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The effectivenes of alternate intake and training programs for new college graduate hires

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THE EFFECTIVENESS OF ALTERNATE INTAKE AND TRAINING PROGRAMS FOR NEW COLLEGE GRADUATE HIRES

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Abstract

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Studies reveal that for a new college graduate, the transition from school to work can be a traumatic experience (Schein, 1978). Given that the hiring rate of new college graduates is on the rise (Northwestern University Lindquist-Endicott Report, 1994), organizations who develop specific training strategies will be in a better position to attract and retain the best of the best in this desired population of new recruits. The purpose of this study was to determine the effectiveness of an intake and training program for new college graduate hires (The New College Graduate Training Program) at a high technology company in Silicon Valley (Applied Materials).

A six month pre-post test survey was taken by both an experimental (NCG) and Control Group. Post test scores for the NCG Group reported higher job satisfaction and job preparedness than did the control group. In addition, those new college hires who participated in the training program increased their overall knowledge about Applied Materials business operations, mission, methodology, policies and procedures, functional areas, etc., over the course of the six months, while the Control group's knowledge in these areas remained relatively the same.

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Abstract

Studies reveal that for a new college graduate, the transition from school to work can be a traumatic experience (Schein, 1978). Given that the hiring rate of new college graduates is on the rise (Northwestern University Lindquist-Endicott Report, 1994), organizations who develop specific training strategies will be in a better position to attract and retain the best of the best in this desired population of new recruits. The purpose of this study was to determine the effectiveness of an intake and training program for new college graduate hires (The New College Graduate Training Program) at a high technology company in Silicon Valley (Applied Materials). A six month pre-post-test survey was taken by both an experimental (NCG) and control Group. Post-test scores for the NCG Group reported higher job satisfaction and job preparedness than did the control group. In addition, those new college hires who participated in the training program increased their overall knowledge about Applied Materials business operations, mission, methodology, policies and procedures, functional areas, etc., over the course of the six months, while the control group's knowledge in these areas remained relatively the same.

The Effectiveness of Intake and Training Programs for New College Graduate Hires

Although employment offers are on the rise for college graduates (Northwestern University Lindquist-Endicott Report, 1994), many organizations are still wondering why they should take on new people and train them when skilled and experienced people who will be able to earn their keep immediately are easily available (Nadler, 1992). The answer, of course, is that institutions need fresh blood and fresh ideas as well as people with experience. Organizations who have not realized this focus the majority of their recruiting efforts on hiring experienced mid-career employees instead of new college graduates (Nadler, 1992).

Using this type of strategy, one in which organizations focus their recruiting efforts on hiring experienced mid-career employees, to increase the "peoplepower" and skills of a workforce poses three potential downfalls. The first is the lack of young, fresh talent and energy that a new college graduate can bring to an organization. The second is the cost associated with hiring mid-career employees, reflected in their significantly higher starting salaries. Lastly is the "culture clash" that occurs when you bring in individuals from all different organizations (Strock, 1991).

Specialized training for new college hires can be expensive and even time-consuming. However, the benefits of tapping into and developing this highly valued

workforce far outweigh the costs. To stop the life cycle of an organization because many older people are available is to deny the institution the excitement and new ideas that those who have just graduated from school can provide (Nadler, 1992). Young people are full of the most precious commodity in the world: hope. They possess enthusiasm, optimism, and a desire to find a place where they can work hard and prove themselves. Unfortunately, these qualities get battered in a hurry. What many of these new college graduates end up seeing is a shining city full of barriers. Barriers of which they have no experience or knowledge of how to break down (Strock, 1991).

Although new college graduates may cost more to train than more experienced candidates, the long term costs of hiring a mid-career employee are much higher. Generally, the longer individuals have been in the working world, the more salary they demand. Often they are recruited away from a competing organization and may also demand a signing bonus. In addition, although they may not require as much training as a new college graduate, some training will still be required. (Strock, 1991). Finally, "culture clash" occurs when individuals come in to an organizations from many different companies and bring with them varying organizational cultures. This in turn may affect their ability to assimilate into the desired culture and support their new organization's "way of doing things" (Strock, 1991).

Because new college graduates do not have a clear picture of the organization or of their place in it, they may perceive the job environment as ambiguous and even threatening (Porter, Lawler & Hachman, 1975). The possibility of failure is always in their mind, and there is a high need for feedback and reassurance that they are performing as they should be (Herold, Leatherwood & Parsons, 1985). It is likely that job satisfaction will be low among populations that have had no support or training during this entry phase. To add to this problem, the skills of these new degree holders have been found to be slightly out of sync with organizational needs. Therefore, companies are being forced to supply training to augment the knowledge, skills and abilities college graduates must have before they can fit effectively into the organization (Thompson & Smith, 1992).

How does an organization or manager increase a new college graduates' knowledge, skills and abilities, job satisfaction and commitment, or even individual performance? Activities and programs that might have some impact on these areas include such things as better recruitment selection, career planning and development activities, new compensations systems, and orientation, socialization or training programs. Of all these possibilities, orientation, socialization or training programs are perhaps most important (Allen & Meyer, 1990). For the remainder of this paper, these

type of programs will be referred to as "New College Graduate Intake and Training Programs."

New members of an organization need to understand the corporate culture. This consists of knowing the goals of the organization, the means by which goals are to be attained, the basic responsibilities of the role he or she is assigned, and what behavior patterns will be rewarded. For many, this learning takes place over time–by trial and error–largely from peers and from observation. An effective new college graduate intake and training program tries to speed up this process of assimilation by clearly explaining the organization's goals and by showing through example how goals have been achieved historically. Effective programs also include basic corporate information on products, services, profitability, sales, key customers, and organizational structure (McGarrell, 1984).

An effective new college graduate intake and training program can be seen as an extended, comprehensive orientation. A good training program has been shown to help facilitate an organization's "culturalization" process, another important piece of a successful transition from academics to industry. Reduced turnover, higher morale, shorter learning curves and increased employee motivation and commitment have all been associated with effective orientation and training activities (Cooke, 1989). The

importance of this process for new college graduates is further highlighted by some basic assumptions (Allen & Meyer, 1990):

1. New graduates are highly motivated and filled with energy when they enter the company. They have waited years for a chance to use the skills they have developed, and they expect to do exciting and productive things right away.
2. The initial impressions they get of their coworkers, the human resources staff, the physical environment, and the corporate culture will have a long-lasting impact. The first few weeks and even months of employment are critical, as is the continuing commitment they see from the company toward their assimilation into the company.
3. Lastly, the first months of employment represent the best, and perhaps the only, opportunity to influence and shape the new college graduate's attitudes and perceptions (pp. 355-356).

Training programs for new college graduates that continue beyond the first few days of employment and that set goals to improve job satisfaction and job commitment can affect performance and turnover during the first year of employment. Handled well, such orientation programs can give a new college graduate a positive view of work life, provide the necessary tools and skills needed within the first few weeks of employment,

and over the longer term, lead to better performance and job satisfaction (McGarrell, 1984).

The process by which people enter organizations affects later decisions to leave or to stay (Wanous, 1977). Newcomers need to feel that their efforts at work are both useful and appreciated. Initial expectations often influence the level of satisfaction and happiness a newcomer will have with the company. One theory (Feldman, 1976) states that individuals leave organizations because the initial expectations they have of their jobs are to some large degree negatively different from what they actually experience after starting the job and that this leads to turnover. Another similar theory concerned with the level of initial expectations (Mobley, et al., 1979; Wanous, 1977) is that recruiters create inflated or unrealistic expectations in the minds of recruits that later cause dissatisfaction and potential turnover.

