



Terms of reference for training needs analysis

CONTINUING EDUCATION COMPONENT

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INTRODUCTION

As part of its mission, the Institut national de santé publique du Québec (INSPQ) has a mandate to promulgate and build on knowledge and expertise in the field of public health. Legally, the Institute is a recognized educational institution pursuant to section 7.6 of the Act to promote workplace skills development and recognition (R.S.Q., c. D-7.1)¹. In connection with this mandate, the INSPQ has established the *Skills Development* unit under the Research, Training and Development Branch.

To ensure optimum consistency in skills development between the training activities designed for staff working in the Québec health system and the training needs existing in these populations, the INSPQ Skills Development unit considered it relevant to develop terms of reference for performing analyses of continuing education needs. The fact is that analysis of training needs is a step often skipped in the process of developing training activities (Pérusse 2001, 31). However, the needs analysis process is essential in order to maximize attainment of the objectives of this type of activity.

The final product of a training needs analysis is an accurate description of exactly what type of training is required, which is adapted to the real situation of the professionals in question² and of the environment in which they operate. Thus, the training needs analysis makes it possible to transform the identified needs into learning objectives, which can then be achieved through appropriate training activities (McConnell 2003, 8).

Accordingly, the goal of these terms of reference is to define the training needs analysis, describe the various levels to which it applies, and present the various methods enabling it to be completed. The document concludes with a presentation of the elements to be included in the needs analysis final report.

¹ Therefore, investments made by enterprises and organizations for training purposes organized by the INSPQ are eligible and reportable (law specifying 1% of total payroll).

² The term “professional” used here applies to all individuals following a profession or occupation whose training needs can be studied.

PART ONE
THEORETICAL FOUNDATIONS

1 NATURE AND RELEVANCE OF TRAINING NEEDS ANALYSIS

This chapter addresses the following:

- definition of continuing education;
- types of training needs;
- objective of training needs analysis;
- circumstances in which continuing education needs analysis is performed;
- limitations of training;
- skills of person responsible for continuing education needs analysis;
- ethical issues;
- target groups of training needs analysis.

1.1 WHAT IS CONTINUING EDUCATION?

By continuing education, we mean training activities taking place after completion of initial training. Continuing education promotes upgrading and updating of knowledge as well as skills development. The ministère de la Santé et des Services sociaux [Québec department of health and social services] defines continuing education as follows:

“[Translation] Continuing education is the permanent process through which individuals and organizations, throughout their existence, gain the skills they need for improved proficiency in their specific activities, based on personal, organizational or societal needs. By continuing education, we also mean any training, activity or program whose objectives and instructional approaches enable any person, individually or in association with an organization, to perform continuing education as defined above” (Policy 2500-002, 3).

Continuing education activities include seminars, workshops or lectures promoting reflection or sharing of knowledge and expertise, without necessarily requiring specific evaluation of what has been achieved on completion of the activity (*Departmental guidelines for skills development by staff of the health and social services system 2004*, 3). This occupational resourcing process has a number of purposes: development of an organization and its staff, upgrading of initial training, gaining of new skills, abilities and competencies, and qualification for a new career (redirection, outplacement, retraining, etc.).

Training needs analyses ensure the relevance of training activities for the target populations, consisting of professionals or types of professionals concerned to increase work quality and performance.

1.2 WHAT ARE THE VARIOUS TYPES OF TRAINING NEEDS?

The need is defined as the gap between the existing and the desired situation. In other words, it refers to what is indispensable, or at least valuable, to the organization or to individuals for the purpose of achieving an evaluated, appropriate objective (Fernandez 1988, 57). Training needs may be individual or collective.

A collective need is determined in terms of the lowest common denominator of individual needs. This is the basis for development of the future training activity. The greater the homogeneity of the group, the easier it will be to determine the collective needs.

There are several types of training needs: normative, organizational, comparative, demonstrated and felt.

1.2.1 Normative needs

Normative needs are defined by expert members of recognized professional associations or research centres who continuously develop science and technology and therefore base themselves on the need to update skills based on progress achieved in the research field. The new elements are often introduced in the form of practice guides, guidelines and protocols, such as new standards and new methods. Any gap between actual practices and the new standard defined by the experts is recognized as the normative need of the individual professional or the group (Lawton 1999, 325).

Example: A notice issued by the Department of health and social services recommends new rules for isolation of patients with certain specific symptoms. Hospital staff must be instructed in the applicable new practices.

1.2.2 Organizational needs

Organizational training needs are intrinsically related to the role of the organization or the institution responsible for the educational activity. Organizational skills are those that the organization considers essential for its various groups of professionals to have in order to carry out the mission it has assumed (McConnell 2003, 67).

Example: An organization takes its environmental responsibilities seriously and decides to include this commitment in its mission. Accordingly, professionals must in future adopt environmentally responsible behaviour in their everyday activities. In addition, they must promote this behaviour among their clients. In short, all the professionals belonging to this organization have an organizational training need in the area of environmental practices.

1.2.3 Comparative needs

Comparative needs represent the gaps observed between a group or individuals when they are mutually compared (Lawton 1999, 326).

Example: Two work teams study the behaviour in a given community. However, one of these teams has consulted an expert. During the meeting between the team and the expert, the latter identified the actual behaviour in the community in terms of the cultural code of conduct in effect. As a result, the professional members of this group were able to ascribe meanings to the various types of behaviour adopted by the community members. They can now better understand and predict the behaviours they are considering. It could therefore be argued that the second work team has a comparative training need with respect to the cultural framework in which the studied behaviours are taking place.

1.2.4 Demonstrated needs

Demonstrated needs arise from the measured gap between the skills of a professional and those recommended by specialists. These needs may be revealed by compiling responses to self-assessment questionnaires, appraisals by peers, or reports of institutional boards or committees working to improve overall quality.

Example: The method of diagnosing cervical cancer has evolved in recent years. According to an analysis of medical intervention profiles, a number of physicians have not integrated the new approaches into their practice. The demonstrated needs relate to the gap between the skills of personnel and recommended skills.

1.2.5 Felt needs

Felt needs consist of the gap between the skills that a professional believes that they possess and those they wish to have. In consequence of a process of self-criticism, the individual personally determines their needs based on their work experience. The felt needs therefore emerge from the individual's frame of reference, which is itself formed by that individual's knowledge, experience and understanding of the circumstances. This level of analysis is limited by the fact that professionals are unable to perceive the need for something when they are unaware of its existence or necessity (Lawton 1999, 326).

Example: A policy analyst responsible for evaluating public health policies realizes that they will perform their work more effectively if they have a knowledge of basic concepts in the field of epidemiology. The policy analyst has a felt need for a knowledge of epidemiology.

1.3 WHAT IS THE PURPOSE OF A TRAINING NEEDS ANALYSIS?

The purpose of a training needs analysis is to close the gap between the actual and desired situations by determining discrepancies in outcomes, placing them in order of priority and selecting the most important for closure or reduction (Rothwell and Kazanas 1998, 55).

“[Translation] [...] [it] therefore consists in collecting, analysing and comparing concrete (measurable) data representing, on the one hand the actual 'performance' of a system (objectives, outputs or variables in terms of actions) and, on the other hand, its desirable 'performance', whether wanted internally or externally, with the overall goal of identifying as accurately as possible the specific needs of the clientele affected by the activities of an educational or training system” (Lapointe 1992, 99).

The training needs analysis must be carried out before training activities are organized, since it guarantees the success of those activities. It ensures synergy among individual learning needs and the quest for effectiveness, job performance, and strategic organizational development (Potter et al. 2003, 202).

To do so, the data analysis process must allow collection of the largest possible volume of information concerning the type of optimum skills required to perform a task, the actual level of skills among the population(s) under review, their opinion concerning their own

performance, potential causes of the gap between the actual and desired situations, and various possible solutions, from a number of perspectives (Rossett 1987, 15).

In fact, the training needs analysis outcome is expressed not in the form of a training policy or program, but a database defining the measured training needs of the population(s) under review. This database will provide the foundation for development of the training specification.

1.4 IN WHAT CIRCUMSTANCES IS IT NECESSARY TO PERFORM A TRAINING NEEDS ANALYSIS?

The training needs analysis is a vital phase in planning training that will successfully close the gap between the actual and desired situations. It ensures that the right remedy is applied to the right problem. Since limited budgets are available for training, the preferred areas of training must be those ensuring that the anticipated outcome will be achieved, as well as maximum gains for the professionals and their organization (Sims 1990, 36).

In some contexts, as described below, needs analysis is crucial (McConnell 2003, 72-73).

1.4.1 Changes in the system or in work

When a work description is changed or operating methods are reviewed, or simply in the case of new expectations, training is often required. At that time, a training needs analysis allows identification of staff training needs, to enable them to adapt appropriately to the changes introduced.

Example: The director of nursing and the physician responsible for the emergency department have adopted a new work allocation protocol for each staff member involved in cardiac arrest cases in the emergency department. They want to inform the various staff members in question.

1.4.2 Introduction of new technology

Where a work environment adopts a specific new technology, this normally goes hand in hand with a method of use that must be the subject of training. In addition, this training must anticipate how use of this new technology will be adapted to the specific organizational context to which it is introduced. Accordingly, learning to operate a specific new technology requires acquisition of additional skills or knowledge, which may vary in the various staff groups likely to make differing use of the technology in question. It is therefore appropriate to perform a training needs analysis to specify the training needs of each of these groups as regards use of the new technology.

Example: With the establishment of a public health information centre including, among other things, environmental data concerning air and potable water quality, a training needs analysis was ordered for regional environmental health staff. The purpose of this analysis was to determine the additional knowledge this population needed to correctly interpret and apply the environmental data provided by the Department of Sustainable Development, Environment and Parks.

1.4.3 Introduction of new government standards

Revised or new government standards normally require training for professionals whose practice is affected by these changes. This is the best way to ensure compliance with the new standards. At that time, the training needs analysis will allow definition of the skills that must be developed for correct implementation of these new standards.

Example: The government introduces new occupational health and safety rules in clinical laboratories. Laboratory coordinators must therefore analyse training needs with respect to implementation of these rules and the skills required to implement them correctly. Following this needs analysis, they organize training activities for all medical technologists, so that they will have all the necessary tools to apply the new government rules.

1.4.4 Decline in quality of work or performance in department or organization

Many factors contribute to a decline in quality of work or performance of a given department or area of activity. A training needs analysis among the various professional groups involved will indicate whether training is one of the ways to improve attainment of preset objectives.

Example: A team of social workers is responsible for preventing sexually transmitted and blood-borne infections among injection drug users (IDUs) in a specific neighbourhood. Over time, the team notices that its activities are reaching fewer and fewer IDUs in the neighbourhood and that the incidence of sexually transmitted and blood-borne infections is rising, while the number of its social workers is also increasing. A training needs analysis will establish what these workers need to acquire or change to have a greater impact on their environment and counter this decline in performance.

1.4.5 Departmental meetings, opinion surveys, organizational studies and separation interviews

Departmental meetings, opinion surveys, organizational studies and separation interviews of employees leaving their job, although conducted for other purposes, are often opportunities for disclosure of felt or demonstrated training needs. Training needs analysis will then provide the possibility of establishing whether these needs are common to all staff.

