

## **Part I: Professional Needs Assessment for Renewal /Training**

- 1. Prologue: The Reformation Design of Training.**
- 2. Professional Needs Assessment of Job.**
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- 4. Unifying Professional Needs and Establishing the Behavioral Digital Bases of Training Design.**

# Chapter I

## Prologue: The Reformation Design of Training

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### Introduction

Training is a direct approach to education. It concerns itself with the behavioral development of individuals by bringing their inadequate professional status to its optimistic level of performance.

Training also is a behavioral operational act, necessitating simultaneously the application of both theoretical and practical knowledge. It differs for example from school education where cognitive - armchair epistemology is dominant.

Training moreover concentrates on reality, or on the felt needs of employees, organization and/or job in their actual work settings, whether these needs belong to the present or immediate future.

Current literature on training, though contains tremendous information concerning: goals, skills, steps / stages, methods, media, technologies, support services, merits and problems, and is considered very useful for understanding and guiding training acts; it is seen generally however, un-operational. It stops short from providing training specialists with objective and rational mechanisms by which they could scientifically plan, construct and implement a professional development program.

It is noticed in this context, that while some sources <sup>(1)</sup> appear to be somewhat operational, e.g. Abella (1989), Freedman and Yarbrough (1985), and Rogoff (1987), many others are still exclusively descriptive, incoherent and open-ended treatments of training. Hence, they are incompatible with the technical, behavioral and strictly time-bound acts of training.

What training actually needs is an accountable and integrated literature, specific and concise in language, instrumental in methodology, and measurable in content and products. In short: a down-to-earth operational literature.

The rational method to achieve these qualities in training is possible through controlling the quality of its attributes: programs and execution. A preliminary tool by which one could exert his/her professionalism in this regard is embedded in the art and science of designing.

Designing is probably the first act that God used in creating the universe. Training, without designing, will not lead to professional development of people in the proper sense. With poor designing, there could be many losses in manpower, time, efforts, logistics and outcomes.

Thus, considering the ultimate importance of design for training, this book presents a systemic behavioral and digital approach. It is hoped that the newly developed methodology is capable of reforming the designing processes of training, helping specialists 'to' pull together the various pieces of training data, factors and activities; and to obtain consequently professional development programs that are valid, reliable, and effective in content and product.

## The History of Training - A Short Summary

Training, like teaching, is a prehistoric <sup>(2)</sup> and still persisting human activity. It occupied a good part of daily activities of early settlements of human kind; probably with the formation of hunting communities during the **Old Stone Age**, several million years ago.

One could also infer from history that primitive man of the Stone Age, initiated the first type of training, that is the **Informal method**, to help his offspring's and fellow men develop the basic life skills, such as: making stone weapons, animal skin dresses, wood utensils and dwellings.

With the advent of The Modern Stone Age, about 7000-3000 B.C, new human developments had emerged within the realm of training, such as: the written language, agricultural settlements, battery industry and domestication of animals. Despite of all these developments, training is believed to have remained, during this long period of human history, an informal labor.

The **second principal shift** in the status of training came about toward the beginning of recorded history **around 3000 B.C.** During this era, the popularly organized method by means of **apprenticeship** was widely practiced in Mesopotamia. The use of this method, which is still effective for the conduct of training until today, was documented in Babylonia at the year 2100 B.C.<sup>(3)</sup>,

Apprenticeship, in spite of the profound changes within human life which took place throughout the last four thousand years, is yet prevailing to a large degree. Ancient, medieval and recent societies up to eighteenth century, used apprenticeship as a basic popular method for developing almost all daily life skills, from farming, commerce, hand crafts and industry, sports, rearing / education of the young, to the inculcation of culture.

**During the eighteenth century** however, training was transformed into a new **third approach** that is **the formal method**. From that period on, training became an administrative, certificated business ... a formal schooling, and a relatively curricular pursuit.

In the United States for example, Moravian Brothers established in 1745 a training centre in Bethlehem Pa. The nineteenth century moreover was

characterized by the foundation of factory training schools. Ho and Associates, and Westinghouse schools<sup>(4)</sup> are just two examples.

Throughout the **first half of the twentieth century**, training had witnessed further developments, covering many of its endeavors like setting up of **professional affiliations** (e.g. ASTD, NSP, ASAP) and the extensive use of **new methods** (e.g. laboratory training, case studies, programmed training and demonstration<sup>(5)</sup>). Training became a more planned, technical and standardized activity; thus, achieving its **fourth major development: the academic method or the neo-technical formal method.**

In addition, the **second half of twentieth century**, with its accelerating technological advances, knowledge explosion, and the fever of narrow specialization, has contributed immensely to **the formation of training as a specialized field of study and practice with much technology at its disposal.**

This new status paved the way for training to crystallize its own terminology; and to have also its own epistemology, specialists, adult learners, professional materials, resources, facilities, equipment, machinery, technology, media and methods. **Training at last has converted to a contemporary significant science: a compelling field of applied sciences. As a result, training has achieved its fifth working approach... that is the scientific method.**

## Current Problems of Training

Training as a newly formulated science and profession, faces many problems in both developed and developing countries. These problems seem profound and comprehensive, covering almost every aspect of this human endeavor.

In the United States, training in the spheres of education, business and public services is severely criticized by a number of specialists. One writer<sup>(6)</sup> has confirmed that the history of educational training / programs during the last one hundred and twenty five years appears to be dim and unencouraging. The professional development on the whole has been taken for granted; and is lacking the appropriate systematic methodology.

Hence, the generated results are characterized as mediocre and unconvincing.

Others <sup>(7)</sup> assured the above, adding that trainers seem incapable of living up to the responsibilities expected from them. Training programs, too, proved generally to be ineffective due to the absence of the theoretical and organizational frameworks which take into account the principles, theories and research findings of andragogy. Moreover, the hesitance to apply ongoing social, scientific, and technological developments has added to the problems of the training field.

A final critical remark concerning the weaknesses of training in the U.S., is noted by the recent professional book of the ASTD <sup>(8)</sup>. It cites that training is suffering from many deficiencies, particularly in the realm of human services. Training personnel, it indicates, are seemingly in need of professional development as is the case of their traditional customers: the trainees. Very few of them (e.g. only 2% on the undergraduate level and 6.1 % on the graduate level) are found to be prepared professionally for training. It goes on to detail that 85% of all working personnel in the training field are recruited from different occupational and academic backgrounds other than training per se.

The problems of training in developing countries are more profound and acute than in their developed counterparts in the west. The reasons, which are somewhat understandable, go back to the lack of qualified human, educational, material, and administrative resources. Kerrigan and Luke (1987) <sup>(9)</sup>, and Shaffer (1974) <sup>(10)</sup> offer a meaningful treatment in this regard.

Further, Pan Arab States of the Middle East have experienced, like many other developing countries, several problems in training. **The Author of this book**, as a full-time trainer during 1988/1989 at the Institute of Public Administration (Riyadh-Saudi Arabia), administered a questionnaire with fifty trainees\* who participated in three in-service programs. The returns of training data were grouped within six categories as follow (\* These trainees belong to: Bahrain, Saudi Arabia, Yemen, Jordan, Sudan, Tunisia and Morocco):

### **Administrative Problems:**

1. **The inefficient organizational structure of training departments** within governmental agencies or ministries. These internal branches of training

are usually placed under direct supervision and rules of their sponsored, institutions. They don't have budgets of their own, nor have clear-cut training policies, independent decision-making or operating headquarters. Further, they are expected to follow literally the administrative instructions and wishes of the supervisors or top officers. Consequently, the training practices of these departments appear to be very marginal, and limited to paper work.

**2. The absence of coordination among various administrations** concerning training within the same ministry or agency. Each administration sees itself as the sole source of power and decision making; thus, it is the only party who should govern the training department. This administrative selfishness adds to the already existing problem of psychological gap which shatters the bonds of mutual confidence and trust in daily contacts/relations among different officials.

**3. The absence of objectivity when nominating employees for off campus training.** This process is accomplished subjectively by decision-makers to reward their personal beneficiaries or to appease acquaintances and followers; or in other cases, for punishing opponents by merely distancing them outside the organization for a while by means of short leaves or holidays.

**4. The lacking ability to plan, conduct, evaluate and follow up the activities of training.** Most departments, who are designated to pursue this endeavor, are not professionally qualified to accomplish training responsibilities.

**5. The emphasis on the quantitative rather than qualitative aspects of training.** There is much concern with the number of available training institutions or departments, trainers, trainees/graduates, resources and so forth, without a parallel attention to the qualities of these factors mastery skills accruing from training programs.

### ***Programming Problems:***

Training programs are found to suffer from the following problems:

**1. Programs are not scientifically designed.** The main reason behind this shortcoming is the lack of specialized personnel who are recruited for the job.

**2. The weakness or the absence of needs assessment studies of training.** Consequently, programs are established by either armchair designing, or by being based on imaginative training skills; thus proving to be invalid for the actual needs of trainees.

**3. The alienation of some programs, due to their literal translation from originals abroad.** This approach leads usually to invalid programs for the behavioral, social, psychological and administrative qualities of trainees and local environments.

**4. The obsolete content of some programs.** Programs are found in some cases to be outdated in professional knowledge and skills, or in the equipment, machinery, materials and methods by which they operate.

**5. The lack of validity and effectiveness evaluations.** Program evaluation is either not existent or unscientifically conducted by unqualified personnel.

**6. The overlapping of some programs' contents.** This problem may result in some instructional confusions, relative similarities in content covered, training techniques used, and the loss of viable training time.

### ***Implementation Problems:***

Most problems encountered in this area, are:

**1. Difficulties experienced in communicating and understanding training messages,** especially in settings where personnel are of different nationalities. Translators in this respect are found to be ineffective.

**2. The lack of practical opportunities offered to trainees** by which they could exercise and master the mandated skills.

**3. The insufficient use of adult learning theories and techniques while conducting training.**

**4. The exclusion of contemporary media and technologies.**

**5. The dependence to a large degree on lecturing,** mainly due to the inability of trainers to use other techniques.

**6. The absence of evaluative efforts** that are designed to follow up trainees after graduation from training programs, for the purpose of correcting/improving the training process.

### ***Problems of Trainers and Other Human Services:***

Training personnel are found to suffer from the following:

**1. The low professional profile of trainers.** Trainers are either totally strangers to the field, or unqualified to undertake the training responsibilities expected from them.

**2. The alienated language and attitudes of alienated trainers.** Trainers are found to be unprepared psychologically to convey training messages to trainees from different backgrounds, in addition to experiencing some degree of value conflict while communicating with them.

**3. The qualitatively and quantitatively limited human services available to training,** particularly those of experts, specialized trainers, technicians, maintenance and secretarial personnel.

