

An Empirical Analysis of the Relationship between Characteristics and Formative Evaluation of Training

Muhammad Zahid Iqbal, PhD (Corresponding author)

Department of Management Science, COMSATS Institute of Information Technology, Islamabad
Park Road, Chak Shahzad Campus, Islamabad, Pakistan
Tel: 92-333-511-2159 E-mail: mzahid75@comsats.edu.pk

Muhammad Waqas Maharvi

Department of Management Science, COMSATS Institute of Information Technology, Sahiwal
Campus, Sahiwal, Pakistan
Tel: 92-300-632-8212 E-mail: maharvi@ciitsahiwal.edu.pk

Shahab Alam Malik, PhD

Department of Management Science, COMSATS Institute of Information Technology, Islamabad
Park Road, Chak Shahzad Campus, Islamabad, Pakistan
Tel: 92-0333-515-4104 E-mail: shahab@comsats.edu.pk

Muhammad Majid Khan, PhD

Department of Management Science, COMSATS Institute of Information Technology, Islamabad
Park Road, Chak Shahzad Campus, Islamabad, Pakistan
Tel: 92-0333-560-0104 E-mail: majidkhan799@comsats.edu.pk

Abstract

This paper attempted to signify the use of formative training evaluation. The authors carried out a study at three public-sector training institutions to empirically test the predicted relationship between training characteristics and formative training evaluation under the Kirkpatrick model i.e. reaction and learning. In addition, to study the causal linkage between components of formative training evaluation, the mediating role of reaction in the relationships between training characteristics and learning was also investigated. The principal finding revealed that a set of seven training characteristics explained 59% and 61% variance in reaction and learning respectively. All training characteristics were found to have positive impact on reaction and learning except training contents. For reaction, the most influencing training characteristic was training method followed by training management, training objectives, training environment, and trainer whereas for learning, the greatest variation was also explained by training methods but followed by trainer, training management, training environment, and training material. Moreover, reaction partially mediated the relationships between each training characteristic and learning. The study concluded with areas of future research emphasizing on linking formative evaluation with summative one i.e. behavior and results.

Keywords: Training Characteristics, Formative Training Evaluation, Reaction, Learning

1. Introduction

Training is the most important as well as commonly used human resource development activity (Ashton and Easterby-Smith, 1979). Organizations use it for solution of varied problems (Goldstein, 1989), for example, to change employees' attitudes towards new programs, functions, and roles (Chunn and Thacker, 1993). Training helps employees perform their jobs effectively (Moskowitz, 2008) by making them suitable (Miller, 2002), eligible, skillful (Houlton, 1998), and a valuable resource (Prokopenko, 1987). Therefore, organizations have been spending billions of dollars on training programs. However, even than sometimes return does not correspond with the investment (Desimone et al., 2002). This is because, either training evaluation (TE) is not carried out in spirit (Tennant et al., 2002) or it is absolutely neglected (Rajeev et al., 2009). Oostrom and van Mierlo (2008) highlight that organizations spend a lot on training, but only few report TEs and even these evaluations are found to be restricted to the first level i.e. reaction. Time and resource pressures are the common reasons for this (Kraiger et al., 2004). However, in developed countries situation is comparatively better as they have realized that TE is not only a cost but a real essence of the training (Tennant et al., 2002). For example, a study provides evidence that the sample

US organizations allocated 10% of the annual training budget (\$30 billion) for its evaluation (Magdy, 1999). Contrarily, such examples are rare in developing countries as rarity of this practice is empirically evidenced, for example, in Kuwait, only 7.5% of the government and 13.5% of private organizations report that they evaluate their training programs (Al-Athari and Zairi, 2002). Meanwhile, some reasonable efforts are made. For example, in 1992, Malaysian government enacted that private-sector organizations will fund one percent of the payroll to the Human Resource Development (HRD) council. This council was developed, amongst others, to ensure the conduct of effective TE (Hashim, 2001).

By and large, TE is either completely avoided (Pershing and Pershing, 2001) or it is applied half heartedly (Twitchell and Holton, 2000). There are obvious reasons for avoiding TE at all or conduct of an ad hoc based, unsystematic, and informal one. Literature unveils that training professionals take TE as such an organized (Hashim, 2001) yet complex analysis of pre- and post-training data (Eseryel, 2002) that comprises hectic, time consuming, and difficult activities. Therefore, the authors attempted to find a workable solution that could provide the practitioners with an easy to practice and cost effective TE mechanism. In this connection, they empirically tested the predicted relationship between training characteristics (TC), i.e., training objectives, training contents, training material, trainer, training methods, training environment and training management, and two components of TE, i.e., reaction and learning, under the tenets of Kirkpatrick (1959) model that helps evaluators perform the basic but technical evaluation (Eseryel, 2002). The literature maintains that the TE consists of two techniques i.e. formative and summative (Rajeev et al., 2009). The first two levels of Kirkpatrick model, i.e., reaction and learning, are known as formative and the other two, i.e., behavior and results, are summative (Laird, 2003). Thus, this paper proposes and then empirically tests the predicted relationship between TC and formative TE (Collins, 2008) that ultimately leads to training effectiveness (Kraiger et al., 2004). Levels of Kirkpatrick model are causally linked (Wang et al., 2002) hence, reaction is predicted to be playing role of a mediator. Therefore, this study also analyzes the intervening role of reaction in the relationships between TC and learning

The main objective of this study is to highlight the importance of TE in the public-sector training institutions by analyzing impact of TC on the formative TE. To achieve the research objective, the authors pose the following research questions: Are interrelationships among TC significant? To what extent training characteristics influence formative TE? and Does reaction mediate in relationships between TC and Learning?

2. Literature Review

2.1 Training Evaluation

TE standardizes the training process (Smith and Piper, 1990) to make it effective and useful for achieving predetermined goals of the organization (Miller, 2002). These goals are also known as 'organizational outcomes' (Lee and Pershing, 1999) such as, utilizing the available human resource optimally and increasing outputs to elevate the productivity (Sugrue and Fuller, 1999). However, to achieve these outcomes, this paper proposes a bi-dimensional approach to evaluation in which the authors suggest that the circumference of evaluation should not be wide and broad (Collins, 2002) but rather narrowly focus on fulfilling the needs of training participants. Therefore, this paper includes the first two components of the best known (Oostrom and van Mierlo, 2008), simple (Kirkpatrick, 1996) practicable (Hamtini, 2008), flexible, widely applicable (Aldrich, 2002), extensively accepted and used (Tian et al., 2007), and frequently described (Bober and Bartlett, 2004) TE model offered by Kirkpatrick (1959). The literature provides support to the first two components of this model, i.e., reaction and learning, as most of the TEs have focused primarily on them (Ban and Faerman, 1990) because these are usually assessed within the training setting and are easy to measure (Collins, 2008). In the beginning of this decade, empirical evidence revealed that among organizations participating in the American Society for Training Development's (ASTD) benchmarking service, 75% measured 'reaction' and 41% measured 'learning' (Kraiger et al., 2004). The other researches also endorse its popularity. For example, in Kuwait, most of the government and private-sector organizations use this model. Overall, 95% reported use of Kirkpatrick model whereas only five percent used the others (Al-Athari and Zairi, 2002). The previous research (Indira, 2008) revealed that its participants appreciated components of other TE models, which were identical to Kirkpatrick's.

