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ABSTRACT

A survey was conducted to investigate variation in stakeholder perceptions of training results and evaluation within the context of a high-technology product development firm (the case organization). A scannable questionnaire survey booklet was developed and scanned data were exported and analyzed. Based on an achieved sample of 280 (70% response rate), analyses involved the computation of descriptive statistics as well as the construction of several scale variables corresponding to perceived training program outcomes, evaluation processes, and uses. Reliability was examined, and program participant and line management stakeholder groups were compared. Other analyses examined the relationships between perceived training outcomes and preferences for evaluation processes and uses by group. Three predictor variables (customer satisfaction, product development, and employee satisfaction) were constructed using the conceptual framework from a previous investigation. The criterion variables were labeled as evaluation purposes, process, and consequences. Stepwise multiple regression revealed highly significant relationships between predictors (training results) involving employees and customer satisfaction and the criterion variables (training evaluation). The overall results suggest that both managers and nonmanagers tended to view the results and evaluation of training as being closely connected with employee satisfaction. An expanded deployment of the survey is recommended beyond the case organization for future research. Four appendixes contain the survey cover letter, the instrument, response demographics, factor analysis results, and the code and index structure for survey written comments. (Contains 19 references.) (Author/SLD)

A Quantitative Investigation of Stakeholder Variation in Training Program Evaluation

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Authors' Note

This research is part of a larger study completed by the author (Michalski, 1999) in partial fulfillment for the requirements for a Ph.D. (Education) at the University of Ottawa, Ottawa, Ontario, Canada. This study has benefited greatly from input by committee members Dr. Swee Goh, Dr. Colla MacDonald, and Dr. Maurice Taylor. Correspondence: Greg Michalski, 4772 Homesteaders Rd., Fitzroy Harbour, Ontario, Canada, K0A 1X0; e-mail: gregm@nortelnetworks.com

Abstract

Referencing a conceptual framework and the results of two previous investigations (that used concept mapping/pattern matching and qualitative interviewing methods), the present paper reports quantitative (survey) results to complement and generalize prior findings within the case organization studied. A scannable questionnaire survey booklet was developed using *Teleform* software. Scanned survey data were exported and analyzed. Based on an achieved sample of 280 (70% response rate) these analyses involved the computation of descriptive statistics as well as the construction of several scale variables corresponding to perceived training program outcomes, evaluation processes and uses. Reliability was examined using Cronbach's Alpha as a coefficient of internal consistency. Program participant and line management stakeholder groups were compared using independent t-tests and multivariate analysis of variance (MANOVA) for comparisons of stakeholder group scores on multiple item sets (i.e., dependent variables). Further analyses also examined relationships between perceived training outcomes and preferences for evaluation processes and uses by group. Three predictor and five criterion (scale) variables were constructed using the conceptual framework. The predictor variables were labeled *customer satisfaction*, *product development*, *employee satisfaction*. The criterion variables were labeled as evaluation *purposes*, *process* (data collection and participation/reporting), *consequences* (instrumental/conceptual and symbolic use). Stepwise multiple regression revealed several highly significant relationships ($p \leq .001$) between predictors (training results) involving employee and customer satisfaction and the criterion variables (training evaluation). The overall results suggest that—with a few notable exceptions—both managers and non-managers tended to view both the results and evaluation of training as being closely connected to employee satisfaction. These results are further discussed with written comments also collected from the survey. An expanded deployment of the survey is recommended beyond the case organization for future research.

A Quantitative Investigation of Stakeholder Variation in Training Program Evaluation

As mainstream training evaluation practice continues to focus predominantly on demonstrating positive return on investment (ROI) at the course level from the singular stakeholder perspective of corporate management (who pay for courses), a growing body of literature suggests that, particularly within knowledge-intensive organizational settings, training evaluation would be better performed at the program level from multiple stakeholder perspectives (Altschuld & Zheng, 1995; Hackett, 1997; McLinden & Trochim, 1998; Stewart, 1999). A clearer understanding of stakeholder variation has several important implications for the theory, practice of training program evaluation. For example, (1) Can any single training evaluation model equally serve all organizational constituencies? (2) Which stakeholder group(s) or individual(s) is/are best positioned to plan and execute the evaluation, and further to interpret, and act, on its findings? (3) Whose ends are served by large-scale corporate training and the results of such typically highlighted in formalized training evaluations?

This paper reports the results of a survey designed to investigate variation in stakeholder perceptions of training results and evaluation within the context of a high-technology product development firm (case organization). The results reported here are derived directly from the author's dissertation research as a multiple-method study organized into three phases. Details of the conceptual framework developed and the results of from the prior two research phases have been reported and are not re-stated here (see Michalski, 1997; Michalski, 1998; Michalski & Cousins, in press). The objectives of the overall dissertation study were to answer the following two research questions: (1) To what extent do training stakeholder groups differ in their perceptions about the importance and evaluation of training program results? What are the key dimensions of divergence? (2) Do stakeholder views about training program evaluation depend on the organizational results they perceive for the program? If so, in what ways?

Purpose

The purpose of the survey was to further address research question two (above) regarding stakeholder views of training evaluation in relation to their perceptions of training results. The survey involved managers (sponsors) and non-managers (trainees) in the case organization, a division of a large network and telecommunications development firm headquartered in Ontario, Canada. The central analyses performed here were concerned with the relationship between three predictor variables developed to describe stakeholder perceptions of training results and five criterion variables developed to describe stakeholder perceptions of training evaluation. The three predictor variables developed described training results in terms of customer satisfaction, product development, and employee satisfaction. The five criterion variables derived described training evaluation in terms of evaluation purposes, data collection, participation and involvement, instrumental-conceptual use, and symbolic evaluation use.

Beyond several marginal differences revealed between the groups regarding their respective perceptions of training results and training evaluation, the key concern relative to research question two is which (if any) of the predictor variables (training results) are related to the criterion variables describing stakeholder perceptions of training evaluation. The following sections provide a progressive description of the survey development and analyses performed.

Sample

The training participant (non-manager) population consisted of approximately 700 engineers, designers, and technicians, while the manager population consisted of approximately 100 managers in the case organization. Based on researcher experience with the organization it was known that managers generally respond to surveys at a proportional rate of three to one relative to engineering staff, an appropriate proportional sample was prepared using simple random sampling principles (see, e.g., Miller,

1994). Also, because training is equally available to all members of all organizational subdivisions, sampling stratification was considered but deemed unnecessary. From the organizational population a list of names (each accompanied by departmental and job classification information to distinguish managers from non-managers) was randomly selected using the most current internal employment record information available from the company's human resources group.

Implementation and Response

Several authors have emphasized the importance of achieving sufficient response rates in surveys. For example, Fink (1995a) discussed the problems associated with non-response at both the survey and item level. Furthermore, Bourque and Fielder (1995) emphasized the importance of the many details of survey preparation and administration. They discussed many of these in terms of obtaining a valid and reliable sample in connection with achieving a sufficient response rate. This was a particular concern for the present research because the population sampled is very routinely polled and surveyed using all varieties of techniques (mail, phone, E-mail, web, even live solicitation). Hence, extreme care and effort was taken to maximize the response rate of this survey. This included careful considerations of details such as questionnaire objectives; general length and format; item wording, length, and format; use of clear and sufficient instructions and contact information; pilot testing; cover letter; and follow-up reminders.

A total of 415 surveys were mailed via interoffice mail to randomly selected individuals from the case organization population sampling frame consisting of 610 names. The list of individuals for the sample was obtained from the host organizations human resources database and was sorted to show the names of regular, full-time employees with job band classifications five through ten (inclusive). It included a total of 458 non-managers (bands 5 and 6) and 152 managers. This population of knowledge workers consists mostly of telecommunications engineers, programmers, designers, as well as project and line managers. Because 15 individuals from the original list were later determined to be invalid because they had left the division (or company), or were otherwise unavailable to participate (for example due to vacation or leave of absence) a final total of 400 surveys were sent to individuals including 100 managers and 300 non-managers.

An achieved sample of 280 (70% response rate) was obtained consisting of 60 managers and 220 non-managers. This represents a proportion of 21% managers and 79% non-managers who responded to the survey. Careful random sampling is credited for attaining an achieved sample with demographic proportions closely comparable to their respective (total) population proportions. For example, the sampling frame included 25% managers and 75% non-managers as determined by job band.

Instrument

A four page questionnaire survey booklet was developed in view of research question two and the results obtained in the prior two phases of research (Michalski & Cousins, in press; Michalski, 1998). The final conceptual cluster titles from the phase 1 investigation were used as a starting point to identify six initial question categories for part 1 of the survey regarding perceptions of training results beneficial to the organization. These cluster titles reflected several common themes, such as customer and employee satisfaction, perceived by both line managers (training sponsors) and non-managers (trainees). They were used to derive six distinctive categories for survey part 1 scale variable construction as discussed later in this paper.

The average importance ratings assigned by each of the two groups to the phase 1 statements was further used to identify training results within each of the six areas included in survey part 1. To do this a simple differential was calculated by arithmetically subtracting the average trainee ratings from the average sponsor ratings for each of the 100 statements. These calculations (performed using a common spreadsheet software application) resulted in a column of 100 difference scores (deltas) each corresponding to a phase 1 statement. A descending bubble sort was performed on this column of

differences to identify rating dissimilarities between the groups[1]. As simple differences, these delta values were both positive and negative. A large positive value indicated a statement that was rated (on average) higher by the sponsor group relative to the trainees. A large negative value indicated the opposite relationship (a difference at or close to zero indicated minimal difference). For example, for statement #23 (support key performance plan of organization) the sponsor average importance rating (as a training result) was 4.08 (very important). The average importance for this same statement as assigned by trainees was 2.77 (somewhat to moderately important). The difference between these two averages was 1.31 indicating that sponsors generally rated the statement higher in average importance relative to trainees. A similar calculation for statement #8 (training is integrated with university-industry interaction programs) yields a difference of -0.93 indicating that trainees generally considered the statement (training result) more important relative to sponsors. In providing an indication of statements rated differently by managers and non-managers, this process provided some objective guidance to formulate and balance the representation of the 20 items finally developed for part 1 of the survey. A minimum of three items per scale variable were planned.

Results from a prior qualitative investigation (Michalski, 1998) were also employed to formulate the items contained in part 2 of the survey. This survey section focused on respondent perceptions related specifically to training evaluation. The first three items were concerned with respondent perceptions related to the purpose of training evaluation. Items 4 through 8 focused on stakeholder involvement. Items 9 through 13 sought to capture respondent views about the type of data required for training evaluation. Items 14 through 17 were concerned with views related to evaluation reporting audiences. The last nine items (18 through 26) were focused on the consequences of training program evaluation especially in terms of conceptual, instrumental, and symbolic uses. Similar to the three sections of the semistructured interview guide developed for phase 2 (Michalski, 1998), the 26 items comprising survey part 2 sought to capture data related to stakeholder view of the purposes, processes, and consequences of training evaluation.

At the request of the management group that approved deployment of the survey ten items (part 3) were also included to measure respondent general satisfaction with the existing training program. This purpose was mentioned in the cover letter that accompanied the survey. While the part 3 data was not used for the analyses reported here the pooled analysis of these ten items was made available to respondents as promised in the cover letter. Because by far most respondents who completed parts 1 and 2 of the survey also completed part 3, and because part 3 was physically located on the last page of the survey form (just before the demographic section at the end) there was little concern (and no evidence) that the ten part 3 questions affected responses of the first two sections.