Several authors have shown that the initial period of employment is critical in shaping employee's future attitudes and behavior (Allen & Meyer, 1990; Pearson, 1982; Wanous, 1977). While many factors influence a new employee's decision to stay or leave, the first few weeks and months of employment, when the socialization process is taking place, are critical in shaping future behavior and expectations (Feldman, 1976; Schein, 1979). When a new college graduate, or any newcomer for that matter, arrive at an organization, they are typically filled with enthusiasm and excitement about the

opportunities that lie ahead. Some of their perceptions are more realistic than others, and the more a new college graduate intake and training program can help them align their expectations to corporate realities, the greater their satisfaction is likely to be with the company and work situation (Reis, 1980).

At the same time, new college graduate intake and training programs build skills and abilities that lead to higher performance. This attempt to match expectations to realities and to improve skills and abilities to raise productivity and quality can be a significant investment for an organization. Unfortunately, most organizations treat new college hires the same as they would treat any new hire; they throw them directly into their jobs and expect them to perform with little direction or guidance. At a minimum, these "sink-or-swim" and "learn-on-your-own" philosophies are dysfunctional both for the recruit and their employing organizations (Louis, 1980).

One study (Pearson, 1982) theorizes that there are three kinds of tasks that these new employees must deal with. The first is for them to learn about the organization and what performance it expects from them. The second is for the new employees to determine if the organization will help them meet personal career goals and help them deal with internal conflict, unmet expectations and disillusionment. The third is for them to develop the relationships with co-workers and supervisors that will lead to successful performance. Employers who actively support this kind of learning environment are

more likely to develop new college graduates who remain with the organization and are more satisfied.

Organizations who have not yet seen the value of hiring new college graduates are beginning to notice a growing shortage of qualified employees. Therefore, employers need to be aggressive in developing programs not only to attract but to retain their valued employees (Herman, 1992). It is expensive to recruit, interview, test, investigate, hire, and train new employees, and with ever-tightening budgets and operations, the increase of uncontrolled turnover is showing up with serious negative effect (Herman, 1992).

It is estimated by the College Placement Council (1993) that the average cost of recruiting and hiring a college graduate, exclusive of salary, is between $5,000 and $7,000. It is usually assumed that college hires will be unproductive for at least six months while they are learning the skills and procedures necessary to perform productively. At an average salary of between $3,000 and $3,500 per month, this lost time costs the company about $18,000 to $21,000 over the six month training period. Therefore, costs to recruit and retain a new college graduate to the point where they can productively contribute to the company total at least $23,000 and often times more. If a training program can be put in place that will reduce turnover and simultaneously improve productivity and satisfaction, it becomes economically desirable to institute such programs.

It has been found that those organizations who have in place exceptional recruiting, selecting, training, evaluating, and compensation programs linked to the organization's goals will be in a better position to attract and retain the quality of new college hire employee needed to face present and future competition (Morris, 1986). Training programs for new college graduates that set goals to improve job satisfaction and commitment can affect performance and turnover. Handled well, such programs can give a new college graduate a positive view of work life, provide the necessary tools and skills needed in the first few weeks of employment, and over the long term, lead to better performance (McGarrell, 1984).

While most companies have some sort of orientation program, very few of these programs have clearly formulated objectives aimed at improving assimilation of corporate goals, of reducing the uncertainty and anxiety that exists in each new employee's mind about what will be expected, about how his or her job fits into the overall scheme of the organization, and about the organizational and financial structure of the company (Reis, 1980). Even fewer companies have specific programs for new college graduates. However, some companies have developed extensive and well-thought-out training programs designed to speed up the assimilation process and develop or improve the knowledge, skills and abilities these employees need to succeed. One of

those organizations is Applied Materials, a high tech billion dollar company whose headquarters are in Santa Clara, CA.

Applied Materials Background

Applied Materials is the leading supplier of semi-conductor wafer processing equipment. In the last three years, it has grown 150%, with record sales and profits reported every quarter. The culture of Applied is engineering driven, fast paced, and achievement oriented. The company has grown from a small to large company so quickly that it still maintains an entrepreneurial feel to it.

In the past, Applied Materials has focused their recruiting efforts on hiring the best and the brightest "experienced" worker, which did not include new college graduates. When a study revealed that Applied Materials lagged behind the average for a company their size in hiring new college graduates, the Senior Management of the company developed a strategy to reverse this trend. A decision was made to develop a training program which would attract, train and retain new college graduates.

The New College Graduate Engineering Training Program

The New College Graduate Training Program was developed to respond to the following problem statements:

1. A trend toward hiring mid-career contributors.
2. High costs involved in mid-career hiring.

3. A dilution of Applied Material's culture (caused by hiring individuals who came from all different organizations).
4. An unacceptable low level of new graduate hires - Applied Materials needed to be infused with new fresh young talent.

The purpose of the six month engineering training program was as follows: to ease the transition for new college graduates from college life to professional life, to develop and train new college graduates to be productive members of their organization within their first six months, to help new college graduates gain experience and an understanding of the business and determine where their interests and skills best fit, and to increase the overall satisfaction and job preparedness of these new employees.

The first step is the recruitment of new college graduates for the training program from a pre-selected list of universities. Candidates must have an engineering degree in one of the following disciplines: Mechanical, Material Science, Chemical, Electrical, Physics or Computer Science. All level of degrees (BS, MS and Ph.D.) are recruited into the organization.

The first week of the program is spent mainly in orientation activities. The orientation piece includes, but is not limited to, the following components:

1. A 1/2 day in Benefits.
2. A Welcome Luncheon hosted by the President of Applied Materials.

3. A Kick-Off reception attended by those individuals who they will be working closely with over the next six months.
4. Building and Lab Tours.
5. A three day Welcome to Applied course given to all new employees.
6. A Ropes Course designed to build relationships and develop the team.

Over the course of the six months, program participants attend a variety of both interpersonal and technical skill development training courses, totaling over 200 hours of classroom training. Most of the courses teach skills that can be used throughout all organizations, but many are Applied Materials specific. All are intended to develop skills that will better able the new employee to contribute to Applied Materials.

Some of the interpersonal skills development training courses include: *Managing Interpersonal Relationships, Quality Service Skills, Project Management, Quality Tool Kit, Seven Tools of Quality, Process Management, Statistical Process control,* and *Design for Reliability.* Some of the technical training courses include: *Introduction to Semi-Conductor Fabrication,* product overviews of the systems *Applied Materials develops and manufactures (Endura, Centura, Precision 5000),* process overviews of the processes our systems run, *Micro-Contamination,* and *San Jose State University Micro-Fab Class.*

A major aspect of the program consists of 3 five-week project assignments: one in engineering, one in manufacturing, and one in sales/service. These projects provide program participants the opportunity to work in the various functional areas where they are challenged to complete projects that will both add value to the sponsoring divisions and educate them. The theory behind this is that the exposure gained in other functional areas will make them better engineers–sensitive to the impacts that their decisions will have on the customer (both internal and external). At the conclusion of each project assignment, written reports and presentations are given by each program participant and evaluation and coaching are provided. In addition, the participants performance is evaluated by their project supervisors. They in turn, are also given the opportunity to evaluate the support of their supervisors and the project itself.

Team building and working in teams is another area of skill development that the program focuses on. In addition to the three project assignments, a team project is also completed. The project task is to identify an internal customer and work with that customer to identify a needed product or service which will remedy a problem they have been experiencing. The team then develops a product or service which must meet or exceed customer requirements for the problem. Reports, presentations and evaluations are given at the conclusion of this project as well.

The program also consists of some group learning events. These include but are not limited to informational interviews with individuals at all levels throughout the organization, with reports given to the entire group on who they interviewed and what they learned, and Brown Bag Lunches sponsored by various divisions throughout the organization. The purposes of these events are to provide networking opportunities, give information about the various divisions throughout the organizations, and help the new college graduate begin to determine where they might best fit based on their interests and skills.

