The Systematic Construction and Influential Factors of Training Needs Assessment

Jen-Chia Chang
Institute of Technological & Vocational Education
National Taipei University of Technology
Taipei, Taiwan

Tseng-Chang Chiang
Institute of Technological & Vocational Education
National Taipei University of Technology
Taipei, Taiwan

Chen Kun yi
Institute of Technological & Vocational Education
National Taipei University of Technology
Taipei, Taiwan

Abstract

The study found that training needs assessment(TNA) using the dimensions of strategic competence, organizational performance gap & competencies gap, which is consistent with McGhee and Thayer's three-fold analysis. This study used questionnaires and exploratory factor analysis found four factors that affect TNA: (1) mastering problems and analyses, (2) mastering organizational development, (3) mastering resource applications, and (4) capability for intervention implementation. In this study, 193 HRD practitioners in charge of organizational training were regarded as the research samples to analyze the influential factors of TNA, and it was found that "mastering organizational development" was significantly related to organizational scale, and "capability for intervention implementation" was significantly related to training performance.

Keywords: Training needs assessment (TNA), Training performance, Organizational scale

1. Introduction

Training is a method to increase the work performance of employees and maximize human capital. Training and organizational performance already interconnect, so employees have to successively learn new personal knowledge, obtain new skills, and continuously accept training to maintain the maximum work performance. However, there are some problems. How effective is the provided training? Will receiving training really help employees increase their work performance? How do training practitioners make sure that the provided training meets employees' needs? Will training cause another type of organizational problems instead? The key lies in the following. Does the provided training result from a needs analysis? Are training practitioners capable to analyze problems? Do they spend time on analyzing training needs? A training needs analysis is to understand what training employees really need (Cekada, 2010). There are always training, training, and training. People always think that organizational problems can be solved through training. However, can training really solve problems? Which content should training include? What if employees still have the same behavior after finishing training? In a lot of enterprises, training is considered employee welfare, but their employees tend to think that participating in training is a burden or waste for them, so the effectiveness of training is always doubtful. Furthermore, too much training will result in degeneracy instead of benefit (Whiles, 1999). The effectiveness of training includes the application after training as well as the duration of the application which varies according to the relationship between the content of training and the position that an employee serves.

It is estimated that only 10%-15% of training content maintains for one year (Broad & Newstrom, 1992). Cekada (2010) argued that if management adopt regular training and use simple training content, the training will not be effective. Moreover, overtraining will increase trainees' torments and damage their trust in the training courses (Blair & Seo, 2007). Contemporary training should focus on helping solve organizational problems and increase performance instead of caring about the forms and quantity of training. Without quality and performance output, training is unproductive and wasteful. Therefore, it is necessary to establish a new performance-based training model and emphasize training needs in order to train employees properly and generate training benefit (Holton, Bates & Naquin, 2000).

Training includes four stages, respectively training needs analysis, training program design, training program implementation, and training result assessment. A training practitioner usually focuses on training program design as well as training program implementation and often ignores training needs analysis as well as training result evaluation. Training needs analysis is the first step of training. When suitable training courses are provided according to needs, demand and supply are balanced, and training thus becomes effective. A training practitioner should have not only skills necessary in training, such as course design, learning theory, and teaching skills, but also the following capabilities: "capability for performance management and analysis" for identifying training gaps, "capability for reformation" for confirming the new knowledge and skills that employees should possess in the future, and "capability for strategy management" for distinguishing relevant capabilities that employees should have when implementing strategies.

In recent three decades, training theorists or researchers addressed that training needs analyses are not trusted by organizations and lack systematic applications (Tylor, O' Driscoll, & Bining, 1998). Even until the recent, survey is still the main approach used to understand training needs (Holden, 1991; Tylor, & O' Driscoll, 1992). A great number of researchers still suggest employing surveys to understand training needs and form training strategies. Training needs analysis is a key step for training and the results. Necessary training that an organization needs is decided through training needs analyses. Are the training needs generated by surveys what employees really need? Or are they just employees' preferences? Training practitioners should understand if training needs result from surveys or analyses. In the past, training practitioners seldom spent time on training needs analyses. When an organization encounters problems, training is one of the options to solve the problems. When the problems result from the employees' lack of capability, the organization should adopt training to increase the employees' capability to perform the work or tasks. Before training is adopted as an intervention, it is necessary to collect and analyze the situations. This is the meaning of training needs analysis.

