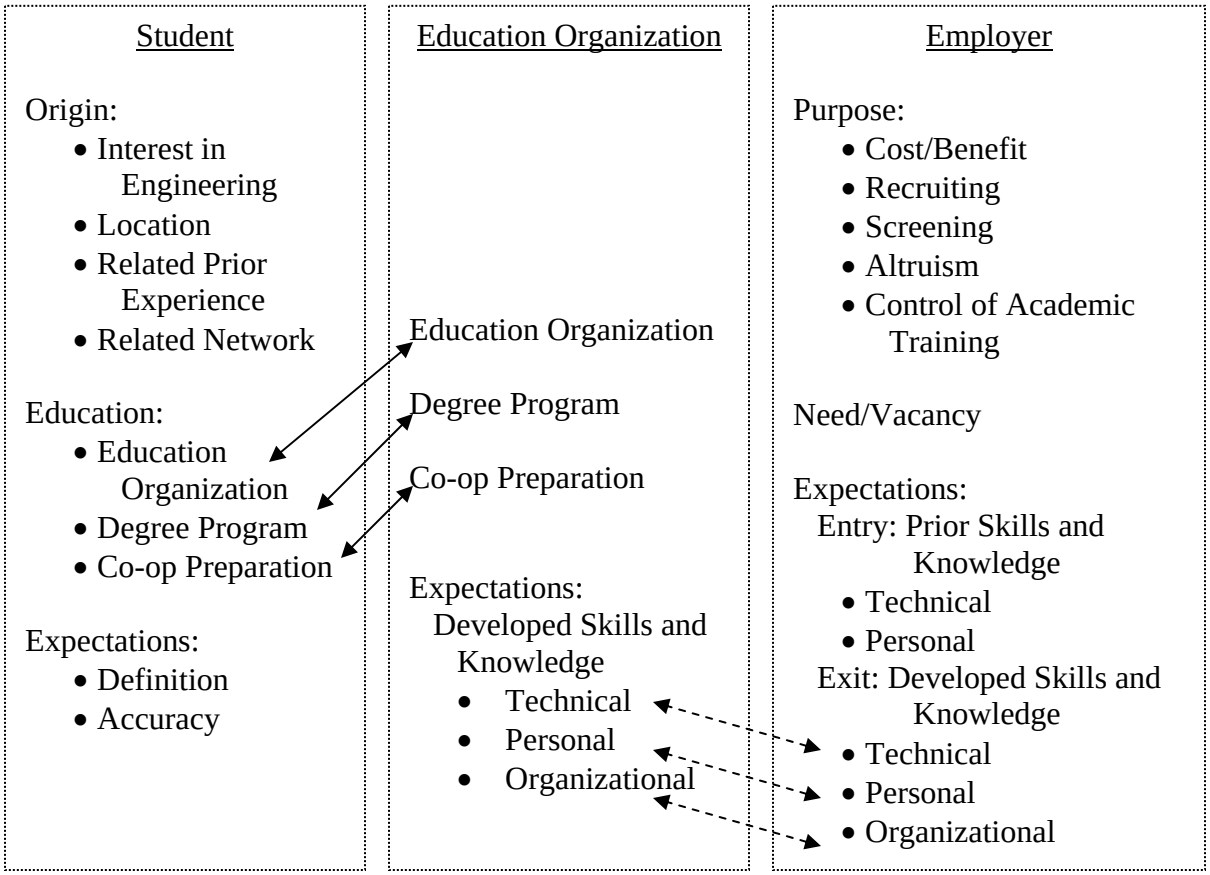


Figure 31: Five-stage socialization model for a co-op program

Stage 2: Match-Making Co-op Position

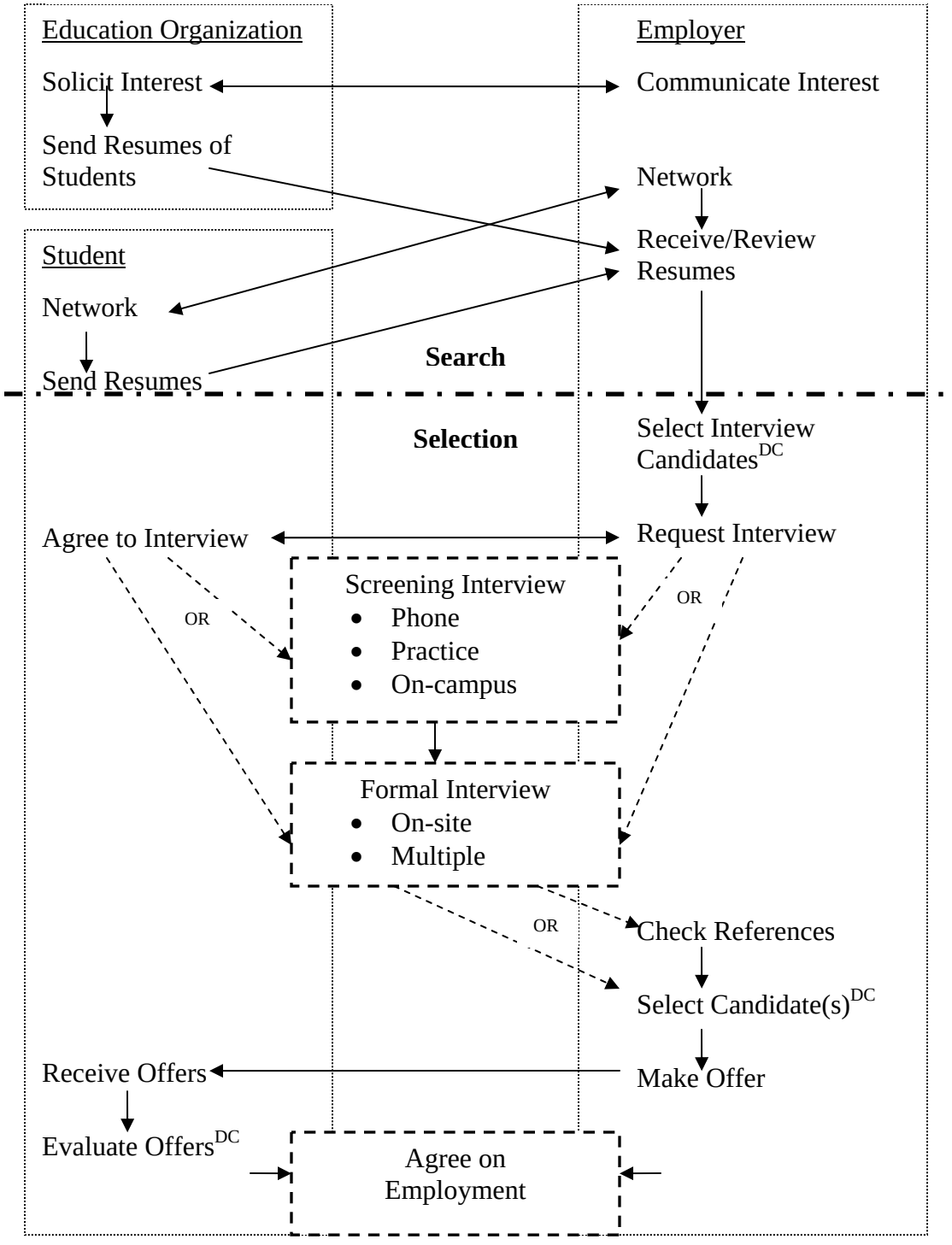


Figure 31: Five-stage socialization model for a co-op program (continued)

Stage 2: Match-Making Co-op Position Selection Decision Criteria

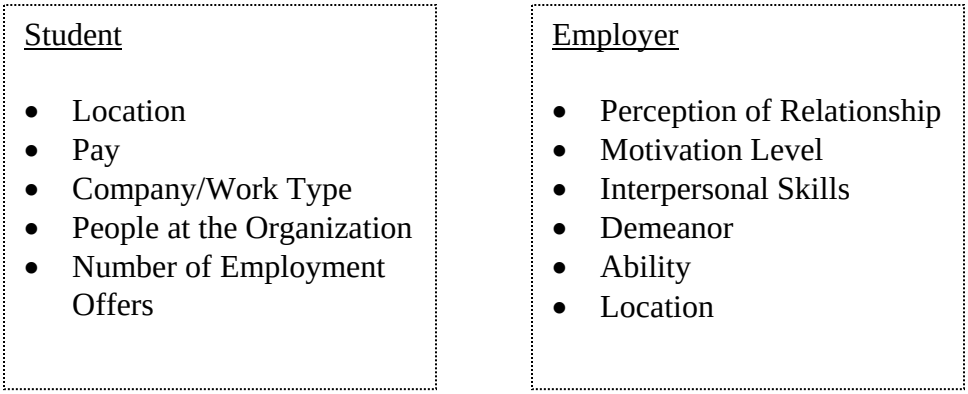


Figure 31: Five-stage socialization model for a co-op program (continued)

Stage 3: Entry – Co-op Position

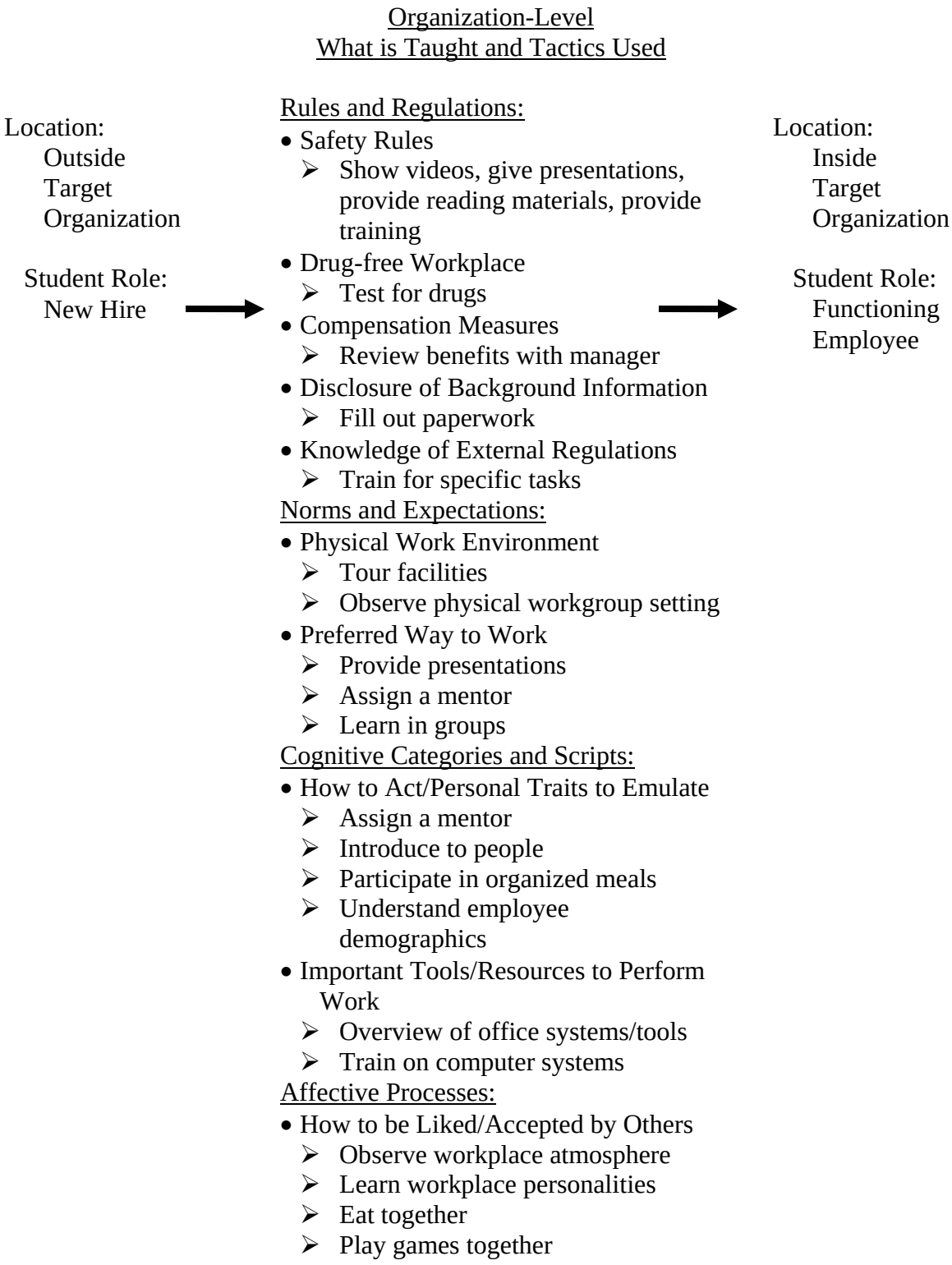


Figure 31: Five-stage socialization model for a co-op program (continued)

Stage 3: Entry for the Co-op Position

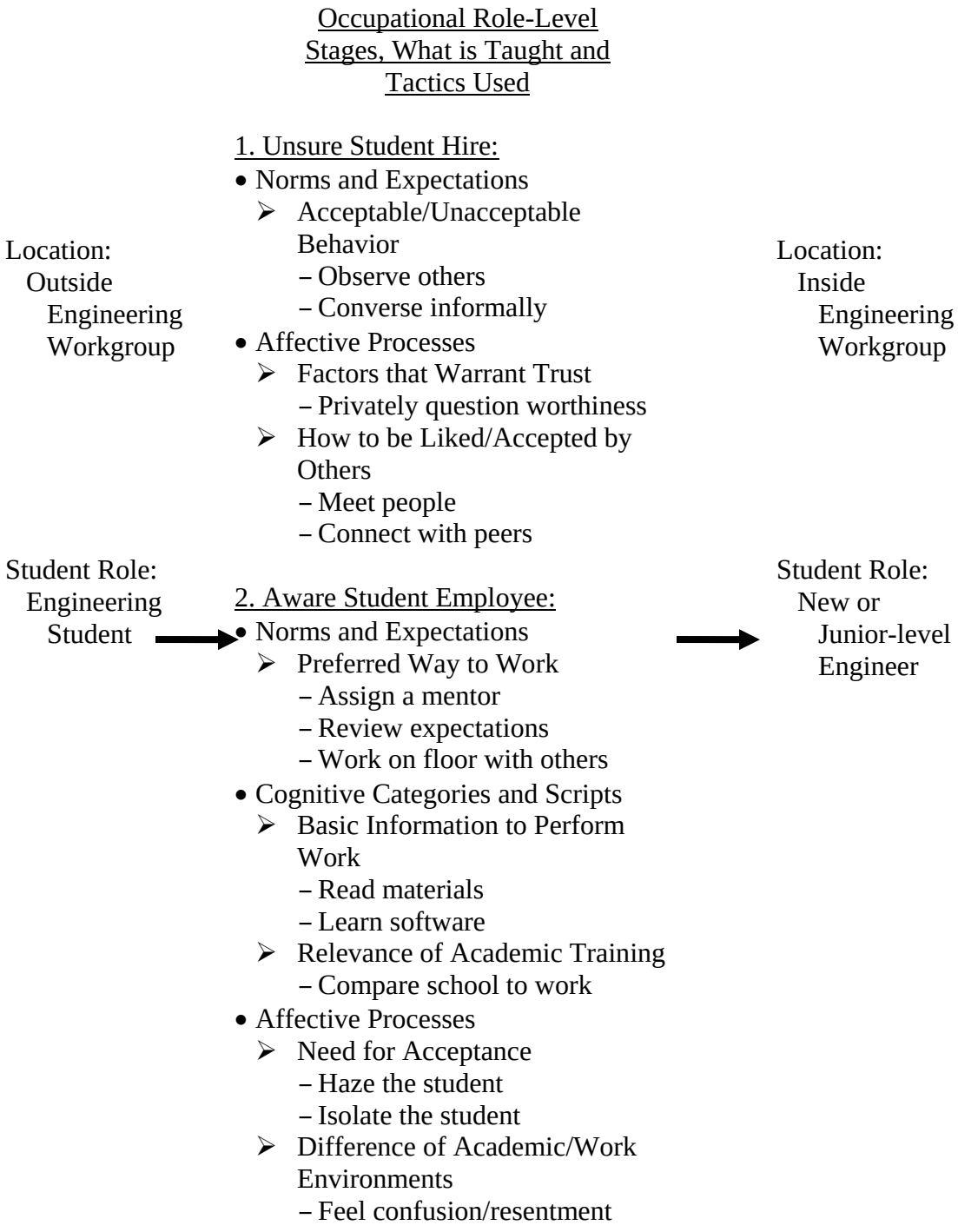


Figure 31: Five-stage socialization model for a co-op program (continued)

Stage 3: Entry for the Co-op Position

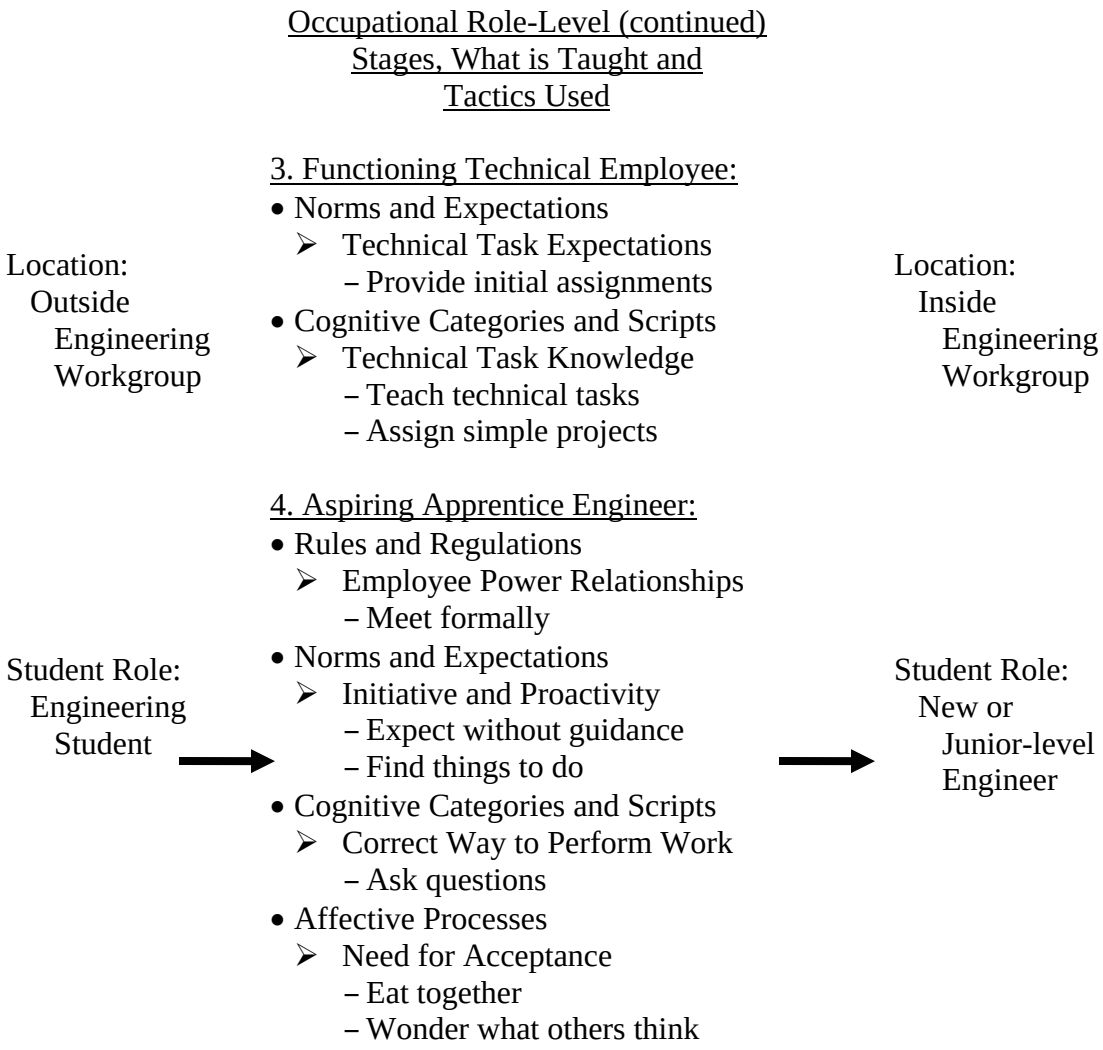


Figure 31: Five-stage socialization model for a co-op program (continued)

Stage 3: Entry for the Co-op Position

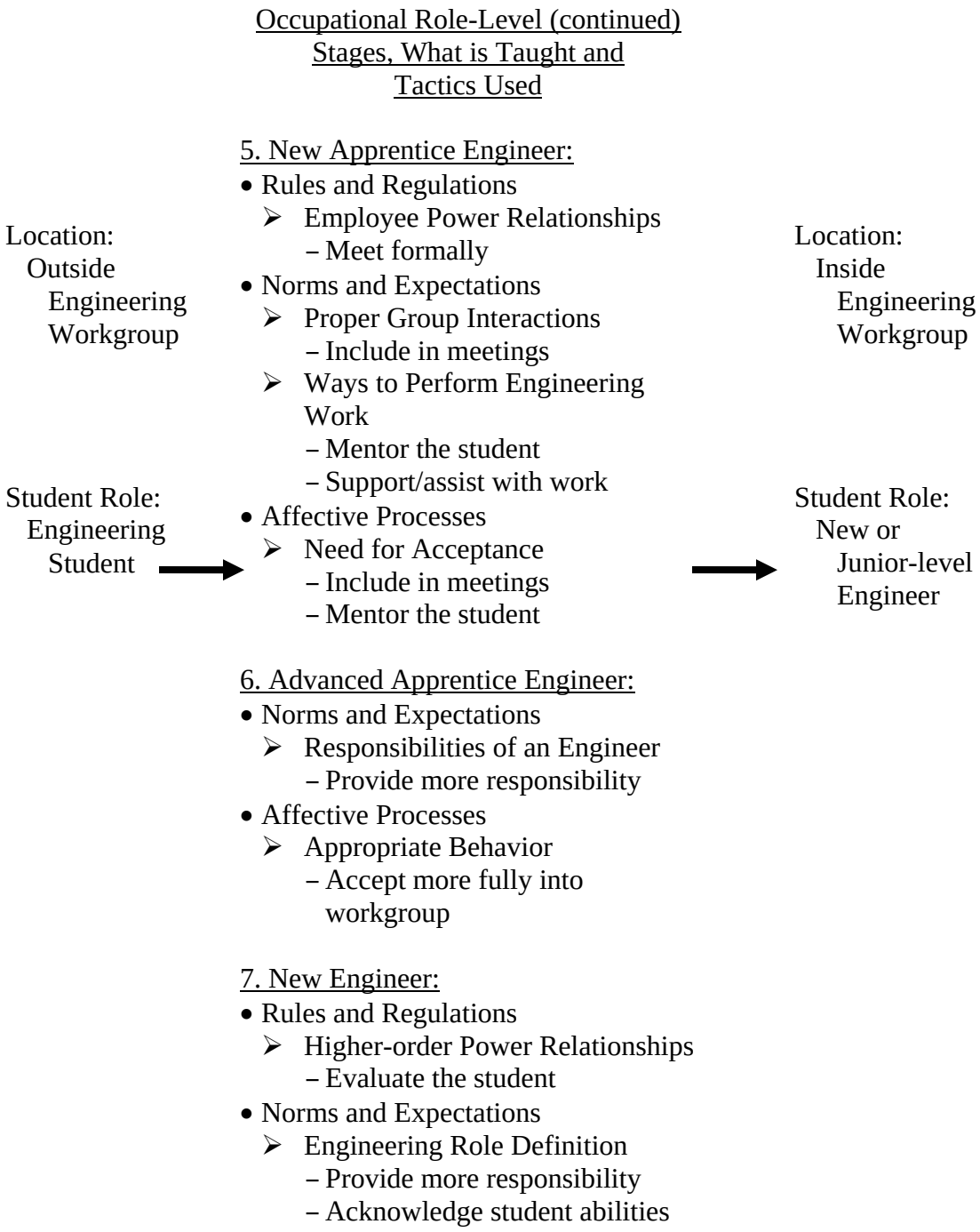


Figure 31: Five-stage socialization model for a co-op program (continued)