**4. The lack of specialists in program designing.** Individuals who claim to be designers of training are characterized by either unsound documentations for the job, or false personal perception of their actual abilities to accomplish the designing tasks. Hence, the observed products of such unqualified personnel are simply inadequate programs for the needed training.

**5. The negative attitudes of training personnel** which reflect upon their subjective interaction with trainees and the negligence in responding to the achievement demands of training skills.

**6. The lacking ability of training personnel to use modern media and technology,** practical instructional methods, and the principles of andragogy.

### ***Problems of Trainees:***

Trainees, too, contribute to the worsening problems of training by:

**1. Indifferent attitudes towards the role of training in developing their professional skills,** leading thus to the lack of concentration on learning and achievement.

**2. Limiting the concept of training to money and promotion benefits,** or to recreational needs, giving consequently little attention to the actual improvement of their professional skills.

### ***Problems of Material Services:***

Most problems concerning the material services are:

- 1. The lack of training resources** such as sufficient budgets, textbooks, guide and work books, appropriate media and technology, forcing implementation to progress without adequate knowledge or necessary curricular materials.
- 2. The lack of financial support** which leaves training without enough tools, machinery, equipment, materials, technology, and facilities which are all essential for implementation.
- 3. The slow pace of maintenance and repair work.** Consequently, facilities, equipment and machinery are usually not available when needed.

## **The Reformation Design of Training:**

### **A Brief Illustration**

The behavioral digital approach which forms the crux of the proposed design of training in this Book is a technical disciplined mechanism by which specialists could construct training acts from needs assessment to evaluation of productivity.

The designing approach is a scientific methodology built on three principles: the systematization, behaviorism and quantification of training.

**1. Systematic training:** The designing approach treats training as a system. This means that all program components starting from planning to implementation and evaluation, are mutually interdependent, interactive, and logically derived one from another. They are moreover, consistent in nature, roles and outcomes. **Figures I and II illustrate this principle.**

**2. Behavioral training:** This means that all acts and outcomes of a training program are observable and measurable in nature.

**3. Quantitative training:** This means that all program components, data, acts, and behaviors could be quantified digitally or numerically... hence; it could be stored in and treated by the computer.

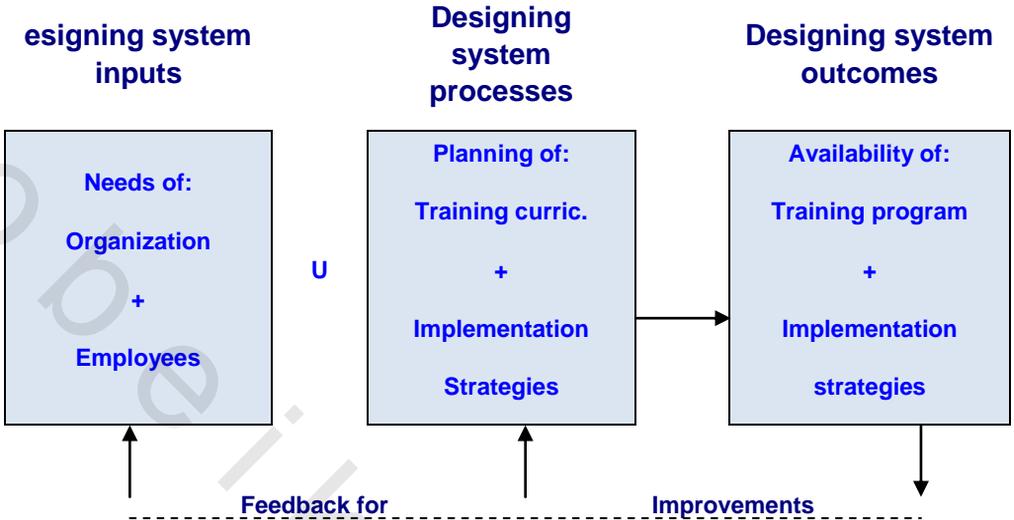


Figure I: The design system of training with its inputs, processes, outputs and corrective feedbacks.

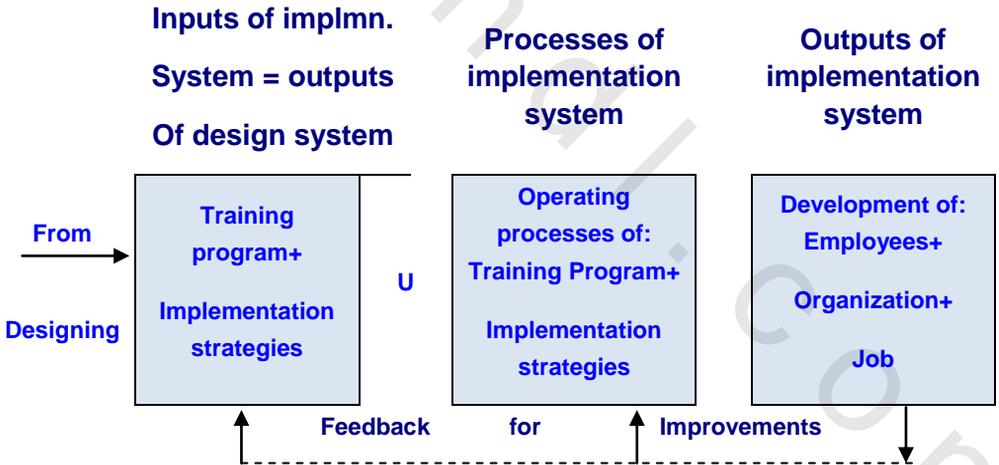


Figure II: The implementation system of training.

While this book is concerned with the first phase of training system: the designing system, it provides nonetheless, a blue print training map for the second one, the implementation system.

## Foundations of the Reformation Design of Training

The behavioral digital approach of the reformation design of training is based on the implications of several sciences. These are:

**1. Cybernetic Psychology:** Since training in this book, is viewed as a behavioral system, its factors and processes should be logically and harmoniously channeled to achieve specific ends. The quality of these outputs will be judged then by pre-established criteria; determining directly the faulty aspects of the training system, whether they belong to factors, processes, or products. The next step is refocusing and correcting the system by employing defective indicators.

While the general methodology of current designing approach has benefited widely from above cybernetic principles, several related training concepts are utilized, such as: simulators, simulation exercises/games, micro-training, the system method of training, and computer-internet assisted training.

**2. Andragogy and Adult Psychology:** These sciences make it possible to observe the concepts, principles, instructional techniques, communication styles, personal/behavioral characteristics, as well as, psychological and physical settings which are all considered crucial to adult motivation, learning and interaction.

**3. Behavioral Psychology:** The principles of this science helps in the quantification of program's components: e.g. goals/objectives, knowledge, learning/evaluating activities, human and material services, products, and validity assessments.

**4. Humanistic Psychology:** The current training design utilizes the main principle of this science, that is the "respect for man." Training, consequently, takes the responsibility of responding to individual different needs: physical, personal, social, economical, psychological and

professional-from feeding his stomach to self-fulfillment. The effects of this framework may be observed throughout the chapters of this book.

**5. The sciences of curriculum, instruction, administration, guidance, supervision and evaluation.** The implications of these sciences appear concretely in chapters 5-9.

**6. The Available Literature of Training<sup>(11)</sup>:** This framework endows the present designing approach, its specialized terminology, epistemology, types of methods, media, technology, human and material services which are generally utilized in this book.

## The Methodology of Developing the Reformation Design of Training

The behavioral digital approach which constitutes the substance of the reformation design of training is founded by the use of two main research procedures: the descriptive and action-developmental methods. The two methods are interweavingly employed throughout the following steps:

**1. Analytic study of current training sources** which are available to the author as a professional trainer during the year 1988/1989. The study provided the author with two major outputs:

**The first: The professional terminology and knowledge available in the training field.**

**The second: The observed gaps or weaknesses in the training literature and practice.**

It is noted that training sources suffer from an overly-theoretical, not-operational tone that forces training to rely on invalid/in-effective programs and implementation strategies; and consequently to be satisfied with mediocre outcomes (refer to the paragraph: "current problems of training" in this chapter).

**2. Administration of a questionnaire** to a sample of fifty in-service trainees (as indicated earlier) concerning the current status of training. The results were summarized in the previous paragraph.

**3. The development of eight designing forms**, to be used in teaching a main unit called: "designing training programs"; which is required for a course by the title "Training specialists."

The application's results were highly encouraging. Several forms, however, had to undergo some modifications/improvements. Furthermore, the introduction of two additional forms appeared to be necessary. Hence, the total of designed forms reached 10.

**4. Application of the ten forms** with ten participants in another training program under a title: "Managers of training administrations". The trainees belonged, this time, to seven Arab states, working as directors or managers of training departments within ministries / agencies of the following: a university, a tele-communications company, the ministry of the interior, the National Guard, the Red Crescent, a post office, the civil aviation and a directorate of training institutes.

The feedback which resulted from the application of the ten forms was once again very encouraging. However, further studying of and contemplation at the nature, roles, contents, factors, and processes of training during the year 1990, have led to profound details and refinements of the designing forms, and the training behavioral digital approach which is based upon them. The outcomes of this stage which embody twenty-seven forms coupled with a concrete training methodology are presented in the chapters of this book.

## What Comes Next?

This chapter presents preliminary facts concerning in-service training. These include basic concepts, major historical developments and problems, condensed illustrations of both the proposed behavioral digital approach to designing of training and the methodology by which it was developed.

Thus, the purpose of the chapter is to serve as a prelude to the understanding of the concepts and working mechanism of the new designing approach within the next eight chapters.

Chapter II starts with the first step of designing, that is, needs assessment for training. The step involves the study of a basic factor: the

job. The third chapter completes the second task of needs assessment, that is of organization and employees.

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## Chapter II

### Professional Needs Assessment of a Job

Introduction

The Concepts of Professional Description and Analysis

The Concept of a Job

Professional Needs Assessment of a Job for Renewal

What Comes Next?

#### Introduction

Professional needs assessment is a surveying/examination study by which the training designer either evaluates an on-going program against specified validity/ productivity standards to determine its future comparability to emergent professional needs or priorities; or establishes the necessities of introducing a totally new one. This ultra basic undertaking presented in the chapter, involves two important operations: description and analysis.

#### The Concepts of Professional Description and Analysis

"Description", means in this book, numerating the professional behaviors of tasks and acts which embody the performing configuration of a service or product. Numeration of behaviors is done by listing the working steps according to their actual sequence within a job.

Further, description neither concerns itself with spelling out the criteria and environmental conditions of a job, nor with enacting personal and professional characteristics of its personnel. These psycho- practical

considerations belong to the sphere of a subsequent effort, that is, analysis<sup>(1)</sup>.

