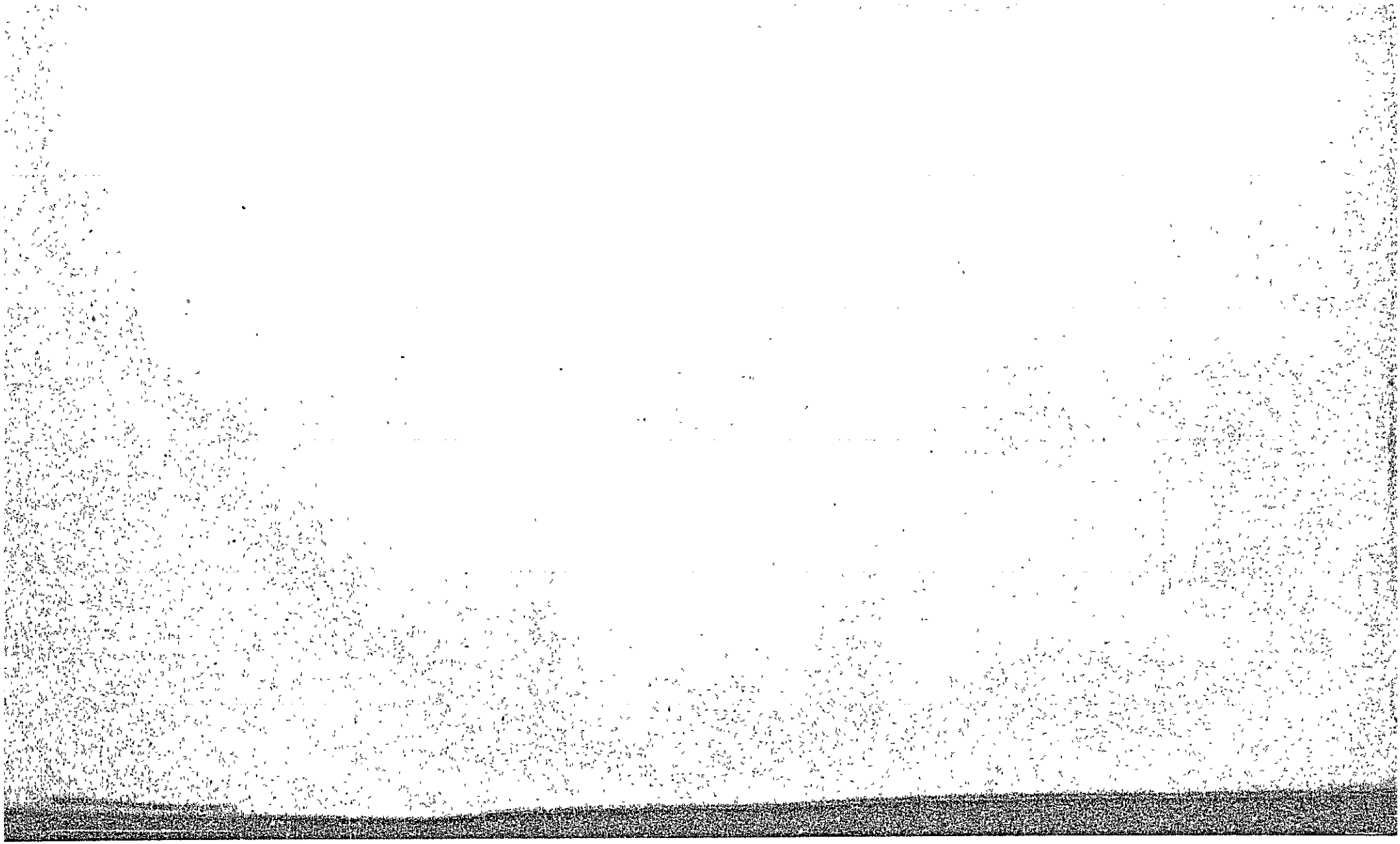
Training methodology and training evaluation for instructors and inspectors