Focus of this study is only on formative TE because it evaluates the training activities when learning is taking place and procedures are in progress. It also judges the learning materials, trainee's learning, success and trainer's competency etc. It therefore, contributes to achieve the targets and provides solution for upcoming problems that may create obstacles in the way of success (Laird, 2003). Moreover, TE in key areas, such as reaction and learning, also helps measure training effectiveness (Pandey, 2007). Following are the two components of formative TE:

2.1.1 Reaction

Most of the studies on training effectiveness are based on reaction (Oostrom and van Mierlo, 2008) as 85% of

government and 73% of business organizations evaluate only the reaction of trainees (Al-Athari and Zairi, 2002). Reaction is trainee's response to training activities, which is based on his/her opinions, observations, judgments, perceptions, and understanding about the training program as well as his/her performance (Jeng and Hsu, 2002; Rajeev et al., 2009). Ostrom and van Mierlo (2008) clarify that this response is post-training. This level of evaluation focuses on the key stakeholder, i.e., the trainee who responds only by showing his/her behavior towards training, and therefore, researchers prefer the aspects of authenticity and usefulness of measuring trainees' reactions so that accuracy is ensured (Kirkpatrick and Kirkpatrick, 2006). Reaction is considered as a major source of information for formative TE (Tan and Hall, 2003) because it provides immediate response that facilitates trainers in enhancing the quality of the ongoing training program (Lee and Pershing, 1999).

2.1.2 Learning

Learning is the second level of TE model. It is measured by assessing whether there is a positive change in the level of trainees' knowledge, skills, and abilities (KSA) (Rajeev et al., 2009). However, some researchers focus on the subjective response of trainees only (Galloway, 2005) but others are in favor of objective measurement revealing difference between the prior and the current level of trainees' KSA (Jeng and Hsu, 2002). The ultimate objective of this level of TE is to help trainees reflect in their job performance about what they have learned (Kirkpatrick 1996).

2.2 Training Characteristics

Literature reveals that certain attributes affect the training outcomes (Aldrich, 2002) and trainees' feedback that reveals the ultimate effect in TE mechanism. In the current study, these attributes are titled as training characteristics (TC), which are training objectives, training contents, training material, trainer, training methods, training environment, and training management (Kirkpatrick, 1996). These TC have been reported to have an ability to influence the outcomes of TE (Eseryel, 2002) especially, with regard to reaction (Jeng and Hsu, 2002) and learning (Tan and Hall, 2003).

2.2.1 Training objectives

Well defined training objectives provide suitable and accurate criteria for TE (Kirkpatrick, 1996). The 'well defined' means those training objectives which are vivid (Collins, 2002), quite visible, certain to achieve the target (Goldstein, 1989), and are part of the training plan (Tenant et al., 2002) that focuses on the requisite level of KSA. Literature reveals that training objectives relate to TE (Houlton, 1998) because training professionals become clear headed about the reasons of developing, changing, and improving the training program by identifying its objectives (Miller, 2002). Therefore, training objectives are considered as one of the benchmarks of TE as well as future training programs (Barrington and Reid, 1997). Literature also emphasizes that training objectives should be consistent with the TE purposes (Lee and Pershing, 1999).

2.2.2 Training contents

Outcomes of training (Farr et al., 1993) as well as trainees' reaction and learning are dependent on the training content e.g. unnecessary repetition and misconceptions in the content affect the criterion accordingly (Lee and Pershing, 1999). Therefore, training content is deemed predictor of formative TE. The important aspects of training contents are, amongst others, its organization and suitability of the method of delivery (Robinson and Robinson, 1989).

2.2.3 Training material

The training material affects the evaluation of training in general and of its contents in particular (Dick and Carry, 1996). This is done by looking at quality, changeability and difficulty level of the training material, i.e., audio/visual aids, handouts, and study material etc. However, in addition to having an influence on TE, training material relates strongly to training contents (Lee and Pershing, 1999) and training environment (Hellebrandt and Russell, 1993) to make overall training program useful. However, according to the predictive evaluation model (Lanigan, 2008) training material relates to training reaction.

2.2.4 The Trainer

The trainer standardizes the TE in a positive manner (Hashim, 2001) because s/he is the main contributor towards success of training (Hesseling, 1966). S/he also encourages and motivates the trainees towards learning (Forsyth et al., 1995) that further enhances the effectiveness of the training program by formulating performance standards for trainees during training (Power, 1992). Therefore, the trainer is predicted to have positive influence on reaction and learning of the trainees.

2.2.5 Training methods

Training methods are instrumental to success of the training program. These provide an efficient design to facilitate

effective delivery of training material for achievement of training objectives. Selecting the most appropriate training method to meet training objectives is more important than other issues (Dean, 1994). Training methods can be on-the-job or off-the-job. In on-the-job training actual environment becomes a guideline for trainees because it is an efficient learning tool for trainees to perform in actual situation whereas, off-the-job training provides an open forum in artificial environment for learning with confidence (Coles, 2000).

2.2.6 Training environment

Training location or environment facilitates trainees' learning (Harris and Tessmer, 1992). Therefore, Russ-Eft (2002) maintains that the criteria for TE must reflect suitability of the training environment including physical facilities, equipments (Wart et al., 1993), accommodation, classrooms, etc. because these have a significant impact on trainees' feedback (Haertel and Walberg, 1988).

2.2.7 Training management

Training manager is one who makes the training program useful and effective (Tracey, 1992). Training management plays a central role in selection of training objectives, contents and methods. This is done by an effective teamwork (Lee and Pershing 1999). Likewise, effective TE is also a concern of the training manager. His/her skills and abilities make the training program successful (Forsyth et al., 1995). Moreover, placing due emphasis on the quality of learning is a concern of training management therefore, TE should reflect on these issues as well.