Stage 3: Entry for the Co-op Position

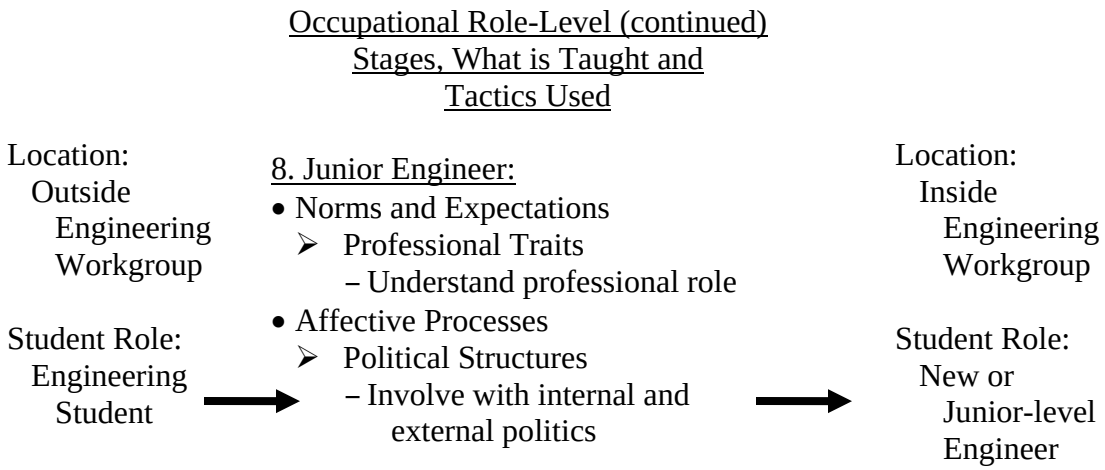


Figure 31: Five-stage socialization model for a co-op program (continued)

Stage 4: Match-Making Postgraduation Position

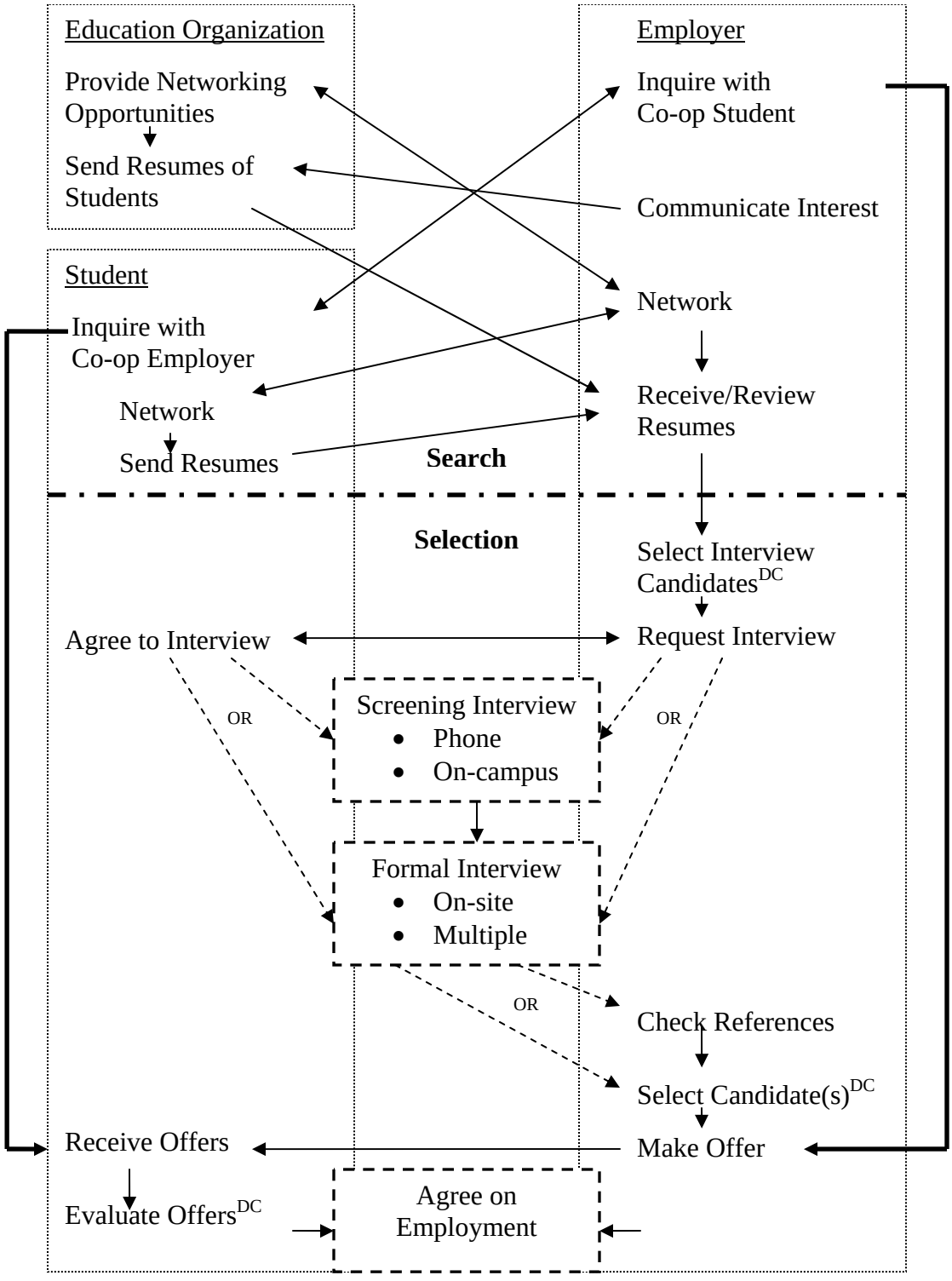


Figure 31: Five-stage socialization model for a co-op program (continued)

Stage 4: Match-Making Postgraduation
Selection Decision Criteria and Reasons for Retaining a Co-op Student

Student Decision Criteria

- Comfort-level with People/Organization
- Easier not to Look Elsewhere
- Location
- Pay/Benefits
- Interest in Company/Work Type
- Stability of the Employer
- Number of Employment Offers

Employer Decision Criteria

- Perception of Relationship
- Motivation Level
- Interpersonal Skills
- Demeanor
- Ability
- Location
- Prior Related Experience

Employer Retention Reasons

- Position Opening
- Student Fit with Organization and Occupational Role
  - Intelligence
  - Self-Motivation
  - Ability to Get Along with People
  - Work Ethic
- Student Knowledge of Organization and Occupational Role
- Lower Start-up Costs
- Greater Return on Investment
- Lower Cost of Hiring Process

Figure 31: Five-stage socialization model for a co-op program (continued)

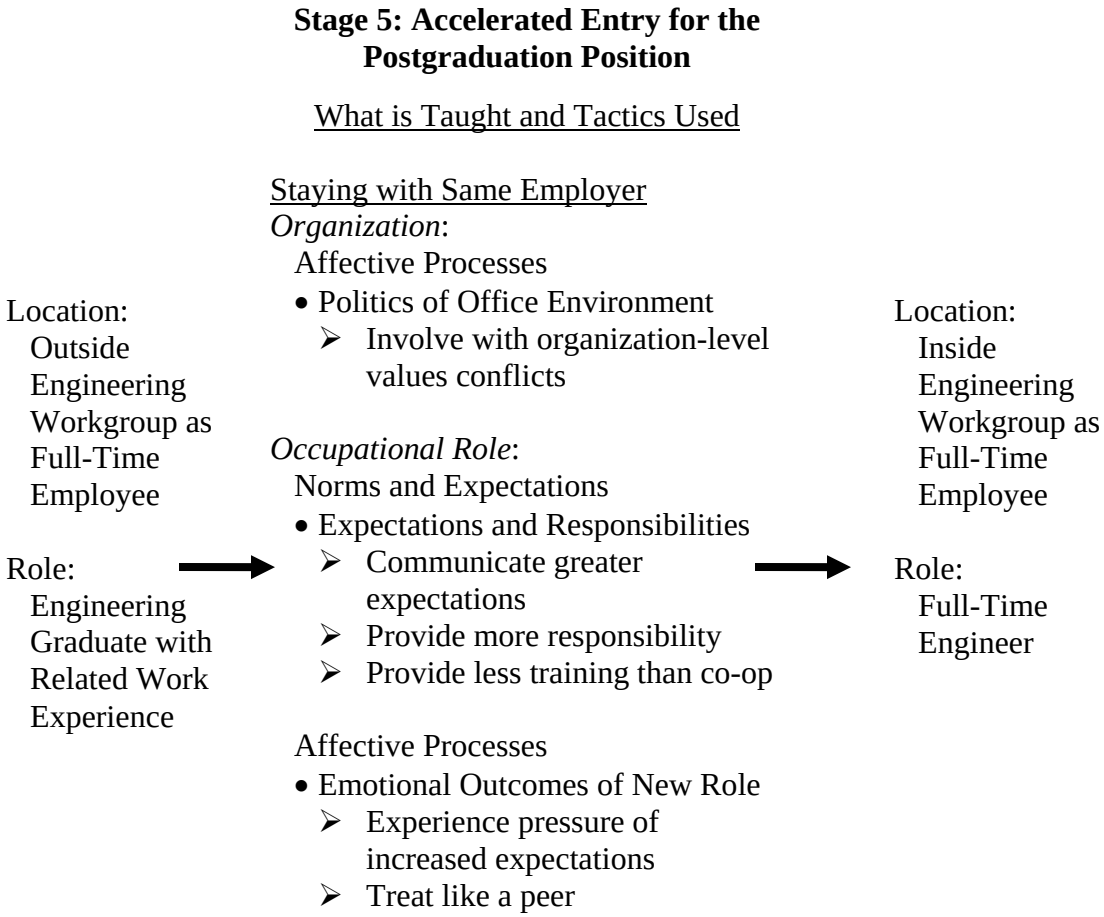


Figure 31: Five-stage socialization model for a co-op program (continued)

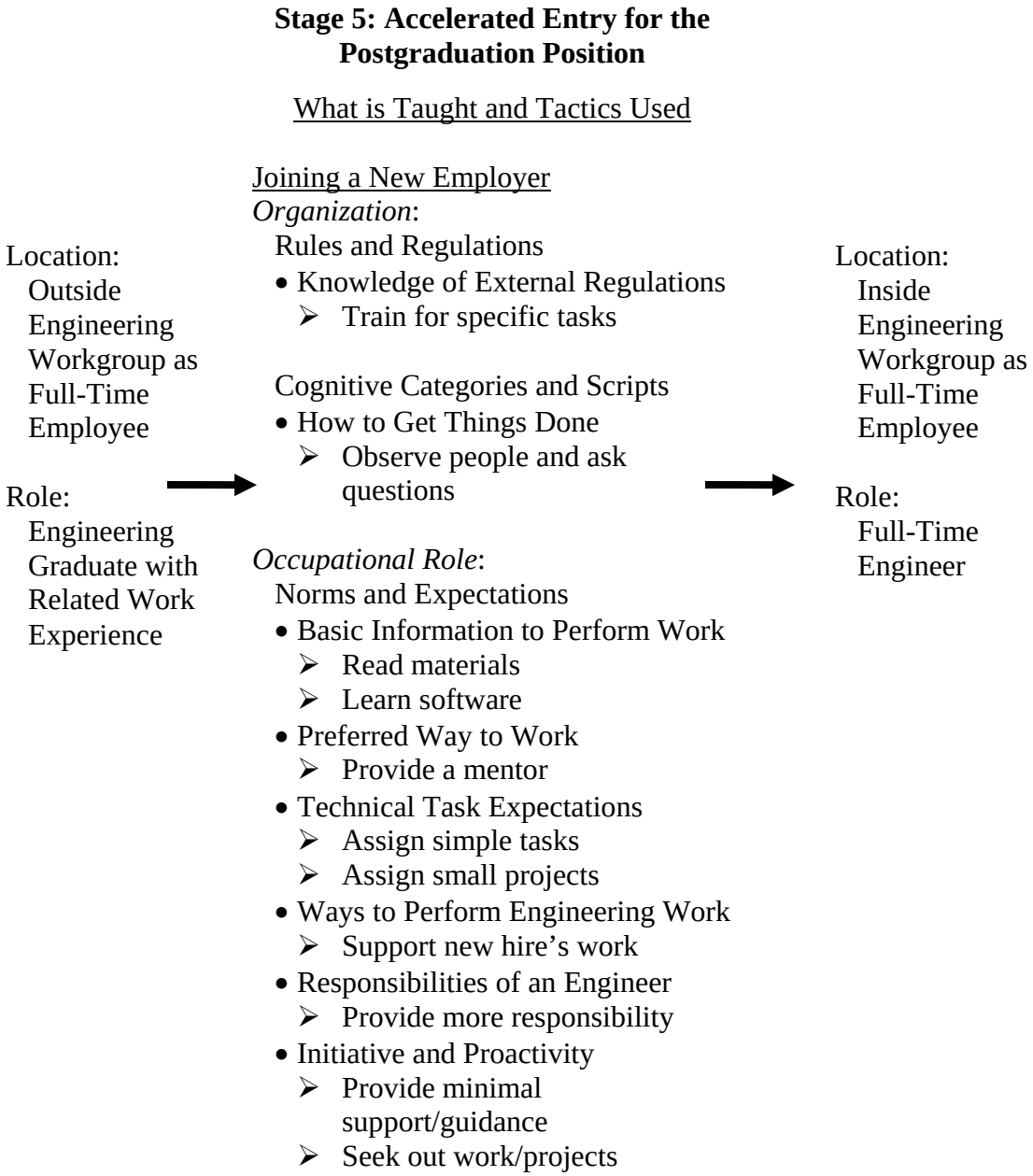


Figure 31: Five-stage socialization model for a co-op program (continued)

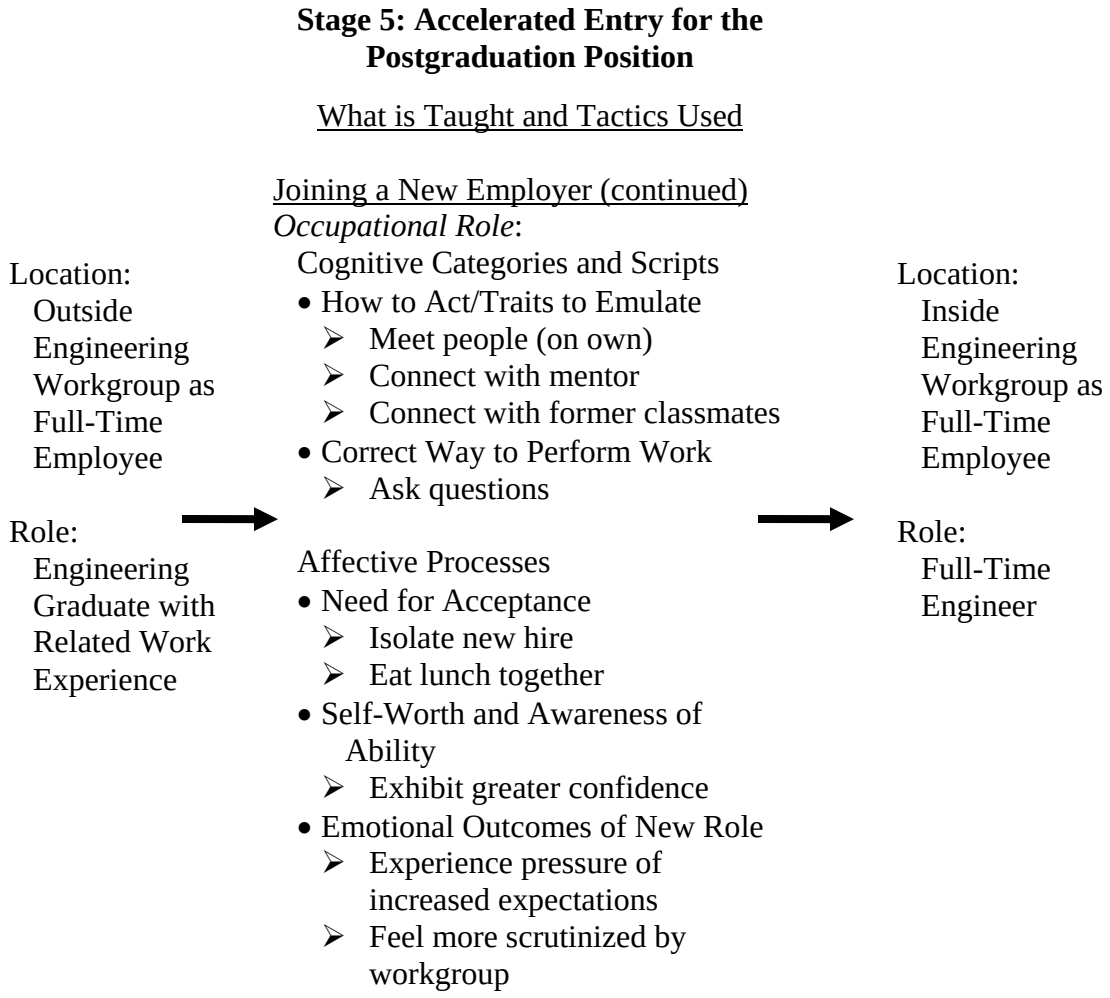


Figure 31: Five-stage socialization model for a co-op program (continued)

Feldman's (1976) Three-stage Entry Model also included an initial anticipatory socialization or "getting in" stage. Buchanan's (1974) Three-stage Early Career Model called the first stage basic training and initiation, while pre-arrival was identified as the first stage in Porter-Lawler-Hackman's (1975) Three-stage Entry Model. Fischer's (1986) review of socialization literature identified three distinct phases within the socialization process, with

the first phase being one of “anticipatory socialization (Brief et al., 1979; Feldman, 1976; Louis, 1980), when newcomers prepare themselves for entry into the organization.”

Pre-Entry: Student:

The student component of pre-entry contains three categories: origin, education, and expectations. Origin consists of four properties: interest in engineering, location, related prior experience, and related network. Interest in engineering is the “why” and “when” a student made a decision (conscious or unconscious) to pursue engineering training toward a career as an engineer. Location refers to where the student physically came from prior to arriving at the university and is important because of the connection to where the student chose to attend college and chose to work for the co-op assignments. The majority of students were from an area local to GSU.

Related experience referred to whether the student had prior engineering or technical work experience prior to starting the co-op assignment. This property impacted the student’s perspective on the ensuing work experience (Nixon, 1989), contributed to the student’s potential attractiveness to employers, and lessened entry shock (Jones 1983). Having prior related experience was a positive attribute for students, with the five students having prior related experience gaining legitimate interest from employers when looking for a co-op position and ultimately obtaining a choice position. Related network is the contacts a student may have with potential employers prior to starting the search for a co-op position. Six of eight student respondents who indicated having some engineering contacts prior to the co-op search were successful in having those contacts result in an offer for a co-op position.

Education for the student includes properties of education organization, degree program, and co-op preparation. The student was admitted to the education organization

(GSU) and the degree program (engineering) prior to beginning the search for a co-op position. All students but one took the co-op preparation course intended to prepare students for the workplace and begin the process of connecting students with employers. In order for the student to progress into an engineering organization and begin an engineering-related occupational role through a co-op program, it is essential to be in a higher education organization and an engineering degree-granting program and highly desirable to obtain some preparation prior to beginning the search for a co-op position and beginning the work experience.

Expectations for the student are either developed through experience or network or likely do not exist in any substantial or developed manner. Properties of student expectations are definition (how defined the expectations are) and accuracy (how accurate the expectations are). The extent of how well-defined the students' expectations of the co-op experience were did not appear to have a considerable impact on the ability to move into an engineering-related employer organization and role. However, two of three students who indicated having no real defined expectations of the co-op experience had significant difficulty locating a suitable co-op employer for the assignments.

If a student had prior expectations of the co-op experience that were inaccurate, the process of moving into an engineering organization and occupational role was troublesome to the student. The student had to recognize that his/her expectations were inaccurate, decide whether the career was still of value and interest to him/her, and then learn what the occupational role and expectations really were. This process was evident in all but five students who indicated a relatively accurate understanding of the engineering field. The five students each had either prior engineering-related experience or knew an engineer who was a

personal resource to them for understanding the occupational role of an engineer. This is consistent with Jones (1983), who wrote that prior work experience can influence newcomers' expectations and lessen entry shock. Also, Feldman and Weitz (1990) found that interns (similar to co-ops) with realistic and positive job expectations were more likely to have positive experiences.

Pre-Entry: Education Organization:

The education organization component of pre-entry contains three categories (education organization, degree program, and co-op preparation) that are identical to the properties contained in the student education category because the student and education organization need each other to engage in education. A fourth category, expectations, is different from the student's expectations. For the education organization, expectations are that the student will learn to function in an engineering work environment, not, primarily, to gain engineering design experience as most students expect. Properties of education organization expectations are development of technical, personal, and organizational skills and knowledge. Technical skills includes some engineering design experience, while personal skills refers to development of professionalism and maturity, how to interact in the workplace, how to relate to clients, and how to run a meeting. Organizational knowledge includes knowing how to get things done and what different occupational roles are in an engineering environment.

Pre-Entry: Employer:

The third component of pre-entry is the employer and includes three categories: purpose, need/vacancy, and expectations. The purpose of the co-op program for employers is

one or a combination of five properties: cost/benefit, recruiting, screening, altruism, and control of academic training. Cost/benefit refers to getting work completed at a low cost while realizing some work output from the student. Recruiting means the co-op program is a way to effectively hire full-time engineering talent. Screening helps determine if the student is suitable for the organization before hiring him/her full-time. Altruism is the term used to describe employers' interest in helping engineering students and the local community, and control of academic training refers to input employers have in the curriculum development process. Need/vacancy simply refers to the concept that each employer identified a need or vacancy prior to connecting with students for co-op positions.