In brief, description is committed primarily to the specification of the behavioral content of a job as it occurs sequentially in actual and professional settings.

**Analysis, on the other hand, carries out the burden of several tasks, which are:**

**1. Screening the behavioral content of a job** which is basically accomplished by description. The result of this reviewing mission is acquiring a finalized performing list that is free from any behavioral excesses, and is compensated regarding any probable behavioral deficits. The end results of this step are audited clusters of professional acts which are qualified all together to form the practical concept of the required job.

**2. Establishing human requirements of a job.** This handles all categories of professional personnel necessary for implementation, their personal and working characteristics, interaction and learning styles and behavioral consequences.

**3. Establishing the administrative and material characteristics of a job environment.** These cover the organizational and operational laws/rules, administrative instructions, communication patterns and techniques, materials, tools, machinery, facilities and equipment.

**4. Establishing the standard interaction patterns among human services** and administrative laws and instructions, material services, human services, administrative laws.

## The Concept of a Job

The concept of a job indulges all professional behaviors which specialize in performing a service or yielding a product. The nature and outcomes of the job could of course, be of any thing that deems useful to an individual or Society as a whole.

To understand the job and to be able to deal effectively with its content throughout the design and training, a taxonomy for the classification of professional behaviors is presented. The taxonomy proposes four different mutually inclusive levels: the job (the macro professional behavioral system

or framework), the tasks (the sub-jobs within the mother job or the major behavioral undertakings or clusters within the macro job system); the acts (the miniature or micro-behavioral responsibilities within tasks) and act's behaviors (the finite behavioral steps necessary to perform the act itself). Further exploration of a job concept appears below.

**First: The job is a group of behaviors** which are specialized in producing a general function, service or product. The job according to its nature and behavioral demands from employees, or in other words, according to its behavioral size, could be of three types: compound, normal, and confined or simple. Astronautics is an example of a compound job. Car driving is seen as a normal job, while laundry is a limited human undertaking.

**Second: The task is a group of behaviors** specialized in producing a major formative function, service or product within the general job.

Complicated or highly demanding jobs like astronautics consists of several tasks, normal jobs as car driving on the other hand, is usually made up of a moderate number of tasks, ranging probably from 3-5. Finally, simple jobs are also simple in behavioral composition. Laundry for example is composed of two tasks at the most.

If car driving is taken as an illustration, the major tasks could be: Driving on road, observance of traffic safety and laws, and car maintenance.

**Third: The act represents a main behavior or a major step** within a task. A group of acts with a common cause or purpose will lead under normal operating conditions to a behavioral or material end specified by the concerned task. While "driving on road" is an example of a behavioral end, "sewing a dress" is considered a material output.

To further explain the concept of professional acts, the task of "car maintenance" is sliced into the behavioral segments or acts below:

1. Comprehending general acts of car maintenance.
2. Appreciating the role of maintenance in safety driving.
3. Reserving battery water to required level.
4. Reserving radiator water to required level.

5. Maintaining engine oil to required level.
6. Reserving wheel oil to required level.
7. Controlling engine temperature to required level.
8. Keeping car lights properly working.
9. Keeping car brakes effectively working.
10. Changing car flat tires.
11. Keeping car locks properly working.
12. Maintaining good cleanliness of car.
13. Changing engine oil every (2000) kms.
14. Repairing cause of engine high temperature.
15. Repairing car lights when necessary.

**Fourth: The behaviors that represent the finite behavioral units** and which form cluster of the different acts within a task. Hence, they are called formative behaviors, or objectives throughout the text (refer to chapter V and forms 13, 14, 15 & 16).

If act no. 3 in form (3) is taken as an example, its formative behaviors could appear as follows:

1. Lifting and securing the engine cover.
2. Bringing (or buying) the appropriate fluid from car trunk.
3. Dusting the battery.
4. Opening battery packets.
5. Filling packets with water according to their individual needs.
6. Checking the adequacy of water in battery packets.
7. Closing battery packets.
8. Storing battery water in an appropriate place within the car.

The constitutional and logical relationships of above job components, could be depicted in Figure (1)

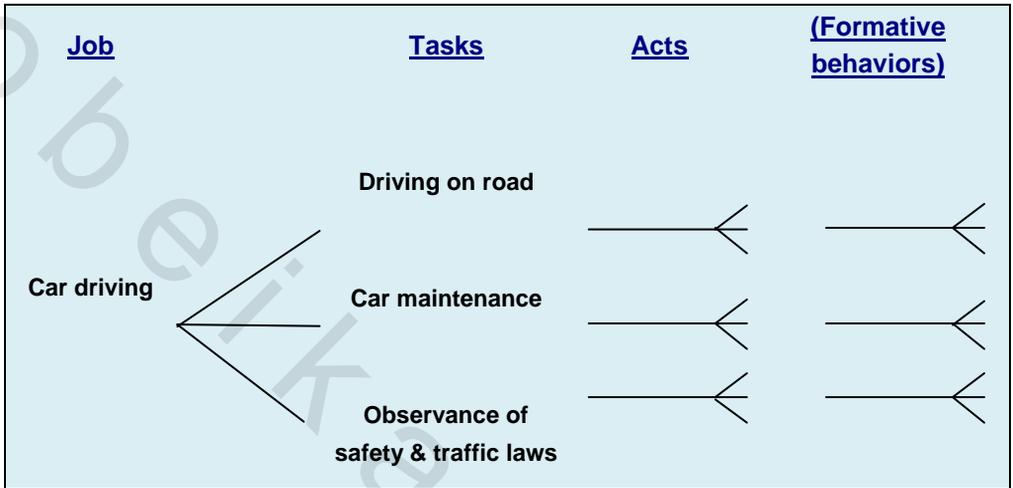


Figure (1): A taxonomy for the classification of a professional behavior.

## Professional Needs Assessment of a Job for Renewal

Four main steps are offered for job needs assessment by means of description and analyses. These are:

### A- Numerating and Sorting Job Acts into Basic & Minor:

Numerating and sorting are processes of a job description aiming primarily at:

1. Providing an operational ground for later task analysis.
2. Specifying objectives of training (as in chapter IV).
3. Specifying topics or content of training.
4. Specifying the sequence of training.
5. Specifying the appropriate training strategies.

For numerating and sorting to achieve the aforementioned goals, the designer should maintain <sup>(2)</sup> .:

1. **A detailed and complete description.**
2. **A clear and down to the point description.**
3. **Internally compatible description, free from any contradictory behaviors in both nature and sequence.**
4. **Specialized description of job tasks and acts.**

This calls for the exclusion of any behavior which does not belong directly to the described task or act.

While the designer may search different sources (summarized in Form (I) for numerating job behaviors, he could adopt for sorting purposes, the following procedures:

***First: Holding formal discussions to decide upon two matters (refer to Form 1):***

1. The necessity of each act for the job.
2. The status of each necessary act within a job: basic or minor?

***Second: Consulting a team of job experts.*** Using the Delphi method <sup>(3)</sup> in this regard will enable the designer to reach an agreement concerning the two matters stated above.

***Third: Selecting a group of competent employees, job supervisors and other professional personnel,*** then asking each of them to sort the numerated job acts into necessary and unnecessary. The necessary ones should then be sorted into basic and minor acts.

To ease the above tasks of numerating and sorting job acts, Form (1) below is presented. This form is a primary tool for the design of training, particularly when the following instances are considered:

1. One purpose of training is to update the behavioral content of a job for better performance, service, or product.
2. The job is newly enacted within a local environment.

3. The behavioral content of a job is not finalized, or it is subject to professional doubts.

Regardless of previous instances, the preliminary role of form (1) is to numerate and sort job acts as a fundamental step to analyzing and understanding a job, and as a prelude to the design of training in subsequent forms and chapters.

### **B- Specifying The Behavioral Nature of Basic and Minor Acts.**

Five categories are suggested for classifying basic and minor acts according to their behavioral nature. These are (refer to form 2) : knowledge, application, attitudes, problem solving, and evaluation / guidance.

The proposed five categories of professional behavior are based on two main sources:

**Firstly: The study of some specialized references**(5) as Bloom et al (1956), Derr (1973), Gagne (1977), Harrow, (1972), and Karathwohl et al (1974).

**Secondly: The observation of vocational/ professional acts within real settings.**

The basic function of form (2) is sorting job acts according to above five behavioral categories. This is of course an expert estimation by the designer. Despite the fact that it could be viewed as somewhat personal and undisciplined, it is still seen as very effective when dealing with such complex human behavior as in the case of training and skill development.

Professional expertise seems to be the practical and short-cut method to accomplish the judgmental responsibilities of current pursuit.

**For sorting basic and minor acts however, the guidelines below are offered:**

#### **Form (1): Numerating and sorting job acts into basic and minor.**

**The job:** .....

**Designer:** .....

**Task:** .....

**Administration:** .....

No.S	Job acts	Relevancy of acts (put ✓ or X)	Basic or Minor	Description
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	<p>The designer may write in this category any act believed to belong to the job. He could use for the purpose, sources such as<sup>(4)</sup>:</p> <ol style="list-style-type: none"> <li>1. Behavioral realities of the job.</li> <li>2. Job materials, equipment, machinery, and facilities.</li> <li>3. Job problems, difficulties... faced by employees.</li> <li>4. Job descriptions in other countries.</li> <li>5. Job training literature.</li> <li>6. Official records and documents of a job.</li> <li>7. Research studies, reports of a job.</li> <li>8. Diaries of employees.</li> <li>9. Work//guidebooks of a job.</li> <li>10. Job supervisory and maintenance sources.</li> <li>11. Behavioral lists of a job.</li> <li>12. Job experts, supervisors, administrators, training committees.</li> </ol>	<p>The designer with the help of experts, will determine here the relevancy of acts to a job by putting (✓) for relevant ones and (X) for irrelevant ones.</p>	<p>The designer with the help of experts will sort relevant acts into basic and minor ones.</p>	<p>The designer will summarize here any data that could benefit the description and analysis of a job, such as: totals of basic and minor acts; the logical or practical sequence of acts, or other notes which may help the process of designing.</p>

**Comments:**

1. More cognition aimed at facts +some affect + some motion  
 cognitive behavior or knowledge act.

2. More cognition aimed at problem solving + some affect + some motion

⇒ problem solving behavior or act.

3. More cognition aimed at evaluation and feedback + some affect + some motion ⇒ evaluation and guiding behavior or act.

4. Some cognition + more affect + some motion ⇒ affective behavior or attitudinal act.

5. Some cognition + some affect + more motion ⇒ psychomotor behavior or application/performance act.

**To use form (2), the designer simply writes down the professional acts, keeping throughout their logical and practical sequence within a job.**

The designer then classifies each act according to its prevailing behavioral nature: knowledge, application, attitude, problem solving, and evaluation guidance.