Example: At a team meeting, a professional states that she does not feel she has the necessary skill to perform a specific part of her job. After listening to this individual, other professionals also admit that they feel they have the same shortcoming regarding this part of the job. Conducting a training needs analysis is then appropriate, since it will be used to accurately identify the weaknesses in capacities making up the skills enabling them to perform the part of the job in question.

1.4.6 Lack of skills and knowledge

Setting of specific objectives by an organization does not provide information as regards staff capacity to attain them. A training needs analysis will determine whether training needs exist associated with attainment of these objectives and, if so, which ones (Rossett 1987, 43).

Example: A work team promotes physical activity among the teenagers of a community. The team realizes that it is having problems communicating with its target public. Given the rapid changes in teenagers' communications methods and lifestyles, the team leader carries out a training needs analysis to identify the knowledge and skills the professionals must improve in order to make better use of the resources available to reach their target public.

1.4.7 Absence or lack of motivation

Absence or lack of motivation affects work performance. Two factors increase in proportion to work motivation: the value ascribed to work and the level of its performance. The greater value an individual ascribes to their work and the higher their performance, the greater will be their motivation. The inverse relationship also holds true.

In such a situation, a training needs analysis can help identify the causes of lower performance or bring to light undeveloped skills. Well-targeted training, by cultivating deficient skills, could quickly raise the level of self confidence—a factor often intrinsically linked to motivation. Training can be beneficial for an individual lacking in motivation if it enables the person to achieve quick gains in their level of confidence.

Example: A work team is responsible for promoting pro-health public policies. Although it performs a large volume of activities designed to raise awareness among decision-makers of the social, economic and environmental determinants of health, the group loses motivation because its work seems to have no impact on emerging public policies. A training needs analysis identifies a need for training in decision-making processes leading to establishment of public policies. Following a training activity on public policy development, the work team learns to intervene more effectively in the decision-making process. As a result, it has an impact on development of public policies and its motivation accordingly increases.

1.5 CAN TRAINING OVERCOME PROBLEMS IN THE WORKPLACE?

Despite the benefits provided by well targeted training, other factors must be taken into account to improve operations and work quality. Although a training needs analysis suggests shortcomings related to work performance or quality, **training will not necessarily solve the problem**. To avoid misconceived training needs, it is essential to draw a distinction between causes and symptoms. The gap between actual and desired levels of skills in a specific organization is a symptom that may have both multiple and varied causes (Sims 1990, 54). For example, staff shortage, mismanagement, incorrect work allocation, lack of procedures, inaccurate work descriptions and unrealistic set objectives may all be causes of a gap between the actual and desired situations. Where the obstacles are organizational in nature, training may achieve little or nothing, since it will only change those subjected to the

learning process. The author of *The Revolution in Training*, Robert F. Mager, makes the point clear in the following way: “If a man doesn’t have a skill, train. If he has the skill but doesn’t perform, manage” (Tracey 1971, 34).

Here are some examples of solutions not involving training (Wright 1999, 96):

- review and rewrite work descriptions;
- increase staff or budgets;
- make changes in staff;
- implement methods and measures to stimulate motivation among professionals;
- develop management policies and structures.

In a work environment where there are no incentives, productive professionals are burdened with the heaviest workload, while less competent professionals are simply ignored. In other words, high-performance individuals are penalized. In such a situation, introduction of new policies may be beneficial:

- reorganize work methods.

It is said that the work environment is harmful when its organization, spatial layout and available tools are inadequate. The work quality of the organization’s staff will then decline despite their motivation and adequate skills. Development of better work methods, redesign of the work area or better matching of individuals and jobs may be beneficial in a situation where the work environment is harmful (Rossett 1987, 43):

- enhance communication systems and practices;
- even...do nothing.

To conclude, we will introduce here an essential element of successful training activities. If we want to see training produce the best possible results, it is necessary to create a situation allowing transfer of gains from training in the organization’s daily operations. For example, work tools must be consistent with what the professionals have learned during training. In fact, where training is part of the solution to a specific situation, it is often necessary to apply complementary organizational methods, so that the organization can truly benefit from the training (Pérusse 2001, 35).

1.6 WHAT SKILLS MUST THE INDIVIDUAL CONDUCTING THE TRAINING NEEDS ANALYSIS HAVE?

The individual responsible for carrying out the training needs analysis must be as objective as possible. Individuals questioned must feel comfortable with this individual, so that they do not skew the information provided in the training needs analysis process (McConnell 2003, 111).

The individual responsible for the analysis must design, implement and carry out the entire analysis process. In addition to choosing the methods and indicators on which the analysis will be based, their tasks include selecting, implementing and managing the strategies

designed to obtain the desired interactions with the various players in the environment in question. Establishment of a planning group is a valuable initial phase in this regard (Pineault 1986, 82).

1.7 ETHICAL ISSUES

Training needs analyses involve two major ethical challenges. The first of these relates to senior management support for the results of the needs analysis and direction of resources accordingly. Certain supervisors assume what the training needs of their staff are regardless of the investigation results. They place no value on the objective nature of the analysis process. The second ethical challenge for training needs analyses relates to the objective nature of the process, which is specifically ensured by the confidentiality of the results obtained.

To resolve these ethical issues, the person responsible for carrying out the needs analysis must, at the outset of their initiative, promote to senior management the value of an objective training needs analysis based on use of standardized and impartial measurements of the knowledge and skills involved. In an ethical process, administration, analysis and interpretation of the data must be completely independent of the analyst's subjective judgments (McConnell 2003, 217).

Therefore, the person carrying out the training needs analysis must provide mechanisms to ensure confidentiality of the data collected and advise respondents that such is the case before beginning data collection (Rothwell and Kazanas 1998, 78).

1.8 WHICH GROUPS ARE TARGETED BY CONTINUING EDUCATION NEEDS ANALYSIS?

An continuing education needs analysis generally seeks to have a minimum of two target groups: professionals and managers. Since the study focusses on needs of professionals, those staff will probably be extremely interested in the results obtained.

It is normally managers who request a training needs analysis and receive the results. Their support is crucial for establishment of the training needs analysis and subsequent implementation of training activities. Managers' values, beliefs and imperatives may therefore affect the interpretation of the results (Rothwell and Kazanas 1998, 62).

2 LEVELS OF ANALYSIS

This chapter focusses on:

- organizational analysis;
- work environment analysis;
- job analysis;
- task analysis;
- skills analysis;
- content analysis;
- secondary data analysis;
- personnel evaluation;
- critical incidents analysis;
- felt training needs analysis;
- learner analysis;
- (in conclusion) importance of triangulating levels of analysis.

2.1 ORGANIZATIONAL ANALYSIS

The primary goal of delivering training activities in the workplace is to respond more adequately to the organization's objectives and mission. To that end, training needs must have regard to the organization's strategies and goals, to enable it to derive the maximum benefit from the results of training. If there is no gap between the organization's actual situation and the one it will need to occupy in the future to accomplish its strategic objectives, there is no need to train (Gent and Dell'Omo 1989, 82).

The objective of this level of analysis is therefore to determine the parts of the organization requiring training, given its short- and long-term goals and the trends likely to affect those goals (Sims 1990, 36). Accordingly, the organizational analysis reflects organizational needs. It reviews in detail such aspects as the organization's culture and effectiveness.

In brief, the organization's culture is conveyed by its values and philosophy. Training may aim to transmit those values and philosophy to the entire staff, if the staff have little allegiance to organizational culture in the context of their work.

The organization's effectiveness is assessed by measuring the extent to which it achieves its goals. The organization's structure, or how responsibilities and functions are allocated, is an important aspect of its effectiveness. Training needs may emerge if the staff only partly assimilate the organizational model (Rothwell and Kazanas 1998, 104).

Example: As a result of government reforms, the mandate of an agency providing health care is expanded. The agency's senior management then commissions a survey of training needs, to assess whether all managers understand the organization's ethical bases and its new mandate, and to review how they convey these

elements in their everyday activities. In order to build a relevant questionnaire, it is necessary to analyse the organization to determine the principles underlying its mandate and the relations between them.

2.2 WORK ENVIRONMENT ANALYSIS

The work environment affects professionals as well as their work methods. Therefore, the work environment analysis essentially focusses on the environmental factors impinging on or likely to impinge on training needs (Peterson 1992, 86).

The objective of work environment analysis is therefore to link training needs and the environment in which they emerge, and to determine what relates to the individual and what to the environment.

In this way it will be possible to select the appropriate strategies to meet these needs. Furthermore, use of a training environment faithfully reflecting the work environment will promote transfer of instruction to work (Rothwell and Kazanas 1998, 107). This type of analysis can help identify resources available to carry out training and therefore facilitate its planning.

This type of analysis focusses on the work environment characteristics affecting all staff; in this way it is similar to organizational analysis, which explains why the characteristics studied are sometimes identical. Indeed, a well-integrated organizational culture impacts on the work environment at several levels.

Here are a number of work environment factors impacting on training needs: satisfaction, stress, cohesiveness, autonomy, sense of responsibility, comfort with the work environment, involvement, self-esteem and security of staff members. Support, supervision and working conditions experienced by staff are also part of environmental characteristics, in the same way as the organizational climate created by senior management.

Example: In a health centre, social workers take turns performing the mental health reception function. Given this specific clientele, these workers experience stressful situations. Reception staff are rotated through a lengthy work cycle. The training needs analysis indicates that these social workers have relatively few needs. However, the work environment analysis makes it clear that the problem does not relate to lack of knowledge and skills on the part of these social workers in the patient reception role. The work environment they experience limits exposure, which does not allow them to become proficient in and develop their skills, thus causing them to feel insecurity and stress. In short, the training needs analysis indicates that the training activity that will take place must enable these social workers to practise and update the targeted skills.

2.3 JOB ANALYSIS

Job analysis is defined as “[Translation] a systematic operation involving a breakdown of the factors involved in performing a given job” (Fernandez 1988, 50).

Job analysis scrutinizes the job to accurately define the training needs of the professional on the job. It complements the organizational analysis, whose holistic nature means that it cannot identify the specific training needs of people holding different jobs within the organization.

Table 1 Steps in job analysis

1. Systematic data gathering
This details how a specific job is done, by bringing together a maximum amount of information concerning the conditions associated with its performance (time schedule, tools used, applicable procedures, etc.) [actual situation].
2. Definition of objectives of the job in question
3. Description of the process of carrying out the tasks making up the job being studied, in order to give concrete form to the objectives of the job in question [desired situation]
4. Description of skills, knowledge elements, abilities and other factors required to perform the job

This type of analysis is based on gathering of data explaining all the tasks performed by a professional in the course of their job. The following are some examples of data sources contributing to information collection (Miller and Osinski 2002, 4):

- description of tasks of job under review;
- objectives to be achieved by job under review;
- literature review relating to job under review;
- list of requirements and necessary profile to perform job under review;
- responses to job inventory questionnaire developed on basis of job under review. Questions may be contributed by professionals, their supervisors or senior management;
- findings from performing the job or one of its parts;
- findings from participant observation of job under review;
- investigation of operating problems associated with job under review;
- ...