3. The Research Model and Hypotheses

The research model studies the relationship between TC and formative TE under the Kirkpatrick (1959) model (see Figure 1). The study analyzes the relative importance of all TC on reaction and learning. In addition, consistent with previous literature (e.g. Wang et al., 2002), it also analyzes the intervening role of reaction in the relationship between TC and learning. Following are the research hypotheses:

Hypothesis 1: Training characteristics: training objectives, training contents, training material, trainer, training methods, training environment and training management have significant positive impact on reaction.

Hypothesis 2: Training characteristics: training objectives, training contents, training material, trainer, training methods, training environment and training management have significant positive impact on learning.

Hypothesis 3: The relationships between training characteristics: training objectives, training contents, training material, trainer, training methods, training environment and training management, and learning are mediated by reaction.

4. Method

4.1 Sample and Procedure

Training organizations use Kirkpatrick model for TE but their results are not found in literature (Indira, 2008) especially, those which are based on trainees' reaction and learning (Morgan and Casper, 2000). Therefore, the authors selected three public-sector training institutions in Islamabad Viz. National Institute of Science and Technical Education (NISTE), National Institute of Banking and Finance (NIBAF) and Pakistan Planning and Management Institute (PPMI). Trainees of one training program at each institute were taken as sample. This is because, trainees are the most important figure of evaluation practice and their perceptions can standardize it in a positive manner (Hashim, 2001). NISTE, NIBAF, and PPMI impart training to the teachers of government schools, bankers of national banks, and government officials respectively.

A total of 500 questionnaires were personally distributed to training institutions NIBAF (150), NISTE (150), and PPMI (200). Response from NISTE was 49 yielding 33%, NIBAF (87, 58%), and PPMI (104, 52%). The authors did not include the questionnaires having more than 25% blank responses (Sekaran, 2003). Therefore, finally 212 questionnaires (46, 78, and 88 from NISTE, NIBAF, and PPMI respectively) were used for analysis. The sample comprised 78.8% male participants. Their age cohorts were: 20-29 years (12.3%), 30-39 (43.4%), 40-49 (33.0%), 50 and above (11.3%). As regards education, 82.5% had Master's degree and rests were Graduates. Experience in years revealed that 6.6%, 11.8%, 32.1%, and 49.5% had less than one year, one to three, four to seven, and more than eight years respectively.

4.2 Measures

Previous researches on TE, especially on reaction and learning, report use of questionnaire for data collection (e.g. Jeng and Hsu, 2002; Al-Athari and Zairi, 2002; Indira, 2008). Moreover, The Kirkpatrick model focuses only on post-training measures (Tennant et al., 2002) therefore, for this cross-sectional type of causal study, the authors collected data in non-contrived environment by adapting the TE measures (reaction and learning) originally

developed by Rae (2004) and TC measures developed by “Community-based psychological support: a training manual” (2003), after conduct of trainings at sample training institutions. The measures were scaled at seven points. Measures of all TC, except ‘training methods,’ were scaled at agreement level (1 = strongly Disagree to 7 = Strongly Agree). Constructs of ‘training methods’ and ‘learning’ were scaled with ‘to what extent’ categories (1 = Not at all to 7 = To a very large extent). The response on ‘reaction’ was elicited on ‘satisfaction’ scale (1 = Very Dissatisfied to 7 = Very Satisfied). Original measures were modified with permission from developers to make them consistent with the respective constructs of interest and corresponding to design and analysis of the study. Following are details:

Reaction evaluates how well trainees like the training program using data on their perceptions, satisfaction with program objectives, content, instruction, delivery, and trainers (Tian et al., 2007; Hahs-Vaughn et al., 2007). Therefore, the authors examined trainees’ reactions to and satisfaction with the 10 features of the training program (e.g., Stimulating, Challenging, Well conducted, Interesting, Utilization of time, Relevance to my job etc.).

Learning refers to an increase in knowledge (Ostrom and van Mierlo, 2008) and desired change in skills and attitudes of trainees brought about by the training program (Tian et al., 2007). Therefore, beyond satisfaction (Hahs-Vaughn et al., 2007), the participants were asked to self-report on learning by responding to six items (e.g., you feel you have learnt from this training, the training encouraged exchange of information etc.).

Training Objectives was measured by three items (e.g. Training was designed according to its objectives covering my learning needs etc.). *Training Contents* (three items, e.g., information given in this training is usefully applicable in my job etc.). *Training Material* (three items, e.g., provided material was related to the training objectives etc.). *Trainer* (three items, e.g., the trainer was well-prepared and organized etc.). *Training Methods* was measured by asking about appropriateness of four methods, such as lecture, group discussion, role play, and review and revision exercises, which were used in the training program. *Training Environment* (three items, e.g., the training environment was supportive to the learning process etc.). *Training Management* (three items, e.g., management designed training program according to TNA etc.).

5. Results

Table 1 shows that the Cronbach’s alphas for each scale and overall questionnaire are acceptable (Sekaran, 2003; Gliem and Gliem, 2003). Moreover, descriptive statistics reveal that average score of all variables is falling close to respective higher category.

5.1 Hypotheses Testing

The hypotheses are tested by carrying out multiple regression analysis and simple mediation techniques. The multiple regression technique is applied by using both standard and stepwise methods. Former is used with the objective of finding the relative importance of each TC for each component of formative TE whereas, later is used to refine the results further and to identify the best model corresponding to each formative TE response. However, the authors preferred to run tests of assumptions to be satisfied before application of regression analysis (Iqbal, 2008; Awan 2008). These assumptions are of sample size, multicollinearity, normality, and independence of observations (Carver and Nash, 2000).

The suitability of the sample size for multiple regression is determined by the formula: $N > 50 + 8m$, where N = sample size and m = number of independent variables. The results show that sample size of this study is suitable for regression analysis. The authors adopted three ways to satisfy assumption of multicollinearity i.e. analysis of intercorrelations among the independent variables, Tolerance (defined as $1 - R^2$), and Variance Inflation Factor (VIF). Table 2 shows that in case of all TC, Tolerance > 0.1 and VIF < 10 . Moreover, correlation coefficients are within the range i.e. $r < 0.90$ (Hadi and Chatterjee, 2006). These results satisfy the assumption of multicollinearity. The authors used one technique to satisfy the assumption of normality i.e. Normal probability plot (Carver and Nash, 2000). For all hypotheses, Figures 2a and 2b show normal probability plot of regression standardized residual (also called Normal P-P plot) showing all observations close to 45° line. This indicates satisfaction of assumption of normality. The values of Durbin-Watson coefficient for dependent variables of reaction and learning are 1.826 and 1.825 respectively. These values are within the range ($1.5 < DW < 2.5$) hence, assumption of independence is satisfied (Iqbal, 2008).