If TNA are not applied to the training of an organization, there will be overtraining, insufficient training, and incomplete training in the organization (Judith, 2002). Judith also addressed the four reasons for having TNA: (1) confirming the real problems in an organization, (2) obtaining the support of the management, (3) developing evaluation data, and (4) deciding training cost and benefit. Training needs are still learning needs, but learning is not training. Properly speaking, learning covers training, and training is one of many methods to facilitate learning (Martin, 2009). Hence, more extensively, the needs should be learning needs, and the learning needs which can be fulfilled through training are then found out. A needs assessment is the first step to establish an effective training course. It can be used to decide learning goals, design training courses, and evaluate if training is effectively implemented. Meanwhile, it also provides managers and learners an opportunity to talk to each other and participate in organizational activities (Cekada, 2010). A good TNA provides the following benefits (Warshauer, 1988; Denis & McConnell, 2003): (1) increasing the commitment of the management to enable participants to participate in training and development continuously, (2) increasing the visibility of training functions, (3) elaborating critical organizational issues, (4) making the best use of limited organizational resources, (5) providing training courses and training design ideas, (6) making training become strategies, (7) providing employees with knowledge and skills for performing their duties, (8) helping an organization find the goal of performance, and (9) improving employee relations and morale. Is training effective? Can training really help an organization solve its problems? What is the difference between organizations not providing training and organizations providing training? Before these questions are answered, it is necessary to carefully examine if a training needs analysis should be conducted before a training course is designed, and if there is consistent relation between provided training and organizational problems.

2. Training needs assessment

From the perspective of planning, it is necessary to conduct a training needs analysis before a course is designed in order to master the performance gap of the learners, confirm the current situation of the learners, and decide which resource and method should be applied to training for achieving goals **(**Martin, 2009). Nevertheless, supervisors and training practitioners usually spend very less time on analyzing training needs. From a great deal of training, it was found that TNA are performed in only 6% of training programs (Arthur et al, 2003). A lot of training needs come from high-ranking supervisors or management. They subjectively assume problems and promptly decide which training to provide. That is, needs analyses are seldom conducted before training. This type of training lacks training and learning goals, and the designed training activities also can not meet the real needs of learners.

A TNA is a process of confirming the knowledge and technology necessary for achieving organizational goals (Brinkerhoff & Gill, 1994). Inside an organization, a TNA is a process to decide if it is necessary to provide the employees with training and which training should be provided (Tylor, O' Driscoll, & Bining, 1998). TNA is a basic skill that a training practitioner should possess. The so-called training needs analysis is a process of continuously collecting data in order to decide if training needs exist and help achieve organizational development goals (Brown, 2002). According to Rossett (1987), a training needs analysis should be conducted in order to find out the following information: (1) optimal performance or knowledge, (2) actual or current performance or knowledge, (3) necessary participants or obvious objects, (4) the causes of problems, and (5) solving problems. A training needs analysis is a process of thinking and solving problems, which are caused by employees' lack of knowledge, technology, or capability. Therefore, the process of a so-called training needs analysis is detailed as follows: (1) The origin of needs (problems): Training practitioners should establish fundamental dimensions of the origin of an organizational problem to disciplinedly and systematically seek for the origin of a problem. (2) Specific objects with needs.

After a problem is found out, it is necessary to make sure what caused the problem. Training intervention programs, for instance, can be applied to employees lacking or having insufficient capability. (3) Confirming the content of needs. Training goals, purposes, and needs should be clarified after the causes of a problem is analyzed and confirmed, and training interventions are adopted. (4) Solutions. Aiming at the causes of a problem, the structure and content (syllabus) of training are brought up. Training content design should fully connect with the problem. (5) Effectiveness assessments. According to Kirkpatrick's four-level assessment, a training practitioner can estimate the post-training effect while planning a training course and compare it with the actual effect after training. In addition, according to Phillips' return on investment (ROI) of training, training expenses can be estimated and included in the stage of training planning, and various post-training benefits and amounts can also be estimated to calculate the expected ROI for decision-makers to easily judge if a training program should be supported.

In other words, a training needs analysis tells an organization if training is necessary through collecting and analyzing information. Training needs should be comprehended by collecting and analyzing data. Obviously, if training decisions are made according to training information obtained only through surveys, there will be a lack of training needs analysis elements. A complete training needs analysis should include the following steps: (1) collecting data, (2) analyzing data, (3) providing information on decision-making, (4) establishing solutions, and (5) implementing training. For example, the defective rate of a production department was found to be higher than the expected. If a training needs analysis was not conducted, the training of "reducing production defects" would be directly provided, or other solutions would be adopted. However, if a training practitioner was capable of TNA, the practitioner would collect data with the supervisor of the department. Assume when they collected the data, they found it was because recently the supplier was changed, and the quality assurance department had not yet had any evaluation for the new supplier and any sample test. The causes of this problem included: the procedures for the procurement department to change a suppler, not having any supplier evaluation, and not confirming the quality of the delivery. After a further analysis, it was found that the problem was caused because the employees in the procurement department, quality assurance, and production departments did not understand the procedures of changing suppliers. That is, the problem was related to employees' ability. Thus, training should be regarded as an intervention, which includes:

1. The notification procedures of replacing suppliers.
2. The advanced management of replacing suppliers.
3. New supplier evaluation.
4. The quality assurance of new supplier delivery.
5. Employee training.