The final category of employer pre-entry is expectations. Employer expectations consist of two subcategories. These are entry: prior skills and knowledge, and exit: developed skills and knowledge. Prior skills refers to those skills and abilities an employer expects a student to have prior to entering the organization and consists of properties of technical and personal components. The desired technical skills includes computer programming knowledge and computer-aided drafting skills. Also included is a suitable grade point average (more than 3.0 on a 4.0 scale), which demonstrates mastery of academic technical knowledge. Personal skills included good communication skills, organizational skills, strong problem-solving ability, self-motivation, and maturity.

Developed skills refers to the skills and abilities a student is expected to gain during the co-op experience, from the employer's perspective. Developed skills consists of properties of technical, personal, and organizational components. The developed skills and knowledge are consistent with the education organization's faculty expectations, but are not created in an intentional, joint manner with the education organization. Most of these skills

are similar to Morrison's (1995) seven primary types of information newcomers need to acquire: technical, referent, social, feedback, normative, organizational, and political.

Stage 2: Match-Making for the Co-op Position

The match-making stage is a boundary spanning phenomenon between the pre-entry and entry stages. It is a process of students and employers connecting with each other regarding employment as a co-op employee and ultimately agreeing to enter into a work relationship in the form of an engineering co-op occupational role. In many cases, the education organization acts as a facilitator for connecting the students and employers. Aspects of the match-making stage occur for the entities of education organization, student and employer. There are two substages of match-making: search and selection.

Search:

The search substage contains seven steps and is separated into education organization, student, and employer activities. The education organization is involved only in the search substage and constitutes two steps, soliciting interest from qualified employers and sending resumes of qualified students to qualified employers. Qualified refers to the idea that the education organization admits the student to upper division standing within the engineering academic program and approves (qualifies) employers to be a co-op worksite, prior to introducing the student and employer to each another. In many ways, the education organization assumes the role of a match-maker – a third-party assisting in two interested people (or groups of people) getting to know each other. After the student and employer are introduced, the education organization is not involved again until the co-op assignment begins.

The student search process contains two possible steps: networking with potential employers and submitting resumes to potential employers. The employer search process contains three possible steps: communicating interest to the education organization and students, networking with potential student candidates, and receiving/reviewing resumes.

Selection:

For the student, the selection process contains six potential steps, including agreeing to interview with interested employers, conducting a screening interview, conducting a formal interview, receiving offer(s) of employment, evaluating offers of employment, and agreeing to employment. The student uses decision criteria (described in the next section) to evaluate offers of employment. The selection process for the employer contains eight potential steps, including selecting student interview candidates, requesting interviews of the student, conducting a screening interview, conducting formal interviews, checking student references, selecting student candidate(s), making an employment offer, and agreeing to employment. The employer also uses decision criteria when reviewing student resumes and deciding whom to interview, and when selecting a student to offer the co-op employment occupational role.

Decision Criteria:

The student decision criteria contains five properties: location of the workplace (students prefer the workplace to be near home or the university), pay (higher pay is preferred), company/work-type congruency with student interests, positive relationship with people at the organization (perceived during the interview process), and number of employment offers (few offers limits the ability to be selective in choosing a co-op site). The

employer decision criteria contains six properties: perception of the relationship between the student and the members of the employer organization (determined during the interview process); motivation level of the student (students who demonstrate a high motivation level are desirable); interpersonal skills of the student (students who demonstrate good communication skills are desirable); demeanor of the student (positive, professional, and mature students are desirable); the ability (technical and personal) of the student; and location (students from near the employer workplace are desirable).

Summary:

The match-making stage can begin with any of the three entities: education organization, student, or employer. The education organization can begin the process through coordination of the practice interview program or by soliciting interest from the employer. The employer can begin the process by communicating interest to the education organization or student or through networking with the education organization or student. Finally, the student can begin the process by networking with the employer or by submitting resumes to the employer.

The result of the initial actions is for resumes to either be requested from the education organization or student by the employer or for the education organization or student to submit resumes to the employer for consideration. The employer then reviews the resumes and, in combination with the networking activities, selects students to interview. Decision criteria are used by the employer to determine the students to interview. The employer then requests an interview from the selected student(s) and the student agrees (or declines) the employer's request.

The first joint step occurs next and involves a screening interview, a formal interview, or both. Some organizations conduct a brief telephone or on-campus interview with student candidates first, then reduce the number of students they would like to bring to the workplace for a formal interview. Some employers choose to move directly to the formal interview step after requesting an interview. In some cases, more than one formal interview is conducted. After the interviews are completed, some employers elect to check student references before choosing which student(s) to hire, while other employers move directly to a student selection step.

When a student (or students) is identified, an offer of employment is made to the student. The student receives one or more offers of employment and then must evaluate the offer(s) based on the decision criteria. Once the student makes a final decision, a joint step occurs between the student and employer, termed "agreement on employment," which concludes the match-making stage. Because of the recessed economic conditions in the West Great Lakes region, co-op opportunities were scarce in some fields, and therefore some students had to struggle to receive a single offer of employment, which they were then obligated to accept. The concept of resource dependency and the relationship to power advanced by Emerson (1962) and Thompson (1967) are evident in this instance. The scarcity of opportunities for the co-op students places the power with the employer in the employer-student relationship, as the employer can be selective when deciding whether to hire a co-op student, while the student is left with little choice but to follow the employers' decisions.

Employers' decision criteria were based on the expectations identified in the pre-entry category and included the student's technical and personal skills. In many cases the employer used these criteria to identify candidates to interview from the resumes reviewed

but reverted to whether the students would “fit” in terms of personality with the group following the interview process. As Schein (1990) wrote, the socialization process for an organization begins with recruitment, as the organization looks for new members who already have the assumptions, beliefs, and values that are congruent with those who already belong to the organization.

Stage 3: Entry for the Co-op Position

The third stage that was identified was entry for the co-op position. Socialization is the process of the student breaking into the organization and an engineering-related occupational role. The two primary properties of entry were outside and inside. The student began the co-op experience on the outside of the organization and an engineering-related occupational role, unless they had already worked in an engineering occupational role or within the organization before beginning the co-op assignments. During the co-op experience the student moved from outside to inside. Students moved from outside to inside the organization during the hiring process, during the orientation activities when the student began the co-op assignment, and by learning the company culture. The student moved from outside to inside an engineering-related occupational role through interactions with coworkers within the workgroup and through the work assignments. The students also enter occupational roles by learning from their mentors and engineer coworkers, gaining more engineering-related assignments and responsibilities, and proving the technical and personal abilities to successfully manage engineering projects.

The entry stage consists of teaching the student what needs to be known in order to successfully enter the organization and occupational role. The objective is that the student learn rules and regulations, norms and expectations, cognitive categories and scripts, and

affective processes by means of tactics that are both employer-driven and student-driven. What is learned is consistent with the elements of the three-pillar paradigm of Scott (2001) and the work of Greenspan and Shanker (2004) and Homans (1950) on affect. Regulative processes/activities rely on rules, laws, and power systems to coerce people into conforming. Normative processes/activities teach organization and group norms and help define roles and jobs. Cognitive categories and scripts rely on mimetic mechanisms and a person learning by copying and/or adopting the behaviors, actions, and beliefs of others. Affective processes refer to emotion, sentiment, and motive. The tactics have properties ranging from formally to informally communicated or presented, and consciously enacted to taken-for-granted. The properties define how the organization members display, project, communicate, and teach the student, and evaluate worthiness of the student for acceptance into the organization and occupational role(s).

Entry to the organization contained aspects of all four subcategories of "what was learned." Rules and regulations were an important subcategory, including many of the first tactics used by the organization upon entry after hiring the student. The number of tactics used to communicate norms and expectations and cognitive categories and scripts during entry to the organization was similar to the number of tactics used to teach rules and regulations. Affective processes were identified but were more generalized and symbolic than the impact affective processes have in the entry to occupational role substage. All four subcategories were also identified for entry to the occupational role. However, there was a different composition of the four types of elements ("what is learned") as compared to entry to the organization. There were very few rules and regulations being taught for the entry

substage to the occupational role(s). There were predominantly tactics used to teach norms and expectations and affective processes.

The difference in the composition of the four types of elements indicates that the two entry processes are different and that students are socialized to the organization in a different manner than to the occupational role. Entry to the organization focuses on teaching the student what all employees need to know, regardless of what group, or subgroup, the employee belongs to in the organization. Therefore more (but not only) formal tactics are used in order to ensure consistency organization-wide with certain elements important to the organization, most often in the forms of rules and regulations and cognitive categories and scripts. Entry to the occupational role is concerned with the student learning about what to do and how to behave and act (norms) within expectations of defined jobs and positions. It is a much more narrowly focused process and therefore relies on more individual and informal tactics enacted by a person (a mentor) or smaller group (subset) of the organization, most often in the forms of norms and expectations and affective processes. The two entry categories contain some common tactics used to teach both similar and different things, but the two processes are distinctly separate and identifiable, with distinctly different purposes and desired outcomes.

There is a “feeling out” process between the student and the groups of people the student interacts with in the employer organization, with both student and employer groups trying to identify the fit both short-term and long-term with one another. Rules and regulations, norms and expectations, cognitive categories and scripts, and affective processes are taught to the student by the employer using various tactics. At the organization level, company-wide and workgroup-level orientation processes and other tactics used to transfer

information about employer organization culture were used to move the student from a new hire occupational role to a functioning employee occupational role. Various employer-driven and student-driven workgroup interactions and work assignments were used to move the student from being an engineering student to a new or junior-level engineer within the employer organization. An eight-stage process was identified that moved a student to a new or junior-level engineer occupational role by engineering personnel using various methods of showing acceptance of, sharing knowledge with, and adding responsibility to the student.

Mentors were identified as important people within the entry to the organization process, as the mentor communicates various norms and expectations, types of information, and affective processes to the student. This finding is consistent with the findings of Louis (1980) and Reichers (1987), who found that mentors are an important agent of socialization. Ostroff and Kozlowski (1993) also found that newcomers learn more about an organization if they have mentors. Blau (1988) determined that an intern-manager relationship (similar to a co-op student – mentor relationship) has a direct effect on socialization outcomes for a newcomer. The organization assigns the mentor as a person trusted to help the student learn and understand many of the various key aspects of the organization.

Organization:

Making it inside the organization includes learning about all four elements: rules and regulations, norms and expectations, cognitive categories and scripts, and affective processes. Within these subcategories were two general components: orientation tactics and other cultural/environmental tactics. Many of the organizations had some form of company-wide orientation program for new hires that was typically coordinated by the human resources office. This program often includes an overview of company policies or procedures (such as

filling out timecards), an overview of company systems (such as computer login and intranet usage), and training (such as safety in the facility). More elaborate orientation programs existed at some organizations and included facility tours, presentations by group and company leaders, and lunch gatherings. There was also evidence of orientation taking place within the workgroup or departments where the co-op student worked. However, these were more often unplanned and less formal and involved getting to know the people, places, and tools the student would be working with.

Communication of rules and regulations by organization members is an important first step when students enter the organization. This process is often formal and planned and occurs within the first two weeks of starting work at the organization. Many of the rules and regulations are communicated by people in central management functions within the organization (human resources personnel, department managers, etc.). The purpose is for everyone in the organization to have the same set of rules and regulations by which to abide.

Norms and expectations and cognitive categories and scripts are also an integral part of the entry to organization process. The student is expected to learn how to act and what is acceptable or unacceptable behavior within the organization. The student is introduced to the use of important symbolic artifacts and resources, such as computer technology and other machinery in the facility. Affective processes that were identified tended to be fairly generalized and symbolic. The result is that the student does experience affect associated with the organization, but it is not as strong an emotional connection, particularly when compared to the affective processes that are described in the following “entry to occupational role” section.

More often than not, students gathered information about company culture through observation and talking with their coworkers and/or mentors. Some organizations were very fast-paced and the people were driven by production goals, while others were “laid-back” environments and people were more easy-going. Getting to know and understand the employer organization culture involved environmental factors, peoples’ attitudes, and student-mentor and student-workgroup activities. The environment consisted of the type of atmosphere (easy-going, professional, etc.) and the physical setting (office layout, where things are, etc.).

Entry to the organization during the co-op position is consistent with Fischer’s (1986) second phase of the socialization process called the “accommodation” (Feldman, 1976) or “initial confrontation” (Graen, 1976) stage when newcomers first join the organization and begin to master their job, develop relationships with coworkers, and learn how the organization operates. In most cases, the students moved to inside the organization in the first few weeks of their first co-op semester and always by the time the first co-op semester was completed. There were a couple of instances where a student moved from inside to outside of the organization after being laid-off due to lack of work or economic conditions facing the organization, and then had to begin the process of moving inside a new organization again, with a new employer.

Occupational Role:

The occupational role category of the entry stage for the co-op position describes the student’s movement from outside to inside an engineering-related occupational role. The employer and student jointly participate in the process. There are four subcategories associated with the occupational role category consistent with the three pillars of institutions

outlined by Scott (2001) – rules and regulations, norms, and cognitive (language/scripts) – and the concept of affect advanced by Greenspan and Shanker (2004) and Homans (1950). Tactics were identified that the employer members used to teach newcomers (co-op students) the information grouped according to the four subcategories. The tactics had dimensions ranging from being either formally or informally and consciously or unconsciously (taken-for-granted) enacted.

Aspects of all four subcategories were identified as part of the entry process to the occupational roles. However, different from the entry to the organization process, the predominant subcategories identified were norms and expectations (fourteen tactics) and affective processes (twelve tactics). There was very little indication of rules and regulations discussion for entry to the occupational role, although rules and regulations were an important aspect of the entry to the organization. This indicates that the process of entering the occupational role is different from entry to the organization, even though there are overlapping and multidimensional tactics used to communicate socialization activity for both categories. Entry to the occupational roles is much more concerned with learning how things are done and how to act within the workgroup and gaining acceptance from the workgroup members.

The students learned about, and gained access to, various occupational roles within the engineering-related organization through interactions with members of the workgroups and through work assignments. Some workgroup interactions were employer-driven (originated from employer action or activities) and others were student-driven (proactive actions or activities by the student). Several of the students experienced forms of testing and challenging by their coworkers before they were allowed inside the workgroup or team.

These activities included making fun of the new person because of the lack of knowledge of what was supposed to be done, and questioning the student's understanding and ability. There also was evidence that many coworkers were friendly and helpful to the co-op students and were able to assist the students with understanding how to cope and manage in the new engineering-related occupational roles.

Within workgroup interactions, it was determined that some tactics were employer-driven while others were student-driven. Employer-driven workgroup interactions are activities or events targeting the student and resulting from employer representative action (or non-action). The employer-driven interactions had dimensions ranging from challenging to supporting, meaning some actions inhibited the students from moving into given occupational roles until they proved themselves, while other actions assisted the students' move inside given engineering-related occupational roles. The student-driven workgroup interactions consist of those activities resulting from student-initiated actions that help the student move into an engineering-related occupational role. The dimensions of this property ranged from proactive to reactive. Proactivity describes whether the student initiated the action or responded to workplace stimuli.

Students were expected to prove knowledge and ability to perform engineering-related work by first demonstrating the ability to learn and accomplish small tasks. Many of the students were simply given reading assignments or computer tutorials to complete during the first few days. The student was either encouraged, or expected, to ask questions in order to learn what to do. Eventually the student was given assignments to demonstrate the ability to handle more responsibility. More increasingly complex and meaningful assignments were given to the student until the student was accepted as part of the work team and had regular

responsibilities like other members of the workgroup. The student had moved from outside to inside the workgroup in an engineering-related occupational role. This process is consistent with Fischer's (1986) third phase of socialization called "role management" (Feldman, 1976), "mutual acceptance" (Schein, 1978), "adaptation" (Louis, 1980), or "metamorphosis" (Van Maanen, 1975), when newcomers become fully accepted members of the organization (cited in Bauer et al., 1998, p. 153).

The result of the entry processes and tactics for the occupational role category is to move the student from outside to inside a given occupational role within the engineering-related organization. The student goes from being an engineering student outside of an engineering workgroup to being a new or junior-level engineer inside an engineering workgroup. The role of a member of an engineering workgroup is to know the people, processes, and work requirements well enough to effectively manage personal and work-related activities in an engineering environment. The student is accepted as a member of the workgroup in an engineering-related role.

There is an eight-stage process associated with the occupational role category that moves a student from outside to inside of various engineering-related occupational roles. The eight-stage process consists of the following student-centered role phases: unsure student hire, aware student employee, functioning technical employee, aspiring apprentice engineer, new apprentice engineer, advanced apprentice engineer, new engineer, and junior engineer. Not all students begin at the same stage, nor do all students progress through each stage. Some students even move forward and backward in the stages, particularly after starting the second or third co-op semester and having gone back to the university between co-op

semesters. Finally, not all student progress to the same final stage, although no students interviewed for this study progressed further than the eighth stage.

The eight-stage process is consistent with Morgan's (1997) and Mintzberg's (1979) ideas about the training and indoctrination of the specialist that occurs when entering the professional bureaucracy. The process also contains aspects of the work of Fischer (1986), who identified five types of learning and change that occur during socialization: (1) preliminary learning (understanding that learning is needed and what and from whom they need to learn), (2) learning about the organization, (3) learning to function in a workgroup, (4) learning to do the job, and (5) personal learning (learning about oneself).

Initially, most students move from being a new hire (stage 1) to a functioning technical employee (stage 3), completing technical tasks such as CAD work, machine maintenance, and paperwork/documentation. In between, the student goes through a stage named "aware student employee" that consists of the student becoming aware of the difference between his/her academic training and the application in the work environment. This stage is consistent with the first stage of Wanous' (1992) four-stage model of the socialization process, which consisted of confronting and accepting organizational reality, including confirmation/disconfirmation of expectations, conflicts between personal job wants and organizational climates, and determining which personal aspects are reinforced or punished by the organization.

The "aware student employee" includes the student becoming aware of the difference between the academic training and the application in the work environment. This stage includes indications that the student is changing his/her social identity from one of academic people (faculty and students) as the ingroup to that of the employer organization workgroup

as the ingroup. Implied is that the academic group starts to become the outgroup as the student feels resentment toward the academic members for not properly preparing (in the student's estimation) him/her for the work environment. Merton (1996) refers to this phenomenon as changing reference groups, meaning the student compares himself/herself to members of the groups that are encountered and identifies himself/herself with the members of the group. Students, through the co-op program, begin to change reference groups from people in academic settings (faculty, classmates) to workgroup members at the employer worksites.

To move to stage 3 (becoming a functioning technical employer), the student experiences aspects of Wanous' (1992) second stage of his socialization model, achieving role clarity, which includes being initiated to the tasks of the new job, defining one's interpersonal roles, learning to cope with resistance to change, and learning how to work within a given structure and ambiguity. At some point, the student desires to move beyond (or the employer pushes them to move beyond) the technician stage to one of being an apprentice engineer. If the student proactively seeks this role, the student goes through an "aspiring apprentice engineer" stage (stage 4) where engineering-related work is sought out.

Once the engineering personnel in the employer organization are comfortable with the student and his/her abilities, the student is moved into a "new apprentice engineer" role (stage 5) where he/she is mentored by the engineering staff and works on engineering-related projects. Stage 6, the "advanced apprentice engineer" role, consists of the student gaining more confidence from the engineers and therefore gaining more responsibility with less supervision. This phase corresponds with Wanous' (1992) third stage of socialization, in which the newcomer locates him- or herself in the organizational context. This includes

learning which modes of behavior are congruent with those of the organization, resolution of conflicts at work, commitment to work, and establishment of an altered self-image and adoption of new values.

At some point, the student proves his/her ability to the engineers in the organization and the student is given his/her own projects. At this point, the student becomes a "new engineer" (stage 7). Aspects of Wanous' (1992) fourth stage correspond to the final stages of this eight-stage process and include detection of signposts of successful socialization, high satisfaction, feelings of mutual acceptance, job involvement, and achievement of organizational dependability. Many students reach the "new engineer" stage by the end of the three-semester co-op experience. Some students move further and enter stage 8, which is named a "junior engineer" role. At this stage, the student functions as an engineer in the organization and moves further inside the engineering profession, gaining responsibility for external correspondence with customers and becoming involved as a semi-equal in internal group politics.

Within the eight stages, the student learns to become an engineer primarily through understanding norms and expectations and through affective processes. Scott (2001) notes that tactics that teach norms involve defining expectations, constructing regimes, and developing jobs and roles – all tactics important for teaching a newcomer (student) about entering new engineering-related occupational roles, as well as the workgroup evaluating the student and ultimately accepting him/her into the workgroup. The importance of affect with entry to the occupational role was evident, more so than with entry to the organization. The student connects to the workgroup more so than to the organization through acceptance into an engineering-related occupational role. The student develops affect towards the

occupational role through task development within the workgroup, and that set of feelings is then generalized to the semi-profession as the student connects to being an engineer.

Examples of tactics used to teach rules and regulations were not as prevalent within the entry process to occupational roles as with entry to the organiztion, but when identified, there seemed to be a connection between learning rules and regulations prior to the student moving from one new occupational role to another. For example, before moving from a technical role (stage 3) to an engineering apprentice role (stages 4, 5, and 6), and from being in an engineering apprentice role to an engineer role (stages 7 and 8), rules and regulations were taught to act as a sort of gate-keeping function, allowing a student to advance (or not to advance) to the new occupational role. Once in the new role, the student was expected to learn norms and expectations, cognitive categories and scripts, and affective processes to develop the student within the role until it was deemed appropriate to evaluate the student for advancement to the next, progressive occupational role.

The result of the entry process for the occupational role category is to move the student from outside the engineering environment as a student pursuing an academic degree to inside engineering-related occupational role(s) within an engineering-related organization. The student goes from being a new hire in a technical role to being a new or junior-level engineer. A new or junior-level engineer is accepted by the established engineering personnel internal and external to the organization, and the student is expected to perform engineering-related tasks or functions on behalf of the employer organization. The student has autonomy to conduct and manage engineering-related projects, including the people, processes, and work requirements associated with such projects.

As with the entry to the organization processes, there was evidence that most students learned additional aspects of technical, personal, and organizational skills and knowledge as a result of being socialized to the occupational roles(s). This satisfies the expectations of the education organization and the exit (developed skills and knowledge) expectations of the employer, as identified in stage 1: pre-entry. Both education and employer organizations would indicate the co-op program is successful in developing technical, personal, and organizational skills and knowledge.

Outcomes of Socialization:

Aspects of all types of tactics (Van Maanen and Schein, 1979) were identified for socialization processes during entry to the organization. Although both group and individual tactics were identified, the tactics were more individual than group. Likewise, more formal tactics than informal, more random tactics than sequential, and more self-enhancing tactics than reconstructive were identified. Equal amounts of mentoring and sink-or-swim tactics were used by the employers. Variable timetable tactics were used rather than fixed timetables, and the process was contest-like versus tournament-based. Therefore, some tactics thought to create a custodial outcome (formal, mentoring, variable timetable) were dominantly identified, while other tactics common to creative individualism (self-enhancing, random, contest-like) were also identified.

