TRAINING PROGRAM EVALUATION: A COMPARISON OF THE EFFECTIVENESS OF SCHOOL VERSUS ON-THE-JOB TRAINING

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The hypothesis was investigated that school training was more effective than on-the-job training. Of a sample of 349 male subjects, 217 received on-the-job training and 132 received school training. Data were collected and analyzed on tenure, performance, promotions, salary increases, and accidents.

Training type had a significant positive correlation with tenure and accident occurrence at the .01 and .05 level, respectively, and a significant correlation with salary increase at the .05 level. A regression model using accident occurrence and salary increase yielded a prediction of training type significant at the .05 level. No difference was found between the two types of training, as measured by the study variables.

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TRAINING PROGRAM EVALUATION: A COMPARISON OF THE EFFECTIVENESS OF SCHOOL VERSUS ON-THE-JOB TRAINING

The importance of evaluating training programs has been voiced with frequency in the literature and has been reportedly recognized by those carrying out training programs in industry. However, little of the literature has gone beyond admonishing companies to evaluate their training programs, and few organizations carry out any scientific program of evaluation.

McGehee and Thayer (1961) suggested that the evaluation of industrial training was analogous to Mark Twain's comment about the weather, i.e., "everybody talks about it, but nobody does anything about it." The authors further argued that evaluation of training programs was generally weak because management was reluctant to "waste time" testing something that it had convinced itself was good.

Parker (1973) stated that the primary reason for the lack of proper evaluation was that many of the people in charge of training were unaware of the various techniques that could be used for evaluation. He believed that they were also unaware of the procedures that should be followed in the planning and implementation of an evaluation program.

A survey was conducted by Catalanello and Kirkpatrick (1968) of 110 firms which expressed an interest in the evaluation of their training programs. Of the group surveyed, 78% attempted to measure the amount of learning that took place in their program, 54% attempted to measure changes in their trainees' on-the-job behavior, and 45% tried to determine if their training program was bringing the desired results in areas of organizational impact such as absenteeism, turnover, grievances, morale, productivity, and costs.

In the evaluation designs used by the responding firms, only 35 used a pretest and posttest experimental design. Of 47 firms responding to a follow-up questionnaire, all 21 that attempted to measure on-the-job behavior measured this behavior after the training, and 12 measured on-the-job behavior before training. Only one firm used a control group as well as an experimental group. Of the 45% of the firms attempting to measure the effects of their programs upon the organization, in only a "few cases" records were compared on a before-and-after basis.

The criteria for evaluation used by those firms attempting to measure learning were mostly the results of paper-and-pencil tests. In the evaluation of changes in behavior, much of the evaluation was "superficial and subjective." Only two of these firms did any statistical analysis. In the measurement of organizational results, there were "very few systematic and objective measurements."

Morano (1975) emphasized that the measurement and evaluation of training should not be neglected by any training department. The difficulty of selecting standards that realistically and accurately reflected the value of training to the organization's objectives made the issue of criteria the largest problem in this area. Morano suggested a three-step procedure for measurement and evaluation. This method included the identification of parameters for ranking training needs, the determination of the kind of training that was required, and the establishment of standards for evaluation tools. As a part of the system, screening and counseling of employees was conducted to determine who should be taught and the validity of employee training requests.

A widely advocated model for training research was that described by Kirkpatrick (1959a, 1959b, 1960a, 1960b). This model of training research attempted to measure participants' reactions, learning, behavior on the job, and organizational results. The first step in this evaluation process should be the measurement of participants' reactions to the training program. This was the aspect of training results that was most often measured by organizations. Studies designed to evaluate reaction to training programs have been reported by Fast (1974), Glueck (1971), Heith (1970), Jensen (1972), Lester (1971), Sammons (1965), Shader (1962), and Reeves and Jensen (1972). The measurement of reactions was considered important since decisions on future training activities

were frequently based on the reactions of "key persons." The more favorable their reaction to the program, the more likely the participants were to pay attention to the material that was discussed.