"Training Methodology and Training Evaluation For Instructors and Inspectors"

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CONTENTS

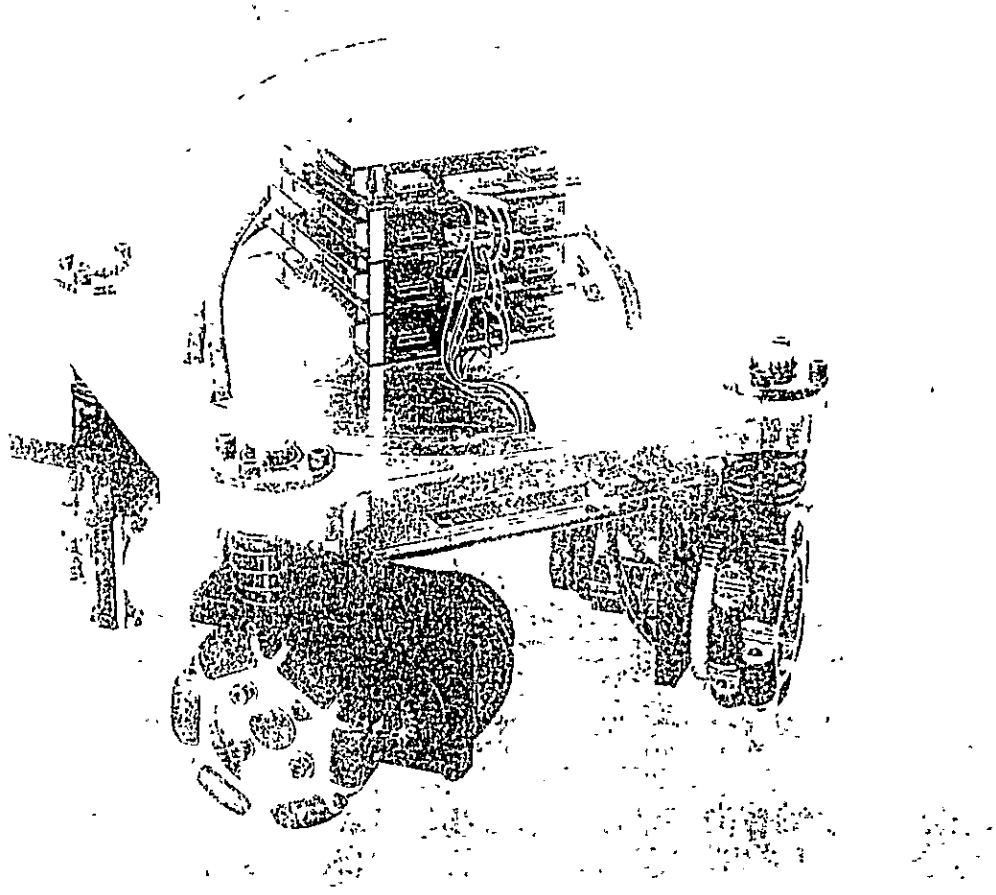
Prologue to Educational Training

In the light of "global" problems and technological innovations, our society needs adequate solutions.

Such solutions require educational training

As a result, educational training instructors should be trained

Governments of many countries and companies plan to train the required number of experts and specialists in educational training



1-1 Why is Educational Training Necessary?

Life of an individual

Education has focused on children and young people in schools including kindergarten, elementary school, high-school, and university. With its increasing maturity, our society is beginning to suffer from new problems, in addition to conventional ones, all of which we should try to solve. "Increased satisfaction in life," for example, can be handled by age as an educational training theme. This problem has until now been handled only as a social welfare issue. It is important to educate not only children and young people but also adults after leaving school.

When we think of "job satisfaction" in our daily life, we can get a good idea of the issues. A profession does not consist of repeating the same work every day. Job satisfaction cannot be obtained by repeating routine work. Educational training is needed to give people broader work opportunities.