Twelve of eighteen employers were successful in creating either a custodial or creative individualism outcome with the co-op student and retained the student for all three co-op assignments. Four employers produced an outcome of rebellion since the students who performed a co-op with those organizations left for either another career area (changed academic majors) or for another co-op employer. Two employers had the co-op student leave

for another employer to complete the co-op assignments; however, both employers had to release the student due to economic conditions at the time within the organization. These cases were not a result of rebellion to the socialization process, but rather a result of resource dependency with a power structure in favor of the organization. The employer's dependence on co-op labor was less than the co-op students' needs to obtain engineering-related work for academic program requirements, thus giving the employer the power in the relationship.

There was evidence of a possible difference in how a student is successfully socialized to the organization based upon the size of the organization and/or the number of students the organization is attempting to socialize. Larger employers used some custodial and some creative individualism strategies to produce aspects of both a custodial orientation and creative individualism, while the smaller employer used strategies that primarily produced a creative individualism outcome. One possible explanation for this phenomenon could be the amount of resources that a larger employer has, compared to a smaller employer. The larger employer can absorb a new employee more gradually and can afford to indoctrinate the student more fully into the organization before letting the newcomer contribute creatively to the organization's work. The smaller employer sometimes cannot afford the time needed to fully indoctrinate the newcomer to custodial-type work activity and needs the newcomer to contribute in creative ways in order to advance and grow the organization. Finally, the larger employer likely needs to use some custodial orientation in order to manage a larger workforce that cannot be controlled as easily as a smaller one.

Aspects of most of the types of tactics were identified for socialization to the engineering-related occupational roles as well. Although both group and individual dimensions were identified, the majority of the strategies and tactics were individual.

Likewise, the majority of the tactics were informal, random, variable timetable, self-enhancing, and contest-like. Equal amounts of mentoring and sink-or-swim tactics were used by the employers. The dominant strategies used by most co-op employers resulted in creative individualism (use of informal, individual, self-enhancing, mentoring, random, and contest-like strategies). The only evidence of typical custodial-oriented strategies was the use of some sink-or-swim tactics and fixed timetables for activities.

All but one student were successfully socialized to an engineering-related occupational role by the end of the co-op program. Twenty of the 21 students interviewed were working in engineering-related positions two years after graduation, indicating that all but one student were successfully socialized to the engineering-related occupational roles after completion of the co-op program.

Stage 4: Match-Making for the Postgraduation Position

The match-making postgraduation stage is a process of students and employers connecting with each other regarding employment as a postgraduation, full-time engineer and ultimately agreeing to enter into a work relationship. In some cases, the education organization acts as a facilitator for connecting the students and employers. This stage is very similar to stage 2 (match-making for the co-op position), except that postgraduation match-making includes more options for the student and employer, who have already connected through the co-op process.

Aspects of the match-making stage occur for the entities of education organization, student, and employer. Two substages compose the match-making stage: search and selection. Search refers to the seeking out of a suitable partner for the employment arrangement, by both the student and employer. Selection is the “courting” activity that

occurs when students and employers identify potential partners and then begin to evaluate with whom they will ultimately enter into an employment arrangement. The conclusion of the match-making stage is the agreement between the partners (student and employer) to enter into an agreement to begin an employment relationship in the form of an engineering co-op role.

Search:

The education organization is involved only in the search substage and constitutes two steps: providing networking opportunities for students and employers and sending resumes of students to employers. In many ways, the education organization assumes the role of a match-maker – a third-party assisting in two interested people (or groups of people) getting to know one another. After the student and employer are introduced, the education organization is not involved again.

The student search process contains three possible steps: inquiring with the co-op employer about full-time opportunities, networking with potential employers, and submitting resumes to potential employers. If the student inquires about full-time opportunities with the employer and the employer agrees to offer a position of full-time employment, the student moves directly to evaluating the offer to decide whether to work for the employer. The employer search process contains four possible steps: inquiring with the co-op student about a full-time position, communicating interest to the education organization and students, networking with potential student candidates, and receiving/reviewing resumes.

Selection:

The selection process contains six potential steps, including agreeing to interview with interested employers, conducting a screening interview, conducting a formal interview, receiving offer(s) of employment, evaluating offers of employment, and agreeing to employment. The employer selection process contains eight potential steps, including selecting student interview candidates, requesting interviews of the student, conducting a screening interview, conducting formal interviews, checking student references, selecting student candidate(s), making an employment offer, and agreeing to employment.

Decision Criteria/Retention Reasons:

The student uses decision criteria to evaluate offers of employment. The decision criteria contains seven properties: comfort-level with people/organization (mentioned often by student respondents who stayed with the same employer where the co-op assignment was conducted, and includes classmates at the co-op organization or other organizations where interviews/job offers were granted); easier not to look elsewhere (again, mentioned by those students staying with the host co-op employer); location (near to home is desirable); pay/benefits (higher pay and better benefits is desirable); interest in company/work type; stability of the employer (a perceived value mentioned by students who were subjected to employee lay-offs at their own or other employers during the co-op program); and number of employment offers (fewer offers translates to fewer decisions to make for the student).

The employer uses decision criteria when reviewing student resumes, deciding whom to interview, and selecting a student to offer the co-op employment role. The employer decision criteria contains seven properties: perception of the relationship between the student and the members of the employer organization (was there a “fit” determined during the co-op

program); motivation level of the student (the more motivated the student, the more desirable); interpersonal skills of the student (better communication and interpersonal skills are desirable); demeanor of the student (positive attitude, maturity, and professionalism are all desirable); the ability (technical and personal) of the student; location (where the student is from – closer to the workplace can be desirable); and prior related work experience (demonstrated applied engineering experience is desirable).

Six reasons were identified for an employer wanting to retain a co-op student for full-time hire after graduation: 1)whether the employer had a position opening; 2) the student fit with the organization and occupational role(s) (the employer knows the student's capabilities, and desirable student traits included demonstration of intelligence, self-motivation, ability to get along with others in the organization, and work ethic); 3) the student knowledge of the organization and occupational role(s) gained during the co-op assignment; 4) lower start-up costs (a co-op student can make contributions to the employer more quickly than another graduate); 5) greater return on investment (the employer receives additional benefit from the time and money spent on training the student during the co-op assignment); and 6) lower cost of the hiring process (hiring is cheaper during the co-op phase than during postgraduation).

Summary:

The match-making for the postgraduation stage can begin with either of two entities: the student or the employer. The employer can begin the process by inquiring with the co-op student about a full-time position (if one or more of the "reasons for retention" are satisfied), by communicating interest to the education organization or student, or through networking with the education organization or student. The student can begin the process by inquiring

with the co-op employer about a full-time position, networking with the employer, or by submitting resumes to the employer.

The result of the initial actions is for the co-op student and employer to agree about entering into full-time, postgraduation employment, for resumes to either be requested from the education organization or student by the employer, or for the education organization or student to submit resumes to the employer for consideration. The employer reviews the resumes and, in combination with the networking activities, selects students to interview. The employer uses decision criteria to determine the students to interview. The employer then requests an interview from the selected student(s), and the student agrees (or declines) the employer's request.

The first joint step occurs next and involves a screening interview, a formal interview, or both. Some organizations conduct a brief telephone or on-campus interview with student candidates first, then reduce the number of students to bring to the workplace for a formal interview. Some employers choose to move directly to the formal interview step after requesting an interview. In some cases, more than one formal interview is conducted. After the interviews are completed, some employers elect to check student references before choosing the student(s) to hire, while other employers move directly to a student selection step.

When a student (or students) is identified based on the employer selection decision criteria, an offer of employment is made to the student. The student receives one or more offers of employment and then must evaluate the offer(s) based on the student's decision criteria. Once the student makes a final decision, a joint step occurs between the student and employer, termed "agree on employment," that concludes the match-making stage. Kristof's

(1996) needs-supplies perspective of person-organization (P-O) fit is consistent with the situations when a co-op student and employer agree to continue the employment relationship in the form of a full-time, postgraduation position. This "occurs when an organization satisfies individuals' needs, desires, or preferences," and the demands-abilities perspective "suggests that fit occurs when an individual has the abilities required to meet organizational demands" (p. 3).

Stage 5: Accelerated Entry for the Postgraduation Position

Aspects of the entry phase occur for students after graduation when the student begins a full-time position either with the organization that hosted him/her during the co-op program or with a new organization. The socialization process happens at an accelerated rate because the student knows what to expect and has already experienced the process during the co-op program. A student who stays with the organization that hosted him/her during the co-op program typically encounters some level of change in status as it relates to being inside a new engineering-related occupational role. More responsibilities and expectations are realized by the student after accepting a full-time position. There is little in terms of socialization processes that occurs for entering the organization since the student has already worked for the employer during the co-op experience.

For a student who begins at a new organization, there is a re-experiencing of moving from outside to inside the organization and engineering-related occupational role. The acceptance into the organization can be quick, especially if the organization is in a similar engineering field as that experienced by the student during the co-op assignment. The same is true for moving into the new engineering occupational role, because the new graduate has

learned from the co-op experience what to expect and how to manage the strategies enacted by the employer he/she will encounter when beginning in the new occupational role.

Although postgraduation experiences were not a focus of this study, socialization processes were identified for entry to both the new organization as well as the occupational role of the new graduate. This occurred because the student informants were all interviewed postgraduation in new occupational roles as full-time engineers, and some shared information about the new experiences and how those experiences compared to the experiences during the co-op assignments. Because postgraduation activities were not the focus, this stage is not fully developed yet is included because enough evidence was gathered to provide useful information to build on the model.

Staying with Same Employer:

According to preliminary results, the student who stayed with the same employer experienced very little additional socialization to the organization since the student had been working at the organization for at least four months. However, there were more tactics and activities noted for movement into the new occupational role within the workgroup, which consisted of both norms and expectations and affective processes. Most of these tactics were related to the student having greater expectations and responsibility from the workgroup and the pressures the student felt, which were associated with those greater expectations and responsibilities.

Joining a New Employer:

For the student joining a new employer organization, tactics used to teach both rules and regulations and cognitive categories and scripts were identified and enacted by the

employer as the student entered the new organization. The tactics noted were similar to those experienced during the co-op assignments, but there were less of them stated by the informants. This could be consistent with the student either perceiving less issue related to negotiating those tactics because of prior experience during the co-op assignment, or actually experiencing a lesser amount of socialization tactics since the student was able to prove acceptable much more quickly due to the knowledge gained during co-op for negotiating those tactics.

The entry to the occupational role included learning norms and expectations, cognitive categories and scripts, and affective processes. There were no tactics used to teach rules and regulations identified, which again could be due to the student having the knowledge to negotiate and prove himself/herself more quickly to the workgroup. The tactics used to teach (learn) norms and expectations and cognitive categories and scripts were similar in many ways to those experienced during the co-op assignments with a few differences. Students were asked to read materials and learn computer software, were provided a mentor, and were given small tasks in the early going. Most students indicated fewer of, or a shorter duration of, the tactics than during the co-op assignments. The students indicated feeling greater expectations from the employer workgroup more quickly than during the co-op assignments. As with the student who stayed with the same organization after the co-op assignments, the student felt more pressure due to the increased expectations and felt more scrutinized by the workgroup members. Also, as during the co-op process, some graduates indicated feeling isolated from workgroup members early in the process, which is an affective process enacted by the workgroup members to determine the new

graduate's feelings towards them. Unlike during the co-op assignments, the students felt more confident to navigate the processes and were more proactive in managing the transition.

Implications of the Study

A co-op program is appropriate and effective as a vehicle for socializing newcomers to engineering employer organizations and engineering-related occupational roles. The majority of students who completed the co-op program made the transition from engineering student to full-time, postgraduation engineer, and remained in an engineering-related occupational role two years after graduation. Prior to this study, knowledge of the processes used to socialize the student to the organization and occupational role during the co-op program was incomplete, taken-for-granted, or nonexistent. An explanatory model of the co-op process, from the perspective of entry and socialization to the organization and occupational role, did not exist.

Development of the five-stage explanatory socialization model is significant to the student, education organization, and employer. Because the processes can be predicted, all three groups can become better informed and trained to understand the processes prior to beginning and during the co-op experience. From the student's perspective, understanding what to expect prior to beginning the experience will allow the student to anticipate strategies and tactics, experience less anxiety associated with the unknown, and prepare to cope with the strategies and tactics. If the student is trained to understand the entry and socialization processes prior to experiencing them, intensity and duration of the socialization process will be reduced. This will allow the student to more quickly make decisions about interest in remaining with the employer organization for a longer period of time and/or to progress more quickly to productive engineering-related roles.

From the education organization perspective, understanding the entry and socialization processes will permit instructors or advisors to better train students prior to the co-op experience. In particular, it is not advantageous to the education organization for the student to switch identities from the education reference group to the employer workgroup reference group. While it is inevitable that the student will identify with the employer workgroup during a successful socialization process to engineering-related occupational roles, and counterproductive to try and prevent that identification from happening, it is advantageous for the student to be positively connected to the education organization reference groups, particularly postgraduation. It is unknown if the educational organization can influence a co-op student's conscious (or unconscious) decision to change referent groups from education organization to the workplace members during the co-op process. However, it is important for the education organization to stay connected to the student after graduation in order to maintain positive employer organization relations for future co-op student worksites, for industry-sponsored projects used in the classroom, and for potential monetary contributions from the employer to education organizations.

The depth of description and understanding of the co-op process will also help the education organization to more effectively evaluate potential co-op employer sites and to develop better experiences for the student (in conjunction with the employer). The education organization will also be able to assist the employer in understanding how to effectively socialize the student, including training of employer members.

Employers will be able to plan more effective strategies and tactics to move students into the organization and engineering roles and retain the students after the co-op experience. The results could mean more cost-effective hiring process and realization of greater

productivity, more quickly, from the student. Employers who have not participated in a co-op program in the past will have a road map of what to do and what to expect with the first effort of hosting a co-op student. This will increase the likelihood of the first co-op experience being successful. Successful strategies and tactics were identified that can provide employers with information to more effectively plan the co-op socialization process.

The “leaky funnel” metaphor is useful for leaders to strategize about the current state of, and future planning for, a semi-profession – such as engineering – or a profession. Educators, members of the semi-profession, organization leaders who hire members of the semi-profession, and government officials can conceptualize the entry and socialization processes and determine strategies to modify the process in order to obtain a desired outcome. The desired outcome could be either more or fewer people entering the semi-profession, or people entering the semi-profession more efficiently and effectively, resulting in greater retention of members.

Summary of Conclusions

1) Co-op programs work for effectively socializing engineering students to an engineering organization, engineering-related occupational roles, and the engineering semi-profession. Co-op programs are also effective for sorting people in or out of engineering-related semi-professional occupational roles.

2) A comprehensive five-stage model of the entry and socialization processes used for engineering co-op students was developed. The five stages are pre-entry, match-making for the co-op position, entry for the co-op position, match-making for the postgraduation position, and accelerated entry for the postgraduation position.

3) The entry and socialization process was patterned and predictable and therefore can be replicated by student, employer, and education organization members.

4) The model can be used to better prepare engineering students, employers, and education organization members, with the potential for positively impacting retention in academic programs and persistence into early career.

5) Students who experience the entry and socialization processes during the co-op program are likely to more efficiently and effectively navigate similar processes when moving to a new engineering organization or new engineering-related occupational role.

6) Successful socialization to the engineering organization involves the following outcomes and techniques:

    Larger Employers – part custodial orientation and part creative individualism (individual and group-based, formal and informal, self-enhancing, random, mentoring and sink-or-swim, variable, contest-like);

    Smaller Employers – primarily creative individualism (individual, informal, self-enhancing, random, sink-or-swim, variable, contest-like).

7) Successful socialization to an engineering-related occupational role involves the following outcomes and techniques for most employers:

    Creative individualism (individual, informal, self-enhancing, random, mentoring and sink-or-swim, variable, contest-like).

8) Entry and socialization processes to the engineering semi-profession have been conceptualized, helping stakeholders to identify strategies to modify the process in

order to obtain a desired outcome (greater, lesser, or more effective entry to the engineering semi-profession).

Suggestions for Further Research

The limitations identified in Chapter 3 could be addressed through further research. The study could be replicated with student informant groups that were more racially diverse, contained more women, and consisted of nontraditional-aged members. It could also be of interest to study nontraditional-aged students who have left one career and are beginning a new career to determine if prior socialization to an unrelated organization and occupational role impacts socialization to a new organization or occupational role in a different profession or field. Likewise, the study could be replicated with more racially diverse and more women employer informants to determine impact on the entry and socialization processes.

Education organizations from different geographic locations could be sampled. In addition, different types of education organizations could be studied, including larger or smaller organizations, national versus regional organizations, and optional co-op program organizations versus a mandatory co-op program organization. Studying an education organization that attracts students and employers from more than one regional area could develop further aspects of the model not encountered in this study.

One way to build on this study would be to talk to more students who did not persist in the engineering academic program. The focus of this study was on students who were successfully socialized to an engineering-related organization and occupational role. Only one student left the engineering academic program to complete a degree in another discipline. By studying those students who left the engineering academic program at some point during

the entry or socialization processes, one could learn what is ineffective in socializing students to the engineering semi-profession. This could be compared to the effective processes and strategies identified here to determine if there are similarities or differences and to determine the key characteristics, tactics, or strategies that result in ineffective socialization.

Other studies could determine whether co-op programs impact postgraduation persistence and success with the employer organization and within the engineering semi-profession (determined by advancement within engineering-related occupational roles or development of expert-level knowledge within an engineering-related occupational role). Co-op program graduates could be compared to non-co-op program graduates to better understand both the impact of experiencing the entry and socialization processes while a student (as opposed to postgraduation), as well as the impact on retention with the organization and persistence and success within the engineering semi-profession. At education organizations with an optional co-op program, students from the same academic program who did and did not participate in the co-op program could be compared to identify the impact on the entry and socialization processes.

Finally, the model developed for this study has the potential to be generalized to other professional or semi-professional career fields (e.g. law, medicine, education). Co-op, internship, or some other form of experiential learning program in another professional or semi-professional career field could be studied in a similar manner to determine if the model is valid. The “leaky funnel” metaphor could also be tested to determine whether it can be generalized to other career fields.

References

Adkins, C.L. (1995). Previous work experience and organizational socialization. *Academy of Management Journal, 38,* 839-862.

Agar, M. H. (1980). The professional stranger. An informal introduction to ethnography. New York: Academic Press.

Alwell, W. (1977). An evaluation of the Marymount College cooperative experimental education program. *Journal of Cooperative Education, 14(1),* 34-41.

Anfara, V. A., Brown, K. M., & Mangione, T. L. (2002). Qualitative analysis on stage: Making the research process more public. *Educational Researcher, 31*(7), 28-38.

Apostolides, V., & Looye, J.A. (1997). Student assessment of the co-op experience and optimum integration of classroom learning with professional practice. *Journal of Cooperative Education,* 27 (3), 16-30.

Archambault, R.D. (Ed.). (1964). *John Dewey on education: Selected writings.* New York: The Modern Library.

Armstrong, B.A. (1989). Evaluating the cooperative education program. *Journal of Cooperative Education, 25(3),* 44-55.

Arnold, T. W. (1938). *The folklore of capitalism.* New Haven, CT: Yale University Press.

Ashford, S.J., & Black, J.S. (1996). Proactivity during organizational entry: The role of desire for control. *Journal of Applied Psychology,* 81(2), 199-214.

Ashforth, B.E., & Saks, A.M. (1996). Socialization tactics: Longitudinal effects on newcomer adjustment. *Academy of Management Journal, 39,* 149-178.

Atkinson, J. (1964). *An introduction to motivation*. New York: D. Van Norstrand.

Bandura, A. (1977). Self-efficacy: Towards a unifying theory of behavioral change. *Psychological Review,* 84, 191-215.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.* Englewood Cliffs, NJ: Prentice Hall.

Barnard, C. (1938). *Functions of the executive.* Cambridge, MA: Harvard University Press.

Barott, J.E. (2002, Fall). *Organizational Theory*. Lecture presented at the meeting of the EDLD640 Organizational Theory course through Eastern Michigan University. Grand Rapids, MI.

Barott, J. E. (October 11, 2003). *Research design*. Lecture presented at the meeting of the EDLD681 Qualitative Research course through Eastern Michigan University. Grand Rapids, MI.

Bartkus, K.R. (2001). Social skills and cooperative education: A conceptual framework. *Journal of Cooperative Education, 36(1),* 48-60.

Bauer, T.N., & Green, S.G. (1994). Effect of newcomer involvement in work-related activities: A longitudinal study of socialization. *Journal of Applied Psychology,* 79(2), 211-223.

Bauer, T.N., & Green, S.G. (1998). Testing the combined effects of newcomer information seeking and manager behavior on socialization. *Journal of Applied Psychology, 83,* 72-83.

Bauer, T.N., Morrison, E.W., & Callister, R.R. (1998). Organizational socialization: A review and directions for future research (pp.149-214). In G.R. Ferris (Ed.), *Research in personnel and human resources management, 16.* Greenwich, CT: JAI Press.

Baxter Magolda, M.B. (1992). *Knowing and reasoning in college: Gender-related patterns in students' intellectual development.* San Francisco: Jossey-Bass.

Baxtger Magolda, M.B. (2001). *Making their own way: Narratives for transforming higher education to promote self-development.* Sterling, VA: Stylus.

Becker, H.S. (1964). Personal change in adult life. *Sociometry, 27,* 40-53.

Becker, H.S., & Strauss, A. (1956). Careers, personality and adult socialization. *American Journal of Sociology, 62,* 404-413.

Berg, D. N., & Smith, K. K. (1988). The self in social inquiry: Researching methods. Newbury Park, CA: Sage Publications.

Bergquist, W. H. (1992). *The four cultures of the academy.* San Francisco: Jossey-Bass.

Black, J.S. (1992). Socializing American expatiate managers overseas: Tactics, tenure, and role innovation. *Group & Organization Management, 17,* 171-192.

Black, J.S., & Ashford, S.J. (1995). Fitting in or making jobs fit: Factors affecting mode of adjustment for new hires. *Human Relations, 48,* 421-437.

Blau, G. (1988). An investigation of the apprenticeship organizational socialization strategy. *Journal of Vocational Behavior, 32,* 176-195.

Bloom, B. (1956). *Taxonomy of educational objectives, Handbook 1: Cognitive domain*. New York: Longmans, Green.

Blumer, H. (1969). *Symbolic interactionism.* Englewood Cliffs, NJ: Prentice-Hall.

Bogdan, R. C., & Biklin, S. K. (1992). Chapter 1, Foundations of qualitative research in education. In R.C. Bogdan, & S.K. Bilkin, (Eds.), *Qualitative Research for Education* (pp. 1-57). Boston, MA: Allyn and Bacon.

Bolman, L., & Deal, T. (1991). *Reframing organizations: Artistry, choice, and leadership.* San Francisco: Jossey-Bass Publishers.

Borg & Gall (1989). Ethics, legal constraints, and human relations. In *Educational research: An introduction* (5th ed., pp. 83-113). New York: Longman.

Bourdieu, P. (1977). *Outline of a theory of practice.* Cambridge, UK: Cambridge University Press.

Bowen, D.E., Ledford, G.E. Jr., & Nathan, B.R. (1991). Hiring for the organization not the job. *Academy of Management Executive, 5,* 35-51.

Bower, M. (1966). *The will to manage: Corporate success through programmed management.* New York: McGraw-Hill.

