Formative Evaluation of a
Quasi-Algorithmic Training Job Aid

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ABSTRACT

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Research has indicated that many smaller business' trainers are relatively unfamiliar with the processes of the Systems Approach to Training (Zemke, 1982). Systematic training is essential to help businesses to adapt to a rapidly changing world. A Quasi-Algorithmic Training Job Aid was developed to aid the smaller business trainer in conducting systematic training.

The Job Aid was subjected to the process of Formative Evaluation, during development. The first stage was actually a validation of the content and methodologies by a panel of subject experts. At this time the data gathering questionnaire was also validated. Required changes were made to prepare the Job Aid for small scale testing.

A representative sample of business trainers took part in the small scale testing. Data was gathered by questionnaire and follow-up interviews. Feedback was received that, when implemented , will lead to a refined product.

Simple statistical analysis was done to determine if the size of the business' training function would be reflected

in positive responses to the variable studied. The unexpectedly small sample size unfortunately, meant that the results could not be generalized. However, by combining statistical indicators with other data it would seem that the Job Aid was well received by small business trainers.

The Job Aid was considered by many of the trainers to be a novel approach addressing a critical problem. Several organizations are using the proto-type in their training activities. Overall, the response to the Job Aid has been such to encourage further development.

Dedication

The completion of this Thesis would not have been
possible without the support and understanding of many
people. This dedication is addressed to them with
heartfelt gratitude. Firstly, I would like to thank my
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Chapter1: The Role of Training in Business Organizations

Business organizations invest billions of dollars yearly in training. Training is viewed as an essential problem solving function (Stein, 1981). However, it is not a panacea for all organizational problems. Training assumes a major role in anticipating and reacting to internal and external organizational problems that are resolvable through learning. These include reducing the impact of technological change on employee skills and knowledge and the effects of individual's career plateaus (Maslach, 1981). To a lessor degree training can also affect employee attitudes and motivation towards work (Kearsley & Compton, 1980).

In 1982, of organizations that conducted formal training, 70% trained employees in supervisory, management development, communications and technical skills. Over 45% were involved in the training of skilled occupations such as sales, clerical and secretarial skills. Finally, 45% conducted formal training in new methods and procedures brought about by technological change (Zemke, 1982).

The United States Training and Census Report (1982) revealed that over 90% of organizations polled felt that training was essential to their operations. This was primarily due to the need for maintaining productivity. In addition, 51% stated that they had difficulty in finding qualified personnel for key jobs which necessitated further training.

The report also clearly indicated that organizations are becoming aware of the value of their personnel investment. For example, it was estimated that by 1985 each American clerical worker would have received an organizational investment of over $10,000. The days of quick hire and fire were coming to an end (Gardner, 1981). Training was emerging as a system of personnel development within the organization that benefited both the organization and the employee

By 1982, training budgets in the United States, had reached considerable proportions. Nearly three billion dollars were being spent on training yearly. Smaller organizations, with 50-499 employees, spent nearly two-thirds of this amount. Therefore, smaller organizations accounted for about 66% of the U.S. training expenditure (Zemke, 1982).

The census revealed interesting statistics about training personnel. It showed that there were nearly 250,000 professional American trainers. Nearly 57% of organizations with full-time trainers had a training function headed by a professional trainer. Over 125,000 trainers were employed by small business organizations (<500 employees). In addition, these organizations employed a further 515,000 part-time non-professionals.

Training and Organizational Problems

Despite the impressive statistics quoted above indicating that training is well entrenched in the operations of business organizations, there were also alarming indications that all is

not well. In addition, there are formidable organizational challenges that training must address. These problems could well have a determining influence on organizational survival.

Zemke (1982) found that 43% of businesses with 50-99 employees did not conduct formal training. Even 21% of larger organizations, with 100-499 employees, did not have anybody responsible for training, 55% had only a part-time trainer. Unfortunately, many trainers did not possess relevant education or experience for training. Additionally, management has been found to be skeptical about the value of training and inclined to restrict budgets (Craig, 1975). One suspects, therefore, that many business organizations have not effectively met the training challenge. When training is conducted by such organizations it is often devoid of system. As a result, training needs are not properly identified beforehand (Cash & Minter, 1979). Training effectiveness evaluation is either ignored or restricted to measures of how well the trainees enjoyed the course. Whether or not the person can do his job better or that organizational performance improves is usually not determined.

Small business tends to receive little measurable return on its investment dollar when using outside sources. This is usually because the business has not properly identified its needs or determined the relevancy of the product being purchased. This does not mean that all outside sources are bad but they must be carefully evaluated and matched to

needs (Pisher, 1981). Many small business organizations are not able to do this due to a lack of competent personnel.

All business organizations are facing formidable challenges. These have greater impact on the smaller organization because it lacks the resources of the larger and is usually restricted to a small range of activities. The following is a list of problems facing business organizations that are at least partly addressable through training.

Technological Change

According to many researchers technological change poses the greatest challenge to organizations (Warren, 1969; Kaufman, 1974; Ewing, 1970). Ian Wilson (1973) states that the computer is producing a significant impact on the work place. It is revising the nature and content of many jobs, eliminating some and creating others with bewildering rapidity. Wilson asks the question, "What will the people do and how will they do it?" Since he asked this question, the pace of computerization has significantly increased.

Technological change generally advances the production of goods and services to meet demands with fewer workers. This has led to the overall growth in the number of "white collar" workers so that even in manufacturing they now outnumber "blue collar" workers. Furthermore, organizations have flattened their hierarchies so that career mobility in industry has

become blocked. It is now more difficult for a worker to rise
above the first level of management (Taviss, 1969).
The introduction of new technology, particularly since 1975,
has caused wide dislocation in traditional job areas. The
introduction of robots, for example, in the automotive
industry has dislocated thousands of assembly line workers.
Reissman (1980) has argued that due to technological change,
training prior to a job cannot be considered sufficient pre-
requisite to the job. Instead, he proposes that training be
designed to lead employees from non-skilled entry levels to
semi- and finally, highly skilled levels. Accrediting job
experience would be an added bonus to the system.

Above all, technology has affected the professional such
as the engineer, the technician and the manager (Kaufman, 1974).
The individual must not only remain current in his own profession
but in several ancilliary ones as well. It is not unusual to
find an engineer's half-life to be slightly more than five
years today before his skills and knowledge are considered
obsolete.

Globally, rapid technological change has had a vast impact
on organizations that did not anticipate these changes or
could not alter their output to cope with them. Traditional
labor extensive industries like iron and steel, automotive
and textile were particularly hard hit. The impact on the
individual has been unemployment, skills obsolescence and
career plateaus.

Skills Obsolescence

The main negative manifestation of technological change has been obsolescence. In the individual, obsolescence has been considered a factor in both technical and managerial occupations. In the case of either unskilled or semi-skilled workers, organizations tend to externalize the problem by discharging the workers (Erikson, 1980). In unionized work places displacement is bitterly contested resulting in confrontation and the retention of redundant workers. This is a major factor in low productivity and high unit production costs that lead to the loss of organizational comptetitiveness. Such organizations will go under unless bailed out by massive outside intervention and internal reorganization as in the case of the Chrysler Corporation several years ago. Kaufman (1974) points out that obsolescence has the following characteristics.

Lack of new knowledge and skills. Regardless of occupation, obsolescence occurs when the individual lacks new skills and knowledge. It involves a failure on the part of the individual to keep up to date. There are varying degrees of obsolescence and nobody is ever completely obsolete or current.

Ineffectiveness. The greatest impact obsolescence has had on the professional is resulting ineffectiveness. However, not all cases of ineffectivenss are due to obsolescence. A professional who has the most up to date skills and knowledge but is unwilling or unable to use them is ineffective but not obsolete. Only ineffectiveness that stems from the aging

of skills and knowledge can be considered obsolescence. It may be more relevant to some roles than others. Obsolescence is usually tied to the individual in his current organizational role. If he has lost the requisite skills and knowledge to do his job then he is obsolete. This is called 'job obsolescence'.

Professional obsolescence. The professional who does not keep abreast of current developments in his field is in a condition of professional obsolescence. This will affect his performance in future work roles in his career. This is similiar in concept to potential obsolescence where the professional has not kept current but still performs his job assignment effectively. In these situations the capability of taking on new job assignments with greater responsibilities is limited.

Organizational obsolescence. Obsolescence can have a profound impact on the organization. The greater the number of obsolete persons in the organization, the greater the liklihood of the organization becoming obsolete. Organizational obsolescence can be described as the degree to which professional and skilled workers have failed to keep up to date with skills and knowledge necessary for current and future effective organizational performance. Organizations can become obsolete if key functions like research and development, production, marketing, sales, accounting, personnel and management use methods that are out of date and not as effective as those currently available and employed by competing organizations. Questions that can be asked to determine if an organization

is obsolete include:

    1. Have products changed little or not at all over long periods of time;

    2. Have few new methods been introduced;

    3. Have few new ideas been developed;

    4. Have errors in decision making increased;

    5. Has there been an increase in the effectiveness of the competition; and

    6. Has output been steady or declining.

Kaufman (1974) claims that by the time overt signs of obsolescence have become apparent it may well be too late to save the organization.

Career Plateaus

Kaufman (1974) has shown that individuals pass through periods of levelling off in their career development. However, other studies have clouded the issue. Mali (1972) found that professional development peaked in the thirties and declined steadily thereafter. Sparks (1965) reported that peak performance was achieved after the age of fifty. Indications are, according to Kearverny (1983), that career plateaus are most marked between the ages of 30-35, affecting between 59-84% of the professional white collar workers. This is the time that the professional is most likely to quit his job. There does not seem to be a relationship however, between age and plateaus. What does seem apparent is that there are times in any career where an individual's performance may not be optimal

for varying periods of time due to the effects of career plateaus.

The general characteristics of a person in a sustained plateau are marked with feelings of frustration and personal failure. Work is viewed as unimportant with little to look foreward to in the future. Marriage failure, alcoholism and suicides rise during these times.

Aging of the Workforce

This phenomena is also known as 'the greying of the work force' and will become very evident over the next 15 years. Demographic indicators are that there will be a shift in the average age from 28 years to over 40 years in the next 10 years (Leibowitz, Farren & Kaye, 1983). Characteristic of this phenomena will be a decline in the under 25 years of age group that currently represents the largest bulge in the population. By the year 2000 those over 65 years of age in the Unites States will number more than 32 million persons. The 'Baby Boom' generation will create a bottleneck in the 25-50 years age group. This will lead to intense competition for jobs and promotions. This will be amplified by the likely elimination of compulsary retirement, which will see sons fathers and grandfathers competing with each other (Washington Post, July 82). The implication is that those who have jobs will tend to hold onto them for longer periods of time. The heightened danger of obsolescence and prolonged periods of plateau is clear unless some form of career development is

emplaced to alleviate them.

Falling Productivity

Despite rapid technological changes over the past 20 years, industrial activity has actually declined. In Canada, productivity declined by nearly 10% in 1983 when compared to 1982 figures (Britannica, 1983). Many factors have caused this, but employee attitudes towards work have contributed. Kaufman (1974) states that motivation to work has generally declined although technological change has tended to mask resulting decline in productivity. Fewer individuals select a single career path and many frequently change career goals. Quality work and hard work are no longer viewed as pre-requisites for success. Furthermore, penalties for poor performance are rapidly becoming a thing of the past. A 'doom and gloom' outlook for the future has led many to desire instant gratification of needs and few will wait long enough to commit themselves for long term payoffs.

The Role of the Trainer in Smaller Business Organizations

In 1982 the typical small business training function was a one-person show (Zemke, 1982). Nearly 70% of small business training functions are of this type. The trainer is faced with a formidable challenge. Overall, he must be able to recognize and solve training problems. This must be done with very limited training resources (often with a budget of less than $10,000). Usually the trainer will be the manager and

instructor. Constraints will severely curtail in-house course development. This means that the trainer must be able to evaluate currently available commercial training programs for adaquacy and appropriateness. Perhaps the most important aspect of his job is to be able to describe effectively to higher management to obtain their commitment (Cullen, Sawjin, & Sisson & Swanson, 1978). Overall, the trainer's role is one of challenge and he/she must possess the requisite skills and knowledge if the function is to survive.

Summary

This chapter has discussed the importance and role of
training in business organizations. All organizations,
regardless of size, face great challenges. These include such
problems as technological change, evolving employee work
attitudes and obsolescence, both organizational and individual.
The results of these problems have been the transformation
of many traditional jobs, unemployment and loss of organizational
effectivenss.

Career plateaus, while not necessarily caused by
obsolescence, have serious organizational implications
and to the individual are marked by sub-optimal performance
for extended and varying periods of time.

Organizations have responded by spending billions of
dollars yearly on training. Yet, despite the effort, many
smaller organizations lack established training functions
or qualified trainers in those that do exist.

How can these organizations meet the 'training' challenge?

Statement of the Problem

Business organizations are faced with awesome challenges
that must be met if they are to survive. These are at least
in part addressable through training. Obsolescence is the most
obvious sign of an organization in trouble. This is a result
of the individuals within the organization failing to keep
current in skills and knowledge. The degree to which an
organization is obsolete depends on the number of obsolete
persons in it (Kaufman, 1974). Technological change is the
primary cause of obsolescence (Lee, 1983). Obsolescence results
in job displacement among workers and loss of organizational
effectiveness.

If an organization is to avoid the pitfalls outlined above
it must have ways of anticipating and reacting to change before
it is too late. The Systems Approach to Training(SAT) offers
a complex but effective methodology to identify and address
organizational problems that are resolvable by training (Craig,
1975).

To effectively use the SAT normally requires considerable
expertise on the part of the trainer. Unfortunately, as pointed
out by Zemke (1982), many trainers, particularly small business
trainers, lack these. They are often further hampered by
management indifference and lack of resources.

The problem becomes one of finding an effective way of
presenting the SAT to the smaller business trainer in an easily

learnable manner that will produce quick results.

Job Aids have been used extensively for many years for complex tasks (Rakow, 1981). They have proven an effective media if properly conceived and designed. Could a job aid for trainers be developed?

The goal of this Project became a study of the current literature to determine what the content and form should be of a Training Job Aid, to help small business trainers to learn and implement the SAT. The Project would also develop and test the Training Job Aid for approrpriateness and make indicated changes to improve its chances of being adopted.

Chapter 2: Review of the Literature

The Design and Content of the Training Job Aid was determined after an extensive review of existing literature. The review concentrated primarily on Systems Theory and Training, Algorithms and Quasi-Algorithms and the design and applications of Job Aids.

Systems Theory and the Business Organization

The business organization can be viewed as a system of organized complexities (Schoderbek, Schoderbek & Kefalas, 1975). This is because it is composed of many different parts that interact in a logical and orderly manner (Tucker, 1964).he organization can also be viewed as a complex 'goal seeking organism' or system. The typical organization is hierarchical in structure, composed of sub-systems of different types. There is continuous interaction between the different sub-systems and the system's environment. Interactions are in the form of feedback loops, the more complex the loop the higher the sub-system's position in the organizational hierarchy. Each sub-system has its own goals and strives to maintain itself in equilibrium within the system. The sum of the sub-system's outputs becomes the system's output. The system's output attempts to fill perceived needs in the environment. The system will use feedback from the environment to identify goals and to remain stable, this is called homeostasis (Ashby, 1976). In Systems Theory the business organization would be termed a 'cybernetic system' (Odiorne,

1978).

Schoderbek et al state the levels in the organizational hierarchy are readily discernible and their attributes studied. The first level is that of simple goal maintenance. Goals are set higher up in the organization and system's performance is regulated through negative feedback. Goal attainability depends on identified needs in the environment and how well performance can be measured against them. This level cannot actually set up levels of output but only strive to achieve them.

At the second level, deviation from pre-set goals is not automatically reduced as it occurs. The cause of the deviation is analysed and, in the light of experience, the goal can be changed. The ability to make decisions is based on recall or memory. By way of example, a sales manager who has been given set sales levels for a specific time might know from experience that he can expect higher or lower sales levels than the levels he has been given. Accordingly, he adjusts his inventory based on this experience.

The third level is that of reflective goal changing. Feedback is of an anticipatory nature. The environment is actively searched for information indicating future trends. This is used to predict impact on the organization. Subtle manipulation of the environment is done to see what happens. Based on feedback, alterations to goals can be made either to take advantage or to offset the effects. This level is one of

active learning in which experience in similar situations
is recalled and used to meet new requirements. This level
sets goals and provides feedback for lower organizational
levels. Information is the key to this level's operations,
both internal and external. Without external information the
organization can only react to environmental changes rather
than anticipate them. As illustrated by the North American
Automotive Industry in the early 1970's, this mode of operation
can have disastorous results. Without internal information
problems pertaining to sub-system's operations cannot be
perceived and rectified.

Systems Theory and Training

Ideally, training is on the boundary between the second
and third levels of the organizational hierarchy. It is
generally one of the organization's sub-systems and at
least some of its goals are set from above.

As the organization searches its environment for needs
that it can meet, problems of production can arise. If the
cost of production is so high as to endanger organizational
profits then problems are said to exist. Most organizations
in the business world exist to make profit. The goal of the
training sub-system is to aid the profit sharing ability of
the organization by solving those problems that are
addressable by learning (Craig, 1975).

The training sub-system actively searches internally

and externally to identify for problems to solve. Deviations
from norms are classed as beneficial or harmful. Those that
are considered harmful and reducible through training are
addressed. Those considered beneficial and amplifiable through
training are also addressed. The training sub-system is
therefore an important feedback mechanism for the organization.
Training needs in the organization can be anticipatory in
nature, such as developing training programs in advance of
changes due to technological change. This type of behavior
is only possible if the sub-system is of an open loop type
(Odiorne, 1978). To be open loop, training must function
at least partially on the third level. When training goals
are set from above but are unrealistic they are reduced, when
this occurs the sub-system is operating on the second level.
The training sub-system cannot function effectively if it
is on the first level.

Training as a Sub-System Among Sub-Systems

The boundaries of the training sub-system are considered
to be determined by the range of organizational problems
resolvable by learning interventions provided through
training. Most training problems will fall into the categories
of production and operations (Craig, 1975). These boundaries
are quite arbitrary as the distinction between training
and other personnel problems is often unclear.

All sub-systems depend on the allocation of scarce
resources given by the highest levels in the organization

for survival. There is often fierce competition for these resources among the sub-systems (Blauberg, Sadovsky & Yudin, 1977). Those sub-systems that most effectively convert resources to desired outputs will be rewarded by more resource inputs. Those that are inefficient will be deprived of them. Training has been traditionally weak in proving effectiveness and in consequence is often severely restricted or eliminated during times of fiscal restraint (Cullen, Sawjin & Swanson, 1979; Kearsley & Compton, 1980; Zenger & Hargis, 1982). Training must be able to perceive and solve problems that are considered important to the organization in terms of its ability to generate profits. It must solve these problems in a cost-effective and timely manner and express results to the higher levels in terms of cost savings and increased profitability. If this is not done the sub-system can lose its resources (Craig, 1975).

Characteristics of the Training Sub-System

The Training Sub-System should exhibit characteristics of systems and sub-systems as specified in the the Systems Approach to Training (SAT). This widely accepted approach, is described as, "The application of a logical, interacting series of steps between the identification of a necessary task or problem and the provision of a trained person to do that task. The application of the Systems Approach to Training provides a structure for the management of training; it ensures an orderly approach to the goal of relating training to the job."

(Canadian Forces Publication 9000(1) Part2, 1979). An additional
key element, is that Learning Theories are applied to solving
identified training problems (Odiorne, 1978).

The training sub-system is basically cybernetic in structure
and operation as illustrated below:

```
INPUTS-------->PROCESS--------->OUTPUT
     |               |              |
     |               |              |
     |               |              |
     <-----------CONTROL----------->
```
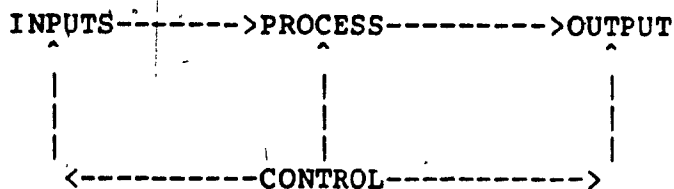
As described earlier, the sub-system can either be close
loop (Goad, 1982) and Canadian Forces Publication(CFP)
9000(1) Part 2, 1979 or open loop (Odiorne, 1979). It was
was felt that Odiorne's model was better suited for this
Project because a close loop system can only evaluate
its own performance. It cannot determine if its operations
helped the organization to achieve its goals. In addition,
any organization that chose to operate in the close loop
mode could do so by not actively addressing it environment.

Goals are the key to the sub-system's operations and their
importance cannot be over-stated. The objective in training,
is an outline of the precise performance towards which the
training is directed (Mager, 1975; Boston, 1972). Goals form
the link between operational requirements and the training
process (Griffin, 1982).

From the environment and from within, the organizational
training needs are identified. The sub-system processes

these in 'The Analysis Phase' (Goad, 1972; Odiorne, 1978).
The results are expressed as training objectives which are
written in precise behavioral terms. These become inputs for
the next phase, 'The Design Phase' (Craig, 1975; Odiorne, 1979;
Boston, 1972). In this phase the objectives are processed
into sub-objectives and sub-sub-objectives. These form the
link between what the trainee must be able to do and what he
must know to do it. At this time learning sequences, teaching
methods, training and learning aids are all developed
(Gagne & Briggs, 1974; Davis, Alexander & Yelon, 1974; Gropper,
1975; Briggs, 1981). It is here that operational requirements
and learning theories meet (This, 1980). This approach
is efficient as it maintains, through the objective, the
link between operational requirements and training. It is
effective as the training is designed to meet the need by taking
into account the characteristics of the trainee and the available
training resources (Hannum & Briggs, 1982).

The sub-system can be considered effective if the
trainee can achieve all objectives. This means that the
processes of evaluation and validation are essential
control mechanisms of the sub-system. Evaluation is
particularly important in the case of newly developed or
acquired training programs. The purpose of evaluation is to
identify and rectify problems that may exist with the training
program itself and as such, is an integral part of the SAT (Dick &
Carey, 1978; Briggs & Wager, 1981). Evaluation assess whether

the learner achieved the stated course goals?" (Hannum &
Briggs, 1982). Validation is the mechanism that ensures
the sub-system's output is meeting identified organizational
goals and problems (CFP 9000(1) Part2, 1979). Without validation
the sub-system cannot maintain equilibrium.

The elements of the training sub-system are in their
own right sub-systems, although the term sub-sub-system will
not be used here. The arrangement of the elements is essentially
hierarchical in structure (Goad, 1982).

The Elements of the Training Sub-System

The characteristics of the training sub-system were derived
from a variety of sources, many already referred to. Few,
however, dealt with the process as a complete entity. Basic
outlines were provided by Goad (1982) and Craig (1975). These were
supported by many specific sources such as Mager (1972) for
Objectives, Gropper (1975) for Instructional Systems Analysis,
Craig (1975) for Organizational Analysis, Kearsley and Compton
(1981) for Training Effectiveness Analysis and Shelley and
Cashman (1981) for Systems Analysis and Communications.
It was by synthesizing these sources that the basic training
model for the Project was developed (See Appendix A). It is
generally acknowledged that these researchers have produced work
that is effective in the domains addressed.

Analysis Phase

The key operations for this Phase involved the identification of organizational training needs through analysis. The training sub-system must be aware of the impact of the larger organization on its operations (Schoderbek et al, 1975). It must know the short and long term goals of the organization, this tends to reduce problems that could arise later. Training must align its own goals and policies to those of the organization (Mc Ghee & Thayer, 1961; Kilpatrick, 1975). Usually at this point an organizational chart is constructed (Craig, 1975).

Once a clear idea of the direction the organization will be taking is known it becomes possible to determine how training can help it achieve its goals. This is accomplished through the Situation or Organizational Analysis. Many aspects of the organization are studied, including manpower requirements, employee satisfaction and goals. Consistent patterns of problems are noted for further investigation (Becker, 1981). It is also important to predict future organizational trends. This is often done by employing The Delphi Technique. Consistent predicted changes may have future implications in terms of training requirements. Once possible problem areas are identified, they must be analysed for training appropriateness.

Many sources point out that most organizational problems are resolvable through methods other than training (Mc Ghee et al, 1961; Yager, 1981). With this in mind, all problems must

be carefully analysed before committing resources to them. Problems should be ordered begining with the potentially most important one first. Many problems that at first appeared to be training problems will, upon examination, be otherwise. Even training problems should be analysed to determine if cheaper alternate solutions will suffice, such as job aids and checklists (Taylor & Lippiate, 1975; Mager & pipe, 1972). The small business training sub-system possesses few resources and must only commit them in areas that will bring the highest returns on the training investment (Steele, 1981; Becker, 1981).

Once a problem is deemed to be resolvable through training the cost of the problem to the organization must be determined. This often involves the conversion of non-monetary measures such as absenteeism rates, scrap rates, turnover rates and accident rates into dollars. This must be done as the organization communicates through dollars (Craig, 1975). It is also useful to calculate how the problem indirectly affects the organization or what Mager et al (1972) refer to as the 'Ripple Effect'. The total cost of the problem can either be projected over a period of years to realistically heighten the impact.

Before the commitment of training resources is made, higher management's view on the more expensive problems should be obtained. There are times when management will not allow training on a given problem due to unforseen circumstances (Mc Ghee et al, 1961). Only the most expensive management

approved problem that will give the highest payoff should be pursued. Usually, the small training sub-system can only handle one such problem at a time (Steele, 1981).

Once the training problem is identified it is possible to begin the essential last step of the Analysis Phase, the Job Analysis. This actually involves two distinct but highly related processes, the Job Description(Occupational Analysis) and the Task Analysis. This analysis is critical as from it comes the objectives for the next Phase. The Job Description will produce a document that will outline the major responsibilities of the job, how many persons should do it, how well, how often and under what conditions (Craig, 1975). With this information, the extent of the training requirement can be determined and a projection can be made of the number of likely trainees to pass through the training during its lifetime can be made (Ricard, 1981).

The next step is to determine the actual job behaviors. This is done through the Task Analysis which breaks the job into minute detail. All observable tasks and sub-tasks must be identified and sequenced correctly. It must be possible to do the job from the results of the Task Analysis (Briggs, 1981; Davis et al, 1974). Areas requiring training can be isolated from the analysis and rewritten as performance objectives (Mager, 1975; Mager et al, 1972). There are various techniques for performing the analysis such as the Graphical Task Analysis Technique (Ricard, 1981). This technique results in a flowchart model

of the job. Once the Task Analysis is complete it is possible
to enter the next phase, the Design Phase.

Design

In this Phase training course objectives are determined
in great detail. These objectives must be derived from
training needs. Objectives are broken down into the
smallest worthwhile tasks (Mager, 1975). These should then
be logically sequenced by going from simple to complex, in
order of instruction or in order of performance on the job.
At this point, with an overview of what will be taught, it is
possible to decide whether to buy or develop the training.
Small training sub-systems are usually better off buying
training whenever possible due to high developmental costs
(Fisher, 1981). Fisher states that even if the training is
not ideal it usually can be modified for less than the cost
of developing it in-house.

If it is necessary to develop the training, then the
process of Instructional Systems Design must be followed.

The Instructional Systems Analysis

The goal of the Instructional Systems Analysis(IA) is to
produce instruction that will effectively satisfy the training
need. The process begins with the identification of the skills
and knowledge that the trainee will require to achieve the
instructional objectives. The minimum entry skills are determined
by an analysis of the trainees themselves to produce what

is known as a Target Population Report (TPR) (Davis et al, 1974).
A detailed analysis of available resources, facilities and
instructional skills of instructors is also done at this time.
Additionally, the cognitive level of instruction for each
instructional objective is determined (Bloom, 1956). This will
allow for a match up between instructional needs and
methods, media and aids available. At this point schedules
can be constructed in light of such factors as saturation,
tempo and intellectual activities. In this manner an
instructional strategy is developed.

Once the instruction has been developed, it is necessary
to go through the process of Formative Evaluation.

Formative Evaluation

Formative Evaluation(FE) is done to identify and eliminate
any problems with materials, content, strategy or scheduling
before full-scale implementation of the training (Dick et al,
1978). Errors not discovered before implementation can be costly
in terms of time and money. Dick et al (1978) detail a three part
approach to FE that is very effective. These parts are:

> 1. One on one testing. This involves the Prototype of
> the instructional package, the designer and several
> persons who are representative of the target population.
> The designer sits with each person throughtout the
> package while the trainee does it. This process
> reveals gross errors in the instructional design.

2. **Small group testing.** This second stage involves the
course designer, trainers and groups of representative
trainees. The instructional package is in a more
perfected state at this point. The designer will observe
the instructional process as it occurs. Errors in
learning sequencing, instructional methods used and
general adminstration will be uncovered by the process.

3. **Fieldtest.** This stage of the process is undertaken
by an actual group of representative trainees and their
trainers. The instructional package is in a virtually
finished form. The identification of administrative
problems is the primary purpose of this final stage.

Each succeeding phase of FE results in a more perfect package.
This reduces the possibility of having to make costly design
changes after implementation. It is not always possible to
undertake each part but at least one on one testing must
occur before implementation. During the FE process, tests
can also be evaluated for face validity and sometimes
reliability (Gronlund, 1976).

Evaluation does not cease once the course is implemented
but continues in the guise of Summative Evaluation.

Summative Evaluation

Summative Evaluation(SE) is an ongoing process that is
designed to ensure that the course effectively achieves
its designed instructional objectives. This is a particularly
valuable form of evaluation as it allows for changes to

courses as required due to constantly evolving conditions,
such as changes in the Target Population or in training
resources and requirements.

External Evaluation

External evaluation is a key feedback process of the SAT
as it provides feedback to all sub-elements of the system. It
has the primary role of measuring the degree to which training
addresses the needs for which it was designed. Problems that
have occurred at any point in the training process will
be brought to light here. The tools of the process are essentially
the same as other forms of evaluation, questionnaires and
techniques of observation, but they are applied once the
the trainee has been back on the job for several months.
It is conceivable for instructional objectives to be achieved
but the training outcome still may not resolve the original
training problem. Validation will show this problem
and provide appropriate feedback to eliminate the deviation.
It is such an important element of the SAT that it is considered
to be the key to the CFITS (CFP 9000 (Part2) 1979).

Drew (1980) recommends that validation follow a
process of establishing a data base through observation then
constructing a questionnaire to gather data on a large scale.
Care must be taken to ensure that all data is objectively
gathered or else the validity of the analysis is at risk (Chase,
1978). Chase recommends that when sample sizes are less than

20 that observation be the sole data gathering instrument.
Data can be gathered through checklists and rating scales
in observation. However, subjectivity is a problem with
observation and it is difficult to gather statistically useful
data with this method. The questionnaire, although time
consuming to construct, provides more objective and statistically
useful data. The 'Design and Use of Questionnaires in Training',
(1975) is a very useful source for questionnaire design.

Cost-Effectiveness Analysis

Proving a course is cost-effective is one of the most
important but difficult elements of the training process
(Craig, 1975). The purpose of Cost-Effectiveness Analysis
is to prove to the organization the value of the results of
training exceed the cost of the training. The biggest problem
is proving that reductions in accidents rates or in turnover
rates are due to training and not other factors. If a course
should not prove to be cost-effective it must be altered to become
so. Cost-effectiveness can be realistically heightened by
projecting the savings over the expected lifetime of the course
(Kearsley et al,1981; Cullen et al, 1978).

Communications of Results

The communication of results to higher authorities is
the last step to be included with the training process.
Communication occurs at all times of course, but it is a
matter of convenience to separate them by type. Poor

communications have been the downfall of more than one training
sub-system (Kelly, 1980; Craig, 1975 & Ricard, 1981). The
characteristics of effective communications are in the style,
length and the format. These should be concise, systematic
and vary according to the management level addressed (Shelley
et al, 1981). In training, formal communications should occur
in the initial stages of development, the process stage
and the reporting of results stage. It is general practice
to decrease the size and detail of reports with ascending
managerial levels. Terms used should be in the language that
the higher authority will relate to and be familiar with,
mostly dollars.

