

Does Training Affect Productivity of Employees? Two Methods of Meta-Analysis

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This study is based on the sample correlations arrived at by different studies. Though a number of studies indicate that there is weak or no relationship between training and productivity, the present meta-analysis indicates that the training provided to employees does have a significant effect on productivity. The present study finds that there is a moderate (mean) relationship between training and productivity of employees. Training affects productivity across-the-board i. e. for top-level managers, medium level managers and bottom-line employees. However, certain moderator variables e.g. citizenship of the sample may influence the magnitude of the effect of training on the productivity.

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Introduction

In today's world of technological changes, organizational work is characterized by complexity, rapid change and increasingly competitive business environment. Thus, a critical issue in work-setting that pervades the minds of behavioral scientists and management practitioners is to get the maximum output with available human resources at a given workplace. Moreover, it is necessary to equip the employees with requisite skills needed to outperform and upgrade them. Behavioral scientists are confident that whatever may be the level of equipment sophistication in the organization, its size, or products produced or services provided, the increase in competence and efficiency of employees through provision of training is a useful investment. Olivero and Kopelman (1997) analyzed the effects of off-the-job training given to 31 top level managers in a public sector, service providing enterprise on their productivity. Training imparted covered areas like goal-setting, collaborative problem solving, supervisory involvement, evaluation of end results, etc. They found a positive correlation of 0.22 between training given and resultant increase in

productivity. The limitation of the study however was that the selected research design included only 31 participants and as a result field experiment could not be conducted.

Hamid (2011) emphasized that training is an important human resource development tool used in the tourism industry in India. Also training should be provided to employees of different levels, specially the middle level managers in the organizations to cope with social and technological changes and improve their productivity. She did an analytical study using chi square and regression tools. The results showed a correlation of 0.30 between the on-the-job training given to public sector middle level employees and their productivity. However, it is difficult to establish that there exists a significant relationship between training and employee productivity. Results of a set of studies indicate that there is a positive relationship between training and employee productivity (Monge 1986; Delame & Kramarz, 1997). But, a number of research studies report a low level of relationship (correlation) between training and employee productivity (Taymaz, 1998). Also, previous studies based on meta-analysis do not indicate a clear picture about the relationship between training and productivity. A major limitation of the past studies is that they do not cross-validate the results. Therefore, the results given by these studies could not be trusted. Further, all the probable moderators that can affect the relationship between training and productivity have not been explored.

Training is one of the most pervasive methods for enhancing the productivity of individuals and communicating organizational goals to new personnel.

Meta-analytic studies have been conducted to ascertain the general relationship between training and productivity. Arthur & Bennett (2003) used meta-analysis to examine the relationship between specified training design and employee productivity and the effectiveness of training in organizations. The results suggested a correlation of 0.2873 between training given to workers and their productivity. In addition, the training method used, the skill or task characteristic trained, and the choice of evaluation criteria were related to the effectiveness of training programs. They concluded that training is one of the most pervasive methods for enhancing the productivity of individuals and communicating organizational goals to new personnel. Zhang (1999) applied meta-analysis procedures to experimental studies to find out the magnitude of the effect of management training from 1983 to 1997 on trainee's learning, job productivity and organization results. A major finding of the study was that on-the-job training made a significant difference in trainees' productivity and increased it by 0.49%. Greenberg, Michalopoulos, and Robinsan (2003) used meta-analysis to synthesize findings from 31 evaluations of 15 voluntary government-funded training programs for the disadvantaged that operated between 1964 and 1998. They adopted the model drawn by Raudenbush

(1981), which studied the variance due to sampling error and variance between unmeasured factors. The study analyzed the training's effect on productivity through effects on earnings. The program characteristics included type of training, enrollee characteristics, area economic conditions, and evaluation method and time period of training. Through the mean and standard deviations, it was concluded that training effects were largest for women, modest for men and negligible for youths. Moreover, the training programs have not become more effective over time as the increase in earnings was