The aforementioned 5 issues were the training programs. Only when all of the five issues were implemented, the current problem in the organization would be truly solved. The training should be named "the Operation Procedures and Quality Assurance Methods of Replacing Suppliers." When a TNA was conducted, it is necessary to clearly understand the problems and consider all possible solutions. Before a decision-maker-level decision is made, it is necessary to accomplish not only training but also optimal solution and priorities (Cekada, 2010). If a training needs analysis is conducted in advanced, training will be an organization rewarding investment, and it will save money and time. Furthermore, correct solutions will be adopted to solve problems (McArdle, 1998). The implementation of TNA in an organization is influenced by some factors, including organizational scale, management goals, resources, being governmental or private, globalization, and organizational culture. All of these factors influence the analysis methods and applications that an organization applies to TNA. However, an organization indeed should consider adopting the TNA tools which meet the needs (Hannum & Hansen, 1989).

When performing a TNA, a training practitioner follows certain procedures, finds out training needs, and links them with training courses and programs. A TNA includes five steps (Table 1). Step 1 is "the origin of needs," namely confirming an organizational problem or gap. Step 2 is "specific objects with needs," namely identifying which department or who causes the problem or gap and deciding if the problem is caused by employees' lack of capability. Step 3 is to confirm the content of training needs. After confirming that the problem or gap is caused by employees, a training practitioner decides to solve the problem by training. The practitioner thus should clarify the training needs, training goals, and learning goals. Step 4 is solutions, which are the core of training course design. A planner should master Step 3 and bring up corresponding solutions. A syllabus is the summary of a solution. Step 5 is training effectiveness assessments. The post-training results should be estimated in training course design as the basis of deciding if training is worth adopting. That is, the ROI of training is estimated in the stage of training course planning.

Table 1 The procedures of TNA

step	issue	contents
1	The origin of needs (problems)	Training practitioners should establish fundamental dimensions of the origin of an organizational problem to disciplined and systematically seek for the origin of a problem.
2	Specific objects with needs	After a problem is found out, it is necessary to make sure what caused the problem. Training interventions, for instance, can be applied to employees lacking or having insufficient capability.
3	Confirming the content of needs	Training goals, purposes, and needs should be clarified after the causes of a problem are analyzed and confirmed, and training interventions are adopted.
4	Solutions	Aiming at the causes of a problem, the structure and content (syllabus) of training are brought up. The design of training content should fully connect with the problem.
5	Effectiveness evaluations	According to Kirkpatrick's four-level evaluations, a training practitioner can estimate the post-training effect while planning a training course and compare it with the actual effect after training. In addition, according to Phillips' ROI of training, training expenses can be estimated and included in the stage of training planning, and various post-training benefits and money can also be estimated to calculate the expected ROI for decision-makers to easily judge if a training program should be supported.

In traditional training needs assessment, employees are queried or asked to list the training courses that they prefer, so the origin of assessment needs can be obtained promptly. However, this type of training is, at best, what employees prefer but not what they need. Training may bring only temporary satisfaction and increase in morale, and it may improve work performance very limitedly because the origin of the training needs is not performance-based. In that case, how is a TNA carried out? How are dimensions evaluated systematically? Should proper analysis tools be used? These were the issues investigated in this study.

3. The dimensions of training needs assessment

The background of TNA lies in the process of collecting, sorting, analyzing, and inducing data, identifying problems, bringing out solutions according to the problems, and selecting an optimal solution. McGehee and Thayer (1961) brought up a three-fold approach to analyze training needs. The approach, which is called the O-T-P model in short, is the most common framework applied to TNA. It has always been used in literature or textbooks related to training in the past three decades (Taylor & O'Driscoll, 1998). The three levels are respectively organizational level, operational level (which is also called task and work analysis) and individual level. An organizational-level analysis focuses on an employee's future job competence as well as the new knowledge, technology, and competence that an employee should possess after organization change. Brown(2002) argued that in addition to the new KSAs necessary for work environment change, the training content that employees need should be analyzed from the demographic analysis of labor sources, the competence structure and gender change of the labor market, and the amendment applicability of labor laws and regulations. An organizational-level analysis is used to inspect the plans and goals of an organization and decide which places need training under the principle of resource needs and efficient resource use (Taylor & O'Driscoll, 1998).