The second step in evaluation recommended by this model was the measurement of learning. This should be measured for each participant on a before-and-after basis with the use of a control group. Measurements should be objective and quantifiable to enable statistical analysis where possible. Studies of the measurement of learning achieved in training have been reported in works by Achein (1971), Belasco and Trice (1969), Burke (1969), Gilbert, Campbell, and Oliver (1963), Kayloe (1971), and Roy and Dolke (1971).

The evaluation of training programs in terms of one-the-job behavior was more difficult than the measurement of reaction or learning. Kirkpatrick suggested that measurement of behavioral changes should be made to compare before and after performance. A control group should be used and the appraisal of performance should be made by the trainee, superiors, subordinates, and/or peers. The posttraining appraisal should be made 3 months or more after the training so that the trainees would have an opportunity to put into practice what they had learned. Evaluation studies which measured behavioral effects have been reported by Blocker (1955), Buchanan and Brunstetter (1959), Fleishman, Harris, and Burtt (1955), Lindholm (1953), Moon and Hariton (1958), Stroud (1959), and Tarnopol (1957).

Considered to be the most difficult aspect to measure, organizational results have been the best measure of the effectiveness of a training effort. These results have been those such as changes in costs, turnover, obsenteeism, grievances, quality and quantity of production, or morale. Evaluations which have been made in terms of organizational results have been reported in works by Likert (1958), Massey (1957), and Merrihue and Katzell (1955).

The use of the experimental approach to evaluate any form of training has been advocated in numerous studies (Buchanan, 1957; DePhillips, Berliner, & Cribbin, 1960; Goodacre, 1957; Kirkpatrick, 1960; Korb, 1956; MacKinney, 1957; McGehee & Thayer, 1961; Thorndike, 1949) which had as their central theme four considerations in the design of evaluative research: the use of a control; the use of a pretest and a posttest; the use of an appropriate measurement instrument; and attention to the control of extraneous variables.

Blaiwes, Puig, and Regan (1973) discussed the use of the transfer of training paradigm often used by the military in the evaluation of synthetic training devices. This procedure compared performance on operational tasks as a function of training variables. If training was long and operational performance was poor, then instruction was ineffective. The authors referred to Murdock (1957) and Hammerton (1967) as classic reviews of the issues involved with the variations

in designs and formulas used to measure transfer of training. Gagne, Foster, and Crowley (1948) presented a summary of the methods which have been used to give quantitative expression to measures of transfer of training.

Jeantheau (1971) described a system of obtaining useful evaluation information without the need for transfer of training measures. This system gave four levels of assessment, three of which could be used to obtain evaluation information without requiring data on the performance of personnel in operational settings. The first level was qualitative in that it involved examining the procedures used in terms of specified objectives and their capability to implement those procedures. The second level was noncomparative measurement which involved the tracking of trainee performance from beginning to the end of training with the gain in scores being a crude expression of effectiveness. Level three involved comparative measurement between groups trained or treated differently. The highest level of evaluation within this system was the transfer of training measure wherein behavior was observed and measured in the operational situation.

Solomon (1949) suggested the use of an extended control group design research study on the basis that there was an interaction between the control group and the pretest. This design involved the selection of a second control group which did not receive the pretest but which received the same

treatment as the experimental group and the posttest. A value for the interaction effect was obtained by adding the amount of change taking place in the first and second control groups and subtracting this from the amount of change obtained in the experimental group.

Solomon also provided a four-group design wherein a third control group was given the posttest but neither the pretest nor the experimental treatment. This was based upon the idea that there were effects of the pretest combining with the independent variable and subsequently interacting with the posttest.

The use of the extended control group design was suggested by Solomon in three types of settings. These settings were: (a) transfer of training experiments; (b) experiments on induced changes in existing attitudes, opinions, and personal values; and (c) experiments on the effects of controlled experience on responses, skills, and performance already existing in the behavior repertoire.

Canter (1951) advocated the use of Solomon's design, especially in studies in the area of human relations. However, he pointed out the problem of the selection of the control groups in a manner which would insure the equivalency of all the groups without the use of a pretest with all the subjects.