The necessary next stage is breaking down these jobs into specific disciplines. It should be noted that absolute respect for multidisciplinary data and a concern for accuracy are vital conditions for the purpose of bridging, *by training*, the gap between the actual and desired situations (Fernandez 1988, 50). The skills required to perform these tasks are identified by grouping them into a certain number of activities (Jean 2001, 103). A skill is defined as follows:

“[Translation] A skill is a complex expertise resulting from integration, mobilization and employment of a set of capacities and abilities (that may be cognitive, emotional, psychomotor and social) and of knowledge elements [...] used effectively in situations having a common characteristic” (Lasnier 2000, 481).

In other words, skills break down primarily into abilities, knowledge elements and attitudes, which will be targeted in order to develop new training activities. Training objectives are attributes or characteristics that individuals must have to successfully exercise a skill or perform a task (*Training Needs Analysis Guidelines and Assessment Procedure*).

Table 2 Training objectives

Training objectives may consist of...	
<i>knowledge elements</i>	What the professional must know to perform their work adequately.
<i>abilities</i>	What the professional must know how to employ, in order to perform their work and use their knowledge elements adequately. Abilities are gained gradually through practice or other types of experience.
<i>attitudes</i>	The behaviour that the professional must adopt to be able to meet the job requirements.

Accordingly, the outcome of a job analysis sets out in detail the training objectives for the job under review (*Training Needs Analysis Guidelines and Assessment Procedure*).

Example: We want to perform a felt needs analysis of perinatal counsellors in a health care institution. We begin by doing a job analysis to become familiar with their everyday activities and the skills they need to successfully perform them. The outcome of the job analysis is a list of skills and knowledge elements that we use to question the perinatal counsellors. For each skills component, each perinatal counsellor must evaluate their felt training need, so that the future training activity will accurately target the shortcomings identified by these counsellors.

2.4 TASK ANALYSIS

Task analysis is a systematic operation breaking down the factors involved in performing the tasks of a specific job. Each activity is made up of a group of tasks. A task is made up of sub-tasks representing a stage in performance of a task. The latter is defined as a work operation that is a logical and essential step in the performance of an activity associated with a job (Tracey 1971, 44). It may be cognitive (mental process) or active (physical process). Performance of a task normally requires a certain amount of time and is repeated reasonably frequently in the context of a job.

Task analysis considers the closely enmeshed knowledge elements and abilities making up a task. It defines what a professional must know, do and perceive to adequately perform a specific task. Outcomes of a task analysis take the form of implementation of:

- a cognitive strategy;
- an intellectual skill;
- a verbal method of [providing] information;
- a motor ability or motive skill.

Task analysis helps determine the components and conditions of a quality job performed efficiently (Rothwell and Kazanas 1998, 125).

Performing a task analysis normally requires a large amount of time, especially if many tasks and a high degree of detail are involved. Task analysis generates very thorough outcomes in a degree of detail that can sometimes be more confusing than useful. For this reason, it is better to determine in advance the steps that need to be performed and their content.

Table 3 Steps in task analysis

1. Identify tasks to be analysed
First of all, the type of tasks to be reviewed must be established, since this will impact on the method to be adopted for the investigation.
2. Specify type of anticipated outcomes
Initially, this is a matter of establishing the nature of the task analysis objective. This analysis may be undertaken to investigate: <ol style="list-style-type: none">a. how professionals actually perform tasks;b. how professionals should perform tasks;c. how professionals think they perform tasks;d. how professionals should perform tasks in future. Most task analyses adopt at least two of these objectives. Second, the level of detail sought must be defined. The analysis should preferably begin with general information that is gradually developed through the addition of detail. To facilitate understanding of inter-task relationships, the inputs and outputs of each task should be examined first, and at this stage sub-tasks are enumerated.
3. Gather data
Data on tasks are drawn from four major sources: <ul style="list-style-type: none">• Performers [of tasks] The performers in question may be experts or have average or low levels of skill. The analyst's performance can also be considered (Sims 1990, 59).• Non-performers Non-performers are individuals who are familiar with the tasks but do not perform them. They may be supervisors, subordinates or any other staff member supporting performers. All individuals affected by task performance (peers, clients, patients, etc.) are also non-performers whose perceptions may be revealing. The viewpoints of experts in the field is also a potentially highly instructive information source. Finally, future performers may represent a valuable information source.• Documents Documents used by performers when carrying out tasks, or by non-performers when they interact with the task performed, may provide significant clues. Examples of such documents are forms, procedures, guides, and so forth.• Work environment As already stated, the work environment impacts on how tasks are performed. For this reason, it is necessary to consider how the work environment affects the processes through which tasks are performed.
4. Analyse outcomes and make recommendations
Following division of the task into sub-tasks, the relationships between the sub-tasks must be reviewed and compared with correct principles of performance. Next, the subtasks can be restructured to create an improved task. Finally, training objectives for each improved task will be specified (Rothwell and Kazanas 1998, 133).

Example: To develop an effective training program, senior management of a health care centre commissions a task analysis of physiotherapists' tasks. To fully comprehend (and improve) the psychological and cognitive skills required for the work of these physiotherapists, it is necessary to have a complete understanding of the specific requirements generated by their tasks, as well as the characteristics of the professional performing them. The task analysis considers the energy, motor and perceptive-motor aspect. Thus, such factors as the type of workload, muscles involved, separate or cyclical actions, coordination, dexterity and space required will have a major impact on the psychological skills of concentration and thought and emotion management. In fact, it is essential to understand all the abilities used to perform a task if the goal is to improve the task in question.

2.5 SKILLS ANALYSIS

The objective of a skills analysis is to identify and isolate the characteristics of a professional performing their work at an excellent level of proficiency. Training based on such characteristics will upgrade the average performance level of professionals to a higher level.

Briefly, the skill-based approach aims to raise the performance of professional staff to a maximum level, rather than simply correct their shortcomings. Therefore, this level of analysis transcends simple knowledge elements and abilities. Instead it refers to bodies of knowledge, skills and attitudes. However, skills analysis also has a major drawback: it is expensive and time consuming (Rothwell and Kazanas 1998, 67).

Table 4 Steps in skills analysis

1. Establish a discussion group of seasoned professionals with long experience in performing the job under review
Before meeting, the discussion group members should list the universal skills that in their view must be training priorities (Potter et al. 2000, 1294).
2. In the group setting, define the specific nature of the work done by an efficient professional
In the group, the discussion group members make a list of the skills they determine on an individual basis. They then discuss the correctness and relevance of the general skills model. The characteristics identified may relate to behaviours, attitudes, values, methods and outcomes achieved. The group must exhaustively specify the skills that the professional in question must have to do a specific job at a superior level of performance. To achieve this, the discussion group members may, for example, discuss situations they have experienced in the workplace and explain their reactions, feelings and actions taken in various situations.
3. Design methods to recognize and measure the skills diagnosed by the discussion group members
The selected methods must be adapted to the developed skills model.
4. Compare the attributes of the professionals whose needs have been analysed with the skills model developed by the discussion group members
5. Target the identified differences that can be corrected by planning training activities

Example: The public health crisis resulting from the spread of Clostridium difficile among hospital patients raised issues concerning the skills of front-line professionals with respect to investigation of outbreaks of infectious diseases in health care environments. A skills analysis required for investigation of these outbreaks was therefore carried out to support the planned training needs survey of these professionals.

2.6 JOB CONTENT ANALYSIS

To perform a specific job, professionals use information that they organize to apply in the job context. This information is translated into knowledge, attitudes, skills etc. Content analysis makes it possible to identify the essential information that professionals adapt to their job setting (Rothwell and Kazanas 1998, 134).

Content analysis is appropriate for jobs involving person-to-person relationships, or relationships between persons and ideas. Job content analysis is not appropriate for types of jobs that can be described simply in terms of "step-by-step" procedures or processes. Use of this level of analysis is therefore warranted in cases where work quality and performance lies in integration of concepts, processes, facts and principles by the professional.

The goal of content analysis is to break down large bodies of knowledge or tasks into smaller and instructionally useful units. These units assist in determining the topics that should be the subject of training and their distribution in the context of training activities.

Table 5 Steps in content analysis (Rothwell and Kazanas 1998, 135-136)

1. Identify the topic
At the outset, associating the topic with reference sources and databases is helpful, since this makes it possible to establish a link with keywords associated with the topic. These keywords will in turn assist in expanding the area of research.
2. Investigate what expert professionals know about the topic
Interviews, questionnaires, Internet searches, document reviews and observation of professionals at work may be useful for this purpose.
3. Investigate how professionals perform the mental activities associated with the topic
Interviews, questionnaires, review of outcomes secured and observation of professionals at work may be useful for this purpose. The issue is to identify what knowledge elements are applied in the job context and how professionals organize and structure those elements.
4. Conduct a literature search
Organizational, governmental, academic, occupational or industrial references can be included.
5. Synthesize content analysis outcomes
Preferably, a model should be adapted that integrates all the information and ideas organized by topic, thus enabling a professional to be efficient on the job and generate quality outcomes.
6. Describe the content
The topics must be described in a way to facilitate learning by others. To prevent confused content, imposing organization on the subject matter should be avoided.

Example: Senior management of a public health research institute wants to learn about the training needs of all research officers in the organization. Since these officers work on different but related topics, a content analysis is performed to determine the cross-cutting issues dealt with by the research officers. The needs analysis then investigates the level of needs of each officer as regards each of the common topics recognized.

2.7 SECONDARY DATA ANALYSIS

Secondary data analysis is based on a review of tangible factors reflecting performance and attainment of goals in doing a job. The central aim of this type of analysis is to identify outcomes of the work of the staff and use those outcomes to gain a better understanding of their work performance and quality. The issue here is to draw inferences concerning staff performance from secondary data concerning the type, volume and quality of a professional's work. The conclusion reached by a secondary data analysis is founded on a comparison between the aggregate outcome of the professionals' work and the rationale for their work. Connections must then be made between what is indicated by the secondary data analysis and the professionals' potential training needs.

In schematic terms, the secondary data analysis can be represented as follows (Rossett 1987, 61):

Job outcomes → (inferences) → Performance

Secondary data analysis is a method to be adopted only where performance problems exist. The analysis focusses strictly on the actual situation and is based on a document review revealing what is and what is not occurring in the course of performing a job (Rossett 1987, 49).

This type of analysis has valuable advantages: it provides objective indicators of performance problems, which also disclose excellent clues regarding critical points (Fernandez 1988, 41). Where a felt needs analysis indicates few training needs in a context where severe performance problems exist, the secondary data analysis throws up factors that will allow this dead end to be resolved. This level of analysis also clarifies the relationship between the professionals' work and organizational goals.

The drawback of this type of analysis is that it usually provides too few cases for a significant result. Furthermore, it does not reveal the causes of the problem or identify potential solutions. In addition, its inability to reflect movement in the current situation (such as recent changes) is a major disadvantage in some contexts.