Bowles, S., & Gintis, H. (1976). *Schooling in capitalist America.* New York: Basic Books.

Boxx, W.R., Odom, R.Y., & Dunn, M.G. (1991). Organizational values and value congruency and their impact on satisfaction, commitment, and cohesion. *Public Personnel Management, 20,* 195-205.

Branton, G., Van Gyn, G., Cutt, J., Loken, M., Ney, T., & Ricks, F. (1990). A model for assessing the learning benefits of cooperative education. *Journal of Cooperative Education, 26(3),* 30-39.

Braunstein, L. A., & Stull, W. A. (2001). Employer benefits of, and attitudes toward, postsecondary cooperative education. *Journal of Cooperative Education, 36*(1), 7-17.

Bridges, W. (1991). *Managing transitions.* Reading, MA: Addison-Wesley.

Brief, A.P., Aldag, R.J., Van Sell, M., & Melone, N. (1979). Anticipatory socialization and role stress among registered nurses. *Journal of Health and Social Behavior, 20,* 161-166.

Brockner, J. (1988). *Self-esteem at work: Research, theory, and practice.* Lexington, MA: Lexington Books.

Brown, S.J. (1976). *Cooperative education and career development: A comparative study of alumni.* Report to Cooperative Education Research Center, Northeastern University, Boston, MA.

Brown, S.J. (1985a). *The relationship of cooperative education to organizational socialization and sense of power in first job after college.* Unpublished doctoral dissertation. Boston College University, Chestnut Hill, MA.

Brown, S.J. (1985b). *The influence of cooperative education on first job after graduation.* Boston: Cooperative Education Research Center, Northeastern University.

Buchanan, B. (1974). Building organizational commitment: The socialization of managers in work organizations. *Administrative Science Quarterly, 19,* 533-546.

Burrell, G., & Morgan, G. (1982). *Sociological paradigms and organizational analysis.* London: Heinemann.

Cable, D.M., & Parsons, C.K. (2001). Socialization tactics and person-organization fit. *Personnel Psychology,* 54, 1-23.

Cable, D.M., & Judge, T.A. (1994). Pay preferences and job search decisions: A person-organization fit perspective. *Personnel Psychology, 47,* 317-348.

Cable, D.M., & Judge, T.A. (1996). Person-organization fit, job choice decisions, and organizational entry. *Organizational Behavior and Human Decision Processes,* 67, 294-311.

Campbell, D. T., & Stanley, J. C. (1963). Experimental and quasi-experimental designs for research on teaching. In N.L. Gage (Ed.), *Handbook of Research on Teaching* (pp.171-246). Chicago: Rand McNally.

Campbell, J.L. (1974). Why Union Carbide Corporation participate in cooperative education. In D.C. Hunt (Ed.), *50 views of cooperative education* (p.20). Detroit, MI: University of Detroit.

Campion, M.A., & Mitchell, M.M. (1983). Management turnover : Experiential differences between former and current managers. *Personnel Psychology, 39,* 57-69.

Canale, R., Cates, C., & Duwart, E. (2000). Co-op and ABET2000 : The added learning dimension ! *Proceedings of the 2000 American Society for Engineering Education Annual Conference & Exposition.* American Society for Engineering Education.

Caplow, T. (1964). *Principles of organization.* New York : Harcourt, Brace and World.

Cash, S.H. (1985). Employability and job satisfaction of co-op versus non-co-op business graduates, 1978-79. *Proceedings of Fourth World Conference on Cooperative Education,* Edinburgh.

Cates, C., & Jones, P. (1999). *Learning outcomes : The educational value of cooperative education.* Columbia, MD: Cooperative Education Association, Inc.

Chao, G.T., O'Leary-Kelly, A.M., Wolf, S., Klein, H.J., & Gardner, P. (1994). Organizational socialization: Its content and consequences. *Journal of Applied Psychology, 79,* 730-743.

Chatman, J.A. (1991). Matching people and organizations: Selection and socialization in public accounting firms. *Administrative Science Quarterly,* 36(3), 459-484.

Colarelli, S.M., Dean, R.A., & Konstans, C. (1987). Comparative effects of personal and situational influences on job outcomes of new professionals. *Journal of Applied Psychology, 72,* 558-566.

Coll, R.K., & Chapman, R. (2000a). Qualitative or quantitative? Choices of methodology for cooperative education researchers. *Journal of Cooperative Education, 35(1),* 25-34.

Coll, R.K., & Chapman, R. (2000b). Advantages and disadvantages of international co-op placements: The students' perspective. *Journal of Cooperative Education, 35(2-3),* 95-105.

Coll, R.K., Eames, C., & Halsey, E. (1997). Keeping the customer satisfied. *Journal of Cooperative Education,* 32 (3), 31-39.

Collins, S.B. (1971). Types of programs. In A.S. Knowles & Associates (Eds.), *Handbook of cooperative education* (pp.29-36). San Francisco: Jossey-Bass Inc., Publishers.

Comer, D.R. (1991). Organizational newcomers' acquisition of information from peers. *Management Communication Quarterly, 5(1),* 64-89.

Comerford, J. (1999, July). *Planning for a quality workforce.* Paper presented at the 11th World Association of Cooperative Education Conference. Washington, D.C.

Committee on Scientific and Professional Ethics and Conduct (1981). Ethical principles of psychologists. *American Psychologist, 36,* 633-638.

Contomanolis, E. (2001). Engineering faculty and the integration of cooperative education based student learning in the college classroom. *Proceedings for the 2001 Conference for Industry and Education Collaboration,* CED313: American Society for Engineering Education.

Costa, A.L., & Garmston, R.J. (1998). Maturing outcomes. *Encounter: Education for Meaning and Social Justice, 11,* 10-18.

Crites, J.O. (1969) *Vocational psychology.* New York: McGraw-Hill.

Cronbach, L.J. et al. (1980). *Toward reform of program evaluation.* San Francisco: Jossey Bass Publishers.

Cutt, J. & Loken, M.K. (1995). The nature of evidence in assessing cooperative education. *Journal of Cooperative Education,* 30 (3), 24-38.

Davie, R.S., & Russell, J.K. (1974). Attitudes and abilities of cooperative students. *Australian Journal of Education, 8(2),* 160-172.

Davies, L. (1985). First career destinations of sandwich and non-sandwich graduates. *Proceedings of Fourth World Conference on Cooperative Education*, Edinburgh.

Dawson, J.D. (1989). Education outcomes for students in cooperative education. *Journal of Cooperative Education, 25(2),* 6-13.

Deal, T.E., & Kennedy, A.A. (1982). *Corporate cultures.* Reading, MA: Addison-Wesley.

Dean, R.A., Ferris, K.R., & Konstans, C. (1988). Occupational reality shock and organizational commitment: Evidence from the accounting profession. *Accounting, Organizations and Society, 13,* 235-250.

Deane, R.T., Frankel, S., & Cohen, A.J. (1978). An analysis of cooperative education student employer costs and benefits. *Journal of Cooperative Education, 14,* 5-53.

Demlow, J. (1977). Why Chrysler Corporation participates in cooperative education. In D.C. Hunt (Ed.), *50 views of cooperative education* (p.23). Detroit, MI: University of Detroit.

Denzin, N.K. (1989). *The research act: A theoretical introduction to sociological methods* (3rd ed.). Englewood Cliffs, NJ: Prentice-Hall.

Dewey, J. (1958). *Experience and nature* (2nd ed.). La Salle, IL: Open Court.

Deyhle, D. L., Hess, G. A., & LeCompte, M. D. (1992). Approaching ethical issues. In M.D. LeCompte, W.L. Millroy, & J.Preissle (Eds.), *The handbook of qualitative research in education* (pp. 597-641). San Diego: Academic Press.

Dill, W.R. (1958). Environment as an influence on managerial autonomy. *Administrative Science Quarterly, 2,* 409-443.

Douvanis, G., & Brown, J. (1995). Privileged communication in educational research: The case for statutory protection. *Educational Researcher, 24*(6), 27-30.

Eames, C. (1999, July). *Learning in the workplace through co-op placements.* Paper presented at the 11th World Association of Cooperative Education Conference. Washington, D.C.

Eckel, P., Green, M., Hill, B., & Mallon, W. (1999). *On change III - Taking charge of change: A primer for colleges and universities* . Washington, DC: American Council on Education.

Eden, D. (1992). Female engineers: Their career socialization into a male-dominated occupation. *Urban Education, 27,* 174-195.

Edison, K.M. (1980). *Cooperative education and career development at Central State and Wilberforce Universities*. Unpublished doctoral dissertation, Harvard University.

Ehrlich, D. (1978). Employer assessment of a cooperative education program. *Journal of Cooperative Education, 16(2),* 74-87.

Eisenhart, M. A., & Howe, K. R. (1992). Chapter 14: Validity in educational research. In M.D. LeCompte, W.L. Millroy, & J. Preissle (Eds.), *The handbook of qualitative research in education* (pp. 643-679). San Diego, CA: Academic Press, Inc.

Ellis, R.J. (1987). *Postsecondary cooperative education in Canada.* Ottawa, Canada: Science Council of Canada.

Ely, M., Anzul, M., Friedman, T., Garner, D., & McCormack Steinmetz, A. (1991). *Doing qualitative research: Circles within circles*. London: The Falmer Press.

Emerson, R. (1962). Power-dependence relations. *American Sociological Review, 27(1),* 30-41.

Enoch, Y. (1989). Change of values during socialization for a profession: An application of the marginal man theory. *Human Relations, 42,* 219-239.

Epting, L.B. (1975). *Comparing selected characteristics of cooperative and non-cooperative engineering graduates at Mississippi State University from 1973-1978.* Unpublished doctoral dissertation, Mississippi State University.

Erickcek, G.A., Jones, B.C., Watts, B.R., & Wertz, E.T. (2005, December). Business outlook for West Michigan. W.E. Upjohn Institute for Employment Research. Vol. XXI, No. 4.

Erickson, F. (1986). Qualitative methods in research on teaching. In M.C. Wittrock (Ed.), *Handbook of research on teaching* (3rd ed., pp. 119-161). New York: Macmillan.

Etzioni, A. (1969). Preface, In A. Etzioni (Ed.), *The semi-professions and their organization: Teachers, nurses, social workers* (pp. v-xvii), New York: The Free Press.

Evan, W.M. (1966). The organization set: Toward a theory of interorganizational relations. In J.D. Thompson (Ed.), *Approaches to organizational design* (pp. 173-188). Pittsburgh: University of Pittsburgh Press.

Feldman, D.C. (1976). A contingency theory of socialization. *Administrative Science Quarterly, 21,* 433-452.

Feldman, D.C. (1981). The multiple socialization of organization members. *Academy of Management Review, 6,* 309-318.

Feldman, D.C., & Arnold, H.J. (1978). Position choice: Comparing the importance of organizational and job factors. *Journal of Applied Psychology, 63,* 706-710.

Feldman, D.C., & Weitz, B.A. (1990). Summer interns: Factors contributing to positive developmental experiences. *Journal of Vocational Behavior, 37,* 267-284.

Ferris, G.R., Russ, G.S., & Fandt, P.M. (1989). Politics in organizations (pp.143-170). In R.A. Giacalone & P. Rosenfeld (Eds.), *Impression management in the organization.* Hillsdale, NJ: Erlbaum.

Finn, K.C. (1985). *Cooperative education in nursing: Effect of organizational socialization on selected role variables.* Unpublished doctoral dissertation. Northeastern University; Boston, MA.

Fischer, C.D. (1986). Organizational socialization: An integrative review (pp.101-145). In K.M. Rowland & G.R. Ferris (Eds.), *Research in personnel and human resources management, 4.* Greenwich, CT: JAI Press.

Fletcher, J. (1989). Student outcomes: What do we know and how do we know it? *Journal of Cooperative Education, 26(1),* 26-38.

Fletcher, J. (1990). Self-esteem and cooperative education: A theoretical framework. *Journal of Cooperative Education, 26(3),* 41-55.

Foster, S.F. (1986). Ten principles of learning revised in accordance with cognitive psychology: With implications for teaching. *Educational Psychology, 21,* 235-243.

Gagne, R.M. (1985). *The conditions of learning* (4th ed.). New York: Rinehart and Winston.

Garavan, T.N., & Murphy, C. (2001). The co-operative education process and organizational socialization: A qualitative study of student perceptions of its effectiveness. *Education + Training, 43(6),* 281-302.

Gardner, H. (1983). *Multiple intelligences: The theory to practice.* New York: Basic Books.

Gardner, P. (2004). *Recruiting Trends: 2003-2004.* East Lansing, MI: Collegiate Employment Research Institute, Michigan State University.

Gardner, P.D., Nixon, D.C., & Motschenbacher, G. (1992). Starting salary outcomes of cooperative education graduates. *Journal of Cooperative Education, 27(3),* 16-26.

Geer, B. (1964). First days in the field: A chronicle of research in progress. In G.J. McCall & J.L. Simmons (Eds.), Issues in participant observation: A text and reader (pp. 144-162). Reading, MA: Addison-Wesley Publishing Company.

Giles, D.E. (1991). Dewey's theory of experience: Implication for service-learning. *Journal of Cooperative Education, 27(2),* 87-90.

Gillin, L.M., Davie, R.S., & Beissel, K.R. (1984). Evaluating the career progress of Australian engineering graduates. *Journal of Cooperative Education, 20(3),* 53-70.

Ginsberg , R., & Matthews, B. (n.d.). *Ethnographic countertransference: Beneath bias and subjectivity on qualitative research.* Unpublished paper available from Ginsberg. Charleston: University of South Carolina. [cited in Jansen, G., & Peshkin, A. (1992). Subjectivity in qualitative research. In M.D. LeCompte, W.L. Millroy, & J.Preissle (Eds.), *The handbook of qualitative research in education* (pp. 681-725). San Diego: Academic Press, Inc.]

Glaser, B.G. (1964). *Organizational scientists: Their professional careers.* Indianapolis: The Bobbs-Merrill Co., Inc.

Gleshne, C., & Peshkin, A. (1992). But is it ethical? Learning to do right. In *Becoming qualitative researchers: An introduction* (pp. 109-125). White Plains, NY: Longman.

Gore, G.J. (1972). Co-op versus non co-op revisited. *Journal of Cooperative Education, 9(1),* 23-33.

Gore, G.J. (1973). Value of cooperative education as a graduate views it. *Journal of Cooperative Education, 9,* 53-59.

Graen, G. (1976). Role making processes within complex organizations. In M.D. Dunnette (Ed.), *The handbook of industrial and organizational psychology*. Chicago: Rand McNally.

Greenspan, S.I., & Shanker, S.G. (2004). *The first idea: How symbols, language, and intelligence evolved from our primate ancestors to modern humans.* Cambridge, MA: Da Capo Press.

Guba, E. G., & Lincoln, Y. S. (1989). *Fourth generation evaluation.* Newbury Park, CA: Sage.

Guba, E. G., & Lincoln, Y. S. (1994). Chapter 6, Competing paradigms in qualitative research. In N.K. Denzin & Y.S. Lincoln (Eds.), *Handbook of qualitative research in education* (pp.105-117). Thousand Oaks, CA: Sage Publications.

Gundry, L.K. (1993). Fitting into technical organizations: The socialization of newcomer engineers. *IEEE Transactions on Engineering Management, 40,* 335-345.

Haas, J.E., & Drabek, T.E. (1974). Chapter 3. Looking inside an organization. In *Understanding complex organizations* (pp. 38-53). Dubuque, IA: W.C. Brown Co.

Hall, M.C., Stiles, G. & Kuzma, J. (1995). Business student expectations of internships. *Marketing Educator's Journal,* 21, 37-51.

Hansen, J. F. (1983). From background to foreground: Toward an anthropology of learning. *Anthropology and Education Quarterly, 13,* 189-202.

Hartley, M. (1978). Locus of control and achievement needs as predictors of job satisfaction. *Journal of Cooperative Education, 14(3),* 69-79.

Hayes, R.A., & Travis, J.H. (1978). *Employer experience with cooperative education: Analysis of costs and benefits.* Detroit, MI: Detroit Institute of Technology Cooperative Education Research Center.

Heinemann, H.N., & DeFalco, A.A. (1990). Dewey's pragmatism: A philosophical foundation for cooperative education. *Journal of Cooperative Education, 27(1),* 38-44.

Heinemann, H.N., DeFalco, A.A., & Smelkinson, M. (1992). Work-experience enriched learning. *Journal of Cooperative Education, 28(1),* 17-33.

Heinemann, H.N., Enright, J., Johnson, P., Murtaugh, K., Reed, G., Robinson, V., & Wilson, J. (1988). Cooperative education and the academy: Ad hoc committee on cooperative education and the curriculum. *Journal of Cooperative Education, 24(2-3),* 109-119.

Heshusius, L. (1994). Freeing ourselves from objectivity: Managing subjectivity or turning toward a participatory mode of consciousness? *Educational Researcher,* April 1994, 15-22.

Hewitt, D.T. (1998). Cooperative education and EC2000. *Proceedings of the 1998 Conference for Industry and Education Collaboration,* 52-57: American Society for Engineering Education.

Hoffman, A.W. (1997). *From heresy to dogma: an institutional history of corporate environmentalism.* San Francisco: New Lexington Press.

Hogg, M.A. & Vaughan, G.M. (2002). *Social Psychology (3rd* ed. *).* London: Prentice-Hall.

Holland, J.L. (1985). *Making vocational choices: A theory of vocational personalities and work environments* (2nd ed.). Englewood Cliffs, NJ: Prentice-Hall.

Homans, G. (1950). *The human group.* New York: Harcort, Brace & World, Inc.

Hoskyn, K. (1999, July). *Evaluation of workplace performance of co-op students*. Paper presented at the 11th World Association of Cooperative Education Conference. Washington, D.C.

Huber, A-M. & Tegart, W. (1996). Finding meaningful employment in the 90s: Will a university education be enough? *Journal of Cooperative Education, 31(2-3),* 25-40.

Hunt, D.C. (Ed.) (1978), *50 views of cooperative education*. Detroit, MI: University of Detroit.

Hurd, J., & Hendy, M. (1997). What we know about co-op employers' perceptions of cooperative education: A synthesis of research in the USA and in Canada. *Journal of Cooperative Education, 32(2),* 55-62.

Hymes, D. H. (1978). What is ethnography? Sociolinguistics Working Paper #45, Southwest Educational Development Laboratory. Austin, TX. (cited in Spradley, J. P. (1980). *Participant observation*. New York: Holt, Rinehart and Winston, p.31).

Jacob, E. (1987). Qualitative research traditions: A review. *Review of educational research,* 57(1), 1-50.

Jacob, E. (1988). Clarifying qualitative research: A focus on traditions. *Educational Researcher, 17*(1), 16-24.

Jagacinski, C.M., LeBold, W.K., Linden, K.W., & Shell, K.D. (1986). The relationship between undergraduate work experience and job placement of engineers. *Engineering Education.*

Jansen, G., & Peshkin, A. (1992). Subjectivity in qualitative research. In M.D. LeCompte, W.L. Millroy, & J.Preissle (Eds.), *The handbook of qualitative research in education* (pp. 681-725). San Diego: Academic Press, Inc.

Jones, G.R. (1983). Psychological orientation and the process of organizational socialization: An interactionist perspective. *Academy of Management Review, 8,* 464-474.

Jones, G.R. (1986). Socialization tactics, self-efficacy, and newcomers' adjustments to organizations. *Academy of Management Journal,* 29(2), 262-279.

Judge, T.A, & Bretz, R.D. Jr. (1992). Effects of work values on job choice decisions. *Journal of Applied Psychology, 77,* 261-271.

Jurgensen, C.E. (1978). Job preferences (What makes a job good or bad?). *Journal of Applied Psychology, 63,* 267-276.

Kegan, R. (1982). *The evolving self: Problem and process in human development.* Cambridge, MA: Harvard University Press.

Kegan, R. (1994). *In over our heads: The mental demands of modern life.* Cambridge, MA: Harvard University Press.

Kelly, M. (1985). Early careers of graduates: The Destinations Project at Manchester Polytechnic, 1982-1985. *Proceedings Fourth World Conference on Cooperative Education,* Edinburgh.

King, R.C., & Sethi, V. (1992). Socialization of professionals in high-technology firms. *Journal of High Technology Management Research, 3,* 147-168.

Kirby, R.L. (1990). *Cooperative education and organizational socialization of university graduates.* Doctoral dissertation, The University of Arizona, Tuscon, AZ.

Kirchmeyer, C. (1995). Demographic similarity to the work group: A longitudinal study of managers at the early career stage. *Journal of Organizational Behavior, 16,* 67-83.

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Englewood Cliffs, NJ: Prentice Hall.

Kotter, J.P. (1977). Power, dependence, and effective management (pp.128-143). In R.W. Allen & L.W. Porter (Eds.), *Organizational influence processes.* Glenview, IL: Scott-Foresman.

Kramer, M. (1977). Why Younkers participates in cooperative education. In D.C. Hunt (Ed.), *50 views of cooperative education* (p.23). Detroit, MI: University of Detroit.

Kristof, A.L. (1996). Person-organization fit: An integrative review of its conceptualizations, measurement, and implications. *Personnel Psychology, 49,* 1-49.

Kuh, G. D., & Whitt, E. J. (1988). *The invisible tapestry: Culture in American colleges and universities.* ASHE-ERIC Higher Education Report, No. 1. Washington, DC: Association for the Study of Higher Education.

Kuzel, A. J. (1992). Sampling in qualitative inquiry. In B.F. Crabtree & W.L. Miller (Eds.), *Doing qualitative research* (pp. 31-44). (Research Methods for Primary Care Series, Vol.3). Newbury Park, CA: Sage.

Kvale, S. (1989). To validate is to question. In S. Kvale (Ed.), *Issues of validity in qualitative research* (pp. 73-92). Lund, Sweden: Studentlitteratur.

Laker, D.R., & Steffy, B.D. (1995). The impact of alternative socialization tactics on self-managing behavior and organizational commitment. *Journal of Social Behavior and Personality, 10,* 645-660.

Langford, D.R., & Cates, C.L. (1995). Developing general education skills through co-operative education. *Proceedings of the World Conference on Co-operative Education,* 129-137. Kingston, Jamaica: World Association of Cooperative Education.

Langford, D.R. & Lockart, C. (1999). *Using student & employer perceptions to assess specific co-op learning outcomes*. Paper presented at the 11th World Association of Cooperative Education Conference. Washington, D.C.

Lave, J., & Wegner, E. (1991). *Situated learning: Legitimate peripheral participation.* Cambridge, England: Cambridge University Press.

Laycock, A.B., Hermon, M.V., & Laetz, V. (1992). Cooperative education: Key factors related to a quality experience. *Journal of Cooperative Education*, 27 (3), 36-46.

LeBold, I.A.T., Pullin, R.A., & Wilson, J.C. (1990). Cooperative education in Canada. *Journal of Cooperative Education, 26(2),* 7-13.

LeCompte, M. D. (1987). Bias in the biography: Bias and subjectivity in ethnographic research. *Anthropology and Education Quarterly*, *18*(1), 43-52.