Blumenfeld and Holland (1971) described a model for the empirical evaluation of training effectiveness to determine

if management-desired changes occurred as a result of the training and to evaluate the quality of the evidence of effectiveness. The authors stated that there were two primary classes of information in assessing the quality of information--criterion measurement and experimental design. The authors advocated the use of an experimental design which incorporated the use of pretest and posttest along with control group procedures. They believed that this design could be considered minimally adequate whereas anything less would be inadequate.

The question of whether or not the method used in the evaluation of training was a valid method or not was examined by MacKinney (1957). The author described the levels of evaluation methodology which yielded increasingly different qualities of information. He also discussed the use of the classification of evaluation as either objective or subjective and as formal or informal.

MacKinney offered a system of classification which was related primarily to the design of the evaluation used. At the top of the scale was the controlled study in which a pretest, posttest, and control group were used. The second level in the classification system was the evaluation of the training group only on a before-and-after basis. The lowest level was the evaluation of only the trained group with the criterion measure taken after training but not before. He stated that the controlled experimental study was the only proper way to evaluate a program.

MacKinney also suggested a hierarchy of levels of criteria to evaluate the relevance of the criteria used. The highest level in this classification system was the use of objective performance scores. The second level was the use of subjective judgements or estimates of job performance. The third level was the evaluation of trainees' knowledge of the content of the training course. The lowest level was the use of opinions and attitudes.

Lindbom and Osterberg (1954) classified evaluations according to the kinds of behavior being classified. These classifications were: (a) trainee's classroom behavior, (b) trainee's on-the-job behavior, and (c) subordinate's on-the-job behavior.

Similarly, Goodacre (1954) suggested the use of a three-unit scale of classification. This scale had at its lowest level the measurement of attitudes. The second level was the measurement of knowledge, and as its highest level was actual job performance which was best reached by the rating of job performance by the trainee's immediate superior.

A review was made by Wolfe (1973) of 21 of the better-known studies which attempted a rigorous evaluation of training program effectiveness. He concluded that evaluation efforts often failed to include many of the crucial elements needed to accomplish a valid and reliable evaluation. It was found that the use of controls of some type and an attempt to gauge on-the-job behavior change had become

almost standard procedure. Two studies reviewed featured random assignment of subjects, while another seven of the studies attempted to match a control group to the trained group. Eight of the 21 evaluations reviewed used no before measurements and of those evaluations that did perform a pre-training measurement, about two-thirds of them used standardized and validated test instruments.

Wolfe found that four of the 21 evaluations attempted to determine which training inputs were the most effective. Only two of the studies attempted to measure the effect of training upon operational effectiveness. Four of the studies attempted to measure participants' reactions and eleven attempted to measure the learning that took place.

Describing the evaluation of a new-hire employee-training program, Denova (1969) expressed his belief that a program of evaluation could bring about changes in employees' behavior. The program described required the participation of the employees' supervisors in the observation and rating of their employees. The author believed that a high level of performance was achieved because the workers presumed that the supervisors were taking an interest in them and their work.

In comparing turnover rates for those who had participated in the formal training program and nonparticipants for the same period, Denova found that the rate for the participant group was less than half that of the nonparticipant

group. Denova thought perhaps labor turnover could be reduced through an effective program of orientation, formal training, and capable leadership in supervision.

Kohn and Parker (1969) conducted a study in which the technique of multiple regression analysis was used to explore the relationship between feelings about selected aspects of the learning situation and satisfaction with the outcome. Similarly, Lee and Dean (1971) reported the use of a multiple regression analysis to identify variables related to the participants' perceived value of a training program.

The literature on the evaluation of training efforts brought out several main points. The evaluation process should be formulated as an integral part of the training program at the time of the training program. The evaluation program should be based upon the goals and objectives of the training program and thus be designed to measure variables related to those goals and any changes which occur in those variables.