Technically and from an analytical perspective, the development and analysis plan of this instrument was also informed by prior survey research related to evaluation practice. Referencing Cousins, Donohue, and Bloom, (1996) the scale variables were constructed as linear combinations of Likert type item sets using the research questions and conceptual framework. As described below in the analysis section, relationships among variables were examined using bivariate and multivariate procedures. Intercorrelation matrices using Pearson correlation were examined for variable set patterns. Stepwise multiple regression was used to account for variation in criterion variables and to assess the relative uniqueness and magnitude of contributions by predictors. Repeated measures multivariate analysis of variance (MANOVA) was used to test for differences between groups.

The questionnaire was developed following general techniques of good survey design (see, e.g., Fink, 1995 b,c,d; Mangione, 1995; Rodeghier, 1996; Rosenberg, 1968). Realizing that the survey instrument was being developed primarily in relation to the research project as a new instrument and, therefore, does not enjoy long history to compare certain aspects of reliability and validity, these areas were, nevertheless, considered. For example, the instrument's stability (test-retest reliability) and

[1] Although the spreadsheet used to produce the calculations is not provided in the thesis, the data in Appendix H can be used to calculate these delta values.

alternate-form reliability are obviously not known due to its single form and instance of administration. The homogeneity of items and scale variables was possible to assess using Cronbach's alpha. This is discussed further shortly.

The content, face, criterion, and construct validity of the survey were also considered, but again the initial administration of the instrument limits extensive conclusiveness here. As noted the content for the survey was derived from the conceptual framework with reference to the literature review performed. Care was taken to ensure a high quality and highly readable form to enhance face validity. Due to the research nature of the instrument, criterion validity (predictive and concurrent) could not be conclusively established. According to Fink (1995a) construct validity (convergent and discriminant) is established experimentally to demonstrate that a survey distinguishes between people who do and do not have certain characteristics. This can be accomplished in at least two different ways both of which rely upon existing (valid) instruments for comparison or well-developed theory. Again, due to the dearth of material available in either of these categories specifically related to the research undertaken here, conclusive claims about the construct validity of the instrument cannot be made. Rather, the research project as a whole might be viewed as a precursory contribution to efforts aimed at developing future versions of the instrument.

Pilot testing of the instrument was performed by mailing the form to a total of six members of the target population who agreed to complete it and provide feedback for improvement. These individuals did not participate in the survey proper. Comments from these individuals were used to ensure the appropriate level of language and usage of terms understandable to the target population. Face validity was also examined by discussing the overall look, readability, time and ease of completion.

The survey form included two primary data collection sections with a total of 46 items related to respondent perceptions of general training results (part 1 containing 20 items) and training program evaluation (part 2 containing 26 items). A five-point, balanced, attitudinal scale was used for all items (strongly disagree to strongly agree). As mentioned the third section was included only to collect participant satisfaction data relative to the current training program. Because they are outside the scope of the present study, the results of these ten survey questions are not presented or discussed in connection with the present study. Similarly, as taken from the fourth and final survey section, only the demographic data about respondent job classification (i.e., manager or non-manager) were used in the current study.

To maximize the accuracy of data entry, the final instrument was produced as a scanable form using the software application called *Teleform* (version 5.4). This software produces survey forms from which data can be scanned directly into a number of database formats (e.g., SPSS) using a fax machine or flatbed scanner.

Implementation and Deployment

The survey deployed was both random and anonymous. To encourage participation and ameliorate the overall response rate, prenotification of all potential respondents was accomplished using standard postcards distributed through interoffice mail 1 week before the survey was mailed. Similar postcards were also sent as reminders 2 weeks after the survey package was mailed.

The survey package contained three items including (1) a cover letter, (2) the questionnaire form, and (3) a self-addressed interoffice mail envelope. A recommended return period of 1 week was suggested in the cover letter. To accommodate travel and vacations, a total period of 4 weeks was allowed for responses. The cover letter accompanying the survey was drafted by the principle researcher and co-signed on his behalf by the vice president responsible for training in the organization. The vice president's signature was used because (unlike that of the researcher) his name was well known among the potential respondents within the case organization. Such cover letter name familiarity has been shown to be beneficial in boosting survey response rates (Bourque & Fielder, 1995). The cover letter and complete survey form are shown in **Appendix A**.

Results

As shown in **Appendix B** survey response was also broken down demographically by the experience level (time in company), product development responsibility, and job category of the respondents. Nearly half (47%) of all respondents indicated 1 to 5 years of experience in the company followed by 20% who indicated 10 to 20 years experience. Proportionally smaller percentages of respondents indicated 5 to 10 years (14%), less than 1 year (14%), or over 20 years (5%) of experience respectively. Approximately 44% of all respondents indicated a primary affiliation with the optical carrier (OC) 192 development group. Another 18% identified an affiliation with the OC-48 group while OC-12 was identified by 14% and OC-3 by 13% of respondents. The category "other" product group was indicated by 11% of respondents who wrote in affiliation such as TNUI (transport node user interface), or various combinations of the OC development groups among others. Nearly 90% of respondents indicated job functions of either software (60%) or hardware (29%) as their primary job function. Verification was indicated by 2% and captive office by 1% of respondents. The "other" job category was selected by 8% of respondents and included write-in functions such as "project management", "design field support", "customer support", "characterization", "program office", and "design advisor". All product groups were represented well by both managers and non-managers. For example, manager response by product group ranged from 15% (OC-12) to 40% (other). The "other" category included write-in job-roles such as "project manager" that correspond to specialized managerial roles.

Part 1: Training results

Part 1 of the included 20 items pertaining to stakeholder perceptions of training results. As mentioned, these items were developed based on findings in the previous two studies with reference to the conceptual framework developed. The item-level results by stakeholder group for each of the 20 part 1 items are first examined followed by a similar examination of the items in survey part 2.

As mentioned above, all items were scored using a five-point scale: 1=strongly disagree, 2=disagree, 3=neither agree or disagree, 4=agree, 5=strongly agree. **Table 1** displays each of the items from survey part 1 along with group comparisons of item means, standard deviations, and numbers of respondents in both stakeholder groups. As shown, missing data problems were minimal with most items answered by all of the managers (n=60) and non-managers (n=220) who returned surveys.

Item means (M) ranged from 2.03 (managers Only job-specific training should be provided to employees) to 4.40 (managers The availability of high-quality training leads to increased employee satisfaction). Item standard deviations ranged from .61 (non-managers The availability of high-quality training leads to increased employee satisfaction) to 1.04 (managers The main purpose of training should be to improve customer satisfaction).

Item-level group means were also compared using independent samples t-tests. The null hypothesis is that there is no difference between average ratings by managers and non-managers. The alternative is that there is a difference. By selecting an alpha level of significance of .05 as the probability of committing a Type I error (rejecting the null hypothesis when it is true) significant differences ($p \leq .05$) between managers and non-managers were found in only three of the 20 items. In all three cases non-managers agreed more strongly than managers with the statements which had to do with training results respectively in terms of anticipating customer requirements, product innovation, and employee professional development. For the item "Effective training should help designers to anticipate customer requirements" the average ratings by non-managers (M=3.65) was significantly greater (p = .017) than those of managers (M=3.33). Non-managers also rated the item "Effective training ultimately leads to product innovation" significantly higher (M=3.67; p = .001) than managers (M=3.22). Similarly, for the item "The main purpose of training should be to develop employees professionally" the average rating by non-managers (M=4.16) was significantly greater ($p < .001$) than that of managers (M=3.77).

Part 2: Training Program Evaluation

The same five-point scale used for part 1 was also used to score items in part 2. **Table 2** displays each of the items from survey part 2 along with the item mean, standard deviation, and number of respondents by stakeholder group. While missing data was similarly not excessive, the number of individuals who rated all items in part 2 was obviously less than that of the previous section on training results. Generalizations can be made as to the possible reasons for this (e.g., respondent fatigue), however, the written comments (discussed later) indicate that a substantial number of respondents considered the items in this section as somewhat technical and beyond their specialty area or realm of expertise. Nevertheless, each item in part 2 was rated by a minimum of 55 managers and 213 non-managers, with most items being rated respectively by at least 57 and 215 individuals. Item means ranged from 2.14 (managers—Training program evaluation results should be used mainly to comply with quality standards such as ISO audits) to 4.14 (managers—Trainees should be actively involved in performing the training program evaluation). Item standard deviations ranged from .47 (managers Training program evaluation results should be used mainly to develop new knowledge about program effects) to .99 (managers—External evaluation experts should be actively involved in performing the training program evaluation).

Item-level group means were also compared using independent samples t-tests. Significant differences ($p \leq .05$) between managers and non-managers were found in only two items. Managers agreed ($M=4.10$) more strongly than non-managers ($M=3.90$) that "Training program evaluation results should be used mainly to determine if the program is meeting its goals" ($p = .047$). However, non-managers provided a higher rating ($M=2.84$; $p < .001$) to the statement "Training program evaluation results should be used mainly to comply with quality standards such as ISO audits" than managers ($M=2.14$) who more clearly tended to disagree with the statement.

Several multiple-item scale variables were also constructed as linear combinations of item average scores. In addressing the second research question about whether stakeholder views of training program evaluation depend on the results they perceive for the program, all items from both part 1 and part 2 were initially grouped respectively in terms of specific subcategories of training results and evaluation purposes, processes, and consequences. This process ultimately resulted in the definition of three predictor variables for training results and five criterion variables for training evaluation. The details of predictor and criterion variable construction are described next.

Training Program Result Predictor Variables

Referencing previous results (Michalski & Cousins, in press), all items in part 1 of the survey were organized conceptually into subcategories of training results. As shown in **Table 3** the items were grouped initially according to the following six conceptual subcategories of training results: (1) business and market, (2) customer satisfaction, (3) product development, (4) employee productivity, (5) training efficiency, and (6) employee satisfaction. While each of these initially contained a minimum of three items to allow for the calculation of reliability coefficients (Cronbach's alpha[2]) unacceptably low reliability coefficients were revealed using these sub-categories. The coefficients for each of the categories were as follows: business and market ($\alpha = .53$), customer satisfaction ($\alpha = .59$), product development ($\alpha = .46$), employee productivity ($\alpha = .40$), training efficiency ($\alpha = .48$), and employee satisfaction ($\alpha = .61$). Although Hinkin (1998) stated that a coefficient alpha value of .70 is considered large for exploratory measures, the original reliability coefficients were considered too low. To improve this situation items from part 1 were regrouped into three conceptually broader subcategories describing training results in terms of (1) customer satisfaction, (2) product development, and (3) employee satisfaction. As shown in **Table 4** this regrouping did substantially improve reliability among the variables and so these were developed and used for subsequent analysis.

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[2] Cronbach's Coefficient Alpha (α) is a general form of the Kuder-Richardson (K-R) 20 formula used to estimate the internal consistency of items when they are not scored dichotomously, see Borg and Gall (1989).