Table 6 Steps in secondary data analysis (Rossett 1987, 54-57)

1. Review the job and its outcomes
In studying a job and the outcomes it should generate, special attention must be given to functions and tasks that have been identified as problematical. It is necessary to attempt to imagine what a professional does and may do when facing problems and positive opportunities that may arise.
2. Recognize quantitative outcomes of the job
A list must be prepared of the palpable and quantitative outcomes of the job in question. Research must focus on the types of outcomes that can be objectively quantified and measured. It must consider outcomes secured during the process as well as final outcomes.
3. Recognize qualitative outcomes of the job
A list must be prepared of written reports on the qualitative results of job performance by the professionals, bringing together subjective information derived from patients or other players in contact with the professionals. Letters of complaint and appreciation are good examples. It is then necessary to analyse the content of these data in order to extract their recurring themes.
4. Determine a way to obtain evidence for the prepared lists, by overcoming obstacles
Outcomes secured during the process of the work are often easier to obtain than final outcomes. For this reason, it is preferable to prepare a rationale for use of such evidence.
5. Review secondary data
The content analysis outcome identifies points that must be carefully examined during the training needs analysis. The secondary data analysis explains what the professionals actually do. Consideration of the implications of what the analysis suggests must be included. It must succeed in explaining the actions taken based on the knowledge elements and the skills essential for performing them.

Example: A health and social services agency annually investigates a series of outbreaks in the community. The number of cases remaining unexplained has risen for two years. To probe this decline in performance, a secondary data analysis is launched. Therefore, all the survey questionnaires developed for the purpose of identifying how these outbreaks occurred and all the documents bringing together the relevant information are reviewed to reveal omissions.

2.8 PERSONNEL EVALUATION

Personnel evaluation describes the performance of each professional in doing their own job tasks or functions over a specific period of time. There are two ways to evaluate staff: first, the professional's performance can be compared with the minimum performance standards; second, evaluation of the professionals' skills can be compared with minimum standards of skills required to perform the work (Sims 1990, 38).

The minimum skill or performance standards must be interpreted as the desired situation, while the personnel evaluation must be related to the actual situation. The gap between the minimum skill or performance standards and the personnel evaluation therefore reflects the training needs.

Personnel evaluation is normally performed by the immediate supervisor, who prepares a report. It can also be done through a test or an interview with the professional.

Personnel evaluation has significant advantages. The first one that comes to mind is that organizations usually perform a personnel evaluation annually, regardless of completion of a training needs analysis. Therefore, the information has often already been produced. Only access to it is necessary. Furthermore, the personnel evaluation assesses the professional's performance as it relates to departmental and organizational goals (McConnell 2003, 121). Ideally, the personnel evaluation should involve diagnosis by the supervisor and the professional of the latter's training needs. In that regard, the personnel evaluation has the major advantage represented by consensus.

Although the personal evaluation is the most common way to identify training needs, it still involves a number of disadvantages. The first of these is that the personnel evaluation is not always based on measurable criteria. The second is that it is often performed only once a year, while processes to estimate training needs are seldom implemented in the interim. Since the professionals' skills may change significantly during a year, the accuracy of this method is uncertain.

Example: A health care organization wishes to conduct a training needs analysis, but has few resources to do so. Despite this, it has just completed the personnel evaluation with a high degree of rigour. The organization's human resources department therefore decides to deduce training needs from shortcomings reported in the personnel evaluation.

2.9 CRITICAL INCIDENTS ANALYSIS

This level of analysis focusses on undesired outcomes during performance of a job and seeks thereby to derive training needs (Jean 2001, 104).

Completion of a critical incidents analysis requires **collection of statements by performers or their supervisors who have directly observed critical incidents during performance of a task or job**. In concrete terms, these incidents are unexpected events impairing the performance of a professional. The analysis must also focus on the practice of professionals whose performance is instructive and of professionals whose performance is unsatisfactory (Tracey 1971, 51).

A critical incidents analysis can be done by asking professionals to systematically record situations in which they feel they could have performed better. These professionals must then report the "incident," paying special attention to the setting, exactly what occurred, the outcomes and what might have improved those outcomes (Grant 2002, 156).

This type of analysis accordingly highlights the behavioural aspect of job performance. The usefulness of critical incidents analysis is limited, since it cannot cover all job behaviours (Tracey 1971, 51). Incidentally, critical incidents analysis is a valuable line of investigation

when faced with a decline in performance by professionals and absence of indications from other levels of analysis as to any training needs.

Example: In a blood bank organization, a large number of blood products pass their use-by dates daily. A felt training needs analysis is then conducted to detect the source of this problem. However, no specific training need emerges. A critical incidents analysis is then conducted to uncover why the out-of-date products were not included in the rotation process established to prevent products passing their use-by dates. The training needs will be determined on the basis of incidents whose outcomes were such that these products did not follow the normal cycle.

2.10 FELT TRAINING NEEDS ANALYSIS

Unlike critical incidents analysis or secondary data analysis, which rely on inferences, felt needs analysis is opinion-based. Through contact with professionals, it seeks to gather new viewpoints and new information concerning the job performance level of each individual (Rossett 1987, 26).

Felt needs analysis investigates shortcomings associated with their training, as felt by professionals in the context of their daily practice. For example, it may be coupled with a skills analysis. **The professionals anonymously assess their training needs** in terms of each part of the skills required to perform a specific job. Training activities can then be developed on the basis of common training needs emerging from the investigation.

The advantage of felt needs analysis is that it enables training needs to be directly surveyed. In many cases, asking professionals whether they have training needs and what they are is just as informative as requiring them to undergo a battery of tests. After all, professionals are the primary persons in a position to testify as to their training needs.

On the other hand, the limitation associated with this type of analysis is that the professionals may still have training needs they are unaware of. For example, certain professionals may have been performing a job in the same way for several years. While this set of methods could have been adequate in the past, this may no longer be the case a few years later. Professional practice evolves at the same pace as its setting. These professionals do not necessarily have an overview of the environment in which they work and of the changes in process in and around it, so that they do not necessary feel a need for more training and updating.

Example: A multidisciplinary team within a local health organization has put a lot of effort into a strategy to support community development. Since the team members all have different initial training, they feel that training needs exist with respect to integration of professional, organizational and management practices promoting implementation of this strategy. A felt needs analysis is accordingly performed to identify more accurately the practices in which the professionals feel they have the least competence.

2.11 LEARNER ANALYSIS

Learner analysis is the process resulting in identification of the characteristics of professionals whose training needs are being reviewed.

A number of aspects of the profile of future learners need to be identified. First of all, **assumptions need to be determined prior to training as regards the skills in which the target population is proficient.** It is necessary to establish the level of knowledge, attitudes and skills that typical learners have acquired, in order to focus on them with greater relevance. The fact is that if the target population is asked about its training needs on the basis of questions that refer to knowledge that is too elementary or too advanced, they may not feel any commitment to the training needs survey, which will then have a low response rate. The target population can be questioned regarding its initial training and training experiences. However, where radical differences exist between the target population and typical learners in the field, it is absolutely necessary that this be taken into account, if we want the training needs survey and the resulting training to be effective (Rothwell and Kazanas 1998, 92).

The other major aspects of the profile of future learners are sociodemographic and personal in nature. To approach a specific public appropriately and, even more, to design training activities for them, it is vital to be aware of their demographic profile, work habits, schedule and type of availability, learning style, job culture and values system on which that culture is based, career cycles they pass through, etc.

In most cases, it is not necessary to base the learner analysis on highly complex methods and tools. To identify the sociodemographic characteristics or instructional preferences of the target population, a satisfactory result will be achieved by observing and describing a group of future learners. A professional or supervisor can also be consulted. If a high level of accuracy is wanted, it is enough to add some questions to those focussing on the type of training needs.

To uncover specific aspects associated with the area where we are seeking to improve work quality, a derived or contrived approach method can be adopted. The derived approach involves initial consideration of hindrances to quality, followed by preparation of a list of the characteristics of future learners that result from this. The contrived approach requires a little more effort, since it begins by listing the characteristics, which must then be considered individually and rated in terms of the extent to which they are contributing to the decline in quality (Rothwell and Kazanas 1998, 93).

For a number of reasons, learner analysis is *essential* to the success of a training needs analysis. Knowledge of the target population facilitates selection of effective methods to reach them and evoke their response. It is also used to interpret, in light of their culture, the responses of the professionals surveyed. In the long term, learner analysis makes it possible to plan training activities adapted to the type of public they target. As a result, those activities are much more likely to reach their target if they are constructed in part on the basis of a learner analysis. In fact, targeted professionals interpret the information, questions and instruction addressed to them on the basis of their beliefs, values, expectations and

experiences. The nature of the latter aspects is crucial in a training situation, since it can support or impair knowledge transfer.

Example: In a felt training needs analysis, the person responsible adds to the questionnaire a set of questions designed to analyse the learners. This will provide information as to the types of training activities he should recommend in his final report, to ensure that their design evokes the target public's interest and is easily assimilable by them.

Therefore, for each type of training needs, there is a corresponding level of analysis. It should be noted that the various types of training needs and their equivalence with a level of analysis are not always mutually exclusive.

Table 7 Matching levels of analysis with types of training needs

Analysis of Continuing education Needs		
	Level of Analysis	Type of Needs
Environ- ment	<ul style="list-style-type: none"> • Organizational analysis; • Work environment analysis. 	<ul style="list-style-type: none"> • Normative needs; • Comparative needs; • Organizational needs.
Job	<ul style="list-style-type: none"> • Job analysis; • Task analysis; • Skills analysis; • Content analysis; • Secondary data analysis; • Critical incidents analysis; • Personnel evaluation. 	<ul style="list-style-type: none"> • Comparative needs; • Demonstrated needs; • Normative needs.
Individual	<ul style="list-style-type: none"> • Felt needs analysis; • Learner analysis. 	<ul style="list-style-type: none"> • Felt needs; • Comparative needs.

2.12 CONCLUSION: IMPORTANCE OF TRIANGULATING LEVELS OF ANALYSIS

The outcomes of the training needs survey will be more accurate if several levels of analysis are combined (Sims 1990, 53). Without necessarily conducting an in-depth study for each level of analysis, a variety of methods must be selected that will reflect a comprehensive picture of the situation. Indeed, Raynald Pineault and Carole Daveluy argue (1986, 78):

“[Translation] Therefore, a needs study that uses only a single perceptual process based on the client's interpretation or, inversely, a single normative or rational process based on the professional's interpretation may represent only the

tip of the iceberg and, in fact, provide only a partial picture of the situation. [...] the success of planning depends on the degree of convergence between these two views of the need”.

Accordingly, consulting the players involved in an unsatisfactory situation is unavoidable. If the viewpoint of major players in a specific situation is ignored, even though their support is vital to implementation of one or more solutions, it can be assumed that their support will not be secured. As far as possible, the training needs analysis should promote emergence of a consensus on the solutions to consider. Implementation of the selected solutions will then be facilitated (Lapointe 1992, 108).

Launching the process to plan training by identifying low-performance sectors is a way to more effectively reveal the causes and effects of hindrances to job performance. If this approach is adopted, the subsequent training needs analysis will be of better quality (Pineault and Daveluy 1986, 78).

The following table presents the principal characteristics of the various levels of analysis.

Table 8 Summary table: levels of analysis of training needs

Level of Analysis	Definition	Target/Goal	Issues Reviewed	Limitations
Organizational analysis	In-depth review of the organization's culture and effectiveness	Determine the parts of the organization requiring training, given its short- and long-term goals and the trends likely to affect those goals.	Are departmental or organizational activities, as actually performed, useful for the organization's mission? Do departmental or organizational activities, as actually performed, enable the organization to achieve its strategic goals? Are organizational culture and effectiveness responsive to the imperatives of its reason for existence? Are the organizational model and conventions effectively assimilated by staff?	This level of analysis does not provide specific data on professionals' individual work.
Environmental analysis	In-depth review of the environmental factors likely to impinge on training needs	Make a link between training needs and the environment in which they emerge.	What part of training needs is directly attributable to the work environment? What characteristics of the work environment impact on work quality or performance?	This level of analysis does not provide specific data on professionals' individual work.