The design of the evaluation should be experimentally sound, using as many controls as the situation allows. One or more control groups should be used, with all control and experimental groups being as equivalent as possible through the use of random assignment, the creation of matched groups, or some other method of equalization. Measurements should be made before and after the training effort. The time lapse between the training effort and the postmeasurement is

dependent upon what is being measured. Reaction and learning can ususally be measured immediately, whereas a change in job performance takes longer to realize. The measurement instrument used should be objective and quantifiable and should measure as closely as possible those variables which were the target of the training program.

The criteria used in the evaluation process should be objective and quantifiable. They should be based upon the goals of the training effort. If the goal of the program is to change on-the-job behavior, the measurement of participants' relations might be informative, but it would tell nothing about the effect of training upon the on-the-job behavior--the target area. If measurement of the criterion variable is not objective, as is often true of the measurement of on-the-job behavior, measurement should be made by as many sources as feasible, such as peers, subordinates, and superiors. Through a more extensive program of evaluation, it is possible not only to measure the impact of a training program upon the target area, but to also measure which inputs are most effective and upon which variables the training had the most impact.

If the data gathered in an evaluation are objective, quantifiable, and systematic, a meaningful analysis can be made. Correlational methods are most often used as a means of analysis.

It is realized that in an industrial setting, many of the controls called for by the experimental method are not always possible. However, techniques used should come as close as possible to a truly experimental evaluation given the limits of the situation. If this is done, the results of the evaluation of a training program can give an indication of the effectiveness of the training program, can show the areas in which it is most effective, and can be the basis for the improvement of the training effort.

It was the purpose of this study to measure the comparative effectiveness of a 2-week centralized training school versus on-the-job training for entry-level employees in an oil field service company. During each employee's initial 3-month employment period, the variables of tenure, promotions, percent salary increase, accidents, type of accident, and the results of a performance appraisal were examined for each employee used in the study. The data on each variable were analyzed for differences between employees who received on-the-job training at the work site and employees trained at the centralized training school. It was expected that centralized training would result in superior performance on the study variables with some variables being more strongly affected than others.

Method

Subjects

Subjects were 349 newly hired male employees in an entry-level job hired over a 12-month period. Of these, 132

participated in a 2-week centralized training program away from the work site and 217 participated in on-the-job training at the work site.

Procedure

Immediately after hiring, employees were either sent to the work site where they received on-the-job training or were sent to a 2-week resident course conducted by the organization. Those in the on-the-job training group were trained by their supervisors and members of their work group on how to perform the job, safety procedures, and equipment operation. Employees in the school-training group received classroom and workbook training on job procedures and safety. Equipment operation was taught on an individual basis using actual equipment and simulated circumstances. School instructors were former job-site supervisors who had been brought to the school to teach on a full-time basis.

Assignment of employees to a type of training was not based on any differences in employees or in the type of jobs to which they were to be assigned after training. A close evaluation of training assignment conducted prior to this study revealed that assignment was based primarily upon whether or not the district office responsible for hiring the new employee had the funds available in the budget at the time of hiring to send the employee to the centralized training school. If no funds were available, the employee was given on-the-job training. Also considered by the

district manager was whether or not the newly hired employee could be enrolled in a class at the training school which would start soon after the hiring date. If not, the employee would not be scheduled for training at the school, as it would delay his availability for work. These two considerations were the basis for training assignment.

The 3-month period following the hiring of an employee was considered by the organization to be an introductory or probationary period. These first 3 months were used as the study time frame and data were collected on each employee at its end on the following variables: (a) accident occurrence, (b) number of months from employment date until accident, (c) type of accident, (d) tenure, (e) performance appraisal rating, (f) promotion, (g) percent salary increase, and (h) type of training. Data were collected from accident reports completed by job-site supervisors, personnel files, and school records.