During the conclusion of the program, internal placement opportunities are identified based on needs of the hiring divisions and participant's skills and interests. A formal interviewing process takes place upon which permanent offers are made. After the participants are placed, follow up activities take place for up to one year post program to assist in a successful transition. These activities include but are not limited to an experiential learning event (i.e., rock climbing) and quarterly meetings. The purpose of these events is centered around the importance of extended networking and team building.

Figure 1 is a summary of the Program Design Model. Note that the Program is designed around business issues. It addresses both personal and organizational development, as well as the gaining of organizational knowledge. Each event falls under

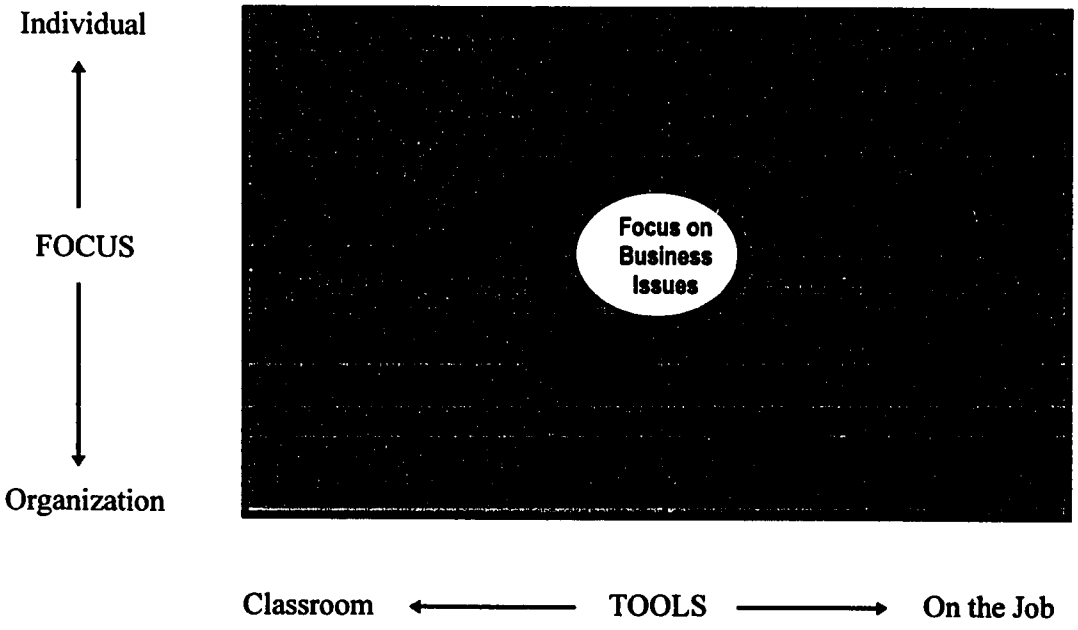

Figure 1. New College Graduate Training Program Design Model

one of these areas with the focus being on either the individual or the organization. The two main tools of learning used are either classroom or on-the-job training.

Using the New College Graduate Training Program at Applied Materials as an example, the purpose of this paper will be to evaluate whether or not there is a significant difference between the New College Graduate Training Program participants and a control group in relation to their job satisfaction and job preparedness, and knowledge about Applied Materials. Applied Material's design is a "training" program with the goal of giving the new college graduate hire an overview of the company combined with in-depth classroom training, exposure to various functional areas via project assignments, and assimilation into Applied's culture. Applied's program is not a classic "rotational program" where the goal is to give the new college hire in-depth knowledge and "on the job" training in three or four different functions across the company or division (see Figure 2).

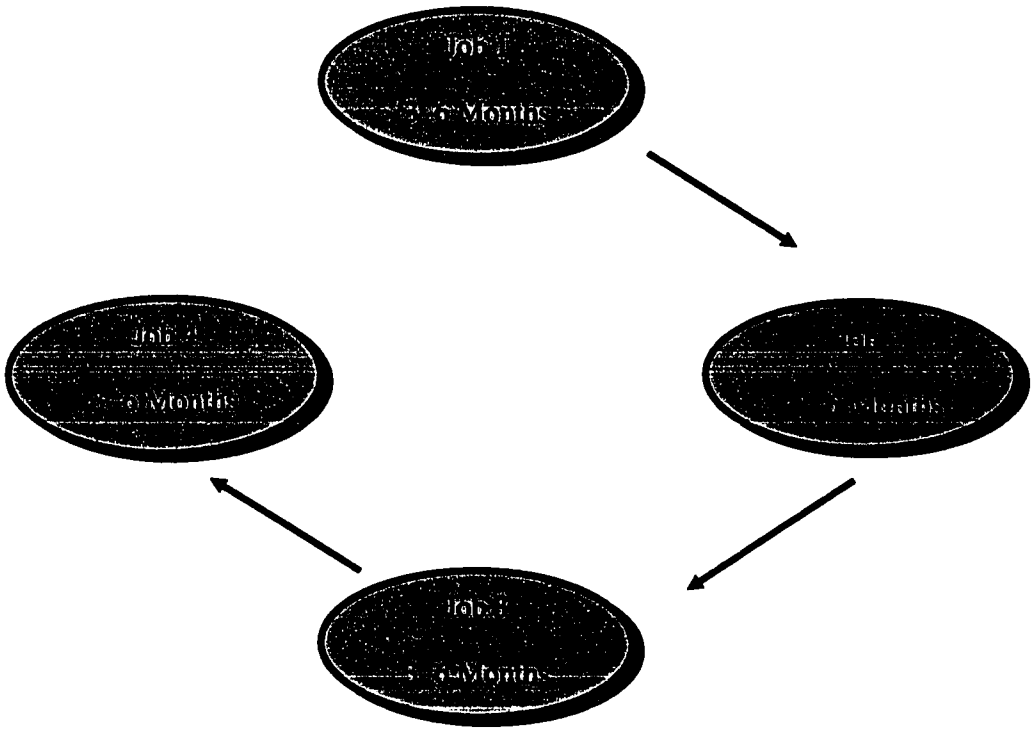

Figure 2. Classic Job Rotation Program

Hypotheses

The purpose of this paper is to report the effectiveness of the use of intake and training programs for new college graduate hires. The New College Graduate Training Program, which is run by a high tech company in the Silicon Valley called Applied Materials, was evaluated for the purpose of this study. A six month pre-post-test survey was completed by both program participants (NCG) and a control group. This survey intended to measure several things. The three areas analyzed for the purpose of this study were: differences between the two groups job satisfaction, job preparedness, and learning curves, represented by the amount of knowledge learned and retained in reference to Applied Materials business operations, mission, methodology, policies and procedures, functional areas, etc.

The hypotheses to be investigated were as follows:

I. Related to job satisfaction and job preparedness, scores for the NCG group were to improve over the course of the 6 month training program (from pre-to post-test survey), while scores for the control group will have remained relatively the same.

II. Related to job satisfaction and job preparedness, no differences in pre-test scores between the two groups were predicted, while it was predicted that post-test scores of those new college graduate hires who participated in the

training program would be higher than those in the control group for both areas.

III. It is also hypothesized that the new college hires who participated in the training program will have learned and retained more over the course of the six months than the control group would regarding Applied Material's business operations, mission, methodology, policies and procedures, functional areas, etc., representing a shorter learning curve.

Methods

Subject

Forty-four new college hire graduates at Applied Materials participated in the study. Twenty new college graduates participated in the training program (experimental group), while 24 of them went straight into direct hire positions (control group). Looking at the entire population, over 85% of the new entrants to the organization held engineering degrees. Over 50% of the respondents were Caucasian, with an average age of 26 years old. Seventy-five percent were paid an annual salary, while the remaining were paid hourly. Table 1 summarizes the basic demographic information about the experimental group. Table 2 summarizes the basic demographic information about the control group.