The Method

Determining the best method of presenting the SAT to the
user was the next step in the research. A wide range of media
is available. The appropriate method for the Job Aid was
determined by studying the nature of the subject matter, resource
constraints and by the characteristics of the intended user
population which at that time were very imperfectly understood.
The problem was compounded by the variance in skills, knowledge
and experience among the intended users (Zemke, 1982). The
amount of information that could be presented to them at one
time was unknown. There was even doubt about their acceptance
of the SAT. The idea was to introduce the SAT in such a way
that users would adopt it. The algorithm or quasi-algorithm

seemed to provide a way of achieving this as each is used to
present and apply complex rules of decision making and problem
solving in many different areas of application (Horabin & Lewis,
1980; Lewis & Woolfendon, 1969).

Algorithms and quasi-algorithms have been successfully used
in a variety of training and educational problem situations.
They have also been used for the management of training in
such organizations as NASA (Duffy, 1976) and the USAF (Caves &
Wilkinson 1977). There are many examples of them being used in
all aspects of the training process such as the instructional
process (Duffy, 1976; Schmid & Gerlach, 1978; Aagard & Bradly,
1976), job and organizational analysis (Tashker et al, 1982;
Kopstein, Kingsley & Giebold, 1978) and in evaluation and
standards (Kopstein et al, 1978; Aagard et al, 1976).

Before finally deciding to use an algorithmic or quasi-
algorithmic method for the Training Job Aid it was necessary
to learn more about them.

Characteristics of Algorithms

An Algorithm is a communications tool which tells people
how to do things. It allows them to solve problems that are
of interest to them. It should have a carefully designed
set of instructions that will allow the user to turn out
a nearly perfect performance at once (Horabin and Lewis,
1980). This general description of algorithms is supported
by notable others such as Landa (1974) and Kreitzberg and
Scheiderman (1975).

The algorithm must possess the properties of Replicability, Resultivity and Generality (Landa, 1974). Resultivity means that no matter how many times the algorithm is followed, for a given procedure, the result will always be correct, provided the user possesses the requisite entry skills to use it.

Replicability, the second attribute of algorithms, implies that the algorithm must be unambiguous. It becomes obvious that instructions have to be absolutely precise as only one course of action can lead to a correct outcome. They must include precise statements of the nature and conditions of each action. Therefore, if two persons perform a given task, following an algorithm for that task, the results will be correct provided that the data sets are the same.

The final attribute of algorithms, is that of Generality. This means that an algorithm must be capable of solving a whole class of similiar problems. Horabin et al (1980) have shown that Generality depends not on the nature of the subject matter but on laws, natural or man-made. Algorithms developed for science and engineering are called grounded because they are based on hard or grounded laws of nature. Algorithms developed for games or for form filling are called agreemental as the man-made laws they are based on are founded on agreement. The type of law that the algorithm is founded on is of little consequence as long as it possess Generality for that class of problems.

The Quasi-Algorithmic Prescription

It was very clear that the Training Job Aid could not be designed as a true algorithm because it would lack the required precision of outcomes demanded by Landa (1974). Fortunately, Landa (1974) had foreseen such situations and had prepared an alternate solution which he called the quasi-algorithm.

The Quasi-Algorithm fits the same general description as given for the algorithm. The only major difference is that the precision of outcomes required for algorithms is relaxed and that Resultivity, Generality and Replicability need be ensured only in a general way. This makes the quasi-algorithm an ideal tool for the Social Sciences such as Education because they allow for the semantic interpretation of results, therefore mathematical derivation is not necessary.

The Medium

In determining which medium to use for the Job Aid a number of factors were considered. The most important ones included expense, user utilization facilities and production time.

This resulted in a paper medium being selected. It was fairly inexpensive to reproduce the Job Aid in this manner both in money and time and it could be guaranteed that the user would be able to use it without special facilities. Additionally, costs of revisions would also be reduced by using paper as the medium.

Language for Optimizing Graphically Ordered Systems(LOGOS)

Of the many possible ways to present the Training Job Aid, the flowchart seemed to offer the best way of efficiently representing the system while at the same time retaining the attributes of the quasi-algorithm. Flowcharts have been used succesfully for many years to map out complex computer programs (Kreitzberg, 1975). Horabin et al (1980) provide many useful examples of quasi-algorithmic flowcharts which have been used successfully for training purposes. Silvern (1969, 1972) has used this method over the years with the USAF and other large organizations. His formalized flowcharting language is called LOGOS.

Flowcharting is a visual representation of the ordering and interrelationships between the elements of a system in such a way as to make the whole understandable. In this way the complex training sub-system could be represented in the simplest manner. This would also reinforce the function of the quasi-algorithm which is to provide a conceptual framework of problem solving that would be internalized, through use, by the user (Landa, 1974). Representation of the SAT through flowcharts promised to be useful for showing the novice trainer the logical links between it processes. It was hoped that this would make clear the reasons why there are so many steps involved in training.

LOGOS: A Language for Modeling Systems

Originally, LOGOS was intended to facilitate clear and concise communications by the simplest means (Silvern, 1969).

A clearly defined language forces the author to select from a restricted set of symbols. LOGOS thus becomes either algorithmic or quasi-algorithmic in nature. Silvern Describes LOGOS as a, "...graphic language that uses alphanumerics and other symbols and shapes to represent fundamental vocabulary elements. The purpose of LOGOS is to communicate the thought or concept of a group of words or string of characters in another language."

In its simplest form LOGOS uses alpha characters to form groups of words which, when combined with LOGOS symbols, produce a flowchart. In more advanced applications, the groups of words are supplanted by mathematical equations. This final version is very precise in nature. Originally, Silvern used LOGOS for representing systems in engineering but later used the alpha form for educational applications (Silvern, 1974). The basic LOGOS symbols are illustrated by Table 1.

Insert Table 1
About Here

LOGOS and Systems

LOGOS allows for the representation of system's attributes including:

      1. The structure of the system;

      2. The ordering of the parts;

      3. The relationships between the parts; and

      4. The relationships between the parts and the whole.

LOGOS can be used to model any variety of systems (Silvern, 1969). If a system is composed of two or more relational systems, each part is called a sub-system. When sub-systems are composed of smaller parts these are called sub-systems as well. It is possible to synthesize systems into larger systems called super-systems. This occurs when two seemingly unrelated systems are found to have a clear relationship. This process continues when two seemingly unrelated super-systems are linked to form supra-systems and finally meta-systems.

Systems models using LOGOS are developed through Systems Engineering which includes:

      1. _Analysis._ To identify the problem from existing information and to derive the elements and their interrelationships;

      2. _Synthesis._ Combines unrelated relationships and their elements into new wholes;

      3. _Models._ Designed as constructs, which can predict effectiveness, without implementing the system; and

4. <u>Simulation</u>. The final step, designed to generate alternate solutions.

Silvern (1969) states that for a LOGOS flowchart to be valid it must be developed through System's Engineering. The main advantage to the user is that LOGOS offers the opportunity to analyse the system's elements and their relationships without using mathematical simulation.

<u>LOGOS Modification</u>

For the sake of simplicity, only a subset of LOGOS rules was used for flowchart construction of the Training Job Aid. Not all of the language elements were used, for the sake of simplicity. Feedforeward Signal Paths, Feedback, Interference and simple intersecting path sysmbols were dispensed with. Other modifications included additional symbols to indicate binary decisions and additional information. It was important that all decision points be clearly indicated and that the user was provided with supporting information which was not part of the LOGOS symbology(See Table 2).

Insert Table 2
About Here

The flowcharts were designed to be scroll-like in appearence as an attempt to simplify the appearence of the flowcharts.

<u>The Training Job Aid</u>

The prototype of the Training Job Aid was developed
through a logical and systematic process as outlined in the
Literature Review. The Job Aid went through an evolutionary
process of design, reconsideration and adjustment to reach its
prototype form. One of the biggest problems was in providing
the user with sufficient content. It was difficult to determine
the cutoff point between overwhelming detail and insufficient.
The only logical thing to do was to set the entry skill level
at what was hopefully the correct level and see how the Training
Job Aid stood up to evaluation and then make required changes.

The overall method of using the Training Job Aid was kept
as simple as possible. The Training Process Flowchart(TPF)
represents the highest level of the system. As such, it gives
an overview to the entire training sub-system, including decision
points at that level. The elements with associated sub-systems,
have the letter 'A' in their numeric code, for example 1.A. The
user simply has to locate flowchart '1.A Organizational Analysis'
to find the sub-system. In addition the flowcharts themselves
are provided with margin tabs at the top of each to allow for
quick identification, there is also an index provided as an
alternate means of identification. For those few sub-systems at
the third level of the hierarchy, they are accessed directly
through the associated second level flowchart. As illustrated by
Appendix B the basic method of coding maintains the logic and
continuity of the process from element to element and level to
level(See Appendix B).

The Training Job Aid at this point was considered to be in a sufficiently developed state to undergo formative evaluation. This became the focus of the balance of this Project.

Summary

The Literature Review provided essential background for this Project. It allowed the approach, the content, the medium and the evaluation process to be developed. The result of this was the production of the prototype of the Training Job Aid which was then submitted to the formative evaluation process.

Chapter 3: A Justification of the Content and Quasi-Algorithmic Structure of the Prototype Training Job Aid

The purpose of this section is to justify, by explaining the logic of its content and quasi-algorithmic nature, that the prototype of the Training Job Aid was ready for testing.

It was essential that before testing could begin that the Training Job Aid be in as complete a state as possible. This required that the content and the logic be in place and that the whole be organized as a quasi-algorithm with those attributes prescribed by Landa (1974). Basically, all of the work that could be done without testing had to be done at this point.

The Content

It was difficult to clearly distinguish between content development and the development of the quasi-algorithm using Silvern's (1969) Systems Engineering Approach to LOGOS Flowchart construction. Obviously the two were highly interrelated. The content was derived exclusively from existing sources as outlined in the Literature Review previously. The reason for doing this was that these researcher's work has been validated in the light of experience. There was no reason to modify it except for adjustments to compensate for entry skill levels of the target population. The logic of each of the sub-system's processes was preserved through the flowcharts. The only 'novel' thing about the approach

was that the whole SAT was presented through LOGOS Flowcharts.

The main concept of each process studied became an element of the Training Process Flowchart(TPF). This is the highest level flowchart of the Training Job Aid. Supporting detail was incorporated into the second and third level flowcharts. The main sources for the TPF were Ricard (1981), Craig (1975) and Odiorne (1979). Fortunately, the degree of consistency within the literature made it quite easy to standardize the detail. This consistency generally was true of the subordinate detailed flowcharts as well. Variance in the literature seemed to be highly related to the uniqueness of the situation studied. The purpose of the Training Job Aid was to generalize of course.

The following is a brief flowchart by flowchart description of the content of the Training Job Aid.

The Training Process Flowchart

The content of this chart represents the overview of model of the SAT used for this Project. The content is, as outlined above, conventional. The numeric coding and the information flow arrows form the links between the elements and the lower level flowcharts. The user, by referring to the TPF, is presented with a simplification of the training subsystem which is intended to reduce its complexity. The TPF also illustrates major training process decisions to be taken. For simplicity's sake, all decisions are of a binary nature.

Only major feedback loops are provided at this level. This appears to create a close loop system. However, to undertake the Goal and Situation Analysis requires data form outside the organization, so the sub-system is in fact open loop.

The main purpose of the TPF, in conclusion, is to provide the user with a simplified overview of the sub-system and to illustrate major decision points and feedback loops.

Determine Organizational Goals

The content for this flowchart was derived largely from Schoderbek et al (1975), Craig (1975) and Becker (1981). The purpose of this process is to determine how management perceives organizational goals and the direction the organization will take in the near and long term future. It also gives the trainer insight to the structure of the organizational power hierarchy. By knowing what direction the organization will take and what the goals are it allows the training sub-system to anticipate training needs and to align its own goals with those of the organization. This will maximize the chances of the sub-system being perceived as useful by the organization.

The output from this process, through the TPF, becomes input for the Situation Analysis.

The Situation Analysis

This is a two level flowchart. Its content was largely

derived form Craig (1975) and the CFP 9000(1) Part 2 (1979).
It emphasizes the need for deriving potential organizational
training/problems, both current and future. This is consistent
with an open loop training sub-system (Odiorne, 1979).

Questionnaires and interviews are the main data gathering
tools and are so critical that an ancilliary flowchart has
been developed. This is referred to frequently not only by
the Situation Analysis but throughout most of the flowcharts.

The Situation Analysis flowchart is designed to identify
broad problem areas and to determine if the organization's
situation will interfere with management's objectives determined
previously.

Potential problems are arranged from the most expensive
problem first and the least last. This is because of the
limited training resources available. The training sub-system
must invest resources only in those areas with the largest
potential payoffs. Problems that would be of interest would
be those that interfere with organization performance
potential and profit generation.

The output of this process is a list of priorized
potential training problems. This becomes input to the
Organizational Problem Analysis and is clearly indicated by
the TPF.

Organizational Problem Analysis

Important sources for this flowchart were Mager et al,
(1972), Mallory (1981), Mc Ghee (1961) and Taylor et al

(1975).

At this point the sub-system is aware of potential
training problems as indicated by previous elements in the
sub-system. It must now determine which ones are training
related. It is essential that only the most serious problems
be addressed.

The first stage of the analysis focuses in on the general
problem, who says there is a problem, where it appears to be
and the validation of its existence.

If a problem does exist the next step is to classify it
as training or non-training resolvable. This is done here
largely on the basis of a set of criteria derived from Mager
et al (1972).

Even if a problem is deemed training resolvable it is
analysed further to determine if alternate methods can be
used to solve it. Training must be justified as the only
method for solving a training problem. If at any time the
problem is found resolvable by other means then feedback
loops in the flowchart indicate that another problem from
the list should be selected for analysis.

If training is deemed the correct solution then this
will be the input for the next part of the sub-system.

Standards

Before the training process continues further a critical
question must be answered, "Do job standards exist?" Mager et

al, (1972), Mager (1972) and Kelley (1980) provided the sources
for the content for this flowchart.

The TPF asks if standards exist for each identified
training problem because if a person does not know how well he
must perform his job or even what his job tasks are then there
is no way to reduce performance discrepencies. Problems will
arise that, on the surface, appear to be training problems.

In a small organization it is possible for the trainer to
become involved in the establishment of job standards (Becker,
1981). The flowchart provides the process by which this is
done. The process is very similiar to performing a Job
Analysis.

It is essential that standards be based on objective
criteria and be set at logical levels. It is essential that
if the standards are consistently met then the problem will
disappear. Standards must be dynamic and evolve over time
as necessary.

Once standards are established it is necessary for
time to pass to determine if the problem has been solved.
While this is occurring the TPF indicates that the training
sub-system should be addressing other problems on the list.

Enforce Standards

If standards do exist or they have been set and the
problem still exists then it is necessary to determine if
they are being enforced. Often the failure to enforce
standards is an indication of training problems within

the first level of management. Thus what appeared to be
a performance problem can turn out to be a problem of
supervisory training (Ricard, 1981; Craig, 1975 & Mager et
al, 1972).

This flowchart also has two levels. This reflects the
complexity of the problem if it is due to a lack of skills
on the part of first level managers. In small business the
trainer may be expected to solve this problem (Becker, 1981).

The approach used here is to provide information to the
supervisor in the form of checklists, rating scales and even
coaching. In the final event it may be necessary to obtain
higher management's authority to force the issue.

The flowchart indicates that if it is not possible to
enforce standards then there is no need for further
intervention. The TPF loops back to choose the next most
expensive problem on the list to analyse.

On the other hand, if standards are being enforced and
they are realistic and the problem still persists, then it
can be addressed as a training problem. The parameters of
the problem become input for the Training Problem Analysis
Flowchart.

Training Problem Analysis

Ricard (1981) and Craig (1975) provided most of the
content for this flowchart.

The flowchart clearly illustrates the importance of

calculating the cost of the training problem in dollars and cents. This involves the translation of many non-dollar units. It is also critical to calculate indirect costs of training as well (Mager et al, 1972).

There are really no major decisions to take within this process as it really outlines how to do an audit of a training problem. This will be used when presenting the problem to management for approval for action to be taken.

The TPF uses the output of this process to compare the cost of each identified training problem. This process is clearly illustrated by feedback loops. Only the most expensive problem will be acted on.

Prepare Report to Management

The main source for this flowchart was Shelley (1981). It was difficult to decide where to place this flowchart as it really is not part of the SAT. Shelley (1981) indicates that major presentation reports are made to management usually at the beginning and the end of projects with updates provided on an agreed upon schedule. Therefore, this flowchart was given two numeric codes to reflect this, even though sub-elements are only provided with the first it is assumed that the user will understand.

The flowchart outlines the development of a presentation that is directed to the audience in as clear and concise a manner as possible. It also addresses the management level the report is directed to and which report it is, first or last.

Presentation principles and information are also provided. Shelley (1981) points out that presentations made with these principles in mind maximize the chances of success.

In the case of the first presentation, that of the problem, the training sub-system must await management's decision before proceeding with further action on the problem. Mager (1972) points out that sometimes management will not allow action to be taken on a problem for unforseen reasons. If this should happen the TPF will loop back to the next most expensive problem on the list to begin again.

If management allows action on the problem then this will be used as input for the Job Analysis.

Do Job Analysis

The major sources of content for this flowchart were Craig (1975), the CFP 9000(1) Part 2 (1979), Ricard (1981) and Gardner (1981).

This is a crucial stage of the SAT so a fairly detailed two level flowchart was necessary to outline the processes. Most researchers indicate that both the content and conditions of job performance must be determined in depth. It is also important to determine early in the analysis if major job restructuring is likely in the near future (5 years). These requirements, as well as the need for only objective data, are clearly illustrated by the flowcharts.

The ouput of the process is a detailed job specification.

This allows optimal performance to be measured against actual to help identify training needs. To aid this process the user is provided with a fair amount of suggested data types.

Before the job specification can be produced it is necessary to develop a detailed task inventory of the job. This is where the third level flowchart is needed due to the complexity of the task. This flowchart is based on Ricard's (1981) Graphical Task Analysis technique. The flowchart is set up to illustrate the flow of this process in detail as well as the roles of the participants. The outcome is a highly detailed flowchart showing the tasks, in detail, of the job being analysed. The flowchart also provides critical decisions that must be taken when assessing the outcome of the analysis

The results of the Graphical Task Analysis are returned to the second level flowchart and compiled to produce the job specification. This becomes input for determining training objectives.

Develop Course Objectives

This flowchart represents an essential part of the SAT. Its content was primarily taken from Mager (1972).

The development of course objectives forms a direct link between the Job Analysis and the Problem Analysis. The First part of the flowchart does not involve major decisions. The emphasis is on relating the Job Tasks to Performance Objectives. It is fundamental that these objectives be based only on objective criteria. Once all of

the objectives have been written they must be arranged in sequence.

Most objectives at this point will be too general to be used as course objectives. Therefore, objectives will be broken down into smaller component units. They will be written in the three part format advocated by Mager (1972). These objectives are then assembled in sequence as well. The next step is to determine what constraints could prevent these objectives from being attained.

The final part of the flowchart deals with the development of test items for each course objective. The purpose of such tests is to determine if success on the test means that the trainee can perform the performance objective.

Test to Determine if Course Outcomes will Match Job Tasks

Major sources of the content for this flowchart were Briggs et al (1981), Davis et al (1974).

The purpose of this flowchart is to ensure that training is directly relevant to the job. To ensure this test items are derived for each objective. The flowchart outlines the criteria for test design, test reliability and validity.

Additionally, requisite skills and knowledge needed to achieve each objective are also determined and tested. The tests must ensure that if the individual suceeds at the test he will be able to perform those tasks on the job. This will maintain the link between course objectives and organizational needs.

The output of this process is tested by the TPF for validity. If course objectives do not match job tasks or if test items do not match job performances then the TPF will loop back so alterations can be made.

If all is valid then the output of this flowchart will be used as input to the 'Do Purchase or Develop Course Analysis' flowchart.

Do Purchase or Develop Course Analysis

This essential process is primarily one of analysing information and making decisions on whether to purchase or develop training. The content for this flowchart was derived from Craig (1975), Ricard (1981), Stein (1981), Kilpatrick (1980) and Fisher (1981).

The flowchart reflects the logic of the small business purchasing existing training whenever possible. It is usually cheaper to buy training and then modify it than it is to develop it from scratch.

With course objectives available it is quite straight forward to match these with existing training packages for the best 'fit'. The flowchart also matches constraints with what is available. The general approach is that for small business developing training is a last resort.

The outcome of this process is a decision to either buy or purchase training. If it is necessary to develop the training then the complex process of Instructional Systems

Analysis must be followed.

Do Instructional Systems Analysis

The content of this lengthy flowchart was derived from Briggs (1981), the CFP 9000(1) Part 2 (1979), Davis (1974) and Gropper (1975).

This flowchart begins with what is essentially an inventory of training resources, constraints and the characteristics of the Target Population. These are then matched with intended learner outcomes. When these are related to cognitive levels of learning (Bloom, 1956) instructional objectives are produced.

The next step in the process is the selection of the best choice of media to match the instructional objective. The flowchart takes into consideration that this match must be done in the light of resource constraints.

With the instructional package at this stage of development it becomes possible to calculate the instructional time required for each objective. These times are then summarized to produce an estimate of the training time. Time constraints are then considered and if necessary, alterations are made to the instructional package to conform to them.

Next, lesson plans are developed for each instructional objective. These are based on the principle of the Developmental Lesson Plan. Assessment strategies are also developed at this time. They are based on either 'Norm' or 'Criterion' Referenced Testing types.

When the test items are completed the package is assembled into its complete-prototype form to undergo Formative Evaluation. This process involves evaluation by SMEs and then by small group testing. Feedback within the flowchart allows alterations to be made as required. Only when the process is completed can the courseware be finalized.

Do Training Effectiveness Analysis

The output of the 'Run Course' element of the TPF is trained persons. It is essential to determine if they are able to do their job in such a way that the original organizational problem is solved. This form of evaluation is often not done but it is critical to the SAT. Sources for the content included Craig (1975), Hamblin (1974), Gardner (1981) and Cullen (1978).

Initially, the flowchart outlines the ways that data can be gathered to measure trainee performance back on the job. Only objective data must be used for this analysis. It is also important to account for any factor that could cause performance change other than the training intervention. If there are contaminating factors these must be filtered out or accommodated.

Performance changes are summarized to determine if the training was effective. If it was effective a report can be prepared. If it was not then the reason(s) why must be determined. If deficiencies lie in either the course or the trainee changes must be made to the course. Feedback loops in the TPF will allow for this to happen. The cycle will be continued until the

course is considered effective.

Do Training Cost-Effectiveness Analysis

This final flowchart is designed to test to determine if the training was cost-effective. Training must be cost-effective for the training sub-system to be deemed effective. The content of this flowchart was derived from Bell (1983), Craig (1975), Kearsley et al (1980) and Zenger (1982).

The first stage of the analysis involves the assessment of all training costs. These are summarized to produce a total cost. Trainee performance figures are accumulated once they have been back on the job for about three months. Pre-test performance levels are compared to post-training. If the new figures are not higher than the old then the training is automatically not cost-effective. This indicates serious flaws, the cost of these are then calculated. The process will be terminated at this point and the TPF will loop back to allow alterations to occur. It is also possible for post-training performance figures to be higher than pre-training but the net savings may be less than the cost of the training. In this situation the training is not cost effective. The costs will then be calculated and the process terminated as before.

Only when the savings accrued by training exceed costs is training considered to be cost-effective. The TPF will continuously loop until this occurs. When a course is cost-effective the TPF will then loop to pick up another problem and begin the process again.

The Quasi-Algorithmic Structure of the Training Job Aid

The following outlines why the Training Job Aid was
considered to possess the attributes of quasi-algorithms.

The Process of Systems Engineering

The prototype of the Training Job Aid had passed through
three stages of Silvern's process of Systems Engineering.
These stages were Analysis, Synthesis and Model building.
It could be argued that as these lead to the development
of a LOGOS model and that as LOGOS is quasi-algorithmic then
the Training Job Aid had to be quasi-algorithmic. The following
outlines the process as it was completed at this point:

Analysis. In this phase the initial problem was first
identified from the materials available for research. Similiarly,
the available research was combed systmatically to derive
the basic content of the system and the system's elements
and their interrelationships;

Synthesis. The overall system had yet to be developed and
some content not normally included as part of the SAT had
to be logically related. This phase caused the synthesis
of all the content plus the user characteristics into
a unique version of the SAT; and

Model building. When the SAT was combined with LOGOS
flowcharts the model of the SAT was complete and ready
for testing.

The Training Job Aid as a LOGOS Model

If the model of the Training Job Aid was to be a quasi-algorithm it would have the general characteristics of Resultivity, Generality and Replicability (Landa, 1974). At the completion of the Model Building stage of the Systems Engineering process these attributes could only be assumed until the model was tested.

Generality. This attribute was considered to be present because the content and processes used were not new and had been used successfully in different situations. By way of example, the task analysis is done basically the same way by all organizations, it is usually only the amount of detail that varies. The Training Job Aid sought to reduce this variability by using Task Analysis results as input to the Instructional Systems Analysis Flowchart which specified the level of detail required. The danger at this point, was that ambiquity caused by the degree of detail provided or the medium used might arise.

Replicability and Resultivity. These attributes were largely content related. It was felt that as all sources were well known the liklihood of committing a systems error on content was slight. This was further reduced by prior consulting and experience in those areas sometimes overlooked in the basic SAT, i.e. Situational and Organizational Analysis. By using this approach it was felt that the chances of producing correct and replicable results for similiar types of problems would be maximized. The major potential flaw was that the content and

the medium had to be sufficiently clear to the user that he/she would be able to use the Training Job Aid without ambiguity. Ambiguity would also be a factor if the entry skill level of the Training Job Aid had been incorrectly set.

The Target Population Entry Skill Level

Although it was acceptable to arbitrarily set the entry skill level it would detract from the general uselfulness of the Training Job Aid if it was beyond the ability of the general target population to use it.

The typical small business oranization trainer is not a training specialist and often lacks relevant skills and experience to operate effectively. He/She is generally a business specialist with some expertise in systems analysis. He/She often works within the constraints of limited budgets, organizational indifference and tight time frames (Zemke, 1982).

This description implied that the Training Job Aid had to use non-jargonistic terms, be relatively elementary in approach and be easy to use. Essentially, it would form a bare minimally useble approach that could form a conceptual framework that was expandable in the future.

Simulation

Simulation was the final step of the Systems Engineering Approach. It would test the Training Job Aid to determine if it possessed the attributes of quasi-algorithms and suggest alternatives to improve deficient areas.

Up to this point it was only possible to say that by taking care and by following the Systems Engineering Approach that the chances of the Training Job Aid having the attributes of quasi-algorithms were maximized. The remainder of the Project was devoted to testing the Model with the intent of improving it.

Summary

This chapter formed the link between the Literature Review and the Evaluation phase of the Project. The prototype of the Training Job Aid was judged ready for evaluation because its content and logical flow were in place and the whole Aid had passed through the first three stages of the Systems Engineering Process for LOGOS flowchart construction thereby maximizing its chances of possessing the attributes of quasi-algorithms.

Chapter 6: The Formative Evaluation Process

The objective in formative evaluation was to determine the usefullness of the Training Job Aid as a quasi-algoritmic job aid to trainers in small business organizations. Usefulness was guaged with the following criteria:

1. Correctness of spelling and grammer;

2. Clarity of symbology;

3. Logical flow;

4. Appropriateness of content;

5. Clarity of layout; and

6. User acceptance and utilization.

As the Training Job Aid was in a prototype state it was not expected to be perfect. Feedback from the evaluation was to be used to make appropriate changes.

PART I: Validation by Subject Matter Experts (SMEs)

The first part of the FE process was in reality a validation of the content and methodology of the flowcharts by a committee SMEs (Gronlund, 1978). The validity of the data gathering questionnaire was also examined. Each SME worked independently. The committee was composed of three members. Changes were made on a two out of three basis. In some cases changes were made on the basis of a single observation provided at least one other member agreed upon re-examining the issue.

The SMEs were drawn from the local training development field. The committee members were:

1. A Professor from the Saint Mary's University MBA Program and private training consultant;

2. A Senior Training Development Officer from
The Canadian Armed Forces Fleet School Halifax
who is also a professor at Saint Mary's; and

3. The Vice-President of Human Resources for
Michelin Tire in New Glascow.

Process

Each member was given the rough prototype of the Training
Job Aid and a guide on what to evaluate. The following areas
were to be considered:

1. Errors. These were the most obvious of flaws,
including, spelling, grammer, mis-directed arrows
and other similiar problems;

2. Generality. Would all parts of the Aid be
suitable for the organizations it was designed
to be used by;

3. Resultivity. Would the sub-system as
represented, lead to correct results;

4. Replicablity. Would the results acheived
by various organizations, be similiar in similiar
situations; and

5. Organization. All of the above would be
affected by the logic and content of the Aid
as well as by the interpretation of it through
the flowcharts.

The SMEs were also left free to identify any other problem
areas they might see fit. They were asked to complete their

evaluations within one month.

The questionnaire was to be evaluated by the following criteria:

> 1. <u>Errors</u>. These included spelling, grammatical and typographical;
>
> 2. <u>Completeness</u>. Did the questionnaire ask sufficient numbers of appropriate questions to yeild the required data;
>
> 3. <u>Question quality</u>. Were the questions used open ended and unambiguous in nature; and
>
> 4. <u>Organization</u>. Were all instructions and scales concise and unambiguous in intent.

It should be noted that the questionnaire was in an almost finished form having been produced using the facilities of the CAN8 text formatting editor. The Training Job Aid was in a rather crude, but complete, hand drawn draft form. It was expected that rather more radical changes would have to be made to it before the next Phase than the questionnaire. This is why it was decided to save the expense of word-processing and photo-reduction and to do this when incorporating the corrections and changes of the first Phase.

Results

The overall results of the first Phase were quite encouraging. There was a high degree of consistency between the evaluations which made it easier to make changes.

There was no problem with the organization, as it clearly
illustrated the SAT although there were problems with the
detail. There were also rather extensive problems associated
with the questionnaire.

Problems Associated with the Training Job Aid

The expected errors in grammar, spelling and mis-directed
arrowheads did appear. An unexpected type of problem of that
nature was the tendency to state descriptors in the negative.
All SMEs indicated that this would distract the user and that
all descriptors should be positively stated.

Several rather controversial issues were raised. One
revolved around apparent inconsistencies between the structure
of the Situational/Organizational Analysis Flowchart and the
other flowcharts of the Aid. The problem was that this
flowchart had a third level in its hierarchy. The way that
it was structured seemed to make this level independent of the
second level. This problem was repeated in the Job Analysis
and Standards flowcharts although these were not indicated
by the evaluators. The appropriateness of using Standards
as part of the content of the SAT was also questioned.
One SME felt that the Training Job Aid was too complex for
the typical small business trainer. His concern was that
the complexity would reduce the liklihood of trainers using
the Aid. He also felt that the trainers would experience
difficulties in correctly interpreting it. This would cause
different interpretations which would clearly violate the

criteria for quasi-algorithms.

On a more subjective note, the SMEs as a group felt that
the Training Job Aid was a unique approach which addressed
a pressing problem and that it could make the basis for an
attractive consulting tool.

Problems Associated with the Questionnaire

The committee was generally much more critical of the
questionnaire. Other than the obvious expected errors there
was a variety of other problems.

The most serious concern was over the 'General Information'
section. This was because in the evaluator's view, the
organizational attitude towards the Training Job Aid would
be largely determined by the attitude towards training in
general. This section had to be designed carefully so as to
bring this attitude out. Two SME's stated that this section
would answer the question, "Can the Training Job Aid be used
to educate the small business organization so that it
will adopt the SAT?" A negative answer to this question could
have led to switching emphasis to larger organizations with
established training commitments. The main problem in this
section was the use of many closed questions which would
detract from the value of the desired data.