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fairly less for every trainee as compared to previous years specially when unemployment rate was high. Also, on-the-job training was most effective than basic education. Miller and Monge (1986) considered 41 estimates of the relationship between participation and satisfaction. After accumulation of estimates of effects, the weighted mean correlation was .34 and the true variance was .0301. As many as 25 studies containing estimates of the relationship between participation and productivity were analyzed. After accumulation of effect estimates, the weighted mean correlation was .15 and the true variance was .0334. A chi-square test showed this variance differed significantly from 0 (chi-square = 69.47, d.f. = 25, $p < .01$), so moderator variables were identified as the objects of participation, research setting, manipulation

used in the laboratory studies, job type and organizational type. The study concluded that moderators had small influence and as a result productivity improved after participation. Pritchard, Melissa, Granados, and Guzman (2007) conducted meta-analytic procedures to examine data from eighty-three field studies of the Productivity Measurement and Enhancement System (ProMES). The paper expands the evidence on effectiveness of the intervention, examines where it has been successful, and explores moderators related to its success. Four research questions were explored and results indicate that: 1) ProMES results in large improvements in productivity, 2) these effects last over time in some cases years, 3) the intervention results in productivity improvements in many different types of settings (i.e., type of organization/work/worker/country), and 4) moderator variables are related to the degree of productivity improvement. These moderator variables include how closely the study followed the original ProMES methodology, the quality of feedback given, whether changes were made in the feedback system, the degree of interdependence of the work group, and centralization of the organization. The results indicated that on an average productivity under PROMES feedback is 1.16 standard deviation higher than productivity in baseline. The overall correlation was 0.44.

In the studies, few authors used Burke and Day's meta-analysis (1986) to integrate the findings whereas others used Hunter, Schmidt, and Jackson (1982) Framework. The findings across

the various studies showed that training given to employees had positive impact on their productivity but various moderator factors influence the magnitude of this impact. These moderators may be present in the form of type of training, nature of job, organization type, size of firm, gender of employees etc.

Key Hypotheses

The present meta-analysis attempts to clarify whether there is a substantive relationship between training and productivity. It may be explained that a meta-analysis brings out the magnitude of average effect of size and this predicts the substantive relationship. Also the study explores the moderators, if any, that influence the relationship between training and productivity.

Methodology

These days, it is common to apply the meta-analysis in the discipline of education, psychology, and general management, for the generalization of various relationships and identification of moderator variables (Davar, 2004). Glass (1976) coined the term—meta analysis with a view to distinguish the unique statistical methodology for the synthesis of descriptive statistics (e.g. correlation coefficients). It is a way to summarize, integrate and interpret selected descriptive statistics (e.g., sample correlations) produced by sample studies or experimental outcomes (e.g. d-statistics). A meta-analytic study may be carried out with a view to obtain a common correlation. Further, with the help of this methodology, we can ascertain

whether a key relationship between two postulates could be generalized across different settings. A substantial true variance would indicate the presence of one (or more) moderator variables (Hunter, Schmidt & Jackson, 1982).

Different meta-analytic approaches have been developed for the cummulation of correlation coefficients. For example, to determine whether there are significant variations in the correlation coefficients produced by a set of studies, Hunter, Schmidt and Jackson (1982) (henceforth HSJ, 1982) Framework entails the computation of true variance i.e. observed variance net of the measurement error, sampling error and range-restriction, if any. Davar (2004) has formulated an improved version of HSJ (1982) Framework. Hedges and Olkin (1985) have postulated powerful statistical procedures meant for the determination of a common correlation and testing of the homogeneity of a set of correlation coefficients.

The present study utilizes sample correlations of 60 studies (Annexure – A). The effect of training given to the employees on the productivity has been measured through the sample correlations. The effect of training on productivity of employees is found out by conducting a meta-analysis of studies with the help of Davar (2004) method and Hunter- Schmidt and Jackson (1982) henceforth HSJ (1982) Framework. The key hypothesis of the study is that there is a positive and significant effect of training on productivity of employees. However, there is a possibility of exist-

ence of moderator variables affecting the relationship between training and productivity of employees. This is done by Davar (2004) formulas.

Identification and retrieval of studies on the effect of training on productivity of employees from 1981 to 2011 involved computerized search of various data bases, manual search of existing literature, and communication with subject matter experts to locate unpublished studies. The list of studies used for meta-analysis can be seen in the Annexure-A and definitions of various terms are incorporated in Annexure – C.