Table 1

Demographics of College Hires - Experimental (NCG) Group (n=20)

College Hire Population	Percentage
Gender	
Male	80%
Female	20%
Ethnicity	
Caucasian	50%
Asian	45%
Other	5%
Pay Distribution	
Exempt (salary)	100%
Non-Exempt (hourly)	0
Degree	
Engineering Background	100%
BS/BA	45%
MA/MS	30%
Ph.D.	25%

Table 2

Demographics of College Hires - Control Group (n=24)

College Hire Population	Percentage
Gender	
Male	74%
Female	26%
Ethnicity	
Caucasian	57%
Asian	31%
Other	12%
Pay Distribution	
Exempt (salary)	39%
Non-Exempt (hourly)	57%
Degree	
Engineering Background	74%
BS/BA	70%
MA/MS	18%
Ph.D.	9%

Both populations were similar in most aspects, with the exception of the control group being over half non-exempt (hourly vs. salary) employees. This difference can mostly be attributed to location (many of the respondents in the control group came from the Applied Materials Austin site where all employees are non-exempt).

The experimental group, which were participants of the New College Graduate Training Program, were recruited from several pre-determined top engineering universities for this particular training program. The control group was also recruited from various universities, but were placed into direct hire positions throughout the various divisions within the organization.

Instrument

A six month pre-post-test survey, consisting of 29 questions, was developed by the Human Resource Development Department as an instrument which measured job satisfaction and job preparedness (Survey Data: Part 1), as well as knowledge learned and retained about Applied Materials over the course of the six months (Survey Data: Part 2). Questions measuring job satisfaction and job preparedness were placed on a five point Likert type scale. The anchors varied from question to question. Question 1-5 related to job satisfaction while questions 6-7 related to job preparedness (see Appendix B). The questions were as follows:

1. Was your introduction to Applied appropriate for your needs as you perceive them at this time? Anchors ranged from 1 (yes) to 5 (no).
2. I believe that extensive formal training at Applied Materials is essential to my success. Anchors ranged from 1 (very much) to 5 (not at all).
3. I am satisfied with the training I received in order to do my job. Anchors ranged from 1 (very satisfied) to 5 (not satisfied).
4. What is your feeling about Applied at this point in time? Anchors ranged from 1 (excited) to 5 (discouraged).
5. How confident are you that you made a good decision by choosing Applied Materials as an employer? Anchors ranged from 1 (very confident) to 5 (not confident).
6. My comfort level with my job assignment is: 1 (very comfortable) to 5 (uncomfortable).
7. I feel that I am fully prepared and ready to begin my job assignment. Anchors ranged from 1 (fully prepared) to 5 (not at all prepared).

The remainder of the questions asked factual information regarding the respondent's experiences and knowledge about Applied Materials business operations, mission, methodology, policies and procedures, functional areas, etc. These questions were chosen because the writers felt that the more knowledge employees had of these

areas, the more successful they would be. Questions were phrased either as multiple choice or matching. The following scale items were in a multiple choice format:

1. Which of the following is one of the definitions of quality used at Applied Materials?
2. The Price of Non-conformance is the cost related to...?
3. At Applied Materials, a problem may also be called a...?
4. All employees at Applied Materials are expected to utilize problem solving skills in order to...?
5. Which of the following best describes the purpose or objective of implementing the Seven Tools at Applied Materials?
6. Which of the following illustrations indicate that Applied Materials is achieving the corporate mission?

The following scale items were in a matching format:

1. Match the following items and terms with which they are often associated (following was a list of terms and associations).
2. Match the following terms and definitions related to Applied Materials products and technology (following was a list of products and definitions).
3. Match the following Corporate Officers with their title/role (following was a list of the three executive officers and their titles/roles).

Demographic information was also obtained through the provision of an extra questionnaire which was attached to the pre-post-test survey (see Appendix C). Subjects were asked to answer demographic questions relating to their employment status, how long they have been out of college, college major, level of degree earned, gender, age, ethnic background, marital status, and number of children (if any).

Procedures

This study took place at Applied Materials in Santa Clara, CA, over approximately a ten month period beginning in August, 1994. The research was conducted and the data evaluated by an employee of Applied Materials. All subjects were asked to complete both a six month pre-test and post-test survey. The experimental group (NCG) was required to fill out the pre-test survey within their first week in the program and the post-test within the last week of the program. The control group was identified and surveys distributed in one of two ways, either through a list of new college hires put out by college relations or by identifying themselves in their orientation class *Welcome to Applied.* If subjects were identified by a list, they were contacted via interoffice memo and asked to participate in the study. If they were identified through the *Welcome to Applied* orientation, they were given a brief description of the study at that time and asked to complete the survey upon completion of the three day orientation class. The control group was offered a $5.00 gift certificate honored by the Cafe at Applied

Materials upon completion of both their pre and post-test surveys. Both the experimental and control groups had to be hired between the months of June and September to be considered a new hire at the time the pre-test survey was distributed.

Subjects in the control group were asked for their name and mailstop location. This information was used only as a means of sending them their gift certificate and post-test survey. In the cover memo of the survey, the respondents were notified that their names were in no way going to be tied to individual surveys. Instead they were each assigned an identification number between 1 and 100, which was the only means of identification used. Confidentiality of the subjects was also maintained by storing completed surveys in locked cabinets. The Program Manager and Coordinator were the only two individuals who had access to this information.

Subjects were not expected to benefit from participation in this study. However, the results of this study may be responsible for better recruiting, training, and development of new college hires in which they may indirectly benefit. There were no risks to the subjects anticipated from participation in the study.

Results

The purpose of this study was to determine the effectiveness of an intake and training program for new college graduate hires at a high tech company in Silicon Valley. This section explores the interactions and differences between the NCG and control group

in relation to their pre-test and post-test scores. The means and standard deviations for questions related to job satisfaction and job preparedness (Survey Data: Part 1) are listed in Table 3. As the results show, on four out of seven variables measured, the pre-to post-test scores for the NCG group improved significantly. For the control group, no scores on any of the seven variables improved significantly. When comparing pre-to pre-test differences, the NCG Group scores were better on only three out of seven variables. However, when compared at post-test, the NCG Group's scores surpassed those of the control group on six out of eight variables. To test whether or not there were any interactions between the two groups over time, MANOVAs were run on the means (see Tables 4.1-4.7). The following are those questions where the interaction was statistically significant: Question 1: Introduction to Applied Appropriate, $\underline{F}(1,42) = 8.23$, $\underline{p}<.01$; Question 5: Confidence in Choosing Applied, $\underline{F}(1,42) = 5.00$, $\underline{p}<.05$; Question 6: Prepared to Begin Job Assignment, $\underline{F}(1,41) = 5.18$, $\underline{p}<.05$; Question 7, Comfort Level with Job Assignment, $\underline{F}(1,42) = 9.25$, $\underline{p}<.01$. These results indicate that for these four variables, there is an overall interaction between the NCG and control group and their pre-to post-test scores.