Table 8 Summary table: levels of analysis of training needs (continued)

Level of Analysis	Definition	Target/Goal	Issues Reviewed	Limitations
Job analysis	Systematic operation involving a breakdown of the factors involved in performing a given job	Identify the skills (knowledge elements, abilities and attitudes) required to perform the tasks specific to a job.	Does the job, as actually done, achieve the goals it must achieve, as efficiently as possible? What abilities are required to do this job? Without exception, what skills are required to perform a given job to a high level of performance and quality?	This level of analysis focusses on the direct relationship between the professional and their work and does not identify potential hindrances to performance that may interfere in this relationship.
Task analysis	Intensive review of how professionals perform the activities involved in their job	Describe the closely enmeshed knowledge elements and abilities making up a task, for all tasks involved in a given job.	Without exception, what skills are required to perform each task of a given job to a high level of performance and quality? How do professionals actually perform the tasks? How should professionals perform the tasks? How do professionals think that they are performing the tasks? How should professionals perform the tasks in future?	This level of analysis focusses on the direct relationship between the professional and their work and does not identify potential hindrances to performance that may interfere in this relationship.

Table 8 Summary table: levels of analysis of training needs (continued)

Level of Analysis	Definition	Target/Goal	Issues Reviewed	Limitations
Skills analysis	Cooperation by experts to identify the bodies of knowledge, skills and attitudes involved in performing a job	In the group setting, define the skills possessed by a professional doing a job at superior levels of performance and quality.	Without exception, what are the skills required to do each of the tasks of a given job at superior levels of performance and quality?	Although this level of analysis considers the best known performance in doing a job, its purpose is not to establish practices that would result in higher quality and performance.
Job content analysis	Intensive review of information used by a professional to do a job and how they organize the information for this purpose	Identify the essential information processed by professionals to make it suitable for the purposes of their job.	What concepts, processes, principles and facts must a professional assimilate to perform a quality job?	This level of analysis shows what the professional must assimilate to do a quality job, but it does not indicate how they must mobilize this content for such a purpose. Furthermore, it is appropriate only for jobs involving person-to-person relationships or relationships between persons and ideas. It is not appropriate for procedural jobs.

Table 8 Summary table: levels of analysis of training needs (continued)

Level of Analysis	Definition	Target/Goal	Issues Reviewed	Limitations
Secondary data analysis	Intensive review of tangible outcomes from a job in order to draw inferences concerning staff performance	Identify outcomes of the work of staff and use those outcomes to gain a better understanding of their performance.	What do secondary data concerning the type, quantity and volume of the work of professionals reveal about shortcomings in their job performance? In concrete terms, what occurs as they perform a job? What are the critical points in performance of a given job?	This level of analysis can focus only on an actual situation and cannot reflect movement in that situation. It is valuable only when problems of performance or a decline in quality exist. Furthermore, it usually provides too few cases for a significant result. In addition, it does not reveal the causes of the problem or identify potential solutions.
Personnel evaluation	Evaluation of the professional's performance in light of departmental and organizational goals	Evaluate the individual performance of a professional in terms of the standards established for their job.	Over a given period of time, how does the work of a specific professional compare with the minimum standards of performance or skill for their job?	The desired situation is represented by the minimum skill or performance standards. Accordingly, this level of analysis does not provide any indications as to ways to exceed these minimum standards. Furthermore, the accuracy of this method is uncertain.
Critical incidents analysis	Extensive review of undesired outcomes during performance of a task or job	Identify unintentional or culpable undesired outcomes occurring during performance of a job.	What activities cause problems in performing a job or task? What behaviours need to be changed to perform a job more efficiently and to a better level of quality?	This level of analysis does not cover all job behaviours.

Table 8 Summary table: levels of analysis of training needs (continued)

Level of Analysis	Definition	Target/Goal	Issues Reviewed	Limitations
Felt needs analysis	Investigation of shortcomings associated with training, as felt by the professional in the context of their daily practice	Gather opinions, new viewpoints and new information concerning the job performance level of each individual.	From their own point of view, what are the professional's training needs?	This level of analysis does not reveal the professional's training needs that they are unaware of.
Learner analysis	Identification of characteristics of professionals	Determine assumptions as regards the skills and sociodemographic and personal characteristics of the professionals whose training needs are being considered.	What characteristics of the target population are likely to contribute toward conducting the needs survey, completing the training activity and assimilating the training objectives?	This level of analysis provides no information about training needs.

PART TWO

PERFORMING THE TRAINING NEEDS ANALYSIS IN THE FIELD

3 STEPS IN PERFORMING THE TRAINING NEEDS ANALYSIS

This chapter addresses the following issues:

- design of training needs analysis plan;
- degrees of exhaustiveness of training needs analysis;
- definition of goal of training needs analysis.

3.1 DESIGN OF TRAINING NEEDS ANALYSIS PLAN

Preparation of a plan for the training needs analysis is a pivotal step whose importance must not be underestimated. This plan makes it possible not only to set parameters for each required operation, but also to set an order for their implementation. In addition, the plan provides an overview of the methods and tools used. As a result, it is easier to expose shortcomings and inconsistencies.

Designing the training needs analysis plan includes a description of its set goals and the schedule of actions required to attain those goals. The model training needs analysis plan is similar to a study design (Rothwell and Kazanas 1998, 76). Here are the phases that need to be completed in the field and specified in the analysis plan:

- definition of set objectives;
- definition of population targeted by the study;
- definition of method used to sample the target population;
- definition of data-gathering methods;
- description of work instruments and protocols employed;
- definition of data analysis methods;
- definition of procedure employed to identify proposed recommendations arising from the analysis;
- time schedule adopted.

After all these phases have been completed, the report is written and submitted to the party that commissioned it (see Chapter 5).

Before completion of the training plan, the degree of exhaustiveness must be determined. In addition, the goal of the analysis needs to be carefully specified, as well as the populations that will be the subject of this analysis. These three factors are addressed in the next section.

3.2 POSSIBLE LEVELS OF EXHAUSTIVENESS OF TRAINING NEEDS ANALYSIS

The exhaustiveness of a needs analysis is determined by the type of training needs to be compiled, the size and characteristics of the population under review, and the resources and methods available to conduct the analysis.

The exhaustiveness of training needs analyses varies between a high level and a much more fragmented level (Peterson 1992, 53). A comprehensive analysis of training needs is associated with a high level of exhaustiveness. It involves thoroughly reviewing the tasks as well as the skills required to perform the job, conducting interviews with experts and key staff, distributing questionnaires for completion by all levels of the population being studied, participant observation in the workplace, and drawing comparisons with other organizations of the same type, etc.

A partial training needs analysis corresponds to a more moderate degree of exhaustiveness. This type of analysis normally includes interviews with key managers and a review of work descriptions of the people whose training needs are of interest.

A preliminary training needs analysis is more superficial. It provides an overview of the type and extent of training needs, with a view to conducting a comprehensive analysis. Even if a highly exhaustive analysis is the choice, a preliminary analysis is often performed first. Initial brief data gathering provides information allowing better choices of the methodology to be employed.

3.3 DEFINING A GOAL FOR THE TRAINING NEEDS ANALYSIS

The training needs analysis goal states the desired outcomes flowing from this evaluation process. It indicates what should have been done by the end of the training needs analysis.

The goal should be expressed in clear, direct language. It is a good idea to include the date for completion in the conditions (Peterson 1992, 50). Since conducting a training needs analysis tends to create expectations in the areas of training and improved performance in the workplace, it is better to be as transparent as possible regarding the purposes being targeted by the study, even if it means amending the goal (Pineault 1986, 82).

Example: The set goal of this analysis is to determine the training needs and priorities of public health counsellors working in health and social services centres (CSSS) in order to assist in developing and planning training activities at the local and regional levels. The analysis results will be tabled on October 8, 2009.

4 METHODS OF COLLECTING TRAINING NEEDS DATA

This chapter addresses the following issues:

- criteria to consider when selecting the method;
- complementarity of quantitative and qualitative methods;
- the various data collection methods;
- processing and analysis of results;
- sampling procedures;
- indicators;
- scales;
- priority needs indices.

The methods presented in this chapter are elementary in nature. A much more abundant variety of methodologies exist than those we present here. Especially concerning the statistical component, we invite you to review section 4.9 of this chapter for references to works providing a more exhaustive review of the calculations that can be used.

4.1 CRITERIA TO CONSIDER WHEN SELECTING THE METHOD

The method selected to evaluate training needs should be selected on the basis of the following criteria (Sims 1990, 42):

- degree of involvement by professionals in the training needs analysis process;
- degree of involvement by senior management in the training needs analysis process;
- time required;
- relative cost;
- degree of expertise required;
- degree to which the data can be quantified.

Since no method seems clearly superior, a survey method needs to be chosen of a type that will not represent a disincentive to involvement by professionals and senior management.

Participation by professionals in the training needs analysis process is essential. They must be sufficiently motivated to participate in the ensuing activities and to apply what they will learn in their work.

Senior management participation is also desirable, since senior management is in a position to reward the various ways in which the newly developed skills are applied by the trained professionals. Furthermore, inadequate involvement in the training needs analysis on the part of senior management or the professionals surveyed is the main reason for training failure.

In the interests of rigorous training needs analysis, it is absolutely essential that the process through which the data are generated be documented and reported (see Chapter 5). To maximize data quality, it is essential to ensure that the methods employed (McConnell 2003, 218):

- measure what you need to have measured;
- are error-free;
- are valid within your environment and your population;
- are administered and scored properly, with a common understanding on how to interpret their results.

In the field of research, four indispensable principles ensure compliance with the above four prerequisites: validity, transparency, reliability and sensitivity.

4.1.1 Validity

If a method is valid, it will succeed in measuring what it should measure without interference. Validity can be maximized by adhering strictly to the data, while also attempting to counter the effects of non-observable or non-measurable concepts (King, Keohane and Verba 1994, 25).

There are several types of validity characterizing the methods employed in an analysis: content validity, face validity, construct validity and criterion validity (concurrent and predictive validity).

For example, the method is said to be valid when, if the goal is to assess the capacity of a professional to handle a tool, their skill in using the tool is actually measured, rather than the performance of the tool itself.

4.1.2 Transparency

Scientific transparency lies in the ability to report the data production method. It is essential to report all the methods used and the information necessary for exact repetition of the method in the same way by an outside person. Scientific transparency ensures scientific validity, because only an accurate description of the scientific processes used can prove the validity of the descriptive and causal inferences (King, Keohane and Verba 1994, 23).

4.1.3 Reliability

Reliability exists when the same individual obtains the same result for the same test. If identical results are obtained when the test is repeated under identical conditions, this establishes that the method is error-free.

For example, after several questions have been answered, it is concluded that a nurse has training needs ranging from moderate to average in the area of vaccination. If the same nurse gives the same responses to the same questions put to them a second time and, this

time, the method leads to the conclusion that their training needs in the area of vaccination range from average to high, the method's reliability is poor.