Afterwards, the designer summarizes in the lower section of form (2), the behavioral data in terms of percentages. The digital results of this step will show the overall behavioral nature of the task involved.

The behavioral and digital data which results by current form, plays a major role in the design of training; since it will enter in whole, form (11) in Chapter IV, and will be indirectly utilized in later forms (13), (16) and many subsequent others.

### **C- Assessing Importance Levels of Basic and Minor Acts:**

It is time now for the designer to assess the degree of importance each act deserves within a job. This is a very crucial step for the design and construction of training program (refer to Chapters 5, 6, 7, & 8); and for the evaluation of program validity and productivity in the final chapter of the book.

**Form (2): Specifying the behavioral nature of basic and minor job acts.**

**The job:** ..... **Designer:** .....

**Task:** ..... **Administration:** .....

No.s	Job acts	Behavioral natures of acts				
		Know- ledge	Appli- cation	Attit- udes	Probl- em solving	Evaluati- on/ guidance
1	Comprehending general acts of car maintenance.	v				
2	Appreciating the role of maintenance in safety driving			v		
3	Reserving battery water to required level.		v			
4	Reserving radiator water to required level.		v			
5	Maintaining engine oil to required level.		v			
6	Reserving wheel oil to required level.		v			
7	Controlling engine temperature to required level					v
8	Keeping the car lights working properly.					v
9	Keeping car brakes working effectively.					v
10	Changing flat car tire.				v	
11	Keeping car locks working properly.					v
12	Maintaining cleanliness of car.	v				
13	Changing engine oil every	v				

	(1000) kms.					
14	Repairing cause of high engine temperature.				√	
15	Repairing car lights when necessary.				√	
16	Repairing flat car tire.				√	
		<b>Totals</b>	<b>1</b>	<b>6</b>	<b>1</b>	<b>4</b>
<b>Classification Summary:</b>						
<b>Knowledge</b>		<b>: 6.25%</b>		<b>Attitudes</b>		<b>: 6.25%</b>
<b>Application</b>		<b>: 37.5%</b>		<b>Problem Solving</b>		<b>: 25%</b>
				<b>Evaluation/Guiding</b>		<b>: 25%</b>
<b>Comments:</b>						
<b>Signature &amp; date</b>						

For assessing the importance of professional acts within a job, the designer may consider the following procedures:

**1. Comparing each act with others within a job or a task**, adopting, thus, norm-referenced evaluation. The criteria which may guide the decision making process here, are:

- The time length needed to perform the act. The more time could mean more weight or importance for the act.
- The number of behaviors involved in performing the act.
- The implementation difficulty and the multiplicity of performing requirements (rules, tools, materials, facilities and environmental conditions).

- The occurrence of the act within a job. The more occurring act comparable to others, the more important it could be.

**2. Administering a questionnaire to a group of job experts,** employees, supervisors, evaluators and other competent personnel. Using the Delphi technique coupled with a questionnaire containing basic and minor acts, the designer will ask each member of the group to rate the importance of individual acts for performing the job as shown in form (3).

**3. Giving the degree of 4 (out of 4) as highly important; or the degree of 3 as Important, for each basic act.** The degrees of 2 and 1 as moderate and limited (low) importance for each minor act, whenever the designer lacks the experience or the environment to use the two procedures above.

The end results which are achieved here will suffice for the assessment undertaking required by the current designing stage of training. This undertaking could be operated by the use of form (3).

Form (3) plays a fundamental, analytical role in the design of training. It summarizes the estimated importance levels of acts, which in turn will be recorded later in forms (9) and (10) of chapter IV.

To use form (3), the designer first writes down the basic and minor acts according to their logical and practical order within the job. Secondly, he or she estimates professionally (probably with a help from experts) the degrees of importance of each act in producing the job, considering in this regard the criteria stated previously.

Nonetheless, the designer could, whenever necessary enlarge the form to hold more acts. He could moreover divide the form into two: the first for basic acts and the second for minor acts.

While estimating the importance of acts, the designer may resort, if necessary, to dropping minor acts which rate low (1) on the scale. This is due most likely, to both their marginality in implementing the job, and time limitation imposed on him/her.

**Form (3): Assessment of importance levels of basic and minor acts within a job.**

**The job:** .....

**Designer:** .....

**Task:** .....

**Administration:** .....

Types	No.S	Job acts Illustrative examples	Importance levels of acts						Notes
			Nil (0)	Low (1)	Mode rate (2)	High (3)	V. High (4)	Digital Degrees	
Daily / Basic acts or Characteristics	1	Comprehending general acts of car maintenance.				√		3	
	2	Appreciating the role of maintenance in safety driving.			√			2	
	3	Maintaining battery water to required level.					√	4	
	4	Maintaining radiator water to required level.					√	4	
	5	Maintaining engine oil to required level.					√	4	
	6	Maintaining wheel oil to required level.				√		3	<u>2+12</u> <u>+28</u> 12
	7	Controlling engine temperature to required level.					√	4	

	8	Keeping car lights working properly.			√		3	= 42
	9	Keeping car brakes working effectively.				√	4	12
	10	Changing flat car tire.				√	4	= 3.5
	11	Keeping car locks working properly.			√		3	
	12	Maintaining cleanliness of car.				√	4	
	Basic acts' subtotals			2	12	28	42	3.5
Sporadic / Minor acts	1	Changing engine oil every (1000) kms.		√				
	2	Repairing engine oil every (1000) kms.		√				
	3	Repairing car lights when necessary.		√				
	4	Repairing flat car tire.	√					The mean
	Minor acts' sub-totals			1	6			7

**Form (4): Analyzing job constituents & implementation requirements.**

**The job:** .....

**Designer:** .....

**Task:** .....

**Administration:** .....

**Location:** .....  
**Type of service/product:** .....  
**Personnel (numbers & qualification):** .....  
**Administrators / Supervisors:** .....  
.....

**Overall product:** .....  
.....

**Physical & psychological milieu:** .....

**Facilities:** .....  
.....

**Equipment:** .....  
.....

**Machinery / Tools:** .....  
.....

**Raw & fabricated materials:** .....  
.....  
.....

**Communication mechanisms:** .....  
.....

**Interaction styles:** .....  
.....

**Supervisory techniques:** .....

.....

Leadership styles: .....

.....

Criterion behaviors of a job (type & frequency within a job):

1. ....
2. ....
3. ....
4. ....
5. ....
6. ....
7. ....
8. ....
9. ....
10. ....

Additional notes: .....

..... Signature & date

### D- Analyzing Job Constituents and Implementation Requirements for Renewal and Training Needs

Job constituents and implementation requirements consist of professional behaviors, personnel, administrative , operation laws, materials, tools, machinery, facilities and equipments. Form (4) is offered as a summary analytic tool for the purpose of accomplishing the present step.

**In using form (4) the designer should take into consideration the following :**

**1. Recording the behavioral acts by different observers** on several occasions. This may lead to a valid job description.

**2. Dividing the form, if necessary, to several sub-forms.** Each is specialized to record specific factors such as: personnel and support services,

administrative routine, physical and psychological requirements, standard professional behaviors or acts, and so on.

### **3. Specifying all the details concerning the implementation factors**

as to their types or categories, characteristics, qualifications, qualities, roles, work conditions, strengths and weaknesses, and end products. The designer with all these specifications may find him/her self in need of introducing more sub-forms than what is recommended above. He should not hesitate to do so, since such action will benefit the scientific design of training.

The data of form (4) is utilized directly by form (7) in chapter III and form (11) in chapter IV, and other forms in subsequent chapters. This major designing role of form (4) stems from its comprehensive nature as descriptive and analytic mechanism which helps in understanding the job and in sorting its renewal / training needs.

### **What Comes Next?**

The following chapter concerns itself with needs assessment of a job for renewal and/or training. This important task of designing professional development programs is accomplished by means of description and analysis, and the use of four forms specially constructed for the chapter.

The cycle of professional needs assessment could not be complete without the description and analysis of organization and employees.. The next chapter will undertake this responsibility.

\*\*\*\*\*

## Chapter III

# Professional Needs Assessment of Organization and Employees

Introduction

The Concept of Organization

The Concept of an Employee

Professional Needs Assessment of Organization and Employees  
for Renewal / Training

What Comes Next?

### Introduction

Professional needs assessment of organization and employees, as in the case of a job, is accomplished by description and analysis of their status for the purpose of determining renewal / training needs.

Description is primarily a counting process of all human, psychological, behavioral, organizational and material components which formulate the concepts of organization or employee.

Analysis on the other hand, is the process of finding the interactive working relationships among described components, coupled with their roles, conditions and environments which together form the professional configuration of the organization or the employee. Analysis helps further in understanding the status of organization or employee, and the effective

ways of communicating / interacting with them for purposes of work and development.

## The Concept of Organization

The organization is a team of professional individuals who work harmoniously together in accordance with declared roles, standards and behavioral systems to achieve meaningful ends: services or products.

Moreover, organization is founded within a society by an individual or group of investors as a private enterprise; or by the public as the case of governmental or common cause agencies. Both types, of course, have specific categories of employees to accomplish specified services or products. This to say that organization owns characteristically both employees and the job.

Administratively, however, the organization could be defined as a pyramid of behavioral communicative system with a director or a general administrator / manager situated at its top, while downwards to the base, the second and third degrees managers, job supervisors, employees, technicians, secretarial and maintenance services are operating.

The administrative personnel at the middle of the pyramid serve besides carrying out the to-and-fro communications of head administrators and workers, as a mediating mechanism between the work force on one side, and the customers on the other.

***Considering above, the organization is a compound human and functional system which is composed mainly of the following:***

**1. The human component** which includes all professional personnel such as: administrators, experts; employees, technicians, secretarial and maintenance services; and last but not the least: the customers.

Customers are considered here an integral part of any organization as is the case of administrators and employees. Without customers, the existence of an organization will be automatically nullified.

**2. The administrative/organizational component** which embodies the laws, rules, instructions, principles and standards of communication, interaction and operation. These elements are very essential for steering

human and material services, while performing the required duties or products.

**3. The professional behavior component** which represents the total services/ products that the organization yields to the public or to its customers.

**4. The material component** which is basically made of: work facilities, equipments, machineries, tools, raw/prefabricated materials, media, technologies and financial budgets. The four components above are depicted in the behavioral system below (figure 1):

## The Concept of an Employee

The employee, in the broader sense, is the generator of all things, services, or products needed by a society, whether these are rearing offsprings, educating children, manufacturing specific products, or performing services necessary for daily life.