5.1.1 Hypothesis 1

The results in Table 3 show that corresponding to hypothesis 1 the regression model provides evidence of its fitness ($F = 44.426$, $p < 0.01$) revealing strong multiple correlation between all TC and reaction as the first component of formative TE. The coefficient of determination reveals 59% variation in reaction is explained by TC. The t statistic for training objectives, training material, trainer, training methods, training environment and training management ($t = 3.562$, 1.918, 1.957, 2.780, 3.278 and 4.876 respectively, $p < 0.01$) for respective b coefficients provide very

strong evidences that the slopes associated with above mentioned TC are not equal to zero. These b coefficients are positive and indicate direct relationship with reaction. However, the b coefficient associated with training contents is negative, indicating inverse relationship with reaction. The b coefficient for intercept indicates positive and direct relationship with reaction representing the value of reaction if all TC are equal to zero. Table 4 presents the output of stepwise method with the purpose of refining the results further. The stepwise procedure generated five steps. Step 1 reveals the TC having the greatest impact on reaction followed by steps 2, 3, 4, and 5 showing combinations of next to the best one. For all steps respective regression models provide evidences for their fitness ($F = 135.814, 109.398, 87.837, 71.531$ and 59.675 respectively, $p < 0.01$) revealing strong multiple correlations between respective TC and reaction. The coefficients of determination reveal 39.0%, 50.7%, 55.2%, 57.2% and 58.2% variations in reaction are explained by combinations of TC in steps 1, 2, 3, 4, and 5 respectively. The t statistic for training methods (step 1: $t = 11.654, p < 0.01$); training methods and training management (step 2: $t = 8.336$ and 7.126 respectively, $p < 0.01$); training methods, training management, and training objectives (step 3: $t = 6.886, 6.087,$ and 4.713 respectively, $p < 0.01$); training methods, training management, training objectives, and training environment (step 4: $t = 4.496, 4.888, 4.294,$ and 3.267 respectively, $p < 0.01$); and training methods, training management, training objectives, training environment, and trainer (step 5: $t = 3.016, 4.914, 3.716, 3.211,$ and 2.392 respectively, $p < 0.05$) provide strong evidences that the slopes associated with above-mentioned TC are not equal to zero. All b coefficients are positive and indicate direct relationships with reaction. Similarly, b coefficients for intercepts also indicate direct relationship with reaction representing the value of reaction if all TC are equal to zero.

5.1.2 Hypothesis 2

The results in Table 3 show that corresponding to hypothesis 2 the regression model provides evidence of its fitness ($F = 48.331, p < 0.01$) revealing strong multiple correlation between all TC and learning as the second component of formative TE. The coefficient of determination reveals 61.3% variation in learning is explained by TC. The t statistic for training objectives, training material, trainer, training methods, training environment and training management ($t = 1.573, 1.808, 4.536, 3.036, 3.295,$ and 3.259 respectively, $p < 0.01$) for respective b coefficients provide very strong evidences that the slopes associated with above mentioned TC are not equal to zero. These b coefficients are positive and indicate direct relationship with learning. However, the b coefficient associated with training contents is negative, indicating inverse relationship with learning. The b coefficient for intercept indicates positive and direct relationship with learning representing the value of learning if all TC are equal to zero. In Table 4, the results of stepwise procedure reveal five steps. For all steps respective regression models provide evidences for their fitness ($F = 159.352, 119.072, 98.686, 81.412$ and 67.671 respectively, $p < 0.01$) revealing strong multiple correlations between respective TC and learning. The coefficients of determination reveal that 44.4%, 52.8%, 58.1%, 60.4% and 61.2% variations in learning are explained by combinations of TC in steps 1, 2, 3, 4, and 5 respectively. The t statistic for training methods (step 1: $t = 13.014, p < 0.01$); training methods and trainer (step 2: $t = 7.170$ and 6.207 respectively, $p < 0.01$); training methods, trainer, and training management (step 3: $t = 5.474, 6.136$ and 5.254 respectively, $p < 0.01$); training methods, trainer, training management, and training environment (step 4: $t = 3.466, 6.044, 3.832$ and 3.578 respectively, $p < 0.01$); and training methods, trainer, training management, training environment, and training material (step 5: $t = 3.050, 4.533, 3.423, 3.459$ and 2.356 respectively, $p < 0.05$) provide strong evidence that the slopes associated with above-mentioned TC are not equal to zero. All b coefficients are positive and indicate direct relationships with learning. Similarly, b coefficients for intercepts also indicate direct relationship with learning representing the value of learning if all TC are equal to zero.

5.1.3 Hypothesis 3

The authors adopted simple mediation procedure (Preacher and Hayes, 2004) to test the hypothesis 3. Results in Table 5 reveal that difference between direct and indirect effects of each TC on Learning ($c - c'$) is positive however, no c' is zero. Hence, reaction partially mediates the relationships between each TC and Learning. These results partially substantiate the predicted intervention of reaction in relationships between TC and Learning that further supports Wang et al. (2002), who maintain that levels of Kirkpatrick model are causally linked.

6. Discussion

Training professionals maintain that an organization cannot determine the effectiveness of a training program without evaluating it (Collis, 2002). There are multiple criteria for TE, for example, it is linked with achievement of training objectives, desired financial outcomes, or employees' learning that improves their performance. This study focused on the last because it additionally helps achieve the former ones too. Moreover, this paper attempted to signify the formative TE practice by identifying TC and assessing their impact on TE in public-sector training institutes of Islamabad, Pakistan. The authors endeavored to promote the TE practice in Pakistan and tried to bridge up their findings with previous studies. The focus of this study was on Kirkpatrick's model, which is generally used

by the training evaluators (Faerman and Ban, 2004).

Corresponding to the first research question seeking empirical evidence on significant interrelationships among all TC, this study reveals that all TC are significantly related with each other (see Table 2). These findings support previous studies that emphasize on considering different combinations of TC with respect to different training outcomes. Rajeev et al. (2009) maintain that need based application of training methods, training contents and training material by the trainer helps attain trainees' satisfaction. Likewise, Forsyth et al. (1995) contend that TC like training material, training methods, trainers, training media, training manager and training environment ensure effectiveness of the training program.