Table 1. Item-Level Results by Stakeholder Group for Survey Part I

Survey Items: Training Program Results	Stakeholder Group	n	M	SD
• An effective training program attracts or retains the most talented employees.	manager	59	3.34	.94
	non-manager	220	3.53	.98
• Effective training ultimately improves business profitability.	manager	60	4.35	.66
	non-manager	219	4.37	.66
• The main purpose of training should be to improve customer satisfaction	manager	60	2.90	1.04
	non-manager	220	2.95	1.00
• Effective training should directly support our customer's business objectives	manager	60	3.43	.85
	non-manager	220	3.41	.86
• Effective training should help designers to anticipate customer requirements	manager	60	3.33*	.97
	non-manager	220	3.65*	.89
• Effective training should improve employee understanding of product development processes	manager	60	4.03	.64
	non-manager	219	3.90	.67
• Effective training ultimately improves employee-customer relations	manager	60	3.62	.87
	non-manager	220	3.43	.81
• The main purpose of training should be to improve employee productivity	manager	60	3.83	1.01
	non-manager	219	3.98	.94
• The availability of high-quality training leads to increased employee satisfaction.	manager	60	4.40	.74
	non-manager	220	4.39	.61
• Effective training ultimately leads to product innovation	manager	60	3.22**	1.01
	non-manager	219	3.67**	.90
• Only job-specific training should be provided to employees	manager	60	2.03	.92
	non-manager	220	2.08	.95
• Effective training should result in the immediate use of knowledge on the job	manager	59	3.36	.94
	non-manager	220	3.31	1.02
• Training is the best way to make new employees productive as quickly as possible	manager	60	3.85	.88
	non-manager	220	3.90	.94
• Employee pay and employee training are directly related	manager	60	2.22	.92
	non-manager	220	2.43	.83
• The main purpose of training should be to develop employees professionally	manager	60	3.77**	.91
	non-manager	219	4.16**	.71
• Employee promotion and employee training are directly related	manager	59	2.54	.95
	non-manager	220	2.70	.98
• Product quality can be improved substantially through employee training	manager	60	4.32	.68
	non-manager	218	4.19	.86
• All training provided to employees should have a positive "Return on Investment" (ROI)	manager	60	3.45	1.00
	non-manager	219	3.50	.95
• Training program objectives should be derived directly from organizational business objectives	manager	59	3.36	.98
	non-manager	219	3.14	.95
• Product Time to Market (TTM) can be reduced substantially through employee training	manager	60	3.48	.98
	non-manager	219	3.58	.84

Note: group mean comparison using independent samples t-test (alpha = .05)
* $p \leq .05$ ** $p \leq .001$

Table 2. Item-Level Results by Stakeholder Group for Survey Part II

Survey Items: Training Program Evaluation	Stakeholder Group	n	M	SD
• The main purpose of training program evaluation is to improve the program	manager	57	4.07	.62
	non-manager	216	4.08	.62
• The main purpose of training program evaluation is to judge whether the program should be continued	manager	56	3.80	.67
	non-manager	216	3.94	.69
• Training specialists should be actively involved in performing the training program evaluation	manager	58	3.72	.79
	non-manager	217	3.88	.69
• Trainees (training recipients) should be actively involved in performing the training program evaluation	manager	58	4.14	.54
	non-manager	217	4.04	.69
• Training sponsors (line management) should be actively involved in performing the training program evaluation	manager	58	3.74	.81
	non-manager	217	3.69	.75
• External evaluation experts should be actively involved in performing the training program evaluation	manager	58	3.28	.99
	non-manager	216	3.40	.89
• Questionnaire data from training participants is essential in training program evaluation	manager	59	3.63	.79
	non-manager	216	3.74	.76
• Interview data from training participants is essential in training program evaluation	manager	59	3.61	.70
	non-manager	216	3.40	.82
• Focus group data from training participants is essential in training program evaluation	manager	59	3.44	.73
	non-manager	216	3.40	.78
• Knowledge test data from training participants is essential in training program evaluation	manager	59	3.47	.97
	non-manager	216	3.33	.88
• All training program evaluation results should be reported directly to training specialists	manager	59	4.05	.63
	non-manager	217	3.93	.65
• All training program evaluation results should be reported directly to trainees (training recipients)	manager	59	3.61	.89
	non-manager	217	3.63	.77
• All training program evaluation results should be reported directly to training sponsors (line management)	manager	59	4.03	.76
	non-manager	217	3.83	.76
• Training program evaluation results should be used mainly as a basis for future decisions about the program	manager	56	3.89	.73
	non-manager	215	3.98	.67
• Training program evaluation results should be used mainly to develop new knowledge about program effects	manager	55	3.82	.47
	non-manager	213	3.77	.71
• Training program evaluation results should be used mainly to comply with quality standards such as ISO audits	manager	57	2.14**	.93
	non-manager	215	2.84**	.86
• Training program evaluation results should be used mainly to routinely monitor program activities	manager	57	3.25	.83
	non-manager	215	3.36	.85
• Training program evaluation results should be used mainly to determine trainee satisfaction with the program	manager	57	3.82	.85
	non-manager	215	3.87	.74
• Training program evaluation results should be used mainly to determine manager satisfaction with the program	manager	57	3.25	.97
	non-manager	214	3.24	.81
• Training program evaluation results should be used mainly to determine if the program is meeting its goals	manager	58	4.10*	.58
	non-manager	215	3.90*	.72
• Training program evaluation results should be used mainly to assist trainees in selecting courses	manager	58	3.09	.88
	non-manager	213	3.34	.92

Note: group mean comparison using independent samples t-test (alpha = .05)

* $p \leq .05$ ** $p \leq .001$

Table 3. Part I item groupings as anticipated scale variables (20 total; 3 to five items per variable)

Business & Market	Customer Satisfaction	Product Development	Employee Productivity	Training Efficiency	Employee Satisfaction
-Effective training ultimately improves business profitability -Training program objectives should be derived directly from organizational business objectives -Effective training should directly support our customer's business objectives	-The main purpose of training should be to improve [organization] customer satisfaction -Effective training should help designers to anticipate customer requirements -Effective training ultimately improves employee-customer relations	-Product quality can be improved substantially through employee training -Effective training should improve employee understanding of product development processes -Effective training ultimately leads to product innovation	-The main purpose of training should be to improve employee productivity -Product Time to Market (TTM) can be reduced substantially through employee training -Training is the best way to make new employees productive as quickly as possible	-Only job-specific training should be provided to employees -All training provided to employees should have a positive "Return on Investment" (ROI) -Effective training should result in the immediate use of knowledge on the job	-The availability of high-quality training leads to increased employee satisfaction -The main purpose of training should be to develop employees professionally -Employee promotion and employee training are directly related - Employee pay and employee training are directly related -An effective training program helps to attract and/or retain the most talented employees

Table 4. New Predictors—Training Program Results (15 out of 20 original items used)

Predictor Variable	Description (Composite Items)	α	Mean*	SD	N
Customer Satisfaction	Composite (average) of 4 items associated with external customer satisfaction (from survey part I): (1.6) The main purpose of training should be to improve customer satisfaction (1.9) Effective training should help designers to anticipate customer requirements (1.14) Effective training should directly support our customer's business objectives (1.15) Effective training ultimately improves employee-customer relations	.67	3.35	.282	280
Product Development	Composite (average) of 6 items associated with product development and productivity (part I): (1.1) The main purpose of training should be to improve employee productivity (1.3) Product quality can be improved substantially through employee training (1.10) Product Time to Market (TTM) can be reduced substantially through employee training (1.12) Effective training should improve employee understanding of product development processes (1.16) Training is the best way to make new employees productive as quickly as possible (1.18) Effective training ultimately leads to product innovation	.60	3.85	.252	277
Employee Satisfaction	Composite (average) of 5 items associated with employee satisfaction (part I): (1.3) The availability of high-quality training leads to increased employee satisfaction (1.8) The main purpose of training should be to develop employees professionally (1.13) Employee promotion and employee training are directly related (1.17) Employee pay and employee training are directly related (1.20) An effective training program helps to attract and/or retain the most talented employees	.61	3.40	.873	277

*The same 5-point scale was used for all items: 1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, 5=strongly agree

It should be noted that, in an effort to obtain better scale variable reliability, a departure was taken from the conceptual framework and an exploratory factor analysis (principle components with varimax rotation; factor extraction using Eigenvalues > 1; factor loadings $\geq$ .40) was also performed on all part 1 items. This yielded five factors which accounted for 52% of the variance. However, because only one factor (factor 1) yielded a potential scale variable with a reliability in excess of .7, and because the remaining potential scale variables (defined by the remaining factors) were conceptually unrelated to each other, the use of factor analysis to construct scale variables was abandoned in favor of the original conceptual framework described. **Appendix C** contains the detailed results of this factor analysis.

Training Program Evaluation Criterion Variables

Referencing the conceptual framework and qualitative results (Michalski, 1998), a set of predictor variables related to training evaluation was also developed from the part 2 survey items. Similar to the process used to derive the part 1 scale variables, the criterion variables were also organized into conceptually sound subcategories describing stakeholder perceptions of the purposes, processes (data collection, participation and involvement) and consequences of training evaluation. **Table 5** shows the initial item groupings by subcategory. As shown training evaluation purposes are described in terms of formative and summative categorizations. Evaluation processes are divided into three subcategories related to (1) stakeholder involvement in the performance of the evaluation, (2) data collection, and (3) reporting audience.

Additionally, eight items were included to describe various instrumental, conceptual, and symbolic consequences of evaluation. The reliability coefficients initially obtained for each item subcategory were as follows: purposes (α =.65), processes involvement (α =.59), data (α =.66), reporting (α =.56); consequences (all items combined, α =.75). Again, adhering to the original conceptual framework, these groupings were slightly re-organized to improve reliabilities and construct the criterion variables shown in **Table 6**.

As shown, the criterion variables developed to describe training evaluation include (1) evaluation purposes, (2) data collection, (3) participation and involvement, (4) instrumental-conceptual use, (5) symbolic use. The reliabilities for these variables fall in the range of .65 to .69. Similar to the process used to analyze the part 1 items, a factor analysis (principle components with varimax rotation; factor extraction using Eigenvalues > 1; factor loadings $\geq$ .50) was also performed for the part 2 survey items. Of the seven factors extracted reliability coefficients ranged between .61 and .42. Because of these low reliabilities and because the items composing the factors were conceptually unrelated, factor analysis was again abandoned (in favor of the conceptual groupings described). The factor analysis details for the part 2 items are also displayed in **Appendix C**. The next section describes the zero-order intercorrelation relationships revealed among the scale variables derived.