The employee therefore, should be treated as a priceless human asset that any society may have. His personal and professional integrities must be constantly preserved. Whenever he is degraded or his energies are wasted, the stability / maintenance of society's presence, as well as the realization of his future, may be compromised.

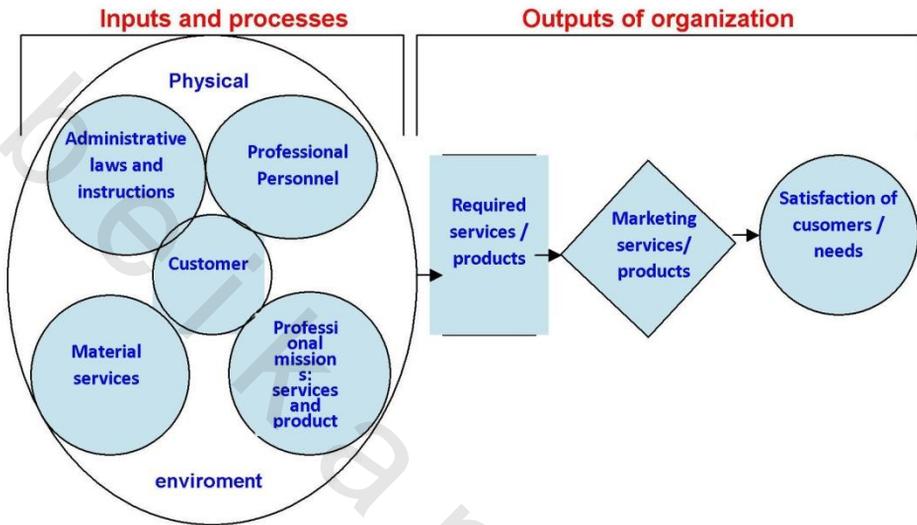
*As an artisan however, the employee is a human adult who is professionally qualified to work with others for the purpose of accomplishing a job (service or product) through which he could fulfill his Individual/family needs. The growth of an employee requires as the case of any human being, a systematic intakes of new constructive experiences.*

**The above definition of employee has several implications:**

**First: The employee is a human being.** This human being, due to his sophisticated personal, physical, social, cognitive, affective, and psychomotor qualities, represents the ultimate master of animal life.

Thus, an employee requires by nature positive, human and civic considerations throughout work and training. Maslow's hierarchy of human needs, Cronbach's classification of needs, Muray's psychogenic needs, and

Hamdan's pyramid of individual's needs as a dignified social being,, provide examples of what could be applied here.



**Figure I: The organization as a compound operational system.**

**Second: The employee is an adult.** This means that he/she, as a human being, is also a grown individual with different life experiences, values, communicative skills, personal aspirations and obligations..

This emphasizes the fact that the employee as an adult comes normally to training with a mature personality, possessing a stable behavioral framework. Hence, the principles, theories and principles of andragogy must be employed here.

**Third: The employee is a professionally qualified individual, pecialized to perform a specific work responsibility.**

This indicates that an employee is not an outright ignorant professional; rather he has already some qualifications which training could build upon, while some other skills or characteristics must be developed or updated by him. This will enable the designer to respect the employee's time, needs

and efforts, by giving him/her only what he/she needs; thus, leading to a valid professional program which is eagerly sought in training. Herzberg's motivation-hygiene theory may apply to the present employee's element.

**Fourth: The employee is a social creature** who is capable of coexisting and working with others for the betterment of him/her self and his/her fellow women/men. The principles of sociology, social psychology and human interaction / cooperation, should be applied whenever training is recommended for him/her.

**Fifth: The employee is dependent upon the returns of his/her job** whether these are monthly salaries for a service, or benefits of commercial products. This principle could be exploited as a convincing motivational factor for the employee to be actively involved in the acts of training; and to be more productive while performing the job in the future.

**Sixth: The employee is a growing human being.** This means that while he/she possesses initial professional experiences of the job, he/she still needs more new experiences as a growing individual, encountering almost every day novel work and life situations. These of course could be made available to him/she by means of training and professional development programs.

## Professional Needs Assessment of Organization and Employees for Renewal / Training

Training handles all behavioral aspects, skills and characteristics which could be developed by means of professional programs. The duration of these programs may be a day, some days or weeks, or in other cases may last to several months or even for a year or two. The programs could be presented by forms of courses, intensive workshops, training-working sessions, counseling interviews, T. groups and organized guidance.

Renewal on the other hand, is concerned basically in this book, with material needs of employees and organization. These needs are fulfilled normally by means of purchase, leasing, maintenance and repair. However, when training concerns itself with updating working skills of employees, then the process could be called professional renewal.

**Assessment of professional needs for renewal / training involves three major steps, explained as follows:**

**1- Describing and Analyzing Behavioral / Characteristic Givens of Organization.**

The behavioral / characteristic givens of an organization as stated earlier, are of four types: human, administrative, behavioral, and physical constituents.

To describe the four constituents of an organization, the designer may adopt form (5) for surveying them as existing in reality. The designing role of form (5) therefore is numerating the qualities, behaviors, characteristics or professional qualifications of each component.

The form allows further for the conduct of elementary analysis of the aforementioned constituents of an organization. The data of the form will enter the next one, form (6) for digital analysis.

**The results of form (5) are recorded within four categories:**

- Incompletely available elements (-)
- Completely available elements ( $\cong$ )
- Excessively available elements (+)
- Completely missing elements (.)

**If employees are taken as an example, then the following cases may be observed as a result of their description and elementary analysis:**

1. Employees who are incompletely available, when:

\* there are 90 employees instead of 100 actually needed by an organization (quantitative shortage).

\* there are four categories of employees, while the organization needs five ones (qualitative class shortage).

\* there are 100 employees needed by an organization, some of them have to undergo specific professional improvement (qualification shortage).

2. Employees who are completely available, when there are 100 who are congruent in their qualifications and qualitative characteristics with what is required by the organization.

**Form (5): Description and elementary analysis of an organization.**

**The job:** ..... **Designer:** .....

**Task:** ..... **Administration:** .....

Organizational constituents (illustrative examples)	Current status				Notes
	Available			Nil	
	-	≡	+	(.)	
<b>Human constituents:</b>					When using the form, the designer considers the following: (1) Developing various independent forms for different constituents due to details which may pursue to maintain a clear picture of each constituent. (2) Putting (✓) where constituents are observed
A. Working employees.					
B. Administrators.					
C. Personnel of support services.					
Customers.					
<b>Job Constitutions:</b> <b>Totals</b>					
A. Operating acts.					
B. Administrative acts.					
<b>Administrative constituents:</b> <b>Totals</b>					
A. Laws, rules & decrees.					
B. Equipment.					
C. Machinery & tools.					
D. Raw materials.					
E. Pre-fab. Materials.					
Budget.					
<b>Physical constituents:</b> <b>Totals</b>					
A. Facilities.					
B. Equipment.					
C. Machinery & tools.					
D. Raw materials.					

<b>E. Pre-fab. Materials. Budget.</b>					<b>completely (≡); incompletely (-) or excessively (+); and (.) when it is missing. (3) Specifying current status and / or qualifications observed for each constituents in this column.</b>
	<b>Totals</b>				
<b>Description summary</b>					
<b>A. Completely available elements. (≡)</b>					
<b>B. Incompletely available elements. (-)</b>					
<b>C. Excessively available elements. (+)</b>					
<b>D. Completely missing element. (.)</b>					

3. Employees who are totally missing from the organization as an extreme negative case, or when organization and job are newly initiated within an environment.

4. Employees who are excessively available, when there are 115 while the organization is in need of 100.

**2- Digital Analysis of Organizational Needs for Renewal/ Training**

The behavioral characteristics' data of form (5) is treated more statistically in this step by form (6). The designer could accomplish this task by comparing observed data with criterion one already available to him/her. This will result in quantitative values marked by ( / ) in the appropriate columns of the scale.

While the digital data statistically pinpoints the missing, excessive, inadequate and satisfactory constituents of the organization, two major needs may arise:

**Firstly: The materialistic needs** which could immediately be met by means of leasing, purchasing, repair, maintenance, omission or addition, and;

**Secondly: The human needs** that should be fulfilled by training.

These different needs however, will enter forms (9 and 10) for integration with employees and job needs, in order to achieve an articulated list for training.

### ***3- Describing and Analyzing Employees for Renewal/ Training***

When describing and analyzing employees, several factors should be examined:

1. Personal characteristics, e.g. physical features, endurance and abilities, age, sex, achievement background, reading and writing levels, flexibility, general/ special intelligence, perseverance and concentration abilities, psycho-social moods, and motivational qualities.

2. Professional skills which are concerned with performing a mandated job, service, or product.

3. Life and work experiences.

4. Learning/achievement styles.

5. Communication/ interaction styles.

6. Personal/ private concerns.

7. Economic and social family status.

To accomplish the current step with the designing pursuits embodied in it, four alternative forms (7 a and b, 8 a and b) are presented. Form (7 a) includes professional acts or behaviors, their criterion and observed performances and the resulting training needs. Form (7b) on the other hand, is concerned primarily with personal characteristics/ behaviors and qualifications.

**Form (6): Description and elementary analysis of an organization.**

**The job:** .....

**Designer:** .....

**Task:** .....

**Administration:** .....

Organizational constituents (illustrative examples)	Excessive +	Assessment of current status										Nil 0
		10	9	8	7	6	5	4	3	2	1	
<b>Human constituents:</b>	√											
A. Working employees.	√											
B. Administrators.												
C. Personnel of support services.		√										
D. Customers										√		
<b>Job Constitutions: Tot als</b>	<b>2</b>	<b>1</b>								<b>1</b>		
A. Operating acts.					√							
B. Administrative acts.							√					
<b>Administrative constituents: Tot als</b>					<b>1</b>		<b>1</b>					
A. Laws, rules & decrees.				√								
B. Instructions.					√							
C. Machinery & tools.												√
D. Raw materials.											√	
E. Work schedules.										√		
F. Files and records.									√			
<b>Physical constituents: Tot als</b>				<b>1</b>	<b>1</b>				<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
A. Facilities.								√				
B. Equipment.									√			
C. Machinery & tools.												√
D. Raw materials.							√					
E. Pre-fab. Materials.								√				
F. Budget.						√						
<b>Tot als</b>						<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>			<b>1</b>

**Analysis Summary:**

**A. Addition needs (Missing elements):**

- 1. Work relations.
- 2. Machinery
- 3.
- 4.
- 5.

**B. Omission needs (excessive elements):**

- 1. Employees
- 2. Administratc
- 3.
- 4.
- 5.