Answering the second research question that seeks significant impact of TC on formative TE, this study provides empirical evidence of significant relationships between different sets of TC and formative TE (see Tables 3 and 4). These findings support previous studies. Indira (2008) finds that 55% of participants consider that TC such as training contents, training methods, training material and trainer influence the formative TE (only reaction). Likewise, Basarab Sr. and Root (1992) also maintain the importance of trainees' reaction. They found that training contents, trainer, training material and training environment significantly affect the training program. Previous research also highlights the TC such as training objectives, training contents, trainer, and training methods affect the overall outcomes of the training program. These outcomes are thought to be a way of feedback because these help reset training objectives, redesign the contents, improve the course material and ensure the quality presentation. Moreover, these TC prosper the trainee's learning and affect the overall training program (Sanderson, 1994). As regards learning, Collis (2002) emphasized that if TE is not intended to assess the learner then it would largely be misunderstood because such evaluations provide trainers with the opportunity to review training programs, course material, instructor skills, resource materials etc. When it comes to overall formative TE (the combination of reaction and learning), Elbadri (2001) finds that surveyed organizations rely heavily on them.

Multiple regression analysis (standard method) reveals that all TC are proved to have significant positive impact on both components of formative TE i.e. reaction and learning. However, the impact of training contents on them is found negative yet insignificant. This is because the sample training institutions are found to be neglecting the importance of training contents. Furthermore, the major cause is avoiding Training Need Analysis (TNA) at all or performing an ineffective one. Sample training institutions are found to be designing training courses before inviting participants. In this way, trainees cannot express their requirements regarding design of training contents. Moreover, these institutions develop their own contents for different training programs or their trainers develop some general course contents, in which needs of trainees are generally ignored. These are some basic reasons, which showed the negative and less significant impact of training contents on formative TE. Multiple regression analysis (stepwise method) reveals that training method is found to be the most influencing variable at first step for both components of formative TE. This finding supports Kraiger et al. (2004). The overall results of the study reveal that all TC have significant impact on formative TE under the Kirkpatrick model.

The final research question seeks empirical evidence on intervening role of reaction in relationships between TC and learning. In this respect, findings of this study provide evidence of partial mediation in case of all TC supporting the previous studies (e.g. Wang et al., 2002; Leskiw and Singh, 2007; Tian et al., 2007).

6.1 Practical Implications

The findings of this study provide rationale for inclusion of TE in the training plan. The study offers solution to the training management of public-sector training institutions for conduct of time and cost effective TE. For cost effectiveness, most of the organizations rely on post-training reaction measures only (Faerman and Ban, 2004) because cost increases with each level (Leskiw and Singh, 2007). Tian et al. (2007) recommend that TE should begin with level 1 and should be continued till level 4 if time and budget allow. Therefore, this paper emphasizes only on two components of formative TE i.e. reaction and learning. Moreover, to bridge up theory and practice, findings of this study provide empirical evidence on usability of Kirkpatrick model in training institutions. In addition, this study identifies seven TC that influence formative TE. Therefore, training professionals need to align them with the other training steps with special focus on TE.

6.2 Limitations and Future Research

The Kirkpatrick model is the mostly used TE mechanism (Al-Athari and Zairi, 2002) that comprises four levels. The authors conceptualized the segregation of these four components into two categories i.e. formative and summative evaluation to keep their significance intact. Therefore, they delimited scope of this research by studying first two components of Kirkpatrick model (reaction and learning) and left next two (behavior and results) for future research. Likewise, literature provides evidence that there is a number of TC but this study focused only on the seven most important ones (Aldrich, 2002).

Every study is like one piece of a jigsaw puzzle. It does not solve the paradox completely but without its contribution paradox can not be solved. Same is the case with this study as it focused only on components of formative TE but summative ones are still to be studied. This is because, for better understanding of the benefits of training programs, a systematic evaluation at all levels of Kirkpatrick's model is needed (Oostrom and van Mierlo, 2008). Velada and Caetano (2007) maintain that formative TE is an antecedent of summative TE (especially transfer) because all four levels of Kirkpatrick model are causally linked (Wang et al., 2002). This is because each prior level serves as a basis for the next one, and each successive level increases the rigor and thoroughness of the evaluation (Leskiw and Singh, 2007; Tian et al., 2007). Therefore, the authors suggest that in future relationship between TC and components of summative TE, i.e., behavior and results (Laird, 2003) should also be studied so that the influence of TC on overall TE is assessed.

References

- Al-Athari, A., and Zairi, M. (2002). Training evaluation: an empirical study in Kuwait. *Journal of European Industrial Training*, 26(5), 241-251.
- Aldrich, C. (2002). Measuring success: In a post-Maslow/Kirkpatrick world, which metrics matter? *Online Learning*, 6(2), 30-32.
- Ashton, D., and Easterby-Smith, M. (1979). *Management development in the organization*. London: Macmillan.
- Awan, S. H. (2008). Impact of capacity building interventions towards employee development in the garments and apparel organizations of Pakistan (Doctoral dissertation, National University of Modern Languages, 2008).
- Ban, C. and Faerman, S. R. (1990). Issues in the evaluation of management training. *Public Productivity & Management Review*, 13(3), 271-286.
- Barrington, H. and Reid, M. A. (1997). *Training interventions: managing employee development*. London: Chartered Institute of Personnel & Development.
- Basarab Sr., D. J., and Root, D. K. (1992). *The training evaluation process: A practical approach to evaluating corporate training programs (Evaluation in Education and Human Services)*. London: Kluwer Academic.
- Bober, C. F. and Bartlett, K. R. (2004). The utilization of training program evaluation in corporate universities. *Human Resource Development Quarterly*, 15(4), 363-383.
- Chatterjee, S. and Hadi, A. S. (2006). *Regression analysis by example* (4th ed.). New Jersey: John Wiley.
- Chunn, G. C., and Thacker, C. (1993, February). A manager's role in developing and reinforcing strong training. *Corrections Today*, 55, 48+.
- Coles, M. (2000). Virtual universities are the job. *The Sunday Times*, VA.
- Collins, D. B. (2002). Performance level evaluation methods used in management development studies from 1986 to 2000. *Human Resource Development Review*, 1(1), 91-110.
- Collins, M. E. (2008). Evaluating child welfare training in public agencies: status and prospects. *Evaluation and Program Planning*, 31, 241-246.
- Collis, B. (2002). So how effective is your training? *Beverage Industry*, 93(1), 52.
- Community-based psychological support: a training manual. (2003). International Federation of Red Cross and Red Crescent societies. Geneva. Accessed <http://drr.upeace.org/english/documents/References/Topic%206-Vulnerability%20and%20Capacity%20Assessment/IFRC%202003%20Community%20Based%20Psychological%20Support.pdf> on May 30, 2009.
- Dean, G. J. (1994). *Designing instruction for adult learners (the professional practices in adult education and human resource development series)*. Malabar, FL: Krieger.
- Desimone, R. L., Werner, J. M., and Harris, D. M. (2002). *Human resource development* (3rd ed.). Harbor Drive, Orlando: Harcourt College.
- Dick, W., and Carey, L. (1996). *The systematic design of instruction* (4th ed.). New York: Harper Collins.
- Elbadri, A. N. A. (2001). Training practices of Polish companies: an appraisal and agenda for improvement. *Journal of European Industrial Training*, 25(2/3/4), 69-79.
- Eseryel, D. (2002). Approached to evaluation of training: theory & practice. *Educational Technology & Society*, 5(2), 93-98.
- Faerman, S. R. and Ban, C. (1993). Trainee satisfaction and training impact: issues in training evaluation. *Public*

Productivity & Management Review, 16(3), 299-314.