Training & Productivity

Today need is felt to continue provision of training beyond initial qualifications to maintain, upgrade and update skills throughout the working life. Thus training may be defined as the process of aiding employees to gain effectiveness in the present and future works. Armstrong (1949) defines training as systematic development of the knowledge, skills and attitudes required by an individual to perform adequately a given task or job. Richard (1977) states that training includes any efforts made within the organization to teach, instruct, coach and develop employees in technical skills, knowledge, principles, techniques and to provide insight into the organization. According to Michael J. (2007) training is the process by which the attitudes, skills and abilities of employees to perform specific jobs are improved. Thus, it is any process that tries to improve skills, add to existing knowledge of employees

to aid him in the present job or to fit him for a higher job involving higher responsibilities. The end goal of training is essentially to improve the productivity that enables enterprises to develop competitiveness and grow. Drucker (1955) states that productivity refers to the balance between all factors of production that will result in greatest output for smallest factors. In fact, it is referred to as the 'key to prosperity and efficiency' and is a synonym for progress. Karmarkar (2007) defines productivity as the ratio between the production of a given commodity measured by volume and one or more of the corresponding input factors also measured by volume. Productivity reflects a measure of output from a production process per unit of input. In the case of partial productivity, a single type of input is used, e.g. direct labor hours or man-days.

Measurement of the effect of training:

The first method used in a few studies to test the relationship between employee training and employee productivity is comparing two individuals at the same time in the same firm doing the same job, given the previous skills and those acquired thereafter. Thus, partial correlation between measures of training and various indicators of productivity were arrived at by such studies. (e.g. Bartel, 1994; Black & Lynch, 1996). The second was the experimental method. Experiments were conducted under two conditions where in under the first condition participant groups were given training prior to actual task performance while under the second condition participant

groups were not given any training. Then the results were compared between the two groups and it was found that training led to increase in participants' skill levels. Some studies mention it as Pre-test-posttest design. (e.g. Kazmi, Kizhakhail& Ismail, 1987; Lai 1996). Lastly, the employees of a company in which impact of training programs was being analyzed, were asked to respond to a survey. The survey form was validated by a panel of experts and followed by a pilot study to establish reliability. Main aim of the survey was to stratify the perceptions of employees in regard to the applicability of their training skills to an increase in their productivity. The study findings

indicated a positive association between the two. (e.g. Prasad, 1976).

Results & Discussion

The comparative meta-analytic results for measurement corrected correlations and measurement uncorrected correlations using Davar(3004) Method and Hunter-Schmidt Framework (1982) have been shown in Table 1. Results for moderator variables (using Davar method) have been listed in Tables 2 and 3. The procedure and formulas for the mean estimate and true variance estimate have been listed in Annexure B.

Table: 1 Meta-analysis (overall) of Sample Correlations; Davar (2004) & HSJ Framework (1982)

	Davar (2004)		HSJ(1982)	
	Sample-correlations Uncorrected for measurement error	Sample-correlations Corrected for measurement error	Sample correlations Uncorrected for measurement error	Sample correlations Corrected for measurement error
Mean-correlation	0.3929	0.4871	0.4322	0.5343
Observed variance	0.0234	0.0378	0.0191	0.0296
Sampling error variance	0.01192	0.00969	0.000541	0.000417
True variance	0.01148	0.02811	0.01855	0.02918

Mean Correlation: The meta-analytic formula given by Davar (2004) for the computation of mean value for correlation values corrected for measurement error generates a mean $r = 0.4871$. However, non-correction of r values for measurement error generates a mean correlation = 0.3929. The formula for common (mean) correlation given by HSJ (1982) generates a mean correlation=0.4322 when uncorrected for measurement error. The mean correlation

Overall the meta-analytic outcomes suggest that there is a moderate relationship.

rises to the level of 0.5343 when corrected for measurement error. This means that in order to obtain The true picture of mean r , we must correct r values for measurement error as suggested in Davar (2004) and HSJ (1982). Further, overall the meta-analytic outcomes suggest that there is a moderate relation-

ship between training and productivity. Past meta-analytic studies too suggest moderate relationship. The values also indicate that on an average about 25 percent of the variation in productivity is explained by training i.e. moderate relationship can be accepted. Other factors (e.g. technology) do operate and could be assigned some values for their contribution to productivity.

True Variance: Once the observed correlation coefficients have been corrected for measurement error, the true variance rises to 0.02811 from 0.01148 by Davar (2004) formula and to 0.02918 from 0.01855 with Hunter, Schmidt and Jackson (1982) procedure. It means that measurement error could distort the true

variance estimates. Therefore, we must correct observed correlations for this error. Further, substantial true variance estimates for corrected correlations (both methods) indicate that there are significant variations in effect-size of training i.e. one or more moderators influence the level of effect-size for a training program.