It was the policy of the organization to start all new-hire employees in this job at the same level and salary. Promotions and pay increases were awarded when the employee was given a performance appraisal at the end of the probationary period. These promotions, raises, and performance appraisals were controlled by each employee's district manager based on his judgement and the recommendations of the work-site supervisor. These personnel actions were then recorded in the worker's file at the organization's central office. Also

recorded in this file was any termination action. This was used to compute the tenure variable which was how many months the employee remained on the job. Accident reports stating the date of the accident, type of accident, and personnel responsible for the accident were filed in the safety office at the central office. Accidents were classified as to type on the basis of equipment involved and employee time loss by the job-site supervisor. The number of months from employment date until accident was computed using the employment date listed in the personnel file and the date of accident on the accident report. Finally, the type of training each worker received was obtained from school records. From these sources data were computed for analysis.

Results

The data collected in this study were analyzed to determine if there was a linear combination of predictor variables which was significantly and meaningfully associated with the type of training received. This was done by using a multiple regression equation to indicate how the predictors, taken together, associate with the training type.

Further analysis was conducted to determine which predictor variable was most strongly associated with training type and to determine if this singular association was significant by itself. A zero-order correlation was used to look at a single predictor and its association with type of training in a linear one-to-one relation.

The last step in the analysis was to determine if there was any unique association between type of training and an individual predictor other than that shared with the other predictor variables. This was done by removing the covariability in the predictor-training type correlation due to any overlap of the predictor in question with the remaining predictor variables by the use of a partial correlation.

In the course of the data analysis it became apparent that data were nonrandomly missing for a subset of the study sample. For those subjects who terminated prior to the end of the 3-month employment period used for data collection, no data were available for the variables of percent salary increase, performance appraisal, and promotion as these actions took place at the end of the subject's initial 3-month employment period.

Therefore, for the purpose of having a meaningful analysis which would deal with the problem of these missing data by the most straightforward means, a subsample was created which could be treated independently. This was possible since the data were missing nonrandomly and, in essence, defined a sample of 181 employees who remained to the end of the initial 3-month employment period. The 168 employees who terminated prior to the end of the 3-month period were included in the total sample, but were not treated separately as a subsample. This approach to the analysis was considered more appropriate in this situation than the alternatives of

dropping subjects, dropping variables, using a "missing data correlation matrix," or using a "missing-data plus plugged-blanks" method (Cohen & Cohen, 1975).

The subsample which was created, consisted of the 181 employees employed throughout the entire 3-month data collection period. The total sample consisted of the 349 employed throughout the 3-month period as well as those who terminated prior to the end of this period.

Those variables which were available in each of the two groups were examined using only the group or groups to which they were relevant in the investigation of their association to training type.

The data analysis phase also revealed other problems in the study. The variable coding used for the dichotomous variables was not the standard 0-1 code but, instead, a 1-2 code. Although this did not affect the regression analysis or the interpretation of the type of training variable (coded "1" for on-the-job training and "2" for school training), it did cause confusion in the interpretation of the values associated with the variables of promotion, accident, lost time injury accident, heavy vehicle accident, and moving vehicle accident variables.

It should also be noted for the purpose of interpreting the mean values of tenure, a value of 4 was given for months employed if termination had not occurred in the first 3-month observation period. Likewise, a value of 4 was assigned for

the months until accident if no accident occurred in that time period. The range of values for performance appraisal was 1-9, with 1 being the highest value. Accident occurrence was coded "1" for occurrence and "2" for nonoccurrence, while the remaining variables were coded "2" for occurrence and "1" for nonoccurrence.

Total Sample

A stepwise multiple linear regression analysis procedure was used in order to isolate a subset of available predictor variables which would yield an optimal prediction equation with as few terms as possible (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975). A two-predictor multiple linear regression equation using tenure and accident occurrence as predictors yielded an R of .2078. Although this accounts for only 4% of the sample variance, it significantly departs from zero, F (2, 346) = 3.74, $p < .01$. This full two-predictor model was tested against the zero-order correlation of tenure with type of training, i.e., a restricted one-predictor model. No significant difference was found between the two models. Therefore, adding accident occurrence to tenure in a predictive model did not significantly increase predictive efficiency.

In Table 1 are shown the zero-order correlations of tenure and the accident variables with type of training. Only tenure shows a zero-order correlation which is significant. The accident variables show no significant association with

type of training. This positively significant correlation of tenure to type of training indicates that school-trained workers stay longer on the job than do workers trained on the job.