Lentz, G.F. (1980). Evaluating Title VIII proposals, or what a director learned on her own cooperative education assignment. *Journal of Cooperative Education, 17(1),* 52-57.

Levine, S., & White, P.E. (1961). Exchange as a conceptual framework for the study of interorganizational relationships. *Administrative Science Quarterly, 5,* 583-601.

Lindenmeyer, R.S. (1967). Comparison study of the academic progress of the cooperative and the four year student. *Journal of Cooperative Education, 3(2),* 8-18.

Linn, P.L. (1999, July). *Student learning in the workplace: A report of a lifespan study*. Paper presented at the 11th World Association of Cooperative Education Conference. Washington, D.C.

Linn, P.L. (2004). Chapter 2: Theories about learning development in cooperative education and internships. In P.L. Linn, A. Howard, & E. Miller (Eds.), *Handbook for research in cooperative education and internships.* (pp.11-28). Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.

Lofland, J., & Lofland, L. H. (1995). *Analyzing social settings: A guide to qualitative observation and analysis* (3rd ed.). Belmont, CA: Wadsworth Publishing Company.

Loken, M.K., & Cutt, J. (1986, August). *The academic benefits of cooperative educations – The neglected question.* Paper presented at the Annual Conference of the Canadian Association for Cooperative Education, Vancouver, Canada.

Louis, M.R. (1980). Surprise and sense making : What newcomers experience in entering unfamiliar organizational settings. *Administrative Science Quarterly, 25*, 226-251.

Louis, M.R. (1990). Acculturation in the workplace : Newcomers as lay ethnographers (pp.85-129). In B. Schneider (Ed.), *Organizational climate and culture.* San Francisco : Jossey-Bass.

Louis, M.R., Posner, B.Z., & Powell, G.N. (1983). The availibility and helpfulness of socialization practices. *Personnel Psychology, 36,* 857-866.

Major, D.A., & Kozlowski, S.W.J. (1997). Newcomer information seeking: Individual and contextual influences. *International Journal of Selection and Assessment, 5,* 16-28.

Major, D.A., Kozlowski, S.W.J., Chao, J.T., & Gardner, P.D. (1995). A longitudinal investigation of newcomer expectations, early socialization outcomes, and the moderating effect of role development factors. *Journal of Applied Psychology, 80,* 418-431.

Manis, J., & Meltzer, B.N. (Eds.). (1978). *Symbolic interaction: A reader in social psychology* (3rd ed.). Boston: Allyn and Bacon.

Mann, R., & Schlueter, D. (1985). *The relationship between realistic expectations about work and the cooperative experience.* Boston: Cooperative Education Research Center, Northeastern University.

Marini, R.C., & Tillman, R.R. (1998). Giving graduates worldwide the business skills they need through cooperative education. *Journal of Cooperative Education, 33(2),* 50-59.

May, W. F. (1980). Doing ethics: The bearing of ethical theories on fieldwork. *Social Problems, 27*(3), 358-370.

McKibbin, S. (1981). Traditional organizational theory in educational administration. In D.L. Clark, S. McKibbin & M. Malkas (Eds.), *Alternative perspectives for viewing educational organizations* (pp.3-13). San Francisco: Far West Laboratory.

Meltzer, B.N., Petras, J.W., & Reynolds, L.T. (1975). *Symbolic interactionism: Genesis, varieties and criticism.* London: Routledge and Kegan Paul.

Merriam-Webster. (2002). *Merriam-Webster Collegiate Dictionary* (10th ed.). Springfield, MA: Merriam-Webster, Incorporated.

Merton, R.K. (1957). *Social theory and social structure.* New York: The Free Press.

Merton, R.K. (1996). *On social structure and science.* Chicago: The University of Chicago Press.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). Thousand Oaks, CA: Sage Publications, Inc.

Miller, G.H. (1967). Cooperative education wins place in placement statistical picture. *Journal of Cooperative Education, 9(1),* 22-25.

Miller, G.H. (1968). Cooperative education makes gain in placement picture. J*ournal of Cooperative Education, 5(1),* 39-41.

Miller, J.B. (1984). *The development of women's sense of self.* Work in progress 84-12. Wellesley, MA: Stone Center Working Papers Series.

Miller, V.D., & Jablin, F.M. (1991). Information seeking during organizational entry: Influences, tactics, and a model of the process. *Academy of Management Review,* 16(1), 92-120.

Mintzberg, H. (1979). *The structuring of organizations.* Englewood Cliffs, NJ: Prentice-Hall, 348-379.

Mintzberg, H. (1989). *Mintzberg on management: Inside our strange world of organizations.* New York: The Free Press.

Moore, W.E. (1969). Occupational socialization. In D.A. Goslin (Ed.), *Handbook of Socialization, Theory and Research.* Chicago: Rand McNally and Company.

Morgan, G. (1997). *Images of organization* (2nd ed.). Thousand Oaks, CA: Sage Publications, Inc.

Morrison, E. W. (1993a). Longitudinal study of the effects of information seeking on newcomer socialization. *Journal of Applied Psychology,* 78(2), 173-183.

Morrison, E.W. (1993b). Newcomer information seeking: Exploring types, modes, sources, and outcomes. *Academy of Management Journal,* 36(3), 557-589.

Morrison, E.W. (1995). Information usefulness and acquisition during organizational encounter. *Management Communication Quarterly, 9,* 131-155.

Morse, J. M. (Ed.). (1989). *Qualitative nursing research: A contemporary dialogue.* Newbury Park, CA: Sage.

Muchinsky, P.M., & Monahan, C.J. (1987). What is person-environment congruence? Supplementary versus complementary models of fit. *Journal of Vocational Behavior, 31,* 268-277.

Nasr, K.J., Pennington, J., & Andres, C. (2004). A study of students' assessment of cooperative education outcomes. *Journal of Cooperative Education, 38(1),* 13-21.

National Commission of Cooperative Education. (2004). Definition of cooperative education, as listed on the NCCE website, http://www.co-op.edu/model.html#def, retrieved on September 9, 2004.

Nixon, F.W. (1989). *Perceptions of cooperative education as a mechanism for organizational socialization.* Doctoral dissertation, The University of Mississippi, University, MS.

O'Reilly, C.A., & Caldwell, D.F. (1981). The commitment and job tenure of new employees: Some evidence of postdecisional justification. *Administrative Science Quarterly, 26,* 597-616.

O'Reilly, C.A., Chatman, J., & Caldwell, D.F. (1991). People and organizational culture: A profile comparison approach to assessing person-organization fit. *Academy of Management Journal, 34,* 487-516.

Ostroff, C., & Kozlowski, S.W.J. (1992). Organizational socialization as a learning process: The role of information acquisition. *Personnel Psychology,* 45(4), 849-874.

Ostroff, C., & Kozlowski, S.W.J. (1993). The role of mentoring in the information gathering processes of newcomers during early organizational socialization. *Journal of Vocational Behavior, 42,* 170-183.

Parks, D.K., Onwuegbuzie, A.J., & Cash, S.H. (2001). Development of a measure for Predicting Learning Advancement through Cooperative Education: Reliability and validity of the PLACE scale. *Journal of Cooperative Education,* 36 (1), 23-31.

Parsons, C., & Caylor, E. (2004). Newcomer socialization in cooperative education work assignments: The role of organizational and individual factors. Unpublished manuscript, presented at the *2004 Conference for Industry and Education Collaboration/Cooperative Education Division,* Biloxi, MS. Feb. 3-5, 2004.

Parsons, C., Caylor, E., & Simmons, H. (2005) Cooperative education work assignments: The role of organizational and individual factor in enhancing ABET, competencies and co-op workplace well-being. *Journal of Engineering Education*, 94 (3), 309-318.

Parsons, T. (1960). *Structure and process in modern societies.* Glencoe, IL: Free Press.

Peters, H.W. (1977). Why Ford Motor Company participates in cooperative education. In D.C. Hunt (Ed.), *50 views of cooperative education* (p.19). Detroit, MI: University of Detroit.

Perloff, R., & Sussna, E. (1978). Toward an evaluation of cooperative education: A managerial perspective. *Journal of Cooperative Education, 14*, 54-73.

Perry, W.G., Jr. (1970). *Forms of intellectual and ethical development in the college years: A scheme.* Austin, TX: Holt, Rinehart, & Winston.

Pettit, D.E. (1998). 1998 census of cooperative education executive summary. *Cooperative Education Experience*, 4-5.

Pffefer, J. (1992). *Managing with power.* Boston: Harvard Business School Press.

Phillips, J.J. (1978). An employer evaluation of a cooperative education program. *Journal of Cooperative Education, 14(2),* 104-120.

Phillips, J.J. (1987). *Recruiting, training and retaining new employees: Managing the transition from college to work.* Jossey-Bass.

Piaget, J. (1963). *The origin of intelligence in children* (2nd ed.). New York: Norton.

Piaget, J. (1972). Intellectual evolution from adolescence to adulthood. *Human Development, 15,* 1-12.

Pierce, J.H. (1998). Developing a framework for the assessment of engineering education: The role of cooperative education. *Proceedings of the 1998 Conference for Industry and Education Collaboration,* 38-46: American Society for Engineering Education.

Porter, L.W., Lawler, E.E., & Hackman, J.R. (1975). *Behavior in organizations.* New York: McGraw-Hill.

Posner, B.Z. (1992). Person-organization values congruence: No support for individual differences as a moderating influence. *Human Relations, 45,* 351-361.

Raschke, S. (2003). *Socialization of new school business administrators from outside the education field.* Doctoral dissertation, Eastern Michigan University, Ypsilanti, MI.

Reichers, A.E. (1987). An interactionist perspective on newcomer socialization rates. *Academy of Management Review, 12(*2), 278-287.

Ricks, F., Van Gyn, G., Branton, G., Cut, J., Loken, M., & Ney, T. (1990). Theory and research in cooperative education: Practice implications. *Journal of Cooperative Education, 27(1),* 7-20.

Ricks, F., Cutt, J., Branton, G., Loken, M., & Van Gyn, G. (1993). Reflections on the cooperative education literature. *Journal of Cooperative Education, 29(1),* 6-23.

Ritzer, G. (1980). *Sociology: A multiple paradigm science* (rev. ed.). Boston: Allyn and Bacon.

Rogers, B.H., & Weston, W.D. (1987). A survey of recent engineering graduates: The relationship of cooperative education to job factors. *Journal of Cooperative Education, 23(3),* 33-39.

Rowe, P.M. (1970). Motivation and satisfaction on the work term of cooperative students. *Journal of Cooperative Education, 11(1),* 13-23.

Rowe, P.M. (1992). Comparison of cooperative education graduates with two cohorts of regular graduates: Fellow entrants and fellow graduates. *Journal of Cooperative Education, 27(3),* 7-15.

Ryder, K.G. (1987). Social and educational roots. In K.G. Ryder, J.W. Wilson, & Associates (Eds.), *Cooperative education in a new era: Understanding and strengthening the links between college and the workplace* (pp.1-12). San Francisco: Jossey-Bass Publishers.

Rynes, S.L., & Gerhart, B. (1990). Interviewer assessments of applicant 'fit': An exploratory investigation. *Personnel Psychology, 43,* 178-196.

Saks, A.M. (1995). Longitudinal field investigation of the moderating and mediating effects of self-efficacy on the relationship between training and newcomer adjustment. *Journal of Applied Psychology, 80,* 211-225.

Saks, A.M., & Ashforth, B.E. (1996). Proactive socialization and behavioral self-management. *Journal of Vocational Behavior, 48,* 301-323.

Schatzmann, L., & Strauss, A.L. (1973). *Field research: Strategies for a natural sociology.* Englewood Cliffs, NJ: Prentice-Hall.

Schaubroeck, J., & Green, S.G. (1989). Confirmatory factor analytic procedures for assessing change during organizational entry. *Journal of Applied Psychology, 74,* 892-200.

Schein, E.H. (1968a). Organizational socialization and the profession of management. *Industrial Management Review, 9,* 1-15.

Schein, E.H. (1968b). *The individual, the organization and the career; a conceptual scheme*. Cambridge, MA: Massachusetts Institute of Technology. Unpublished paper.

Schein, E.H. (1970). Organizational socialization and the profession of management. In A.O. Elbing (Ed.), *Behavioral decisions in organizations.* Albany, NY: State University of New York.

Schein, E.H. (1971). The individual, the organization, and the career: A conceptual scheme. *Journal of Applied Behavioral Science, 7,* 401-426.

Schein, E.H. (1978). *Career dynamics: Matching individual and organizational needs.* Reading, MA: Addison-Wesley Publishing Company.

Schein, E.H. (1990). Organizational culture. *American Psychologist,* 45 (2), 109-119.

Schein, E. H. (1992). *Organizational culture and leadership* (2nd ed.). San Francisco: Jossey-Bass Publishers.

Schlossberg, N. K., Waters, E. B., & Goodman, J. (1995). *Counseling adults in transition* (2nd ed.). New York: Springer.

Schneider, B. (1987). The people make the place. *Personnel Psychology,* 40, 437-453.

Scott, W.R. (1994). Conceptualizing organizational fields: Linking organizations and societal systems. In H.U. Derlien, U. Gerhardt, and F.W. Scharpf (Eds.), *Systemrationalitat and Partial Interesse.* Baden-Baden, Germany: Nomos Verlagsgesellschaft.

Scott, W.R. (1998). *Organizations: Rational, natural, and open systems.* Upper Saddle River, NJ: Prentice Hall.

Scott, W.R. (2001). *Institutions and organizations (2nd ed.).* Thousand Oaks, CA: Sage Publications.

Scott, W.R., & Backman, E.V. (1990). Institutional theory and the medical care sector. In S.S. Mick (Ed.), *Innovations in health care delivery: Insights for organization theory* (pp.20-52). San Francisco: Jossey-Bass.

Scriven, M. (1983). Cost in evaluation: Concept and practice. In M.C. Alkin & L.C. Solomon (Eds.), *The costs of evaluation* (pp.27-44). Beverly Hills: Sage.

Seidenberg, J.M. (1987). *Analyzing the investment returns to cooperative education: The Lehman College experience and initial full-time employment.* Unpublished doctoral dissertation, Columbia University.

Selznick, P. (1949). *TVA and the grass roots.* Berkeley, CA: University of California Press.

Selznick, P. (1957). *Leadership and administration.* New York: Harper & Row.

Shaeiwitz, J.A. (1996). Outcomes assessment in engineering education. *Journal of Engineering Education.* 239-246.

Sheetz, L. P. (1995). *Recruiting Trends: 1995-96.* East Lansing, MI: Collegiate Employment Research Institute, Michigan State University.

Smelt, R. (1975). Why Lockheed Aircraft Corporation participates in cooperative education. In D.C. Hunt (Ed.), *50 views of cooperative education* (p.16). Detroit, MI: University of Detroit.

Smith, H.S. (1965). The influence of participation in the cooperative programme on academic performance. *Journal of Cooperative Education, 2(1),* 7-20.

Somers, G.M.(1986). How cooperative education affects recruitment and retention. *Journal of Cooperative Education, 22(3),* 72-78.

Somers. G.M. (1995). The post-graduate pecuniary benefits of co-op participation: A review of the literature. *Journal of Cooperative Education, 31(1),* 25-41.

Spradley, J.P. (1979). *The ethnographic interview*. New York: Holt, Rinehart, and Winston, Inc.

Spradley, J.P. (1980). *Participant observation*. New York: Holt, Rinehart, and Winston, Inc.

Stake, R.E. (1976). A theoretical statement of responsive evaluation. *Studies in Educational Evaluation, 2,* 19-22.

Steinrock, D.A. (2006). *An ethnographic study of Washtenaw Community College,* Doctoral dissertation proposal, Eastern Michigan University, Ypsilanti, MI.

Sternberg, R.J., & Wagner, R.K. (Eds.). (1986). *Practical intelligence: Nature and origins of competence in the everyday world.* New York: Cambridge University Press.

Strauss, A., & Corbin, J. (1990). *Basics of qualitative research.* Newbury Park, CA: Sage Publications.

Stufflebeam, D.L., & Shinkfield, A.J. (1985). *Systematic evaluation.* Boston: Kluwer-Nijhoff Publishing.

Suchman, E.A. (1954). The principles of research design. In J.T. Doby et al. (Eds.), *An introduction to social research* (pp.254-267). Harrisburg, PA: The Stackpole Co.

Sutton, R.I., & Louis, M.R. (1987). How selecting and socializing newcomers influences insiders. *Human Resource Management, 26,* 347-361.

Sykes, G. (1999). Chapter 11, The "new professionalism" in education: An appraisal. In J. Murphy & K.S. Louis (Eds.), *Handbook of research on educational administration* (pp. 227-249), San Francisco, CA: Jossey-Bass Publishers.

Tajfel, H., & Turner, J. C. (1979). An integrative theory of intergroup conflict. In W. G. Austin & S. Worchel (Eds.), *The social psychology of intergroup relations* (pp. 33-47). Monterey, CA: Brooks-Cole.

Tajfel, H. & Turner, J. C. (1986). The social identity theory of inter-group behavior. In S. Worchel and L. W. Austin (Eds.), *Psychology of intergroup relations*. Chicago: Nelson-Hall.

Tammen, M.G. (1977). A comparison of students' and employers' needs. In D.C. Hunt (Ed.), *50 views of cooperative education* (p.37). Detroit, MI: University of Detroit.

Thompson, J.D. (1967). Chapters 1-3. In *Organizations in action* (pp.3-38). New York: McGraw-Hill.

Thuynsma, B. (1999, July). *A case for value-added teacher education by improved socialization process.* Paper presented at the 11th World Association of Cooperative Education Conference. Washington, D.C.

Turban, D.B., & Keon, T.L. (1993). Organization attractiveness: An interactionist perspective. *Journal of Applied Psychology, 78,* 184-193.

Tyler, R.W. (1980). A brief overview of program evaluation. *Journal of Cooperative Education, 16(3),* 7-15.

Vancouver, J.B., Millsap, R.E., & Peters, P.A. (1994). Multilevel analysis of organizational goal congruence. *Journal of Applied Psychology, 79,* 666-679.

Van Gyn, G., Cutt, J., Loken, M., & Ricks, F. (1997). Investigating the educational benefits of cooperative education: A longitudinal study. *Journal of Cooperative Education,* 32 (2), 70-85.

Van Gyn, G., & Hendy, M. (1999, July). *So you want to do some research.* Paper presented at the 11th World Association of Cooperative Education Conference. Washington, D.C.

Van Gyn, G., & Ricks, F. (1997). Proteges' perceptions of the characteristics of the mentoring relationship and its impact. *Journal of Cooperative Education, 32(3),* 80-95.

Van Maanen, J. (1975). Police socialization: A longitudinal examination of job attitudes in an urban police department. *Administrative Science Quarterly, 20,* 207-228.

Van Maanen, J. (1978). Breaking in: Socialization to work. In R. Dubin (Ed.), *Handbook of work, organization and society.* Chicago: Rand McNally College Publishing.

Van Maanen, J., & Schein, E.H. (1979). Toward a theory of organizational socialization. In B.M. Staw (Ed.), *Research in Organizational Behavior,* 1, 209-264. Greenwich, CT: JAI Press.

Vandenberg, R.J., & Scarpello, C. (1990). The matching model : An examination of the processes underlying realistic job previews. *Journal of Applied Psychology, 75,* 60-67.

Waung, M. (1995). The effects of self-regulatory coping orientation on newcomer adjustment and job survival. *Personnel Psychology, 48,* 633-650.

Wanous, J.P. (1992). *Organizational entry: Recruitment, selection, orientation, and socialization of newcomers.* Reading, MA: Addison-Wesley.

Weinstein, D.A. (1980). Cooperative education strategies. *Journal of Cooperative Education, 17,* 34-42.

Werner, O., & Schoepfle, G. M. (1976). *Systematic fieldwork: Vol. 1. Foundations of ethnography and interviewing.* Newbury Park, CA: Sage.

Weston, W. (1986). Career identity and its relationship to participation in a cooperative education program. *Journal of Cooperative Education, 23(1),* 25-36.

Williams, W.M., Sternberg, R.J., Rashotte, C.A., & Wagner, R.K. (1993). Assessing the value of cooperative education. *Journal of Cooperative Education, 28(2),* 32-55.

Wilson, J.W. (1971). Historical development. In A.A. Knowles & Associates (Eds.), *Handbook of cooperative education* (3-17). San Francisco: Jossey-Bass Inc., Publishers.

Wilson, J.W. (1974). Impact of cooperative education on personal development and growth of values. *Final Report to the Breitmayer Foundation,* Northeastern University.

Wilson, J.W. (1988). Research in cooperative education. *Journal of Cooperative Education, 24(2-3),* 77-89.

Wilson, J.W. (1989). Assessing outcomes of cooperative education. *Journal of Cooperative Education, 25(2),* 38-45.

Wilson, J., & Lyons, E. (1961). *Work-study college programs: Appraisal and report of the study of cooperative education.* New York: Harper and Brothers.

Wilson, G. (1977). Why Huntington Alloys Inc. participates in cooperative education. In D.C. Hunt (Ed.), *50 views of cooperative education* (p.17). Detroit, MI: University of Detroit.

Witt, L.A., & Silver, N.C. (1995). *Team politics and person-organization fit predicting team cohesiveness.* Paper presented at the annual meeting of the Southeastern Psychological Association, Savannah, GA.

Wolcott, H. (1992). Chapter 1, Posturing in qualitative research. In LeCompte, M.D., Millroy, W.L.. & Preissle, J. (Eds.), *The handbook of qualitative research in education* (pp. 1-52). San Diego, CA: Academic Press, Inc.

Wooldridge, R.L. (1976). A summary of documented employer benefits from cooperative education. *Journal of Cooperative Education, 12(2),* 5-18.

Yencso, W.R. (1971). Comparing engineering graduates from coop and regular programs. *Engineering Education, 61(7),* 816-818.

Zahrly, J., & Tosi, H. (1989). The differential effect of organizational induction processes on early work role adjustment. *Journal of Organizational Behavior, 10,* 59-74.

APPENDICES

APPENDIX A: BIOGRAPHIES OF INFORMANTS

Student Informants

Abner, Victor

Victor completed his bachelor of science in engineering with a mechanical emphasis from GSU in August of 2003. He graduated with a grade point average of 3.65. He is from the same small town where the main campus of GSU resides, approximately 10 miles from downtown Forde Junction. He attended the mid-size public school there where he graduated in May of 1999. Victor is a white male in his mid-20s.

Victor had no engineering-related work experience prior to beginning his first co-op semester. He had worked in two hands-on or manufacturing environments, including a residential home builder and a small manufacturer, both in the West Great Lakes region. Prior to beginning a search for a co-op, he indicated a preference to stay in the West Great Lakes region for his co-op assignment. Victor completed his first two co-op assignments at TP, Inc., and his third co-op assignment at BR, Inc. After graduation he accepted a full-time engineering position at IG, Inc.

Arnold, Paul

Paul completed his bachelor of science in engineering with a computer emphasis from GSU in August of 2004. He graduated with a 3.14 grade point average. Paul was born in Russia, but his family moved to the United States prior to him starting high school. The family moved to a mid-sized, suburban city around Forde Junction where Alex attended and graduated from the mid-sized high school in the area in May of 1999. Paul is a white male in his mid-20s.