The members unanimously stated that the instructions
for 'PART C: Content' were totally confusing. Ambiguity through
the use of jargon was also a problem. Jargon, it was felt, could

easily lead to misinterpretation by the non-specialist. A final concern was the use of a six point Likert Scale rather than of five. It was also stated that the scale should appear not simply at the top of each section but with each question requiring it.

Revisions as a Result of Phase I Evaluation

All problems affecting 'face validity' were dealt with as they appeared. More serious problems were dealt with on a two out of three basis.

Major Revision to the Training Job Aid

The most extensive changes were made to the Situational/ Organizational Analysis, the Job Analysis and the Standards Flowcharts. Each had to be revised so they would b consistent with the other flowcharts in both logic and layout. This was done by attaching the second and third level flowcharts together. The entire third level flowchart was encased by systems boundary lines and given the appropriate numeric code to relate it back to its parent second level element. Information flow arrows were then drawn linking the two levels together. Finally, each third level flowchart was terminated by a 'RETURN' command to clarify the flow of the process. These changes made the flowcharts consistent with the others of the Training Job Aid.

The final problem that was corrected was that all negatively worded descriptors were re-worded to reflect the positive.

The question of complexity was not addressed as only one
SME thought this was a problem and if it was, this would come
out in the fieldtest.

Upon completion of these changes, the Training Job Aid
was redone using an AES word processor and phote-reduced to
prepare it for the next Phase, the fieldtest(See Appendix C)

Revisions Made to the Questionnaire

Due to the consistencies of the criticisms of the
questionnaire, revisions were straightforward. All ambiguous
questions were rewritten to be concise and open ended. The
instructions for "PART C: Content" were entirely reworked.
The instructions were reduced from about eight lines to
four. The statements were made concise and worded without
jargon. Seven suggested questions were included with "PART A
General Information". Finally, all Likert scales were converted
to five points and placed besides each question as needed.
one.

With these changes the questionnaire was ready to be used
as the data gathering tool in Phase II: Evaluation(See
Appendix C)

Phase II: Small Group Evaluation of the Training Job Aid

This Phase of the evaluation had two purposes. The first

was to have the Training Job Aid evaluated by a group of users
representative of the Target Population. The second was to
determine if the Training Job Aid was useful in helping
small business organizations conduct systematic training.

It was very difficult to find persons who were willing
or able to take the time to participate in the evaluation.
There were several persons who were initially willing to take
part but who later backed out when told of the size of the job.
An additional problem was that there were few organizations
in Nova Scotia that fitted the general population for which
the Training Job Aid was designed. The result was that only
six organizations were recruited to take part. The most
serious repercussion of this was that statistical manipulation
of the data became extremely difficult.

Description of the Sample Population

Despite the small sample size, every effort was
made to obtain a representative cross-section of the
population. The purpose of this was to obtain results that
could be generalized. With the exception of Taylors et Fils
of St. Lambert, Quebec, all organizations were situated in Nova
Scotia.

Insert Table 3
About Here

Michelin Tire did not quite fit the general target
population characteristics, but given the paucity of the sample

size, it was decided to accept their offer to help out. The
person doing the evaluation was not the same one who took part
in the first Phase, he was a novice trainer..

The difficulty in obtaining evaluators while being
discouraging was by no means unexpected. A professor, in
conversation warned, "... since most business in the area is
involved in primary industrial activities, with high levels
of locally unemployed to draw on, training is not an
important consideration. Additionally, many of these
organizations are faced with the prospect of going out
of business in the near future so that the importance of
training is further reduced." These factors would tend to
weaken the attractiveness of the Training Job Aid for small
business, at least in Nova Scotia.

Fieldtest

Each participating organization was sent the questionnaire
and the Training Job Aid. The evaluation was done either by
a trainer or the personnel manager. The evaluators were asked
to return the questionnaire by the 7th of February 1984, they
did not have to return the Training Job Aid. If the questionnaires
were outstanding then follow up telephone calls were made.

Statistical Analysis

Due to the smallness of the sample size, only crude data
manipulation was possible. The tool used was Pearson's R
Correlation.

The Question

It was expected that there would be no correlation between the size of the organizational training function and the attitude displayed towards the following aspects of the Training Job Aid:

1. Its usefulness to the organization;

2. The value of the content; and

3. The logical organization.

If a high correlation between these variables was found, then the implication would be that the Training Job Aid was more useful to larger organizations with more elaborate training activities.

The data was obtained by analysing the information received from each questionnaire. The size of the training function was given in the General Information section. The data relevant for Content, Design and Usefulness was obtained by summarizing the information given for each organization.

The Results

Only five of the questionnaires were returned. The one from Taylors et Fils was too incomplete and had to be discarded. With such a small sample size it would have been impossible to argue that the results obtained were statistically sound. The results can, however, be used as indicators in conjunction with other data from the questionnaire and from later sources. A problem with interpreting the questionnaire data was that

the comments were quite sparse with those questions that
had Likert scales. This made it difficult to know why
certain responses were made the way they were. As can
be seen from Table 4, there was a high correlation
between the size of the organizational function and the
positive results on the variables studied. This indicated
that the Training Job Ais was better accepted by the organizations
with larger training functions. The data used for this analysis
were obtained be averaging the scores of the Design, Content
and Usefulness sections of the questionnaire from each
organization.

Insert Table 4
About Here

The results did indicate that a more detailed analysis of the
appropriateness of the Training Job Aid for small business
would have to be conducted. This was not a totally unexpected
result as it had been hinted at previously by evaluators in
the first Phase and by other persons consulted on the subject.

Training and Organizations Taking Part in the Evaluation

The following is a compilation of the information received
from Part I: General Information of the Questionnaire.

Only Maritime life had a training function that was
independent of personnel. Each organization did have a training
function, although the size and scope of activities varied.

Training budgets ranged from Crossley Karristan's less than one quarter of one per-cent of the corporate budget to Maritime Life's nearly twenty per-cent. Overall, Michelin Tire spent the most on training with expenditures in the millions of dollars annually.

The size of the training budget was directly related to the number of programs initiated. The number of courses given annually ranged from Crossley Karristan's one to over thirty each by Michelin Tire and Maritime Life. The most commonly conducted courses were in management, supervisory skills, clerical, safety and sales. Michelin Tire was heavily involved in technical computer courses and technical trades cross-training.

Organizational training needs were identified in a number of ways, some were very sophisticated. The favored method was that of using skills inventories. Michelin Tire employed manager involvement strategies to determine needs and to obtain commitment. Other needs were identified through the analysis of technological changes, turnover rates, accident rates and corporate performance levels. Farmer's Dairy was involved in a method of managing through performance goals which created a need for management courses. Maritime Life was involved in establishing the automated office which created a training requirement.

Most organizations tended to acquire training programs from outside sources. This included courses offered by equipment sponsoring agencies. Only Michelin Tire and Farmer's Dairy developed and conducted in-house training. Michelin Tire

the organizations felt that training was too slow in providing
a return on the investment dollar. Maritime Life's approach
was innovative and training received a higher priority
as management was involved in the Needs Analysis and Problem
Analysis stages of the training process. They developed a
commitment to training as they had invested work in it.
Farmer's Dairy had a high commitment to training as it was
required for persons to attain set performance goals.
Michelin Tire had the greatest commitment of all, even to
the extent of having their own technical school. This
organization felt that it had to invest in its people to
remain competitive.

From the information received, it was expected that Michelin
Tire, Maritime Life and Farmer's Dairy would react the most
favorably to the Training Job Aid. There were to be some suprises.

How the Training Job Aid was Judged

The Design, Content and Usefulness sections of the
questionnaire provided the data for the evaluation of the
Training Job Aid.

The data from all of the questionnaires was summarized. If
an area under evaluation was considered to be satisfactory, no
further referral was made to it, unless an important point was
raised through a comment. The areas considered to be problems
will be dealt with below.

Design

developed almost all of their training while Farmer' Dairy had developed one course in the last year.

Outside consultants were used rather infrequently. On the average, each organization used training consultants less than twice a year. Five organizations used consultants as resource persons while Farmer's Dairy used one as an instructor.

Training effectiveness was measured in a variety of ways. The methods used ranged from simplistic to complex. Michelin Tire used complex manpower quality control measures. Farmer's Dairy used cost-benefits analysis and on the job observation. The others did not measure training effectiveness.

All of the organizations upper management, with the exception of Crossley Karristan's, viewed training as being essential and were committed to it. Crossley Karristan's management viewed training as being discretionary. The others generally claimed that management's attitude was demananding but positive.

There were mixed attitudes about accepting the SAT. Michelin Tire reported that the SAT provided the ideal degree of flexibility required by the organization. Maritime Life felt that it could be accepted by upper management if it was presented properly. The remainder of the organizations felt that it had some interesting points but that overall it was too cumbersome to be of much use.

The priority training received varied from company to company. Crossley Karristan and Helly Hanson felt that management's commitment to training was more verbal than concrete because

Two comments were noted that raised the possiblity of the
Training Job Aid being too complex. This was particularly the
situation in the case of the one person training function. All
organizations, with the exception of Michelin Tire and Maritime
Life, felt that the complexity of the Training Job Aid made it
nearly useless to them. This appeared to be because of the
numerous steps and complex interactions of the elements of
the Training Job Aid flowcharts. The evaluators felt that
given the limited resources they had that not all of the
steps and interactions could be followed. Time was difficult
constraint as management expected immediate solutions to
training problems. Micheline Tire said the complexity
provided was just right for them. All organizations stated that
by mounting the flowcharts on the wall the system became even
more complex and that the print was too small to read easily.
Two evaluators commented that they did not like those flowcharts
that were joined together hierarchically because this was
inconsistent with the others.

The Content

The degree of satisfaction varied from flowchart to flowchart.
Overall, Farmer's Dairy expressed the most dissatisfaction. They
also found the SAT to be totally unsuited for their needs.
Farmer's Dairy stated that under no circumstances would they
undertake a complex Instructional Systems Analysis, an
Organizational Analysis or a Training Effectiveness Analysis.
This was rather suprising as this organization was employing

very sophisticated management strategies to achieve performance
goals. Excluding Farmer's Dairy, three organizations stated that
the Instructional Systems Analysis flowchart was too detailed.
This problem was of particular concern to the smallest
training functions which felt that they simply lacked the
manpower to attempt an Instructional Systems Analysis.
Michelin Tire suggested that the Organizational Analysis lacked
sufficient depth to be useful. This was because this person
frequently used this tool and was familiar with it. On the other
hand, Farmer's Dairy considered it to be too detailed for them.
Overall, Micheline Tire and Maritime Life commented that
the Training Job Aid was the most complete piece of work
on the subject they had ever seen.

Usefulness

This section provided some of the most interesting feedback.
Comments ranged from those which were favorable to those that
were highly critical. Four organizations stated that they would
use the Training Job Aid or some portions of it. The portions
that they would use would be those that they had the manpower
for and those that would contribute towards what they tended
to consider their unique situations. Farmer's Dairy had no
use for it all. Maritime Life, Michelin Tire, and Helley
Hanson claimed that the Training Job Aid would be useful
for keeping track of training activities and to justify
training. One person, rather surpisingly, felt that it could be

used to raise embarrassing questions about training within his organization. Michelin Tire intended to use the Training Job Aid as a 'Train the Trainer' instructional tool. One evaluator, from Maritime Life felt that it could be used to form the curriculum for a post-graduate Training Development Program.

In summary, three organizations felt that the Training Job Aid was too complex to use in its entirety. However, two of these would use at least the parts that they felt were relevant to them. Two organizations intended to use the Training Job Aid in its entirety. The main problems seemed to stem from limited resources and a certain amount of organizational resistence to some of the approaches used, particularly the Instructional Systems Analysis. However, the questions raised over the complexity and the positive correlation found between the size of the organization's training function and its acceptance of the Training Job Aid were troubling. It did appear that the appropriateness of the Aid for small business was in doubt, at this time.

With problem areas outlined it was now possible to focus in on them in detail. Farmer's Dairy was of the most interest as it had the most negative attitude. The generally less responsive attitudes of the smaller organizations had to be followed up. Finally, problems dealing with complexity, the medium, layout and any problem not yet brought would be revealed by follow-up interviews. Accordingly, a follow-up interview plan was developed and interviews were conducted. The interview

was designed to be about 30 minutes long and produced

very valuable results.

Results of the Follow-Up Interviews

Data that was obtained from the interviews was summarized

and resulted in a number of revisions to be made to the Training

Job Aid(See Appendix D).

Insert Table 5
About Here

The most important thing learned, was that most of Farmer's

Dairy's dissatisfaction was caused by easily corrected problems.

Once these were rectified their attitude became positive. The

following outlines the feedback received by the interviews.

Instructions. Three organizations encountered difficulty

with interpreting how to use the Training Job Aid. One of

the main sources of the problem were the instructions.

It was generally felt that every single training program

contemplated would, in process, have to follow each step

of the Training Job Aid. This was the cause of much of

the complaints about cumbersomeness and over complexity.

Farmer's Dairy wished to use only those parts of the Training

Job Aid that were applicable to them but felt they were

restricted from doing so. Other instructions that caused

confusion were those dealing with how to set up the flowcharts

and how second level flowcharts were referred to from the first

level.

Print size. All agreed that once the flowcharts were wall-mounted, that the print was too small to read. Was it possible to use them in some other fashion?

Language. There was no problem with the vocabulary used with any of the flowcharts. No evaluator reported the slightest problem with interpreting jargon. Farmer's Dairy, however stated that the flowchart containing the Graphical Task Analysis was particularly easy to use because it outlined the process by using the example of how to make an ommlette.

Logic. The organization of the flowcharts. was considered to be clear and unambiguous.

Layout. The purpose of having the flowcharts wall-mounted was to give the user an overview, at a glance of the entire SAT. Another purpose was to allow them to plot the progress of their training activities using color coded pins. The interviews unfortunately, revealed just how unsatisfactory this was. It was felt, overall, that this resulted in making the system seem much more complex than it actually was. It was also very impractical to find wall space of the area required to mount the flowcharts, and when they were mounted the print became too small to read, heightening the frustration. Crossley Karristan suggested that having the flowcharts on flipcharts would make them more practical to use. Two others suggested that it would be more practical to have the flowcharts in a binder with an index.

<u>Complexity</u>. This problem turned out to be a·function of the instructions, the layout and the print size of the Training Job Aid. Farmer's Dairy had the misfortune to receive a Training Process Flowchart that had several typographical errors that made them think that they were missing flowcharts or not using the ones they had correctly.

<u>Errors</u>. With the exception of those found by Farmer's Dairy errors were not a problem.

Through the interviews, it was learned that Crossley Karristan, Michelin Tire and Maritime Life had incorporated the Training Job Aid into their training organizations and that that it had been used to modify certain of their training approaches. Each of these organizations felt that there was money to be made by using the Training Job Aid in a consulting role.

Action Taken

To improve the effectiveness of the Training Job Aid the following steps were taken:

1. The flowcharts were modified to fit into a three ring binder. Each flowchart now folds out onto a normal sized desk;

2. The Training Process Flowchart was preceded by a set of clear directions;

3. An index was provided and each flowchart was further indicated by top margin tab identifiers;

4. All errors have been corrected; and

5. The Situation Analysis, the Job Analysis, and

The Standards Flowcharts were separated into their

individual levels. The levels were linked by numbered

information arrows which indicated the flow of

the processes.

The outcome of this process were alterations to the Training Job

Aid, based on feedback received during each part of the FE

process, these were intended to make it more appropriate

for the small business trainer. Evaluators indicated that

if these revisions were made then the Training Job Aid

would meet with their approval. At this time the new version has

not been implemented.

Summary

The FE process of this Project corresponded to the final

step of Silvern's Systems Engieering Process for LOGOS Flowchart

construction. Along the way the Training Process Flowchart

was refined, on the basis of feedback received, from crude

handwritten charts to the final product. Changes were made to

the layout, the medium, spelling, wording and to a certain

extent, the logic. There were some suprises, particularly that

there was such dissatisfaction with wall-mounting the flowcharts.

The final product, however, has been suitably modified to meet

the requirements of the user while preserving the essentials

of the SAT. The fact that four of the organizations involved

in the evaluation have accepted the Training Job Aid in its

unmodified form is proof of its appropriateness.

Chapter 7: Discussion and Conclusion

The Training Job Aid was presented in a basically theoretical fashion. Only the Graphical Task Analysis Flowchart was presented through an example, the making of an Ommlette. It has been suggested that the latter might have been a more effective approach. The individual who made this comment felt that the use of the example made the SAT seem more relevant and simpler to understand. It would be interesting to test this approach.

The SAT is more than just an approach to training, it is a philosophy as well. This caused some degree of resistence on the part of certain evaluators. It would be of value to include an effective model of Change Agentry to facilitate the acceptance of the SAT by users. Change Agentry itself is an important role of the trainer in any organization, the current edition of the Training Job Aid overlooks this fact. Therefore, models of Change Agentry should be incorporated into the Training Job Aid.

It is possible that one reason for the mixed reaction to the Job Aid was that the users still lacked the requisite skills and knowledge to execute the processes. This problem might be resolved by conducting group seminars prior to the user going off on his/her own with the Job Aid. It would then be possible to deal with ambiguities as the individual becomes familiar with the training processes through practical simulation exercises and case studies. It might prove necessary to increase the instructional role of the Job Aid even with using the seminar, it may be useful

to develop a reference list or bibliography to accompany
each process block of the flowcharts. This would be a major
undertaking in terms of both the researcher and on the part of
the user to obtain and study the material. Alternatively, it
should be possible to provide more information by combining
different types of aids. Checklists, rating scales and truth tables
could all be useful in backing up the Job Aid in areas where
analysis indicated that many users were weak. This approach
would still maintain the systems perspective given by flowcharts.

It has become clear that a much more detailed understanding
of the Target Population is necessary before developing the
Job Aid further. Analysis may indicate that the Job Aid is
really only suited for the experienced trainer as an Aide de
Memoire, a still valuable function.

This Project did not involve the actual testing of the
Job Aid with a real organizational training problem. It would
be useful to determine how it would be used under 'operational
situations'. It would be interesting to measure the difference
in the efficiency of how the problem was solved as compared
to previous methods. It would also be valuable to determine
if other organizations using the Training Job Aid used it
similiarly in like situations and were their results comparable.
Such tests would be concrete measures of the appropriateness
of the Aid.

From flowcharts to computers is really a small step. A
possibly very effective medium might well be to develop an

interactive approach based on the content, intent and quas-
algorithmic design of the Training Job Aid. The difficulty, until
recently, with computers is that they tended not to be able
to deal with data that was incomplete or in the least bit .
ambiguous. The complex interactions between variables in the
training process almost indicates an heuristic approach is
necessary in places. However, recent advances in artificial
intelligence and expert systems has made the possiblity of a
truly effective computer based Training Job Aid a reality. In
fact, given the apparent lack of skills among trainers this approach
may prove to be a salvation if pursued. Expert Systems are being
actively explored in Canada by the Department of Defense Research
Analysis, to be used in the identification of objects through
Towed Array SONAR, an area that until now has been out of
the realm of computerization due to vague and often distorted
data gathered.

Conclusion

We live in a rapidly changing world where requirements for
products, production methods and personal skills are constantly
changing. People and organizations are failing to remain current
with these changes and are becoming obsolete. The SAT offers
a methodology to address this problem. However, it is complex
to understand and use and frequently the smaller business training
function, where it exists at all, lacks the personnel qualified
to use it. Yet, smaller business faces the same challenges as the
corporate giants but without their redundancy of resources.

The Training Job Aid was designed to help the smaller business training function to use the SAT. It contains the latest content if the field and has been presented in an effective quasi-algorithmic fashion. By following the basic principles of Systems Engineering for LOGOS Flowchart development the quasi-algoritmic attributes have been maximized. Subject-matter experts and evaluators representing a cross-section of the Target Popualtion of users provided the necessary feedback to complete the process.

There were several distracting problems that arose during the course of the Project. The two most serious had to do with the small sample size, which effectively prevented any generalization of results statistically and the apparent lack of knowledge among users. The last problem questioned the appropriateness of the Job Aid for novice trainers and made the Job Aid seem non-user friendly. Even so, the logic and organization of the SAT was still clear to the users and the problem of entry skills is being addressed.

It was rewarding to see that most of the organizations that participated in the evaluation of the Training Job Aid had adopted it for their training functions. This was proof that it had been accepted and that the pressing need for well founded training functions in smaller business organizations was recognized. It was pleasing to be able to conclude that this Project had produced a product that had practical applications, even though the results were not measurable in a strictly experimental fashion.

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TABLE 1

BASIC LOGOS SYMBOLOGY
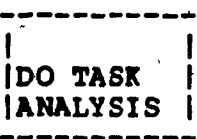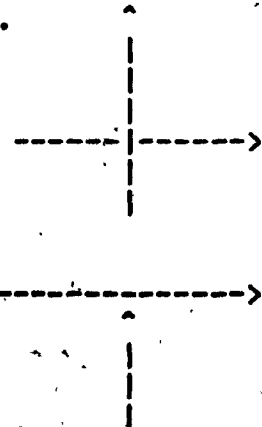
SYMBOL	NAME	FUNCTION
1. ``` ┌─────────┐ │ │ │ │ │ │ └─────────┘ ```	Rectangle	Represents system process elements
2. ``` ┌─────────┐ │ │ │DO TASK │ │ANALYSIS │ └─────────┘ ```	Descriptor	A group of 1-5 words that describes the function of the element. It must be concise and unambiguous
3. ``` ┌─────────┐ │ │ │ │ │ 2.0 │ └─────────┘ ```	Numeric Code	Major functions are coded numerically. Together they form the first level of detail. Levels are indicated 1.1, the second level, 1.1.1, the third and so on.
4. ─────────>	Signal Path	Indicates, by the arrowhead, the direction the information is carried. Information can be carried in one direction.
5. ``` ┌─────────┐ │ │ ──>│ │──> │ │ └─────────┘ ```	Input and Output Signal Paths	Information entering and exiting a systems element.
6. crossing paths	Crossing Signal Paths	Signal paths may cross if there is no relationship. If there is, then they are joined by an arrowhead at the point of intersection.

table 1 cont.

7. ------> 2.0 2.0-------->	Input or Output from Distant Functions	Indicates to and from the signal is directed
8. P <----------------	Feedback Signal Path	If the signal path creates a closed loop system and controls the output of the same preceding system, then then this is a feedback signal path.
9. F.F. ---------------->	Feedforward Signal Path	If the output from a sub- systems is input to another but there are intervening, but unrelated sub-systems, then a feedforward signal path is generated.

TABLE 2

LOGOS SYMBOLS MODIFICATIONS
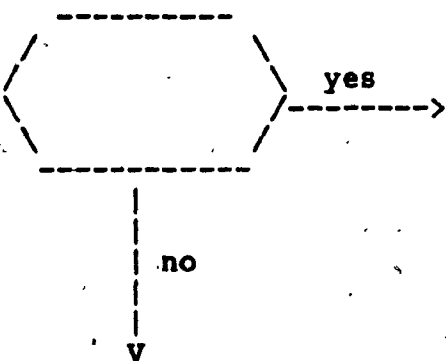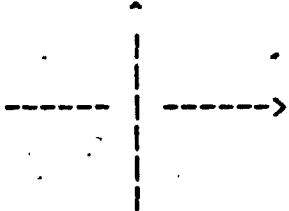
SYMBOL	NAME	FUNCTION
1. ⬡ yes ──> │ no V	Binary Decision	Indicates decision points in the sub-system
2. ▱	Information Process	This symbol allows for the representation of information that does not require action but is supplemental.
3. ─── │ ───>	Unrelated Intersecting Signal Paths	Same function as original LOGOS but clearly shows the function

TABLE 3

ORGANIZATIONS PARTICIPATING IN THE EVALUATION

ORGANIZATION	FUNCTION	INDEPENDENT TRAINING *
1. CROSSLEY KARRISTAN	RETAIL	NO
2. FARMER'S DAIRY	DAIRY RETAIL	NO
3. HELLEY HANSON	SURVIVAL EQUIPMENT RETAIL	NO
4. MARITIME LIFE INSURANCE	SERVICE	YES
5. MICHELIN TIRE	MANUFACTURING	NO
6. TAYLOR'S ET FILS	CLOTHING RETAIL	NO

* Is the Training Function independent of the Personnel Function

TABLE 4

SUMMARY OF QUESTIONNAIRE DATA

ORGANIZATION	number of Trainers	Part of Quest.	Summary	Correlation & Validity
1. Crossley Karristan	2	DESIGN	3.125	r=.73 v=85%
2. Farmer's Dairy	1		2.63	
3. Helley Hanson	2		3.21	
4. Maritime Life	3		3.37	
5. Michelin Tire	16		3.63	
1. Crossley Karristan	2	CONTENT	2.72	r=.63 v=80%
2. Farmer's Dairy	1		1.50	
3. Helley Hanson	2		2.90	
4. Maritime Life	3		3.00	
5. Michelin Tire	16		3.43	
1. Crossley Karristan	2	USEFULNESS	3.13	r=.71 v=85%
2. Farmer's Dairy	1		1.25	
3. Helley Hanson	2		2.71	
4. Maritime Life	3		3.00	
5. Michelin Tire	16		3.75	

TABLE 5

SUMMARY OF PROBLEMS FROM FOLLOW-UP INTERVIEWS

PROBLEM * TYPE	NO PROBLEM *	PROBLEM *
Instructions	2	3
Print Size	0	5
Logic	5	0
Language	5	0
Layout	2	3
Complexity	4	1
Errors	4	1
n=5		

* Numbers refer to organizations that expressed difficulty or no difficulty with each of the listed problem types.

QUESTIONNAIRE INSTRUCTIONS

This Questionnaire is subdivided into the following topics:

       1. General Questions;
       2. Design Questions;
       3. Content Questions; and
       4. Usefulness Questions.

Part A: General Questions: Please give a brief answer to each
     of the questions or N/A.

Part B: Design Questions: For each question circle the
     appropriate number on the RATING SCALE provided. If
     further explanation is needed space is provided below
     each question.

Part C: Content Questions: Examine each of the flowcharts and
     give your assessment of the level of detail.

Part D: Usefulness Questions: Same as Part B.

Please complete the Questionnaire and return it using the
pre-posted and self-addressed envelope provided. As this information
is VITAL to this project please return the Questionnaire no later
than the date indicated in the covering letter.

Thank You for your co-operation on this Project!

COVERING LETTER

Mr. S. Mc Donnell
166 Amaranth Cr.
Dartmouth, N.S.

Dear (whoever):

As per our conversation of (whenever) I have sent you this package which should contain;

1. The Algorithm
2. The Questionnaire
3. Self-addressed pre-stamped
   return envelope

I would like to thank you very much for donating your time to help evaluate the Algorithm. Without your co-operation the completion of this project would not be possible. As you know the Algorithm is basically in a prototype form but with your help it may soon be availible to aid the small business trainer.

Would you be be so kind as to return the completed Questionnaire to me by (whenever).

Sincerely

S. Mc Donnell

Part A: General Information:

1. How many persons are employed by your Organization?

---

2. What are the main income generating activities of your
   Organization?

---

3. Who is responsible for training in your Organization?

---

4. If there is a training function, then how many full/
   part-time training personnel are there?

---

5. How many training persons have training related degrees/courses?

---

6. What proportion of the Organization's budget is for
   training purposes?

---

7. In the past year, what training programs have you conducted?
   in the past year?

Part A: General Information cont:

8. Briefly describe how training needs are identified?

----

9. If any recent changes have caused a need for new
   training activities briefly outline what they are
   and how they generated needs.

----

10. Where are training courses/materials normally acquired?

----

11. If outside consultants are used for training, how
    often are they used.

----

12. How are training results measured?

----

13. How has management reacted to training in the past?

Part A: General Information cont:

14. How suitable is the Systems Approach to Training for your training function?

---

15. What level of priority is training given by your Organization?

---

16. Why is training given the priority it has?

Part B: Design:

	very poor		sufficient		very good
	1	2	3	4	5

----
1.   How clear is the layout of the Algorithm to a non-trainer?

| | 1 | 2 | 3 | 4 | 5 |

RATING

2. How clearly is the role of the one person
   training function illustrated by the Algorithm?

| | 1 | 2 | 3 | 4 | 5 |

----
3. Are the relationships between elements and sub-elements
   easily discernible?

| | 1 | 2 | 3 | 4 | 5 |

4. How logical is the Algorithm?

| | 1 | 2 | 3 | 4 | 5 |

Part B: Design cont:

5. Are the symbols employed clear in meaning?

          1 2 3 4 5

---

6. How practical is it to use the Algorithm?

          1 2 3 4 5

---

7. How difficult is it to read the Algorithm?

          1 2 3 4 5

---

8. Is the print used sufficiently large for easy reading?

          1 2 3 4 5

Part C: Content cont:

	insufficient	adequate	complete
	:	:	:.
	1 2	3 4	5

ELEMENT FROM TRAINING PROCESS FLOWCHART

Determine
Corporate
Goals/Obje-

1 2 3 4 5

Do Situation/
Organizational

1 2 3 4 5

Do Organizational
Problem Analysis

1 2 3 4 5

Establish
Performance
Standards

1 2 3 4 5

Do Training
Problem Cost
Analysis

1 2 3 4 5

Choose Problem
with Greatest
Cost Impact on
Organization

1 2 3 4 5

Make Higher
Management
Aware of
Problem

1 2 3 4 5

Do Task
Analysis of
Problem

1 2 3 4 5

Develop Course
Objectives

1 2 3 4 5

Part C: Content:

Do Purchase or
Develop Course
Analysis   1 . 2 3 4 5

Do Instructional
Systems Analysis   1 2 3 4 5

Do Training
Effectivenss
Analysis   1 2 3 4 5

Do Cost-Effectiv-
eness/Benefits
Analysis   1 2 3 4 5

Part D: Usefulness:

```
                              useless   adequate  useful
                              :    :    :
                              1  2  3  4  5
```

1. How will you be able to use the Algorithm in your work?

   1 2 3 4 5

----

2. How Does the Algorithm make it easier to keep track of
   the training process?

   1 2 3 4 5

----

3. Does the Algorithm cause questions to be raised about
   the training process in your Organization?

   1 2 3 4 5

----

4. How will the Algorithm aid in helping to make management
   more aware of the importance of the training function?

   1 2 3 4 5

Part D: Usefulness cont:

5. How useful is the Algorithm to newcomers to the Training
   Development field?

   1 2 3 4 5

----

6. How will you personally use the Algorithm?

   1 2 3 4 5

----

7. Why does the Algorithm help to generate ideas that lead
   to training problem solutions?

   1 2 3 4 5

----

8. Would you recommend that the Algorithm be available
   for general use (published)?

   1 2 3 4 5

   RATING

Thank You!