Table 1

Total Sample Means, Standard Deviations, and Correlations of Tenure and Accident Variables with Type of Training

Variable	Mean	SD	Correlation	
			Zero-Order	Partial[a]
Tenure	3.35	1.12	0.19*	.19*
Accident Accurrence	1.94	0.24	0.08	.07
Months until Accident	3.86	0.58	0.06	--
Lost Time Injury Accident	1.02	0.13	-0.05	--
Heavy Vehicle Accident	1.04	0.20	-0.07	--
Moving Vehicle Accident	1.00	0.05	0.07	--

Note: On-the-job training group N = 217; school-training group N = 132.

[a]Partial correlation of other variables with location of training independent of other study variables.

*$p < .01$.

Also shown in Table 1 are the partial correlations of tenure with type of training and of accident occurrence with type of training. Independent of other study variables, the partial correlation of tenure with type of training differed

only slightly from its zero-order correlation with type of training, indicating an independent association. Tested for significance, this partial correlation was found to be significant at the .01 level.

The partial correlation of accident occurrence with type of training was not found to be significant. It also differed only slightly from the zero-order correlation of accident occurrence to type of training. This suggests that the study variables of tenure and accident occurrence are virtually independent. These partial correlations were tested using Fisher's *r* to *z* transformation. This is permissible, as any procedure using the *r* to *z* transformation which is applicable to a zero-order correlation can also be applied to a partial correlation provided that the standard error of *z* is adjusted (Hays, 1973).

Thus, the analysis of variables relevant to the total sample indicates that only the variable of tenure has a significant correlation with type of training. This association accounts for only 4% of the sample variance. The direction of this association indicates that there is a positive association between tenure and school training. This association indicates that school-trained employees stayed on the job longer than did on-the-job training employees.

Subsample

Variables relevant to the subsample of 181 employees who remained employed by the organization at the end of the

initial 3-month employment period were analyzed using a stepwise multiple linear regression. A two-predictor model using the variables of accident occurrence and percent salary increase was found to be most efficient. This model yielded an R of .2002 which was found to depart significantly from zero, F (2, 178) = 3.74, $p < .05$. This two-predictor model accounted for 4% of the sample variance. Tested against the first step, one-predictor model using accident occurrence, which was significant at the .05 level, F (1, 1979) = 3.87, $p = .05$, the two-predictor model was significantly more predictive, F (1, 178) = 3.52, $p < .05$.

In Table 2 are shown the zero-order correlations of those variables relevant to subjects still employed at the end of the 3-month evaluation period with type of training. As shown, the variables of accident occurrence and percent salary increase were both found to be significant at the .05 level.

In Table 2 are also shown the partial correlations of accident occurrence and percent of salary increase with type of training. As shown, percent salary increase had a significant association with type of training at the .05 level of significance when examined independently of the other subsample variables. The partial correlation of accident occurrence with type of training was unchanged from its zero-order correlation.

Table 2

Subsample Means, Standard Deviations, and Correlations of Subsample Variables with Type of Training

Variable	Mean	SD	Correlation	
			Zero-Order	Partial[a]
Accident Occurrence	1.95	0.22	.14*	.14*
% Salary Increase	6.67	2.82	-.14*	-.15*
Performance Appraisal	4.66	1.37	.03	
Promotion	1.16	0.37	.04	

Note: On-the-job training group N = 86; School-training group N = 95.

[a]Partial correlation of other variables with location of training independent of other study variables.

*p < .05.

Discussion

The hypothesis that the type of training has a relation to the variables of tenure, performance appraisal ratings, accidents, promotions, and percent salary increase was not completely supported. Training type was correlated only with the variables of tenure, percent salary increase, and accident occurrence. The supposition that school training would have a favorable impact was supported only in the cases of tenure and accident occurrence. The data indicated that school training had a negative relationship to the salary increase awarded to a centrally trained employee at the end of the initial 3-month employment period. Also, the data

indicated that school training was related to a decreased probability of an accident occurrence during that period. Type of training had no observable relation to performance appraisal ratings, promotions, or the type of accident which occurred.