To test Hypothesis I, pre-to post-test differences were compared separately for both group the NCG and control group by running MANOVAs on the means (see Table 5.1-5.7). Hypothesis I states that scores for the NCG group will improve over the course

Table 3

Comparison of Pre and Post-Test Means and Standard Deviations Between the NCG and Control Group for Survey Data: Part 1

Questions		NCG (n=20)		Control (n=24)	
		Pre-test	Post-test	Pre-test	Post-test
1. Introduction to Applied Appropriate?	$\overline{X}$	1.95	1.45*	2.25	2.63
	σ	(1.00)	(.60)	(.90)	(.88)
2. Belief in Formal Training?	$\overline{X}$	2.05	2.35	2.00	2.29
	σ	(1.19)	(1.14)	(1.29)	(1.00)
3. Satisfaction with Current Training?	$\overline{X}$	3.45	2.30*	2.88	2.96
	σ	(2.52)	(.66)	(1.65)	(1.04)
4. Feelings about Applied Now?	$\overline{X}$	1.65	1.70	1.71	2.13
	σ	(.67)	(1.13)	(.62)	(.80)
5. Confidence in Choosing Applied?	$\overline{X}$	1.75	1.35	1.92	2.50
	σ	(.85)	(1.10)	(1.67)	(1.02)
6. Prepared to Begin Job Assignment?	$\overline{X}$	3.20	2.05**	2.33	2.04
	σ	(1.20)	(.83)	(.82)	(.82)
7. Comfort Level with Job Assignment?	$\overline{X}$	2.50	1.85***	2.08	2.42
	σ	(1.15)	(.75)	(1.02)	(.78)

Questions were measured on 5-point Likert-type scales, where 1 = high/favorable and 5 = low/unfavorable.

* Difference is significant at .05 level

** Difference is significant at .01 level

***Difference is significant at .001 level

Table 4.1

Interaction Between Group and Time for Question 1 (Introduction to Applied Appropriate)

Source	SS	df	MS	F	Sig of F
Group	11.87	1	11.87	12.24	p<.001
Error	40.71	42	.97		
Time	.09	1	.09	.17	
Group * Time	4.18	1	4.18	8.23	p<.01
Error	21.31	42	.51		

Table 4.2

Interaction Between Group and Time for Question 2 (Belief in Formal Training)

Source	SS	df	MS	F	Sig of F
Group	.06	1	.06	.04	ns
Error	66.88	42	1.59		
Time	1.91	1	1.91	1.76	
Group * Time	.00	1	.00	.00	ns
Error	45.58	42	.27		

Table 4.3

Interaction Between Group and Time for Question 3 (Satisfaction with Current Training)

Source	SS	df	MS	F	Sig of F
Group	.04	1	.04	.02	ns
Error	102.54	42	2.44		
Time	6.21	1	6.21	2.28	
Group * Time	8.30	1	8.30	3.05	p<.09
Error	114.19	42	2.72		

Table 4.4

Interaction Between Group and Time for Question 4 (Feelings about Applied Now)

Source	SS	df	MS	F	Sig of F
Group	1.27	1	1.27	1.58	ns
Error	33.94	42	.81		
Time	1.19	1	1.19	2.23	
Group * Time	.73	1	.73	1.38	ns
Error	22.39	42	.53		

Table 4.5

Interaction Between Group and Time for Question 5 (Confidence in Choosing Applied)

Source	SS	df	MS	F	Sig of F
Group	9.46	1	9.46	6.03	p<.05
Error	65.82	42	1.57		
Time	.18	1	.18	.17	
Group * Time	5.27	1	5.27	5.00	p<.05
Error	44.32	42	1.06		

Table 4.6

Interaction Between Group and Time for Question 6 (Prepared to Begin Job Assignment)

Source	SS	df	MS	F	Sig of F
Group	4.35	1	4.35	4.89	p<.05
Error	36.48	41	.89		
Time	10.65	1	10.65	13.03	
Group * Time	4.23	1	4.23	5.18	p<.05
Error	33.49	41	.82		

Table 4.7

Interaction Between Group and Time for Question 7 (Comfort Level with Job Assignment)

Source	SS	df	MS	F	Sig of F
Group	.12	1	.12	.10	ns
Error	49.27	42	1.17		
Time	.55	1	.55	.96	
Group * Time	5.27	1	5.27	9.25	p<.01
Error	23.94	42	.57		

Table 5.1

Significance of Time Between Groups for Question 1 (Introduction to Applied Appropriate)

Source	SS	df	MS	F	Sig of F
NCG (n=20)	2.50	1	2.50	4.93	p<.05
Control (n=24)	1.69	1	1.69	3.33	p<.08
Error	21.31	42	.51		

Table 5.2

Significance of Time Between Groups for Question 2 (Belief in Formal Training)

Source	SS	df	MS	F	Sig of F
NCG (n=20)	.90	1	.90	.83	ns
Control (n=24)	1.02	1	1.02	.94	ns
Error	45.58	42	1.09		

Table 5.3

Significance of Time Between Groups for Question 3 (Satisfaction with Current Training)

Source	SS	df	MS	F	Sig of F
NCG (n=20)	13.22	1	13.22	4.86	p<.05
Control (n=24)	.08	1	.08	.03	ns
Error	114.19	42	2.72		

Table 5.4

Significance of Time Between Groups for Question 4 (Feelings about Applied Now)

Source	SS	df	MS	F	Sig of F
NCG (n=20)	.03	1	.03	.05	ns
Control (n=24)	2.08	1	2.08	3.91	p<.06
Error	22.39	42	.53		

Table 5.5

Significance of Time Between Groups for Question 5 (Confidence in Choosing Applied)

Source	SS	df	MS	F	Sig of F
NCG (n=20)	1.60	1	1.60	1.52	ns
Control (n=24)	4.08	1	4.08	3.87	p<.06
Error	44.32	42	1.06		

Table 5.6

Significance of Time Between Groups for Question 6 (Prepared to Begin Job Assignment)

Source	SS	df	MS	F	Sig of F
NCG (n=20)	13.23	1	13.23	16.19	p<.001
Control (n=24)	.78	1	.78	.96	ns
Error	33.49	41	.82		

Table 5.7

Significance of Time Between Groups for Question 7 (Comfort Level with Job Assignment)

Source	SS	df	MS	F	Sig of F
NCG (n=20)	4.22	1	4.22	7.41	p<.01
Control (n=24)	1.33	1	1.33	2.34	ns
Error	23.94	42	.57		

of the six month training program (from pre-to post-test survey), while scores for the control group will remain relatively the same.

For the NCG group, scores on Question 1 improved from pre-to post-test, $F(1,42) = 4.93$, $p<.05$. Scores for the control group decreased over time but the differences did not reach statistical significance, $F(1,42) = 3.33$, $p<.08$. For Question 2, the differences in pre-to post-test mean scores were not significant for either group. For the NCG group, scores in Question 3 improved from pre-to post-test, $F(1,42) = 4.86$, $p<.05$. Differences in scores for the control group on this question were not statistically significant.

For Question 4, the scores for the NCG group remained relatively the same, while the scores for the control group decreased but did not quite reach statistical significance, $F(1,42) = 3.91$, $p<.06$. For Question 5, the scores for the NCG group remained relatively the same, while the scores for the control group decreased, almost reaching statistical significance, $F(1,42) = 3.87$, $p<.06$. For the NCG group, scores on Question 6 improved from pre-to post, $F(1,41) = 16.19$, $p<.001$. Scores for the control group decreased, but not significantly. Finally, for Question 7, scores for the NCG group improved from pre-to post, $F(1,42) = 7.41$, $p<.01$, while again, scores for the control group decreased but not significantly.

Overall, scores for the NCG group significantly improved on four out of the seven questions. The two questions which indicate the largest areas of improvement are those

questions related to job preparedness. Scores for the control group did not significantly improve on any variable. In fact, scores on three out of the six questions almost decreased enough to reach a significance level of $p<.05$. These questions included: Introduction to Applied Appropriate, Feelings about Applied Now, and Confidence in Choosing Applied.

To test the hypothesis of whether or not there was a difference between the NCG and control groups' pre-to pre-test scores and post-to post-test scores in relation to job satisfaction and job preparedness, MANOVAs were run on these means (see Table 6). No differences were found on those questions related to job satisfaction. The only significant difference found between pre-test scores was on Question 6 (Prepared to Begin Job Assignment), $F(1,44) = 8.36$, $p<.01$. These results make sense considering the NCG group has not actually started their job assignment but should change at post-test analysis since a major goal of the training program is to prepare them for their first job assignment. Overall, these results support the first part of Hypothesis II which states that no differences between pre-test scores are predicted.