APPENDIX D

FOLLOW-UP INTERVIEW QUESTION FORMAT

1. How clear are the instructions of the Training Job Aid?
   (If a problem, why, how often and where)

2. Which of the following are too complex, why?

   -Do Organizational Analysis
   -Choose the Problem with the Greatest impact
    on the Organization
   -Do Job/Task Analysis
   -Do Modified Instructional Analysis
   -Do Instructional Systems Analysis
   -Determine Corporate Goals/Objectives

3. How would you simplify all of the above?

4. Why do you feel the Training Job Aid is too complex?
   (Will depend on response given in questionnaire)

5. How could it be made useful to you?

6. Which parts are unnecessary to you?

7. Which terms are ambiguous?

8. How would you describe the logic and clarity of the Training
   Job Aid?

9. What would you do to improve the Training Job Aid that we
   have not already discussed?

```
┌─────────────┐  >20  ┌─────────────────┐   ┌─────────────────┐   ┌─────────────────────┐
│ Numbers to  │──────▶│ Use Questionnaire│──▶│ Gather Detailed │──▶│ Develop Questionnaire│
│ be sampled  │       │                 │   │ Information     │   │                     │
│    1.0      │       │      2.0        │   │      3.0        │   │        4.0          │
└─────────────┘       └─────────────────┘   └─────────────────┘   └─────────────────────┘
      │
      │ <20
      ▼
┌─────────────┐          Advantages                         Make Questions:
│ Use Interview│       ┌──────────┐  ┌──────────────┐     ┌─────────────┐  ┌─────────────┐
│ Technique   │       │Economical│  │Allows many   │     │As Brief as  │  │Avoid Long   │
│             │       │          │  │to Participate│     │Possible     │  │Narrative    │
│    13.0     │       │  2.1.1   │  │Process       │     │             │  │Answers      │
└─────────────┘       └──────────┘  │  2.1.2       │     │   4.1.1     │  │   4.1.2     │
      │               ┌──────────┐  └──────────────┘     └─────────────┘  └─────────────┘
      │               │Can Cover │                       ┌──────────────┐  ┌─────────────┐
      │               │Unlimited │                       │Phrase Questions│ │Avoid all    │
      │               │Topics    │                       │in a Logical    │ │Ambiguity    │
      │               │  2.1.3   │                       │Order           │ │             │
      │               └──────────┘           2.1          │   4.1.4       │ │   4.1.5     │
      │                                                   └──────────────┘  └─────────────┘
      ▼                                                                           4.1
┌─────────────┐   ┌──────────────┐   ┌──────────────┐                   ┌──────────────┐
│ Preliminary │──▶│ Detailed     │──▶│ Interview Line│                  │ Set Interview│
│Investigation│   │ Investigation│   │ Personnel    │                  │ Objectives   │
│    14.0     │   │    27.0      │   │    28.0      │                  │    16.0      │
└─────────────┘   └──────────────┘   └──────────────┘                   └──────────────┘
      │                                                                       25.0
      ▼
┌─────────────┐                    Could include:                      ┌──────────────┐
│Interview Upper│                ┌───────────┐┌───────────┐┌──────────┐ │Base Objective│
│Management   │                 │Secretaries││First Line ││Machine   │ │on the Role of│
│             │                 │ 28.1.1    ││Supervisors││Operators │ │the Person to │
│    15.0     │                 └───────────┘│ 28.1.2    ││ 28.1.3   │ │be Interviewed│
└─────────────┘                 ┌───────────┐└───────────┘└──────────┘ │    16.1      │
      │                         │Forepersons│┌───────────┐┌──────────┐ └──────────────┘
      ▼                         │ 28.1.4    ││Clerks     ││Salespersons│
┌─────────────┐  ┌────────────┐ └───────────┘│ 28.1.5    ││ 28.1.6   │
│Determine Role of│From Organizatinal          └───────────┘└──────────┘
│Management Persons│◀─Chart    │                      28.1
│to be Interviewed│ │          │
│    15.1     │   │  15.1.1    │
└─────────────┘   └────────────┘
```

Develop Questionnaire
4.0

Test Questionnaire
5.0

Satisfactory
6.0
yes

Obtain Sufficient Quantities
7.0

no

Make all changes Indicated
6.1

Must satisfy Development Conditions
5.1

Incl

Cover

Retur

8.

Make Questions:

| As Brief as Possible 4.1.1 | Avoid Long Narrative Answers 4.1.2 | Avoid Questions that PropmptAnswers 4.1.3 |

| Phrase Questions in a Logical Order. 4.1.4 | Avoid all Ambiguity 4.1.5 | Avoid Questions That Might Threaten a Person's Job if Answered 4.1.6 |

4.1

Follow Written Questions
19.1

Avoid note Taking
19.2

Set Interview Objectives
16.0

Organize List of Written Questions
17.0

Prepare to Conduct Interview
18.0

Conduct Interview
19.0

Diverge Only if

25.0

Base Objective on the Role of the Person to be Interviewed
16.1

The Higher the Level of the more General the Question
17.1

Direction of Questions

| Who 17.2.1 | What 17.2.2 | When 17.2.3 |
| Where 17.2.4 | Why 17.2.5 | How Often 17.2.6 |

17.2

DO in Advance

Set up Appointment
18.1.1

Send Letter of Authority
18.1.3

Notify the Interviewees Superior of Appointment
18.1.4

18.1

Giv
Out
to

A
t

lachine lperators
28.1.3

alespersons
28.1.6

```
ctory        ┌──────────┐      ┌──────────────┐      ┌──────────────┐      ┌──────────────┐
  ╲          │ Obtain   │      │ Send out the │      │ Do Follow ups│      │ Compile all  │
   ╲  yes    │ Sufficient│─────│ Questionnaire│──────│ to Obtain Late│─────│ Data         │────────────────→ Return
0  ╱         │ Quantities│     │     8.0      │      │ Returns      │      │              │
            │    7.0    │      └──────────────┘      │     9.0      │      │    10.0      │
            └──────────┘                             └──────────────┘      └──────────────┘

no
┌────────┐
│ changes│
│ d      │
│ l      │
└────────┘
                ┌──────────────────────────────────────────────┐
                │    Include:                                  │
                │  ┌────────────────┐  ┌──────────────┐        │
                │  │ Covering Letter│  │ Detailed     │        │              ┌──────────────┐
                │  │                │  │ Instructions │        │              │ Use Simple   │
                │  │      8.1.1     │  │    8.1.2     │        │              │ Statistics   │
                │  └────────────────┘  └──────────────┘        │              │    10.1      │
                │  ┌────────────────┐  ┌──────────────┐        │              └──────────────┘
                │  │ Return Date    │  │ Level of     │        │
                │  │                │  │ Authority    │        │
                │  │      8.1.3     │  │    8.1.4     │        │
                │  └────────────────┘  └──────────────┘        │
                │                  8.1                         │
                └──────────────────────────────────────────────┘
```

```
┌────────┐   ┌──────────┐
│ Written│   │ Avoid note│
│ ns     │   │ Taking   │
│ .1     │   │   19.2   │
└────────┘   └──────────┘

┌────────┐   ┌──────────────┐      ┌──────────────┐  yes ┌──────────────┐      ┌──────────────┐      ┌──────────────────┐
│nterview│   │ Diverge from │      │ Progress     │──────│ Complete     │──────│ Record all   │──────│ Send Thank You/  │
│ .0     │───│ Format Only  │──────│ Satisfactory │      │ Interview    │      │ Information   │      │ Summary Memo to  │
└────────┘   │ if Necessary │      │              │      │    22.0      │      │    23.0      │      │ Interviewee      │
            │    20.0      │      │    21.0      │      └──────────────┘      └──────────────┘      │    24.0          │
            └──────────────┘      └──────────────┘                                                  └──────────────────┘
                                      │ no
                                      ↓
┌──────────────────────────┐   ┌──────────────┐  ┌──────────────┐      ┌──────────────┐      ┌──────────────┐   ┌──┐
│ DO in Advance            │   │ Terminate the│  │ Access Reason│      │ Try Another  │      │ Use Question │   │ D│
│                          │   │ Interview    │──│ for Failure  │──────│ Person       │      │ Sheet        │   │ o│
│ ┌──────────────┐ ┌──────┐│   │    26.0      │  │    27.0      │      │    28.0      │      │    23.1      │   └──┘
│ │ Set up       │ │Give  ││   └──────────────┘  └──────────────┘      └──────────────┘      └──────────────┘
│ │ Appointment  │ │Inter-││
│ │   18.1.1     │ │viewee││        ┌────────────────────────────────────────────────────────────────┐
│ └──────────────┘ │Out-  ││        │ Might Include                                                  │
│ ┌──────────────┐ │line  ││        │  ┌──────────────────┐      ┌──────────────────┐                │
│ │ Send Letter  │ │of    ││        │  │Personality Conflicts│   │ Lack of Preparation│              │
│ │ of Authority │ │topic ││        │  │    27.1.1        │      │    27.1.2        │                │
│ │   18.1.3     │ │to be ││        │  └──────────────────┘      └──────────────────┘                │
│ └──────────────┘ │Dis-  ││        │  ┌──────────────────┐      ┌──────────────────────┐            │
│ ┌──────────────┐ │cussed││        │  │ Vested Interests │      │ Interviewed Wrong Person│         │
│ │Notify the    │ │18.1.2││        │  │    27.1.3        │      │    27.1.4            │            │
│ │Interviewees  │ └──────┘│        │  └──────────────────┘      └──────────────────────┘            │
│ │Superior of   │ ┌──────┐│        │                      27.1                                      │
│ │Appointment   │ │Allows││        └────────────────────────────────────────────────────────────────┘
│ │   18.1.4     │ │inter-││
│ └──────────────┘ │viewee││
│                  │to    ││
│            18.1  │prepare│
│                  │ 18.1 ││
└──────────────────────────┘
```

```
┌──────────────┐        ┌──────────────┐
│ Do Follow ups│        │ Compile all  │
│ to Obtain Late│──────→│ Data         │──────────────→ Return
│ Returns       │        │        10.0  │
│         9.0  │        └──────┬───────┘
└──────────────┘               │
                               │
                        ┌──────┴───────┐
                        │ Use Simple   │
                        │ Statistics   │
                        │       10.1   │
                        └──────────────┘
```

ed
ctions
.1.2

y

```
                                                                                16.0
                                                                                 ↑ yes

   ┌────────┐  yes ┌──────────┐        ┌──────────┐     ┌──────────────┐      ┌──────────┐
──→│Progress│─────→│ Complete │───────→│Record all│────→│Send Thank You/│────→│ Others to│ no
   │Satisfactory   │ Interview│        │Information│     │Summary Memo to│     │Interview │──→ Return
   │        │       │    22.0 │        │    23.0  │     │Interviewee    │     │    25.0  │
   │   21.0 │       └──────────┘        └──────────┘     │       24.0   │     └──────────┘
   └────────┘                                            └──────────────┘
        │ no
        ↓
 ┌─────────────┐   ┌──────────────┐   ┌──────────┐    ┌──────────────┐  ┌──────────────┐
 │Terminate the│   │Access Reason │   │Try Another│   │Use Question  │  │Do Within 30 min│
 │Interview    │   │for Failure   │   │Person     │   │Sheet         │  │of Interview  │
 │       26.0  │   │        27.0  │   │     28.0 │    │        23.1  │  │        23.2  │
 └─────────────┘   └──────────────┘   └──────────┘    └──────────────┘  └──────────────┘
```

Might Include

```
┌───────────────────────────────────────────────────────────┐
│  ┌─────────────────────┐   ┌─────────────────────┐         │
│  │Personality Conflicts│   │Lack of Preparation  │         │
│  │       27.1.1        │   │       27.1.2        │         │
│  └─────────────────────┘   └─────────────────────┘         │
│                                                             │
│  ┌─────────────────────┐   ┌─────────────────────────┐     │
│  │Vested Interests     │   │Interviewed Wrong Person │     │
│  │       27.1.3        │   │       27.1.4            │     │
│  └─────────────────────┘   └─────────────────────────┘     │
│                        27.1                                 │
└───────────────────────────────────────────────────────────┘
```

TRAINING PROCESS FLOWCHART


```
              ┌──────────────────────────┐
              │                          ▼
              │                         no
   ┌──────────┴──────────┐      ┌──────────────┐      ┌──────────────────┐      ┌──────────────────────┐
   │ DETERMINE CORPORATE │      │   GOALS      │ yes  │ DO SITUATION/    │      │ DO ORGANIZATIONAL    │
   │ GOALS AND OBJECTIVES ├─────▶│   CLEAR      ├─────▶│ ORGANIZATION     ├─────▶│ PROBLEM ANALYSIS     │
   │                     │      │              │      │ ANALYSIS         │      │                      │
   │ 1.A                 │      │   2.0        │      │ 3.A              │      │ 4.A                  │
   └─────────────────────┘      └──────────────┘      └──────────────────┘      └──────────────────────┘
```

1/of

```
                                                        ┌──────────────┐
                                                        │ ENFORCE      │
                                                        │ STANDARDS    │
                                                        │              │
                                                        │ 9.A          │
                                                        └──────────────┘
                                                              │ no
                                                              ▼
┌──────────────┐      ╱─────────╲      ╱─────────────╲      ╱──────────────╲
│ DO ORGANIZA- │     ╱  TRAINING  ╲ yes╱ DETERMINE IF  ╲ yes│ ARE STANDARDS │ Yes
│ TIONAL       │────╱   PROBLEM    ╲──╱  PERFORMANCE     ╲──╱ APPLIED DAY TO ╲───►
│ PROBLEM      │    ╲              ╱  ╲ STANDARDS EXIST  ╱   ╲ DAY            ╱
│ ANALYSIS     │     ╲   5.O      ╱    ╲     6.O       ╱     ╲  8.O         ╱
│ 4.A          │      ╲─────────╱       ╲─────────────╱       ╲──────────────╱
└──────────────┘          │ no                │ no
                          │                   ▼
                          │           ┌──────────────────────┐
                          │           │ ESTABLISH PERFORMANCE │
                          │           │ STANDARDS             │
                          │           │                       │
                          │           │ 7.A                   │
                          └───────────┴──────────────────────┘
```

DO ORGANIZATIONAL PROBLEM ANALYSIS 4.A

TRAINING PROBLEM 5.O

DETERMINE IF PERFORMANCE STANDARDS EXIST 6.O

ESTABLISH PERFORMANCE STANDARDS 7.A

ARE STANDARDS APPLIED DAY TO DAY 8.O

ENFORCE STANDARDS 9.A

2 of

ENFORCE
STANDARDS

.A

no

STANDARDS
ED DAY TO DAY → Yes → DO TRAINING
PROBLEM ANALYSIS

10.A

Yes

OTHER TRAINING
PROBLEMS
11.0 → no →

CHOOSE PROBLEM
WITH THE GREATEST
COST IMPACT ON THE
ORGANIZATION

12.0

MAKE
MANAG
OF TH

3 of 1

```
                                                            ┌──────────────┐
                                                            │ CHOOSE NEXT  │
                                                            │ MOST COSTLY  │
                                                            │ PROBLEM      │
                                                            │ 15.0         │
                                                            └──────────────┘
                                                                   ↑
                                                                  no
┌────────────┐   ┌──────────────┐            ╱───────────────────╲
│OSE PROBLEM │   │ MAKE HIGHER  │           ╱  WILL MANAGEMENT     ╲   yes
│H THE GREATEST│ │ MANAGEMENT AWARE│        │  ALLOW ACTION ON THE  │ ──────→
│T IMPACT ON THE│ │OF THE PROBLEM│          │     PROBLEM           │
│ANIZATION   │   │              │           │      14.0             │
│            │   │    13.A      │            ╲                     ╱
│.0          │   └──────────────┘             ╲───────────────────╱
└────────────┘
```

```
┌──────────────┐
│ CHOOSE NEXT  │
│ MOST COSTLY  │
│ PROBLEM      │
│ 15.0         │
└──────────────┘
      ↑
      │ no
      │
 WILL MANAGEMENT          ┌────────────────────┐        ┌────────────────┐        ┌────────────────────┐
 ALLOW ACTION ON THE  yes │ DO DETAILED JOB    │        │ DEVELOP COURSE │        │ TEST TO DETERMINE  │       MATC
 PROBLEM              ──→  │ ANALYSIS OF PROBLEM│   ──→  │ OBJECTIVES     │   ──→  │ IF COURSE OUTCOMES │  ──→  19.0
 14.0                     │ AREA               │        │                │        │ WILL MATCH JOB TASKS│
                          │                    │        │ 17.A           │        │                    │
                          │ 16.A               │        │                │        │ 18.A               │
                          └────────────────────┘        └────────────────┘        └────────────────────┘
```

5 of 1

```
                                  no

  INE
  OMES          ┌─────────┐  yes  ┌──────────────┐      ┌─────────┐  develop   ┌──────────────────┐
  TASKS ───────▶│ MATCH   ├──────▶│ DO PURCHASE  │─────▶│ DECISION├───────────▶│ DO INSTRUCTIONAL │
                │ 19.0    │       │ OR DEVELOP   │      │         │  buy       │ SYSTEMS          │
                └─────────┘       │ COURSE ANALYSIS│    │ 21.0    │            │ DEVELOPMENT      │
                                  │              │      └─────────┘            │                  │
                                  │ 20.A         │                            │ 22.A             │
                                  └──────────────┘                            └──────────────────┘
```

6 of 1

```
                    ┌──────────────┐       ┌──────────────┐
                    │ MAKE COURSE  │       │ DETERMINE WHY│
                    │ CORRECTIONS  │◄──────│ NOT          │◄────────────
                    │              │       │              │
                    │ 27.0         │       │ 26.0         │
                    └──────────────┘       └──────────────┘
                                                  ▲
                                                  │ no

┌──────────────┐   ┌──────────┐   ┌──────────────┐   ┌──────────────┐       ┌──────────────┐
│DO INSTRUCTIONAL│ │RUN COURSE│   │DO TRAINING   │   │ IS TRAINING  │  yes  │DO COST       │
│SYSTEMS        │  │          │   │EFFECTIVENESS │   │ PERFORMANCE  │──────►│EFFECTIVENESS │
│DEVELOPMENT    │  │          │   │ANALYSIS      │   │ SATISFACTORY │       │ANALYSIS OF   │
│               │  │          │   │              │   │              │       │THE COURSE    │
│22.A           │  │23.0      │   │24.A          │   │    25.0      │       │28.A          │
└──────────────┘   └──────────┘   └──────────────┘   └──────────────┘       └──────────────┘
```

7 of 1

```
                                    ┌────────────────┐
                                    │                │
                                    │                │
                                    │            no  │
                                    │                │

 ┌──────────────┐              ╱────┴────╲           ┌──────────────┐            ╱──────────────╲
 │ DO COST      │             ╱  COST     ╲   yes     │ PREPARE REPORT│          ╱ ARE THERE OTHER ╲  no
es│ EFFECTIVENESS│────────────⟨  EFFECTIVE  ⟩─────────▶│ TO UPPER     │─────────⟨ TRAINING PROBLEMS ⟩─────▶
 ─▶│ ANALYSIS OF  │             ╲  30.0     ╱           │ MANAGEMENT   │          ╲                ╱
 │ THE COURSE   │              ╲────┬────╱            │ 31.A         │           ╲  32.0        ╱
 │              │                                     └──────────────┘            ╲────┬───────╱
 │ 28.A         │                                                                      │
 └──────────────┘                                                                      │ Yes

 ─¥─────────────────────────────────────────────────────────────────────────────────▶│

 ─────────────────────────────────────────────────────────────────────────────────────────────────▶
```

8 of 8

```
┌──────────────┐     ┌──────────────┐     ┌──────────────┐              ┌──────────────────┐
│ Select First │     │ Find Person Who│   │Conduct Interviews│          │Determine With Whom│
│ Problem on   │────▶│ Says There is a│──▶│                │──────────▶ │Does the Problem Lie│
│ the List     │     │ Problem        │   │      4.3       │            │                  │
│              │     │                │   │                │            │      4.4         │
│     4.1      │     │      4.2       │   └────────────────┘            └──────────────────┘
└──────────────┘     └──────────────┘            ▲                              ▲
                                                 │                              │
                                        ┌──────────────────┐          ┌──────────────────┐
                                        │   Interview:     │          │ Example: Does the│
                                        │                  │          │ Problem Seem to be│
                                        │ ┌──────────────┐ │          │ With Supervisors │
                                        │ │ Supervisors  │ │          │                  │
                                        │ │   4.3.1.1    │ │          │      4.4.1       │
                                        │ └──────────────┘ │          └──────────────────┘
                                        │ ┌──────────────┐ │
                                        │ │ Employees    │ │
                                        │ │   4.3.1.2    │ │
                                        │ └──────────────┘ │
                                        │ ┌──────────────┐ │
                                        │ │ Managers     │ │
                                        │ │   4.3.1.3    │ │
                                        │ └──────────────┘ │
                                        │          4.3.1   │
                                        └──────────────────┘
```

1 of 6

no

Determine With Whom
Does the Problem Lie

4.4

Determine What Task
Functions are Invol-
ved in the Problem

4.5

Validate the Existence
of the Problem

4.6

Problem
Valid
4.7

yes

Example: Does the
Problem Seem to be
With Supervisors

4.4.1

Example: Salespersons are
not Operating the New
Cash Registers Properly

4.5.1

Review all Relevent
Sources of Information
Including:

Personnel
Records

4.6.1.1

Departmental
Records

4.6.1.2

Market
Reports

4.6.1.3

Industrial
Performance
Indices

4.6.1.4

Investment
Returns

4.6.1.5

4.6.1

2 of 1

Choose Next
Most Serious
Problem on
the List
4.19

Are Employees
Penalized for
Good Performance
4.8

yes

no

Problem
Valid
4.7

yes

Terminate Emplo
at Present Job
4.20

no

Are There Lack of
Incentives for
Higher Performance
4.9

yes

no

Are Skill
Requirements
Changing
4.10

yes

no

More Than or
Equal to 3
Indications
4.14

yes

Training
Problem
4.15

Do Persons Hav
the Ability to
Perform Adequa
4.16

Indicative of
Training Problem
4.14.1

no

Include:

Apptitude
Tests
4.16.1.1

Did Employees Ever
Perform Satisfactorily
4.11

yes

no

Attitude
Tests
4.16.1.2

Is Feedback
Given on the Job
4.12

yes

Opinion of
Superiors
4.16.1.3

no

4.16.1

Have Employee
Characteristics
Changed
4.13

yes

no

3 of

yes

Determine What Simple Solutions Exist

4.17

Include:

Job Aids
4.17.1.1

Checklists
4.17.1.2

Coaching
4.17.1.3

On the Job Training
4.17.1.4

4.17.1

Will Simple Solutions do
4.18

no

Choose Training Intervention
4.22

Iast Problem
4.23

Yes → Return

no

Yes

Choose Simple Solution
4.21

Do Situation
Analysis:
3.A$_0$

```
┌──────────────────────┐                ╭──────────────────────╮                      From
│ Determine What the   │                │ Are Immediate Needs  │                      3.3.1
│ Organization Needs   │──────────────> │ More Urgent Than Future│                       │
│ to Achieve its Goals │                │         3.2          │                       v
│                      │                ╰──────────────────────╯          ┌──────────────────────┐
│         3.1          │                           │         ──────────── │ Determine the        │
└──────────────────────┘                           │           ─────────> │ Present Situation    │
                                                    │                      │                      │
                                                    v                      │         3.3          │
                                        ┌──────────────────────┐           └──────────────────────┘
                                        │ Determine the Future │
                                        │ Corporate Situation  │
                                        │                      │───────────────────────────────>
                                        │         3.6          │                        ^
                                        └──────────────────────┘                        │
                                                                                        │
                                                                         from information gatherin
                                                                         interviews and questionn
```

1 of

From
3.3.1

rmine the
ent Situation
3.3

Summarize all Problems
in a List

3.4

Organize Problems From
the Most to the Least
Serious

3.5

Develop a Questionnaire
Based on Future Needs

3.7

Give Questionnaire
to Key Personnel

3.8

Notify all Invo
the Confidentia
all Information

3.9

ormation gathering:
s and questionnaires

Include:

Consumer Requirements 3.7.1.1	Manpower Forcasts 3.7.1.2	Corporate Goals 3.7.1.3
Products 3.7.1.4	Production Methods 3.7.1.5	Market Forcasts 3.7.1.6

3.7.1

This will Tend to
Persons of Poten
if Their Predict
Prove to be Wron

3.9.1

2 of

| blems |

Organize Problems From
the Most to the Least
Serious

3.5

→ Return

| onnaire
eeds |

Give Questionnaire
to Key Personnel

3.8

Notify all Involved of
the Confidentiality of
all Information

3.9

Constituent Patterns to
the Projection Should
be Analysed for Possible
Training Requirements

3.10

| Manpower
Forcasts
3.7.1.2 | | Corporate
Goals
3.7.1.3 |

| Production
Methods
3.7.1.5 | | Market
Forcasts
3.7.1.6 |

3.7.1

This will Tend to Relieve
Persons of Potential Problems
if Their Predictions Should
Prove to be Wrong

3.9.1

3 of 3.

INFORMATION GATHERING:
INTERVIEWS AND QUESTIONNAIRES

```
┌─────────────┐   >20   ┌──────────────┐      ┌──────────────┐      ┌──────────────────┐
│ Numbers to  │ ──────► │ Use          │ ───► │ Gather       │ ───► │ Develop          │
│ be sampled  │         │ Questionnaire│      │ Detailed     │      │ Questionnaire    │
│    1.0      │         │    2.0       │      │ Information   │      │     4.0          │
└─────────────┘         └──────────────┘      │    3.0       │      └──────────────────┘
       │                                       └──────────────┘
      <20
```

Advantages

Economical	Allows many
2.1.1	to Participate Process 2.1.2

Can Cover Unlimited Topics
2.1.3

2.1

Make Questions:

As Brief as Possible	Avoid Long Narrative Answers
4.1.1	4.1.2

Phrase Questions in a Logical Order	Avoid all Ambiguity
4.1.4	4.1.5

4.1

Use Interview Technique
13.0

Preliminary Investigation
14.0

Detailed Investigation
27.0

Interview Line Personnel
28.0

Set Interview Objectives
16.0

25.0

Interview Upper Management
15.0

Could include:

Secretaries 28.1.1	First Line Supervisors 28.1.2	Machine Operators 28.1.3
Forepersons 28.1.4	Clerks 28.1.5	Salespersons 28.1.6

28.1

Base Objective on the Role of the Person to be Interviewed
16.1

Determine Role of Management Persons to be Interviewed
15.1

From Organizatinal Chart
15.1.1

1 of

```
┌─────────┐          ┌──────────────┐          ┌──────────────┐
│ t the   │          │ Do Follow ups│          │ Compile all  │
│ nnaire  │─────────▶│ to Obtain Late│────────▶│ Data         │─────────────▶  Return
│ 0       │          │ Returns      │          │              │
└─────────┘          │       9.0    │          │        10.0  │
                     └──────────────┘          └──────────────┘
                                                      ▲
┌──────────┐                                          │
│ ailed    │                                   ┌──────────────┐
│ tructfons│                                   │ Use Simple   │
│      8.1.2│                                  │ Statistics   │
├──────────┤                                   │       10.1   │
│   of     │                                   └──────────────┘
│  city    │
│  1.4     │
└──────────┘
```

16.0
yes

```
┌──────────┐        ┌──────────┐    ┌──────────────┐    ┌──────────────┐        ┌──────────┐
│ Progress │  yes   │ Complete │    │ Record all   │    │ Send Thank You/│       │ Others to│  no
│Satisfactory│─────▶│ Interview│───▶│ Information   │──▶│ Summary Memo to│──────▶│ Interview│──────▶ Return
│          │        │          │    │              │    │ Interviewee   │        │          │
│   21.0   │        │   22.0   │    │        23.0  │    │        24.0   │        │   25.0   │
└──────────┘        └──────────┘    └──────────────┘    └──────────────┘        └──────────┘
     │ no
     ▼
┌──────────────┐  ┌──────────────┐  ┌──────────────┐  ┌──────────────┐  ┌──────────────┐
│ Terminate the│  │ Access Reason│  │ Try Another  │  │ Use Question │  │ Do Within 30 min│
│ Interview    │  │ for Failure  │  │ Person       │  │ Sheet        │  │ of Interview  │
│       26.0   │  │       27.0   │  │       28.0   │  │       23.1   │  │        23.2   │
└──────────────┘  └──────────────┘  └──────────────┘  └──────────────┘  └──────────────┘
```

```
        Might Include
┌──────────────────────────────────────────────────────┐
│  ┌──────────────────────┐   ┌──────────────────────┐  │
│  │ Personality Conflicts│   │ Lack of Preparation  │  │
│  │       27.1.1         │   │       27.1.2         │  │
│  └──────────────────────┘   └──────────────────────┘  │
│  ┌──────────────────────┐   ┌──────────────────────────┐ │
│  │ Vested Interests     │   │ Interviewed Wrong Person │ │
│  │       27.1.3         │   │       27.1.4             │ │
│  └──────────────────────┘   └──────────────────────────┘ │
│                      27.1                              │
└──────────────────────────────────────────────────────┘
```

3 of 3.

Determine Organizational
Goals 1.A

Does Organizational Chart Exist
1.1

yes

no

Interview Top Management
1.2

Interview Middle Management
1.3

Compare the Goals of Both
1.4

Develop Chart
1.11

Ask:

| What are the Main Corporate Functions 1.2.1.1 |

| How are They Conducted 1.2.1.2 |

| What are the Social Responsibilities of the Organization 1.2.1.3 |

In What Direction is the Organization Headed:

| Why 1.2.1.4.1 | How 1.2.1.4.2 |
| Who 1.2.1.4.3 | When 1.2.1.4.4 |

1.2.1.4

1.2

Ask:

| What are their Main Responsibilities 1.3.1.1 |

What Direction are They Headed

Who 1.3.1.2.1	What 1.3.1.2.2
Why 1.3.1.2.3	When 1.3.1.2.4
How 1.3.1.2.5	

1.3.1.2

1.3.1

Determine:

| Who is the Highest Management Person in Organization 1.11.1.1 |

| Who is the Next in Line in What Capacity Link to Highest Person. 1.11.1.2 |

| Continue to Next Level of Management, Outline Each's Capacity and Who They Report to 1.11.1.3 |

| Continue to Supervisor Level Outline Capacity Link to Person They Report to and Those That Report to Them 1.11.1.3 |

1.11.1

ne
Both

Are They
Mutually
Inclusive
1.5

yes

Interview
Supervisors
1.6

Compare Goals
to Those of
Middle Management
1.7

Are They
Mutually
Inclusive
1.8

yes

Divide Goa
Into Long
Short Term
1.9

no

Determine
Why not
1.12

nc

Determine
Why not
1.14

Ask:

What are Their
Main Job Respon
sibilities
1.6.1.1

Report Back
to Higher
Management
1.13

What Direction are
They Headed:

Who	Why
1.6.1.2.1	1.6.1.2.2
How	When
1.6.1.2.3	1.6.1.2.4

1.6.1.2

1.6.1

Report Discrepancies
to Next Level of
Management for Clari
fication
1.15

Goal

Long
Like
Effe
Year

Sho
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Temp
uati

```
[re]
```

Compare Goals
to Those of
Middle Management
1.7

Are They
Mutually
Inclusive
1.8

yes

Divide Goals
Into Long and
Short Term.
1.9

Form Training
Policy Around
Long Term Goals
1.10

→ Return

no

Determine
Why not
1.14

Report Discrepancies
to Next Level of
Management for Clari
fication
1.15

Goals:

Long term will
Likely Have
Effect for 5
Years or More
1.9.1.1

Short Term are
Reactions to
Temporary sit
uation
1.9.1.2

1.9.1

Training Must Always
Support the Organization
in it's Acheivement of
it's Goals
1.10.1

Example: The Organization
will Change it's Line of
Production. How will
Training Facilitate the
Process
1.10.1.1

```
·ir
·pon
```

```
ion are
:
```

Why
1.6.1.2.2

When
1.6.1.2.4

6.1.2

.6.1

3.3.1

```
Review Past
Training Policy

3.3.1.1
```

```
Conduct Consumer
Survey

3.3.1.2
```

```
Interview Ke
Consumers

3.3.1.4
```

yes

```
Indications of N
Performance Chan
3.3.1.3
```

```
Structure Must be
Short and concise

3.3.1.2.1
```

```
Survey Must be
on Performance

3.3.1.2.2
```

Include:

```
Budgets
3.3.1.1.1.1
```

```
Training Programs
3.3.1.1.1.2
```

```
Training Effectiveness
3.3.1.1.1.3
```

```
How Higher Management
Viewed Training
3.3.1.1.1.4
```

```
Training Areas
3.3.1.1.1.5
```

3.3.1.1.1

Including:

```
Production Pe
Levels
3.3.1.2.2.1
```

```
Service Perfor
Figures
3.3.1.2.2.1
```

Interview Key
Consumers

3.3.1.4

May Reveal Problem
not Apparent to
Internal Auditing

3.3.1.5

yes

Indications of Negative
Performance Change
3.3.1.3

no

Do Personnel
Audit

3.3.1.6

Sum

Survey Must be Based
on Performance

3.3.1.2.2

Useful if one
Department's
Output is Input
to Another

3.3.1.2.3

Consumers are Consumers
of Some Types of Organ-
izational Output

3.3.1.2.4

Utilize Personnel Records
to Determine:

Age Groupings of
Personnel
3.3.1.6.1.1

Educa
of En
3.