Farr, J. L., Hofmann, D. A., and Ringenbach, K. L. (1993). Goal orientation and action control theory: Implications for industrial and organizational psychology, *International Review of Industrial and Organizational Psychology*, 8, 193–232.

Forsyth, I., Jolliffe, A., and Stevens, D. (1995). *Evaluating courses: practical strategies for teachers, lecturers, and trainers*. London: Kogan Page.

Galloway, D. L. (2005). Evaluating distance delivery and e-learning: is Kirkpatrick's model relevant? *Performance Improvement*, 44(4), 21-27.

Gliem, J. A., and Gliem, R. R. (2003, October 8-10). *Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales*. Paper presented at the Midwest Research-to-Practice Conference in Adult, Continuing, and Community Education, The Ohio State University, Columbus, US.

Goldstein, I. L. (1989). *Training and Development in Organizations* (3rd ed.). US: Pfeiffer

Haertel, G. D., and Walberg, H. J. (1988). Assessing social-psychological classroom environments in program evaluation. *New Directions for Program Evaluation*, 40, 45-61.

Hahs-Vaughn, D., Zygouris-Coe, V., and Fiedler, R. (2007). A hybrid evaluation model for evaluating online professional development. *Technology, Pedagogy and Education*, 16(1), 5-20.

Hamtini, T. M. (2008). Evaluating e-learning programs: an adaptation of Kirkpatrick's model to accommodate e-learning environments. *Journal of Computer Science*, 4(8), 693-698.

Harris, D. and Tessmer, M. (1992). *Analyzing the instructional setting: environmental analysis*. London: Kogan page.

Hashim, J. (2001). *Training evaluation: clients' role*. *Journal of European Industrial Training*, 25(7), 374-379

Hellebrandt, J., and Russell, J. D. (1993). Confirmative evaluation of instructional materials and learners. *Performance + Instruction*, 32(6), 22-27.

Hesseling, P. G. M. (1966). *Strategy of evaluation research in the field of supervisory and management training*. Amsterdam: Van Gorcum.

Houlton III, E. (1998). What is performance? Levels of performance revisited. In Torracco R. (Ed.), *The research agenda for improving performance*. Washington, DC: ISPI Press.

Indira, A. (2008). *Evaluation of training programs for rural development*. *Journal of Applied Quantitative Methods*, 3(2), 139-150.

Iqbal, M. Z. (2008). Training needs assessment: its impact on improvement of human productivity in pharmaceutical organizations of Pakistan (Doctoral dissertation, National University of Modern Languages, 2008).

Jeng, Y., and Hsu, P. (2005, May 30–June 01). *Establishment of evaluation indicators for student practical training in insurance industry*. Paper presented at the proceedings of international conference on redesigning pedagogy: research, policy, practice. National Institute of Education, Nanyang Technological University, Singapore.

Kirkpatrick, D. L. (1959). Techniques for evaluating training programs. *Journal of the American Society for Training Directors*, 13(11), 3–9.

Kirkpatrick, D. L. (1996). Great Ideas Revisited. *Training & Development*, 50(1), 54-59.

Kirkpatrick, D. L., and Kirkpatrick, J. D. (2006). *Evaluating training programs: the four levels* (3rd ed.). San Francisco, US: Berrett-Koehler.

Kraiger, K., McLinden, D., and Casper, W. J. (2004). Collaborative planning for training impact. *Human Resource Management*, 43(4), 337-351.

Laird, D. (2003). *Approaches to training and development* (3rd ed.). US: Perseus.

Lanigan, M. L. (2008). Are self-efficacy instruments comparable to knowledge and skills tests in training evaluation settings? *Performance Improvement Quarterly*, 20(3-4), 97-112.

Lee, S. H., and Pershing, J. A. (1999). Effective reaction evaluation in evaluating training programs: purposes and dimension classification. *Performance Improvement*, 38(8), 32-39.

Leskiw, S. and Singh, P. (2007). Leadership development: learning from best practices. *Leadership & Organization Development Journal*, 28(5), 444-464.