Table 5. Part II items: 25 total (includes OTHER write-in items)

Purposes	Processes	Consequences
-The main purpose of training program evaluation is to improve the program -The main purpose of training program evaluation is to judge whether the program should be continued -OTHER [write in]	<u>Involvement</u> -Training specialists should be actively involved in performing the training program evaluation -Trainees (training recipients) should be actively involved in performing the training program evaluation -Training sponsors (line management) should be actively involved in performing the training program evaluation -External evaluation experts should be actively involved in performing the training program evaluation -OTHER [write in] <u>Data</u> -Questionnaire data from training participants is essential in training program evaluation -Interview data from training participants is essential in training program evaluation -Focus group data from training participants is essential in training program evaluation -Knowledge test data from training participants is essential in training program evaluation -OTHER [write in] <u>Reporting</u> -All training program evaluation results should be reported directly to training specialists -All training program evaluation results should be reported directly to trainees (training recipients) -All training program evaluation results should be reported directly to training sponsors (line management) -OTHER [write in]	-Training program evaluation results should be used mainly as a basis for future decisions about the program -Training program evaluation results should be used mainly to develop new knowledge about program effects -Training program evaluation results should be used mainly to comply with quality standards such as ISO audits -Training program evaluation results should be used mainly to routinely monitor program activities -Training program evaluation results should be used mainly to determine trainee satisfaction with the program -Training program evaluation results should be used mainly to determine manager satisfaction with the program -Training program evaluation results should be used mainly to determine if the program is meeting its goals -Training program evaluation results should be used mainly to assist trainees in selecting courses -OTHER [write in]

Table 6. New Criterion Variables—Training Program Evaluation (all 21 survey items used)

Criterion Variable	Description (Composite Items)	α	Mean*	SD	N
Evaluation Purposes	Composite (average) of 2 items associated with evaluation purposes (from survey part II):	.65	3.99	.117	272
	(2.1) The main purpose of TPE is to improve the program				
	(2.2) The main purpose of TPE is to judge whether the program should be continued				
Data Collection (Process)	Composite (average) of 4 items associated with data collection process (part II):	.66	3.48	.159	275
	(2.9) Questionnaire data from training participants is essential in TPE				
	(2.10) Focus group data from training participants is essential in TPE				
	(2.11) Interview data from training participants is essential in TPE				
	(2.12) Knowledge test data from training participants is essential in TPE				
Participation and Reporting (Process)	Composite (average) of 7 items associated with participation and reporting process (part II):	.67	3.77	.228	274
	(2.4) Training specialists should be actively involved in performing the TPE				
	(2.5) Trainees (training recipients) should be actively involved in performing the TPE				
	(2.6) Training sponsors (line management) should be actively involved in performing the TPE				
	(2.7) External evaluation experts should be actively involved in performing the TPE				
	(2.14) TPE results should be reported directly to training specialists				
	(2.15) TPE results should be reported directly to trainees (training recipients)				
	(2.16) TPE results should be reported directly to training sponsors (line management)				
Instrumental-Conceptual Use (Consequences)	Composite (average) of 6 items associated with instrumental-conceptual use (part II):	.65	3.51	.485	266
	(2.18) TPE results should be used mainly as a basis for future decisions about the program				
	(2.24) TPE results should be used mainly to determine if the program is meeting its goals				
	(2.25) TPE results should be used mainly to assist trainees in selecting courses				
	(2.20) TPE results should be used mainly to comply with quality standards such as ISO audits				
	(2.19) TPE results should be used mainly to develop new knowledge about program effects				
	(2.21) TPE results should be used mainly to routinely monitor program activities				
Symbolic Use (Consequences)	Composite (average) of 2 items associated with symbolic (part II):	.69	3.55	.436	271
	(2.22) TPE results should be used mainly to determine trainee satisfaction with the program				
	(2.23) TPE results should be used mainly to determine manager satisfaction with the program				

*The same 5-point scale was used for all items: 1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, 5=strongly agree

Relationships Among Scale Variables

Table 7 shows the zero-order intercorrelations among the scale variables constructed to describe stakeholder views of training results and evaluation. This table shows the five criterion variables (variables one through five) presented first followed by the three predictors (variables six through eight). Significant ($p \leq .05$) to highly significant ($p \leq .001$) relationships were observed among all values. As shown by the cell values in the first five intersecting rows and columns, intercorrelations among the five criterion (dependent) variables are all positive ranging from .18 to .58. All positive intercorrelations, ranging from .44 to .57, were again observed among the predictor variables (rows and columns six through eight). The moderate size of most coefficients suggests that the scale variables are measuring different constructs. Also, because these values are moderate, assumptions regarding multicolinearity are not likely to have been violated. Additionally, as shown by the cell values in the intersections of columns one through five with rows six through eight, all intercorrelations between the predictor and criterion variables are positive (ranging from .15 to .29). These values suggest a positive relationship between group perceptions about training results (predictor) and those related to training evaluation (criterion variables).

Table 7. Zero-order Intercorrelations among criterion and predictor (scale) variables

(Pairwise deletion of missing data, N= 270 to 280)

Variable[a]	1	2	3	4	5	6	7	8
1. Evaluation Purposes	--							
2. Data Collection	.29***	--						
3. Participation and Involvement	.35***	.46***	--					
4. Instrumental-Conceptual Use	.36***	.33***	.41***	--				
5. Symbolic Use	.18**	.27***	.37***	.58***	--			
6. Customer Satisfaction	.17**	.17**	.26***	.25***	.24***	--		
7. Product Development	.16**	.19**	.24***	.17**	.15*	.57***	--	
8. Employee Satisfaction	.18**	.21***	.32***	.29***	.23***	.44***	.48***	--

[a] Scale variables 1 through 5 are dependent (criterion) variables; 6 through 8 are independent (predictor) variables.

*$p \leq .05$ **$p \leq .01$ ***$p \leq .001$

Analysis of Group Differences

A MANOVA[3] procedure was performed to test for differences between groups regarding views of training results using the three predictor variables constructed. A marginal difference between the groups was revealed ($p = .055$) by Hotelling's multivariate F (2.563; $df = 3$; 276). While this multivariate result was marginal, as shown in **Table 8** separate univariate tests revealed that the only significant effect was associated with the variable "employee satisfaction" ($F = 7.05$, $p = .008$).

Table 8. Predictor Variable Univariate Tests

Variable	SS	df	MS	F	p
Customer Satisfaction	1.31	1	1.31	.20	.655
	1816.63	278	6.54		
Employee Satisfaction	49.46	1	49.46	7.05	.008
	1950.32	278	7.02		
Product Development	6.66	1	6.66	.67	.415
	2781.12	278	10.00		

The F tests the effect of manager based on the linearly independent pairwise comparisons among the estimated marginal means.

Item-level t-tests on the five statements composing this variable revealed a significant difference ($p \leq .001$) for only a single statement (1.8) on employee professional development. Based on the five-point scale used (1 = strongly disagree through 5 = strongly agree) non-managers agreed more strongly ($M = 4.16$) than managers ($M = 3.77$) with the statement: "The main purpose of training should be to develop employees professionally."

Of the remaining two predictor variables, "customer satisfaction" and "product development" each contained one statistically significant item based on the item-level t-tests discussed. Non-managers agreed more strongly ($M = 3.65$) than managers ($M = 3.33$) with the statement "Effective training should help designers to anticipate customer requirements" in the customer satisfaction variable. Non-managers also agreed more strongly ($M = 3.67$) than managers ($M = 3.22$) with the statement "Effective training ultimately leads to product innovation" in the product development variable.

The MANOVA procedure was also used to examine differences between groups regarding views of training evaluation using the five criterion variables constructed. Somewhat greater difference between groups was revealed ($p = .022$) by Hotelling's multivariate F (2.691; $df = 5$; 264). As shown in **Table 9** separate univariate tests revealed only the variable describing "Instrumental-Conceptual Use " to be significant ($F = 5.83$, $p = .016$).

[3] According to SPSS, Inc. (1997) both MANOVA and GLM provide generalized procedures for analysis of variance and covariance. The major distinction is that GLM uses a non-full-rank or overparameterized indicator variable approach in linear models instead of the full-rank reparameterization approach used in MANOVA. For the current analysis both procedures yielded identical results.

Table 9. Criterion Variable Univariate Tests

Variable	SS	df	MS	F	p
Evaluation Purposes	1.97	1	1.97	1.51	.221
	349.80	268	1.31		
Data Collection	7.84	1	7.84	1.55	.215
	1359.92	268	5.07		
Participation and Involvement	2.38	1	2.38	.26	.614
	2502.67	268	9.34		
Instrumental-Conceptual Use	52.33	1	52.33	5.83	.016
	2406.77	268	8.980		
Symbolic Use	5.77E-02	1	5.768E-02	.029	.865
	530.24	268	1.98		

The F tests the effect of manager based on the linearly independent pairwise comparisons among the estimated marginal means.

Significant differences were found at the item-level in two of the six items composing this variable. As discussed in the item-level analysis, both statements that showed significant differences between managers and non-managers were found in this scale variable. In the first of these, managers agreed more strongly ($\underline{M} = 4.10$) than non-managers ($\underline{M} = 3.90$) with the statement "Training program evaluation results should be used mainly to determine if the program is meeting its goals." However, non-managers agreed much more strongly ($\underline{M} = 2.84$) than managers ($\underline{M} = 2.14$) with the statement " Training program evaluation results should be used mainly to comply with quality standards such as ISO audits." As described later, several of the written comments also support these differences. For example, these comments suggest that managers tend to perceive training results more in terms of the extent to which they help to achieve certain management objectives, hence, they favor instrumental-conceptual modes of evaluation utilization that support this view.

Perceptions of evaluation in terms of training results.

Stepwise multiple regression was also used to further explore the relationship between stakeholder views of training results and evaluation. As shown in **Table 10** the five criterion variables were regressed on the three predictors in separate models. As indicated by the values for $\underline{R}^2$, a relatively low amount of variability was explained by each of the models. However, several significant relationships were revealed between stakeholder views of training results in terms of both employee and customer satisfaction. As shown, the predictor labeled "employee satisfaction" was retained and most significant in all models constructed. This outcome suggests that stakeholder group perceptions of evaluation are influenced by their perceptions of training results particularly in terms of employee satisfaction (see research question two).

Table 10. Stepwise Multiple Regression of Training Program Evaluation on Training Program Results

Criterion	R^2	df[a]	F	Predictor Variables Remaining in Model	t
Evaluation Purposes	.034	1, 271	9.52**	Employee Satisfaction	3.09**
Data Collection	.042	1, 273	11.96***	Employee Satisfaction	3.46***
Participation and Involvement	.118	2, 273	18.19***	Employee Satisfaction	4.03***
				Customer Satisfaction	2.23*
Instrumental-Conceptual Use	.102	2, 271	15.41***	Employee Satisfaction	3.53***
				Customer Satisfaction	2.27*
Symbolic Use	.076	2, 269	11.09***	Customer Satisfaction	2.57*
				Employee Satisfaction	2.39*

[a] regression; residual degrees of freedom
*p ≤ .05; **p ≤ .01; ***p ≤ .001

Discussion and Limitations of Quantitative Results

Perhaps not surprisingly in view of the results obtained in the previous two studies, only moderate variation was found among the training client group stakeholders. The variation that was found, however, supports the general predictions made regarding manager and non-manager emphasis in terms of both the results and evaluation of training. While both groups related training results closely with overall employee satisfaction, significant differences found in both the univariate and multivariate tests suggest that employees perceived training results more in terms of their own professional development than did their line manager counterparts. Both groups of training evaluation were shown to be related to their views of training results marginally in terms of employee and customer satisfaction.

Before attempting to generalize these results further, however, several limitations should be recognized. First, the relatively low reliability exhibited among the scale variables is considered a notable limitation. In performing these analyses it was found that various other item combinations (e.g., using factor analysis) could indeed produce scale variables with higher reliability coefficients. However, as described such combinations tended to deviate profoundly from the conceptual framework and research questions thereby producing "variables" that largely defied interpretation. For example, grouping the part 1 items related to "pay" and "promotion" does indeed yield a high coefficient alpha (.78), however, this is the case simply because there is no significant difference between managers and non-managers in their mild disagreement that training is directly related to these. Simply stated, neither group indicated a belief that there is some direct proportionality between training and one's pay or promotion status in the organization.

The second limitation to note is the relatively low R^2 coefficients obtained in the regression analysis. The ability for the models defined to describe more variation could well be related to the relatively low reliabilities for the scale variables. Hence, while the results obtained suggest that stakeholder group perceptions of training program evaluation may be moderately dependent on the training results they perceive in terms of employee satisfaction, further investigation could only improve our understanding of this apparent relationship.

A third limitation is that these results were obtained within a single organization. Any generalizations to be made from the results would have to be based on a broader deployment of the survey instrument in a range of representative organizational settings. Lastly, and perhaps most obvious, this investigation was limited to only two of the three stakeholder groups identified. As explained, the training provider group did not have a population sufficient to survey and compare relative to the size of the other two groups.