Occupations, for example, have been created from the need to maintain and develop human society. An occupation is asocial activity that changes as society changes. When an occupation changes, working fields and working methods must also change. During the maturing and mature periods of a society, such changes are abrupt. The progress of a nation involves this logic.

If work is indispensable for a person to live, just as air is for human beings, he must draw his energy from education and training.

Human beings cannot be provided with educational training unless we approach the idea of lifelong education. Educational training is based on the idea of the "dignity of the individual," which considers each individual's way of life.

Globalism and educational training

Information on events can be transmitted immediately to the other side of the earth to become common knowledge worldwide. People in all countries can no longer say: "our country is not concerned with ..." or "we remain independent of ..." Many issues must be handled from a global viewpoint. If one resource is handled carefully and economically in one region and is squandered or neglected in another region, the results affect the world as a whole. Issues include environment, resources, human rights, and our existence. Uncontrolled population increase due to a high birth-rate with inadequate medical capabilities, poor nourishment and hygiene, lost natural resources due to environmental pollution, conflicts and destruction due to racial tensions and invasions, and the issue of a country's economic autonomy and interrelationships among countries – none of these issues can be resolved without understanding the position of beings on this planet. Human beings living in this world must think globally, regardless of their nationality or the level of industrialization of their countries. The passengers aboard this vessel have to share the joys and the sorrows they will encounter on the voyage. In this respect, training and education contribute much. As globalism becomes more widely accepted, the importance of training increases.

Innovation and educational training

There are probably many people who feel that aspects of their job have changed in recent these years. We often hear the following opinions:

"The machine we have recently introduced has higher efficiency, but makes me feel a little more tired."

"It has become easier to type, edit, and correct documents on a monitor screen."

"Most of the personnel in many posts cannot use newly introduced machines without special training."

"New perception (kan) and knack (kotsu) have become necessary to deal with .... "

Technical innovations have spread so quickly in Japan that many Japanese must face a new world. Previous technical innovations mostly involved shifts to the application of new power energy sources. Those innovations, new as they were at the time, only caused certain industries and occupations to take on new appearances. Current technical innovations involve microelectronics. These are characterized by the fact that machines are being given the intellectual ability to make judgements and tactile capabilities similar to those of human beings. The appearances of occupations have totally changed in every industry. This does not mean that previous skills have been replaced by new ones, but that new skills have become necessary besides previous ones. Innovation has increased the knowledge and skills required, and led to new training subjects that can only be learned through off-the-job training, because on-the-job training is not sufficient. The shock of technical innovation has been translated into the shock of educational training. People know well that new types of training are needed, but are perplexed by surrounding events and do not know what to do. Many company administrators have had a feeling that existing external training courses are unsatisfactory, and that adequate and sufficient training can only be given in-house. Therefore, new jobs require new kinds of training. Many will insist that a company cannot afford to maintain a specialized training staff. It is time to stop depending on the existing training industry. Training instructors will be needed in-house sooner or later.

On-the-job training and off-the-job training

Educational training is divided into two types: on-the-job training by which trainees remain at their posts in the company to learn the job with colleagues and superiors, and off-the-job training by which trainees are seconded for a definite period to receive a training course at the company's training centre, an outside training establishment, or a university. You must have been trained by one of these methods. We will see the characteristics of these training methods.

OJT (ON-THE-JOB TRAINING)	OFF JT (OFF-THE-JOB TRAINING)
· Training is given at the workplace	· Training is given at a place away from a workplace
· Training is given face-to-face	· Training is given to a group
· Training is given with up-to-date tools and equipment	· Training mostly employs simulations
· Realistic	· Not realistic
· Practical	· It is likely to be non-practical
· Training cannot given systematically	· Training can be given systematically
· Untheoretical	· Theory-centred

Fig. 1-1 Type and nature of training

On-the-job training seems to be easy to perform immediately. This type of training usually involves one instructor and one trainee. This type of training has the advantage of permitting the trainee to apply the results immediately. Training is real and state-of-the-art equipment is often used. Effective workers can be developed immediately by this type of training. However, it also has negative aspects such as the difficulty of training systematic techniques and skills, and does not cover theoretical explanations. In short, these shortcomings result from its fragmentation.