Moderator Analysis

In this study, two variables have been identified as probable moderator variables. These are the size of firm (small versus large) and the citizenship of the employees in the sample (Indian & foreign). The meta-analytic results for subsets are given in Table 2. In Table 2,

Table: 2 Moderator Analysis: Size of Firm (Davar's Method)

	Small firms (k=23)		Large firms (k=37)	
	Sample-correlations Corrected for measurement error	Sample-correlations Uncorrected for measurement error	Sample correlations Corrected for measurement error	Sample correlations Uncorrected for measurement error
Mean correlation	0.4288	0.3420	0.5233	0.4245
Observed variance	0 .0367	0.0209	0 .0350	0.0224
Sampling error variance	0.0289	0.0339	0.0142	0.0181
True variance	0.0078	- 0.013	0.0208	0.0043

the first moderator considered for analysis is the size of the firm. The mean correlation in the case of large firms is 0.5233 and true variance of measurement-corrected correlation is 0.0208 whereas in the case of small firms, the mean correlation (p) is 0.4288 and true variance of 0.0078. None of the two groups generates true variance close to zero. Hence, we can conclude that the size of the firm does not act as a moderator variable.

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However, in the case of uncorrected correlations, true variance (0.013) for small firms vis a vis positive and significant true variance for large firms suggests that there is great likelihood that size of the firm could be an important moderator

factor for the effect-size of training on productivity.

Another probable moderator is citizenship of the employees. For the Indian citizenship (k=11) mean correlation is 0.4712 with true variance of measurement corrected correlations (-0.0028). In the case of foreign citizenship (k= 48), the mean correlation is 0.4924 and true variance of measurement-corrected correlations is 0.0231. Indian citizenship shows nega-

tive value and foreign citizenship shows positive value of true variance. It means that the citizenship of the employees acts as a moderator. A similar situation is exhibited in case of uncorrected correlations. Overall, the analysis suggests that there is a lot of effect of citizenship on productivity.

Overall, the analysis suggests that there is a lot of effect of citizenship on productivity.

Table:3 Moderator Analysis: Citizenship of Sample (Davar’s Method)

	Indian citizenship Number of studies (k) =11		Foreign citizenship Number of studies(k)=48	
	Corrected for measurement error	Uncorrected for measurement error	Corrected for measurement error	Uncorrected for measurement error
Mean correlation	0.4712	0.3782	0.4924	0.3976
Observed variance	.0522	0.0316	0.0350	0.0219
Sampling error	0.0550	0.0667	0.0119	0.0147
True variance	-0.0028	-0.0351	0.0231	0.0072

Conclusions

Though a number of studies indicate that there is a little or no relationship between training and productivity, yet the present meta-analysis indicates that the training provided to employees/workers does have a significant effect on productivity. Moreover, the training affects productivity across-the-board i. e. for top-level managers, medium level managers and bottom-line employees. However, certain moderator variables e.g. citizenship of the employees may influence the magnitude of the effect of training on the productivity.

Suggestions for Improvements

Several authors (e.g. Davar, 2004; Ronco,1987; Hedges &Olkin, 1985;Pal &Davar 2001 : 621-31) have given following important suggestions to do a correct meta- analysis. To begin with all relevant studies should be located in terms of appropriate guidelines for inclusion (or exclusion)in the proposed meta-analysis. Each study must be checked for basic infirmities such as an absurd hypothesis, “structurally” poor-data, questionnaire or research design. For example, studies with severe problems of co-linearity must be ignored for a meta-analysis of regression coefficients. In general, the studies

which do not meet the specified criteria must be excluded from a meta-analysis.

For exploration of moderator variables, we may utilize the ANOVA- type design or multiple regression analysis. Also, we must always include unidirectional findings. None-the-less, we must use at least a given (reasonable) number of studies for a meta-analysis (Ronco, 1987).