4.1.4 Sensitivity

Sensitivity is the capacity of a measurement instrument to detect the presence of the characteristic we want to identify in a population (Pineault and Daveluy 1986, 99). For example, if during a normative needs analysis, the same results are obtained from interviews with an expert professional and with a poor-performing professional, it can be said that the questionnaire is not a sensitive measurement instrument, since it does not detect standards-based performance variations.

4.2 COMPLEMENTARITY OF QUANTITATIVE AND QUALITATIVE METHODS

Training needs analysis methods may be based on quantitative measurement, qualitative measurement, or both as we advise here.

Quantitative methods usually involve numerical data and use an approach based on indicators. They can be more easily reused by other researchers (Huberman and Miles 1991, 24).

So-called qualitative methods process data in verbal form. These methods, traditionally proper to the social sciences, allow analysis of data that are hard to quantify. Perceptions of individuals regarding a given topic are a good example of such data (Pineault and Daveluy 1986, 98). According to Huberman and Miles, the main advantages of qualitative data are (1991, 21):

“[Translation] They make possible meaningful and soundly based descriptions and explanations of processes linked to a local context. With qualitative data we are in a position to comply with the time aspect, evaluate local causes and formulate productive explanations”.

We should regard quantitative and qualitative methods as complementary rather than mutually opposed. After all, the same phenomenon can be addressed in both qualitative and quantitative terms. Certain of its aspects are probably better explained in one language rather than the other, while the opposite will be true of other aspects. That is why it is valuable to use both methods to understand the full nature of a phenomenon (King, Keohane and Verba 1994, 6).

For example, in a work environment where certain declines in quality are noted, the quantitative part of a training needs analysis reveals no need for major training. On the other hand, analysis of the qualitative part of the survey reveals a need to maintain skills that are less frequently used on the job. In short, a combination of the results of the two methods used in the survey confirms that the professionals have training needs, in that they need to "practise" their underused skills (rather than receive training on new topics). To sum up, the results obtained by one specific method provide an opportunity to achieve greater understanding of the results obtained by another method.

Furthermore, when similar results are obtained using two different methods, the validity of the results obtained is even stronger. Although a combination of the two types of methods is desirable, selection of the methods used is, nevertheless, a function of the costs associated with data collection and of the type of problem under study (Pineault and Daveluy 1986, 98).

4.3 THE VARIOUS DATA COLLECTION METHODS

Gathering quality information from several individuals at various organizational levels is a vital part of the training needs analysis.

No specific data collection method is associated with training needs analysis. Several methods are available and can be adapted to this type of analysis. It is then a matter of making a well-judged selection of the data collection method, which should be based both on the methodological criteria set out above and on the following factors (Lapointe 1992, 184):

- set goals of the training needs analysis;
- limitations of the training needs analysis;
- type of individuals consulted;
- time available to perform the training needs analysis;
- human, material and financial resources available to the person responsible for performing the training needs analysis.

Before devising any data collection tool, it is recommended, as a first step, that a check be made as to whether similar tools are already available. Some parts of these may meet the requirements of the training needs analysis in progress, and it may be possible to upgrade other parts for this purpose.

Regardless of the collection tool selected, it should preferably be validated with a number of individuals in the target population before being put to formal use in the analysis. Following this pre-test, the tool can be adjusted accurately by reference to the population under study.

Some of the data collection methods most commonly used in training needs analysis are now briefly presented:

4.3.1 Survey approach

A survey consists primarily in asking questions and compiling the responses obtained. There are two ways to address a survey: to the entire target population or to a subset of that population, known as a sample. We will discuss sampling approaches later (see section 4.5). For the moment, we will assume that the survey focusses on the entire population.

The questionnaire is therefore the tool "par excellence" of this collection method. It is in fact one of the most effective methods for training needs analyses, and is accordingly one of the most commonly used. Furthermore, it is easily communicated via various communications media, including telephone, regular mail, e-mail, Internet platforms and, of course, face-to-face interaction. The questionnaire can therefore be administered using of a number of technical methods.

Its method of design must be based on the type of information sought. Once the draft questionnaire has been prepared, each question must be reviewed, with special attention to the following concerns (Pineault and Daveluy 1986, 221):

- Is the question worth asking?
- Is the question clear?
- Does the formulation of the question generate bias?
- Is the order in which the questions are asked likely to influence the type of responses?

In other words, the form and formulation of the questions may have a decisive impact on the results obtained on completion of the survey. That is why it is important to be vigilant in designing the questions, and to test them thoroughly (McConnell 2003, 111).

In considering the draft questionnaire, it is always necessary to bear in mind the burden on the respondent. It is often better to position objective questions ahead of more subjective ones. After verifying the order and design of the questions, it is important to pre-test the questionnaire with individuals belonging to the target population, to check their understanding of the questions and establish whether it matches the initially planned understanding. This can easily be achieved through the focus group method. The questionnaire must then be corrected in light of the comments obtained through the pre-test. Once this phase has been completed, the questionnaire can be considered valid.

The questionnaire, which can be given both to supervisors and to employees, generally specifies important skill areas or tasks and the training needs of professionals in each of these areas (Sims 1990, 42).

Open questions can be used to compile a large volume of information and allow for subtle shades of meaning colouring respondents' perceptions. However, much more time is needed to read and analyse the responses.

4.3.1.1 Self-administered questionnaire

Given the large number of professionals normally questioned, questions with pre-coded responses are often used in this type of questionnaire. These force the respondent to select a response from a list of formally stated ones. The wording of these responses is normally designed to ensure that they are exhaustive and mutually exclusive. The result is that the professional being questioned takes a position. These questions therefore greatly facilitate quantitative processing of the responses (Quivy and Van Campenhout 1995, 190).

Example: Please circle the response best representing your training need in the area of written communication in the public health field:

- a) I have a great need for training in written communication methods.*
- b) I have some need for training in written communication methods.*
- c) I have no need for training in written communication methods.*

Questions where the respondent must rank response statements in order of priority also generate valuable results. The respondent can also be asked to rank tasks in priority order based on their importance, level of difficulty or frequency (McConnell 2003, 113). It is recommended that no more than 10 points be included for ranking.

Example: We would like to know the most suitable methods of instruction for your organization in the context of implementing a training activity for members of your team. Please rank in order of preference the various methods of instruction listed below by assigning them a number from 1 to 5:

(1 represents the most desirable method of instruction, while 5 will be the least desirable)

- A single intensive instruction session* _____
- Several short instruction sessions* _____
- Self-training tools* _____
- On-line instructional material* _____
- Situation/simulation workshops* _____

Responses providing a grading scale are also very informative, since they enable the administrator to learn respondents' degree of agreement or disagreement with one or more statements.

Example: After reading the following statement, indicate your degree of agreement or disagreement with it by circling the number corresponding most closely to your opinion.

Regarding the task of helping to develop training programs, do you feel that transfusion safety officers have enough knowledge of training evaluation tools?

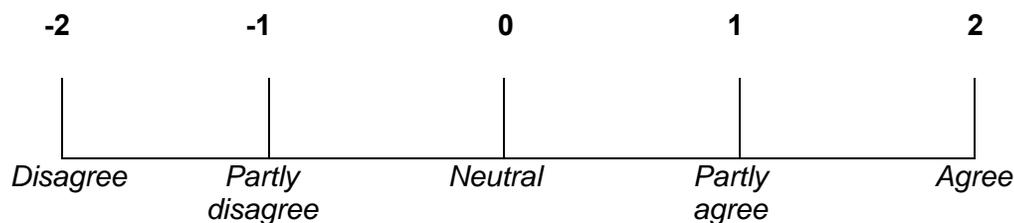


Figure 1 Grading Scale

When respondents complete the questionnaire themselves, this is called "direct administration". When investigators fill out questionnaires based on the responses given to them, this is called "indirect administration" (Quivy and Van Campenhout 1995, 191). Ideal distribution involves the smallest possible number of intermediaries between the person conducting the needs analysis and respondents.

Regardless of the selected distribution method, the person conducting the needs analysis should preferably be present when the questionnaires are distributed, to explain how they work and answer questions that may come up when the respondents read them.

A questionnaire provides the possibility of quickly compiling a large volume of information from many individuals, regardless of their geographic dispersion. In addition to this, the method remains inexpensive. Furthermore, its form is easily adapted to the confidentiality criterion and the data it provides are easily processed (Lapointe 1992, 216).

On the other hand, the questionnaire option also has some disadvantages. First, the predetermined responses inhibit free expression and frustrate considered responses. The questionnaire will then prove to have limited effectiveness in identifying the exact cause of the problems and potential solutions (Fernandez 1988, 40).

4.3.1.2 Interview

There are several types of interviews and these may be appropriate to training needs analysis. This method, which is normally open-ended, is used to collect information that is both abundant and subtle in the distinctions made by respondents.

The distinctive feature of the interview method is direct contact between the person conducting the training needs analysis and the professionals of the target public (Quivy and Van Campenhout 1995, 194). The basic principle of the interview is discussion. Whereas interviewees state their experiences, interpretations, perceptions and opinions regarding a situation, the interviewer tries to stimulate this flow of information through questions and reactions.

The interview technique can range from less to more directed, through the following types: open, semi-directed and focussed. In all cases, the interviewer "pre-targets" topics to be addressed during the discussion and prepares some key questions.

Although a semi-directed interview provides respondents with an opportunity to express themselves freely, it is based on a set of questions that will guide the interview, without, however, channelling it in one direction. The moderate flexibility and directivity of the process provides the possibility of collecting key testimony from informants, while also having due regard to their frame of reference.

The focussed interview analyses the impacts of a specific experience or event on individuals who have been exposed to such an experience or event. Without being absolutely rigid, this type of interview is driven by a large number of questions put by the interviewer, who also has a list of very specific points to clarify with interviewees (Quivy and Van Campenhout 1995, 195).

The focus group is a qualitative strategy for the purpose of gathering information, targeted at groups. The first step is to bring together about a dozen or fewer participants satisfying homogenous criteria, who discuss predetermined topics among themselves. One or two interviewers will then direct the discussions, using a group interview grid and refraining from participating in the discussion themselves. Several sessions can be organized if the goal is to compile the ideas of more individuals. In fact, the objective of this oral method is not to reach a consensus, but to have all opinions aired. Therefore, on conclusion of the discussion sessions, the content of the statements made is analysed and the topics emerging from this analysis must be classified by type (Lapointe 1992, 180).

The interview is a very flexible method. It can be used to generate a very accurate picture of training needs and the environment in which those needs emerge. On the other hand, the interview is probably the method that is the most time consuming and the most expensive in human and financial resources (Rothwell and Kazanas 1998, 64).

4.3.1.3 Attitude survey

The attitude survey is a data collection method used fairly often in needs analyses. These surveys are mainly designed following the Gallup/Kettering model (Lapointe 1998, 179). They allow collection of general information concerning the attitude, opinions and satisfaction of staff. In fact, this data collection method is relevant for the purpose of identifying summary perceptions of staff concerning training needs. All the same, such perceptions are inadequate for the purpose of developing training activities (Sims 1990, 40). We therefore advise supplementing use of the opinion survey with another data collection method.

4.3.2 Consensus-building approach

4.3.2.1 Delphi technique

This technique involves several individuals who are asked to anonymously express their views on an issue. The goal of the technique is to achieve consensus among the participants who are, however, mutually isolated. The technique consists, first, of generating the largest possible number of ideas on a given topic, and then leading participants to analyse the picture generated by the group and take a position regarding it (Lapointe 1992, 134).