**C. Renewal needs:**

- 1. Laws/rates.
- 2. Instructions.
- 3. Week schedules.
- 4. Files & records.
- 5. Budget.
- 6. Facilities.
- 7. Equipments.
- 8. Raw materials.
- 9. Prefab, materials.
- 10. Reward-constituents policies.

**D. Training Needs:**

- 1. Work relations.
- 2. Operating acts.
- 3. Administrative acts.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

When designing training, the designer writes job acts or behaviors together with criterion performances or grades that should be manifested by the individual employee, as measures of his professional adequacies.

The designer then observes the employee, giving him the grades or mark values which he deserves. Comparing now the criterion data with the observed,

**Form (7a): Description and elementary analysis of employees' performance.**

**Employee:** ..... **Designer:** .....  
**Job:** ..... **Administration:** .....  
**Organization:** ..... **Date:** .....

No.S	Professional acts or behaviors	Criterion Performanc	Observed Performanc	Training Needs
------	--------------------------------	----------------------	---------------------	----------------

	(illustrative examples)	e	e	
1	Comprehending general acts of car maintenance.	B	C*	1 degree
2	Appreciating the role of maintenance in safety driving.	B	C	1 degree
3	Maintaining batter water to required level.	A	D	3 degrees
4	Maintaining batter water to required level	A	C	2 degrees
5	Maintaining radiator water to required level	A	D	3 degrees
6	Reserving Wheel oil to required level.	B	C	1 degree
7	Controlling engine temperature to required level.	A	D	3 degrees
8	Keeping car lights working properly.	B	C	1 degree
9	Keeping car brakes effectively working.	A	D	3 degrees
10	Changing flat car tire.	A	D	3 degrees
11	Keeping car locks working properly.	B	C	1 degree
12	Maintaining cleanliness of car.	A	B	1 degree

**Comments:**

- Grades are illustrative examples.
- Generally after: Turell, M. Training Analysis- A Guide to Recognition Training Needs, Plymouth, England: Macdonald and Evans, Ltd, 1980.

**Form (7b): Description and elementary analysis of employees' personal characteristics/behaviors.**

**Employee:** ..... **Designer:** .....

**Job:** ..... **Administration:** .....

**Organization:** ..... **Date:** .....

No.S	Personal characteristics / behaviors (Illustrative examples)	Required characteristics or behaviors	Observed characteristics or behaviors	Renewal / Training Needs
1	Comprehending general acts of car maintenance.	10*	7	3
2	Appreciating the role of maintenance in safety driving.	10	7	3
3	Maintaining batter water to required level.	9	2	6
4	Maintaining radiator water to required level.	8	3	5
5	Maintaining engine oil to required level.	12	5	7
6	Maintaining wheel oil to required level..	6	3	3
7	Controlling engine temperature to required level.	15	5	10
8	Keeping car lights working properly.	7	4	3
9	Keeping car brakes effectively	12	2	10

	working.			
10	Changing flat car tire.	14	3	11
11	Keeping car locks working properly.	5	3	2
12	Maintaining cleanliness.	10	7	3
<b>Comments:</b>				
* The numbers of characteristics or behaviors are illustrative examples.				

**Form (8a): Digital analysis of employees' needs for renewal / training based on their pre-performance.**

**Employee:** ..... **Designer:** .....

**Job:** Car driving **Administration:** .....

**Organization:** ..... **Date:** .....

Types	No.S	Professional acts (illustrative examples)	Observed pre-training performance a& accruing needs					The needs	Notes
			Nil (.)	L (1)	M (2)	H (3)	V.H. (4)		
Daily / Basic acts or Characteristics	1	Comprehending general acts of car maintenance.		√				1	
	2	Appreciating the role of maintenance in safety driving.			√			2	
	3	Maintaining battery water to required level.				√		3	

	4	Maintaining radiator water to required level.			√		3		
	5	Maintaining engine oil to required level.				√	4		
	6	Maintaining wheel oil to required level.			√		3		
	7	Controlling engine temperature to required level.				√	4		
	8	Keeping car lights working properly.		√			2		
	9	Keeping car brakes working effectively.				√	4		
	10	Changing flat car tire.				√	4		
	11	Keeping car locks working properly.		√			2		
	12	Maintaining cleanliness of the car.		√			2	Needs mean	
		Basic acts' sub-totals	0	1	8	9	16	34	2.83
Sporadic / Minor acts	1	Changing engine oil every (1000) kms.		√				1	
	2	Repairing cause of engine high temperature.			√			2	
	3	Repairing car lights when necessary		√				1	
	4	Repairing flat car tire.		√				1	Needs mean
		Minor acts' sub-totals		3	2			5	1.25

**Form (8b): Alternative digital analysis of employees' needs for renewal / training based on their pre-performance.**

**Employee:** ..... **Designer:** .....  
**Job:** Car driving **Administration:** .....  
**Organization:** ..... **Date:** .....

Type	No.S	Professional acts (illustrative examples)	Observed needs for training / renewal					The needs	Notes
			Nil (.)	L (1)	M (2)	H (3)	V.H. (4)		
Daily / Basic acts or characteristics	1	Comprehending general acts of car maintenance.		√				1	
	2	Appreciating the role of maintenance in safety driving.			√			2	
	3	Maintaining battery water to required level.				√		3	
	4	Maintaining radiator water to required level.				√		3	
	5	Maintaining engine oil to required level.					√	4	
	6	Maintaining wheel oil to required level.				√		3	
	7	Controlling engine temperature to required level.					√	4	
	8	Keeping car lights working properly.			√			2	
	9	Keeping car brakes working effectively.					√	4	
	10	Changing flat car tire.	√				√	4	
	11	Keeping car locks working properly.			√			2	
	12	Maintaining cleanliness of the car.			√			2	Needs mean
		<b>Basic acts' sub-totals</b>	4	3	8	3		34	2.83
adic / Misc	1	Changing engine oil every (1000) kms.		√				1	
	2	Repairing cause of engine high			√			2	

	temperature.							
3	Repairing car lights when necessary.		√				1	
4	Repairing flat car tire.		√				1	Needs mean
<b>Minor acts' sub-total</b>				2	9		5	1.25

The designer could easily pinpoint the professional needs that should be adopted for training.

To use form (7 b) above, certain procedures apply. As the form however, is specialized in personal needs, the designer writes down the criterion qualities, characteristics or behaviors. Observing employees afterwards and assessing how they rate comparable to what is required, will produce again the renewal/ training needs that should be fulfilled by future programs.

Finally, forms (8 a & b) are detailed versions of forms (7 a and b). They are constructed to accommodate form (3) and its processes of analysis and the specification of employee's needs for renewal/ training.

Forms (8 a & b) like (3) sort job acts or professional qualifications into basic and minor, and have categories for statistical subtotals and means of training needs. The forms could also be enlarged to hold more needs than are already indicated.

The data from forms (7 a & b) may be utilized by forms (8 a & b) for more statistical manipulation. The two sets of forms may be used independently or in substitute for one another. Regardless of the designing role which the forms may play, their data will enter directly onto forms (9 & 10) in chapter IV, and then indirectly onto later forms, particularly those of (11, 12 and 13) in chapter IV and V.

### What Comes Next?

The cycle of professional description and analysis of job, organization and employees, is now complete. The renewal/ training needs of each factor by this designing stage are properly identified.

The next logical step will be the unification of these tri-needs into one list, in order to be adopted as the nucleus of the coming professional development program. Chapter IV is specialized in this task.

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## Chapter IV

### Unifying Professional Needs and Establishing Behavioral Digital Bases of Training Design

Introduction

Training / Renewal Needs of Employees, Organization and Job:  
a Brief Illustration

Unifying Professional Needs of Employees, the Organization  
and the Job

Transforming Unified Needs into Professional Tasks and Acts

Assessment of Field Time Necessary for Implementing Job Acts

Assessment of Training Percentages of Acts and Their Parallel  
Amounts of Time within a Program

Assessment of Sub-behaviors within Job Acts and Their Parallel  
Training Periods within a Program

What Comes Next?

## Introduction

The proposed approach in the book for the design of training, is built upon two main facts: the behavioral nature of program's content which is apt to observation, measurement and accountability; and the accessibility of this content to digital manipulation. The lack or weakness of these givens will deprive the designing approach, its identity and working substance.

This chapter therefore, lays out the foundations for the behavioral and digital design of training, starting with unifying professional needs of the employees, the organization and the job which were obtained in chapters II and III.

### Training/ Renewal Needs of Employees, Organization and Job: A Brief Illustration

Professional needs of employees, the organization, and the job could be grouped in two classes: physical / material and psycho-behavioral. The first is concerned with renewal, while the second with training. The following are notes regarding these needs:

#### ***Material Renewal Needs:***

Material renewal needs include: the introduction of new types of employees, media, technologies, facilities, equipment, machineries and tools, administrative rules and instructions; or the modification of existing administrative and material services, which are essential for updating, increasing, expanding or improving the professional services / products.

The above various needs could be fulfilled by several procedures such as: recruitment of employees and other human services as well as purchase, leasing, repair or maintenance of material services.

#### ***Psycho-Behavioral Training Needs:***

These needs which focus on the development of professional behaviors by means of training could be classified further into two categories:

The psycho-personal needs:

- Psycho-behavioral problems or needs
- Somatic needs
- Family-social needs
- Economic needs
- Private-personal needs
- Motivational (attitudinal-belonging) needs
- Communication-interaction needs.

The above needs do not call for conventional training, as much as for guidance and clinical programs which may prove very effective in dealing with psycho-personal, social, family, interaction and economic needs.

For the attitudinal-belonging needs; T. groups, psychoanalysis, personal persuasion and interviews could be useful in developing the individual adaptation and belonging to his working environment and satisfaction with job.

***Professional performance needs:***

The present needs concern themselves with the generation of specific services or products that are expected from professional personnel. Training programs which could meet these needs are of three types:

- Programs for training employees (or workers).
- Programs for training administrators.
- Programs for training support services.

The training needs of each category above also embody those of the organization and the job. However, coordinating the three types of needs will result in a unified list that is valid for prospective training program. This task is presented in the next paragraph.

**Form (9): Unifying needs of employees, organization and job.**

Employee: ..... Designer: .....

The job: ..... Administration: .....

Organization: ..... Date: .....