In measuring post-to post-test differences, the following were found to be statistically significant: Question 1, $F(1,42) = 25.74$, $p<.001$; Question 3, $F(1,42) = 5.99$, $p<.05$; Question 5, $F(1,42) = 18.62$, $p<.001$; and Question 7, $F(1,42) = 6.03$, $p<05$. The most surprising results may be related to Question 2, Belief in Formal Training. This

Table 6

Significance of Pre-and Post-Test Differences Between Groups

Questions	Pre-test (n=44)	Post-test (n=44)
1. Introduction to Applied Appropriate?	$F(1,42) = 1.10$, ns	$F(1,42) = 25.74$, $p<.001$
2. Belief in Formal Training?	$F(1,42) = .02$, ns	$F(1,42) = .03$, ns
3. Satisfaction with Current Training?	$F(1,42) = .83$, ns	$F(1,42) = 5.99$, $p<.05$
4. Feelings about Applied Now?	$F(1,42) = .09$, ns	$F(1,42) = 2.13$, ns
5. Confidence in Choosing Applied?	$F(1,42) = .16$, ns	$F(1,42) = 18.62$, $p<.001$
6. Prepared to Begin Job Assignment?	$F(1,41) = 8.36$, $p<.01$	$F(1,41) = .00$, ns
7. Comfort Level with Job Assignment?	$F(1,42) = 1.63$, ns	$F(1,42) = 6.03$, $p<.05$

suggests that new college hires who participate in a formal training program will have a higher belief in formal training, especially by the end of the program. However, mean scores in regard to this question indicate that feelings about formal training did not change for either group at the pre-or post-test level.

For the remainder of questions related to job satisfaction, the overall mean scores were higher on all four questions, however the differences only reached significance on three of the questions. On Question 4, Feelings about Applied Now, although the actual mean score was higher, the difference between the two groups was not statistically significant.

On both questions related to job preparedness, the difference in post-test scores was significant. This indicates that the training program does indeed prepare these new college graduates for their permanent job assignments (at least mentally, since actual performance is not being measured).

The final hypothesis states that those new college hires who participate in the training program will increase their overall knowledge about Applied Materials business operations, mission, methodology, policies and procedures, functional areas, etc. A combined score was calculated for both the number of correct answers given (out of 22 possible) and percentage correct (see Table 7). The NCG Group moves from an average score of 13.9 or 63.2% to 17.9 or 81.2%, indicating an increase in their overall knowledge

Table 7

Comparison of Pre-and Post-Test Scores for Survey Data: Part 2 (Knowledge about Applied Materials)

	NCG (n=20)		Control Group (n=24)	
	Pre-test	Post-test	Pre-test	Post-test
Number of Correct Answers Given – $\overline{X}$	13.9	17.9	14.3	13.5
% – $\overline{X}$	63.2	81.2	65.0	61.3
Minimum %	50.0	59.1	31.8	22.7
Maximum %	86.4	95.5	86.4	86.4

about Applied Materials. On the other hand, the control group went from an average score of 14.3 or 65% (relatively equal to the NCG group) to an average score of 13.5 or 61.3%. Figure 3 places this information in a bar graph showing both pre-and post-test scores for both groups in relation to percentage correct. Although the decrease from pre-to post is slight for the control group, there is an overall strong indication that this group either did not continue to learn any more about Applied Materials in relation to the questions asked on the survey, or the information had been learned but had not been retained; therefore, Hypothesis III is supported.

Discussion

The purpose of this study was to determine the effectiveness of an intake and training program for new college graduate hires (The New College Graduate Training Program) at a high technology company in Silicon Valley (Applied Materials). Specifically, this study investigated the differences between an experimental (NCG) and control group in relation to their job satisfaction, job preparedness, and knowledge learned and retained about Applied Materials. This section will discuss the findings and how they relate to the current literature, as well as discuss the general implications of this study and give recommendations for further research.

Job satisfaction was measured by looking at the responses in reference to the following questions: Introduction to Applied Materials, Belief in Formal Training,

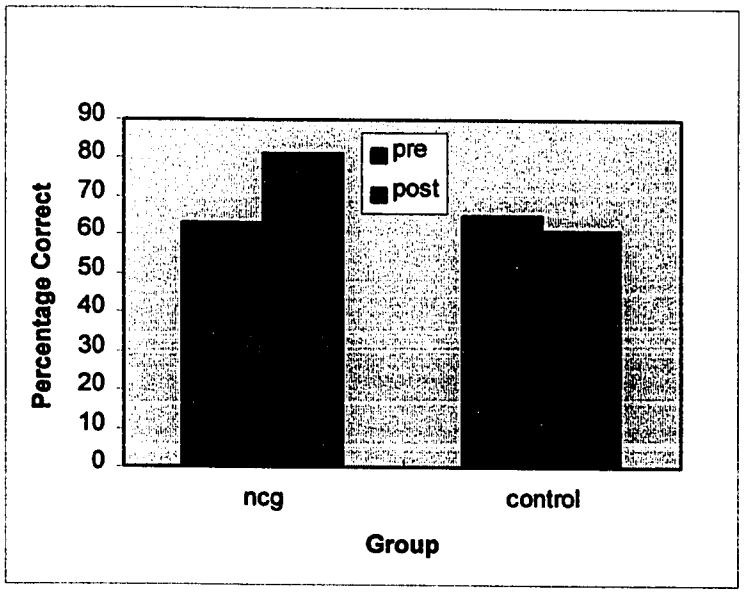

Figure 3. Pre and Post-Test Differences Between Groups on Percentage Correct for Survey Data: Part 2.

Satisfaction With Current Training, Feelings About Applied Materials Now, and Confidence in Choosing Applied. Job preparedness was measured by looking at the responses to these questions: Prepared to Begin Job Assignment, and Comfort Level With Job Assignment. At pre-test analysis, scores differed on only one question, Prepared to Begin Job Assignment. However, after six months, several differences developed.

The NCG group felt more positively that their introduction to Applied was appropriate, and were more satisfied with their current training. The control group's scores did not increase in any of the five areas measured; in fact, they decreased on most of them. These results are consistent with the literature which suggests that job satisfaction is likely to be low for individuals who have had no support or training during their entry phase (Herold, Leatherwood, & Parsons, 1985; Pearson, 1982) and that initial expectations often influence the level of satisfaction and happiness a newcomer will have with the company (Feldman, 1976). However, the results also found that the NCG group's feelings about Applied Materials and their belief in formal training did not change, which indicates some inconsistencies. Even more interesting was the fact that although the NCG group's belief in formal training did not improve, their satisfaction with their current training did. One theory could be related to relative need deprivation, which in this case would indicate that those individuals whose training needs are being

met may not place as much importance on such things as formal training as those individuals would who are not having their needs met. However, further research is needed in order to explain these inconsistencies.

The results further found that the NCG group felt more prepared and comfortable with their job assignments and that the control group's feeling in this area did not change. Although the ultimate measurement of job preparedness may be related to performance (and this was not measured), these results do suggest that job preparedness could be related to expectations being met and to the new college graduate finding out where they best fit in an organization.

Remember that a major goal of the New College Graduate Training Program was to create a successful transition from college to professional life. If an organization can use this transition period to help new college graduates align their expectations to actual corporate realities, the greater their satisfaction and job preparedness is likely to be with the company and work situation (Reis, 1980). In addition, this initial period of employment represents the best, and perhaps only, opportunity to influence and shape the new college graduates' attitudes and perceptions (Allen & Meyer, 1990). Therefore, it is in the best interest of the organization to help the new college graduate learn about all areas of the business, so that they are better able to match their skills and interests to that of the organizations. The results of this study suggest, then, that the New College

Graduate Training Program has been successful in its attempt to create this kind of environment.