The method is based on delivery of several questionnaires one after the other. Each of these is built from the responses collected through the previous questionnaire. All group members state their opinion regarding the information provided by the others, but without being in direct contact with them (Pineault and Daveluy 1986, 231).

The Delphi technique is particularly suitable if organizers want to question key informants or experts. It can be used to question a large number of individuals, who may be widely scattered geographically. Furthermore, the method gives participants time to reflect. All the same, it requires a major investment in time (McConnell 2003, 118).

4.3.2.2 *Nominal group technique*

The nominal group technique is similar to the Delphi technique, in that an iterative process takes place among a participating group that does not intercommunicate. However, unlike the Delphi technique, the participants are brought together in the same room (Rothwell and Kazanas 1998, 64).

This is a simple process. First of all, a number of key informants from the target public or their supervisors must be assembled in a meeting, during which the participants write down their opinions and perceptions concerning the target public's training needs. The next step is to compile all the responses by forming thematic groups to bring together these responses. The participant group will then discuss the results after they are displayed. Finally, participants will vote on the results after they have been fine-tuned as a result of the discussion.

The nominal group technique shares many advantages and drawbacks of the Delphi technique. Both are flexible methods that provide all participants with the opportunity to express their views, without getting into the competitive dynamics normally existing in interactive groups. One disadvantage of the nominal group method is the lack of precision sometimes characterizing the results obtained (Pineault and Daveluy 1986, 240).

4.3.3 **Observational approach**

Connections exist among various workload components, including actions, stance, posture, attitude or cognitive activities. Through the snapshot technique, it is possible to assess the series of interdependent movements involved in a job (Fernandez 1988, 51). For observation to be productive, the observer must already have a good knowledge of the content and processes involved in performing the job being studied.

Collection of data using this method is a matter of carefully observing an individual doing their job. Such observation is necessarily selective, in order to identify how the activities are done and how long they take.

In addition to this, observation can be non-participant or participant, depending on the observer's behaviour. An observer who does not interact with the observed subject and does not participate in the group is non-participant. An observer who questions and has discussions with the observed subject is a "participant" observer (Quivy and Van Campenhoudt 1995, 200).

Observation is limited by the nature of what can be actually observed: accordingly, this data collection method focusses on behaviours and technical skills. The main drawbacks of observation lies in the amount of time it requires. On the other hand, it provides the person conducting the needs analysis with a framework for observations prior to their work that may be very profitable (Fernandez 1988, 51).

4.3.4 Aptitude testing

Aptitude testing is a standardized measure that can be used to assess the actual skill level of a professional. These tests can take several forms: written assessment, simulation, interview, etc. (McConnell 2003, 129). They involve comparing the results obtained by the professional with set skill standards for a specific job.

This method has several advantages. When the aptitude tests are valid and genuinely relate to the job being reviewed, they are an outstanding information source. To ensure that aptitude tests are properly supported, their development should be preceded by a thorough job analysis (Sims 1990, 40). In addition, the results they generate are easy to present and to compare.

Moreover, aptitude tests provide a good insight into specific needs. For example, if the goal is to target professionals for more in-depth training, these tests provide a way to pinpoint individuals whom the organization should train to derive maximum benefit.

However, this data collection method overlooks the subjective dimension of the training need. Compared with aptitude testing, the need is fundamentally objective. It is therefore necessary to put the results concerning work quality and performance into perspective, and consider them as "indications" rather than final conclusions (Fernandez 1988, 40). Also, the validity of these tests is sometimes confined to very specific situations.

Table 9 Comparative evaluation of data collection methods

Data collection methods	Criteria				
	Professionals' Involvement	Supervisors' Involvement	Time Requirement	Cost	Quantifiable Data Production
Self-administered questionnaire	High	Low * Can also be high if there is a separate questionnaire for them	Moderate	Moderate	High
Interview	High	Low * Can also be high if they are interviewed separately	High	High	Moderate
Delphi technique	Low	Moderate	Moderate	Moderate	Moderate
Nominal group technique	High	Moderate	Moderate	Moderate	Moderate
Snapshot	Moderate	Low	High	High	Moderate
Attitude survey	High	Low	Moderate	Low	High
Aptitude testing	High	Moderate	Moderate	Moderate	High

Based on Newstrom, J. and J. Lilyquist, "Selecting Needs Analysis Methods", *Training and Development Journal*, Vol. 33, No. 10, 1979, p. 56.

4.4 PROCESSING AND ANALYSIS OF RESULTS

Raw data collected, whether factual, occupational, sociodemographic or relative to the actual or desired situation, must be subjected to systematic analysis; in other words they must be converted to statistical form. A number of models can be used to generate these statistics; some are addressed below. All the tools presented in this situation are valid, insofar as the information definitely relates to the entire population and not solely to a specific sample.

4.4.1 Descriptive statistics: univariate approach

4.4.1.1 Frequencies and percentages

Participants in the needs analysis are separated by frequencies on the basis of the responses given. These frequencies are very often converted to percentages or proportions.

Presentation of the responses by means of frequencies or percentages allows the person responsible for the needs analysis to gauge the importance and representativeness of the groups making up the sample. The individual in question can then identify the training needs for each of the latter (Lapointe 1992, 250). Univariate frequency tables are appropriate for summarizing the data or presenting them in schematic form.

Example:

Table 10 Distribution of number of shifts per month among nurses working part time in a perinatal clinic

Number of shifts	n	%
<i>Fewer than one</i>	9	1.6
<i>One to five</i>	253	44.7
<i>Six to ten</i>	172	30.4
<i>Eleven to fifteen</i>	105	18.6
<i>Sixteen or more</i>	27	4.8
Total	566	100.0

4.4.1.2 Measures of central tendency

This type of measure provides information concerning the mean or median value of a distribution of all responses obtained. The next table sets out definitions of the principal measures of central tendency, derived from the work entitled *La conduite d'une étude de besoins en éducation et en formation* by Jacques-Jean Lapointe (1992, 251).

Table 11 Definitions of principal measures of central tendency

Measure of Central Tendency	Definition
Arithmetical mean	The arithmetical mean is represented by the total of all values or responses given, divided by the total number of participants.
Median	The median represents the midpoint of a frequency distribution on a rating scale. This point divides the [participants] into two equal groups.
Mode	The mode identifies, among a set of possible response categories, the category favoured by the largest number of [participants].

In short, the mode is the simplest measure and merely indicates the most common response. The arithmetical mean is sensitive to extreme values, known as "outliers". It provides more precise information regarding the responses obtained. In some cases, however, it is preferable to discard outliers in the interests of representativeness. The median, which is little affected by outliers, then becomes the indicator that will provide a better assessment of the central tendency's value.

The fact remains that the arithmetical mean and the median take no account of dispersion of the values of the distribution. This aspect is taken into account by using measures of dispersion.

4.4.1.3 Measures of dispersion of population distribution

Measures of dispersion describe the degree of variability or homogeneity of the data.

The next table sets out definitions of the principal measures of dispersion, again from the work entitled *La conduite d'une étude de besoins en éducation et en formation* by Jacques-Jean Lapointe (1992, 255).

Table 12 Definitions of principal measures of dispersion

Measure of Dispersion	Definition
Standard deviation	The standard deviation is the indicator of dispersion par excellence. It represents the mean deviation separating each result of a distribution about the mean.
Coefficient of variation	[The coefficient of variation] determines the degree of consensus or coefficient of dispersion of a frequency distribution. It is also useful for comparing the variability indices of two or more distributions.

The standard deviation becomes especially important in a training needs analysis. First, it can indicate that a proposition is ambiguous. If such is indeed the case, that fact must be taken into account in the final discussion. Second, the standard deviation reveals the extent of the survey participants' agreement or disagreement with one or more statements. Therefore, this calculation provides indices of the prevailing resistance or support after initiatives associated with the needs analysis are implemented in the workplace.

A coefficient of variation less than or equal to 15 % indicates a high degree of consensus or a low dispersion of the values obtained. Where the result is between 15 and 30 %, an average consensus can be diagnosed, whereas if the coefficient of variation is equal to or greater than 30 %, we are faced with a situation with a high dispersion where, accordingly, opinions are extremely heterogenous (Lapointe 1992, 256).

Table 13 Interpretations of coefficient of variation values

CV ≤ 15	The consensus in the sample is strong
15 < CV < 30	The consensus in the sample is of average strength
CV ≥ 30	The consensus in the sample is weak

4.4.2 Measures of association (comparison of two or more variables)

There are several measures of association, and their choice depends on the nature of the variables. Two measures will be addressed here: the chi-square test and the correlation coefficient.

The chi-square test applies where contingency tables (or 2 by 2 or n by n tables) are constructed. It indicates whether the frequency of cases in each cell differs statistically from the frequency that would be seen there if there was absolutely no relationship between the two variables (null hypothesis).

Like all statistical tests, the chi-square test accordingly consists in evaluating the probability that the results obtained are derived from a sampling error, that is, the probability that an association exists under the null hypothesis. The 5 % threshold ($p > 0.05$) is often used to indicate that this probability is high (Wilson 1988, 142). The presence of an association is plausible, and not due to a sampling error, if this observed probability is less than 5 %.

The correlation coefficient is used in a comparison of two continuous variables. It is a number revealing the strength of an association between these variables that can be any value between -1 and 1.

A correlation coefficient of 1 indicates a perfect correlation between two variables, meaning that when the first variable increases, the second simultaneously rises by an equal amount. For example, if a professional obtains an excellent score in an aptitude test, they will obtain an excellent result at the time of their personnel evaluation (McConnell 2003, 223).

A correlation coefficient of -1 also means a perfect correlation, but of the reverse kind. Thus, when the first variable increases, the second will decrease by an equivalent amount. Again using the example in the previous paragraph, a professional who obtains an excellent score in an aptitude test will obtain a poor result during the personnel evaluation.

A correlation coefficient in the area of 0 indicates a lack of relationship between two variables. Various correlation coefficients exist, depending on whether the connection between the variables being studied is linear in nature or follows another distribution. Statistical testing must be undertaken to confirm the hypothesis that the correlation coefficient differs significantly from 0 (Picard 2005).

4.5 SAMPLING PROCEDURES

It may not be possible to survey the entire population targeted by the study, for various reasons: costs, low response rate, lack of staff to conduct the survey, etc. In such a situation, a sample may represent a very worthwhile alternative, provided that it is representative of the population.

A sample is a small representative group extracted from a large group called a "population". Sampling is therefore the process through which the sample is determined (Rothwell and Kazanas 1998, 62). **Its supreme purpose is to achieve impartial representativeness of**

the population being studied, so that any estimate based on the sample is unbiased and relates to the population.

Generally speaking, conducting a training needs analysis involves a sampling procedure when, on the one hand, the population is too large for all its members to be consulted (mainly because of costs) or because participation by all members is not possible and, on the other hand, it is necessary to extrapolate the results obtained from a subgroup of the population to that entire population (Lapointe, 1992, 201). In brief, it is not always necessary to sample. In the case of a small population it is better to avoid selecting a sample if the aim is greater accuracy.

When sampling is implemented, determination of the sample size must have regard to certain factors set out below.