Prior to beginning his search for a co-op position, he had no technical or engineering-related work experience and indicated a preference to stay in the West Great Lakes region for

his co-op assignment. Paul completed his first co-op assignment at MC, Inc, his second co-op assignment at CP, Inc., and his third co-op assignment at AS, Inc. After graduation, he accepted a full-time engineering position at AS, Inc.

Dews, Wendell

Wendell completed his bachelor of science in engineering with an electrical emphasis from GSU in August of 2004. He graduated with a 3.58 grade point average. Prior to pursuing his degree at GSU, Wendell obtained a bachelor of fine arts degree in broadcasting and cinematic arts from another State of Great Lakes public university in 1987. Therefore he transferred 123 credits to GSU from his previous education. Wendell is from a mid-size city in the West Great Lakes region where he attended a small, public high school graduating in 1983. He is a white male in his early 40s.

Wendell held several professional positions prior to returning to school to pursue his engineering degree. He worked as an installer for a security company, and before that, he worked as a designer/technician/salesman for a small start-up company which designed, manufactured and installed voice-activated court recording systems. Prior to that, he worked in the audio/visual field and went to a technical school to study electronic technology, graduating in 1992. He conducted his co-op assignments at his most recent place of employment, IWG, Inc., from the summer of 2001 through the fall of 2003, where he worked part-time as a controls engineer while working towards his engineering degree. After graduation, Wendell accepted a full-time engineering position at GBA, Inc. IWG, Inc., was not hiring full-time positions at the time Wendell graduated.

Dorale, Henry

Henry completed his bachelor of science in engineering with am electrical emphasis from GSU in December of 2003. He had seven credits of advanced placement courses applied towards degree from high school. He graduated with a grade point average of 3.75. He graduated from a mid-size, private high school in Forde Junction in May of 1999, but he is originally from Maryland. Henry is a white male in his mid-20s.

Prior to beginning his search for a first co-op position, Henry has no technical or engineering experience outside of the educational environment. He did work on a research project with GSU faculty during the summer of 2000 dealing with robotics. He also tutored and was a lab assistant for a freshman-level engineering course. He preferred to be in the West Great Lakes region for his co-op assignment, but he was open to going anywhere for the right position. He ended up performing his co-op assignment in a research role with the GSU from the summer of 2001 through the fall of 2002. After graduation he accepted a full-time engineering position at AS, Inc.

Evans, Barry

Barry completed his Bachelor of Science in Engineering, electrical emphasis, from GSU in August 2003. He was a strong student academically with a cumulative GPA of 3.60 when he graduated. He is originally from a small, rural city in West Great Lakes region where he attended a medium-sized public high school and graduated in 1999. After high school, Barry continued his education at GSU. He is a white male in his mid-20s.

Barry worked in a technical role at a small manufacturing company, and a controls engineering firm, both in the West Great Lakes region, after completing high school and prior to beginning his first co-op assignment through GSU's engineering program. When

preparing to conduct his search, Barry indicated that he preferred to work in the West Great Lakes region for his co-op assignment. He had a specific preference for working at one of two large manufacturing facilities in the West Great Lakes region where he had personal contacts. Barry completed his co-op assignments with DM, Inc. After graduation, he accepted a full-time engineering position with AS, Inc.

Jeffers, Steve

Steve completed his bachelor of science in engineering with an electrical emphasis from GSU in August of 2003. He also graduated with a business minor. His grade point average when he graduated was 3.65. He is originally from a mid-size suburb of Forde Junction where he attended a small, private high school, graduating in May of 1998. Steve is a white male in his mid-20s.

Prior to beginning his search for a first co-op site, Steve had no technical or engineering-related work experience. He indicated a preference to stay in the West Great Lakes region prior to beginning a search for a co-op. Steve completed his co-op assignments at TP, Inc., from the summer of 2001 through the fall of 2002, and accepted a full-time, engineering position at AS, Inc., after graduation.

Jillet, Eric

Eric completed his bachelor of science in engineering with a mechanical emphasis from GSU in August of 2003. He also completed a minor in mathematics. He graduated with a grade point average of 3.88. Eric is from a small suburb of Forde Junction where he attended a small, private high school, graduating in May of 1999. He is a white male in his mid-20s.

Eric worked at a manufacturing company in a technical role prior to beginning his first co-op. He preferred to stay in the Forde Junction area or southwest of Forde Junction for his co-op assignment prior to beginning the search for a first co-op. He knew a recent GSU engineering graduate, now working full-time at a small manufacturing company, prior to starting to look for a co-op and had an interest in working there. Eric ended up getting hired and completing all three co-op assignments at GI, Inc., from the summer of 2001 through the fall of 2002. After graduation, he accepted a full-time, engineering position at GI, Inc.

Jolley, Brent

Brent completed his bachelor of science in engineering with a mechanical emphasis from GSU in December of 2003. He graduated with a grade point average of 2.67. He was from a mid-sized suburb of Forde Junction where he attended the large, public high school, graduating in May of 1995. Brent is a white male in his mid/late-20s.

Brent had no previous technical or engineering experience prior to beginning his first co-op. He preferred to work in the West Great Lakes region for co-op prior to beginning the search for the first co-op assignment. He completed all three co-op assignments at CRCP, Inc. After graduation he was unable to find a full-time position for four months. He then found a temporary engineering position at a mid-sized manufacturing company in Forde Junction which he worked at for six months. Eventually, he found a full-time, engineering position at ARJ, Inc., where he currently works.

Juniper, Wesley

Wesley completed his bachelor of business administration degree with a management emphasis from GSU in April of 2003. He also completed a minor in engineering science. He started his academic career at a community college hear his hometown. He also attended a

small, private college in a neighboring state for one semester. Wesley transferred in 17 credits toward his degree at GSU. He graduated from GSU with a 3.04 grade point average.

Wesley was originally from a small city located about 100 miles south of Forde Junction where he attended the mid-sized, public high school and graduated in May of 1997. Wesley is a white male in his mid-20s. He worked as an engineering assistant for one summer at a small specialty machine designer/builder in his hometown prior to beginning his first co-op. His father was a controls engineer at the company, and he used to take Wesley out on the floor when he was little. He completed one co-op assignment at MH, Inc., in the summer of 2001 before transferring out of the engineering program. After graduation he obtained a full-time position with TG, Inc.

Kelly, Keith

Keith completed his bachelor of science in engineering with an electrical emphasis in August 2003 from GSU. He graduated with a grade point average of 3.28, and is currently pursuing his master of science in electrical engineering, part-time while working full-time, through GSU. Keith started his collegiate studies at the local community college and transferred 50 credits to GSU to be used towards his bachelors degree. He is originally from a small, rural city located about 20 miles outside of Forde Junction where he attended the large, local public high school and graduated in May of 1998. Keith is a white male in his mid-20s.

Keith worked as a computer aided design draftsman for a small, local mechanical contractor for 1 ½ years prior to beginning his first co-op. Prior to beginning the search for his first co-op, Keith preferred working in the West Great Lakes region, in particular at one of two large companies: a material handling system designer and manufacturer or AS, Inc.,

an aerospace components designer and manufacturer. He had a relative who worked in engineering management at AS, Inc., and he performed a job shadow at AS, Inc., when he was in high school. Finally, his grandfather was an engineer for the material handling designer, what Keith described as a very "buttoned up" environment.

Keith completed his co-op assignments at AS, Inc., from the summer of 2001 through the fall of 2002. After graduation, Keith accepted a full-time, engineering position at AS, Inc.

Koontz, Doug

Doug completed his bachelor of science in engineering with a mechanical emphasis from GSU in August of 2003. He also completed a business minor, while graduating with a grade point average of 3.71. He is from a large suburb of Forde Junction, where he graduated from a small, private high school in May 1999. Doug is a white male in his mid-20s.

Doug worked in a technical role gaining hands-on experience at two service stations prior to beginning first co-op. He indicated a preference to work in the Forde Junction or a neighboring city areas for co-op prior to beginning the search for the first co-op. Doug completed his co-op assignments at IS, Inc., from the summer of 2001 through the fall of 2002. After graduation, Doug accepted a full-time, engineering position at ARJ, Inc.

Kline, Gloria

Gloria earned her bachelor of science in engineering degree with a mechanical emphasis in August 2003. She completed her degree with a grade point average of 3.32. She is originally from a small, suburban city located about 120 miles outside of the West Great Lakes region, where she attended the local, large, public high school in May of 1998. Gloria is a white female in her mid-20s.

Prior to beginning her studies and first co-op semester at GSU, Gloria had no previous technical or engineering experience. When preparing for the search for her first co-op semester, Gloria indicated a preference to work in the Forde Junction area for her co-op, even though she was not from the area. She completed her co-op assignments at SI, Inc., from the summer of 2001 through the fall of 2002. After graduation, she accepted a full-time, engineering position at a small architectural and engineering consulting firm in Forde Junction. After a year, she hired back into SI, Inc., where she had conducted her co-op.

Kraft, Keri

Keri completed her bachelor of science in engineering degree with a mechanical emphasis in August of 2003 from GSU. She graduated with a grade point average of 2.77. Prior to attending GSU, Keri completed an associate of science degree from the local community college, from which she transferred 97 credits toward her bachelor's degree.

Keri was born and raised in Vietnam where she completed high school prior to moving with her family to the United States. She did not speak English prior to moving to the United States. Keri is an Asian female in her late-20s. Prior to beginning her first co-op experience, Keri worked as an assembly worker, acquiring some technical/hands-on knowledge. She had no preference for location of her co-op site prior to beginning the search for her first co-op. Her co-op assignments were conducted at VK, Inc., from the summer of 2001 through the fall of 2002. After graduation, she hired on as a full-time engineer at ST, Inc.

Kroll, Fred

Fred completed his bachelor of science in engineering with an electrical emphasis from GSU in August of 2003. He also completed a mathematics minor, while earning a grade

point average of 3.76. He is from a small city within the West Great Lakes region, where he attended a small, private high school, graduating in May of 1999. Fred is a white male in his mid-20s.

Fred had no previous technical or engineering experience prior to beginning his first co-op assignment. He indicated a preference to work in the West Great Lakes region prior to beginning the search for his first co-op. Fred completed his co-op assignments at VPA, Inc., from the summer of 2001 through the fall of 2002. After graduation, Fred accepted a full-time, engineering position at AS, Inc.

Martins, Seth

Seth completed his bachelor of science in engineering degree with a computer emphasis and an electrical emphasis from GSU in August of 2003. He also completed a mathematics minor and graduated with a grade point average of 2.97. Seth completed 13 credits of advanced placement courses prior to beginning his studies at GSU. He is from a mid-sized city within the State of Great Lakes where he graduated from the large, public high school in May of 1998. Seth is a white male in his mid-20s.

Seth had worked at a large U.S.-based automotive manufacturing company in an engineering intern role prior to beginning his co-op assignment. He had a preference for working outside of the State of Great Lakes prior to beginning a search for a co-op. He completed his co-op assignments at AS, Inc., from the summer of 2000 through the fall of 2002. He accepted a full-time, engineering position at AS, Inc., after graduation.

Molner, Hank

Hank completed his bachelor of science in engineering degree with an electrical emphasis from GSU in August of 2004. He graduated with a grade point average of 2.96. He

was from a small city located in the West Great Lakes region where he graduated from a large, private high school in May of 1998. Hank is a white male in his mid-20s.

Hank had no previous technical or engineering experience prior to beginning the first co-op assignment. He preferred to work in the West Great Lakes region (specifically in Forde Junction or the city he grew up in) for co-op prior to beginning to search for the first co-op site. Hank completed two co-op assignments at IT, Inc., in the summer of 2001 and the winter of 2002, and one co-op assignment at GI, Inc., in the fall of 2002. After graduation, he accepted a full-time, engineering position at GI, Inc.

Morrison, Liam

Liam completed his bachelor of science in engineering with an electrical emphasis in August 2003 from GSU. Liam transferred to GSU after his freshman year which he spent at a small, private college in a neighboring state. He graduated with a grade point average of 2.98. Liam is originally from a mid-size, suburban city near Forde Junction where he attended the large public high school in the area, graduating in May of 1998. He is a white male in his mid-20s.

Prior to starting his first co-op assignment, Liam worked as a computer technician for a public high school in the West Great Lakes region. Before starting his co-op site search, he indicated a preference for working in the Forde Junction area. Liam completed his co-op assignments at GBA, Inc., from the summer of 2001 through the fall of 2002. After graduation, he accepted a full-time, engineering position at GBA, Inc.

Prather, Nick

Nick completed his bachelor of science in engineering with an electrical emphasis from GSU in August of 2003. He graduated with a grade point average of 3.26. He is from a

mid-sized city in the State of Great Lakes where he graduated from a mid-sized, private high school in May of 1999. Nick is a white male in his mid-20s.

Nick worked for the local, public utility for two years prior to starting his co-op. His father is an engineer at the public utility. He indicated a preference to work in his home city prior to beginning the search for his first co-op, with the Forde Junction-area a second choice. He hoped to work for the Big 3 automotive company in his home city for his co-op. He ended up completing his first co-op assignment in the summer of 2001 at the public utility (LWBL) where his father worked. For his second and third co-op assignments, Nick worked at PD, Inc., in the winter and fall of 2002. After graduation, he accepted a full-time, engineering position at TPT, Inc.

Randall, Greg

Greg completed his Bachelor of Science in Engineering with an electrical emphasis from GSU in August 2003. He graduated with a grade point average of 2.941, and is currently pursuing a Master of Science in Electrical Engineering through GSU. He is originally from a small, rural city in the West Great Lakes region where he graduated from a mid-sized, public high school in May of 1998. He is a white male who is in his mid-20s.

Greg had no previous technical or engineering experience prior to beginning his first co-op assignment. When preparing to conduct his search, Greg indicated that he preferred to work in the Forde Junction area for his co-op assignment. He had a specific preference for working at an aerospace company. Prior to attending college, Greg had a strong interest in joining the U.S. Air Force. Greg completed his co-op assignments at AS, Inc., from the summer of 2001 through the fall of 2002. After graduation, he accepted a full-time, engineering position at AS, Inc.

Rosey, Bill

Bill completed his bachelor of science in engineering with a computer emphasis from GSU in August of 2003. He graduated with a grade point average of 3.39. He is from a mid-sized suburb of Forde Junction where he graduated from the mid-sized, public high school in May of 1997. Bill is a white male in his mid-20s.

Bill worked in a technical role for the city traffic department where he grew up prior to beginning first co-op. He indicated a preference for working in the West Great Lakes region (particularly in Forde Junction) prior to beginning the search for his first co-op. Bill completed his co-op assignments at ARJ, Inc., from the summer of 2001 through the fall of 2002. After graduation, he accepted a full-time, engineering position at ARJ, Inc.

Slater, Zack

Zack completed his bachelor of science in engineering with a computer emphasis from GSU in August of 2003. He also completed a business minor and a computer science minor while graduating with a grade point average of 3.14. He completed 23 credits of advanced placement courses prior to beginning at GSU. He is from a large suburb of Forde Junction where he attended the large, public high school, graduating in May of 1997. He is a white male in his mid-20s.

Zack had no technical or engineering-related work experience prior to beginning his co-op assignments. He preferred to stay in the Forde Junction area prior to beginning a search for a co-op. He indicated a specific desire to work for AS, Inc. Zack completed his co-op assignments working in a research role for the GSU school of engineering from the summer of 2000 through the winter of 2003. After graduation, he accepted a full-time, engineering position with AS, Inc.

Vilma, Mike

Mike completed his bachelor of science in engineering with a mechanical emphasis from GSU in August 2003. He graduated with a 2.73 grade point average. Mike transferred in 45 credits from the local community college. He is from a small, suburban city near Forde Junction where he attended the large, public high school and graduate in May of 1995. Mike is a white male in his mid/late-20s.

Mike had no technical or engineering-related work experience prior to beginning co-op his first co-op assignment. Prior to beginning his co-op search, he indicated a preference to stay in the greater-Forde Junction area (east-side) for his co-op. Mike completed his co-op assignments at ARJ, Inc., in the winter and fall of 2002. After graduation, he accepted a full-time, engineering position with ARJ, Inc.

Employer Informants

Arbor, Dr. Scott

Dr. Arbor is an Associate Professor of Electrical and Computer Engineering at GSU. He has been a faculty member at GSU for a total of six years. One of his current roles is the chair of the electrical and computer engineering programs at GSU. He also conducted six co-op assignments for four different companies while an undergraduate, worked in industry for two years after completing his undergraduate degree, and worked as a research assistant during graduate school. He has a PhD in Computer/Electrical Engineering from the large, research-focused public university in the State of Great Lakes, and bachelor of science in engineering from a university in Canada (where he is from).

Blanchard, Gary

Gary is the Director of Product Development for the past 1 ½ years at IS, Inc., and was Gloria's supervisor during her first co-op semester. Gary had worked at IS, Inc., for 18 total years including positions in manufacturing engineering, engineering leadership, quality leadership, and manufacturing supervision. Prior to that, he had worked for a data systems company as an engineer, and prior to that worked as a summer intern in engineering at IS, Inc. He also worked in production at a large automotive company for a couple of summers while completing his bachelor of science degree in engineering. Gary also obtained a master of science in manufacturing management.

Bonds, Brad

Brad has been the Software Technical Lead for 20 years at AS, Inc. He also spent some time as a section head during that 20 year period, and prior to that was an engineer for five years at AS, Inc. He has a bachelor of science, a master of science, and a doctor of philosophy, all in physics. Brad was Keith's mentor during the first two co-op semesters at AS, Inc.

Campbell, Brian

Brian is the Quoting Department Manager for ARJ, Inc., and has been in that position for the past 16 years. He held various other roles for eight years at ARJ, Inc., prior to his current position. Prior to joining ARJ, Inc., Brian was a computer operator at a large local automotive manufacturer. Brian is a high school graduate, and he completed one year of college.

Dillenger, Jeff

Jeff is a Senior Design Engineer for the past six years at IS, Inc. He has worked for a total of 12 years at IS, Inc., and completed a co-op assignment at a large automotive manufacturing facility in Forde Junction during his undergraduate studies. Jeff completed his bachelor of science in engineering with a mechanical emphasis from GSU. He was Gloria's work supervisor for her third and final co-op semester with IS, Inc. Since Jeff graduated from GSU and participated in the co-op program himself, he had a unique perspective on what is important to do and learn during a co-op semester.

Elmore, Glen

Glen has been a Controls Engineer at MH, Inc., for eight years. As a GSU engineering co-op student, he also worked in the manufacturing controls engineering department for 1 ½ years at MH, Inc., prior to graduating with his bachelor of science in engineering with an electrical emphasis.

Jackson, Peter

Peter is the Chief Controls Engineer at TP, Inc. He has held this position for the past eight years, and was a Controls Project Engineer for five years and a Controls Engineer for four years at TP, Inc., prior to his current position. Before working at TP, Inc., Peter was a controls engineer at a large automotive company for three years. He possesses a bachelor of science in electrical engineering.

Karlson, Bob

Bob is the Mechanical Engineering Manager at ARJ, Inc., and has held that position for nine years. Prior to his current role, he worked as an engineer for six years at ARJ, Inc. He has his journeyman's card from the local community college, and has taken a couple of

engineering classes at a local university. In addition, he has taken some management classes at another local university.

Mills. Homer

Homer is a Senior Project Engineer for VK, Inc., and was Keri's supervisor for her first two co-op semesters. He has worked for 23 total years at VK, Inc., with previous roles of New Product Engineer, Application Engineer, and Asian Manufacturing Support. Prior to that he worked for four years at a large automotive company, and before that worked two years at another large automotive company. He has a bachelor of science in automotive engineering and a second bachelor of science in mechanical engineering.

Mitchell, Larry

Larry was the manager of advanced engineering, which he indicated was really equivalent to a lead principal engineer. He had been in that position for seven years at DM, Inc. His career in engineering had been entirely at DM, Inc., where he had worked in various positions form entry-level engineer to principal engineer/managerial role for 16 years (including his current role). In addition, Larry conducted two or three summer internships as an undergraduate student at DM, Inc., while completing his bachelor of science in electrical engineering from a large state university in the State of Great Lakes.

Murphy, Vince

Vince is the Chief Mechanical Engineer for TP, Inc., and has held that position for the past eight years. He has worked a total of 17 years in engineering at TP, Inc. Prior to joining TP, Inc., Vince was a Designer/Project Engineer for three years at a large aerospace company in another state. He has a bachelor of science in engineering and a bachelor of science in mechanical engineering from two different colleges/universities.

Nelson, Sally

Sally has been the Technical Manager for one year at AS, Inc., in the group that hired Kris on full-time after receiving his degree. Prior to that, she was the Manager of the Digital Design & Test Department for three years at AS, Inc., during which time she was Keith's supervisor for his third co-op semester. However, she was not his assigned mentor. She had been an engineer for 16 years prior to her managerial roles at AS, Inc. Sally possesses a bachelor of science degree in electrical engineering.

Reynolds, Grant

Gary is the Senior Group Leader – Water & Air Treatment, Houseware Product Development and has been in that position for three years at GBA, Inc. Prior to that he was the Process Development Group Leader for two years, and he held other technical positions for another five years prior to that at GBA, Inc. He started his technical career as a manufacturing/industrial engineer for eight years at a large consumer products manufacturer several hundred miles to the south in another state. Gary holds a bachelor of science in industrial education and a master of science in industrial technology, material and processes.

Schmidt, Carol

Carol is an Employment Representative with AS, Inc., where she is responsible for technical recruiting and acts as the Co-op Coordinator. She has been an Employment Representative for six years, and a Human Resources Generalist for 1 ½ years prior to that at AS, Inc. Before joining AS, Inc., Carol worked in human resources full-time at two small manufacturing companies in Forde Junction for a total of three years, and, prior to those positions, also worked in long-term temporary positions in human resources for two other

companies in Forde Junction. She earned her bachelors of business administration degree in human resources from GSU.

Tollen, Walter

Walter is the Program Manager, Special Projects at AS, Inc., and has held that position for less than a year. Prior to his current role, Walter was an engineering manager for six years, and a staff engineer for 17 years at AS, Inc. He holds a bachelor of science in electrical engineering, a master of science in electrical engineering, and a master of business administration.

Williams, Kyle

Kyle has been a Department Manager for four years at AS, Inc. Prior to that, he was a power supply designer for 20 years at AS, Inc. In addition, he started his career as a general analog designer for three years at another large, international aerospace company after earning a bachelor of science in electrical engineering from a small, public technical college in the State of Great Lakes.

Education Organization Informants

Arbor, Dr. Scott

Dr. Arbor is an Associate Professor of Electrical and Computer Engineering at GSU. He has been a faculty member at GSU for a total of six years. One of his current roles is the chair of the electrical and computer engineering programs at GSU. He also conducted six co-op assignments for four different companies while an undergraduate, worked in industry for two years after completing his undergraduate degree, and worked as a research assistant during graduate school. He has a PhD in Computer/Electrical Engineering from the large,

research-focused public university in the State of Great Lakes, and bachelor of science in engineering from a university in Canada (where he is from).