It was also hypothesized that those new college hires who participate in the training program will learn and retain more knowledge about Applied Materials business operations, mission, methodology, policies and procedures, functional areas, etc. over the course of the six months, representing a shorter learning curve. This hypothesis was supported. Although minimal research was found on the relationship between new college graduate training programs and learning curves, the literature does say that a successful new college graduate intake and training program tries to speed up the assimilation process by clearly outlining the organization's goals and by explaining how goals have been achieved historically. In addition, effective programs also include basic corporate information on products, services, profitability, sales, key customers, and organizational structure and that these types of programs increase the overall knowledge that these new hires need to be successful (McGarrell, 1984). The questions asked on the survey were related to all of these areas.

Limitations of the Study

The generalizability of the results of this study may be limited because of the characteristics and size of the sample. The sample of engineering graduates in a high technology Silicon Valley company is both a limitation and a strength. As it represents a

cross-section of newly hired graduates with technical backgrounds, the results should have high external validity applicable to all other high technology firms employing the same type of graduate. Yet the sample is not representative of the entire workforce, and the results should be used cautiously with other organizations. In addition, if the sample size had been larger, the results might have come out differently.

Another limitation of this study has to do with the survey used. The survey had already been developed by the Human Resource Development Department and it was the one the organization wanted to use. Therefore, it was not written in a way that directly supports the literature or the statement of hypotheses. Instead, certain questions were pulled and grouped together in an effort to measure job satisfaction, job preparedness, and learning curves. There may be other variables or questions other than those analyzed that are more potent influences or indicators of the areas measured. If the survey was developed as a result of the literature review, the questions asked could have been more specific and hypothesis related.

Recommendations for Future Research

The success of an intake and training program for new college graduate hires is measured in many ways. This study looked at job satisfaction, job preparedness and learning curves as indicators of an effective training program. However, although related to the variables measured, turnover rate and performance are two other major areas that

are important to measure in order to determine the overall effectiveness of this type of program. As indicated by some of the literature reviewed for this study, the effect that this type of training program has on turnover rate is positive, although this particular study did not measure it. The area of performance and its connection to intake and training programs for new college graduates is one where little research has been done. Research using special performance rating forms that are not connected to salary increases, forced distributions or other elements that tend to distort findings, would be a place to start.

Another area of research is to investigate and develop qualitative tools that give reasonable indications of success or worth of programs such as these. While job satisfaction, for example, is a complex topic involving numerous variables, it may be possible to develop a qualitative index that, if used across a large body of workers and several companies, could provide an indication about whether or not a particular program was effective.

In summary, it appears that organizations that have in place specialized training programs for new college graduates can help create employees who are more satisfied, will feel more prepared to start contributing to the company, and will overall be more knowledgeable about the organization in relation to their business operations, mission, policies, etc. Handled well, such programs can give a new college graduate a positive

view of work life, provide the necessary tools and skills needed in the first few weeks of employment, and over the long term, lead to better performance and hopefully even lower turnover (McGarrell, 1984).

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Appendix A

Office of the Academic Vice President • *Associate Academic Vice President* • *Graduate Studies and Research*
One Washington Square • San José, California 95192-0025 • 408/924-2480

TO: Renee Manchester
2755 S. Norfolk, #105
San Mateo, CA 94403

FROM: Serena W. Stanford Serena W. Stanford
AAVP, Graduate Studies & Research

DATE: October 10, 1994

The Human Subjects-Institutional Review Board has approved your request to use humans subjects in the study entitled:

"The Evaluation of New College Hire Training Programs"

This approval is contingent upon the subjects participating in your research project being approriately protected from risk. This includes the protection of the anonymity of the subjects' identity when they participate in your research project, and with regard to any and all data that may be collected from the subjects. The Board's approval includes continued monitoring of your research by the Board to assure that the subjects are being adequately and properly protected from such risks. If at any time a subject becomes injured or complains of injury, you must notify Dr. Serena Stanford immediately. Injury includes but is not limited to bodily harm, psychological trauma and release of potentially damaging personal information.

Please also be advised that each subject needs to be fully informed and aware that their pariticpation in your research project is voluntary, and that he or she may withdraw from the project at any time. Further, a subject's participation, refusal to participate, or withdrawal, will not affect any services the subject is receiving or will receive at the institution in which the research is being conducted.

If you have any questions, please contact me at (408) 924-2480.

SJSU SAN JOSE STATE UNIVERSITY

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One Washington Square • San José, California 95192-0120 • 408/924-5600 • FAX 408/924-5605

Agreement to Participate in Research

Responsible Investigator: Renee Manchester

Title of Protocol: The evaluation of new college hire training programs

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You have been asked to participate in a research study investigating the intake and training of new college hires at Applied Materials. You are being asked to voluntarily fill out both a pre and post test evaluation survey. By completing these surveys, there are no foreseeable risks or discomforts anticipated.

Benefits of this research may include the development of better recruiting and training practices of new college hires at Applied Materials. The results of this study may be published but no information could identify you as a subject.

Compensation for participation will include a $5.00 gift certificate good at any Applied Materials Cafe. If you chose not to participate, no service of any kind, to which a subject is otherwise entitled, will be lost or jeopardized. Your consent is given voluntarily and you may refuse to participate at any time during the study.

Questions about the research may be addressed to Renee Manchester at x6874. Complaints about the research may be presented to Ken Nishita, SJSU Psychology Department Chair at #408-924-5600. Questions or complaints about research, subject rights or research-related injury may be presented to Serena Stanford, Ph.D., Associate Academic Vice President for Graduate Studies and Research, at #408-924-2480.

By signing this document, you are giving your consent to participate in this study. Thank you for your participation.

_____ _____
Subjects Signature Date

_____ _____
Investigator's Signature Date

NEW COLLEGE HIRE QUESTIONNAIRE

1. Was your introduction to Applied Materials appropriate for your needs as you perceive them at this time (this means as a new college graduate who has joined Applied Materials)?

yes		somewhat		no
1	2	3	4	5

2. What is your feeling about Applied at this point in time?

excited		so-so		discouraged
1	2	3	4	3

3. Which of the following best reflects your understanding of Applied's objectives for a new college hire? Place a check beside your answers. Choose no more than five. Number your choices in the order of importance to you, with 5 being most important.

_____ To learn and apply problem-solving methods

_____ To "audition" with various functional groups at Applied

_____ To acquire an effective interpersonal communication style

_____ To gain technical knowledge of Applied Materials' business

_____ To learn to be a team member

_____ To learn Applied Materials' mission, vision, values and culture

_____ To understand the product life cycle

_____ To start a fast track program for promotion

_____ To appreciate the functional groups, for example, Marketing, Finance, Human Resources) and recognize their role in the corporation

_____ To learn the basics of quality and reliability and recognize their influence on customer satisfaction and market share

_____ To appreciate the global nature of Applied Materials business operations

_____ To gain access to the technology leaders of Applied Materials

_____ To define long-term career opportunities

4. My comfort level with my job assignment is

very comfortable		somewhat comfortable		uncomfortable
1	2	3	4	5

5. My grasp of Applied Materials' policies and procedures is

very good		so-so		not good
1	2	3	4	5

6. True or False A global company is an organization that can compete within its industry in any market in the world.

7. My knowledge of the functional areas at Applied Materials listed below is _____. (Circle the appropriate number by each functional area listed)

	high		medium		low
Overall, or, in general	1	2	3	4	5
Manufacturing	1	2	3	4	5
Engineering	1	2	3	4	5
Quality	1	2	3	4	5
Finance	1	2	3	4	5
Marketing	1	2	3	4	5
Safety	1	2	3	4	5
Materials Management	1	2	3	4	5

8. Approximately how many people do you know and/or have worked with at AMAT?

1. 0-10
2. 10-20
3. 20-30
4. 30-40
5. 40 or more

9. Approximately how many departments have you worked with at AMAT?

1. 1
2. 2
3. 4
4. 4
5. 5 or more

10. Is three- four weeks long enough to be exposed to a department? yes_____ no_____

If no, what do you feel is a reasonable time period for exposure to the workings of a department?