Population characteristics

The greater the homogeneity of the population, the smaller the sample can be to be representative, whereas a heterogeneous population, consisting of several groups between which there is great diversity, requires a larger sample.

Degree of accuracy sought

The degree of accuracy sought, or the degree of acceptable error, depends on the sample size. The comments of Pineault and Daveluy are illuminating in this regard:

"[Translation] The sampling error is the difference between the result obtained in a sample and the result that would be obtained in the target population. The variability of the results is expressed in the form of the root-mean-square error. The smaller the latter, the more accurate is the result. This error is used to calculate the confidence interval, a value that allows estimation of the *variability* of the results that would be obtained by repeating the study using the same samples" (Pineault and Daveluy 1986, 219).

No sample is perfectly representative of the population from which it is drawn. This principle is enshrined in the concept of root-mean-square error, which cannot be completely eradicated. However, it can be minimized and predicted, so that the analytical conclusions allow for its effect (Rothwell and Kazanas 1998, 65-66).

Nature of information sought

The more complex the information sought, the larger must be the sample. Information complexity relates to the range of possible responses. The broader that range, the greater the diversity there will be among respondents.

A practical rule is that steps must be taken to ensure that an adequate number of respondents appears in each cell of the tables created. If the data analysis method selected involves statistical testing, the number of individuals making up the sample must be at least 30.

Response rate

If the population whose training needs are analysed is considered to generate low response rates, it is better to decide on a larger sample. Steps must be taken to ensure an adequate number of responses in each category if the goal is to obtain statistically significant results. Once again, reference can be made to the practical rule cited above.

A low response rate may introduce major bias, especially if the profile of non-respondents is very different from that of respondents and is strongly associated with the phenomenon under study. For example, more motivated individuals respond more frequently, and since their training needs are less, it may be wrongly concluded that the training needs of the entire population are less than they actually are. If this non-response is not taken into account, the final sample may no longer be representative of the population.

A sampling procedure is a method through which the cases making up a sample are selected. Three simple probabilistic sampling methods are suggested here (Rothwell and Kazanas 1998, 66-67).

4.5.1 Simple random sampling

With this method, there is an equal chance that each individual in a population may be selected for the study.

It is appropriate to adopt this method where the population is numerous and relatively homogenous.

Table 14 Procedure for simple random sampling

1- Clearly define the type of population.
2- Assign a number to each individual in the population.
3- Select the sample, choosing any method that gives all numbers an equal chance of being drawn.

4.5.2 Stratified sampling

This sampling method allows representation of the subgroups of a heterogenous population. This somewhat more complex sampling method ensures that each subgroup of the population is represented to some extent in the sample.

The sample can be divided proportionately by reference to the size of the subgroups; accordingly, as in simple random sampling, all individuals have an equal chance of being selected. The decision to adopt stratified sampling is warranted to the extent that there is a high degree of homogeneity within the subgroups and a high degree of heterogeneity among the subgroups. This way, the same sample size leads to greater accuracy than simple random sampling.

In the case of training needs analysis in the workplace, these subgroups can be made up of professionals who work at different geographical locations, have different work experiences,

occupy different hierarchical levels, have different initial training, perform different types of jobs, or were hired by different branches of the organization, etc.

Table 15 Procedure for stratified sampling proportional to the size of the subgroups in the population

1- Clearly define the type of population.
2- Determine the subgroups to be represented in the sample.
3- Assign a number to each individual in each subgroup.
4- Determine the percentage representing each subgroup in the population.
5- Select a sample, choosing any method that gives all numbers within a subgroup an equal chance of being drawn. Therefore, it is necessary to ensure that each subgroup is represented proportionally to its representation in the population.

4.5.3 Systematic sampling

This method, which is relatively easy to apply, is an alternative to stratified sampling. Its essential point is to improve the representativeness of the sample by ensuring, for example, that the list of professionals be organized by subgroup. Thus, the final sample will include professionals from each subgroup.

Table 16 Procedure for systematic sampling

1- Determine a sample size n , of professionals, considered necessary to obtain estimates having a certain degree of accuracy.
2- Make a list of all professionals in population N , and organize them into subgroups (for example, by work location, branch of the organization to which they belong, etc.).
3- Determine the sampling interval $k = N/n$ and select one name at random between 1 and k .
For example, we want a sample of size $n = 20$ of a population of 200 individuals. We will then choose at random a number/between 1 and 10 ($200/20$).
4- Select the l^{th} name on the list and then every k name. The selected names will be part of the sample.
In the same example with $l = 3 \rightarrow 3, 13, 23, 33, 43, \text{etc.}$, will be part of the sample.

4.6 INDICATORS

When the decision is to use an indicator-based approach, the purpose is not to create new information, but to more effectively analyse information that already exists. Therefore, indicators are used to describe existing elements that have been associated with a certain training needs concept, interpret them, deduce therefrom the level of needs, and thereafter rank those needs in order of priority (Pineault and Daveluy 1986, 99). The indicators must be "empirical equivalents" of the existence of a need (Lapointe 1992, 202).

It is therefore important to select indicators that will reflect the actual and desired situations as accurately as possible. Sometimes, an indicator only partly represents a variable of the survey, because of the fact that certain concepts can be interpreted in a number of ways and it is wished to take these into account. For a variable of this kind, it is preferable to select multiple indicators and therefore obtain a composite measure of the variable (Babbie 1995, 145).

The table below provides examples of indicators of desired and actual situations, all from *La conduite d'une étude de besoins en éducation et en information : une approche systémique* by Jacques-Jean Lapointe (1992).

Table 17 Sample indicators of desired and actual situations

Sample indicator of desired situation	Sample indicator of actual situation
desired level of proficiency [...] in a set of purposes, goals, objectives or skills	level of proficiency [...] in a set of purposes, goals, objectives or skills
degree of importance of a set of purposes, goals, objectives or skills	performance frequency of a task
value or relevance of a task in terms of a function exercised or the conditions in which the task in question is performed	level of difficulty of a set of purposes, goals, objectives or skills
motivation or interest of a respondent in improving [...] through training in a set of purposes, goals, objectives or skills	attitude to various aspects of a set of purposes, goals, objectives or skills
"desirability" of a set of purposes, goals, objectives or skills	

4.7 SCALES

Scales are used to measure attitudes. Each unit of the scale represents an attitude category, each of which provides information on the direction and intensity of the attitude. The direction of the respondent's attitude can be expressed by the respondent's "agreement" or "disagreement" with the statement, while intensity is expressed in the measure of the degree of "agreement" or "disagreement".

Scales must have two essential attributes: taken together, they must be exhaustive (all responses must fall within them), and the categories within a scale must be mutually exclusive (a single response cannot be classified under two categories) (Jenicek 1976, 92).

There are three main types of scales. These are described and illustrated in the following table, which is based on *La conduite d'une étude de besoins en éducation et en information : une approche systémique* by Jacques-Jean Lapointe (1992, 204-205).

Table 18 Description of three principal types of scales

Scale	Characteristics	Example
Nominal	Each unit of the scale is of the same importance. Respondents are placed on this scale objectively	What is your job title? - Community health research officer - Physician - Nurse - Community health planning officer - Further examples: regions, countries, gender, etc.
Ordinal	The units in the scale are in a certain order (for example lower or higher)	What is the highest level of diploma you earned? – Bachelor's – Master's – Doctor's
Interval	With this scale, it is possible not only to classify and rank the units, but also to evaluate the gap between two units. This type of skill is based on the concept that there is a "standard unit" appropriate to the property being measured. There is no absolute zero on a scale of this kind.	What is your weight? – between 41 and 50 kilos – between 51 and 60 kilos – between 61 and 70 kilos – between 71 and 80 kilos – between 81 and 90 kilos

Ordinal scales are the ones most commonly used in training needs analyses. Interval scales are used only seldom in the field of training, because of the high level of requirements associated with them, given that human and psychological phenomena do not have the same clear definition and stability as physical measures. As far as possible, it is preferable to select a way to operationalize the variables that promotes appropriate use of scales. If a nominal scale is used where a more accurate scale can be employed, the researchers are depriving themselves of information that could be invaluable (Manheim and Rich 1995, 63).

4.8 PRIORITY NEEDS INDICES

We use indices to assign an order of priority to the measured needs, by comparing them among themselves. There are several ways to calculate a training needs priority index. Some are more complex, being based on calculations quantifying the value of the desired situation, the actual situation and the gap between them (see the Priority Need Index of Lane, Crofton and Hall, cited by Lapointe 1992, 267).

The index presented here is easily calculated and adjusted to various scales. This is an example applied to a three-level ordinal scale: no needs, some needs and great needs. It has been designed to represent the gaps distinguishing between "some needs" and "great needs". Simultaneously, the needs index allows establishment of an order of priority among the properties measured, based on the level of training they require for respondents. In short, the index has been constructed as indicated in the following table.

Table 19 Steps in constructing a priority needs index

1- A weight is assigned to each level of needs: "no needs" = 0; "some needs" = 1; "great needs" = 2.
2- A value is obtained for each component of the skill (or task) by multiplying the number of respondents by the weight assigned with respect to the needs.
3- By totalling the value assigned to each component of a skill (or task), a score is obtained for each skill (or task).
4- The score for the skill (or task), divided by the number of components of the skill (or task), and then by the number of respondents, yields the index.

Here is a sample calculation.

Table 20 Sample priority needs index calculation

Skill	Components	Level of needs (n)								
		None	Some	Great	None = 0	Some = 1	Great = 2	Value	Score	Index
Detecting existence of an outbreak	C1	13	88	43	0	88	86	174		
	C2	12	78	54	0	78	108	186		
	C3	12	81	51	0	81	102	183	543	$\frac{543}{3} = 1.26$

Analysis of training needs survey results regarding investigation of outbreaks (Bernard and Farley 2006, 9).

4.9 RECOMMENDED SOURCES

The following sources can be consulted for further information on methodologies and statistical calculations suitable for use in a training needs analysis:

BERNARD, Paul-Marie and Claude LAPOINTE, *Épidémiologie et biostatistique : notions de base*, Québec, Department of social and preventive medicine, Faculty of medicine, Université Laval, 1979.

PINEAULT, Raynald and Carole DAVELUY, *La Planification de la santé : concepts, méthodes, stratégies*, Montréal, Éditions nouvelles, 1995.

SCHERRER, Bruno, *Biostatistique*, Chicoutimi, Gaëtan Morin publisher, 1984.

5 THE TRAINING NEEDS ANALYSIS REPORT

The training needs analysis report should contain the following elements:

- goal of training needs analysis;
- description of population(s) targeted by training needs analysis;
- detailed description of methodology used, including:
 - sampling method;
 - data collection method;
 - specifications concerning use of specific tools and protocols;
 - data analysis method.
- final discussion setting out:
 - principal findings concerning profile of respondents;
 - principal findings concerning contents on which training should be given;
 - urgency of meeting needs identified, based on their priority (if applicable).
- recommendations arising from factors emerging from the discussion;
- limitations of training needs analysis (often resulting from methodology used, respondents' profile, context in which survey was conducted, etc.).

The training needs analysis report is not confined to a specific format. However, regardless of its framework, it should essentially present the elements listed above.

Once the report has been written and submitted to the person who commissioned it, it is important to schedule a meeting with the latter to respond to any questions that might be raised on reading the report.

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