Even given these limitations, however, the results obtained might be best viewed as a useful beginning for continuing exploration beyond the scope of the present research. Also, in addition to these quantitative results, a good number of written comments were also supplied. These were useful to more thoroughly understand the quantitative results. They are discussed next.

Written Comments

In addition to responding to the quantitative survey items, respondents also provided a higher than anticipated volume of written comments. The written comments were especially useful in assisting in the overall interpretation and meaningfulness of the survey data. Using a similar coding analysis approach as described for the previous qualitative research, these comments were content analyzed[4]. This section presents the results of these analyses.

[4] All qualitative analyses were performed with the aid of QSR NUD-IST (4.0) software.

Training results

Comments were extracted from the completed surveys and transcribed for coding and analysis. Because the comments were provided by respondents in the context of a particular survey section (and were therefore bounded by the questions being asked) two broad coding categories were defined to correspond respectively with the first two sections of the survey on training results and training program evaluation. Several start codes were defined to correspond with the research questions and conceptual categories initially established for the analysis of the quantitative results (see Tables 3 and 5 respectively). In addition, several codes were added during analysis to accommodate other comments not related to the start codes defined. Both the start and add-on codes are shown in **Appendix D**. While both managers and non-managers commented similarly in many areas, several differences also emerged from the analysis.
Both managers and non-managers commented about training results in common terms of employee and customer satisfaction, product development, and business results. Examples of typical comments about training results made by managers included the following:

- A happy, productive, effective employee producing a high-quality effective product. Poor, ineffective, training is more a dissatisfier than good training is a satisfier; continuous employee development; development of skills needed for future growth of [the company]
- Happy and productive employees that are knowledgeable in both technical skills, process skills best practices, and people skills
- Improved effectiveness; improved ESAT [employee satisfaction] and CSAT [customer satisfaction]

Non-managers provided similar comments related to employee and customer satisfaction:

- Increased awareness of products, processes; CSAT as well as ESAT
- Improve employee satisfaction
- A satisfied employee
- Effectively trained and satisfied participants

Both groups also recognized training's role in keeping up with technological, and industry-specific change. Related to this managers commented that training should result in

- increased productivity, quick familiarity with product and work environment; allow designers to stay current with leading-edge technology advances and practices
- a program which can adopt quickly to changing needs

Perhaps because they are most directly affected by job-specific knowledge requirements, non-managers cited training results mostly in relation to their own jobs in relation to product development. In their view effective training results in

- employees knowledgeable in their field; continuing training is necessary to stay on the cutting edge [it] makes employees productive as fast as possible; improves employee-customer relations; leads to product innovations
- [broadening] employee knowledge as well as to enhance their effectiveness
- [a] continuously update [of] employees knowledge (since the technology is evolving so fast)
- employees who are effective in their current positions and up-to-date with the changing world. [Also serves as] a method for employees to improve professionally and improve their knowledge
- employees that can adapt to a rapidly changing business environment; employees that are willing/capable of anticipating future customer requirements
- [developing employee awareness of] technological domain trends
- [developing employee awareness of] market trends, new technology

Such comments about "keeping up" also extended into those specifically about helping newly-hired employees learn sufficiently fast to become effective on the job. The following manager comment is illustrative:

> [The training program should produce] new hires effectively trained and confident to act independently more often; reducing other staff's time in providing assistance; increasing quality of their output sooner; connecting them to their environment faster

However, beyond these comments, non-managers tended to describe training results more specifically in terms of their own professional development. They also tended to better articulate training's relationship to the roles and importance of non-management employees (such as designers and engineers) than did managers. Non-managers specifically connected improved professional knowledge and skills with the ultimate benefit of the company. In this regard they saw training results in terms of

- More productive employees; better specific or general knowledge of the product or company; better well-being for the employee which pays off for the [company] and its shareholders
- Improving the productivity of the employees; increase ESAT; open-up new job-related opportunities for employees; help retain talented employees; improve the overall competitiveness of [the company]
- Quality and productivity; higher morale; employee effectiveness and better performance; better communication of complex ideas and designs; fewer conflicts due to ignorance or differences in background; a professional skilled workforce that is keeping up with changes in technology
- A satisfied employee who can effectively perform assigned tasks; the outcome of assignments will be received by everyone involved management , employee, and customer increased satisfaction and sense of self which translates to bottom-line productivity

While both groups also recognized strictly personal training results, non-managers emphasized such results as illustrated by the following comments:

- Specific knowledge usable for employee for job at hand; general knowledge of the employee's field; personal skills usable on the job; general skills and knowledge of personal value to the employee
- a program which provides a balance between technical and non-technical courses as well as allows professional development in non-work related areas
- being kept happy with up-to-date technical training in their area as well as personal-interest courses

In contrast to such comments, managers made reference to organizational, business, and program objectives:

- Achieving a specific objective, be it specific skills required for a job or softer skills which can be applied generally; in the case of [our corporate division] these objectives should be driven by both business needs as well as organizational [needs]
- Does the program meet the objectives? Do the target audience accrue the value/knowledge desired? Evaluation involves collecting evaluation data, analyzing and presenting results to trainers and sponsors; the results should be used to determine if business requirements [are met]
- Metrics against objectives (defects, productivity)

Although non-managers also made reference to training's relation to such objectives (as described above) this group emphasized training results most related to job, professional, and career development. Both the written comments from part 1 (training evaluation) and those from part 2 (training evaluation) reflect the quantitative findings described. Comments from survey part 2 are discussed next.

Training Evaluation

Written comments obtained from both groups regarding training program evaluation were more general. In contrast to part 1 of the survey on stakeholder views of training results, there was a tone in the written responses that "training evaluation is not my specialty so please don't expect me to comment too knowledgeably or authoritatively in this area." The following manager comments support this view:

- I never heard of [training program evaluation] before today, therefore, I am not familiar with its objectives.
- What is this "training evaluation" thing? Are you talking about a pre-existing process, some new process, or simply the act of asking people to assess the quality of courses they have taken? I have assumed it is the latter.

The following comment provided by a non-manager also illustrates this view:

- You guys are the professionals; I have no idea how training programs should be evaluated.

Also, as pointed out in connection with the survey response demographics, such comments may help to explain the very slight decrease in the number of respondents for part 2 of the survey compared with part 1. One individual, a non-manager who completed the first but not the second part quantitative items of the survey, commented in the part 2 section:

> Was this survey [training program evaluation]? If so, I guess I should have answered the questions, if not, then I'm not familiar with [training program evaluation] and thus not in position to answer.

Nevertheless, many respondents did provide comments which serve to shed light upon and further explain the response patterns observed. The next section describes stakeholder comments provided in connection with the purposes of training evaluation.

Purposes

Neither group favored exclusively formative or summative evaluation purposes based on their written comments. Rather, both indicated a balanced view between evaluation for training program improvement and judgment. Representative manager comments supporting formative evaluation purposes included

- [training program evaluation] results in long-term curriculum improvements.
- Training evaluations should be used to continuously improve training.

Similarly, non-managers commented that training program evaluation

- [should] improve the quality of the existing programs; lead to the design of new programs to meet the new needs of the [lines of business]
- [leads to] a continuous improvement in the material presented in the training sessions and the presenters of the material
- result[s] in improved training programs
- [leads to] improved training programs; facilitate[s] employee course decisions
- result[s] in better training program
- [should be used to] improve [the] training program

Manager comments indicating a more summative posture included evaluation purposes to

- result in an accurate audit of the value currently being delivered by training
- ensure [the] program meets stated objectives
- identify the value to the company

Non-manager comments supporting this more summative perception of evaluation purposes included suggestions that training program evaluation

- results in determining program effects and goals
- [results in the] elimination or revision of ineffective programs

- [serves to] prune courses—discontinue some, add others
- [determines] whether the program is effective
- [serves to] evaluate the usefulness of the program
- [serves to assess] the effectiveness of the training program
- [allows evaluators] to see what has been gained from the program
- [helps to] remove ineffective training
- [serves to] to determine the degree of success
- [helps] to determine if the program should continue
- [helps] to decide which courses to keep

In addition to comments regarding generally formative and summative purposes, miscellaneous other comments focused on assessing instructor competence, facilitating team building, and benchmarking the training program against those in other firms. Beyond these perceived evaluation purposes, one non-manager implied a certain professional faith in training professionals (and perhaps reinforced a general view that respondents do indeed recognize training and its evaluation as special areas of expertise outside their own) by indicating the purpose of training program evaluation to be simply "whatever uses the training team chooses." Comments made in connection with training evaluation processes are presented and discussed next.

Processes

Written comments were also included pertaining to the training evaluation process. Corresponding to the survey, these comments were focused on the identification of (1) who should be involved in the process, (2) data required, and (3) the reporting of evaluation results. The following sections present written comments made by both managers and non-managers about these areas of the evaluation process.

Involvement.

Both groups made comments to indicate favoring a range of involvement in the training program evaluation process. In these comments many respondents specified a more precise hierarchical relationship for the involvement of immediate line management, that is, one level up from the training participant. Managers specifically mentioned the involvement of both the "immediate manager" of the training participant, as well as, "executive/senior management." Non-managers commented on the involvement of the following:

- senior business line managers
- managers
- trainees' managers
- immediate manager
- next level of management
- business line managers for future ventures
- immediate manager

The following comments on the involvement of training participants were also included:

- involve trainees perception of usefulness of training as applicable to their responsibilities
- to determine...if the program is meeting employee's expectations and needs
- feedback from trainees that are attempting to apply what they have learned

Of all comments provided by both managers and non-managers, only a few comments (by non-managers) implicating the involvement of training specialists were included:

- help course developers improve course content and presentation to meet the needs of the trainees and line management

- [training] specialists
- individuals who deliver training

In addition to suggesting the involvement of each of the three stakeholder groups several respondents identified several other internal and external groups. Managers suggested the involvement of "universities and other companies" as well as "external consultants who are experts in their area." Non-managers mentioned the involvement of

- individual contributors [ICs]
- customers
- auditors [ISO and quality]
- observation by external expert [individuals and groups]
- trainers (the ones training)
- subject matter experts (SMEs)

Data.

Substantially fewer comments were made about the kinds of data required for the training program evaluation process. In addition to the data formats explicitly stated in the survey items included, both groups suggested several other forms of data related to the annual employee performance review process. Several non-managers further commented on the need to obtain feedback data from course instructors as well as training program participants as follow-up and performance data 1 month after the completion of a program course. An interesting comment was also made by a manager who simply stated that "some data are essential, but no individual data listed above are essential." This individual did not elaborate on what these "essential" data might be.

Reporting.

Comments about training program evaluation reporting included suggestions to report results to both management and non-management groups in the line organization as well as instructors of program courses. While, relative to the other categories for which it was possible to supply written comments, very few comments were included about the report audience, both managers and non-managers emphasized that any such results should be made widely available to any interested individual or group in the organization. One manager simply commented that training program evaluation results should be made available to "all stakeholders." Echoing this view non-managers suggested availability to

- all interested parties
- whomever applicable (based on need)
- anyone in the organization
- [the organizational] community

As an external reporting audience, one non-manager also suggested that training program evaluation be made available to "customers."

Consequences

A relatively few original comments were offered by either group pertaining to the consequences of training program evaluation. There are at least three possible reasons for this. The first of these is related simply to respondent fatigue as the comments fields for this section of the survey were all located on the third page (of the four-page survey). A second possible explanation is the general lack of perceived respondent expertise in evaluation. As discussed earlier, several respondents indicated that they felt "unqualified" to add extensive comments based on their limited evaluation background. A third reason is that the eight part 2 survey items (2.18 through 2.25) effectively covered and exhausted the gamut of consequence possibilities.