1. 6-8 weeks
2. 2-4 months
3. 4-6 months
4. over 6 months

11. I believe that extensive formal training at Applied Materials is essential to my success.

very much		somewhat		not at all
1	2	3	4	5

12. I am very satisfied with the training I received in order to do my job.

very satisfied		somewhat		not satisfied
1	2	3	4	5

13. I feel that I am fully prepared and ready to begin my job assignment.

fully prepared		somewhat		not at all
1	2	3	4	5

14. I feel I will be productive in my job assignment _____ after starting.

1. 1-2 weeks
2. 2-4 weeks
3. 1-3 months
4. 3-6 months
5. over 6 months

15. Which of the following benefits of a new college hire program are **important** to you? Number your choices in the order of importance to you, with 5 being highest.

_____ Group experience, team concept

_____ Concentration of structured learning experiences

_____ Early exposure to the product divisions/functional groups across the company

_____ Thorough introduction to Applied Materials' culture, vision, values

_____ Extensive feedback on project work and team participation

16. Which of the benefits checked above do you think **you have actually gained** in the new college hire program? Number your choices in order of importance to you, with 5 being highest.

_____ Group experience, team concept

_____ Concentration of structured learning experiences

_____ Early exposure to the product divisions/functional groups across the company

_____ Thorough introduction to Applied Materials' culture, vision, values

_____ Extensive feedback on project work and team participation

17. Rank order the activities listed below according to their effectiveness as a learning method. How would you rate each one as a provider of information or experience critical to your career at Applied Materials? 1 is high, 6 is low.

_____ Formal instruction (for example, Product Life Cycle, Intro to Semiconductors, QTK, Seven Tools)

_____ Project assignments

_____ Group meetings

_____ Reports

_____ Feedback/Evaluation

_____ Exposure to functional groups

18. How confident are you that you made a good decision by choosing Applied Materials as an employer?

very confident		confident		not confident/unsure
1	2	3	4	5

Please answer the following questions. They reflect the basic principles of Applied Materials culture and approach to quality and management.

19. Which of the following is one of the definitions of quality used at Applied Materials?

    1. Total Quality Management (TQM)
    2. Conformance to requirements
    3. Do Your Best
    4. The customer is our only source of revenue

20. The Price of Nonconformance is the cost related to

    1. Training
    2. Correcting Mistakes
    3. Tracking Inventory
    4. Continuous Improvement Teams

21. At Applied Materials, a problem may also be called a

    1. Defect
    2. Mistake
    3. Root Cause Analysis
    4. Discrepancy

22. All employees at Applied Materials are expected to utilize problem-solving skills in order to (There may be more than one correct answer.)

    1. Meet corporate financial objectives
    2. Contribute to performance evaluation
    3. Qualify for incentives
    4. Ensure continuous improvement

23. Which of the following best describes the purpose or objective of implementing the Seven Tools at Applied Materials?

1. To establish methods for problem solving and continuous improvement
2. To enable engineers to build prototypes
3. To encourage all employees to learn manipulative skills
4. To adopt the latest seven strategies for management, whatever they happen to be

24. Match the following items and the terms with which they are often associated

1. Pareto Chart	_____ a. mean, median, mode
2. Variation Concept	_____ b. National Quality Award
3. Control Charts	_____ c. 80-20 rule
4. Malcom Baldrige	_____ d. Ishikawa
5. Cause and Effect	_____ e. SPC

25. If you have participated in Managing Interpersonal Relationships, what is your interpersonal style?

1. Amiable
2. Analytical
3. Driver
4. Expressive

26. State three of the Applied Materials corporate values.

_____

_____

_____

27. Which of the following illustrations indicate that Applied Materials is achieving the corporate mission?

a.

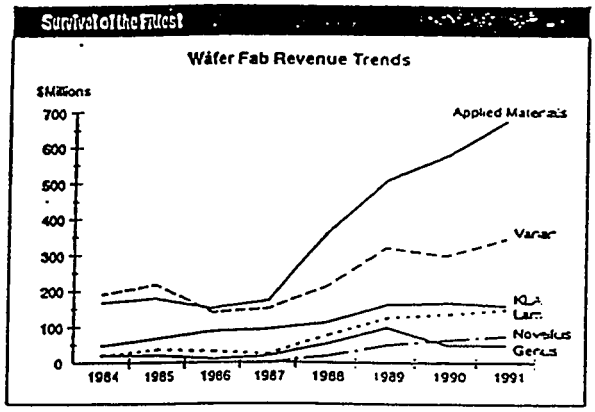
Stock Prices

1/20/93	$37.25
2/19/93	$38.00
3/19/93	$44.25
4/20/93	$41.25
5/20/93	$54.00
6/18/93	$56.25
7/20/93	$59.50

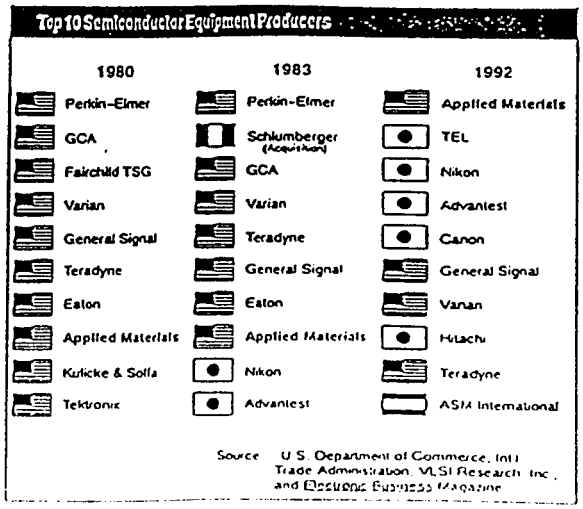
b.

INTEL ANNOUNCES RECORD PROFITS IN '93

c.



d.



28. Match the following terms and definitions related to Applied Materials products and technology.

_____ PVD

_____ WCVD

_____ Epitaxy

_____ CSD

_____ Etching

_____ CVD

_____ Ion implantation

a. a method of deposition a film on a wafer in which a vapor containing the material to be deposited is developed by evaporation or sputtering

b. provides service and support to Applied Materials' customers

c. a process for depositing tungsten films

d. a process for depositing a thin solid film from a chemical reaction using gases as the source material

e. the use of acids, plasmas, or other corrosive agents in order to produce a design on a wafer by removing selected portions of the surface

f. the introduction of selected impurities into a semiconductor, using high voltage, to produce a desired electrical characteristic.

g. the process by which a film "grows" on a silicon base

29. Match the following Corporate Officers with their title/role:

_____ Jim Morgan

_____ Jim Bagley

_____ Dan Maydan

a. President of Applied Materials

b. Chairman and Chief Executive Officer

c. Vice Chairman and Chief Operating Officer

The following is a series of questions about yourself and your background. Please read each question and mark or write the appropriate response.

1. What is your employment status?

_____Exempt _____Non-Exempt _____CE

2. How long have you been out of college?

_____0-6 months _____6 months -1 year _____1-2 years _____2+years

3. What was your major?_____

4. What degree did you earn?

_____Bachelors _____Masters _____Ph.D.

5. What is your gender?

_____male _____female

6. What is your age?

_____20-24 years _____25-30 years _____30 + years

7. What is your ethnic background?

_____White _____Black _____Asian _____Hispanic _____Other (_____)

8. What is your current marital status?

_____Single _____Married _____Divorced _____Other

9. Do you have any children?

_____Yes _____No

If yes, how many?_____