Goldstein (1993) addressed that task-oriented analysis plays a central role in TNA because it directly provides the content of training needs, and the information provides the performance requirements necessary for the knowledge, technology, and competence of a job. Therefore, organizational-level training needs indicate the knowledge and skills that an organizational member should possess in order to achieve organizational plans and goals. Goldstein & Ford (2002) considered that constructing systematic TNA significantly influence training effect and the quality of training courses. In terms of training needs, one should discover which places need training and why is training needed (focusing on organizations), who needs to be trained (focusing on employees), and which training content is needed in the organization (focusing on tasks).

According to McGehee and Thayer's and Goldstein's training needs dimensions, organizational-level analysis aims at the strategies that organizations employ to achieve the goals in order to find out the capability of accomplishing strategies that relevant departments and employees should possess, whose training will be provided by the organizations for ensuring that the strategies will be effectively executed. Task-level analysis focuses on the gaps between tasks in terms of performance achievement indicator. If a performance gap results from employees' lack of capability, the organization will provide training to ensure that the performance meets the requirements. Individual-level analysis aims at the position that a person serves. When an employee lacks necessary skills for achieving individual performance requirements, the organization will provide related training to ensure that the individual performance meets the requirements. Although organizations carry out TNA before training, most of them only emphasize the training needs of a single dimension, and only few of them can multi-dimensionally perform systematic TNA (Abdullah, 2009). In summary, organizations should construct systematic TNA and be able to systematically discover performance gaps and analyze if the gaps are caused by the employees' lack of capability so as to design training programs which meet their needs and ensure that the organizational goals are achieved successfully. In this study, three dimensions of TNA were brought up, respectively strategy, performance, and competency (Figure 1).

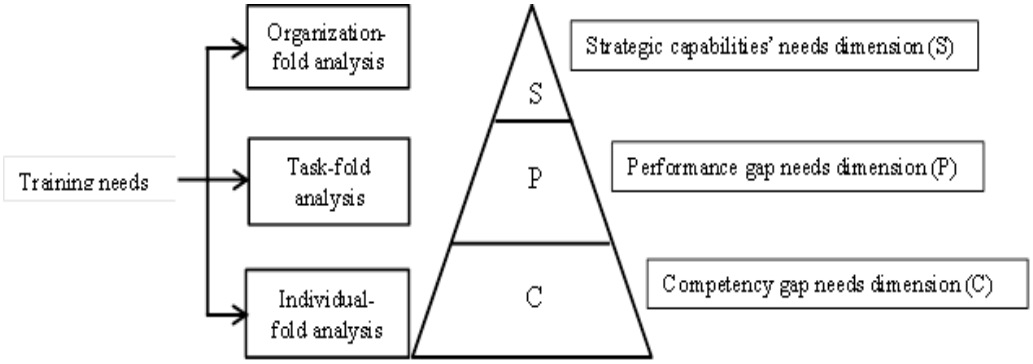

Figure 1: The three dimensions of a systematic TNA

4. Training needs analysis

Training needs analysis is to systematically collect information and analyze the data according the dimensions of TNA before training as the basis of establishing learning goals and course design and decide if training is a correct solution to solve work problems. By training needs analysis, data are continuously collected to make sure that training will help an organization achieve the goals. Collecting information and analyzing data are fundamental in training. The analysis makes sure if training is necessary, confirms which training should be provided, and examines what kind of training patterns and resources should be invested. Cekada (2011) applied the approach of 4WIH to systematical analyses, namely problems and the results are respectively brought up by why, who, how, what, and when in order to generate the content of training needs. Based on different TNA dimensions, Gupta (1999) brought up methods applicable to needs analyses. The analysis tools applicable to strategic training needs include: (1) interview approach, (2) focus group approach, (3) questionnaire approach, (4) observation approach, and (5) process map approach.

The tools adopted to analyze the training needs in performance are: (1) interview approach, (2) questionnaire approach, (3) focus group approach, and (4) observation approach. The tools employed to analyze the training needs in competency are: (1) interview approach, (2) focus group approach, and (3) survey approach. Wilson (1999) suggested that training practitioners can use easy and convenient interview approach, questionnaire approach, observation approach, and focus group approach to collect and analyze information on training needs. Moreover, a great number of researchers addressed that useful information on training needs can be obtained through performance evaluation, departmental supervisors' informal feedback, and employees' individual career development plans. Primary factor analysis can also be applied to training needs analyses to discover various possible reasons which cause performance gaps, confirm critical factors by combining with Pareto, and then design the training course according to the primary factors. No matter which training analysis approach is applied, it is necessary to connect with organizational goals and strategies, and be consistent with the policies of human resources development of the organization. The needs analysis timing and people in charge of each dimension of TNA are detailed in Table 2.