It should be noted that the issue of employee tenure or turnover is of great interest to the management of organizations such as the one used in this study. Interviewing, testing, training, and the accompanying paperwork are a major expense to an organization. This expense is wasted when an employee quits or is fired. Therefore, each employee termination represents a loss to the organization. Although the association between school training and tenure was not a strong one, it does indicate that the location of an employee's training, and thus, the type of training obtained, is related to how long the employee stays with the organization.

Many factors could contribute to this association. Pride in the organization and possibilities for advancement are stressed at the training school and could influence the trainees. This influence could remain with the trainees when they go to their jobs, thus making them less susceptible to dissatisfaction and less likely to quit.

It is also possible that the actual expenditure of money for training an individual has an influence upon the district management. As a visible sum of money had been spent on an individual, management might make more of an effort to insure

that the employee does not terminate. District management is also aware that the headquarters management is in favor of the training school, has invested a lot of resources in it, and is anxious that it succeed. Thus, district management might make an effort to see that the school-trained employees stay with the organization.

School-trained employees were on the job at their actual work site for 2 weeks less than workers trained at the job site. School-trained workers were subject to 2 weeks less of working long hours under unpleasant conditions and the other problems associated with the job. Over a short time frame such as used in this study, this could have had an impact.

Finally, it is possible that the training school adequately prepared the students for their jobs, making is less frustrating, safer, and more rewarding. This, also, could influence an employee to stay on the job or make him less likely to be fired.

Due to the short time period used in this study, it is not possible to make an inference as to the long-term influence of training type on tenure. In the organization used in this study, the highest turnover rate occurred during the first 3 months of employment and declined thereafter. An investigation of the association between training type and tenure over a longer period of time would be of interest. Also to be explored would be the question of whether or not this effect, if present, declines or increases with time.

The actual time on the job and the time spent in training at the school and on-the-job training should also be considered. Other variables associated with tenure could also be investigated in such a follow-up study.

The association between training site and percent salary increase is an interesting one. Although a rather weak association, it indicates that workers attending the training school were awarded a lower salary increase than workers receiving on-the-job training. Since the amount of salary increase awarded an employee at the end of his initial employment period was at the discretion of the district manager, it is possible to propose several explanations for this association. The most straightforward explanation that can be proposed based on this association is that school-trained employees did not perform as well as workers trained while on the job and, therefore, received a lesser raise. This poorer performance, if present, could be due to ineffective training at the school which did not prepare the workers for their jobs. It could also be that the school-trained workers took time to adjust to the real-life work situation and did not reach the proficiency level by the end of the study period of the workers trained on the job. However, it should be noted that the association between accident occurrence and training type indicated that school-trained employees were less likely to have an accident than employees trained on the job.

It is also possible that because the worker receiving school training had been at the work site 2 weeks less than the worker trained on the job, the district manager may perceive him as having contributed less to the job. After spending 2 weeks at a training school, the school-trained worker would need additional time and training to become familiar with the worksite and routine on the job. Thus, the district manager might perceive the school-trained worker as deserving a lesser raise than the worker trained on the job.

District managers could see the training school as taking over their responsibilities for training, and thus somewhat a threat to their position and authority. If pressure from upper management is the only reason that new workers are sent to the school, and if the school is seen as a threat to the district managers, these feelings could possibly influence the salary increases given school trainees.

Similarly, the district managers had a greater involvement with the workers they helped train on the job, both as individuals and as workers, than those trained at the school. Therefore, the district manager might be inclined to give the worker trained on the job a higher raise.

Finally, a differential rate of attrition between the two groups could have an impact. As school-trained workers were slightly more likely to stay on the job the entire 3-month period, that group may have contained poorer quality workers who otherwise should have quite or have been fired

had they not been influenced to remain or had their superiors not been influenced to keep them because they had been centrally trained. If this were the case, the poorer quality workers would have been eliminated from the group trained at the job site by having been fired or leaving voluntarily, as they were not under the same influences to stay. This difference would be reflected in the salary increase variable if the salary increases given were actually based on job performance.