Including:

Production Performance
Levels
3.3.1.2.2.1.1

Sales Performance
Figures
3.3.1.2.2.1.2

What Types of Employ-
ment are Available
3.3.1.6.1.3

Numb

Service Performance
Figures
3.3.1.2.2.1.3

Quality Control
Measures
3.3.1.2.2.1.4

3.3.1.2.2.1

Average Number of
Years employees have
Been with The Organization
3.3.1.6.1.5

3.3.1.6.1

Summarize Data

3.3.1.7

Will Provide Useful
Data

3.3.1.8

Changes in Categories
of Employment

3.3.1.9

Changes in Skill
Requirements

3.3.1.10

Changes in the
Workforce Structure

3.3.1.11

Conduct Organizational
Audit

3.3.1.12

...nnel Records

... of

Educational Levels
of Employees
3.3.1.6.1.2

... Employ-
...lable

Number of Employees
3.3.1.6.1.4

...r of
...res have
... Organization
..5

What is the sex Ratio
per Employement Category
3.3.1.6.1.6

3.3.1.6.1

Use Only Quantifiable
Units of Measure

3.3.1.12.

Including:

Returns on Investment
3.3.1.12. .1.1

Labor Costs
3.3.1.12. .1.4

Quality Control Record
3.3.1.12. .1.7

3.3.1

```
┌──────────────────────┐     ┌──────────────────────┐     ┌──────────────────────┐     ┌──────────────────────┐
│ Conduct Organizational│    │ Compare Each Type    │     │ Compare Each Type of │     │ Consistent Poor      │
│ Audit                │     │ of data to Past      │     │ Data to Industrial   │     │ Performances is      │
│                      │─────▶│ Performance          │────▶│ Averages             │────▶│ Indication of        │
│    3.3.1.12          │     │                      │     │                      │     │ Problems             │
│                      │     │    3.3.1.13          │     │    3.3.1.14          │     │                      │
└──────────────────────┘     └──────────────────────┘     └──────────────────────┘     │    3.3.1.15          │
         ▲                                                          ▲                    └──────────────────────┘
         │                                                          │
         │                                              ┌──────────────────────┐
         │                                              │ Available Through    │        from information gathering: ──────
         │                                              │ Statistics Canada    │        interviews and questionnaires
         │                                              │                      │
         │                                              │    3.3.1.14.1        │
         │                                              └──────────────────────┘
┌──────────────────────┐
│ Use Only Quantifiable│
│ Units of Measure     │
│                      │
│    3.3.1.12.         │
└──────────────────────┘
         ▲
         │
┌────────────────────────────────────────────────────────────────────────┐
│  Including:                                                             │
│                                                                        │
│  ┌──────────────────────┐  ┌──────────────────────┐  ┌────────────────┐│
│  │ Returns on Investments│  │ Manhours Spent on    │  │ Sales Volume per││
│  │   3.3.1.12. .1.1     │  │ Given Job Tasks      │  │ Salesperson    ││
│  │                      │  │ 3.3.1.12. .1.2       │  │   3.3.1.12. .1.3││
│  └──────────────────────┘  └──────────────────────┘  └────────────────┘│
│                                                                        │
│  ┌──────────────────────┐  ┌──────────────────────┐  ┌────────────────┐│
│  │ Labor Costs          │  │ Loss of Production Due│  │ Turnover Rates ││
│  │ 3.3.1.12. .1.4       │  │ to Grievences and Strike│ 3.3.1.12.. .1.6││
│  └──────────────────────┘  │   3.3.1.12. .1.5     │  └────────────────┘│
│                            └──────────────────────┘                    │
│  ┌──────────────────────┐                                              │
│  │ Quality Control Records│                                            │
│  │   3.3.1.12. .1.7     │                                              │
│  └──────────────────────┘                                              │
│                        3.3.1.12. .1                                    │
└────────────────────────────────────────────────────────────────────────┘
```

4 of

```
                ┌─────────────────────┐    ┌──────────────────┐    ┌──────────────────────┐
                │  Begin Needs Analysis│    │  Summarize Data  │    │ Note Recurring       │
   ────────────▶│                     │───▶│                  │───▶│ Problem Patterns     │──────▶ Return
                │     3.3.1.16         │    │    3.3.1.17      │    │ for More Inves-      │        to
                └─────────────────────┘    └──────────────────┘    │ tigation             │        3.3.1
                           ▲                                        │                      │
                           │                                        │     3.3.1.18         │
                           │                                        └──────────────────────┘
                           │
                           │◀──────────────────────────────────┐
                ┌─────────────────────────────┐    ┌──────────────────────┐
                │ Develop Questionnaire Along │    │ Conduct Interviews with│
   g:           │ Lines of Job Dis/satisfaction│   │ Key Personnel          │
   ires ───────▶│                             │    │                      │
                │       3.3.1.16.1            │    │     3.3.1.16.2       │
                └─────────────────────────────┘    └──────────────────────┘
                           ▲
                           │
                  ┌────────────────────────┐
                  │ What Factors Lead to a │
                  │ Sense of Well Being,   │
                  │ Which Detract From This│
                  │ Feeling                │
                  │                        │
                  │     3.3.1.16.1.1       │
                  └────────────────────────┘
```

5 4 5

Establish Performance
Standards: 7A

Obtain Information
About the Job

7.1

Break Down Job
Into Individual
Tasks

7.2

List all
Job Skills

7.3

Determine if List
is Complete

7.4

Comple

7.1

List

7.

Sources of
Information:

Observe Job Being
Done
7.1.1.1

Interview Supervisors
7.1.1.2

Interview Employees
7.1.1.3

Read Job Descrip;tion
7.1.1.4

7.1.1

Example:

A Secretary Files, Takes
Notes, Types,Organizes
Agendae and so on
7.2.1.1

7.2.1

.Ask:

Employees
7.4.1.1

Supervisors
7.4.1.2

7.4.1

from information
gathering: Question-
naires and interviews

1 of

```
┌──────────────┐
│Complete List │
│              │
│     7.13     │
└──────────────┘
       ▲
       │
      no
       │
┌──────────────┐  yes   ┌──────────────┐       ┌────────────────────────┐       ┌──────────────┐
│ List Complete├───────►│ Make Skill   ├──────►│ Describe Conditions Under│─────►│ Determine Lev│
│     7.5      │        │ Performance  │       │ Which Performance will be│      │ Acceptable Pe│
│              │        │ Statement    │       │ Carried' out             │      │              │
└──────────────┘        │     7.6      │       │          7.7             │      │     7.8      │
                        └──────┬───────┘       └───────────▲────────────┘       └──────▲───────┘
                               ▲                           │                           │
                               ┃                           │                           │
```

Properties of Skill
Performance Statement:

Describes What Persons
will do
        7.6.1.1

Use Only Action Verbs
to Begin Each Statement
        7.6.1.2

                7.6.1

Include:

What Resources will
be Available:

Tools, Job Aids,
Manuals
  7.7.1.1.1
        7.7.1.1

What Resources will
not be Available
        7.7.1.2

What is the Work
Environment Like

Lighting, Climate,
Space, Noise Level
Danger
    7.7.1.3.1
        7.7.1.3
            7.7.1

Define Quali
Performance

Accuracy, Ne
Number of Er
            7.8

Define Quan
Standards a

Production
    7.8.1.2.

Volume
7.8.1.2.2

Sales Rate
7.8.1.2.3

Units of
per Hour
    7.8.1.2.4

        7.8.1.2

2 of

```
                                    ┌──────────────┐
                                    │  Clear up    │
                                    │  Problems    │
                                    │              │
                                    │    7.14      │
                                    └──────────────┘
                                           ↑
                                          no

┌────────────────────────┐        ┌──────────────────┐  yes   ┌──────────────────────────┐
│ Determine Levels of    │        │ Are all Statements│──────→ │ Assemble all Statements  │
│ Acceptable Performance │───────→│ Unambiguous       │        │ to Become Job Performance│
│                        │        │      7.9          │        │ Standards                │
│        7.8             │        └──────────────────┘        │         7.10             │
└────────────────────────┘                 ↑                   └──────────────────────────┘
           ↑
                                    ┌──────────────────┐
                                    │ Look for:        │
Define Quality of                   │ ┌──────────────┐ │
Performance in Terms of:            │ │ Grammatical and│ │
                                    │ │ Spelling Errors│ │
                                    │ │   7.9.1.1    │ │
                                    │ └──────────────┘ │
┌────────────────────────────────┐  │                  │
│ ┌────────────────────────────┐ │  │ ┌──────────────┐ │
│ │ Accuracy, Neatness, Tolerance│ │ │ │ Sentence Structure│
│ │ Number of Errors, Scrap Rates│ │ │ │   7.9.1.2    │ │
│ │        7.8.1.1             │ │  │ └──────────────┘ │
│ └────────────────────────────┘ │  │                  │
│                                │  │ ┌──────────────┐ │
│ ┌──────────────────┐  Define Time in │ │ Logic Errors │ │
│ │ Define Quantity  │  Terms of:      │ │   7.9.1.3    │ │
│ │ Standards as:    │ ┌────────────┐  │ └──────────────┘ │
│ │ ┌──────────────┐ │ │ Duration of│  │                  │
│ │ │Production Rates│ │ Activities │  │ ┌──────────────┐ │
│ │ │  7.8.1.2.1   │ │ │ 7.8.1.3.1 │  │ │ Confusing    │ │
│ │ └──────────────┘ │ └────────────┘  │ │ Information  │ │
│ │                  │ ┌────────────┐  │ │   7.9.1.4    │ │
│ │ ┌──────────────┐ │ │ Frequency of│ │ └──────────────┘ │
│ │ │ Volume       │ │ │ Activities │  │                  │
│ │ │ 7.8.1.2.2    │ │ │ 7.8.1.3.2 │  │     7.9.1        │
│ │ └──────────────┘ │ └────────────┘  └──────────────────┘
│ │                  │ ┌────────────┐
│ │ ┌──────────────┐ │ │ Punctuality│
│ │ │ Sales Rates  │ │ │ 7.8.1.3.3 │
│ │ │ 7.8.1.2.3    │ │ └────────────┘
│ │ └──────────────┘ │ ┌────────────┐
│ │ ┌──────────────┐ │ │ Schedules and met│
│ │ │ Units of Work│ │ │ Deadlines  │
│ │ │ per Hour     │ │ │   7.8.1.3.4│
│ │ │ 7.8.1.2.4    │ │ └────────────┘
│ │ └──────────────┘ │     7.8.1.3
│ │    7.8.1.2       │
│ └──────────────────┘
│                 7.8.1             │
└────────────────────────────────┘
```

3 of

```
                                                            ┌──────────────┐
                                                            │ Alter Job    │
                                                            │ Performance  │
                                                            │ Standard     │
                                                            │              │
                                                            │   7.15       │
                                                            └──────────────┘
                                                                  ▲
                                                                  │ no

┌─────────────────────┐     ┌──────────────┐          ┌──────────────┐
│ Assemble all        │     │ Validate Job │          │              │  yes
│ Statements          │     │ Performance  │          │  Validated   │──────►  Return
│ to Become Job       │────►│ Standards    │─────────►│    7.12      │
│ Performance         │     │              │          └──────────────┘
│ Standards           │     │   7.11       │
│       7.10          │     └──────────────┘
└─────────────────────┘            ▲
                                   │
```

```
            ┌─────────────────────────┐   ┌──────────────────────────┐
            │   Verify:               │   │  How to Verify:          │
            │                         │   │                          │
            │ ┌─────────────────────┐ │   │ ┌──────────────────────┐ │
            │ │ Conditions of       │ │   │ │ Observe Employees    │ │
            │ │ Performance         │ │◄──│ │ on the Job           │ │
            │ │  7.11.1.1           │ │   │ │    7.11.2.1          │ │
            │ └─────────────────────┘ │   │ └──────────────────────┘ │
            │                         │   │                          │
            │ ┌─────────────────────┐ │   │ ┌──────────────────────┐ │
            │ │ Levels of Acceptable│ │   │ │ Have Supervisors     │ │
            │ │ Performance         │ │   │ │ Verify               │ │
            │ │   7.11.1.2          │ │   │ │ Through a            │ │
            │ └─────────────────────┘ │   │ │ Questionnaire        │ │
            │      7.11.1             │   │ │    7.11.2.2          │ │
            └─────────────────────────┘   │ └──────────────────────┘ │
                                          │       7.11.2             │
                                          └──────────────────────────┘
                                                     ▲
                                                     │
```

from information gathering:
interviews and questionnaires.

Enforce Standards
9.A

```
┌─────────────────┐        ┌──────────────────────────┐     ┌──────────────────────────┐     ┌──────────────────────────┐
│ Ensure Senior   │        │ Make Standards Enforcement│     │ Provide Performance      │     │ Outline Methods of       │
│ Management's    │───────▶│ Part of First Line        │────▶│ Standards Checklists     │────▶│ Standards Enforcement    │
│ Support         │        │ Management's Job          │     │ for Those Jobs the       │     │                          │
│                 │        │                           │     │ Manager is Responsible   │     │                          │
│      9.1        │        │          9.2              │     │                          │     │          9.4             │
└─────────────────┘        └──────────────────────────┘     │          9.3             │     └──────────────────────────┘
                                        ▲                    └──────────────────────────┘                    ▲
                                        │                                                                     │
                           ┌────────────────────────┐                                                        │
                           │  Include:              │                                             From:
                           │  ┌──────────────────┐  │                                             9.4.1
                           │  │ Supervisors      │  │
                           │  │ 9.2.1.1          │  │
                           │  └──────────────────┘  │
                           │  ┌──────────────────┐  │
                           │  │ Forepersons      │  │
                           │  │ 9.2.1.2          │  │
                           │  └──────────────────┘  │
                           │  ┌──────────────────┐  │
                           │  │ Section Heads    │  │
                           │  │ 9.2.1.3          │  │
                           │  └──────────────────┘  │
                           │  ┌──────────────────┐  │
                           │  │ Office Managers  │  │
                           │  │ 9.2.1.4          │  │
                           │  └──────────────────┘  │
                           │         9.2.1          │
                           └────────────────────────┘
```

```
┌──────────┐        ┌─────────────────────┐                    ⬡ Are Managers
│ rmance   │        │ Outline Methods of  │                      Enforcing          yes ──────► Return
│ cklists  │───────►│ Standards Enforcement│──────────────────►  Standards
│ s the    │        │                     │                      9.5
│ sponsible│        │         9.4         │                       │
└──────────┘        └─────────────────────┘                       │ no
                              ▲                                    ▼
                              │                                 Are They
                              │                                 Unwilling ──── no ──────────►
                              │                                 9.6
                         From                                      │
                         9.4.1                                     │ yes
                                                                   ▼
                                          ┌──────────────┐     ┌──────────────┐
                                          │Inform Persons│     │Determine the │
                                          │Involved:     │     │Cause of Problem│
                                          │              │     │              │
                                          │    9.7       │     │              │
                                          └──────────────┘     └──────────────┘
```

Inform Persons Involved:

9.7

of:

Importance to the
Organization
9.7.1.1

The Level of Management
That Supports Standards
Enforcement
9.7.1.2

9.7.1

Determine the
Cause of Problem

Could be:

Cause for Supervisors
Training Course
9.8.1.1

Required Coaching
9.8.1.2

9.8.1

```
┌──────────────────┐    ┌──────────────────┐    ┌──────────────────┐    ╱─────────────────╲
│ Managers to      │    │ Inform Employee  │    │ Arrange Time for │   ╱ Employee Performance╲   yes
│ Collect Data on  │───▶│ of Performance   │───▶│ Performance      │──▶│ Satisfactory       │──────▶
│ a Monthly Basis  │    │ Appraisal        │    │ Appraisal        │   ╲                   ╱
│                  │    │                  │    │ Interview        │    ╲     9.4.5       ╱
│     9.4.1        │    │     9.4.2        │    │     9.4.3        │     ╲─────────────────╱
└──────────────────┘    └──────────────────┘    └──────────────────┘            │
                                                                               no│
                                                                                 ▼
                                                                        ┌──────────────────┐
                                                                        │ Begin Analysis to│
                                                                        │ Determine Why not│
                                                                        │                  │
                                                                        │     9.4.8        │
                                                                        └──────────────────┘
                                                                                 │
                                                                                 ▼
                                                                          ╱─────────────╲
                                                                         ╱ New Employee  ╲  yes   ┌────────┐
                                                                         │ on the Job     │──────▶│ Ex...  │
                                                                         ╲                ╱        │ St...  │
                                                                          ╲   9.4.9     ╱         └────────┘
                                                                           ╲───────────╱
                                                                                │
                                                                              no│
                                                                                ▼
                                                                          ╱─────────────╲
                                                                         ╱ First Time    ╲  yes
                                                                         │ Problem        │──────▶
                                                                         ╲                ╱
                                                                          ╲   9.4.12    ╱
                                                                           ╲───────────╱
                                                                                │
                                                                              no│
                                                                                ▼
    ┌──────────────────────┐                                      ┌──────────────────┐
    │ Standards are Useful │                                      │ Take Disciplinary│
    │ in These Situations  │                                      │ Action           │
    │ as They are Objective│─────────────────────────────────────▶│                  │
    │ Based and are Unbiased│                                     │     9.4.16       │
    │                      │                                      └──────────────────┘
    │     9.4.16.1         │                                               │
    └──────────────────────┘                                               ▼
                                                                  ┌──────────────────┐
                                                                  │ Monitor Closely  │
                                                                  │                  │
                                                                  │     9.4.17       │
                                                                  └──────────────────┘
```

```
ee Performance      yes      Re-enforce Employee        Continue Process
actory         ───────▶      Behavior                   
   9.4.5                                                    9.4.7
                                9.4.6

   │
   no
   │
   ▼
n Analysis to                   Can Use:
rmine Why not
   .4.8                          Note in Employment         Security
                                 Record                     9.4.6.1.4
                                    9.4.6.1.1
                                                            Praise
                                 Consideration for          9.4.6.1.5
                                 Advancement
                                    9.4.6.1.2               Set New
                                                            Challenges
                                 Recommendation             9.4.6.1.6
                                 for Bonus
                                    9.4.6.1.3
                                            9.4.6.1

Employee       yes      Explain Performance         Monitor Closely
the Job        ───────▶ Standards
   4.9                                                 9.4.11
                            9.4.10
   │
   no
   │
   ▼
rst Time       yes      Check for              Employee at       no     Take Appropriate
oblem          ───────▶ Reason                 Fault                     Action
   4.12                                                                     9.4.19
                         9.4.13                   9.4.14
   │
  no
   │                     IN:                                yes        Council      Action Within the
   ▼                                                                   9.4.15      Sphere of Responsibil
iplinary                 Knowledge, Skills and    Physical and Social              9.4.19.1
                         Motivation               Environment
   6                        9.4.13.1.1               9.4.13.1.2        Attempt to Make Employee
                                                                      Aware of Problems and to
                         Necessary Resources to do Understanding of   Have Him Determine Plan
                         the Job                   Production Expectations to Solve Problem
                            9.4.13.1.3                9.4.13.4
                                                                         9.4.15.1           yes
                                     9.4.13.1

Closely                                                                         Improvement
                                                                                  9.4.18
.17
                                    9.4.1
```

Process

ly

no

Take Appropriate
Action

9.4.19

Is This a General
Problem
9.4.20

yes

Inform Next Level
of Management

9.4.21

Council

9.4.15

Action Within the
Sphere of Responsibility

9.4.19.1

Conditions May
Have Changed

9.4.21.1

Attempt to Make Employee
Aware of Problems and to
Have Him Determine Plan
to Solve Problem

9.4.15.1

of
ectations

yes

Improvement
9.4.18

no

Recommend
Termination

9.4.22

9.4.1

Determine Measures
of Loss

10.1

Determine if the
Problem has Affected
other Areas

10.2

Include:

Loss of
Productivity

10.1.1.1

Excessive Rates
of Turnover

10.1.1.2

Cost of Idle
Facilities

10.1.1.3

Losses Due to Low
Productivity

10.1.1.4

Losses Due to Obsolete
Methods of Production

10.1.1.5

Loss of Sales

10.1.1.6

Losses Due to Lack
of Competitiveness

10.1.1.7

Losses due to
Excessive levels
of Absenteeism

10.1.1.8

Losses due to
Accident Rates

10.1.1.9

10.1.1

Outputs from one Department
are often Inputs to Another.
If there are Problems with
the Outputs then it is Likely
to 'Ripple' out.

10.2.1

1 of

one Department
uts to Another.
Problems with
hen it is Likely
tit.

.2.1

```
                    ┌─────────────┐
                    │ New Problem │  no        ┌──────────────────────┐          ┌──────────────────────┐
───────────────────<│    10.3     >──────────> │ Calculate the Cost Of│          │ Convert all Problem  │
                    └──────┬──────┘             │ the Problem if Left  │          │ Inputs to Dollars    │
                           │                    │ for a 1-5 year period│ ───────> │                      │
                           │ yes                │                      │          │        10.6          │
                           │                    │        10.5          │          └──────────────────────┘
                           │                    └──────────▲───────────┘
                           │                               │
                           │                    ┌──────────┴───────────┐
                           └───────────────────>│ Compare the Performance of│
                                                │ the Affected Areas to the │
                                                │ National Average. Subtract│
                                                │ One from the Other to Det-│
                                                │ ermine Losses             │
                                                │                           │
                                                │            10.4           │
                                                └───────────────────────────┘
```

Examples:

Turnover Rates n(cost of trainir
salaries loss of productivity co
personnel administration)

10.6.1.1

Loss of Productivity Difference
between national average for in
and own $ value of output

10.6.1.2

Cost of Idle Facilities Average
Value/hours of operation x hour
idleness

10.6.1.3

10.6.1

2 of 1

```
Of
t
iod
```

Convert all Problem Inputs to Dollars

10.6

Summarize all Costs

10.7

Return

```
rmance of
s to the
 Subtract
r to Det-
```

Examples:

Turnover Rates n(cost of training salaries loss of productivity cost personnel administration)

10.6.1.1

Loss of Productivity Difference between national average for industry and own $ value of output

10.6.1.2

Cost of Idle Facilities Average & Value/hours of operation x hours of idleness

10.6.1.3

10.6.1

```
┌─────────────┐      ╱─────────╲  no   ┌──────────────────┐   ┌──────────────┐        ┌──────────┐
│Define Target│─────▶│ Initial  │─────▶│Directed to       │   │Derive Basic  │        │Define Ob │
│Audience     │      │ Report   │      │Upper Management  │──▶│Subject Materials│─────│          │
│   13.1      │      │  13.2    │      │    13.1          │   │   13.1       │        │   13.9   │
└─────────────┘      ╲─────────╱       └──────────────────┘   └──────────────┘        └──────────┘
       ▲                  │ yes
       │                  ▼
┌─────────────────┐  ┌──────────────────┐   ┌──────────────┐
│ Will Be:        │  │Direct to Middle  │   │Derive Basic  │
│ ┌─────────────┐ │  │and Lower Management│─▶│Subject Materials│
│ │Upper Management│ │    13.3          │   │   13.4       │
│ │   13.1.1.1  │ │  └──────────────────┘   └──────────────┘
│ └─────────────┘ │          ▲
│ ┌─────────────┐ │          │
│ │Middle Management│
│ │   13.1.1.2  │ │
│ └─────────────┘ │
│ ┌─────────────┐ │
│ │Lower Management│
│ │   13.1.1.3  │ │
│ └─────────────┘ │
│       13.1.1    │
└─────────────────┘
```

Will Be:
- Upper Management 13.1.1.1
- Middle Management 13.1.1.2
- Lower Management 13.1.1.3

13.1.1

Benefits:
- Does not appear to Break Chain of Command by Going Over Heads 13.3.1.1
- Involves persons most affected by problem and solution 13.3.1.2
- Helps to Ensure Co-operation 13.3.1.3

13.3.1

Include:
- Initial Problem Awareness 13.4.1.1
- Methods of Investigation 13.4.1.2
- Time Required for Study 13.4.1.3
- Cost of Problem 13.4.1.4
- Why the Problem is Considered a Training Problem

13.4.1

Include:
- All Materials from Initial Report 13.19.1.1
- Strategy Employed to solve Problem 13.19.1.2
- Cost of Solving Problem 13.19.1.3
- Cost-effectiveness of Solution 13.19.1.4
- Recommendations 13.19.1.5

13.19.1

```
┌─────────────────┐                              ╱────────╲            ┌─────────────────┐
│ Define Objectives│                             ╱  Final   ╲   no      │ Organize        │
│                 │────────────────────────────<   Report    >─────────│ Presentation    │
│      13.5       │                             ╲   13.6    ╱           │      13.8       │
└─────────────────┘                              ╲────────╱            └─────────────────┘
                                                      │ yes
```

┌─────────────────┐
│ Include: │
│   │
│ ┌─────────────┐ │
│ │ All Materials│ │
│ │ from Initial │ │
│ │ Report   │ │
│ │ 13.19.1.1 │ │
│ └─────────────┘ │
│   │
│ ┌─────────────┐ │
│ │Strategy Employed│
│ │to solve Problem│
│ │ 13.19.1.2 │ │
│ └─────────────┘ │
│   │
│ ┌─────────────┐ │
│ │Cost of Solving│ │
│ │Problem   │ │
│ │ 13.19.1.3 │ │
│ └─────────────┘ │
│   │
│ ┌─────────────┐ │
│ │Cost-effectiveness│
│ │of Solution   │ │
│ │ 13.19.1.4 │ │
│ └─────────────┘ │
│   │
│ ┌─────────────┐ │
│ │Recommendations│ │
│ │ 13.19.1.5 │ │
│ └─────────────┘ │
│   13.19.1   │
└─────────────────┘

Usually:

┌──────────────────┐
│ ┌──────────────┐ │
│ │Appraise Management│
│ │of Situation   │ │
│ │   13.5.1.1   │ │
│ └──────────────┘ │
│ ┌──────────────┐ │
│ │Express Discovery│
│ │of the Problem │ │
│ │   13.5.1.2   │ │
│ └──────────────┘ │
│ ┌──────────────┐ │
│ │Explain the Costs│
│ │of the problem to│
│ │the Organization│ │
│ │   13.5.1.3   │ │
│ └──────────────┘ │
│   13.5.1   │
└──────────────────┘

┌─────────────────┐
│ Include: │
│ ┌─────────────┐ │
│ │Approach to   │ │
│ │Solving the   │ │
│ │Problem   │ │
│ │   13.7 1   │ │
│ └─────────────┘ │
│ ┌─────────────┐ │
│ │Costs of Solving│
│ │the Problem   │ │
│ │   13.7.2   │ │
│ └─────────────┘ │
│ ┌─────────────┐ │
│ │Net Benefits to│ │
│ │the Organization│
│ │   13.7.3   │ │
│ └─────────────┘ │
│   13.7   │
└─────────────────┘

┌─────────────────┐
│ Ensure   │
│ Objectives   │
│ are Met   │
│   13.8.1   │
└─────────────────┘

┌─────────────────┐
│ Organize Sequence│
│ of Presentation │
│   13.8.2   │
└─────────────────┘

┌─────────────────┐
│ Let Each Objective│
│ Flow Logically into│
│ the Next   │
│   13.8.2.1   │
└─────────────────┘

┌─────────────────┐
│ Verify sequence of│
│ Recommendations and│
│ Findings to Gain │
│ Confidence of Management│
│   13.8.2.2   │
└─────────────────┘

```
┌──────────────┐        ╱ Audience ╲                          ┌────────────────────────┐
│ Organize     │       ╱ Familiar with ╲   yes                │ Prepare A-V Materials  │
│ Presentation │──────< the Topic       >────────────────────→│ to Support Presentation│
│    13.8      │       ╲    13.9       ╱                       │       13.10            │
└──────────────┘        ╲            ╱                         └────────────────────────┘
                              │ no
                              ↓
┌──────────────┐        ┌──────────────┐     ┌────────────────────┐
│ Ensure       │        │ Determine What│     │ Prepare an Appropriate │
│ Objectives   │        │ Areas They are│────→│ List of Terminology to │
│ are Met      │        │ not Familiar  │     │ Acquaint Audience with │
│   13.8.1     │        │ with          │     │                        │
└──────────────┘        │    13.19      │     │        13.20           │
                        └──────────────┘     └────────────────────┘

                                                        Could Include:

┌──────────────┐                                        ┌──────────┐  ┌────────┐
│ Organize Sequence│                                    │ Overhead │  │ Flip Ch│
│ of Presentation  │                                    │ Projector│  │ 13.10.1│
│    13.8.2        │                                    │ 13.10.1.1│  └────────┘
└──────────────┘                                        └──────────┘  ┌────────┐
                                                        ┌──────────┐  │ Slide  │
                        ┌──────────────┐                │ Video Tape│ │ 13.10.1│
┌──────────────┐        │ Determine Points│             │ 13.10.1.3 │ └────────┘
│ Let Each Objective│   │ to Emphasize  │               └──────────┘
│ Flow Logically into│  │    13.8.3     │               ┌──────────┐
│ the Next          │   └──────────────┘                │ Chalkboard│
│   13.8.2.1        │                                    │ 13.10.1.5 │
└──────────────┘        ┌──────────────┐                └──────────┘
                        │ Usually:      │                      13.10.1
                        │ ┌────────────────┐│
┌──────────────┐        │ │ Problem Identification ││
│ Verify sequence of │  │ │    13.8.3.1.1   ││       Use Various Techni
│ Recommendations and│  │ └────────────────┘│        to Emphasize Point
│ Findings to Gain   │  │ ┌────────────┐│                 13.10.2
│ Confidence of Management│ Costs of Problem ││
│    13.8.2.2        │  │ │   13.8.3.1.2  ││
└──────────────┘        │ └────────────┘│           Include:
                        │ ┌──────────┐│             ┌────────┐  ┌───┐
                        │ │ Solutions ││            │ Colors │  │ Hi│
                        │ │ 13.8.3.1.3││            │13.10.2.1.1│ │13.│
                        │ └──────────┘│             └────────┘  └───┘
                        │ ┌────────────┐│           ┌────────┐  ┌───┐
                        │ │ Costs of Solutions││     │ Shading │  │ So│
                        │ │  13.8.3.1.4   ││        │13.10.2.1.3│ │13 │
                        │ └────────────┘│           └────────┘  └───┘
                        │     13.8.3.1  │                 13.10.2.1
                        └──────────────┘
```

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1

A-V Materials
ort Presentation
13.10

Practice
13.11

Make
Presentation
13.12

Prepare Written
Report
13.13

Include:

head ecton 0.1.1	Flip Chart 13.10.1.2
o Tape 2.1.3	Slide Tape 13.10.1.4
kboard 0.1.5	

13.10.1

Benefits:

| Show Rough Spots 13.11.1.1 | Anticipate Possible Criticism 13.11.1.2 |
| Increase one Self Confidence 13.11.1.3 | |

13.11.1

Speaker Must:

Sell Self:

| Be Confident 13.12.1.1.1 |
| Avoid Conflict 13.12.1.1.2 |
| Be Straight Foreward 13.12.1.1.2 |

13.12.1.1

Control the Presentation:

| Direct to Points he Considers to be important 13.12.1.2.1 |
| Must Avoid Getting off the Topic 13.12.1.2.1 |

13.12.1.2

e Various Techniques
Emphasize Points
13.10.2

clude:

| lots 3.10.2.1.1 | Highlighting 13.10.2.1.2 |
| ading .10.2.1.3 | Sound 13.10.2.1.4 |

13.10.2.1

Answer all Questions:

| Honestly 13.12.1.4.1 | At the Level of the Audience 13.12.1.4.2 |
| Completely 13.12.1.4.3 | |