Organization's Needs	Employees' Needs	Job Needs
<p><b>Human Resources</b></p> <ul style="list-style-type: none"> <li>(1) Working employees.</li> <li>(2) Administrators.</li> <li>(3) Personnel or support services.</li> <li>(4) Customers.</li> </ul> <p><b>Job performance</b></p> <ul style="list-style-type: none"> <li>(1) Operating acts.</li> <li>(2) Administrative acts.</li> </ul> <p><b>Administrative requirements</b></p> <ul style="list-style-type: none"> <li>(1) Laws and rules.</li> <li>(2) Instructions.</li> <li>(3) Work-human relations.</li> <li>(4) Work schedule.</li> <li>(5) Reward-punishment policies.</li> <li>(6) Files and records.</li> </ul> <p><b>Material requirements</b></p> <ul style="list-style-type: none"> <li>(1) Facilities.</li> <li>(2) Equipments.</li> <li>(3) Machinery / tools.</li> <li>(4) Raw materials.</li> <li>(5) Pre-fab. Materials.</li> <li>(6) Budget.</li> </ul>	<p><b>Professional behaviors of:</b></p> <ul style="list-style-type: none"> <li>(1) Operating acts.</li> <li>(2) Administrative acts.</li> <li>(3) Support services acts.</li> <li>(4) Human-environmental interaction acts.</li> </ul> <p><b>Human, Social economic needs of:</b></p> <ul style="list-style-type: none"> <li>(1) Work motivation.</li> <li>(2) Personal characters.</li> <li>(3) Personal interests.</li> <li>(4) Social family life.</li> <li>(5) Economic status.</li> <li>(6) Professional growth.</li> </ul> <p><b>Adult Needs of:</b></p> <ul style="list-style-type: none"> <li>(1) Communication styles.</li> <li>(2) Learning styles.</li> </ul>	<p><b>Behavioral requirements of:</b></p> <ul style="list-style-type: none"> <li>(1) Operating acts.</li> <li>(2) Administrative acts.</li> <li>(3) Technical / maintenance acts.</li> <li>(4) Secretarial acts.</li> <li>(5) Handling / marketing acts.</li> </ul> <p><b>Administrative requirements of:</b></p> <ul style="list-style-type: none"> <li>(1) Work sequence.</li> <li>(2) Work schedules.</li> <li>(3) Work laws &amp; rules.</li> <li>(4) Work instructions.</li> <li>(5) Work climate.</li> <li>(6) Supervisory methods.</li> <li>(7) Product service specifications.</li> </ul> <p><b>Material requirements of:</b></p> <ul style="list-style-type: none"> <li>(1) Facilities.</li> <li>(2) Equipment.</li> <li>(3) Machinery.</li> <li>(4) Raw materials.</li> <li>(5) Pre-fab. Materials.</li> </ul>

## Unifying Professional Needs of Employees, the Organization and the Job

The professional needs of the employees, the organization, and the job are treated previously in chapters II and III, by the utilization of eight forms (1-8). Form (9) in this chapter is an elaborated tool representing simultaneously the three varied needs together.

The use of current form does not limit itself to training needs; rather it is extended to all human and material needs. Hence, the form serves the two major needs:

- Behavioral improvement by means of training.
- Material renewal by means of purchase, repair, maintenance, leasing, recruitment of human services, and enacting or re-enacting administrative / work laws, rules and instructions.

Moreover, it should be noted that the form is not concerned primarily with the observed degrees of needs accrued by chapters II and III. Instead, it focuses on the types of needs per se that are observed for the employees, the organization and the job, and then unifies them all in one trainable list.

### **The form thus serves two purposes:**

**The first is reiterating professional needs** in chapters II and III with the assurance of not missing any of them, and enriching the list by adding new ones whenever it is appropriate.

**The second is the integration of all professional needs** of the employees, the organization and the job in one comprehensive list suitable for adoption in training.

Unifying professional needs in this step however, is accomplished by conducting mutual comparisons and analyses among three professional variables: the employees, the organization and the job needs. It is suggested here that the designer may begin comparing job needs with employees' needs. The result will be an integrated and comprehensive list of needs for the organization, the employees and the job.

This comparison between the two need sets of the employees and the job is considered a basic task for the designer to maintain; since the two

factors interact directly together to bring about the desired service or product which the organization fosters. While the employees and the job play an operating role to generate the mandated profession, the organization works as an administrative/ supervisory mechanism to guide the professional performance to its ultimate ends. The behavioral and economic interests of the organization therefore lie in the very existence of both the employees and the job.

Further, the designer could of course, perform a short-cut unification of professional needs by adopting either the organization's or the employees' list. This suggestion stems from the fact that while the organization owns both the employees and the job, the employees in turn operate the organization and the job. The needs of one party therefore are expected under normal work conditions, to encompass those of others. It should be emphasized however that the other two lists of needs must serve as validating tools to finalize the adopted one of the trio.

To complete the unification task of training needs, nonetheless, the designer now reviews the final list which has resulted from the organizations and/or employees' needs, and checks its elements against the job needs. The purpose of this examination is to obtain a refined and conclusive list of professional needs that is responsive to job requirements and is valid for training.

Finally, the designer might use the computer for easing the complex and tiresome tasks of comparison and analysis. The data which results from this step will enter the following forms (10 and 11), leading consequently to the design of the prospective training program within the following chapters (5-9).

## Transforming Unified Needs into Professional Tasks and Acts

The classification of professional behaviors into job task and acts was treated in chapter II. However, if these training components are not available to the designer, then he may consider here the following steps:

**1. Detailing training needs into behaviors or acts**, applying in this regard the principles and practices stated in chapter II.

**2. Sorting the behaviors or acts into homogeneous groupings,** classes or categories, each is specialized in performing/administering a sub-service or sub-product, or serving a generic professional goal. Every behavioral grouping could be called then, a task with a specific title. The designer should continue this process until the last behavior or act is classified.

**3. Grouping the tasks which serve one professional aim under an appropriate title of a job.**

If "car driving" is taken as an illustration, then all the driving behaviors or acts on the road are put together in one task,, that is, driving on the road. And, further tasks of "driving on the road", "car maintenance" and observance of safety & traffic laws" are lumped into one job: "car driving" (refer to chapter II for details).

**4. Sorting the acts within each task into basic and minor,** then sequencing them according to their actual performance.

**5. Writing the tasks and their acts** in form (10) next, specifying their training degrees within the coming program, based on data of forms (3 and 8) in chapters II and III.

## **Assessment of Field Time Necessary for Implementing Job Acts**

Time is probably the most precious "thing" that man ever has.

Within it, man lives his life, and measures the changes or advances which he encounters in life. For work and training on the other hand, time is viewed as highly critical, since it:

\* Helps in understanding current professional and training status, by describing the characteristics and needs of their present.

\* Helps In understanding the prospective professional and training status, by projecting desired changes that will take place in the future.

\* Carries out the professional and training activities to their behavioral ends... carries the present to its desirable future.

**Professional field time** means in this book, **the total minutes/hours which an employee normally consumes to yield a service or product.** This time is usually available in job written resources such as work guides or supervisory books, administrative files/records and many others.

**When field time however is unknown to the designer, then he may determine it by two procedures:**

***Observing and Measuring Employees' Performance, by:***

**1. Selecting randomly a sample of employees for observation.** The sample could comprise three performance levels: grade (C) employees, grade (B) employees and grade (A) employees. Principles and techniques of random sampling are widely detailed in statistical books.

**2. Observing the group sample** while accomplishing the required acts by using appropriate forms or tools. Form (4) in chapter II may be utilized partly here. The designer nonetheless, makes sure to record the beginning and finishing performance time for each employee.

**3. Summing up the time periods observed for the group sample,** then dividing the total by the number of employees involved. The result will be the time mean needed generally to implement the observed professional behavior.

**4. Summing up all the time means obtained for the professional acts** which belong to specific task. The result here will be the criterion field time necessary for performing the task.

Since a job is composed of two or more tasks, then the total time needed to accomplish the tasks will lead to the grand working time of the whole job.

***Interviewing a Selected Group of Job Personnel:***

Examples of job personnel, whom may be interviewed, are: administrators, supervisors, experts, employees, technicians and aides. Using this procedure, the field time may be determined in three steps:

**1. Selecting a group sample of exceptionally successful job personnel.** The sample is expected to be more capable in giving valid assessment of field times than their counterparts, the negligent peers.

**2. Asking each group member about two types of field time.** The first is the shortest which is needed by (A) employees; and the second is the longest which is needed by (C) employees.

**3. Calculating the time mean for each individual on each act,** and the time mean of the act for all sample members. Summing time means for all acts involved in a task or a job, will produce the grand performance period.

One way to check the validity of working time values to the actual requirements of the job, is adopting simultaneously the two procedures above. Correlating time values afterwards will pinpoint the precision reality of results.

## **Assessment of Training Percentages of Acts and their Parallel Amounts of Time within a Program**

Training percentages are behavioral or working weights designated within a program to the development of job acts based on their importance degrees or levels stated in form (3) and (8) within chapters II and III.

The parallel training time on the other hand, is the program's sub-period allocated for each act based on its training weight or percentage points within the program. Form (10) explains these statistical manipulations.

The behavioral and digital data recorded in columns (1, 2, 3, 4, and 5) of form (10), is taken normally from previous forms (3, 6, 8 and 9) in chapters II, III and IV.

**When assessing the training percentages and their parallel periods of time, the designer faces actually two major tasks:**

***First: Finding the training percentage points of job acts.***

To find the training points or percentages within coming program, the designer simply multiplies the degrees of employee's needs (in column 4) by their counterparts of the job (in column 5). The results of this step appear in column (6) of form (10).

The numerator value of each observed act, when is divided by its denominator value, will represent the training percentage or weight which will withstand in the program. It also indicates the time, money, human and logistical services that should be allocated for it throughout training.

Comparing for example the percentages of acts: the first (19%), the third (75%), the fifth (100%) and the eighth (50%), will pinpoint the differential treatment suitable for each act above.

**Second: Finding the training time suitable for job acts.** The designer could use the following procedures:

**Finding the Criterion Training Time for Job Acts When Field Time is Known.**

To calculate the training time of job acts, the designer should have in hand the field time of each act. The question of this is settled in the previous paragraph.

Now, to obtain the training time for an act, the designer multiplies its professional field period by four. The resulting value will represent the criterion time which could be adopted by prospective training programs.

The question that may arise here, is: why should the designer multiply the field time by 4 in order to get the criterion training time? The justification is as follows: The achievement of behavioral skills whether in training or in formal education, requires four basic processes: teaching, learning, practice/ internalization, and evaluation-correction. Each process necessitates a specific period of time comparable to other accompanying processes.

**Form (10): Assessment of training percentages of acts and their parallel amount of time within program.**

The job: car driving

Designer: .....

The task: car maintenance

Administration: .....