Table 2 The timing of training needs analysis

Dimension of Training Needs	Timing for Needs Analysis	Suggested Timing	People in Charge
Strategy	After the goals and strategies of the next year are accomplished in the end of every year.	The analysis should be accomplished before the end of December every year. It should be accomplished by the end of February in the new year at latest.	• HRD personnel • The supervisor of each business unit and department.
Performance	When gaps are generated in the organizational management process.	It should be conducted as soon as gaps are found in organizational performance.	• HRD personnel • The supervisor of each business unit • Performance management department
Competency	Regularly analyzing occupational gaps every year.	Employees' occupational evaluation should be carried out according to job descriptions in the middle of every year.	• The supervisor of each department • SMEs • HRM/HRD

According to influential factor research on training needs analyses, the effectiveness and post-training benefit of needs assessments are possibly influenced by the following factors, respectively "whether proper evaluation methods and analysis tools are adopted or not," "whether different evaluation dimensions are covered or not," "training practitioners' analysis capability," "whether a needs analysis includes enough resources, such as time, information, and organization members' cooperation, or not," and "organizational scale." Abdullah (2009) found that the larger an organizational scale is, the higher the needs analysis ratio is, and, also, the higher the frequency is. On the contrary, the smaller an organizational scale is, the significantly lower the needs assessment ratio is. This was also one of the issues investigated in this study.

5. Methodology

The samples of this study were actual HRD practitioners, and purposive sampling was adopted. They participating in relevant occupational training courses were sampled and filled in the questionnaires. The samples were obtained from respectively different regions and different training courses to avoid too centralized samples and biases. Each participant represented one organization, and in total, 201 samples were obtained. There were totally 193 valid questionnaires after 8 invalid questionnaires were deducted. In terms of organizational scale, 71 organizations were small organizations, whose employees were less than 50 people, accounting for 36.8%. 62 organizations were medium organizations, whose employees were between 51 and 200 people, accounting for 32.2%. 60 organizations were large organizations, whose employees were more than 201 people, accounting for 31.1%. The questionnaire content included: whether your organization had TNA or not; whether or not the organizational problems are mastered, and the causes are confirmed before the training is designed; whether or not the performance and behavior that one should have are evaluated according to the job descriptions; whether or not the needs for the ability cultivation necessary in the future development of the organization are considered; the methods employed to analyze needs; whether or not the time is limited when a needs assessment is performed; whether or not the departments of the organization cooperates one another in needs assessments and provides assistance; whether or not training practitioners are capable of needs assessments, etc. A five-point Likert scale was applied to the questionnaire. The training practitioners' perception of TNA was understood, and the influential factors were analyzed through the investigations. Systematic needs assessment dimensions were applied to the disciplinary requirements of needs assessments.

6. Findings and Discussions

6.1 The Influential Factor Analysis of TNA

Totally, there were 17 variables in the questionnaire of this study. To understand their relation, exploratory factors analysis (EFA) was employed to reduce the variable dimensions. According to the analysis, the Kaiser-Meyer-Olkin (KMO) value was 0.85, indicating the effect of the factor analysis was good. The Bartlett value was 1516.66, and as for the significance, $p=0.000<\alpha=0.01$, indicating the data were very suitable for factor analysis. There were four items whose eigenvalue was greater than 1, so the 17 variables were condensed into 4 factors. The 1st factor explained 34.56% of the variables, the 2nd factor explained 14.63% of them, the 3rd factor explained 9.47% of them, and the 4th factor explained 6.89% of them. In total, the four factors explained 65.43% of the variables. Varimax rotation was then applied to varmax for explaining the factors with higher factor loadings (the absolute value was higher than 0.5.) (Tables 3 and 4). The influential factor of TNA consisted of highly correlated variables, respectively "finding problems," "analyzing problems," "job performance," "organizational problems," "analyzing organizational problems," "promoting involvement," and "mastering performance problems." The factor loadings were between 0.615 and 0.804, the eigenvalue was 3.706, and the cumulative variance was 34.56%. The factor was named "mastering problems and analyses."