13.12.1.4

Use G
Techn

| Voic 13.1 |
| Rela 13 |
| Do n 13 |

13

0

4 of

```
┌──────┐      ┌─────────────┐              ┌──────────────────┐              ┌──────────────────┐                    ┌──────────┐
│ itten│─────→│ Fol    .c   │─────────────→│ Direct Towards   │─────────────→│ Direct Towards   │───────────────────→│ Use Con  │
└──────┘      │ of    .:::a │              │ Lower Management │              │ Upper Management  │                    │ Letter   │
              └─────────────┘              │      13.15       │              │      13.16        │                    │  13.1    │
                                           └──────────────────┘              └──────────────────┘                    └──────────┘
                                                    ↑                                 ↑
```

Use:

Detail Specific
13.15.1.1

5-10 Pages Long
13.15.1.2

13.15.1

Use:

Bare Essentials
13.16.1.1

Broad Implications
13.16.1.2

1-2 Pages Only
13.16.1.3

13.16.1

Identify with the Audience:

Use Eye Contact
13.12.1.3.1

Use Self-Directed Humour
13.12.1.3.1

13.12.1.3

Use Good Speaking Techniques:

Voice Control
13.12.1.5.1

Avoid Distracting Habits
13.12.1.5.2

Relaxed Approach
13.12.1.5.3

Set a Proper Pace
13.12.1.5.4

Do not Read Speech
13.12.1.5.5

13.12.1.5

13.12.1

```
┌──────────────────┐      ┌──────────────────┐      ┌──────────────────┐   ┌──────────────────┐
│ Direct Towards   │      │ Direct Towards   │      │ Use Company      │   │ Ensure There     │─────► Return
│ ower Management  │─────►│ Upper Management │─────►│ Letterhead       │──►│ are no Errors    │
│      13.15       │      │      13.16       │      │     13.17        │   │      13.18       │
└──────────────────┘      └──────────────────┘      └──────────────────┘   └──────────────────┘
        ▲                          ▲                                               ▲
        │                          │                                               │
┌───────────────┐        ┌──────────────────────┐                    ┌──────────────────────────────┐
│ Use:          │        │ Use:                 │                    │ Check:                       │
│ ┌───────────┐ │        │ ┌──────────────────┐ │                    │ ┌──────────┐ ┌─────────────┐ │
│ │etail Specific│      │ │ Bare Essentials  │ │                    │ │ Typing   │ │ Grammar     │ │
│ │  13.15.1.1 │ │        │ │   13.16.1.1      │ │                    │ │13.18.1.1 │ │ 13.18.1.2   │ │
│ └───────────┘ │        │ └──────────────────┘ │                    │ └──────────┘ └─────────────┘ │
│ ┌───────────┐ │        │ ┌──────────────────┐ │                    │ ┌───────────┐ ┌────────────┐ │
│ │-10 Pages Long│      │ │ Broad Implications│ │                   │ │Punctuation│ │ Spelling   │ │
│ │  13.15.1.2 │ │        │ │   13.16.1.2      │ │                    │ │13.18.1.3 │ │ 13.18 1.4  │ │
│ └───────────┘ │        │ └──────────────────┘ │                    │ └───────────┘ └────────────┘ │
│     13.15.1   │        │ ┌──────────────────┐ │                    │          13.18.1             │
└───────────────┘        │ │ 1-2 Pages Only   │ │                    └──────────────────────────────┘
                         │ │   13.16.1.3      │ │
                         │ └──────────────────┘ │
                         │        13.16.1       │
                         └──────────────────────┘
```

Do Job Analysis:
16.A

```
┌─────────────────┐      ┌──────────────────────────┐      ┌──────────────────┐      ┌──────────────────┐
│Determine Job    │      │Determine how Many Persons│      │What is this Job's│      │Are There  Ma     │
│Content          │─────▶│Perform Job               │─────▶│Relation to Other │─────▶│Changes to b      │
│       16.1      │      │        16.2              │      │Jobs        16.3  │      │to This Job       │
└─────────────────┘      └──────────────────────────┘      └──────────────────┘      │        16.4      │
        ▲                                                                             └──────────────────┘
        │                                                                                      │ no
        │                                                                                      ▼
┌─────────────────────────┐
│Determine:               │
│┌───────────────────────┐│
││Main Job Objective     ││
││    16.1.1.1           ││
│└───────────────────────┘│
│┌───────────────────────┐│
││Main Conditions Under  ││
││Which the Job is       ││
││Performed              ││
││       16.1.1.2        ││
│└───────────────────────┘│
│┌───────────────────────┐│
││The Principle Duties   ││
││and Responsibilities   ││
││      16.1.1.3         ││
│└───────────────────────┘│
│┌───────────────────────┐│
││The Main Difficulties  ││
││Associated with the Job││
││      16.1.1.4         ││
│└───────────────────────┘│
│        16.1.1           │
└─────────────────────────┘
        ▲
        │
┌─────────────────────────┐
│Conduct Interviews with  │
│Employees and Supervisors│◀──────── from information gathering:
│        16.1.2           │          interviews and questionnaires
└─────────────────────────┘
```

1 of

Are There Major
Changes to be Made
to This Job
16.4

yes →

Determine Changes to
Allow Analysis to
Account for Changes
16.5

→ Gather Specific
Data
16.6

→ Who do Persons
Doing Job Report to
16.7

no ↓

Methods:

Observation
16.6.1.1

Questionnaire
16.6.1.2

Interview
16.6.1.3

16.6.1

.thering:
.tionnaires

```
┌──────────┐      ┌────────────────────┐   ┌──────────────────┐   ┌──────────────────┐   ┌─────────────────┐
│ersons    │      │Determine if Persons│   │Determine Specific│   │Calculate how Often│  │Determine W      │
│ Report to│─────>│Doing Job has Persons├──>│Tasks             ├──>│Each Task is Done  ├─>│Each Task i      │
│.7        │      │Reporting to Them    │   │         16.9     │   │        16.10      │  │         16.11   │
└──────────┘      │          16.8       │   └──────────────────┘   └──────────────────┘   └─────────────────┘
                  └────────────────────┘            ▲
                                                    │
                                                    │
                                                    │
                                                 From
                                                 16.9.1
```

3 of 1

Determine When Each Task is Done 16.11	Measure the Degree of Difficulty Associated with Each Task 16.12	Determine Minimal Levels of Performance for Each Task 16.13	Will Provide Useful Checkpoints for New and Current Employees 16.14	De Un

Such as:

Where
16.15.1.1

Temperature
16.15.1.2

Noise Levels
16.15.1.3

Dampness
16.15.1.4

Light Intensity
16.15.1.5

16.15.1

In

Is

Is
St

Is
Ir

ul		Determine Specific Conditions		Specify What Major		Synthesize Data to		Return
lew	→	Under Which Job is Performed	→	Job Changes will	→	Make Job Specification	→	
yees		16.15		Occur in the Near		16.17		
				Future				
				16.16				

```
Intrinsic Conditions:              Psychological Aspects:        Date the Specification
                                                                 so Uptodateness can be
                                                                 Easily Determined
  Is the Work Dirty                  Degree of Stress              16.17.1
     16.15.2.1                         16.15.3.1

  Is the Work Mentally              Working Hours
  Straining                           16.15.3.2
      16.15.2.2
                                    Degree of Boredom
  Is Heavy Physical Labor             16.15.3.3
  Involved
      16.15.2.3                     Degree of Companionship
         16.15.2                       16.15.3.4


                                    Amount of Reward
ty                                    16.15.3.5

                                         16.15.3
```

5 ✗ 5

yes

no

| Use Graphical Task Analysis Technique 16.9.1.1 | → | Outline the Functions of the Co-ordinator 16.9.1.2. | → | Begin Process 16.9.1.3 | → | Job Description 16.9.1.4 | → | Construct Main and S. Duties 16.9.1. |

Outline:

| Arranges Time and Place for Study 16.9.1.2.1.1 | → | Organizes the Room 16.9.1.2.1.2 | → | Determines Sessions Rules and Procedures 16.9.1.2.1.3 | → | Guides the Participants Through Detailed Task Analysis 16.9.1.2.1.4 |

| Assitant 16.9.1.2.1.5 | yes → | Records Tasks on Cards 16.9.1.2.1.6 | → | Gives Cards to Leader 16.9.1.2.1.7 | → | Leader Places Cards on Wall 16.9.1.2.1.8 |

no

| Records Tasks on Cards 16.9.1.2.1.13 |

| Prods Participants on Ordering and Simplification of Tasks 16.9.1.2.1.9 | → | Leader Must not Contribute to the Content of the Analysis 16.9.1.2.1.10 | → | Leader Must not Give Opinion on the Tasks 16.9.1.2.1.11 | → End |

16.9.1.2.1

```
                                    Inform Managers That
                                    This is Not a Training
              Make Changes          Session
              16.9.1.22                16.9.1.23
                      no                          no
  Construct Outline of    Do Persons Interviewed        Request Several Top      Are They Top    yes   Inf
  Main and Secondary      Agree with Outline      yes   Performers for Several   Performers            of
  Duties                  16.9.1.5                      Days                     16.9.1.7
     16.9.1.21                                             16.9.1.6
```

Interview:

Supervisors
16.9.1.21.1.1

Proven Competent
Job Performers
16.9.1.21.1.2

16.9.1.21.1

from information gathering:
interviews and questionnaires

Part
Deta
of T
   1

1pants
Task

2 of

```
┌──────────────────┐
│ Managers That    │
│  Not a Training  │
│                  │
│ 9.1.23           │
└──────────────────┘
      ↑ no
┌──────────┐        ┌──────────────────┐      ┌──────────────────┐      ┌──────────────────┐      ┌──────────────┐
│ They Top │  yes   │Inform Participants│     │Inform Participants│     │Participants Will Bring│  │Begin Session │
│ formers  │───────>│of Study Purpose  │────>│When and Where Sessions│>│Their Regular Job Tools│>│  16.9.1.11   │
│ 9.1.7    │        │    16.9.1.8      │      │Will Take Place   │      │    16.9.1.10     │      └──────────────┘
└──────────┘        └──────────────────┘      │    16.9.1.9      │      └──────────────────┘
                           ↑                    └──────────────────┘
                    ┌──────────────────┐
                    │Participants Will Make│
                    │Detailed Task Outline │
                    │of Their Job         │
                    │    16.9.1.8.1       │
                    └──────────────────┘
```

Symbols:

Processe
Rectangl
16.9.1.1

Decisio
Hexagon
  16.9.

Connect
by Join
  16.9.

Always
Decisio
Before
Proceed
  16.9

16.

3 of
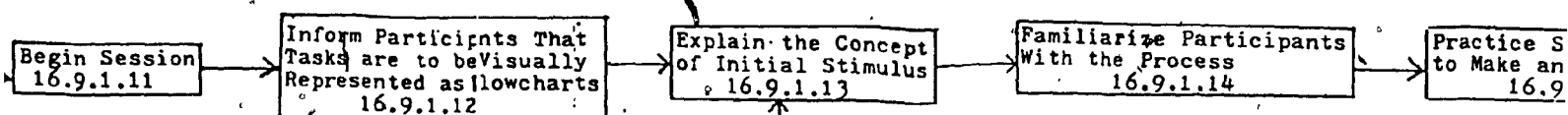
```
┌──────────────┐     ┌──────────────────────┐     ┌────────────────────┐     ┌─────────────────────────┐     ┌──────────────┐
│Begin Session │ ──▶ │Inform Particents That│ ──▶ │Explain the Concept │ ──▶ │Familiarize Participants │ ──▶ │Practice S    │
│  16.9.1.11   │     │Tasks are to beVisually│    │of Initial Stimulus │     │With the Process         │     │to Make an    │
└──────────────┘     │Represented as llowcharts│  │    16.9.1.13       │     │        16.9.1.14        │     │         16.9 │
                     │        16.9.1.12      │    └────────────────────┘     └─────────────────────────┘     └──────────────┘
                     └──────────────────────┘              ▲
                              ▲                            │
                              │                   ┌────────────────────┐
                              │                   │Event Occurance That│
        ┌───────────────────────────────┐        │Causes Action to Begin│
        │  Symbols:                      │        │    16.9.1.13.1     │
        │                                │        └────────────────────┘
        │   ┌──────────────────────┐     │
        │   │Processés Use a       │     │
        │   │Rectangle             │     │
        │   │16.9.1.12.1.1         │     │
        │   └──────────────────────┘     │
        │                                │
        │   ┌──────────────────────┐     │
        │   │Decisions Use a       │     │
        │   │Hexagon               │     │
        │   │   16.9.1.12.1.2      │     │
        │   └──────────────────────┘     │
        │                                │
        │   ┌──────────────────────┐     │
        │   │Connections Made      │     │
        │   │by Joining Arrows     │     │
        │   │   16.9.1.12.1.3      │     │
        │   └──────────────────────┘     │
        │                                │
        │   ┌──────────────────────┐     │
        │   │Always Follow YES     │     │
        │   │Decision to its end   │     │
        │   │Before Doing NO Then  │     │
        │   │Proceed to First NO   │     │
        │   │   16.9.1.12.         │     │
        │   └──────────────────────┘     │
        │        16.9.1.12.1             │
        └───────────────────────────────┘
```

4 of

16.9.1

```
┌─────────┐
│ pants   │──→
└─────────┘
```

Practice Session 'How to Make an Ommlette' 16.9.1.14.1 →

Begin Practice Tasks Analysis 16. .1.15 →

Initial Stimulus 'Sunrise' 16.9.1.16

Terminating Event 'Ommlette Ready' 16.9.1.17

Break Job into Sequence of Tasks Beginning With Sunrise . 16.9.1.18

Break T Subtask 16.9

Example:

Task: 'Coo
Become 'Ta
Fridge Set
Crack Egg'
16.9.
16.9.

```
into          ┌─────────────────┐     ┌──────────────┐  no  ┌───────────────┐     ┌────────────────┐     ┌──────────────────┐
f Tasks       │ Break Tasks Into│     │ Is Task Too  │─────▶│ Write Task on │     │ Place Task Card│     │ Proceed to Next  │
With       ──▶│ Subtasks        │────▶│ General      │      │ Card          │────▶│ on Wall        │···▶│ Task in Sequence │
              │   16.9.1.19     │     │  16.9.1.20   │      │  16.9.1.24    │     │   16.9.1.25    │     │   16.9.1.26      │
8             └─────────────────┘     └──────────────┘      └───────────────┘     └────────────────┘     └──────────────────┘
```

yes

┌──────────────────────────┐
│ Example: │
│   │
│ Task: 'Cook Egg' may   │
│ Become 'Take Egg from   │
│ Fridge Set Pan to High   │
│ Crack Egg into Pan etc' │
│   16.9.1.19.1.1   │
│   16.9.1.19.1   │
└──────────────────────────┘

```
                                    ┌─────────────────┐
                                    │ backtrack and   │
                                    │ Make Changes    │
                                    │   16.9.1.39     │
                                    └─────────────────┘
                                             ▲
                                             │ no
┌──────────┐  ┌──────────────────────┐   ╱─────────────╲  yes  ┌──────────────────────┐       ╱──────────╲  yes
│d to Next │  │Review Sequence After │   │Sequence Correct│───▶│Establish Performance │       │Last Task │───▶
│n Sequence│─▶│Several Tasks Actions │──▶│   16.9.1.28    │    │Criteria and Measures │       │ 16.9.30  │
│ .1.26    │  │Have Been Completed   │   ╲─────────────╱      │     16.9.1.29        │       ╲──────────╱
└──────────┘  │    16.9.1.27         │                        └──────────────────────┘            no
              └──────────────────────┘                                  ▲
                                                                        │
                                                         ┌─────────────────────────────┐
                                                         │Have Participants Come        │
                                                         │to a Consensus on What        │
                                                         │the Minimum Level of          │
                                                         │Performance is and how        │
                                                         │They will Know that This      │
                                                         │Has Been Met                  │
                                                         │        16.9.1.29.1           │
                                                         └─────────────────────────────┘
```

no   no

Task → yes → Can Anyone Reproduce Job Tasks 16.9.1.31 → yes → Number all Cards Sequertially for Reproduction 16.9.1.32 → Was This a Trial Run 16.9.1.33 → yes → Begin Actual Task Analysis 16.9.1.34 → Identify Initial Stimulus 16.9.1.35

no

Identify Terminating Event 16.9.1.36

Upon Reflection is Sequencing Correct 16.9.1.40 → yes → Combine Sequences in Tabular Form 16.9.1.41

no

Challenge Participants 16.9.1.42 → Changes to be Made 16.9.1.43 → yes → Make Change 16.9.1.44

no

8 of

Was This a Trial Run 16.9.1.33 → yes → Begin Actual Task Analysis 16.9.1.34 → Identify Initial Stimulus 16.9.1.35

Identify Terminating Event 16.9.1.36

Upon Reflection is Sequencing Correct 16.9.1.40 → yes → Combine Sequences in Tabular Form 16.9.1.41

Submit Analysis to Management 16.9.1.37 → Agreement 16.9.1.38 → yes → Return

no

Determine Why not 16.9.1.45

Challenge Participants 16.9.1.42 → Changes to be Made 16.9.1.43 → yes → Make Changes 16.9.1.44

no

9 of 9

Develop Course
Objectives 17.A

Write Brief Description
of What the Intended
Outcomes of the Course
will be

17.1

Example: This Course will
Teach personnel to operate
the 709 Machine Tool

17.1.1

Determine Basic Entry
Skills Required to do
the Course

17.2

Using Identified Exemplar
as Source:

Identify Number of Years
and Type of Education

17.2.1.1

Optimal Number of Years
Experience on the Job

17.2.1.2

Displayed or Tested
Apptitudes

17.2.1.3

Attitudes of Employees
Towards the Job

17.2.1.4

17.2.1

State Overall Task
Skills Required to
Perform the Job

17.3

Obtain from
Personnel Office

17.3.1

Intervi

1

Obtain From
Industrial Averages

17.3.2

1 of

```
┌─────────────┐                    ┌──────────────────────┐                         ┌──────────────────────┐
│ verall Task │                    │ Rewrite Tasks as     │                         │ Determine What Meas  │
│ Required to │─────────────────►  │ Performance Objectives│ ──────────────────────► │ can be Used to Eval  │
│ the Job     │                    │                      │                         │ Performance Objecti  │
│             │                    │       17.4           │                         │                      │
│ 7.3         │                    └──────────────────────┘                         │       17.5           │
└─────────────┘                              ▲                                      └──────────────────────┘
     ▲                                        │                                                 ▲
     │                                        │                                                 │
     │         ┌──────────────────────┐       │                                      ┌──────────────────────┐
     │         │ Interview Supervisors │      │                                      │ Use Measures tha     │
     │         │                      │       │                                      │ are Direct and       │
     │         │      17.3.3          │       │                                      │ Measurable           │
     │         └──────────────────────┘       │                                      │                      │
     │                                         │                                      │      17.5.1          │
     │              ┌──────────────────────┐   ┌──────────────────────┐              └──────────────────────┘
     │              │ Determine Exact Observable│ Detail What Materials, Tools │
     │              │ Behavior Required for Skill/│ or Instruments are Available │
     │              │ Objective to be performed │                      │
     │              │ Adaquately           │   │      17.4.3          │
     │              │                      │   └──────────────────────┘
     │              │      17.4.1          │
┌─────────────┐     └──────────────────────┘
│ n From      │
│ crial Averages│            ┌──────────────────────┐
│             │              │ Define Under What Conditions│
│   17.3.2    │              │ or Constraints will the │
└─────────────┘              │ Behavior be Performed Under │
                             │                      │
                             │      17.4.2          │
                             └──────────────────────┘
```

```
                                                                              ┌─────────────┐
                                                                              │ Recall Ta...│
                                                                              │ Team to D...│
                                                                              │ Determine   │
                                                                              │ Degree of   │
                                                                              │             │
                                                                              │      1      │
                                                                              └─────────────┘
```

Determine What Measures [ca]n be Used to Evaluate [Pe]rformance Objective	Assemble Together to Form Course Goals and Objectives	Are the Goals Copmplete and in Proper Order	Take Each Objective and Break it Down to it's Component Sub-objectives	Degr[ee] Disse[ction] Satis[fied]
17.5	17.6	17.7	17.8	

no

yes

Use Measures that are Direct and Measurable
17.5.1

Determine Degree of Dissection Necessary for Completion
17.8.1

Proceed From Broad Skill to Lowest Levels in Direct Sequence
17.8.1.1

Recall Task Analysis Team to Determine to Determine the Necessary Degree of Dissection

17.14

Revise

17

Objective lt Down oponent lves

Degree of Dissection Satisfactory

17.9

yes

Rewrite Each Sub-Objective as a Performance Sub-Objective

17.10

Determine What Measures will be Used to Evaluate Performance Sub-objectives

17.11

Do Constr. Course Su from Bein

17

no

Degree of Necessary tion

.1

Determine for Each Sub-objective the Observable Behavior for Adequate Performance

17.10.1

Detail What Materials, Tools or Instruments will be Available to the Trainee

17.10.3

Use Only Measures That are Direct and Quantifiable

17.11.1

Examples of

Lack of Time

17.12.1

rom Broad ovest Levels Sequence

3.1.1

Define Under What Conditions and const-taints This Behavior will be Performed

17.10.2

Budget

17.12.

Difficult Real Work

17.1

17.

Revise Objectives

17.13

no ↑

Do Constraints Prevent
Course Sub-objectives
from Being Attained

17.12

→ yes →

Reassemble all
Sub-objectives under
Their Respective
Objectives

17.15

→

Sequencing
Correct
17.16

no ↑

Make Certain That
all Sub-Objectives
and Objectives are
Referrent to the
Job Function

17.17

→

Referrent
17.18

→ no →

Make Indicate
Changes
17.19

yes

Examples of Constraints:

Lack of
Time

17.12.1.1

Budgetary

17.12.1.3

Difficulty in Creating
Real Work Conditions

17.12.1.2

17.12.1

Compare the Above to
to Tasks From Job
Analysis to Determine
Referrence

17.17.1

5 of 1

yes

Reassemble all
Sub-objectives under
Their Respective
Objectives

17.15

Sequencing
Correct
17.16

no

yes

Make Certain That
all Sub-Objectives
and Objectives are
Referrent to the
Job Function

17.17

Make·Indicated
Changes
17.19

no

Referrent
17.18

yes

Return

Compare the Above to
to Tasks From Job
Analysis to Determine
Referrence

17.17.1

6 of 6

Test to Determine if
Course Outcomes Will
Match Job Tasks 18.A

```
┌─────────────────────────────────┐      ┌──────────────────────────────────┐      ┌────────────────────────────┐
│ Develop for Each Objective      │      │ Determine Which Sub/Objectives   │      │ Do not Develop Test Item   │
│ and Sub-objective test Items    │─────▶│ are Essential to the Performance │─────▶│ for Non-essential Sub/ob   │
│                                 │      │ Objective                        │      │ ectives                    │
│          18.1                   │      │              18.2                │      │           18.3             │
└─────────────────────────────────┘      └──────────────────────────────────┘      └────────────────────────────┘
```

Sources of Information:

```
                ┌──────────────────┐
                │ Observation of   │
                │ Job              │
                │                  │
                │    18.2.1.1      │
                └──────────────────┘

                ┌──────────────────┐
                │ Interview Supervisors │
                │                  │
                │    18.2.1.2      │
                └──────────────────┘

                ┌──────────────────┐
                │ Interview Exemplar │
                │ Performers       │
                │                  │
                │    18.2.1.3      │
                └──────────────────┘

                ┌──────────────────┐
                │ Interview Job    │
                │ Designers        │
                │                  │
                │    18.2.1.4      │
                └──────────────────┘

                     18.2.1
```
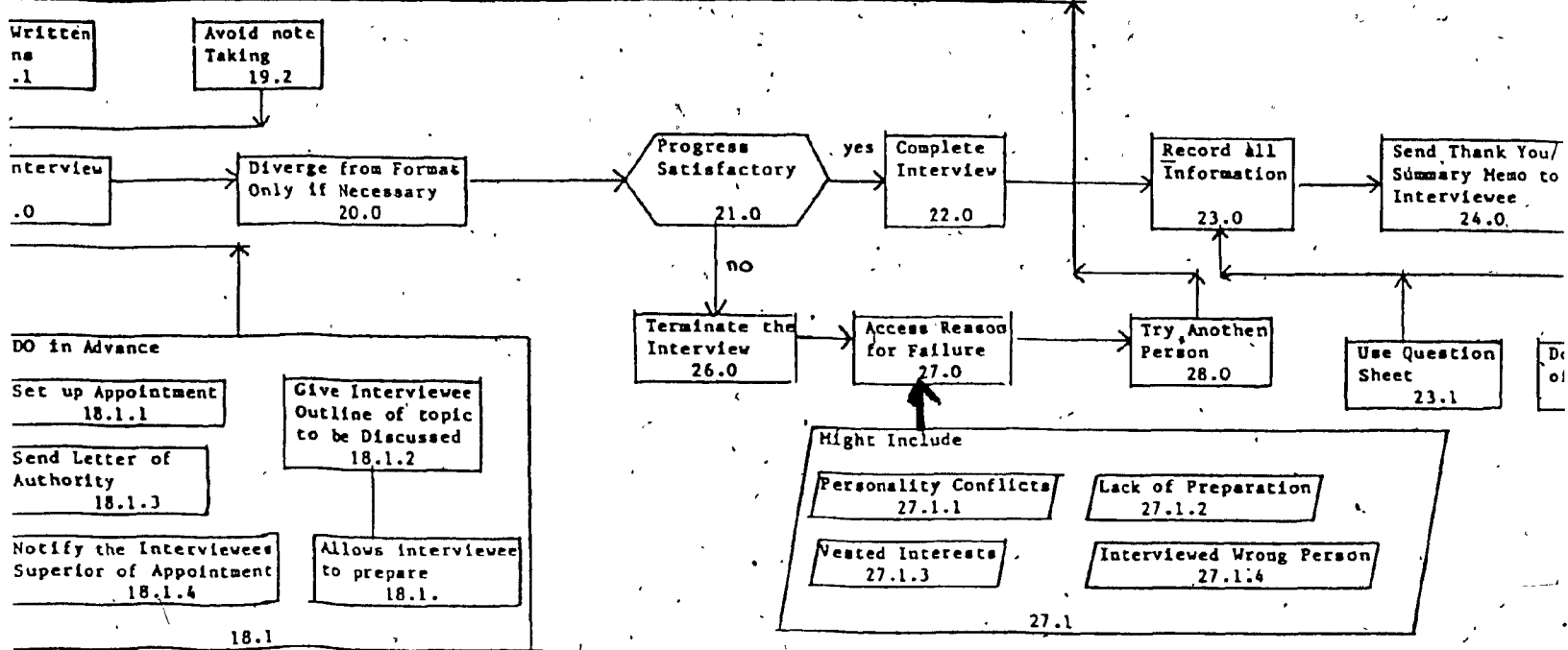
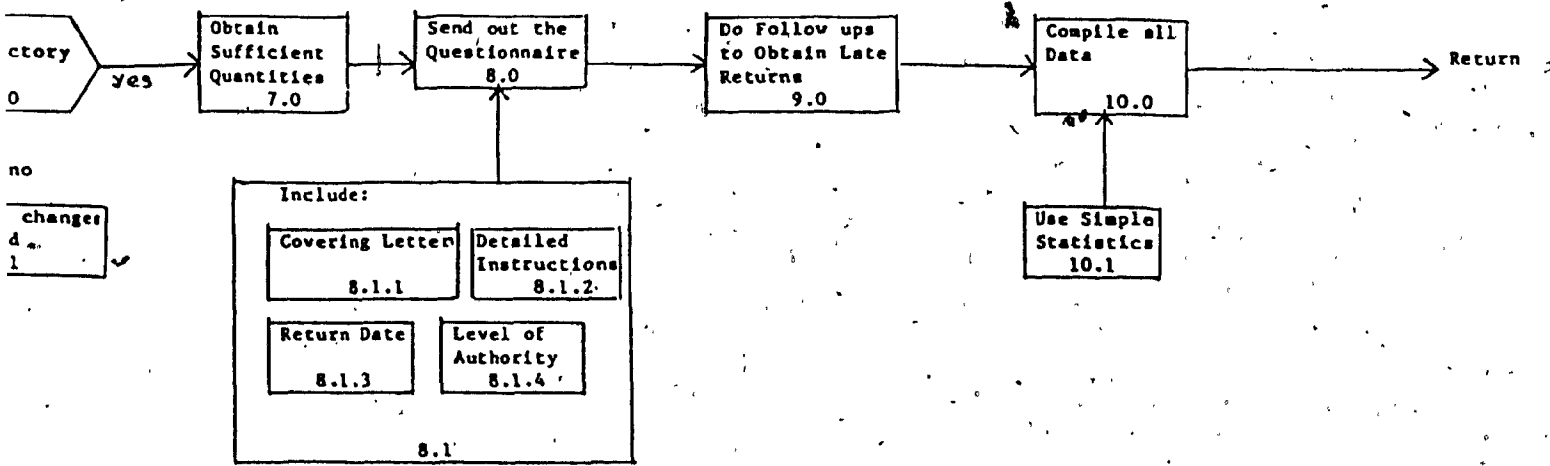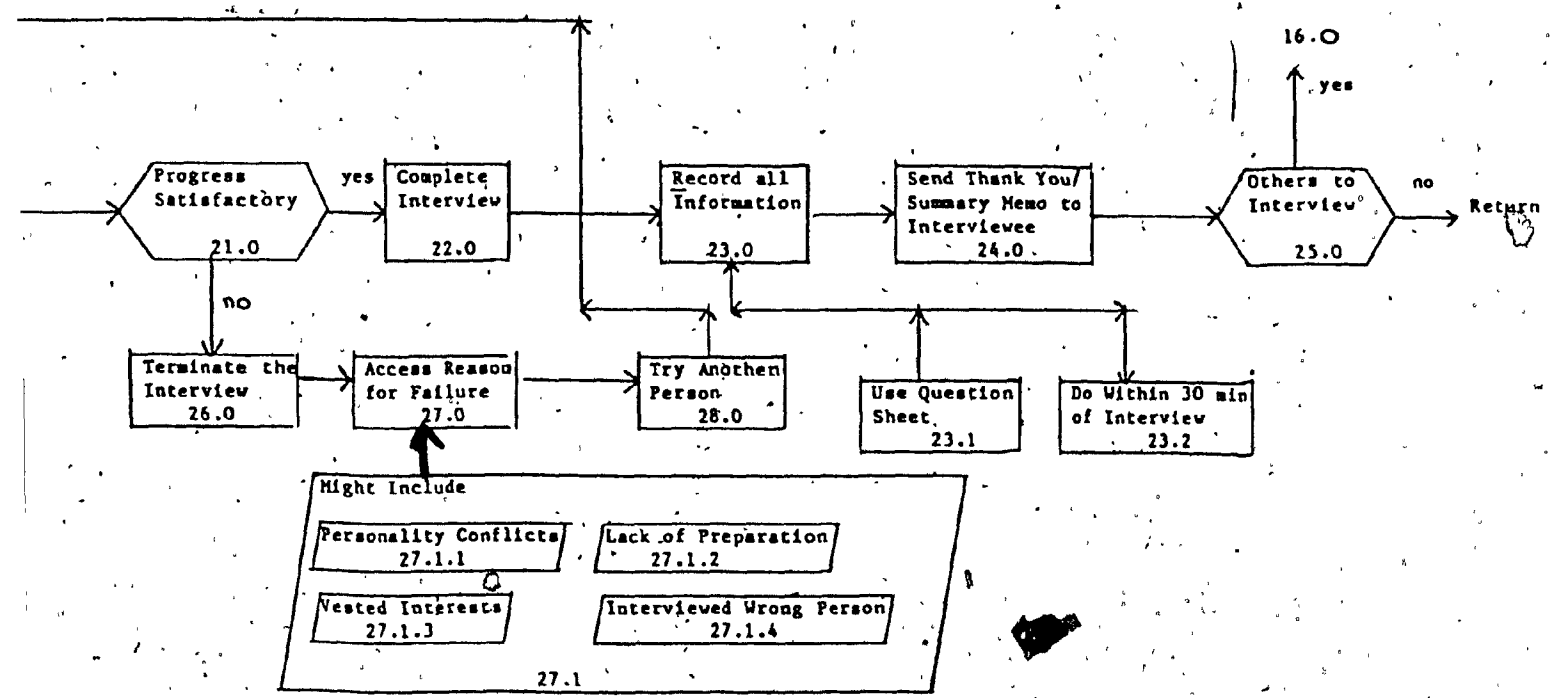From Information
Gathering: Interviews
and Questionnaires

```
                                          ┌──────────────────┐     ┌──────
                                          │ Make Revisions   │     │ Det
                                          │                  │◄────│ Do
                                          │     18.10        │     │
                                          └──────────────────┘     └──────
```
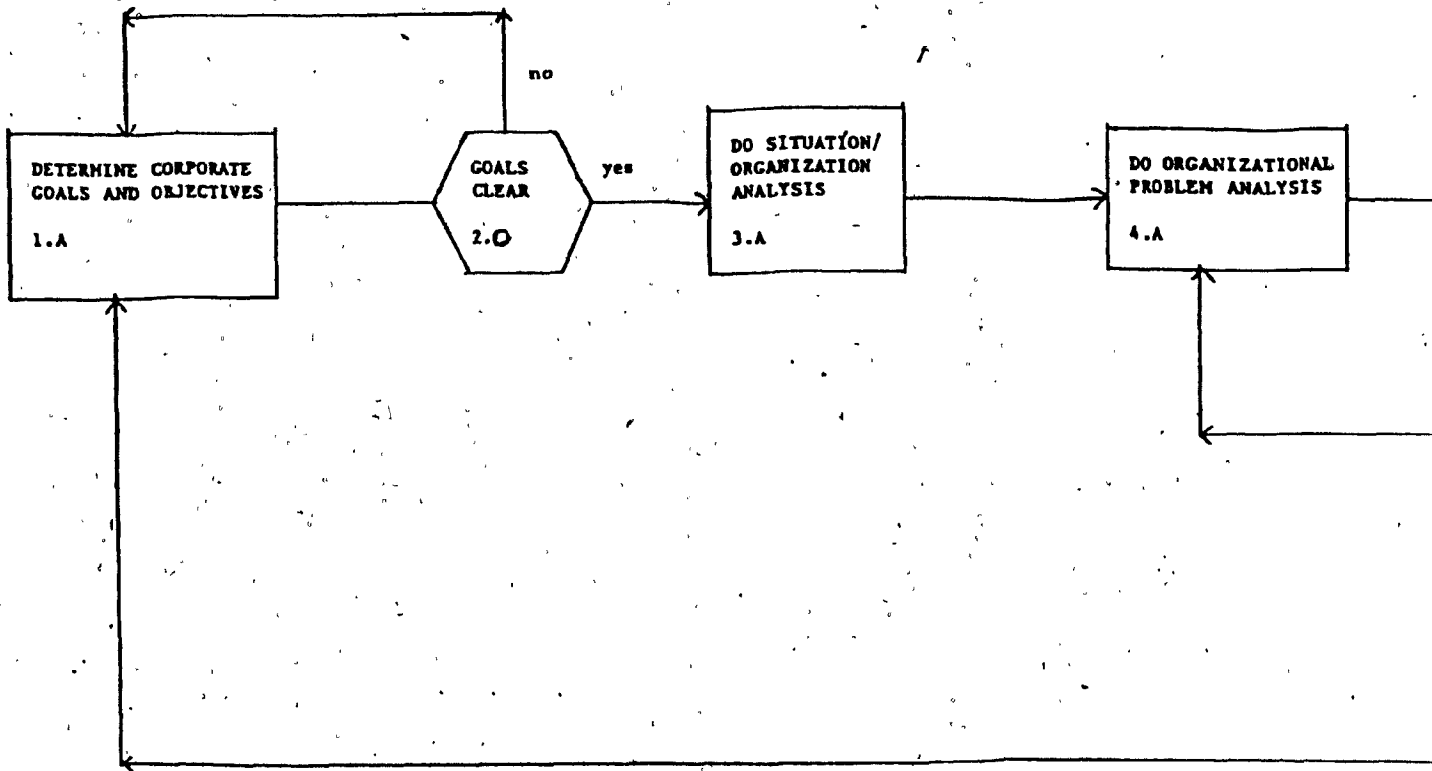
```
┌──────────────────┐   ┌──────────────────┐   ┌──────────────────┐   ┌──────────────────┐
│ evelop Test Items│   │ Ensure the Validity│  │ Ensure the       │   │ Objectively Derive│
│ ssential Sub/obj-│──▶│ of Tests          │──▶│ Reliability      │──▶│ Tests            │
│                  │   │                   │   │ of the Test      │   │                  │
│     18.3         │   │     18.4          │   │     18.5         │   │     18.6         │
└──────────────────┘   └──────────────────┘   └──────────────────┘   └──────────────────┘
```