Types	No. s	Professional acts	Degrees of Employees	Degrees of job	Training weights within
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		(illustrative examples)	needs <sup>1</sup>	needs <sup>2</sup>	program	
					Points	Minutes
Daily / Basic acts or characteristics	1	Comprehending general acts of car maintenance.	1	3	3	2
					16	10
	2	Appreciating the role of maintenance in safety driving.	2	2	4	5
					16	20
	3	Maintaining battery / water to required level.	3	4	12	30
					16	40
	4	Maintaining radiator water to required level.	3	4	12	30
					16	40
	5	Maintaining engine oil to required level.	4	4	16	30
					16	30
6	Maintaining wheel oil to required level.	3	3	9	11	
				16	20	
7	Controlling engine temperature to required level.	4	4	16	60	
				16	60	
8	Keeping car lights working properly.	2	3	6	20	
				16	20	
9	Keeping car brakes working effectively.	4	4	16	120	
				16	120	
10	Changing flat car tire.	4	4	16	120	
				16	120	

	11	Keeping car locks working properly.	2	3	6	11
	12	Maintaining cleanliness of car.	2	4	8	30
					16	60
		<b>Basic acts' subtotals</b>	<b>34</b>	<b>42</b>	<b>124</b>	<b>469</b>
					<b>192</b>	<b>590</b>
		<b>Means &amp; percentages</b>	<b>3</b>	<b>3.5</b>	<b>65%</b>	<b>79.5%</b>
Sporadic / Minor acts	1	Changing engine oil every (1000) kms.	1	2	2	5
	2	Repairing cause of high engine temperature.	2	2	4	15
	3	Repairing car lights when necessary	1	2	2	8
	4	Repairing flat car tire.	1	1	1	4
					16	60
		<b>Minor acts' sub-totals</b>	<b>5</b>	<b>7</b>	<b>9</b>	<b>32</b>
					<b>64</b>	<b>220</b>
		<b>Means &amp; percentages</b>	<b>1.25</b>	<b>2.75</b>	<b>14%</b>	<b>15%</b>

(1) From form (8). (2) From form (3). (3) Criterion training time. (4) Grand total of observed needs of acts 3-12=117. (Minutes are based on the multiplication of percentage points in column (6) by criterion training time in column (7). The result is the total appropriate period for training.

It is assumed here that normal trainees, under normal training conditions, will consume normal comparable periods of time for teaching, learning, practice and evaluation. With the same token, bright trainees will need shorter comparable periods to go through each one of the aforementioned activities.

According to above, if the job time of act (1) in form (10) is for example 2.5 ms., the criterion training time will be:  $2.5 \times 4 = 10$  ms.

### ***Finding the Observed Training Time for Job Acts based on Their Criterion Training Times and Percentage Points.***

Based on the criterion training time of 10 ms. what will be then, the observed training time necessary for act (1) in form (10)? Looking at the percentage points of the act, it is found to be 19% (or 3/16). The program time required for training on the act, is therefore:  $10 \times 3/16 = 2$  ms. The same operation applies of course to other remaining acts. Minutes' data in form (10) results from this procedure.

### **The use of form (10) in the design of training, presents several indicators for training:**

**(1) Low-key acts** indicate either employees master already 1 3/16) required skills to a large degree, or the acts themselves embody minor abilities used to perform the job.

In both cases, the designer allocates appropriate time for reviewing and stimulating past knowledge of the acts.

**(2) Highly needed acts** are important for both employees and the job; in addition, these acts are missing from professional repertoire of employees. Acts (3-12) stated in form (10) constitute in essence the core of the training program.

**(3) The amount of time appropriate for the training on each act**, and for the whole program in general. Form (10) pinpoints digitally these two dimensions of training time ( Column 7 ) .

### ***Finding the Observed Training Time for Job Acts when Criterion Time or Percentage Points are Known, and Specific Period for the Program is Pre-determined.***

What about, if either the criterion time or percentage points are known and the training time is predetermined by the concerned administration? How could the designer calculate the time periods suitable for acts, without overlooking or overweighing one or more of them at the expense of others?

**Rule: If the available time is clearly short comparable 10 the actual demands required under normal conditions for training, the designer is obliged to disregard the low-key acts, thus distributing the available time on the remaining highly needed ones. The basic acts numbered 1 and 2 and tentatively, all minor acts in form (10) could be accordingly ignored here.**

**Regardless of the nature of the predetermined time for training, the designer, when distributing the available period on professional acts, may consider the following steps:**

**1. Transforming the available time of days/ hours into minutes,** if the designer has for example one day training with seven hours only, then he will have the total of 420 minutes.

**2. Adding up the criterion periods (in denominators) of the acts** in column (7). If the ten basic acts (3-12) are taken for example, then the sum of their periods in minutes are 560.

Whenever criterion periods are not available, the designer will add up instead, the percentage points in column (6) . The result in our case (form 10) is 117.

**3. Finding the percentage of the criterion time for each act;** by dividing its specified period on the grand total of all acts. (e.g.  $40/560=.07$ ).

Once again, if the criterion time is unknown, then the designer will use the percentage points dividing them by the grand total of 117 in form (10). The result will be training percentage points which each act deserves comparable to others within program (e.g.  $9/117 = .08$  rounded).

**4. Multiplying the criterion time percentage or the percentage point of each act** in step 3 above, by the actual time available for training.

The result will be the observed training period of each act according to its weight within the program (e.g.  $07 \times 420 = 29.4$  mns. or  $.08 \times 420 = 33.6$ ms)

Considering the above steps, the training periods in minutes (using criterion time) for the acts (3-12) in form (10), are: 30, 30, 22.5, 15, 45, 30, 90, 90, 22.5, and 45.

When considering however, the percentage points, the training periods for the same acts (3-12) are: 43, 43, 57.4, 32.3, 57.4, 21.5, 57.4, 57.4, 21.5, 28.7.

A difference is noted among time values specified by the two methods: the use of criterion time and percentage points of observed needs. This is due to the application of the criterion time which is more representative of acts' realities as first hand raw data than the percentage values as derived data (in column 6).

### **Assessment of Sub-behaviors within Job Acts and Their Parallel Training Periods within a Program**

The designer in this stage of training design, takes from form (10) the reported acts and their individual time periods, plotting them in form (11). He/she then reviews the nature of each act, breaking it down into five behavioral categories stated on the form.

In doing so, the designer relies on his/her professional expertise in the areas of training, curriculum making, behavioral psychology, educational evaluation, the designing science and elementary statistics.

The designer estimates the degrees of sub-behaviors embedded within each act by putting (*true*) in the appropriate space in form (11). He sums up the appraised degrees of sub-behaviors within each act (Column B), then divide its training period by total degrees of sub-behaviors (note 3).

The time value 01 the point is multiplied by the total points specified for each sub-behavioral category. The products are plotted in their places in the form (Column 3, 4, 5, 6 & 7).

**The digital time values which are obtained above will benefit the training design with the following:**

**1. Building the behavioral objectives of training, qualitatively and quantitatively according to ratios specified for the sub-categories of job acts.**

**Form (11): Assessment of training percentages of acts and their parallel amounts of time within program.**

**The job: Car driving**

**Designer: .....**

**The task: Car maintenance**

**Administration: .....**

No.S	Professional acts <sup>(1)</sup> (illustrative examples)	Knowledge			Application			Attitudes			Problem solving			Evaluation			(2) sum of degrees	Notes			
		L	M	H	L	M	H	L	M	H	L	M	H	L	M	H					
		(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)					
1	Maintaining battery water to required level	5						10	2.5					7.5			5			12	(1) Acts (3-12) in form (10) (2) Degrees are based on low (1) moderate (2) High (3), and very high (4) ratings. (3) From numerators of form (10) column (7). (4) Total time available for training on the ten acts is 457 ms. (refer to form (10)). (5) Total behavioral degrees possible for training on objectives of program. (6) Total training time for acts (3-12) in column (7) of form (10).
2	Maintaining radiator water to required level	5				7.5		5						7.5			5			12	
3	Maintaining engine oil to required level		6			6			6					6				6		15	
4	Maintaining wheel oil to required level	2				3		2				2					2			11	
5	Controlling engine temperature to required level		12			12		8						16			12			15	
6	Keeping car lights working properly.	3			3			3			3			3			3			10	
7	Keeping car brakes working effectively			24		24			24				24		24			24		20	
8	Maintaining cleanliness of car		24			32		24				24		24			16			15	
9	Changing flat car tire	2				3		2				3		1						11	
10	Keeping car locks working properly		6			6			8		4						6			15	
Behavioral Analysis of acts (4):																					
(1) Knowledge: $\frac{89}{457} = 19.5\%$	Sub-totals	17	48	24	3	37	5	66	2.5	20	30	32	9	48	40	1	31	24	24	136(5)	
(2) Application: $\frac{106.5}{457} = 23.3\%$	Grand totals	89			106.5			84.5			97			80			457ms.				
(3) Attitudes: $\frac{84.5}{457} = 18.5\%$	The time value of a sub-behavioral degree within an act is: Period of act / sum of its degrees.																				
(4) Problem Solving: $\frac{97}{457} = 21.2\%$	(1) $\frac{30}{12} = 2.5$ ms.			(5) $\frac{60}{15} = 4$ ms.			(9) $\frac{11}{11} = 1$ ms.														
(5) Evaluation: $\frac{80}{457} = 17.5\%$	(2) $\frac{30}{12} = 2.5$ ms.			(6) $\frac{15}{10} = 1.5$ ms.			(10) $\frac{30}{15} = 2$ ms.														
	(4) $\frac{11}{11} = 1$ ms.			(8) $\frac{120}{15} = 8$ ms.																	

The prospective training program will contain, for example, around 19.5% of its objectives specialized in knowledge, 23.3% in application, 18.5% in attitudes, 21.2% in problem solving, and 17.5% in evaluation and correction.

With form (11), the designer can maintain a high degree of precision in specifying and constructing the objectives of training. If one assumes, for example, that each degree within a sub-category embodies one behavioral objective, then there will be 12 formative objectives for act (I) in form (11), distributed as follows:

- \* Two objectives for knowledge.
- \* Four objectives for application.
- \* One objective for attitudes.
- \* Three objectives for problem solving .
- \* Two objectives for evaluation and correction.

**2. Building the total program of training based on the behavioral objectives and digital ratios of behavioral categories of acts.** Data of later forms (12-27), are generally built on the information of current one(11).

## What Comes Next?

The current chapter has anchored the behavioral digital bases of the proposed designing approach for training.

The chapter explains briefly the mechanisms of unifying professional needs, finding the training weights of job acts within program, specifying the performance field time of acts and the derivation of training time appropriate for their skills' development. The next logical task will be to initiate the actual design of training.

The first step of such an undertaking is designing the training curriculum with its elements: the goals, the knowledge content and achievement activities\*. Chapter V is concerned with this significant step.

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\* Refer to chapter V for a definition of this item.