The second factor consisted of four highly correlated variables, namely "involvement in the organizational future," "mastering the organizational future," "mastering organizational goals," and "mastering organizational changes." The factor loadings were between 0.752 and 0.861, the eigenvalue was 3.011, and the cumulative variance was 14.63%. Since these variables were related to organizational development, they were named "mastering organizational development." The third factor consisted of three highly correlated variables, including "sufficient time," "sufficient information," and "personnel cooperation." The factor loadings were between 0.851 and 0.907, the eigenvalue was 2.467, and the cumulative variance was 9.47%. It was related to the resources invested in needs analyses, so it was named "mastering resource applications." The fourth factor consisted of three highly correlated variables, respectively "TNA procedures," "TNA methods," and "TNA implementation." The factor loadings were between 0.412 and 0.879, the eigenvalue was 1.939, and the cumulative variance was 6.89%. Since the factor was related to needs analysis methods, it was named "capability for intervention implementation」。

Table 3 The post-varmax component matrix of the principal component analysis of the factors influencing TNA

Property	Component1	Component2	Component3	Component4
TNA Procedures	.290	.115	.026	.823
TNA Methods	.183	.170	.037	.879
Finding Problems	.804	.121	.085	.105
Analyzing Problems	.656	.068	.117	.321
Job Performance	.630	.134	.139	.187
Sufficient Time	.028	-.011	.866	.077
Sufficient Information	.064	-.066	.907	-.045
Man Cooperation	-.084	.007	.851	-.023
TNA Implementation	.312	.304	-.181	.412
Org. Problems	.688	.309	-.125	.076
Analyzing Org. Problems	.735	.161	-.156	.047
Promoting Participation	.651	.274	-.178	.164
Involvement Org. Future	.202	.752	-.087	.051
Performance Problems	.615	.287	.093	.242
Mastering Org. Future	.223	.780	.073	.111
Mastering Org. Goals	.161	.861	-.030	.143
Mastering Org. Changes	.269	.800	-.019	.179

Table 4 The result of the principal component analysis of the factors influencing TNA

Factor	Item	Factor Loading	Eigenvalue	Cumulative Variance
Mastering Problems and Analyses	Finding Problems	.804	3.706	34.56%
	Analyzing Problems	.656		
	Job Performance	.630		
	Org. Problems	.688		
	Analyzing Org. Problems	.735		
	Promoting Participation	.651		
	Performance Problems	.615		
Mastering Organizational Development	Involvement Org. Future	.752	3.011	14.63%
	Mastering Org. Future	.780		
	Mastering Org. Goals	.861		
	Mastering Org. Changes	.800		
Mastering Resource Applications	Sufficient Time	.866	2.467	9.47%
	Sufficient Information	.907		
	Personnel Cooperation	.851		
Capability for Intervention Implementation	TNA Procedures	.823	1.939	6.89%
	TNA Methods	.879		
	TNA Implementation	.412		

6.2 The Influence of TNA Influential Factors on Training Performance

6.2.1 Organizational Scale

There have already been a great numbers of studies about the influence of organizational scale on training performance. The larger an organizational scale is, the more significant the influence is on training performance. In this study, the organizations were categorized by scale, and, based on the organizational scales, one-way multivariate analysis of variance (MANOVA) was respectively applied to the four TNA factors in order to understand if the importance of each factor for the samples significantly varied due to different organizational scales (Table 5). Among the four factors, a significant difference existed only in "mastering organizational development." It indicates that small organizations tend to less introduce strategic management and less value the connection of goals and management results with performance management. That is, organization development is neglected in TNA.

Training is a measure to increase human capital. Training is for solving organizational problems as well as cultivating the future talents for organizational development. Due to less complete management functions, the ideas of the future organizational development tend to center on few people, the internal information is usually not sufficient and not well- shared, and the training department is only supportive in small organizations. That is, the training function is attached to other departments, and no department is exclusively responsible for the function. The aforementioned factors cause small organizations to lack the control of organizational development in their training. In small organizations, there are not HRD professionals, and most of the employees deal with training on a part-time basis. The training sources did not go through any needs analysis. Instead, they usually result from supervisors' personal preferences or the suggestions that high-level supervisors obtain from external training organizations, so the training is randomly held and lacks an overall needs assessment system and analysis framework.

Table 5 The differences caused by organizational scales between TNA influential factors

Influential Factor	Organizational Scale					F Value	Sig.
	Scale 1	Scale 2	Scale 3	Scale 4	Scale 5		
Mastering Problems and Analyses	0.11	0.09	-0.09	-0.24	0.09	0.72	0.58
Mastering Org. Development	0.23	-0.07	-0.39	0.17	-0.21	2.63*	0.04
Mastering Resource Applications	-0.11	-0.01	0.31	-0.05	0.03	0.89	0.47
Capability for Intervention Implementation	-1.12	-0.02	0.11	0.10	0.10	0.47	0.76

Remark: Scale 1 indicates that the employees of an organization are less than 50 people. Scale 2 indicates that the employees of an organization are between 50 and 100 people. Scale 3 represents that the employees of an organization are between 101 and 200 people. Scale 4 indicates that the employees of an organization are between 201 and 400 people. Scale 5 indicates that the employees of an organization are more than 401 people.