Criteria For Valid Tests:

The Test Must Require the Demonstration of Behavior Specified by the Performance Sub/ Objective.

18.4.1.1

Test Must Include the Conditions or Constraints Detailed by the Sub/objective

18.4.1.2

Test Must be Representative of the Category of Behavior Specified by the Sub/objective

18.4.1.3

18.4.1

Criteria for a Reliable Test:
18.5.1

Test Provides a Constant Measure of a Learner's Ability to Demonstrate Achievement of a/an Sub/objective

18.5.1.1

Test Must Include Only Those Tasks That Those Who Achieved the Sub/ objectives can do

18.5.1.2

```
┌──────────────────┐          ┌──────────────────┐
│ Make Revisions   │◄─────────│ Determine Which  │
│                  │          │ Do not           │
│    18.10         │          │                  │
└──────────────────┘          │    18.9          │
                              └──────────────────┘
                                       ▲
                                       │ no
                                       │
┌──────────────────┐      ╱‾‾‾‾‾‾‾‾‾‾╲         ┌──────────────────────────┐
│ Objectively Derive│     │ Do All Test │  yes  │ Match Introductory Sub/  │
│ Tests            │─────►│ Items Meet  ├──────►│ Objectives With Desig-   │──────► Return
│                  │      │ Criteria    │       │ nated Trainee Pre-req-   │
│    18.6          │      │   18.7      │       │ uisite Skills and        │
└──────────────────┘      ╲_____╱          │ Knowledge                │
                                                │       18.8               │
                                                └──────────────────────────┘
```

┌─────────────────────────┐   ┌──────────────────────────────┐
│   Criteria for an   │   │   Include the   │
│   Objective Test: │   │   Following: │
│   │   │   │
│ ┌─────────────────────┐ │   │ ┌────────────────────────┐ │
│ │Independent Observers│ │   │ │ Reading Skill   │ │
│ │Must   │ │   │ │ Levels   │ │
│ │Agree That the   │ │   │ │   │ │
│ │Learner's   │ │   │ │   18.8.1:1   │ │
│ │Test Performance Has │ │   │ └────────────────────────┘ │
│ │Met   │ │   │ ┌────────────────────────┐ │
│ │the Conditions Set   │ │   │ │ Mathematical Skill   │ │
│ │out by   │ │   │ │ Levels   │ │
│ │the Objective   │ │   │ │   │ │
│ │   │ │   │ │   18.8.1.2   │ │
│ │   18.6.1.1   │ │   │ └────────────────────────┘ │
│ └─────────────────────┘ │   │ ┌────────────────────────┐ │
│   │   │ │ Prerequisite   │ │
│   18.6.1   │   │ │ Courses   │ │
└─────────────────────────┘   │ │   │ │
                                   │ │   18.8.1.3   │ │
┌───────────────────────┐   │ └────────────────────────┘ │
│ Test Must Include Only│   │ ┌────────────────────────┐ │
│ Those Tasks That Those│   │ │ Prerequisite   │ │
│ Who Achieved the Sub/ │   │ │ Work Experience   │ │
│ objectives can do   │   │ │   │ │
│   │   │ │   18.8.1.4   │ │
│   18.5.1.2   │   │ └────────────────────────┘ │
└───────────────────────┘   │   │
                                   │   18.8.1   │
                                   └──────────────────────────────┘

| ticipants
urpose
8 | → | Inform Participants
When and Where Sessions
Will Take Place
16.9.1.9 | → | Participants Will Bring
Their Regular Job Tools
16.9.1.10 | → | Begin Session
16.9.1.11 | → | Inform Participants That
Tasks are to be Visually
Represented as flowcharts
16.9.1.12 |

rs Will Make
sk Outline
b
3.1

Symbols:

Processes Use a
Rectangle
16.9.1.12.1.1

Decisions Use a
Hexagon
16.9.1.12.1.2

Connections Made
by Joining Arrows
16.9.1.12.1.3

Always Follow YES
Decision to its end
Before Doing NO Then
Proceed to First NO
16.9.1.12.

16.9.1.12.1

| .s That
.sually
>wcharts | → | Explain the Concept
of Initial Stimulus
16.9.1.13 | → | Familiarize Participants
With the Process
16.9.1.14 | → | Practice Session 'How
to Make an Ommlette'
16.9.1.14.1 | → | Begin Practice
Tasks Analysis
16..1.15 | → |

Event Occurance That
Causes Action to Begin
16.9.1.13.1

16.9.1

Initial Stimulus
'Sunrise'
16.9.1.16

Terminating Event
'Ommlette Ready'
16.9.1.17

Break Job into
Sequence of Tasks
Beginning With
Sunrise
16.9.1.18

Break Tasks Into
Subtasks
16.9.1.19

Is Task Too
General
16.9.1.20

yes

no

Write Task on
Card
16.9.1.24

Example:

Task: 'Cook Egg' may
Become 'Take Egg from
Fridge Set Pan to High
Crack Egg into Pan etc'
16.9.1.19.1.1
16.9.1.19.1

```
                                          ┌──────────────────┐
                                          │ Backtrack and    │
                                          │ Make Changes     │──────────────
                                          │    16.9.1.39     │
                                          └──────────────────┘
                                                    ↑ no
┌──────────────┐   ┌──────────────┐   ┌──────────────────────┐   ┌─────────────────┐        ┌──────────────────┐
│Place Task Card│  │Proceed to Next│  │Review Sequence After │   │ Sequence Correct│  yes   │Establish Perfo   │
│on Wall       │→ │Task in Sequence│→ │Several Tasks Actions │ → │    16.9.1.28    │ ────→  │Criteria and Me   │
│   16.9.1.25  │   │   16.9.1.26  │   │Have Been Completed   │   └─────────────────┘        │   16.9.1.29      │
└──────────────┘   └──────────────┘   │      16.9.1.27       │                              └──────────────────┘
                                       └──────────────────────┘                                       ↑
                                                                                            ┌──────────────────┐
                                                                                            │Have Participants │
                                                                                            │to a Consensus on │
                                                                                            │the Minimum Level │
                                                                                            │Performance is an │
                                                                                            │They will Know th │
                                                                                            │Has Been Met      │
                                                                                            │       16.9.1.29. │
                                                                                            └──────────────────┘
```

```
                                          no                        no
┌──────────────┐      ╱‾‾‾‾‾‾‾‾╲  yes  ╱‾‾‾‾‾‾‾‾‾‾‾╲  yes ┌──────────────┐      ╱‾‾‾‾‾‾‾‾╲  yes ┌──────────────┐
│Performance   │─────▶│Last Task │────▶│Can Anyone    │───▶│Number all Cards│───▶│Was This a│────▶│Begin Actual  │
│nd Measures   │      │16.9.30   │     │Reproduce Job │    │Sequertially for│    │Trial Run │     │Task Analysis │
│ 9            │      ╲_____╱     │Tasks         │    │Reproduction    │    │16.9.1.33 │     │16.9.1.34     │
└──────────────┘                      │  16.9.1.31   │    │  16.9.1.32     │    ╲_____╱     └──────────────┘
                                      ╲_____╱    └────────────────┘
                                                                                    │ no
┌──────────────┐
│pants Come    │
│s on What     │                                                            ╱‾‾‾‾‾‾‾‾‾‾‾‾‾╲  yes  ┌──────────────┐
│Level of      │                                                           │Upon Reflection is│──▶│Combine Sequen│
│is and how    │                                                           │Sequencing Correct│   │Tabular Form  │
│ow that This  │                                                           │  16.9.1.40       │   │ 16.9.1.41    │
│              │                                                            ╲_____╱    └──────────────┘
│1.29.1        │                                                                    │ no                    │ no
└──────────────┘                                                           ┌────────────────┐      ╱‾‾‾‾‾‾‾‾╲
                                                                           │Challenge Participants│──▶│Changes to│
                                                                           │  16.9.1.42     │      │Made      │
                                                                           └────────────────┘      │16.9.1.4  │
                                                                                                    ╲_____╱
```

```
                  yes   ┌──────────────┐      ┌──────────────────┐
┌──────────┐    ┌──────────────┐      ┌──────────────────┐
│Was This a│    │Begin Actual  │      │Identify Initial  │
│Trial Run │───▶│Task Analysis │─────▶│Stimulus          │
│16.9.1.33 │    │16.9.1.34     │      │   16.9.1.35      │
└──────────┘    └──────────────┘      └──────────────────┘
     │                                ┌────────────────────┐
     │ no                             │Identify Terminating│
     │                             ──▶│Event               │
     ▼                                │    16.9.1.36       │
┌──────────────────┐  yes  ┌──────────────────┐
│Upon Reflection is│       │Combine Sequences in│
│Sequencing Correct│──────▶│Tabular Form        │    ┌────────────────┐
│   16.9.1.40      │       │   16.9.1.41        │    │Submit Analysis │
└──────────────────┘       └──────────────────┘    │to Management   │
     │                          ▲                    │16.9.1.37       │
     │ no                       │ no                 └────────────────┘
     ▼                          │
┌────────────────────┐   ┌──────────────┐  yes  ┌──────────────┐
│Challenge Participants│  │Changes to be │       │Make Changes  │
│   16.9.1.42         │─▶│Made          │──────▶│16.9.1.44     │
└────────────────────┘   │  16.9.1.43   │       └──────────────┘
                         └──────────────┘
                                                    ┌──────────────┐  yes
                                                    │Agreement     │────▶ Return
                                                    │16.9.1.38     │
                                                    └──────────────┘
                                                         │ no
                                                         ▼
                                                    ┌──────────────┐
                                                    │Determine Why not│
                                                    │16.9.1.45     │
                                                    └──────────────┘
```

DEVELOP COURSE
OBJECTIVES 17.A

Develop Course
Objectives 17.A

Write Brief Description
of What the Intended
Outcomes of the Course
will be

17.1

Example: This Course will
Teach pefsonnel to operate
the 709 Machine Tool

17.1.1

Determine Basic Entry
Skills Required to do
the Course

17.2

Using Identified Exemplar
as Source:

Identify Number of Years
and Type of Education

17.2.1.1

Optimal Number of Years
Experience on the Job

17.2.1.2

Displayed or Tested
Apptitudes

17.2.1.3

Attitudes of Employees
Towards the Job

17.2.1.4

17.2.1

State Overall Task
Skills Required to
Perform the Job

17.3

Obtain from
Personnel Office

17.3.1

Interv

Obtain From
Industrial Averages

17.3.2.

Task ed to ob

Rewrite Tasks as
Performance Objectives

17.4

Determine What Measures
can be Used to Evaluate
Performance Objective

17.5

Interview Supervisors

17.3.3

Determine Exact Observable
Behavior Required for Skill/
Objective to be performed
Adaquately

17.4.1

Detail What Materials, Tools
or Instrumehts are Available

17.4.3

Use Measures that
are Direct and
Measurable

17.5.1

Averages

2

Define Under What Conditions
or Constraints will the
Behavior be Performed Under

17.4.2

Recall Task Analysis
Team to Determine to
Determine the Necessary
Degree of Dissection

17.14

no

es
te

Assemble Together
to Form Course Goals
and Objectives

17.6

Are the Goals
Complete and
in Proper Order

17.7

yes

Take Each Objective
and Break it Down
to it's Component
Sub-objectives

17.8

Degree of
Dissection
Satisfactory

17.9

yes

no

Determine for Each
Sub-objective the
Observable Behavior
for Adequate Perfor-
mance

17.10.1

Determine Degree of
Dissection Necessary
for Completion

17.8.1

Proceed From Broad
Skill to Lowest Levels
in Direct Sequence

17.8.1.1

Revise Objectives

17.13

no

(partial box, left edge)
s
o
sary
n

yes → Rewrite Each Sub-Objective as a Performance Sub-Objective

17.10

Determine What Measures will be Used to Evaluate Performance Sub-objectives

17.11

Do Constraints Prevent Course Sub-objectives from Being Attained

17.12

yes → Reassembl Sub-objec Their Res Objective

17.1

or Each ve the Behavior e Perfor-

.1

Detail What Materials, Tools or Instruments will be Available to the Trainee

17.10.3

Use Only Measures That are Direct and Quantifiable

17.11.1

Examples of Constraints:

Lack of Time

17.12.1.1

Budgetary

17.12.1.3

Difficulty in Creating Real Work Conditions

17.12.1.2

17.12.1

Define Under What Conditions and constraints This Behavior will be Performed

17.10.2

yes → **Reassemble all Sub-objectives under Their Respective Objectives**

17.15

no

Sequencing Correct

17.16

yes →

Make Certain That all Sub-Objectives and Objectives are Referrent to the Job Function

17.17

Make Indicated Changes

17.19

no

Referrent

17.18

yes → Return

Compare the Above to to Tasks From Job Analysis to Determine Referrence

17.17.1

TEST TO DETERMINE IF COURSE
OUTCOMES WIDL MATCH JOB TASKS
18.A

Test to Determine if
Course Outcomes Will
Match Job Tasks 18.A


```
┌──────────────────────────┐        ┌────────────────────────────┐        ┌──────────────────────────┐
│ Develop for Each Objective│       │ Determine Which Sub/Objectives│     │ Do not Develop Test Item │
│ and Sub-objective test Items│──────▶│ are Essential to the Performance│──▶│ for Non-essential Sub/ob │
│                          │        │ Objective                    │        │ ectives                  │
│         18.1             │        │           18.2               │        │         18.3             │
└──────────────────────────┘        └────────────────────────────┘        └──────────────────────────┘
```

Sources of Information:

Observation of Job
18.2.1.1

Interview Supervisors
18.2.1.2

Interview Exemplar Performers
18.2.1.3

Interview Job Designers
18.2.1.4

18.2.1

From Information
Gathering: Interviews
and Questionnaires

```
                                    ┌──────────────┐         ┌──────────────┐
                                    │ Make Revisions│◄────────│ Determine Whi │
                                    │              │         │ Do not       │
                                    │    18.10     │         │    18.9      │
                                    └──────────────┘         └──────────────┘
                                            ▲                        ▲
                                            │                       no
┌──────────┐   ┌──────────────┐   ┌──────────────┐   ┌──────────────┐   ┌──────────────┐
│st Items  │   │Ensure the Validity│ │Ensure the   │   │Objectively Derive│ │Do All Test  │
│Sub/obj-  │──►│of Tests      │──►│Reliability   │──►│Tests         │──►│Items Meet   │
│          │   │              │   │of the Test   │   │              │   │Criteria     │
│          │   │    18.4      │   │    18.5      │   │    18.6      │   │    18.7     │
└──────────┘   └──────────────┘   └──────────────┘   └──────────────┘   └──────────────┘
                      ▲                  ▲                   ▲
```

Criteria For Valid Tests:

The Test Must Require the Demonstration of Behavior Specified by the Performance Sub/Objective

18.4.1.1

Test Must Include the Conditions or Constraints Detailed by the Sub/objective

18.4.1.2

Test Must be Representative of the Category of Behavior Specified by the Sub/objective

18.4.1.3

18.4.1

Criteria for a Reliable Test:
18.5.1

Test Provides a Constant Measure of a Learner's Ability to Demonstrate Achievement of a/an Sub/objective

18.5.1.1

Test Must Include Only Those Tasks That Those Who Achieved the Sub/objectives can do

18.5.1.2

Criteria Objective

Independen: Agree That Test Perfor the Conditi the Objecti

Make Revisions

18.10

Determine Which
Do not

18.9

no

Objectively Derive
Tests

18.6

Do All Test
Items Meet
Criteria
18.7

yes

Match Introductory Sub/
Objectives With Desig-
nated Trainee Pre-req-
uisite Skills and
Knowledge

18.8

Return

Criteria for an
Objective Test:

Independent Observers Must
Agree That the Learner's
Test Performance Has Met
the Conditions Set out by
the Objective

18.6.1.1

18.6.1

Test Must Include Only
Those Tasks That Those
Who Achieved the Sub/
objectives can do

18.5.1.2

Include the
Following:

Reading Skill
Levels

18.8.1.1

Mathematical Skill
Levels

18.8.1.2

Prerequisite
Courses

18.8.1.3

Prerequisite
Work Experience

18.8.1.4

18.8.1

DO PURCHASE OR DEVELOP COURSE
ANALYSIS 20.A

Do Purchase or
Develop Course
Analysis 20.A

Salaries of Evaluators x Time to Evaluate
20.30.1

| Conduct Market Analysis 20.26 | → | Match Required Objectives to Possible Course 20.27 | → | Most or all Objectives Match 20.28 | yes → | Evaluate Course 20.29 | → | Calculate the Cost of Evaluation 20.30 |

no (below 20.28) → Find Other Courses 20.37

Course Unique 20.1 — no (up to Conduct Market Analysis)

yes → Calculate Costs of Development 20.2 → Determine Time Constraints 20.3 → What is Total Cost of Course Development 20.4 →

Nobody Anywhere Has Undertaken this Type of Training?

20.1.1

Use as a General Estimate:

Average Course Length
5 days x 8hours

Each Hour of Instruction
Cost 25-300hours Development
Low End for Traditional Class-
room Approach, High End for
High Tech Approach

20.1.1.1

Developer $200 x 8hr/day x no.
of Developers

20.1.1.2

20.1.1

Cost (
Divide
Antici
of Use
Lifeti
Course

20

Forget This Course
20.40

Determine Why not
20.38

Will the Same Problem Affect you
20.39

yes

no

no

Determine How Happy Other Course Users Have Been
20.31

Happy
20.32

yes

Do Other Possible Course Choices Exist
20.33

yes

Compare Each Choice
20.34

no

Calculate Cost/person
20.5

Do Resources to Develop Course Exist
20.6

yes

Is There Enough Time
20.7

yes

Develop Course
20.8

Return

Look for:

Best Fit
20.34.1.1

Cost
20.34.1.2

no

no

Cost of Development Divided by the Anticipated Number of Users over the Lifetime of the Course. Usually 5yrs.
20.5.1

Can Parts from Other Courses be Modified
20.9

yes

Modify Those Parts
20.10

Course Complete
20.11

yes

Post Training Effectiveness Evaluation
20.34.1.3

20.34.1

no

no

Find Company to Make Course
20.12

Do Resources Exist to Develop the Remainder of Course
20.24

yes

Complete the Course
20.25

Return

Determine if Objectives will be Based on a Needs Analysis
20.13

Determine if There will be Pilot Tests
20.14

Determine if You will Run the Course
20.15

Determine if Your own Trainers will be Taught to Give the Course
20.16

No to any of the Last 4 Steps
20.17

yes

Choose Another Company
20.18

Discard Those Courses
Where You Must Always
Hire the Trainer

20.41

no

Will You be
Trained to
Give the
Course
20.35

yes

Purchase the Best
Course for Needs

20.36

Return

---

any of
st 4

17

yes

e Another
ny

0.19

no

Contact Others Who
Used the Company's
Services

20.19

Were They
Satisfied
20.20

yes

Obtain the
Cost Estimate

20.21

no

Other
Compan
20.2

Best
eeds
*

Return

Were They
Satisfied
20.20

yes

Obtain the
Cost Estimate

20.21

Other
Companies
20.22
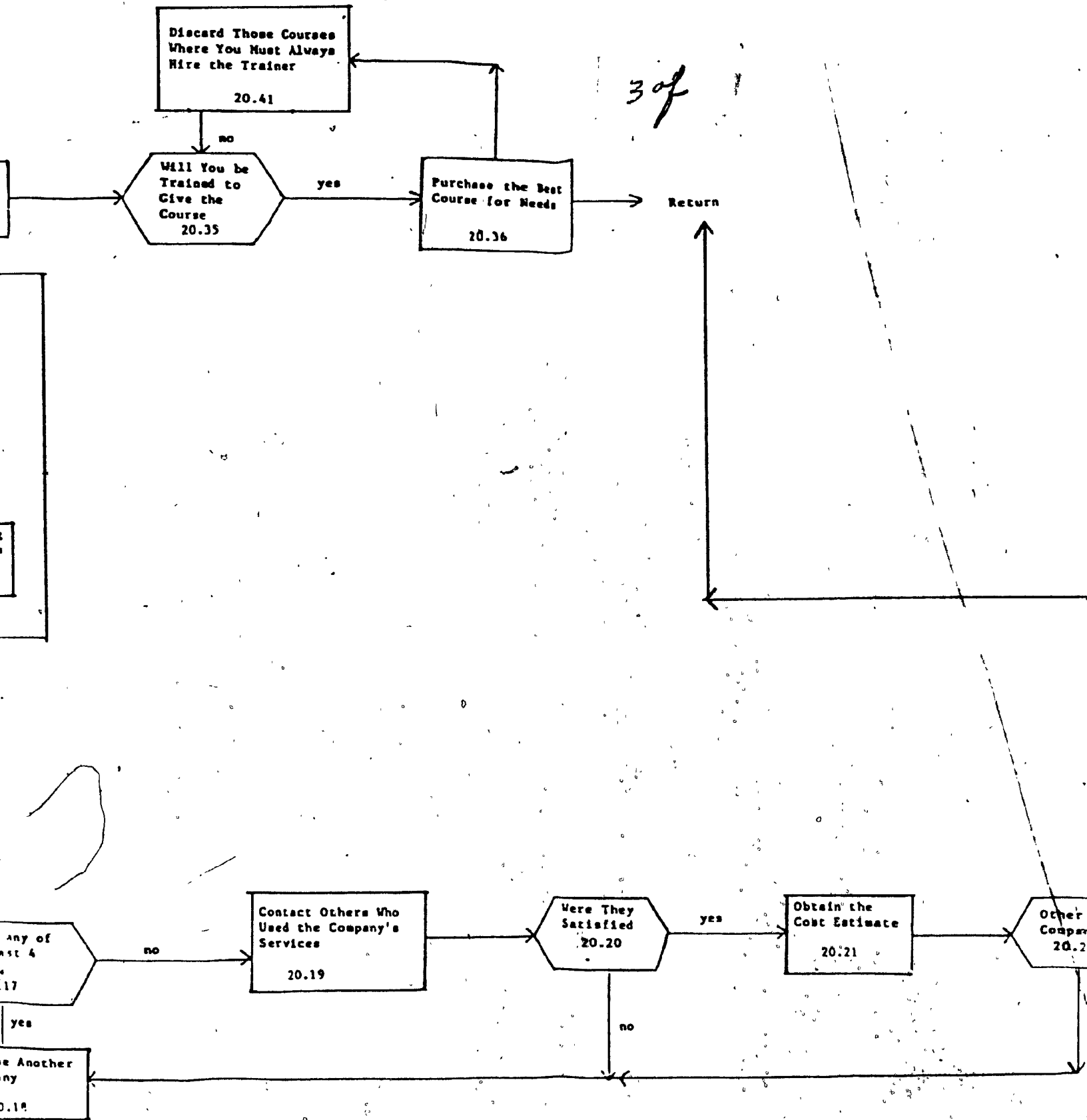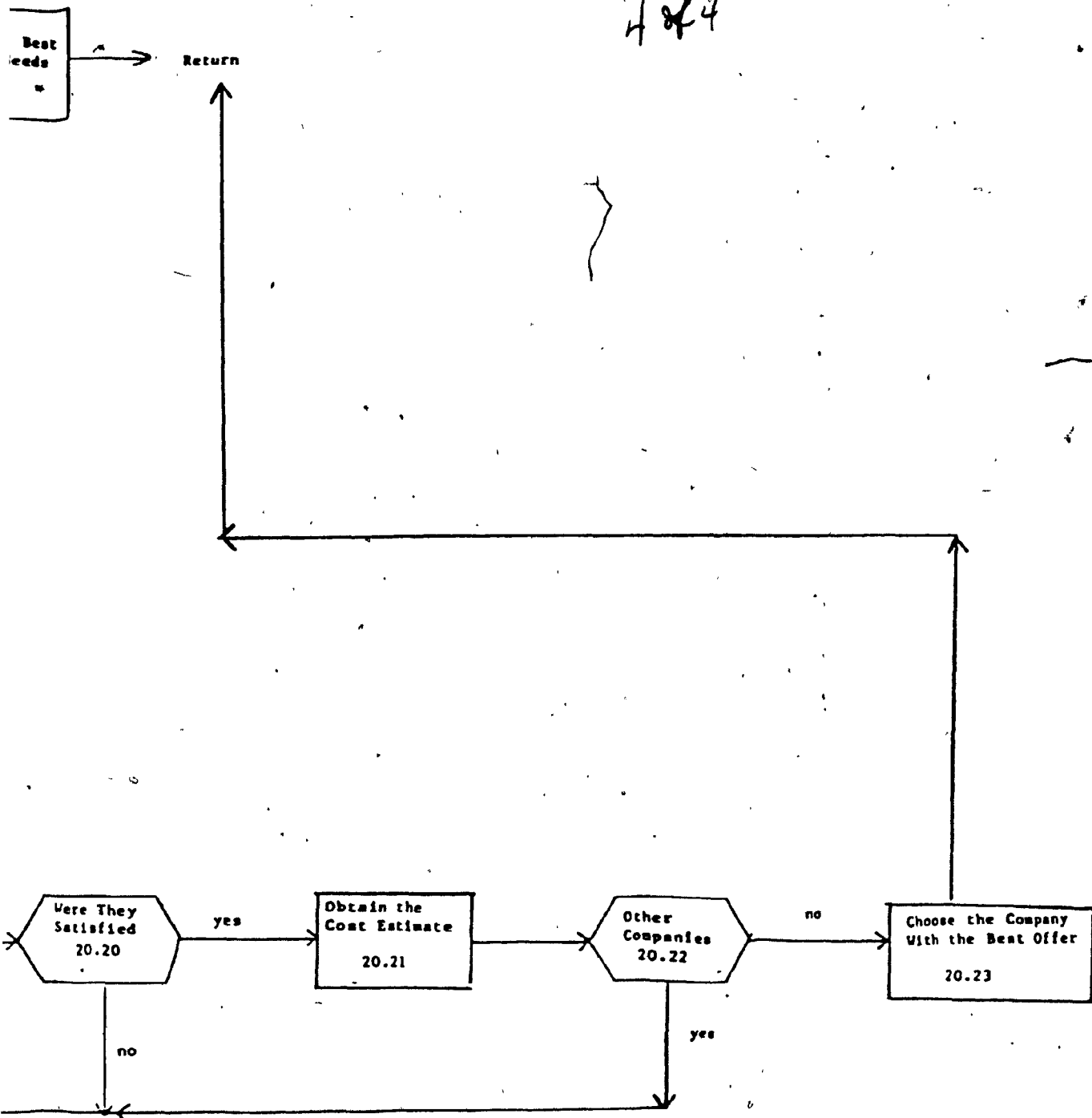
no

Choose the Company
With the Best Offer

20.23

no

yes

DO INSTRUCTIONAL SYSTEMS
ANALYSIS 23.A
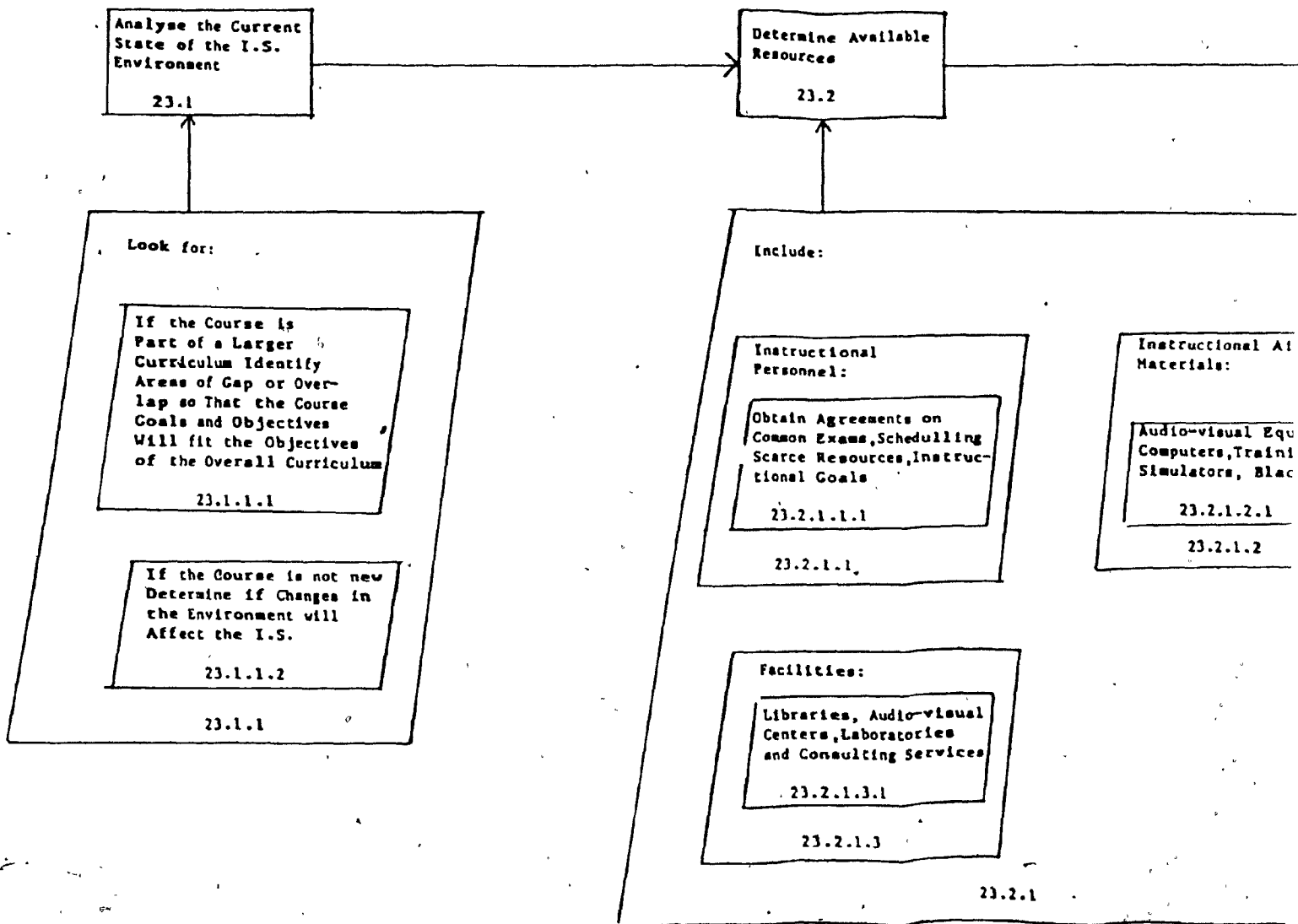
Analyse the Current
State of the I.S.
Environment

23.1

Determine Available
Resources

23.2

Look for:

If the Course is
Part of a Larger
Curriculum Identify
Areas of Gap or Over-
lap so That the Course
Goals and Objectives
Will fit the Objectives
of the Overall Curriculum

23.1.1.1

If the Course is not new
Determine if Changes in
the Environment will
Affect the I.S.