- Magdy, A. (1999). Measuring and evaluating sales force training effectiveness: a proposed and empirically test model. (Doctoral dissertation, Old Dominion University, Norfolk, VA, 1999).
- Miller, L. P. (2002). Perception of training and non training managers of organizational impact measure based on design intent. (Doctoral dissertation, North Carolina State University, 2002).
- Morgan, R. B., and Casper, W. J. (2000). Examining the factor structure of participant reactions to training: a multidimensional approach. *Human Resource Development Quarterly*, 11(3), 301–317.
- Moskowitz, M. (2008). *A Practical guide to training and development: assess, design, deliver and evaluate*. San Francisco, USA: John Wiley & Sons.
- Oostrom, J. K. and van Mierlo, H. (2008). An evaluation of an aggression management training program to cope with workplace violence in the healthcare sector. *Research in Nursing & Health*, 31, 320–328.
- Pandey, A. (2007). Strategically focused training in Six Sigma way: a case study. *Journal of European Industrial Training*, 31(2), 145-162.
- Pershing, J. A. and Pershing, J. L. (2001). Ineffective reaction evaluation, *Human Resource Development Quarterly*, 12(1), 73-90.
- Power, B. (1992). *Instructor excellence: mastering the delivery of training*. San Francisco: Jossey-Bass
- Preacher, K. J. and Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers*, 36(4), 717-731.
- Prokopenko, J. (1987). *Productivity management: A practical handbook*. Geneva: International Labor Organization.
- Rae, W. L. (2004). Free evaluation tools. Accessed <http://www.businessballs.com/trainingprogram>
- Rajeev, P., Madan, M.S., and Jayarajan, K. (2009). Revisiting Kirkpatrick's model – an evaluation of an academic training course. *Current Science*, 96(2), 272-276.
- Robinson, D. G., and Robinson, J. C. (1989). *Training for impact: how to link training to business needs and measure the results*. San Francisco: Jossey- Based.
- Russ-Eft, D. (2002). A typology of training design and work environment factors affecting workplace learning and transfer. *Human Resource Development Review*, 1(1), 45–65.
- Sanderson, G. (1994). Objectives and evaluation. In S. Truelove (Ed.), *Handbook of training and development (2nd ed.)*. Oxford: Blackwell.
- Sekaran, U. (2003). *Research methods for business: a skill building Approach, (4th ed.)*. New York: John Wiley.
- Smith, A. J., and Piper, J. A. (1990). The tailor made training maze: a practitioner's guide to evaluation. *Journal of European Industrial Training*, 14(8), 2-24.
- Sugrue, B. and Fuller, j. (1999). Performance Interventions: Selecting, Implementing and evaluating the results. *American society of training and development*. Alexandria, VA.
- Tan, J. A., Hall, R. J., and Boyce, C. (2003). The role of employee reactions in predicting training effectiveness. *Human Resource Development Quarterly*, 14(4), 397-411.
- Tennant, C., Boonkrong, M., and Roberts, P. A. B. (2002). The design of training programme measurement model. *Journal of European Industrial Training*, 26(5), 230-240.
- Tian, J., Atkinson, N. L., Portnoy, B., and Gold, R. S. (2007). A systematic review of evaluation in formal continuing medical education. *Journal of Continuing Education in the Health Professions*, 27(1), 16–27.
- Tracey, W. R. (1992). *Designing training and development system (3rd ed.)*. New York: AMACOM.
- Twitchell, S., Holton III, E. F., and Trott Jr., J. W. (2000). Technical training evaluation practices in United States. *Performance Improvement Quarterly*, 13(3), 84-109.
- Velada, R. and Caetano, A. (2007). Training transfer: the mediating role of perception of learning. *Journal of European Industrial Training*, (31)4, 283-296.
- Wang, G. G., Dou, Z., and Li, N. (2002). A systems approach to measuring return on investment for HRD interventions. *Human Resource Development Quarterly*, 13(2), 203-224.
- Wart, M. V., Cook, S., and Cayer, N. J. (1993). *Handbook of training and development for the public sector: a comprehensive resource*. San Francisco: Jossey-Bass.

Table 1. Descriptive statistics and reliability of scales

Variables	Cronbach α	<i>N</i>	<i>M</i>	<i>SD</i>	<i>Min.</i>	<i>Max.</i>
All items	0.944	38				
Training objectives	0.827	3	5.40	0.866	4	7
Training contents	0.623	3	5.59	0.625	5	7
Training material	0.794	3	5.73	0.747	4	7
The Trainer	0.777	3	5.85	0.696	4	7
Training method	0.638	4	5.62	0.603	4	7
Training environment	0.734	3	5.45	0.755	4	7
Training management	0.791	3	5.24	0.932	5	7
Reaction	0.818	10	5.81	0.534	4	7
Learning	0.769	6	5.84	0.463	3	7

Table 2. Tolerance, Variance Inflation Factor, and inter-correlations among independent variables

Independent Variables	Tolerance	VIF	1	2	3	4	5	6	7
1. Training objectives	0.525	1.905	1						
2. Training contents	0.476	2.100	0.625	1					
3. Training material	0.383	2.609	0.600	0.663	1				
4. Trainer	0.492	2.034	0.435	0.484	0.634	1			
5. Training method	0.426	2.348	0.429	0.427	0.571	0.624	1		
6. Training environment	0.497	2.011	0.428	0.390	0.467	0.460	0.648	1	
7. Training management	0.665	1.503	0.393	0.354	0.416	0.340	0.452	0.531	1

All correlations are significant at $p < 0.01$

Table 3. Model summary and regression coefficients (Simultaneous Method)

Independent Variables	Dependent Variables		
	Reaction (H_1)	Learning (H_2)	
	<i>B</i>	<i>B</i>	
Constant	2.656 ^a	1.716 ^a	
Training objectives	0.116 ^a	0.057	
Training contents	-0.105 ^b	-0.044	
Training material	0.085 ^c	0.089 ^c	
Trainer	0.082 ^c	0.212 ^a	
Training method	0.144 ^a	0.176 ^a	
Training environment	0.126 ^a	0.141 ^a	
Training management	0.131 ^a	0.098 ^a	
	<i>R</i>	0.777	0.791
	Adjusted R^2	0.590	0.613

^a $p < 0.01$, ^b $p < 0.05$, ^c $p < 0.10$

Table 4. Model summary and regression coefficients (Stepwise Method)

Steps	H ₁ (DV: Reaction)		H ₂ (DV: Learning)	
	Independent Variables	<i>B</i>	Independent Variables	<i>B</i>
1	(Constant)	3.135 ^a	(Constant)	2.486 ^a
	Training methods	0.481 ^a	Training methods	0.591 ^a
	<i>R</i>	0.627	<i>R</i>	0.668
	Adjusted <i>R</i> ²	0.390	Adjusted <i>R</i> ²	0.444
2	(Constant)	2.884 ^a	(Constant)	1.967 ^a
	Training methods	0.347 ^a	Training methods	0.384 ^a
	Training management	0.192 ^a	Trainer	0.288 ^a
	<i>R</i>	0.715	<i>R</i>	0.730
	Adjusted <i>R</i> ²	0.507	Adjusted <i>R</i> ²	0.528
3	(Constant)	2.667 ^a	(Constant)	1.803 ^a
	Training methods	0.287 ^a	Training methods	0.292 ^a
	Training management	0.161 ^a	Trainer	0.269 ^a
	Training objectives	0.133 ^a	Training management	0.151 ^a
	<i>R</i>	0.747	<i>R</i>	0.766
	Adjusted <i>R</i> ²	0.552	Adjusted <i>R</i> ²	0.581
4	(Constant)	2.616 ^a	(Constant)	1.734 ^a
	Training methods	0.211 ^a	Training methods	0.201 ^a
	Training management	0.133 ^a	Trainer	0.258 ^a
	Training objectives	0.119 ^a	Training management	0.114 ^a
	Training environment	0.128 ^a	Training environment	0.154 ^a
	<i>R</i>	0.762	<i>R</i>	0.782
	Adjusted <i>R</i> ²	0.572	Adjusted <i>R</i> ²	0.604
5	(Constant)	2.481 ^a	(Constant)	1.664 ^a
	Training methods	0.156 ^a	Training methods	0.177 ^a
	Training management	0.132 ^a	Trainer	0.212 ^a
	Training objectives	0.105 ^a	Training management	0.102 ^a
	Training environment	0.124 ^a	Training environment	0.148 ^a
	Trainer	0.093 ^b	Training material	0.100 ^b
	<i>R</i>	0.769	<i>R</i>	0.788
	Adjusted <i>R</i> ²	0.582	Adjusted <i>R</i> ²	0.612