A follow-up study using a longer time frame should explore the association between training location and the percent salary increase awarded an employee remaining past the first 3 months of employment. An attitude survey of both managers and employees as to their feelings about the two types of training and the workers participating in each would supply needed information.

The association between accident occurrence and type of training, as earlier stated, indicates that a centrally trained employee who did not terminate employment in the first 3 months on the job is less likely to have an accident on the job during this time than a nonterminating employee trained on the job. The most obvious explanation for this association is that school training is more effective in the area of safety training than on-the-job training.

However, it is interesting that this association is not evident in the total sample. As length of time employed was

not controlled for in the total sample analysis, the time in which an employee had an opportunity to be in an accident was not controlled for either. Thus, in the total sample analysis, where the attrition rate was higher for employees trained on the job, these same employees would have less opportunity to be involved in an accident. This could be an influencing factor in the total sample results relating to this variable. A follow-up study could explore the relationship between accident occurrence and tenure in both school-trained and employees trained on the job.

The overall results of this study are not very conclusive. Although an association was found between training type and three of the study variables, these associations were quite weak and accounted for very little of the sample variance. Thus, much is left unexplained. A study using a longer time frame is needed in order to obtain data which would indicate which method of training is most effective and efficient in this organization. It is necessary to have more information in order to make a decision as to whether the higher cost of school training is justified in terms of reduced turnover costs, employee safety, and employee skills. If no difference between the effects of the training methods can be found, the least expensive method in terms of organizational resources would, obviously, be the most preferred by management. In addition, the evaluation of an organization's training program should be a continuous process in order to

promote improvement and to insure that the most beneficial training available is being given.

However, if conclusions as to training effectiveness are to be drawn from this short-term study, the data indicate that there is little difference between the two types of training. The associations which were found explained very little of the variance which occurred in the sample used. As well as being weak, these associations pointed to neither type of training as being generally superior. School training seemed to have a beneficial effect upon tenure and safety (accident occurrence). However, in the area of employee rewards (percent salary increase), centralized training appeared to be less beneficial than on-the-job training. Thus, based on the results of this study, it would be advantageous to the organization to use the least expensive means of training, which in this instrance would be on-the-job training.

Finally, any future studies using a design similar to this study should be aware of the problem presented in the analysis phase by missing data and by inappropriate variable coding. A clean deletion of employees who terminate prior to the end of the study period would yield only the 3-month workers' analyses of the variables which might be more valuable information for the organization. It should be decided during the design phase of the study what framework for data collection will be used and what methods of analysis will be

used to avoid or deal with these problems in order to collect the most useful data in the most appropriate form.

Appendix A

Table 3

Total Sample Intercorrelations (N = 349)

	1	2	3	4	5	6	7
1	1.00						
2	0.19**	1.00					
3	0.08	-0.01	1.00				
4	0.06	0.03	0.91**	1.00			
5	-0.05	0.00	-0.51**	-0.42**	1.00		
6	-0.07	0.01	-0.82**	-0.75**	-0.03	1.00	
7	0.07	0.03	-0.21**	-0.26**	-0.01	-0.01	1.00

Note: 1 = type of training, 2 = tenure, 3 = accident occurrence, 4 = months until accident, 5 = lost time injury, 6 = heavy vehicle accident, 7 = moving vehicle accident.

*p < .05.

**p < .01.

Appendix B

Table 4

Subsample Intercorrelations (N = 181)

	Type of Training	Accident Occurrence	% Salary Increase	Performance Appraisal	Promotion
Type of Training	1.00				
Accident Occurrence	0.14*	1.00			
% Salary Increase	-0.14*	-0.05	1.00		
Performance Appraisal	0.03	-0.04	-0.45**	1.00	
Promotion	0.04	0.03	0.15*	-0.07	1.00

*p < .05.

**p < .01.

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