Particularly in connection with the first reason (fatigue) by the time most respondents reached the additional comments section they may well have been eager to reach the last page to complete the survey. Nevertheless, some additional comments were provided here. These suggested largely instrumental evaluation consequences, for example, for course and program improvement as well as to assess whether training participant needs were met.

Discussion and Limitations of Qualitative Comments

Rather than promote selective interpretation of the quantitative results discussed, the written comments presented and discussed should be viewed to augment those results. Brief comments were liberally provided by both managers and non-managers. With a few exceptions, most of these can be placed in one or several of the following categories: (1) comments that restated or reiterated one or more of the survey items (e.g., training should contribute to customer or employee satisfaction), (2) comments expressing a lack of expertise perceived as a requirement to respond "correctly" to the items in the second part of the survey (e.g., I don't know much about evaluation so don't expect my responses to be very meaningful), (3) specific suggestions for course or program improvement (e.g., course notes should be made available to participants before they attend the course). Nevertheless, along with some of the more original comments which spoke more directly to the research questions, taken as a whole the comments should be viewed as a valuable addition to the quantitative results in providing additional information about respondent perceptions of training results and evaluation.

Overall Limitations

Both general and specific limitations have been discussed regarding this investigation. As described above most of these concern the quantitative aspects of reliability, validity, internal consistency, and generalizability of the findings. Regarding the qualitative data collected through the written comments, some additional limitations should be mentioned. First, the written comment sections of the survey were necessarily restricted. While many respondents did choose to use the limited space provided to supply such comments. By design, however, these were relatively brief and focused on the topical areas specified (training results and evaluation). While one respondent actually included a separate sheet of typed comments, this was clearly the exception rather than the norm. Hence, because this investigation was concerned primarily with quantitative data collection, most of its limitations revolve around the quantitative limitations discussed above.

A second overall limitation concerns the scope. As discussed, sampling for the investigation was done in a single division that is part of a much larger total corporate organization. While this division seems intuitively representative of both other divisions within the company (and perhaps the company itself), only repeated measures involving larger samples can substantiate further generalization of results. As mentioned, this is certainly the case for generalizations beyond the case organization itself.

Summary and Conclusions

Even with the limitations mentioned, the results obtained in this research have served to supplement and extend findings from the previous two research phases. In terms of the predicted relationships and research questions posed, perceptual variation regarding training results was found to be moderate. These findings generally correspond well with both the pattern matching relationships (Michalski & Cousins, in press) and the qualitative results (Michalski, 1998). While group views regarding evaluation were observed to depend moderately on training results in terms of employee satisfaction, each group emphasized different aspects of this construct.

Both the quantitative variation indicated about training results (in terms of employee satisfaction) and training program evaluation (in terms of instrumental-conceptual use) were also

further explained by the written comments obtained. Managers perceived the importance of employee satisfaction more in terms of productivity and project requirements, whereas non-managers clearly expressed employee satisfaction more specifically in terms of their own professional and career development. This outcome can be further used to explain variation among the two groups based on each group's tendency to use evaluation both instrumentally and conceptually in ways that are congruous with their respective group's perceptions of training results. This conclusion is supported by both the univariate and the multivariate differences described.

Beyond this the results have also enabled further generalization to the case organization. As anticipated, based on both the original predicted relationships and the results of the previous two research phases, the limited variation found can be understood in terms of both groups co-location within the core function of the organization. Organizationally, and from a business perspective, both groups are much more closely aligned and united in their focus on meeting external customer and market requirements. The training provider group (not included in the survey because of their relatively small numbers) on the other hand generally focuses on satisfying both of these core stakeholder groups as internal organizational clients.

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Appendix A. Survey Cover Letter and Instrument

Survey Cover Letter

To: SONET/INM Employees May 6, 1998
Subject: Training Program Evaluation Survey

During the past week you should have received a postcard informing you of the Training Program Evaluation Survey. This survey is enclosed and your cooperation to complete it is appreciated.

We are aware that you are routinely asked to complete various satisfaction surveys, however, this one is substantially different. In addition to gauging your satisfaction with training in SONET/INM, the survey data will also be used to advance knowledge about training evaluation as part of a doctoral (Ph.D.) research project through the University of Ottawa. Greg Michalski, a regular full-time employee with the Advanced Technology Training group, is the doctoral candidate performing this research. Data for this comprehensive case study have been collected for about the last year. To date many of your peers and co-workers have contributed valuable ideas to the project. The survey enclosed represents the culmination of these efforts.

As one of over 400 randomly selected regular full-time employees being asked to participate **your response to this survey is crucial** because your views will serve to represent those of all division 1 employees..

Pilot tests were used both to improve the quality and to minimize the time required to complete the form. Most employees who pilot tested the survey completed it in about 20 minutes. All responses are completely anonymous. Pooled survey results will be made available directly to you through the Transmission Training web site (web URL address) after all surveys are returned.

If you have questions about the survey or research project, please contact Greg at (internal extension). This research project has been approved by the Ethics Committee at the Faculty of Education, University of Ottawa, Chair Professor A. Giroux (562-5800 x4066).

Please complete the enclosed survey form and return it using interoffice mail (Training Evaluation Survey, internal mail address) in the envelope provided within **one week** of receipt.

Your participation is greatly appreciated.

Many thanks,

(signed)
Vice President Principle Researcher

Enc. Training Program Evaluation Survey

Appendix A (continued)

Survey Instrument

TRAINING PROGRAM EVALUATION SURVEY (Optical Networks)

This questionnaire has four parts. **Part I** seeks your views on the results of all training (as an integrated *program)* available to you as an employee. **Part II** asks about the evaluation of thi training. **Part III** asks you to rate your satisfaction with the Transmission Training program. **Part IV** asks a few (important) employee background questions about you.

Please complete and return the questionnaire in the envelope provided (WDLN-1 Mailroom, Attn: Training Evaluation Survey) within ONE week of receipt. If you have questions, please call ESN 393-3736.

PART I: Training Results

For each of the following statements indicate your view by blackening ONE option:

(SD) Strongly Disagree (D) Disagree (N) Neither Agree nor Disagree (A) Agree (SA) Strongly Agree

dark pen or pencil is fi

Fill circles like this: ●
Not like this: ⊗

		D	D	N	A	SA
1.1	The main purpose of training should be to improve employee productivity.	○	○	○	○	○
1.2	Effective training ultimately improves business profitability.	○	○	○	○	○
1.3	Product quality can be improved substantially through employee training.	○	○	○	○	○
1.4	The availability of high-quality training leads to increased employee satisfaction.	○	○	○	○	○
1.5	Only job-specific training should be provided to employees.	○	○	○	○	○
1.6	The main purpose of training should be to improve customer satisfaction.	○	○	○	○	○
1.7	Training program objectives should be derived directly from business objectives.	○	○	○	○	○
1.8	The main purpose of training should be to develop employees professionally.	○	○	○	○	○
1.9	Effective training should help designers to anticipate customer requirements.	○	○	○	○	○
1.10	Product time-to-market can be reduced substantially through employee training.	○	○	○	○	○
1.11	All training provided to employees should have a positive "return on investment".	○	○	○	○	○
1.12	Effective training should improve employee understanding of product development processes.	○	○	○	○	○
1.13	Employee promotion and employee training are directly related.	○	○	○	○	○
1.14	Effective training should directly support our customer business objectives.	○	○	○	○	○
1.15	Effective training ultimately improves employee-customer relations.	○	○	○	○	○
1.16	Training is the best way to make new employees productive as quickly as possible.	○	○	○	○	○
1.17	Employee pay and employee training are directly related.	○	○	○	○	○
1.18	Effective training ultimately leads to product innovation.	○	○	○	○	○
1.19	Effective training should result in the immediate use of knowledge on the job.	○	○	○	○	○
1.20	An effective training program attracts or retains the most talented employees.	○	○	○	○	○

Continue on the next page. ⇨⇨⇨⇨⇨

Part I WRITTEN COMMENTS: Print below any comments you have about training resu

Hint: This field is machine-readable. Neatly printed CAPITAL letters are most easily recognized.

TRAINING RESULTS: An effective training program should result in...

PART II: Training Program Evaluation (TPE)

Part II seeks your views on the evaluation of all training available to employees as an integrated *program* (consisting of all courses, self-paced learning modules, computer-based training).

For each of the following statements indicate your view by blackening ONE option:

(SD) Strongly Disagree	(D) Disagree	(N) Neither Agree nor Disagree	(A) Agree	(SA) Strongly Agree

Fill circles like this: ●
Not like this: ⊠ ✓

		D	D	N	A	SA
2.1	The main purpose of training program evaluation (TPE) is to improve the program.	○	○	○	○	○
2.2	The main purpose of TPE is to judge whether the program is meeting its objectives.	○	○	○	○	○
2.3	The main purpose of training program evaluation is OTHER (PRINT NEATLY below): ⇨	○	○	○	○	○
2.4	Training specialists should be actively involved in performing the TPE.	○	○	○	○	○
2.5	Trainees (training recipients) should be actively involved in performing the TPE.	○	○	○	○	○
2.6	Training sponsors (line management) should be actively involved in performing the TPE.	○	○	○	○	○
2.7	External evaluation experts should be actively involved in performing the TPE.	○	○	○	○	○
2.8	OTHER individuals/groups who should be actively involved in performing the TPE (PRINT NEATLY below): ⇨	○	○	○	○	○
2.9	Questionnaire data are essential for TPE.	○	○	○	○	○
2.10	Interview data are essential for TPE.	○	○	○	○	○
2.11	Focus group data are essential in TPE.	○	○	○	○	○
2.12	Knowledge test data from training participants are essential in TPE.	○	○	○	○	○

Continue on the next page. ⇨⇨⇨⇨⇨

PART II (cont.): Training Program Evaluation (TPE)

2.13 OTHER data are essential in TPE (PRINT NEATLY below):

⇨

	D	D	N	A	SA
2.14 TPE results should be reported directly to training specialists.	O	O	O	O	O
2.15 TPE results should be reported directly to trainees (training recipients).	O	O	O	O	O
2.16 TPE results should be reported directly to training sponsors (line management).	O	O	O	O	O
2.17 TPE results should be reported directly to OTHER (PRINT NEATLY below):	O	O	O	O	O

⇨

	D	D	N	A	SA
2.18 TPE results should be used mainly as a basis for future decisions about the program.	O	O	O	O	O
2.19 TPE results should be used mainly to develop new knowledge about program effects.	O	O	O	O	O
2.20 TPE results should be used mainly to comply with quality standards such as ISO audits.	O	O	O	O	O
2.21 TPE results should be used mainly to routinely monitor program activities.	O	O	O	O	O
2.22 TPE results should be used mainly to determine trainee satisfaction with the program.	O	O	O	O	O
2.23 TPE results should be used mainly to determine manager satisfaction with the program.	O	O	O	O	O
2.24 TPE results should be used mainly to determine whether program goals are met.	O	O	O	O	O
2.25 TPE results should be used mainly to assist trainees in selecting courses.	O	O	O	O	O
2.26 OTHER TPE results (PRINT NEATLY below):	O	O	O	O	O

⇨

Part II WRITTEN COMMENTS: Print below any comments you have about training program evaluation.

Hint: This field is machine-readable. Neatly printed CAPITAL letters are most easily recognized.

TRAINING EVALUTION: Training program evaluation should (accomplish, involve, result in)..