^a $p < 0.01$, ^b $p < 0.05$, ^c $p < 0.10$

Table 5. Meditating role of Reaction in relationships between TC and Learning

TC	Regression Equations	Estimated Regression Equations
Training Objectives	1. $L = i_1 + c \text{ TOB}$	1. $L = 4.163 + 0.305 \text{ TOB}$
	2. $R = i_2 + a \text{ TOB}$	2. $R = 4.295 + 0.286 \text{ TOB}$
	3. $L = i_3 + c \square \text{ TOB} + b \text{ R}$	3. $L = 0.601 + 0.067 \text{ TOB} + 0.829 \text{ R}$
Training Contents	1. $L = i_1 + c \text{ TCO}$	1. $L = 3.676 + 0.382 \text{ TCO}$
	2. $R = i_2 + a \text{ TCO}$	2. $R = 4.198 + 0.294 \text{ TCO}$
	3. $L = i_3 + c \square \text{ TCO} + b \text{ R}$	3. $L = 0.227 + 0.140 \text{ TCO} + 0.822 \text{ R}$
Training Material	1. $L = i_1 + c \text{ TMT}$	1. $L = 3.349 + 0.429 \text{ TMT}$
	2. $R = i_2 + a \text{ TMT}$	2. $R = 3.840 + 0.349 \text{ TMT}$
	3. $L = i_3 + c \square \text{ TMT} + b \text{ R}$	3. $L = 0.498 + 0.170 \text{ TMT} + 0.742 \text{ R}$
Trainer	1. $L = i_1 + c \text{ TRA}$	1. $L = 2.913 + 0.495 \text{ TRA}$
	2. $R = i_2 + a \text{ TRA}$	2. $R = 3.756 + 0.357 \text{ TRA}$
	3. $L = i_3 + c \square \text{ TRA} + b \text{ R}$	3. $L = 0.291 + 0.246 \text{ TRA} + 0.698 \text{ R}$
Training Method	1. $L = i_1 + c \text{ TMD}$	1. $L = 2.483 + 0.591 \text{ TMD}$
	2. $R = i_2 + a \text{ TMD}$	2. $R = 3.135 + 0.481 \text{ TMD}$
	3. $L = i_3 + c \square \text{ TMD} + b \text{ R}$	3. $L = 0.345 + 0.263 \text{ TMD} + 0.682 \text{ R}$
Training Environment	1. $L = i_1 + c \text{ TAT}$	1. $L = 3.400 + 0.442 \text{ TAT}$
	2. $R = i_2 + a \text{ TAT}$	2. $R = 3.755 + 0.383 \text{ TAT}$
	3. $L = i_3 + c \square \text{ TAT} + b \text{ R}$	3. $L = 0.651 + 0.162 \text{ TAT} + 0.732 \text{ R}$
Training Management	1. $L = i_1 + c \text{ TMM}$	1. $L = 4.213 + 0.304 \text{ TMM}$
	2. $R = i_2 + a \text{ TMM}$	2. $R = 4.303 + 0.293 \text{ TMM}$
	3. $L = i_3 + c \square \text{ TMM} + b \text{ R}$	3. $L = 0.679 + 0.063 \text{ TMM} + 0.821 \text{ R}$

i = intercept, c = direct effect of TC on Learning, $c \square$ = indirect effect of TC on Learning, All beta weights are significant at 0.05 level

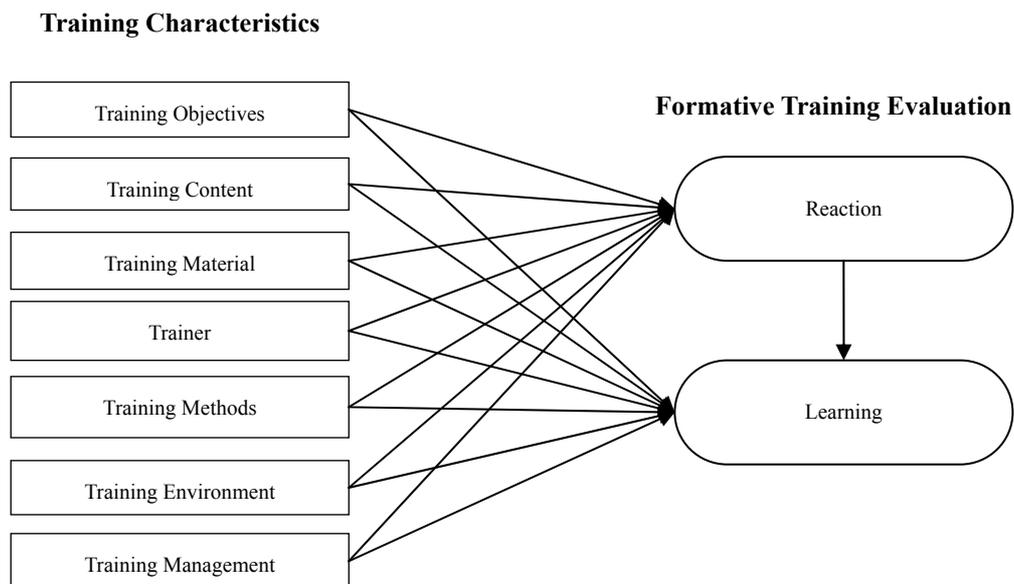
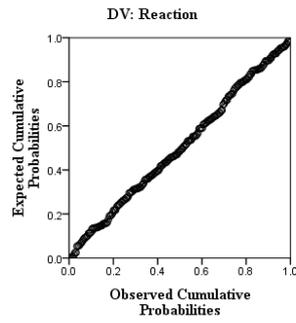


Figure 1. The Research Model

(a) Reaction



a(b) Learning

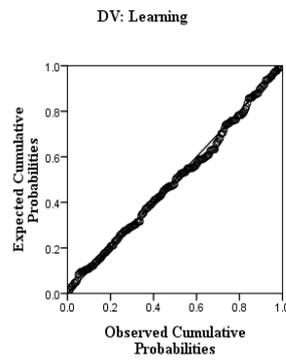


Figure 2. Normal P-P plot of Regression Standardized Residual