Parker, Dr. Phil

Dr. Parker is the current Dean of the College of Engineering and Computing at GSU. He has held this position for about a year. Prior to that, he was the Director of the School of Engineering at GSU for 14 years. Before he joined GSU, he was a professor in engineering at a technical university in the State of Great Lakes for nine years. He possesses a bachelors, masters and PhD in mechanical engineering. While an undergraduate student and following graduation with his undergraduate degree, he worked a large automotive company in the State of Great Lakes.

Short, Dr. Felicia

Dr. Short is a professor of mechanical engineering at GSU, where she has taught for 16 years. She is the mechanical engineering curriculum chair for the university, and has also served as the co-op program faculty coordinator for the entire 16 years she has been at GSU. Prior to joining GSU, Dr. Short taught at the Naval Academy. She possesses a PhD in mechanical engineering.

APPENDIX B: DESCRIPTIONS OF WORKSITE ORGANIZATIONS

AS, Inc.:

AS, Inc., is a leading global provider of innovative solutions to builders and operators of military and civil aircraft and engines, from fighters and transport to large civil, regional and business jets. They are a world-renowned designer, manufacturer and developer of avionics systems that can be found on virtually every civilian and military aircraft worldwide. The facility in Forde Junction employs over 1,550 individuals, including about 1,200 in engineering roles.

ARJ, Inc.:

ARJ, Inc., is one of the leading special machine companies in the Midwest. They have more than 160 employees in the West Great Lakes region. ARJ designs and builds lean manufacturing systems, heatstaking, metal welding, assembly, testing, fabric wrapping, material handling, and robotic welding and assembly solutions. Their customers include the world's leading automotive, consumer goods, and office furniture manufacturers. The design group at ARJ is comprised of 18 mechanical designers and engineers and 40 controls engineers with varied experience totaling over 50 years. Approximately 20 of the engineers have a bachelor's degree.

BR, Inc.:

The Forde Junction facilities of BR, Inc., builds diesel fuel injectors, mostly for semi-trucks. There are over 40,000 employees worldwide and approximately 2,000 in Forde Junction facilities, including about 300 in central engineering where the student performed his co-op assignment.

CP, Inc.:

CP, Inc., is one of the largest independent manufacturing and suppliers of stamped and fine blanked components for the automotive industry. A full time work force of over 735 employees contributes to a full-service approach to design, prototyping, validation and manufacturing excellence. Of the 700+ employees, approximately 150 are engineers.

CRCP, Inc.:

CRCP, Inc., a subsidiary of a large international company, is the leader in NVH products to enhance the safety, comfort and driveability of automobiles, minivans, sport utility vehicles and trucks. Their primary products consist engine mounts, hydraulic engine mounts, strut mounts, suspension bushings, cradle mounts, body mounts, exhaust hangers, steering dampers, transmission and steering couplings and mass dampers. CRCP is part of a global extended enterprise that is one of the world leaders in elastomer-based manufacturing and also part of that enterprise's chemical division. Forde Junction is home to the company's headquarters, and the local facilities include three manufacturing plants with approximately 700 employees.

DM, Inc.:

DM, Inc., designs and manufactures automotive interior and exterior mirrors, engineered glass, door handles and electronics. The company has more than 8,200 employees in sixteen countries. In the West Great Lakes region, they have 3,350 employees. The particular facility the co-op worked in had approximately 40 engineers, and a total of about 250 employees.

GBA, Inc.:

GBA, Inc., develops and manufactures a diverse product line, including well-known wellness, body & beauty and home brands. They have 65 research and development labs worldwide, more than a dozen manufacturing facilities and a distribution network extending to more than 80 countries and territories. GBA has a dedicated research and development staff of over 500 scientists, engineers and technical professionals. The company has approximately 10,000 employees worldwide. The West Great Lakes region facility includes labs and manufacturing facilities. In particular, the group at which the co-op students have worked and hired into after graduation at the West Great Lakes region facility develops and manufactures high-end water and air treatment systems. This department includes 70 employees, 29 of which are scientists who could be degreed engineers or have simply worked long enough to earn that title.

GI, Inc.:

GI, Inc., supplies products to customers through uniquely automated manufacturing processes. Founded in 1992 and located in the West Great Lakes region, it is the company's continuing mission to expand its full service supplier capabilities while striving to retain a small company atmosphere. To do this, GI is growing horizontally integrated satellite companies and product focused divisions. These satellites and divisions offer Industrial Design, Engineering, Assembly, Purchasing, and Logistics.

GSU:

GSU is a mid-sized, public university of over 20,000 students in the State of Great Lakes with a main campus located in the West Great Lakes region and a large satellite

campus in Forde Junction. A complete description of the institution and the school of engineering is provided in an earlier section of this chapter.

HCTF, Inc.:

HCTF, Inc., is a professional civil engineering, environmental, and architectural engineering consulting firm. Their staff of engineers, scientists, and architects continually interacts to benefit clients with a full-service approach to projects. The firm is employee owned, and has approximately 300 employees at their headquarters in a suburb of Forde Junction, including approximately 100 engineers of various disciplines.

IG, Inc.:

IG, Inc., is a global company with annual revenues exceeding $500 million. They develop advanced electro-optical products; electronic devices combining photoelectric sensors and related electronic circuitry. They are the world's leading supplier of electrochromic, automatic-dimming rearview mirrors for the automotive industry, and develop advanced smoke detectors and signaling devices for the commercial fire-protection market. The research lab and test center at IG is home to a host of research scientists, chemists, electrical and mechanical engineers. They operate out of four facilities with approximately 2,000 employees in the West Great Lakes region, approximately 400 of which are technical and office staff; an automotive sales office in east State of Great Lakes; and automotive sales and engineering subsidiaries in Germany, France, UK, Japan and Korea.

IS, Inc.:

IS, Inc., is one of the leading manufacturers of office furniture in North America. They are an international company with approximately 14,000 employees worldwide, manufacturing facilities in over 35 locations and more than 900 dealer locations

around the world. IS has its own research and development site, as well as a learning center, a corporate headquarters building, multiple testing facilities, and manufacturing plants in two separate locations in Forde Junction. There are approximately 4,500 employees in the Forde Junction facilities (including the company headquarters), and about 200 of them are engineers. IS manufactures many components of an office workstation including worksurfaces, seating, panel systems, storage, file cabinets and space dividers.

IT, Inc.:

IT, Inc., is a leading company for technology in coating, finishing, precision marking, electrical control systems and services, and automated assembly equipment. Customers include aerospace, automotive, industrial, consumer and wood systems products. They design and build most of their own equipment. The corporate structure at IT enables them to offer a complete range of services – from innovative designs, to turnkey systems, to servicing electrical controls on a wide range of equipment. Each of their operating groups is an independent organization. The Forde Junction facility focuses on electrical controls, automation and engineering. They design precision automated manufacturing and process control systems, offering a single-source solution for designing and building complete turnkey systems, retrofits, systems upgrades, preventative maintenance and emergency service.

IWG, Inc.:

IWG, Inc., solves complex manufacturing problems for leading manufacturers in the automotive, appliance, furniture and other durable goods industries. They design and build welding systems, custom automation systems, automated assembly, robotics and vision

integration, and part fixturing for customer equipment. IWG currently has nearly 50 full time employees, including 9 engineers, both mechanical and electrical.

LWBL:

LWBL is a municipal operation for a major city located approximately one hour from Forde Junction. They provide drinking water, electricity, steam and other related services to the people in the mid-State of Great Lakes region. LWBL provides electrical service for over 99,000 residential, commercial, and industrial customers and potable water service for over 56,000 residential, commercial, and industrial customers.

MC, Inc.:

MC, Inc., is a metal stampings and die, tools, jigs and fixtures manufacturer located in a suburb of Forde Junction. The company has approximately 560 employees locally, of which approximately 25 are engineers.

MH, Inc.:

MH, Inc., is a global company with operations, sales offices, dealers, and licensees in more than 40 countries in North America, Asia/Pacific, Europe, Middle East, Africa, and Latin America, serving customers virtually anywhere in the world. Their world headquarters is in the West Great Lakes region. They have manufacturing facilities located in the U.S., Italy, and the United Kingdom, including several large facilities in the West Great Lakes region. The businesses of MH produce office furniture systems and accessories, freestanding office furniture, filing and storage products for business, home office and healthcare environments, office and institutional seating, and residential furniture. The company's net sales in fiscal year 2004 were $1.34 billion. There are approximately 4,400 employees in the West Great Lakes region and over 7,000 worldwide.

In the facility where the co-op student worked, the focus is being the main supplier of sheet metal casegoods (i.e., filing cabinets and storage cases) for the company. The machines notch, form, weld, paint, assemble, and ship the product. The process is highly automated. The Controls Engineering group, of which the co-op was a member, is responsible for maintaining, upgrading, specifying, and purchasing the devices used in the automated processes. This facility has approximately 1,500 employees. Approximately 35 manufacturing engineers are responsible for the processes. Controls Engineering is a subset of the manufacturing engineering team, and includes 7 engineers at this facility.

PD, Inc.:

PD, Inc., is an engineering and architectural consulting firm headquartered in Forde Junction. They provide architecture, landscape architecture, mechanical and electrical engineering, and interior design for education, government and industrial settings. There are approximately 65 employees in the Forde Junction office, of which 19 are licensed engineers.

ST, Inc.:

ST, Inc., is an independent environment test lab that develops test equipment and procedures to conduct tests of client's products. Testing is typically conducted for automotive, furniture, aerospace and commercial components. The testing is typically conducted to satisfy state or federal requirements for consumer products. Test equipment and procedures are conducted to determine anything from fire retardation ability to environmental conditions compatibility. The company is small and employs eight people, including two with engineering backgrounds.

TG, Inc.:

TG, Inc., began in 1984 as an unincorporated trucking brokerage service, utilizing owner-operators. Later that year, the company became an agent for a national truckload carrier. A year later the business had grown so dramatically it applied for and received 48-state operation authority, growing into a direct carrier. The company has grown from 5 tractors and 10 trailers in 1984, to over 1,100 tractors and over 2,500 trailers in 1999.

TP, Inc.:

TP, Inc., designs, manufactures and markets surface treatment machinery for companies in the aerospace, automotive, electronics, printing and general manufacturing industries. TP provides a line of automation products for shot peening, grit blasting, ultra-high pressure waterjet stripping and thermal spray coating applications. Most machines involve robotics and heavy industrial machinery. The company consists of approximately 100 total employees, with approximately 25 engineers and 60 machine builders, with facilities located in a suburb of Forde Junction.

TPT, Inc.:

TPT, Inc., is an engineering and architectural consulting firm headquartered in Forde Junction with other offices in the West Great Lakes region. They provide facility design for health care, education, government and industrial settings. There are over 80 employees in the Forde Junction offices, of which 13 are licensed engineers.

VK, Inc.:

VK, Inc., has more than a century of experience to the design, manufacturing and distribution of functional hardware, storage-related components, and ergonomic products for original equipment manufacturers, specialty distributors, office furniture dealers, hardware

chains and major home centers throughout the country. Major product categories include drawer slides, wall-attached shelving units and specialty hardware products, kitchen, closet and bath storage products, and keyboard systems and other ergonomic office products. Their facilities and headquarters are located in Forde Junction, with approximately 600 employees, including 12 design and development project engineers.

VPA, Inc.:

VPA, Inc., is a world leader in the supply of the machines and complete process systems to make the world's favorite food products. They specialize in the supply of engineered components through to a complete process plant equipped with latest automation technology. The VPA business in Forde Junction started in 1904 and cookies have been a consistent theme of the company's activities for a century. The company's strength lies in its process expertise, engineering excellence, and ability to fully support customers worldwide. The service is complete - from design through installation and commissioning to lifetime services. Unit machines and production systems are based on over 100 years experience of the special techniques and requirements of chosen industries.

APPENDIX C: SAMPLE INTERVIEW GUIDES

Student Interview Guide

1. Name:
2. Age:
3. Race/Ethnic Background:
4. Where are you originally from?
5. Please list all previous education (high school, technical school, college, etc.):
6. GSU Major/Emphasis:
7. How many semesters of co-op have you completed?
8. Compan(ies) you co-oped with:
9. Location of your co-op company(ies) (city):
10. Company supervisor's name(s):
11. Tell me about your educational experience.
12. Please describe work experience you had prior to co-op.
13. Please describe your company and what they do:
14. Tell me about your co-op.
15. What skills did you use/apply on co-op? What new skills did you learn on co-op?
16. Describe the process of finding and securing your co-op work site.
17. Describe the information you received and conversations you had with your employer prior to starting your co-op.
18. Describe your first few days/weeks on-the-job.
19. Describe your interactions with people at work: Include early in the process and current observations.
20. Describe your understanding of the engineering profession and work environment(s) before and after co-op.
21. May I have permission to review your co-op journal?

Employer Interview Guide

1. Name:
2. Title:
3. Current organization:
4. Previous organizations and roles:
5. How many years have you been in your current role? Previous roles?
6. Other previous professional work experience:
7. Academic background:
8. Please describe the co-op program from your perspective, including any roles you play in the program.
9. What is the purpose of the co-op program at your organization?
10. What skills and knowledge do you expect a student to have prior to starting work?
11. What do you expect a student to learn or what skills should they acquire while on a co-op? What are the outcomes?
12. Describe your perspective regarding how students are prepared for their co-op experience.
13. Compare an average student prior to and after one, two, or three co-op semesters.
14. Describe the process of obtaining/hiring/securing a co-op.
15. Describe the first few days/weeks of the co-op student's experience.
16. Describe any training or orientation programs you have in place.
17. Describe your interactions with the co-op student.
18. Describe the interactions of the co-op student with other employees, both early in the program and after completion.
19. Describe your views on hiring co-op and non-co-op employees for full-time positions?
20. Describe any similarities and/or differences in the hiring/training processes of co-op and non-co-op new full-time employees.

Faculty Interview Guide

1. Name:
2. Title:
3. Current institution:
4. Previous institutions:
5. How many years have you been in a faculty role, including previous institutions?
6. Other previous professional work experience:
7. Major teaching emphasis:
8. Courses you have taught in the past 5 years:
9. Typically, what skills/attributes do you see students coming to your classes having?
10. Briefly describe the engineering-related background, including professional experience, of students that come to your classroom.
11. Please describe the co-op program from your perspective, including any roles you play in the program.
12. What is the purpose of the co-op program at your institution?
13. What skills and knowledge do you expect a student to leave your classes with?
14. What skills and knowledge do you expect a student to leave your institution with?
15. What do you expect a student to learn or what skills should they acquire while on a co-op? What are the outcomes?
16. How are students prepared for their co-op experience?
17. Compare an average student prior to and after one, two, or three co-op semesters.

APPENDIX D: CONSENT FORMS AND RESEARCH APPROVALS

INFORMED CONSENT FORM:

"Socialization of Undergraduate Engineering Students into Professional Industrial Settings through a Cooperative Education Program"

I, the Subject, agree to participate in the above stated research project by participating in interviews with the investigator as part of the Cooperative Education Program for the School of Engineering at Great Stateside University. Chris Plouff, the Principal Investigator, will conduct this research as a part of his doctoral dissertation research at Eastern Michigan University.

This study is being conducted to better understand the educational experiences related to participation in cooperative education. In this interview, you will be asked to provide some information related to your background and respond to statements about your experiences, beliefs and attitudes, educational history, and your perceptions of your work-related learning. The interview should take no longer than one hour. Depending on the direction and progress of the study, you may be contacted within the next year for follow-up questions. In addition, your permission is requested to review academic records and/or co-op work journals, including voluntary submission of the work journal.

I understand that I will be asked questions in an interview setting that relate to my own personal characteristics and my experiences with the Cooperative Education program at Great Stateside University. I understand that I will also be asked questions about my age, gender, and educational background. I further understand that I may choose not to answer any questions if I do not wish to do so.

The interview will be tape-recorded to enhance accuracy. Later, when the interview is transcribed, your name will not be attached to the transcript and I will be asking you to choose a pseudonym by which your interview will be identified, protecting your own identity in any transcripts of the interview. The interview tapes themselves will be erased immediately after transcription (or destroyed following completion of this study). This informed consent form, with your real name, will not be matched with the data and your participation will be kept strictly confidential.

Participation in this study has no foreseeable risks or benefits to you, the subject. Approximately twenty students, ten employers, and five faculty members will be interviewed for this study.

I understand that my participation in this research is voluntary. I understand that I may withdraw from this research project at any time without prejudice, penalty, or effect on my standing with Great Stateside University. I also understand that I am free to ask questions about any techniques to be used or procedures to be undertaken.

By agreeing to participate in this research I understand that my confidentiality will be protected at all times. I understand that my actual name will not be used in any written or oral report without my express, written permission. In all other cases anonymous excerpts will be used in the written dissertation document or any publications that may result. I

understand that I may request a copy of final reports or transcripts that include the use of my information or results. I understand that information that I give will be held in the strictest confidence and that my responses will be kept separate from my identifying information. All information will be kept in a locked file or on a password protected computer in the office of the Principal Investigator.

I have read all of the above information regarding this study. The procedures and requirements have been explained to me and I understand them. I freely and voluntarily consent to be a participant. For my records, I have been provided with a copy of this consent form. If I have any further questions about this research or its' administration I may contact Chris Plouff (Principal Investigator) or I may contact the researcher's chairperson, Dr. James Barott, PhD. Their contact information is as follows:

Chris Plouff
(616) 331-3311 (work)
(616) 956-1874 (home)

Great Stateside University
206 Student Services Building
City, State 55555

Dr. James Barott, PhD
(734) 487-7120

Eastern Michigan University
304 Porter Building
Ypsilanti, MI 48197

In addition, if I have any further questions or issues with this study, I may contact Dr. Steve Pernecky or Dr. Patrick Melia, who are Co-Chairs of the Eastern Michigan University Human Subjects Review Committee, at (734) 487-0379 or Professor Paul Huizenga, Great Stateside University Human Subjects Review Committee Chair at (616) 331-2472.

Subject_____ Date_____

Researcher_____ Date_____

INFORMED CONSENT FORM:

"Socialization of Undergraduate Engineering Students into Professional Industrial Settings through a Cooperative Education Program"

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I understand that I will be asked questions in an interview setting that relate to my own personal characteristics and my experiences with the Cooperative Education program at Great Stateside University. I understand that I will also be asked questions about my professional position and association with Great Stateside University. I further understand that I may choose not to answer any questions if I do not wish to do so.

The interview will be tape-recorded to enhance accuracy. Later, when the interview is transcribed, your name will not be attached to the transcript and I will be asking you to choose a pseudonym by which your interview will be identified, protecting your own identity in any transcripts of the interview. The interview tapes themselves will be erased immediately after transcription (or destroyed following completion of this study). This informed consent form, with your real name, will not be matched with the data and your participation will be kept strictly confidential.

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By agreeing to participate in this research I understand that my confidentiality will be protected at all times. I understand that my actual name will not be used in any written or oral report without my express, written permission. In all other cases anonymous excerpts will be used in the written dissertation document or any publications that may result. I understand that I may request a copy of final reports or transcripts that include the use of my

information or results. I understand that information that I give will be held in the strictest confidence and that my responses will be kept separate from my identifying information. All information will be kept in a locked file or on a password protected computer in the office of the Principal Investigator.

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Chris Plouff
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(617) 956-1874 (home)

Great Stateside University
206 Student Services Building
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In addition, if I have any further questions or issues with this study, I may contact Dr. Steve Pernecky or Dr. Patrick Melia, who are Co-Chairs of the Eastern Michigan University Human Subjects Review Committee, at (734) 487-0379 or Professor Paul Huizenga, Great Stateside University Human Subjects Review Committee Chair at (616) 331-2472.

Subject_____ Date_____

Researcher_____ Date_____

EASTERN MICHIGAN UNIVERSITY

September 27, 2004

Chris Plouff
Department of Educational Leadership

RE: "*Socialization of undergraduate engineering students into professional industrial settings through a cooperative education program.*"

The Human Subjects Institutional Review Board (IRB) of Eastern Michigan University has granted approval to your proposal: "Socialization of undergraduate engineering students into professional industrial settings through a cooperative education program".

After careful review of your application, the IRB determined that the rights and welfare of the individual subjects involved in this research are carefully guarded. Additionally, the methods used to obtain informed consent are appropriate, and the individuals are not at a risk.

You are reminded of your obligation to advise the IRB of any change in the protocol that might alter your research in any manner that differs from that upon which this approval is based. Approval of this project applies for one year from the date of this letter. If your data collection continues beyond the one-year period, you must apply for a renewal.

On behalf of the Human Subjects Committee, I wish you success in conducting your research.

Sincerely,

Patrick Melia

Dr. Patrick Melia
Administrative Co-Chair
Human Subjects Committee

CC: Dr. Steve Pernecky, Faculty Co-Chair
Dr. James Barott

Graduate Studies & Research • Office of the Associate Vice President • Starkweather Hall • Ypsilanti, Michigan 48197
Phone: 734.487.0042 FAX: 734.487.0050

GRAND VALLEY
STATE UNIVERSITY
www.gvsu.edu

September 30, 2004

TO: Chris Plouff
Career Services
206 STU

RE: Proposal # 05-29-H

Category: ___ Exempt _X_ Expedited ___ Full Review

Approval Date: September 29, 2004

Expiration Date: September 29, 2005

Progress Report and request for re-approval due: August 29, 2005

TITLE: Socialization of Undergraduate Engineering Students into Professional Industrial Settings through a Cooperative Education Program

Grand Valley State University, Human Research Review Committee (HRRC), has completed its review of this proposal. The HRRC serves as the Institution Review Board (IRB) for Grand Valley State University. The rights and welfare of the human subjects appear to be adequately protected and the methods used to obtain informed consent are appropriate. Your project has been approved.

Renewals: The HRRC approval is valid until the expiration date listed above. Any project that continues beyond the expiration date must be renewed with the renewal form and a progress report. A maximum of 4 renewals are possible. If you need to continue a proposal beyond that time, you are required to submit an application for a complete review.

Revisions: The HRRC must review and approve any change in procedures, involving human subjects, prior to the initiation of the change. To revise an approved protocol, send a written request with both the original and revised protocol to the Chair of HRRC. When requesting approval of revisions, both the project's HRRC number and title must be referenced. A copy of the current consent form must also be submitted with the request.

Problems/Changes: The HRRC must be informed promptly if either of the following arises during the course of your project. 1) Problems (unexpected side effects, complaints, etc.) involving the human subjects. 2) Changes in the research environment or new information that indicates greater risk to the human subjects than existed when the protocol was previously reviewed and approved.

If I can be of further assistance, please contact me at 616-331-2472 or via e-mail: huizengp@gvsu.edu. You can also contact the secretary in Faculty Research and Development Office at 616-331-3197.

This approval is contingent on Paul Huizenga's prefix being changed from Dr. to Professor on the consent form.

Sincerely,

Paul H. Huizenga

Paul Huizenga, Chair
Human Research Review Committee

New Grand Rapids Campus • DeVos Center • 401 Fulton Street West • Grand Rapids, MI 49504-6431 • (616) 331-5000