*$p<0.05$

6.2.2 Training Performance

About the measure of training performance, a lot of scholars brought up different evaluation models. Training practitioners commonly use Kirkpatrick's four-level evaluation model and Phillips' ROI model (Griffin, 2010) and integrate the two models into a five-level evaluation model. The Taiwan Train-Quail System (TTQS) is also based on the two models.

To understand the influence of TNA influential factors on training performance, one-way MANOVA was employed to analyze the influence of the four TNA influential factors, respectively "mastering problems and analyses," "mastering organizational development," "mastering resource applications," and "capability for intervention implementation," on training performance. The analysis result is shown in Table 6. The test statistics of TNA Factor 1- mastering problems and analyses: F=1.071; p>.005. The test statistics of Factor 2 - mastering organizational development: F=1.525; p>.005. The test statistics of Factor 3 - mastering resource applications: F=1.678; p>.005. The test statistics of Factor 4 - capability for intervention implementation: F=2.823; p<.005. As for the association indexes of the dependent variables, the square of R_1 was 0.040, the square of R_2 was 0.031, the square of R_3 was 0.034, and the square of R_4 was 0.057. Among the four variables, "capability for intervention implementation" reached significance. The training practitioners thought that their needs assessments and analysis ability will significantly influence training performance. HRD personnel lacking the ability can not master organizational problems and development, and they can not properly apply resources. When organizations hire HRD personnel, they seldom consider that the personnel should have professional backgrounds as well as organizational work experience. Otherwise, the training programs designed by the HRD personnel will not meet the needs of the organizations and employees, and the training performance will also be influenced. Consequently, the HRD personnel in an organization should be capable of TNA and training program design. Otherwise, the training interventions designed by them will influence the training performance.

Table 6 The influence of TNA factors on training performance

Influential Factor	Training Performance					F Value	Sig.
	1	2	3	4	5		
Mastering Problems and Analyses	-0.30	0.09	0.28	-0.19	0.20	1.97	0.10
Mastering Org. Development	-0.29	0.09	-0.06	0.19	0.60	1.53	0.20
Mastering Resource Applications	0.07	0.11	-0.12	-0.42	-0.74	1.68	0.16
Capability for Intervention Implementation	-0.36	0.02	0.13	0.45	0.43	2.82*	0.03

Remark: Performance 1 represents insignificant training performance. Performance 2 indicates partially significant training performance. Performance 3 represents fairly significant training performance. Performance 4 indicates mostly significant training performance. Performance 5 indicates significant training performance.

**p<0.05*

7. Conclusion

TNA are one type of management systems, and they are also the first procedure of training systems. TNA are a technique, in which analysis tools should be well applied, so HRD personnel should be capable to analyze needs. Whether starting from the establishment of needs assessment procedures or proceeding needs analysis steps, it is necessary to construct TNA dimensions in order for HRD personnel to conduct systematic needs analyses according to the dimensions. The TNA dimensions include strategy, performance, and competency. If the three dimensions correspond to McGehee and Thayer's three-fold analysis, organization-level analysis indicates strategy, task-level analysis indicates performance, and individual-level analysis indicates competency. In this study, systematic assessment dimensions, influential factors, and analysis tools were integrated into the framework of the TNA model (Figure 2).