Continue on the next page. ⇨⇨⇨⇨⇨

Part III asks you to rate your satisfaction with the *Transmission (Optical Networks) Trainin Program.* The following statements refer specifically to training offered in the *Transmissio TrainingProgram*describedat(http://47.97.96.115/Transmission/).

PART III: Transmission Training Program Satisfaction

For each of the following statements indicate your view by blackening ONE option:

(SD) Strongly Disagree (D) Disagree (N) Neither Agree nor Disagree (A) Agree (SA) Strongly Agree

Fill circles like this: ●
Not like this: ⊠

		SD	D	N	A	SA
3.1	The program offers me adequate training to improve my job performance.	O	O	O	O	O
3.2	The program offers me adequate training to develop in my career.	O	O	O	O	O
3.3	The program offers me adequate personal development training.	O	O	O	O	O
3.4	I consider the training program to be an asset to me as an employee.	O	O	O	O	O
3.5	The time I spend taking training offered in the program is worthwhile to me.	O	O	O	O	O
3.6	The program meets my needs as an employee in SONET/INM.	O	O	O	O	O
3.7	Training offered in the program helps me to understand customer requirements.	O	O	O	O	O
3.8	Training offered in the program helps me to understand product development process	O	O	O	O	O
3.9	The training program contributes to product design quality in SONET/INM.	O	O	O	O	O
3.10	I would like the program to offer me formal competency certification options.	O	O	O	O	O

Part IV asks you to provide important demographic information about yourself. **All responses are strictly anonymous and confidential.** This information is needed to analyze the overall results of the survey.

PART IV: Background Information

4.1 Please indicate your job role (blacken the appropriate circle).

○ non-manager ○ manager

4.2 How long have you been working with [the company]?

○ less than 1 year ○ 1 to 5 years ○ 5 to 10 years ○ 10 to 20 years ○ 20 years or more

4.3 Please select the job category that best describes the work you do.

Please PRINT NEATLY in area below:

○ software ○ hardware ○ verification ○ captive office ○ other ⇨ [ ]

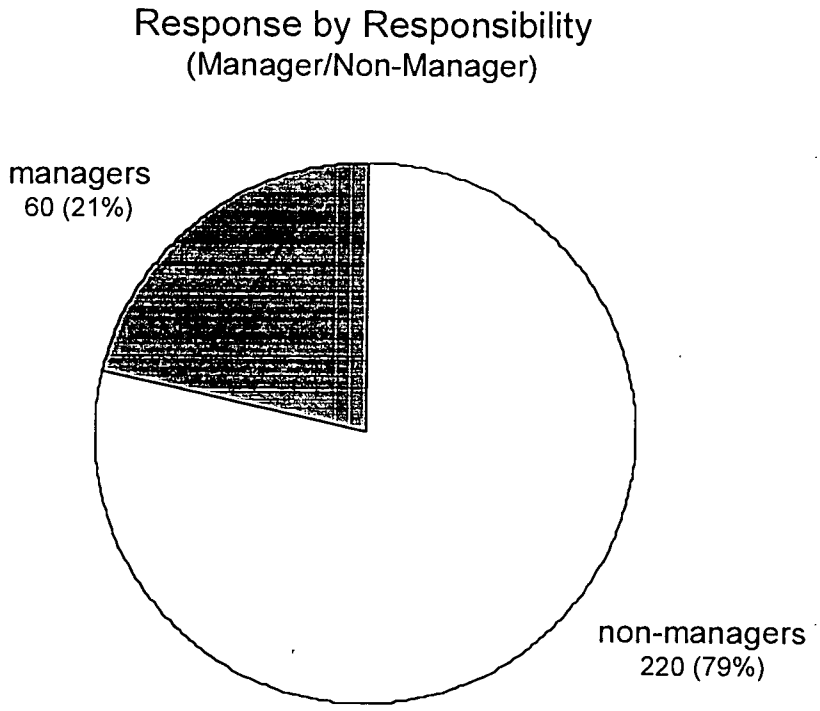
4.4 Please select the product you are most closely associated with.

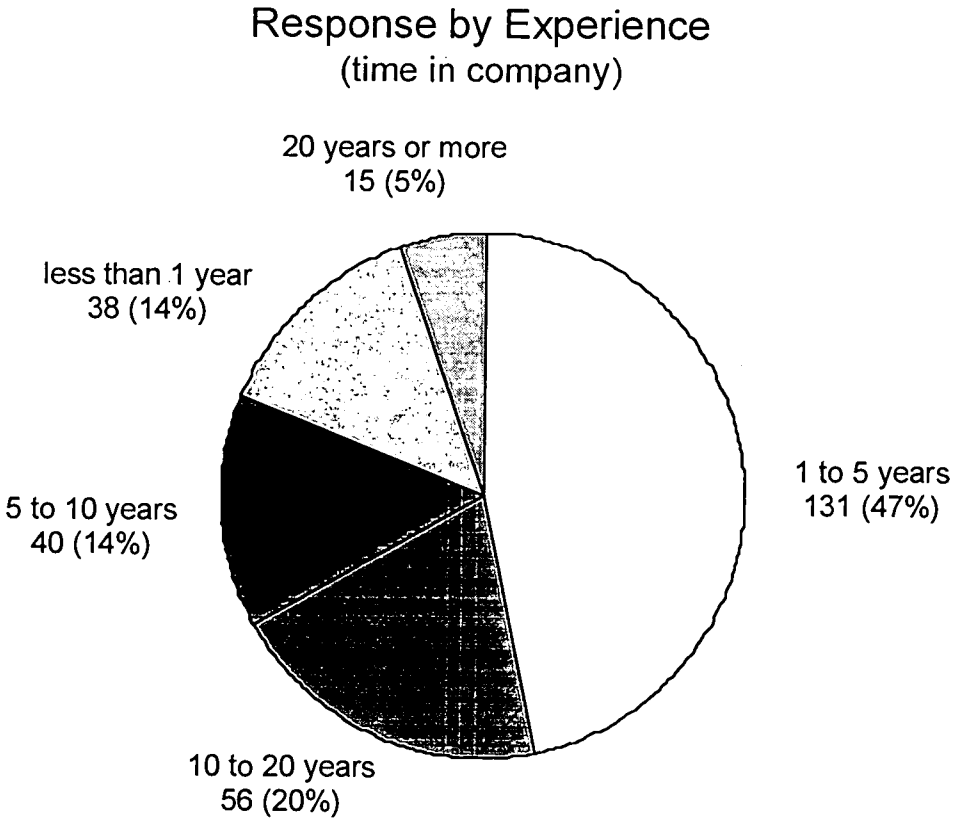
Please PRINT NEATLY below:

○ OC-3 ○ OC-12 ○ OC-48 ○ OC-192 ○ INM ○ other ⇨⇨⇨ [ ]

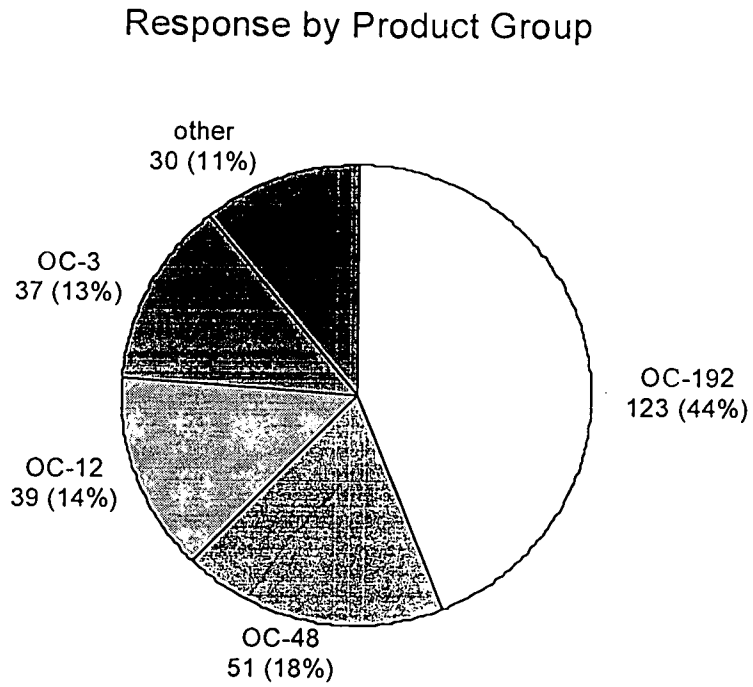
Thank you very much for your participation. Please mail your form back in the envelope provided [Return Address]

Appendix B. Survey Response Demographics.

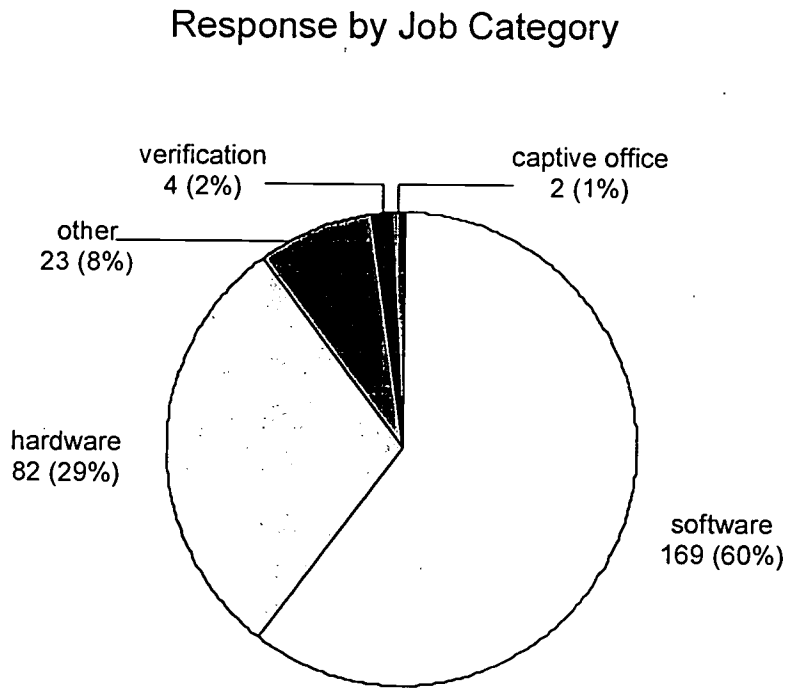




Appendix B (continued)



Note: Product development groups are organized by transmission data capacity. Optical carrier (OC) refers to the fiber optic data transmission. OC-1 is the basic SONET (synchronous optical network) transmission rate of 51.840 Mbits per second. OC-3, 12,..., 192 are multiples of this. OC-192, also referred to as "high-capacity" transport, is capable of transmission rates of 10Gbits per second.



Appendix C. Factor Analysis Results

Factor Analysis of Part I Items on Training Program Results

Rotated Component Matrix[a]

	Component				
	1	2	3	4	5
pay	.788				
promote	.758				
custreqs	.538				
innovat	.490				
emp_cust	.460		.450		
roi		.749			
know_use		.685			
custobj	.403	.514			
dev_proc		.457			
new_emp					
qual			.772		
ttm			.640		
emp_prod				.660	
job_spec				.588	
bus_prof			.423	.579	
csat				.527	
tr_objs		.423		.502	
esat					.667
prof_dev					.640
attr_emp					.637

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 22 iterations.

Total Variance Explained

	Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %
1	2.462	12.311	12.311
2	2.092	10.460	22.770
3	2.057	10.284	33.054
4	1.969	9.846	42.900
5	1.849	9.247	52.147

Extraction Method: Principal Component Analysis.