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Annexure A Sample correlations and characteristics of studies examining the relationship between training and productivity

Publication year	Job classification level	Type of organization	Country	Gender	Type of Training	Size of Firm	Pearson's r	Rxx	Ryy	mcc(ri)	N _i
1999	TL	Ma	Fe	M	OJT	L	0.32	0.84	0.85	0.3787	431
1997	LL	Ai	Fe	M	OJT	S	0.36	0.8	0.82	0.4445	115
2003	n.a	Ma	Fe	F	OJT	L	0.60	0.8	0.82	0.7408	315
2006	TL	Ma	Fe	M	OJT	S	0.20	0.74	0.82	0.2567	92
2004	TL	Ma	I	M	OJT	S	0.165	0.8	0.82	0.2037	329
2009	ML	Ma	I	M+F	OJT	L	0.41	0.8	0.82	0.5062	159
2000	n.a	n.a	Fe	M	OJT	L	0.67	0.8	0.82	0.8272	231
1996	n.a	Ma	Fe	M	OJT	S	0.31	0.8	0.82	0.3827	76
2005	TL	Ma	I	M	OJT	L	0.63	0.75	0.75	0.8400	300
2007	TL	O	Fe	M	OJT	S	0.33	0.88	0.89	0.3729	136
1996	LL	n.a	Fe	M	OJT	L	0.38	0.8	0.82	0.4692	72
2003	LL	Ma	I	M	OJT	L	0.2159	0.78	0.78	0.2768	907
1997	LL	Ma	I	M	OJT	S	0.30	0.8	0.82	0.3704	243
1999	n.a	Ma	n.a	M	OJT	S	0.33	0.8	0.82	0.4074	215
1994	LL	Ma	I	M	OJT	L	0.79	0.8	0.82	0.9754	243
2003	LL	Ma	Fe	M	OFJT	L	0.47	0.8	0.82	0.5803	396
2001	n.a	Ai	Fe	M	OFJT	L	0.40	0.8	0.82	0.4939	290
1985	Ml	n.a	Fe	M	OJT	S	0.44	0.56	0.59	0.7655	330
2005	ML	n.a	Fe	M	OFJT	L	0.36	0.8	0.82	0.4445	233
2002	LL	n.a	Fe	M	OJT	L	0.30	0.8	0.82	0.3704	220

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2008	ML	S	Fe	M	OJT	L	0.47	0.95	0.95	0.4947	360
1994	ML	Ma	Fe	M	OFJT	S	0.27	0.8	0.82	0.3334	400
2001	ML	Ma	Fe	M	OFJT	S	0.34	0.8	0.82	0.4198	215
2008	ML	Ma	Fe	M	OJT	L	0.14	0.8	0.82	0.1729	325
1999	ML	O	Fe	M	OFJT	S	0.16	0.8	0.82	0.1975	101
1999	LL	Ma	I	M	OJT	L	0.34	0.8	0.82	0.4198	100
2007	n.a	Ma	Fe	M	OJT	L	0.39	0.8	0.82	0.4815	130
1994	TL	Ai	Fe	M	OJT	L	0.54	0.8	0.82	0.6667	205
2006	ML	Ma	Fe	M	OJT	S	0.48	0.8	0.82	0.5926	187
2006	LL	S	Fe	M	OJT	L	0.24	0.8	0.82	0.2963	406
2006	ML	Ma	Fe	M	OJT	L	0.39	0.8	0.82	0.4815	310
1998	LL	Ma	Fe	F	OJT	L	0.39	0.8	0.82	0.4815	2124
1998	ML	Ma	Fe	M	OJT	L	0.22	0.8	0.82	0.2716	310
1999	TL	Ma	Fe	M	OJT	L	0.40	0.8	0.82	0.4939	164
2006	LL	Ma	Fe	M	OJT	S	0.144	0.8	0.82	0.1778	300
2002	n.a	O	I	M+F	OFJT	L	0.46	0.8	0.82	0.5679	500
1996	ML	S	Fe	F	OJT	S	0.21	0.9	0.87	0.2373	210
1995	LL	Ma	Fe	M+F	OJT	S	0.61	0.8	0.82	0.7531	99
2006	n.a	n.a	Fe	M+F	OJT	S	0.56	0.8	0.82	0.6914	106
1999	LL	Ma	Fe	M	OJT	S	0.49	0.8	0.82	0.6050	112
1995	LL	Ma	Fe	M	OJT	L	0.80	0.8	0.82	0.9877	570
1987	ML	Ma	Fe	M	OJT	S	0.67	0.8	0.82	0.8272	96
1996	ML	Ma	Fe	M	OFJT	S	0.269	0.8	0.82	0.3321	48
2010	ML	Ma	Fe	M	OJT	L	0.34	0.8	0.82	0.4198	352
2011	ML	O	I	M	OJT	S	0.30	0.85	0.89	0.3449	91
2004	n.a	n.a	Fe	M	OJT	L	0.45	0.8	0.82	0.5556	385
1996	LL	n.a	Fe	M	OJT	L	0.38	0.8	0.82	0.4692	72
2007	n.a	n.a	Fe	M	OJT	L	0.48	0.8	0.82	0.5926	2140
1991	ML	Ma	Fe	M	OFJT	L	0.67	0.8	0.82	0.8272	7191
1994	LL	Ma	I	M	OJT	L	0.26	0.8	0.82	0.3210	6177
2002	ML	O	I	M	OJT	L	0.29	0.8	0.82	0.3581	129
2007	LL	Ma	Fe	M	OJT	L	0.287	0.8	0.82	0.3543	1779
2000	n.a	O	Fe	M	OJT	L	0.436	0.8	0.82	0.5383	2500
2004	LL	O	Fe	M	OJT	L	0.34	0.8	0.82	0.4198	1900
2004	LL	O	Fe	M	OJT	L	0.47	0.8	0.82	0.5803	22700
2002	n.a	Ma	Fe	M	OJT	L	0.53	0.8	0.82	0.6544	5451
2008	LL	Ma	Fe	M	OJT	S	0.18	0.8	0.82	0.2222	4184
2001	ML	Ma	Fe	M	OJT	L	0.45	0.8	0.82	0.5556	3000
2005	LL	O	Fe	M	OJT	S	0.47	0.8	0.82	0.5803	1319
2000	TL	Ma	Fe	M	OJT	S	0.28	0.8	0.82	0.3457	1219