23.1.1.2

23.1.1

Include:

Instructional
Personnel:

Obtain Agreements on
Common Exams,Schedulling
Scarce Resources,Instruc-
tional Goals

23.2.1.1.1

23.2.1.1

Instructional Ai
Materials:

Audio-visual Equ
Computers,Traini
Simulators, Blac

23.2.1.2.1

23.2.1.2

Facilities:

Libraries, Audio-visual
Centers,Laboratories
and Consulting Services

23.2.1.3.1

23.2.1.3

23.2.1

Identify Constraints

23.3

Determine Trainee
Characteristics

23.4

Design I.S. to Accept
Trainees at the Level
That They Enter the
Program at

23.4.1

l Aids and

l Equipment,
raining
Blackboards

2.1

.2

Include:

Time Available for Course,
a Particularly Difficult
Problem When the Overall
Course is not Under the
Control of the Designer

23.3.1.1

If Course is Part of a
Larger Curriculum Then
Freedom to Innovate Might
be Restricted, Particularly
if Several Instructors
Teach the Same Course

23.3.1.2

Will Provide a Framework
for Allocating Time and
Designing of I.S.Materials

23.3.1.3

23.3.1

Include:

The Number of Trainee
Dictate the Type and
of I.S. Goals Possibl
Achieve on the Cours

23.4.1.1.1

Entry Skills will Af
Design and May Neces
Development of Remed
Particularly if Trai
Are to be Heterogene
Composition

23.4.1.1.2

23.4.1.1

ainee
ica

Design I.S. Using
the Results of the
I.S. Analysis as
Input

23.5

Determine for Each Sub/
Objective the Class of
Learning Required

23.6

Accept
he Level
er the

General Classes of
Learning

Information Consisting of
Simple Words, Definitions,
Symbols, Results and Other
Isolated Information

23.6.1.1

Concepts Defined as Sets
of Stimulii with Common
Attributes

23.6.1.2

Principles Defined as
Functional Relationships
Between Concepts, Express
if then, Cause and Effect
Relationships

23.6.1.3

Skills Defined as Complex
Patterns of Purposeful
Behavior Which Require
the Manipulation of
Learned Information

23.6.1.4

Attitudes Defined as
Consistent Patterns of
Responses to Complex
Stimulii

23.6.1.5

23.6.1

f Trainees Can
Type and Number
s Possible to
he Course

1.1

will Affect Course
iay Necessitate the
of Remedial Units
if Trainee Groups
terogeneous in

1.1.2

.1.1

Condition
Class:

Informat

Relate
to What

Provide
Time Be
Term Re

Learn
There
Divisi
2

Make
Intere
Possil
23.7

Define Conditions for the Learning for each Sub/objective

23.7

Conditions by Learning Class:

Information:

Relate What is to be Learned to What Learner Already Knows
23.7.1.1.1

Provide for Practice, Increase Time Between Practice for Long Term Retention
23.7.1.1.2

Learn Material Whole if There are no Logical Divisions
23.7.1.1.3

Make Material as Interesting as Possible
23.7.1.1.4

23.7.1.1

Principles:

Relate to Previous Learning
23.7.1.2.1

Have Learner Use Principle to Predict new Effect
23.7.1.2.2

Use Example to Extend Association
23.7.1.2.3

In General, Work From Concrete to Theoretical and From Simple to Complex
23.7.1.2.4

23.7.1.2

Skills:

Explain Relevancy to Learner
23.7.1.3.1

Have Competent Performer Demonstrate Skill
23.7.1.3.2

Demonstrate Level of Performance Expected by Trainee
23.7.1.3.3

Begin With Elementary Practice of Skills Gradually Increasing to Complex
23.7.1.3.4

Provide Rapid Feedback on Performance Gradually Shifting to Self-evaluation
23.7.1.3.5

Test Against Objective Performance
23.7.1.3.5

23.7.1.3

23.7.1

Concepts:

Outline Application o to be Learned, Review Concepts
23.7.1.4.1

Present Instruction i Manner as the Relatio Commonality of the Cc Pattern are Revealed
23.7.1.4.2

Extend Association Ti Simple Examples Then ingly More Complex O
23.7.1.4.3

Ensure That Learners Define, Recognize an use the Concept
23.7.1.4.4

23.7.1.4

Do Media Selection for
Each Sub-objective

23.8

Is the Necessary
Media Available
23.9

no

Determine the Pertinent
Stimulii of the Sub/obj-
ective

23.8.1

Obtain Additional
Resources

23.31

Adapt Needs to
Fit Situation

23.32

:ation of Concepts
, Review Pre-requisite

.4.1

action in Such a
Relationship and
f the Concept
evealed
4.2

ation Through
es Then Increas-
mplex Ones

earners Can
gnize and
:pt
,.4

7.1.4

Attitude:

Present a Logical and Clear
Statement of Desired Attitude
23.7.1.5.1

Make the Learning Environment
Non-threatening
23.7.1.5.2

Provide Opportunities to
Practice New Attitudes
23.7.1.5.3

If Attitude Conflicts With
Prevalent Social Attitudes
Group Instruction May Have
to Take Place In Isolation
23.7.1.5.3.1

23.7.1.5

Stimulii:

Visual, Tactile
Audio and Others
23.8.1.1.1

23.8.1.1

Media Available

Overhead Projectors, Blackboards
Simulators, Computers, Photgraphs
Tape Recorders, Film Projectors,
Slide Tape Machines, Television
and Actual Equipment
23.8.1.1.1.1

23.8.1.1.1

yes

Select the Media That
Best Fit the Age, Interest
and Maturity of the
Learners

23.10

Do not Overuse A
Particular Media
Type, Vary Media
Presentations

23.10.1

Are any of the Sub-Objectives
the Same or Similar to Other
Courses

23.11

no

Guesstimate t
Requirements
Sub/objective

23.33

yes

Determine the Time
Requirements to
Teach Those Sub/
Objectives

23.12

Use These as Time
Estimates for Course
Under Development

23.13

Are all Time Requirements
Estimated for the Course
23.14

yes

no

y of the Sub-Objectives
me or Similar to Other
s

23.11   no

Guesstimate the Time
Requirements for Each
Sub/objective

23.33

Add Total Times Together
to Estimate Total Course
Time

23.15

yes

Determine the Time
Requirements to
Teach Those Sub/
Objectives

23.12

e These as Time
timates for Course
der Development

23.13

re all Time Requirements
atimated for the Course
23.14   yes

no

TO 23.A

```
┌─────────────────────────┐        ┌──────────────────┐                    ┌────────────────────┐
│ Assign Learning Objectives│      │ Do Course/Lesson │        yes          │ Have Course Outline,│
│ to Lessons Based on Class │─────▶│ Durations Fall   │───────────────────▶│ Media Selections,  │──▶
│ Length                    │      │ Within Constraints│                    │ Strategies and Time │
│                           │      │      23.17        │                    │ Allocations Determined│
│         23.16             │      └──────────────────┘                    │                    │
└─────────────────────────┘              │                                 │       23.18        │
                                         │ no                              └────────────────────┘
                                         ▼
                                ┌──────────────────┐
                                │ Modify Course    │      yes
                                │     23.34        │───────────────────▶
                                └──────────────────┘
                                         │
                                         │ no
                                         ▼
                                ┌──────────────────┐
                                │ Alter Time       │      yes
                                │ Constraints      │───────────────────▶
                                │     23.35        │
                                └──────────────────┘
                                         │
                                         │ no
                                         ▼
                                ┌──────────────────┐
                                │ Lower Performance│
                                │ Expectations     │───────────────────▶
                                │     23.36        │
                                └──────────────────┘
```

```
┌─────────────────────┐     ┌─────────────────────┐     ┌──────────────────────┐  yes  ┌──────────────────────┐
│ Assemble Individual │────>│ Organize Lesson Plan│────>│ Are all Lesson Plans │──────>│ Develop Assessment   │
│ Lesson Plans        │     │ Into a Logical      │     │ for Each Sub/objective│      │ Strategies           │
│                     │     │ Sequence            │     │ Complete             │       │                      │
│      23.19          │     │      23.20          │     │      23.21           │       │      23.22           │
└─────────────────────┘     └─────────────────────┘     └──────────────────────┘       └──────────────────────┘
                                                                    no
```

Suggest Sequence:

State Lesson Objective
23.20.1.1

Provide a Demonstration of Performance
23.20.1.2

Give Learning Guidance Prompting Learners as much as Possible
23.20.1.3

Define Learning Objective
23.20.1.4

Provide a Variety of Examples
23.20.1.5

Provide Practice for Students
23.20.1.6

Give Feedback on Learner Performance
23.20.1.7

23.20.1

Objective Referenced Test:

Measures Directly the Performance Described in the Sub/objectives of the Course
23.23.1.1

Generally Used to Assess Individual Sub/objectives
23.23.1.2

23.23.1

NORM REFERENCED TEST:

COMPARES LEARNERS PERFORMANCE TO THAT OF A GROUP WITH THE NORM ESTABLISHED BY GROUP SCORES
23.23.2.1

USUALLY MEASURES PERFORMANCE ON A MIXTURE OF OBJECTIVES or WHOLE COURSE
23.23.2.2

23.23.2

obje test

What Referenced Type Test
23.23

norm ref test   no

Determine Number of Objectives to be Tested
23.37

NEW TES
23.38

no

COMPARE PERFORMAN TO DETERMI
23

```
┌──────────┐        ┌────────────────────┐
│  ·ssment │        │ Test Must not Aim at│
│          │        │ a Particular Range │
└──────────┘        │ of Scores ie. 50-60%│
                    │                    │
                    │      23.24.1       │
                    └─────────┬──────────┘
   objective referenced       │
   test                       ▼
```

objective referenced test

┌──────────┐   yes   ┌────────────────────┐   ┌──────────────┐   ┌──────────────────────┐   ┌──────────┐
│ ·nced   │ ──────▶ │ Ensure That Test Requires │ │ Set Skill Mastery │ │ Test Must Meet General │ │ Are all Te │
│   │   │ Learner to Perform as │ ──▶ │ at 90%   │ ──▶ │ Criteria for all Sub/ │ ──▶ │ Complete │
└──────────┘   │ Indicated by Sub/objective │ │   │   │ objectives   │   │ 23.27   │
                     │   │   │   23.25   │   │   │   └──────────┘
   norm referenced   │   23.24   │   └──────┬───────┘   │   23.26   │
   test   └────────────────────┘   │   └────────────────────────┘

lumber of
to be

                                      ┌────────────────────────────┐
                                      │ If Learners Fail to Achieve │
                                      │ Mastery than a Re-evaluation│
                                      │ of the I.S. is Necessary   │
                                      │   │
                                      │   23. .1   │
                                      └────────────▲───────────────┘

                                      ┌────────────────────────────┐
                                      │ Mastery must   ·emonstrated│
                                      │ at Least 3 t ·mes to 'Prove │
                                      │ Mastery' of ·   ·en Skill   │
                                      │   │
                                      │   23.25.1.1   │
                                      └────────────────────────────┘

┌──────────┐   yes   ┌────────────────────┐
│ nEW TEST │ ──────▶ │ Accumulate Over Time│
│ 23.38   │   │ Scores per Item Tested │
└────┬─────┘   │ to Form Norms   │
     │ no   │   │
     ▼   │   23.39   │
                     └────────────────────┘
┌────────────────────┐
│ OMPARE EACH LEARNERS│   ┌────────────────────────────┐
│ aformance to the norm │   │ Discard or Modify Questions │
│ DETERMINE ACHIEVEMENT │ ────────▶ │ That are Answe·ed Correctly │
│   23.40   │   │ or Incorrec·   ore Than   │
└────────────────────┘   │ 90% of t·   │
                                    │   │
                                    │   2   │
                                    └────────────────────────────┘

To be Considered 'Met'
at Least 80% of Learners
must Acquire Skill

23.44.1

Run Course

23.43

Have all Learner
Sub/objectives
Been 'Met'
23.44

yes

no

Identify Those Sub/
objectives not Met

23.45

Determine the Cause
of Failure:

Obtain the Learner's
Viewpoint on the
Cause of the Problem
23.45.1.1

Obtain Instructor's
Viewpoint on the
Cause of the
Problem
23.45.1.2

23.45.1

Problem Types:

Not Enough Time for
Learning
23.45.1.1.1

Improper Vocabulary
Level
23.45.1.1.2

Mismatch Between Sub/objectives
and Assessment Method
23.45.1.1.3

Improper Sequencing of
Instruction
23.45.1.1.4

Bad Attitudes Among
Trainees
23.45.1.1.5

23.45.1.1

Check Eac
Detail Be
Changes

23.

Make all
Changes

23.49

Review I.S.
Process

23.48

yes

Types:

1 Time for

1.1

ocabulary

1.2

etween Sub/objectives
ment Method
5.1.1.3

Sequencing of
on
1.1.4

udes Among

1.5

.45.1.1

Check Each Objective in
Detail Before Making
Changes

23.46

Will Major Portions of
the I.S. Have to be
Reviewed and Changed
23.47

no   Re·

DO TRAINING EFFECTIVENSS
ANALYSIS 26.A

Do Training Effectiveness
Analysis:
26.A

```
┌─────────────────────┐      ┌─────────────────┐      ┌─────────────────┐      ┌──────────────┐
│ Do Analysis of      │      │ Choose Assessment│      │ Allow Trainee 3 │      │ Use Only Objec│
│ Trainees            │─────▶│ Technique        │─────▶│ Months on the Job│─────▶│ Gathered Data │
│ Back on the Job     │      │                  │      │ Before Analysis │      │              │
│ Performance         │      │      26.2        │      │                 │      │    26.4      │
│       26.1          │      │                  │      │      26.3       │      │              │
└─────────────────────┘      └─────────────────┘      └─────────────────┘      └──────────────┘
```

Methods to Gather
Performance Data:

Observe Trainee on
The Job
    26.2.1.1

Interview Trainees
and Supervisors
    26.2.1.2

from information gathering:
Interviews and Questionnaires

Conduct Questionnaire
Survey
    26.2.1.3

        26.2.1

Can Include Measurement

| Morale | Absenteei |
| 26.4.1.1 | 26.4.1.2 |

Accident Rates
26.4.1.5

Numb
Grie
26.

Turnover Rate
26.4.1.9

Sal
26

ctively

Analyse only Those Types
of Performance That are
Explicitly Related to
the Content of the
Training Program

26.5

Determine if Changes in
Performance Could Have
Been Caused by Other
Factors Than Training

26.6

Other Factors:

26.7

no

yes

Choose
Measure

26.1

Are Th
Perfor
Measur
26

Can t
be Fi
2

nts of:

| eism | Scrap Rates 26.4.1.3 | Productivity 26.4.1.4 |

| abera of levances 6.4.1.6 | Equipment Servicability 26.4.1.7 | Customer Satisfaction 26.4.1.8 |

les Volume
6.4.1.10

26.4.1

Example:

Changes in Standards
26.6.1.1

Changes in Products
26.6.1.2

Changes in Market
Conditions
26.6.1.3

Changes in Mangement
26.6.1.4

Social Changes
26.6.1.4

26.6.1

```
hoose Other
easures
  26.17
```

Compare the Performance
of Persons who Have
Undergone Training to
Thos who Have not

26.18

Proceed Performance
Measure by Performance
Measure

26.19

Summarize all Indiv-
dual Performance
Changes

26.20

yes

```
Are There Other
Performance
Measures
  26.16
```

no

no

```
Can the Effects
be Filtered out
  26.8
```

yes

Filter out
Effects
26.9

Compare Present Perf-
ormance to Past

26.10

Subtract Present
Performance From
the Former

26.11

```
┌─────────────────────┐
│ Summarize Data to   │
│ Obtain Average      │
│ Performance Change  │
│       26.21         │
└─────────────────────┘
          │
          ▼
┌─────────────────┐      ┌──────────────────────┐      ⟨Plus Greater⟩   no    ┌─────────────────────┐      ⟨Are
│ Make a List of  │────▶│ Place a Plus Where    │────▶│ Than Minus  │──────▶│ Training Program    │────▶│ Kno
│ Each Performance│      │ Overall Performance   │      │   26.14     │        │ was not Effective   │      │ Tra
│     26.12       │      │ has Improved and a    │      ⟨            ⟩        │      26.22          │      │ Uti
└─────────────────┘      │ Minus Where it has    │                                └─────────────────────┘
                         │ not                   │           │
                         │       26.13           │           │ ye-
                         └──────────────────────┘           │
```

┌─────────────────┐   ┌──────────────────────┐   Determi
│ Training Program│   │ Determine where Changes│   Changes
│ is Effective   │◀───────│ are to be made   │◀───────Trainin
│   26.15   │   │   26.25   │   Implead
└─────────────────┘   └──────────────────────┘

Return

Could l

New Tas
Old One
    26.

Have Cl
Render

Are Skills and
Knowledge from
Training Being
Utilized

26.23

→ no →

Have Trainees
Forgotten

26.26

→ yes →

Re-evaluate
Training
Approach

26.27

→ Return

yes (down from 26.23)

Determine What Job Related
Changes Have Occurred Since
Training Program was First
Implemented

26.24

no (down from 26.26)

Did Trainees Ever
Possess Skill

26.28

→ yes →

Are First Lines
Managers Preventing
Persons From Performing

26.30

→ yes →

Report to Senior
Management

26.31

Could be:

New Tasks Added to Job
Old Ones Deleted
26.21.4.1

Have Changes in Technology
Rendered Old Skil s Obsolete

26.21.4.2

26.21.4

no (down from 26.28)

Re-evaluate
Training
Program

26.29

no (down from 26.30)

DO TRAINING COST-EFFECTIVENESS
ANALYSIS 29.A

Do Training Cost Effectiveness
Analysis
29.A

```
┌──────────────────┐   ┌──────────────────┐   ┌──────────────────┐        ┌─────────────────┐
│ Calculate Daily  │   │ Multiply Each Cost by │ Add all Trainee Costs │        │ Travel Expenses │  no
│ Costs of Trainees│ → │ the Number of Training│→ Together             │  →     │     29.4        │ →
│       29.1       │   │ Days        29.2 │   │        29.3      │        └─────────────────┘
└──────────────────┘   └──────────────────┘   └──────────────────┘              │ yes
```

Determine:

┌─────────────────────────────┐
│ $ Value of Salaries   │
│ from Personnel Records   │
│   29.1.1.1   │
└─────────────────────────────┘

┌─────────────────────────────┐
│ $ Value of Benefits   │
│ from Personnel Records   │
│   ·   29.1.1.2   │
└─────────────────────────────┘

┌─────────────────────────────┐
│ $ Value of lost Production │
│ While Undergoing Training   │
│   29.1.1.3   │
└─────────────────────────────┘
            29.1.1

Calculate Costs:

┌──────────────┐
│ Airfare   │
│ 29.5.1.1   │
└──────────────┘

┌──────────────┐
│ Accommodation│
│ 29.5.1.2   │
└──────────────┘

┌──────────────┐
│ Incidentals │
│ 29.5.1.3   │
└──────────────┘

┌──────────────┐
│ Car Rentals │
│ 29.5.1.4   │
└──────────────┘

┌──────────────┐
│ Food   │
│ 29.5.1.5   │
└──────────────┘
        29.5

```
┌────────────────────┐   ┌────────────────────┐   ┌────────────────────┐   ┌────────────────────┐
│Calculate Travel    │   │Add all Travel Costs│   │Calculate Costs of  │   │Add all Costs of    │
│Costs               │──▶│Together for Total  │──▶│Training Personnel  │──▶│Training Personnel  │──▶
│for Each Employee    │   │Travel Costs        │   │        29.8        │   │        29.9        │
│        29.6         │   │        29.7        │   │                    │   │                    │
└────────────────────┘   └────────────────────┘   └────────────────────┘   └────────────────────┘
```

┌──┐
│   │
│   ┌──────────────────────────────────┐   ┌──────────────────────────────────┐ │
│   │ Determine: │   │ $ Value of Benefits   │ │
│   │   │   │ of Support Staff: │ │
│   │ ┌────────────────────────────┐ │   │   ── ──   │ │
│   │ │ $ Value of Support   │ │   │ ┌────────────────────────────┐ │ │
│   │ │ Staff Salaries: │ │   │ │ Secretaries, Graphic   │ │ │
│   │ │   29.8.1.1.1   │ │   │ │ Artists, Programmers,   │ │ │
│   │ └────────────────────────────┘ │   │ │ Technicians   │ │ │
│   │ ┌────────────────────────────┐ │   │ │   29.8.1.2.1   │ │ │
│   │ │ Secretaries, Graphic   │ │   │ └────────────────────────────┘ │ │
│   │ │ Artists, Programmers,   │ │   │   29.8.1.2.   │ │
│   │ │ Technicians   │ │   └──────────────────────────────────┘ │
│   │ │   29.8.1.1.2   │ │   ┌──────────────────────────────────┐ │
│   │ └────────────────────────────┘ │   │ $ Value of Salaries of   │ │
│   │   29.8.1.1   │   │ Line Personnel   │ │
│   └──────────────────────────────────┘   │   │ │
│   │ ┌────────────────────────────┐ │ │
│   ┌──────────────────────────────────┐   │ │ Instructors, Analyst/   │ │ │
│   │ $ Value of Consultant's   │   │ │ Developers, Managers   │ │ │
│   │ Salaries   │   │ │   29.8.1.4.1   │ │ │
│   │   29.8.1.3   │   │ └────────────────────────────┘ │ │
│   └──────────────────────────────────┘   │   29.8.1.4   │ │
│   └──────────────────────────────────┘ │
│   ┌──────────────────────────────────┐   │
│   │ $ Value of Benefits of   │   │
│   │ Line Personnel   │   │
│   │   │   │
│   │ ┌────────────────────────────┐ │   │
│   │ │ Instructors, Analyst/   │ │   │
│   │ │ Developers, Managers   │ │   │
│   │ │   29.8.1.5.1   │ │   │
│   │ └────────────────────────────┘ │   │
│   │   29.8.1.5   │   │
│   └──────────────────────────────────┘   │
│   │
│   29.8.1   │
└──┘

1

Add Total Costs of
Trainees and Training
Personal Together
29.10

Determine Costs of
Hardware
29.11

Costs of
Non-expendables
29.12

Consummables
29.13

Add ta
of Hardw.
29.14

Including the $
Value of:

Audio-Visual
Equipment
29.12.1.1

Textbooks
29.12.1.2

Computerware
29.12.1.3

Furniture
29.12.1.4

Instruments
29.12.1.5

Office Equipment
29.12.1.6

Special Facilities
29.12.1.7

29.12.1

Include the $ Value
of:

Confectionnaries
29.13.1.1

Stationery Materials
29.13.1.2

Work Materials
29.13.1.3

Handouts
29.13.1.4

Diskettes
29.13.1.5

29.13.1

```
┌──────────────────────────┐
│Give Employees 3 Months   │
│back on the Job           │
│          29.15.2         │
└──────────────────────────┘
             │
             ▼
┌─────────────┐   ┌──────────────────────┐        ╱────────────╲ yes  ┌──────────────────────┐   ╱─────────────────
│Id   tal Costs│  │Obtain Current        │       ╱  Statistics   ╲────▶│Compare Pre-Training  │──▶│Present Performanc
│ Hardware    │──▶│Trainee Performance   │──────▶│  Available      │    │Performance Averages  │   │Figures Higher
│  29.14      │   │Figures               │       ╲   29.16       ╱     │to Post-training      │   │      29.22
└─────────────┘   │          29.15       │        ╲────────────╱       │      29.21           │   ╲─────────────────
                  └──────────────────────┘              │             └──────────────────────┘            │
                             ▲                          │ no                                              │ no
                             │                          ▼                                                 ▼
       ┌─────────────────────────────────┐   ┌──────────────────────┐                         ┌──────────────────┐
       │ Using Averaged $ Figures        │   │Form a Panel of 5     │                         │Training not      │
       │ Include:                        │   │Consisting of,        │                         │Cost-effective    │
       │                                 │   │Supervisors and       │                         │   29.31          │
       │  ┌───────────────────────────┐  │   │Employees             │                         └──────────────────┘
       │  │Rates of Absenteeism       │  │   │      29.17           │                                  │
       │  │     29.15.1.1             │  │   └──────────────────────┘                                  ▼
       │  └───────────────────────────┘  │              │                          ┌──────────────────┐
       │  ┌───────────────────────────┐  │              │                          │Indications of    │
       │  │Sales Volumes              │  │              ▼                          │very Grave Problem:│
       │  │  29.15.1.2                │  │   ┌──────────────────────┐              │   29.32          │
       │  └───────────────────────────┘  │   │From Course Description│             └──────────────────┘
       │  ┌───────────────────────────┐  │   │and Job Description.   │                      │
       │  │Unit Production            │  │   │Outline Areas of the Job│                     ▼
       │  │Rates                      │  │   │Function that will Have│             ┌──────────────┐
       │  │   29.15.1.3               │  │   │Changed due to Training│             │Determine     │
       │  └───────────────────────────┘  │   │      29.18           │             │Problems      │
       │  ┌───────────────────────────┐  │   └──────────────────────┘             │29.33         │
       │  │Turnover Rates             │  │              │                          └──────────────┘
       │  │  29.15.1.4                │  │              ▼
       │  └───────────────────────────┘  │   ┌──────────────────────────┐  ┌──────────────────────────┐   ┌──────
       │  ┌───────────────────────────┐  │   │Each Member is to Estimate│  │Discard the Highest and   │   │Add
       │  │Losses Due to              │  │   │the Value of Such Changes │─▶│lowest Estimates. The     │──▶│and
       │  │Strikes                    │  │   │on a Monthly Basis        │  │Remainder will form the   │   │
       │  │  29.15.1.5                │  │   │      29.19               │  │Modified Mean             │   │
       │  └───────────────────────────┘  │   └──────────────────────────┘  │          29.20           │   └──────
       │  ┌───────────────────────────┐  │                                 └──────────────────────────┘
       │  │Repair Times               │  │
       │  │  29.15.1.6                │  │
       │  └───────────────────────────┘  │
       │          29.15.1                │
       └─────────────────────────────────┘
```

ance ⟩ yes →

| Project Net Performance Savings over the Lifetime of the Course 29.23 | → | Continue with Process for each Training Activity 29.24 | → | Accumulate all Projected Savings. 29.25 | → | Subtra all Tr |

| Usual Course Lifetime is around 5 years 29.23.1 |

lems

| Extensive Modifications to Course Indicated 29.34 | → | Accumulate Net $ Losses 29.35 |

| dd all Figures Together nd Express in $'s 29.21 |

```
┌──────────────┐         ╱───────────╲         ┌──────────────────────┐         ╱──────────────╲         ┌──────────────┐
│t from Savings│         ╲Savings Exceed╱  yes  │Compare the Net Saving│         ╲Greater than or╱  yes  │Training is   │
│ining Costs   │ ──────► ╱Costs         ╲ ────► │figure to the Cost of │ ──────► ╲Equal to 100%  ╱ ────► │Completely    │
│ 29.26        │         ╲  29.27       ╱       │the Problem Left Unsolved│       ╱   29.29      ╲       │Successful    │
└──────────────┘          ╲───────────╱         │over the same Time Period│       ╲─────────────╱        │  29.30       │
                                │               │        29.28         │               │                └──────────────┘
                                │ no            └──────────────────────┘               │ no                     │
                                ▼                        ▲                             ▼                        ▼
                        ┌──────────────┐                 │                     ┌──────────────┐            Return
                        │Training not  │                 │                     │Training Not  │
                        │Cost-effective│                 │                     │Completely    │
                        │  29.36       │                 │                     │Successful    │
                        └──────────────┘                 │                     │  29.39       │
                                │                         │                    └──────────────┘
                                ▼                         │                            │
                        ┌──────────────┐                  │                            ▼
                        │Indicative of │                  │                    ┌──────────────┐
                        │Serious Problems│                │                    │Determine Problem│
                        │  29.37       │                  │                    │Areas         │
                        └──────────────┘                  │                    │  29.40       │
                                │                         │                    └──────────────┘
                                ▼                         │                            │
                        ┌──────────────────┐              │                            ▼
                        │Conduct Investigation│           │                    ┌──────────────┐
                        │into Entire Training │ ◄─────────┘                    │Make all      │
                        │Process           │                                  │Necessary     │
                        │  29.38           │                                  │Changes       │
                        └──────────────────┘                                  │  29.41       │
                                │                                             └──────────────┘
                                ▼
                            Return
```