Appendix C (continued)

Rotated Component Matrix[a]

	Component						
	1	2	3	4	5	6	7
aud_use	.756						
mon_use	.681						
mgrsatus	.623						
trsatuse							
rep_spon		.745					
goal_use		.587					
questnne			.659				
dec_use			.559				
trainee			.533				
rep_trsp			.513				
effctuse							
intervw				.811			
focusgrp				.760			
knowtest				.658			
tr_spec					.745		
ext_invt					.632		
sponsor		.537			.584		
formtv						.834	
summtv						.760	
rep_tran							.826
cseselus							.595

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 9 iterations.

Factor Analysis of Part II Items on Training Program Evaluation

Total Variance Explained

	Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %
1	2.160	10.286	10.286
2	2.028	9.657	19.943
3	2.026	9.647	29.590
4	1.961	9.339	38.929
5	1.823	8.683	47.612
6	1.683	8.015	55.627
7	1.463	6.967	62.594

Extraction Method: Principal Component Analysis.

Appendix D. Code and Index Structure for Survey Written Comments

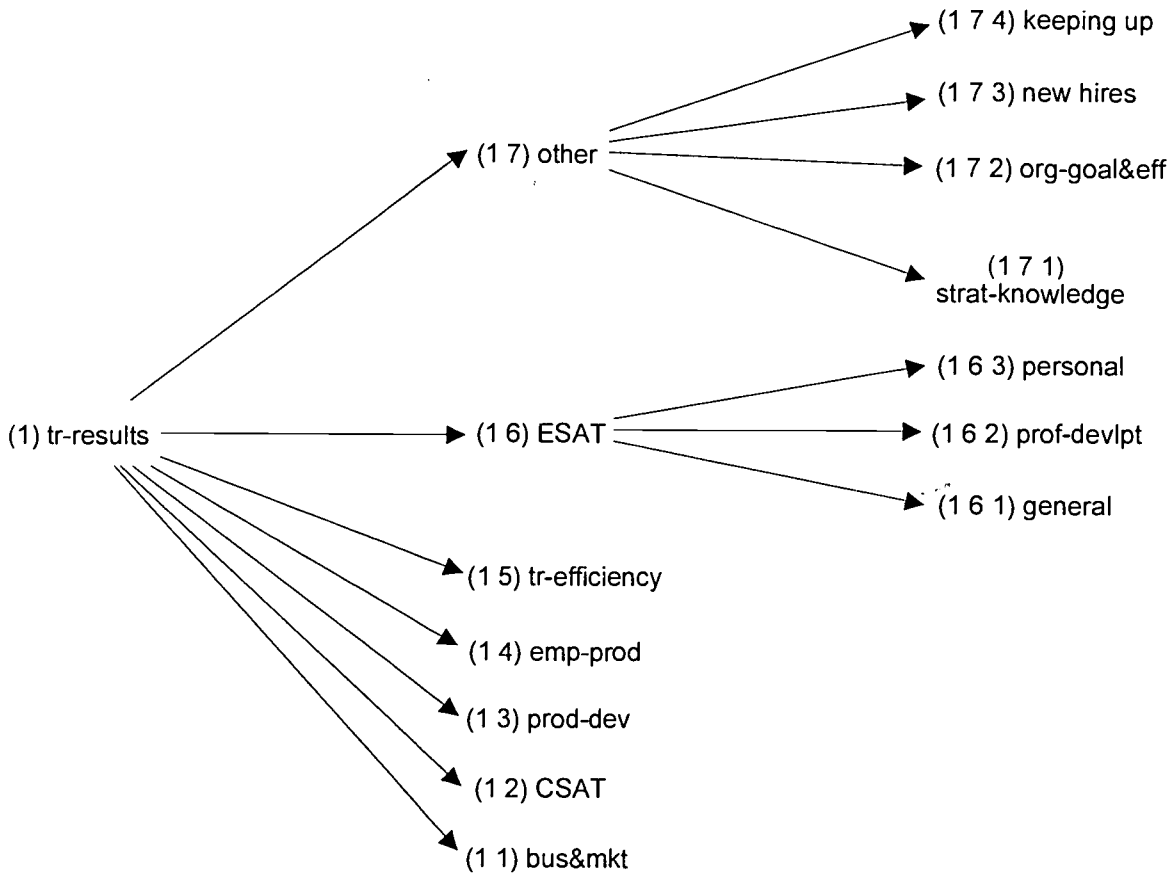
(1) /tr-results: training program results
(1 1) /tr-results/bus&mkt: business and market
(1 2) /tr-results/CSAT: customer satisfaction
(1 3) /tr-results/prod-dev: product development
(1 4) /tr-results/emp-prod: employee productivity
(1 5) /tr-results/tr-efficiency: training efficiency
(1 6) /tr-results/ESAT: employee satisfaction
(1 6 1) /tr-results/ESAT/general: general employee satisfaction
(1 6 2) /tr-results/ESAT/prof-devlpt: employee professional/career development
(1 6 3) /tr-results/ESAT/personal: employee personal development
(1 7) /tr-results/other: other training results*
(1 7 1) /tr-results/other/strat-knowledge: strategic knowledge*
(1 7 2) /tr-results/other/org-goal&eff: organizational/company objectives/efficiency*
(1 7 3) /tr-results/other/new hires: newly hired employees*
(1 7 4) /tr-results/other/keeping up: keeping up with technology*

(2) /tr-eval: training program evaluation
(2 1) /tr-eval/purpose: training program evaluation purpose
(2 1 1) /tr-eval/purpose/formative: formative purposes
(2 1 2) /tr-eval/purpose/summative: summative purpose
(2 1 3) /tr-eval/purpose/other: other purposes of TPE
(2 1 3 1) /tr-eval/purpose/other/instructor: evaluate the instructor
(2 1 3 2) /tr-eval/purpose/other/team: team involvement
(2 1 3 3) /tr-eval/purpose/other/benchmark: compare with other companies and organizations
(2 2) /tr-eval/process: TPE processes
(2 2 1) /tr-eval/process/involvmt: involvement
(2 2 1 1) /tr-eval/process/involvmt/mgt: management
(2 2 1 2) /tr-eval/process/involvmt/other: other individuals or organizations
(2 2 1 3) /tr-eval/process/involvmt/trainees: trainee involvement
(2 2 1 4) /tr-eval/process/involvmt/tr-devlpers: training developers
(2 2 1 5) /tr-eval/process/involvmt/SME's: subject matter experts
(2 2 2) /tr-eval/process/data: data
(2 2 2 1) /tr-eval/process/data/MFA: annual employee performance appraisal record*
(2 2 2 2) /tr-eval/process/data/other: other data
(2 2 2 3) /tr-eval/process/data/instructor: instructor/sme*
(2 2 2 4) /tr-eval/process/data/timing: timing of data collection
(2 2 2 5) /tr-eval/process/data/emp-perf: employee performance*
(2 2 3) /tr-eval/process/reporting: evaluation reporting
(2 2 3 1) /tr-eval/process/reporting/mgt: management
(2 2 3 2) /tr-eval/process/reporting/other: others
(2 2 3 3) /tr-eval/process/reporting/instructors: instructors/sme's
(2 2 3 4) /tr-eval/process/reporting/trainees: trainees
(2 3) /tr-eval/consequence: TPE consequences
(2 3 1) /tr-eval/consequence/knowledge: increased or improved knowledge*
(2 3 2) /tr-eval/consequence/emp-needs: employee needs*
(2 4) /tr-eval/current probs: problems with current system*
(2 5) /tr-eval/courses: course-focused*

*denotes add-on code developed after initial start codes were defined

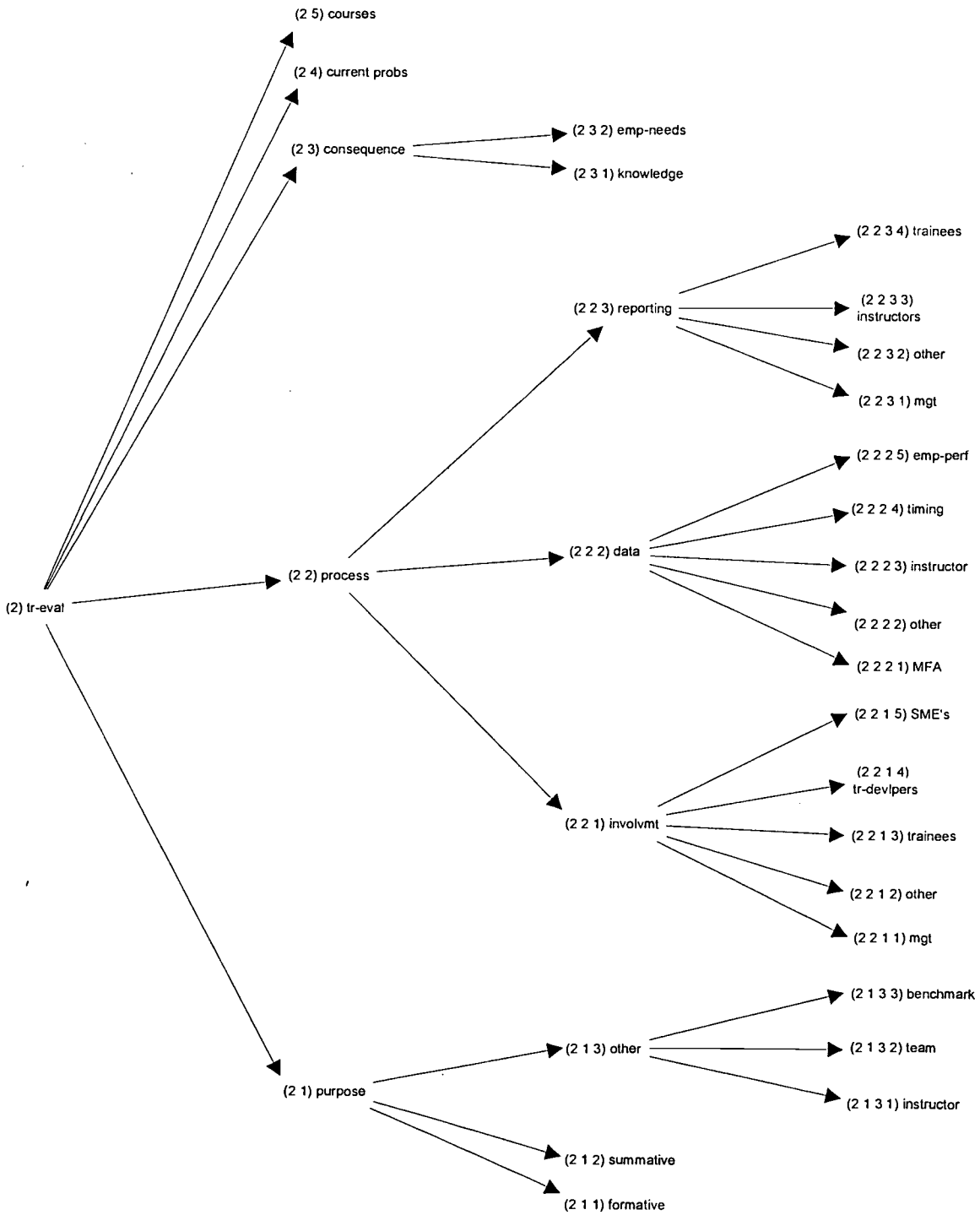
Appendix D (continued)

Index tree for training results written comments



Appendix D (continued)

Coding index tree for evaluation written comments.



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