Notes: TL= top-level management; ML= middle level management; LL= lower level management. Ma= manufacturing; O= others; Ai= Aviation; Se=service sector; Fe= foreign citizenship of sample; I= Indian citizenship of sample, L = large firm , S = small firm; OJT = On the job training, OFJT= Off-the- job training; n.a.= not available

Annexure B Formulas for the Mean Correlation and True Variance Estimate

Hunter, Schmidt and Jackson (1982) framework

Davar (2004)

$$\bar{r} = \frac{\sum[N_i r_i]}{\sum N_i}$$

$$\bar{r} = \frac{\sum[r_i]}{k}$$

$$\sigma_r^2 = \frac{\sum[N_i(r_i - \bar{r})^2]}{\sum N_i}$$

$$\sigma_r^2 = \frac{\sum[(r_i - \bar{r})^2]}{k}$$

$$\sigma_e^2 = \frac{(1 - \bar{r}^2)^2/k}{N}$$

$$\sigma_e^2 = \frac{(1 - \rho^2)^2}{k}$$

$$\sigma_\rho^2 = \sigma_r^2 - \sigma_e^2$$

$$\sigma_\rho^2 = \sigma_r^2 - \sigma_e^2$$

Annexure-C Glossary of Terms

Meta-analytic statistic: The statistic computed with the help of sample statistics produced by different studies is known as meta-analytic statistic e.g., common or mean correlation. Common (mean) correlation: We obtain an estimate of a common correlation by averaging the sample correlations (corrected for measurement error) produced by various studies. The discussion about various methods to estimate a common correlation is available in Hedges & Olkin (1985: 229-34)

Sample statistic – The statistic (e.g. correlation co-efficient) based on the sample data is called a sample statistic.

Observed variance (s_r^2): It is a meta-analytic statistics that measures the extent of variation in the correlation coefficients across studies.

Sampling error variance (s_e^2): It is a meta-analytic statistics that reflects the variation in sampling error in the measurement corrected correlation coefficients.

True variance (s_p^2): The observed variance net of the sampling error variance ($s_r^2 - s_e^2$) is termed as meta-analytic statistic of true variance (HSJ, 1982).

Measurement error: It is the error in the measurement of postulates (variables). Generally, the measurement error arises on account of the lack of construct validity and attenuates the magnitude of a sample correlation coefficient.

Training is the systematic development of the knowledge, skill and attitudes required by an individual to perform adequately a given task or job.

Productivity is denoted as a measure of output from a production process per unit of input.

On-the-job training is where training is given on the job and at the work place under same conditions in which the worker will work later on.

Off-the-job training is where training is given to the worker away from his place of work. Small firm is the firm where number of workers employed is less than 100. Large Firm is the firm where number of workers employed is more than 100.