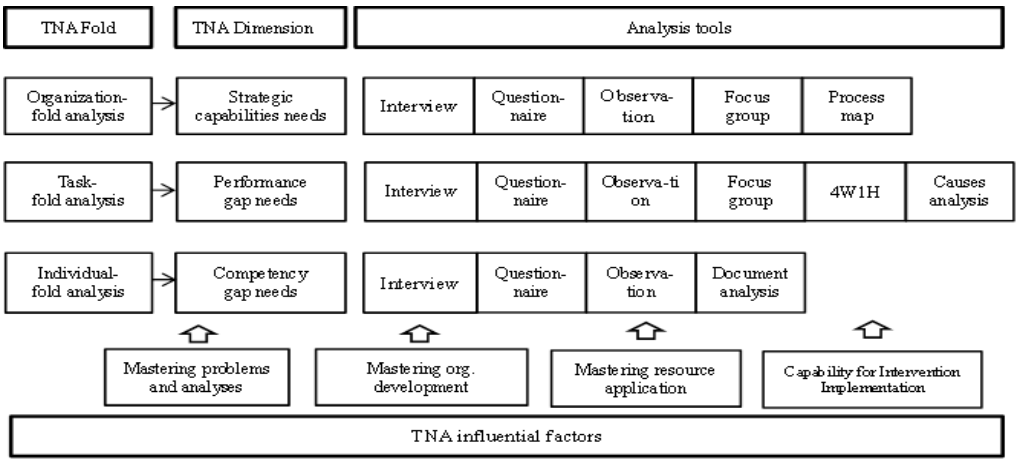

Figure 2 The framework of the TNA model

Training is not panacea. It is just one of the methods to solve organizational problems. If problems are caused by employees lacking capability, training can be used as an intervention, so TNA are a critical assessment procedure to decide if training should be employed to solve the problems. On the other hand, the premise is that training should be able to solve organizational problems. That is, training must be of benefit, and training needs should be properly evaluated from the perspective of either solving problems or investment. Among the possible obstacles of promoting the ROI of training, Phillips (2007), aiming at TNA drawbacks, addressed that proper needs assessments were not conducted in a great number of training courses, and many training courses were based on management requirements or for catering to industrial fashion. However, if training courses are not really necessary for organizations, the effectiveness of the courses will reduce, and the ROI of the courses which are not needed will be negative. Real obstacles are caused in a lot of courses since needs assessments are not properly done.

In this study, the necessity of TNA was explained, and HRD personnel were taught to master the factors influencing assessments, make good use of various analysis tools, and find out the real causes of organizational problems as well as optimal solutions in order to generate training performance and enable their organizations to obtain the investment benefit that the organizations should obtain.

References

Abdullah, H. (2009). Training needs assessment and analysis: a case of Malaysian manufacturing firms. *European Journal of Scientific Research*, 37(3), 351-360.

Arthur,W. J., Bennett,W. J., Edens, P. S., & Bell, S. T. (2003). Effectiveness of training in organizations: A meta–analysis of design and evaluation features. *Journal of Applied Psychology*, 88, 234-245.

Blair, E., & Seo, D. (2007). Safety training: Making the connection to high performance. *Professional Safety*, 52(10), 42-48.

Broad, M. L., & Newstrom, J. (1992). *Transfer of training: action-packed strategies to ensure high payoff from training investments*. New York: Addison Wesley.

Brown, J. (2002). Training needs assessment: A Must For Developing An Effective Training Program. *Public Personnel Management, 31*, (4), 569-579.

Brinkerhoff, R., & Gill, S. (1994). T*he learning alliance*. San Francisco, CA: Jossey-Bass

Cekada, L. T. (2010). Training needs assessment: Understanding what employees need to know. *Professional Safety*, 28-33.

Denis, K. D., & McConnell, J. J. (2003). International corporate governance. *Finance Working Paper*, 5, 1-55.

Goldstein, I. L. (1993). *Training in organizations: Needs assessment, development, and evaluation* (3rd ed.). Pacific Grove, CA: Brooks/Cole.

Goldstein, I. L., & Ford, J. K. (2002). *Training in organizations* (4th ed.).Pacific Grove, CA: Wadsworth/Thomson Learning.

Gupta, K. (1999). *A practical guide to needs assessment*. San Francisco: Pfeiffer.

Hannum, W., & Hansen, C. (1989). *Instructional systems development in large organizations*. Englewood Cliffs, N.J: Educational Technology Publications

Holden, L.(1991). European trends in training and development. *International Journal of Human Resource Management, 2*, 113-131.

Holton, E. F., Bates, R. A., & Ruona, W. E. A. (2000). Development of a generalized learning transfer system inventory. *Human Resource Development Quarterly, 11*, 333–360.

Judith, B. (2002). Training needs assessment: A must for developing an effective training program. *Public Personal Management, 31*,(4), 569-578.

Martin, G. (2009). Making sure the solutions are the right ones: Training needs analysis. *Trainingand Development in Australia, 36*, (2), 18-21.

McGehee, W., & Thayer, P. W. (1961). *Training in business and industry*. New York, John Wiley & Sons.

McArdle, J. (1998). Community development. *Resource Manual, 11*, H3a-H3e.

Phillips, P. P., Phillips, J.J., Stone, R. D., & Burkett, H. (2007). *The ROI field book.* Butterworth-Heinemann, Burlington.

Griffin, P. R. (2010). Means and ends: effective training evaluation. *Industrial and Commercial Training, 42*(4), 220-225.

Rossett, A. (1987). *Training needs assessment*. Englewood Cliffs, NJ: Educational Technology.

Taylor, P. J., & O'Driscoll, M. P. (1992). Congruence between theory and practice in management training needs analysis. *International Journal of Human Resource Management*, 3, 593-603.

Taylor, P. J., O' Driscoll1, M. P., & Binning, J. F. (1998). A new integrated framework for training needs analysis. *Human Resource Management Journal, 8*(2), 29-50.

Wilson, J. P. (1999). *Human resource development. Learning and training for individuals and organizations*. London, Kogan Page.

Warshauer, S. (1988). *Inside training & development*: Creating effective programs. San Diego, CA: University Associates.