Off-the-job training is given to a group of trainees. Despite its lack of simplicity, lack of contact with reality due to the use of models, and lagging hardware for financial reasons, this training method has several considerable advantages. For instance, it is suitable for systematic and theoretical education performed comprehensively. Basic training for future application and training the main points of techniques and skills should be based on this method for the most part. Moreover, on-the-job training coupled with self-education often cannot meet certain requirements created by changes in production processes resulting from recent technical innovations. There is a tendency toward off-the-job training. Because on-the-job training and off-the-job training complement each other, these two methods should be strategically combined to develop effective training.

1-2 The Cycle of Educational Training

In a broad sense, education or training develop from themselves. Plants and insects are instructors in the natural classroom. The patrimony of humanity, natural environment, and cultures cannot be transmitted to our younger generations without resorting to other means. Planned and efficient education involves certain artificial procedures. The cycles of educational training show the flow of such procedures.

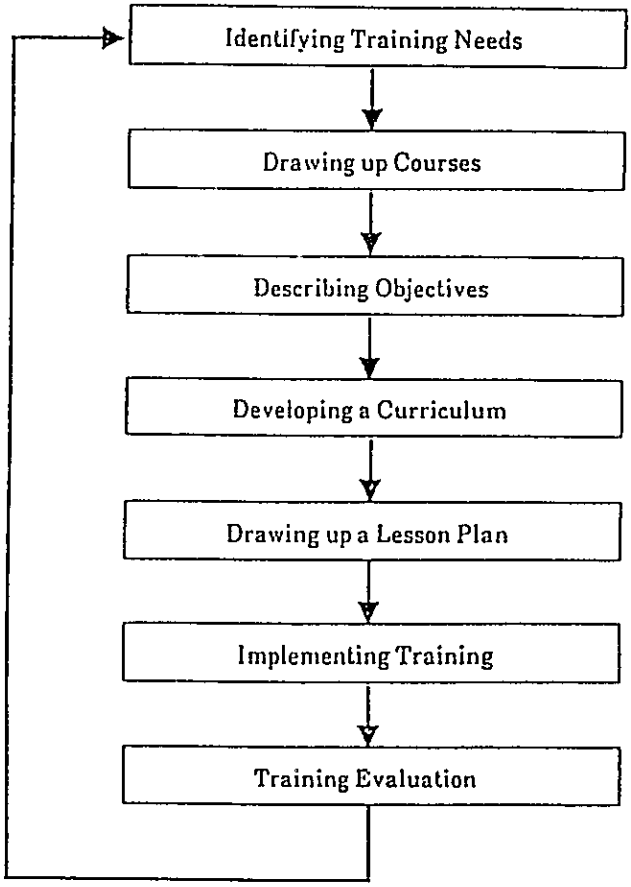
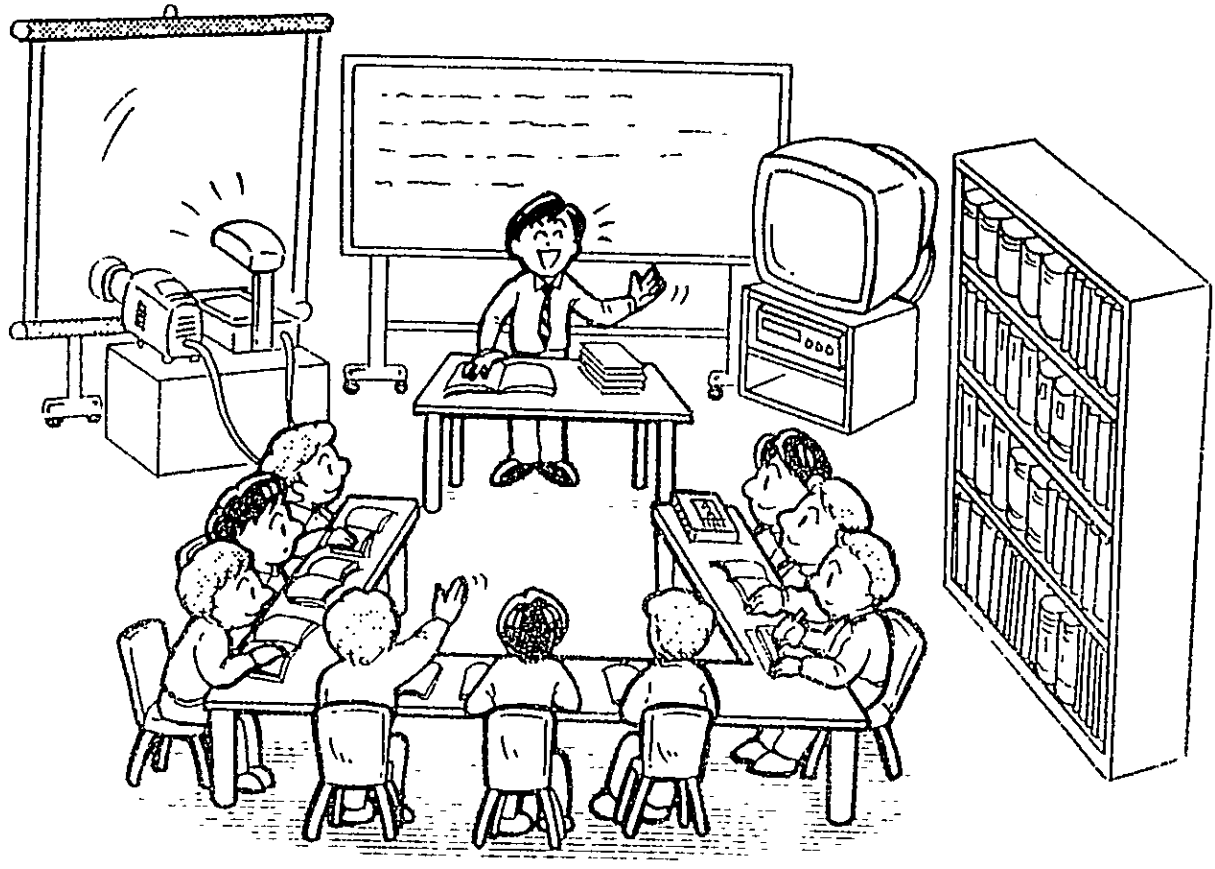


Fig. 1-2 The cycle of educational training

If training should not be given superficially or on a laisser-faire principle, but should be developed with clear intentions and successfully, such training is usually developed through the following definite training cycle.

First, training needs are identified and examined for drawing up courses. The training period and qualifications (describing objectives) are determined in this process. Determination of these parameters is followed by developing a curriculum. A curriculum is the content of the training envisaged. Training items and order of execution are determined and described in the form of a training programme in this process. Training materials are selected or prepared for each training unit before training is performed. Training is evaluated to confirm results and for future training. You can see that training does not mean going to a training room with textbooks.



1-3 What Should an Instructor Be and Do?

People responsible or experts in the field are assigned as instructors for most in-house training. Such training is often given with little success simply because instructors do not have sufficient techniques and skills for training. Good engineers are not always good instructors. There can often be first-class specialists who are not skillful instructors or whose lessons are difficult for trainees to grasp.

An instructor should have the abilities and aptitudes shown in Fig. 1.4.

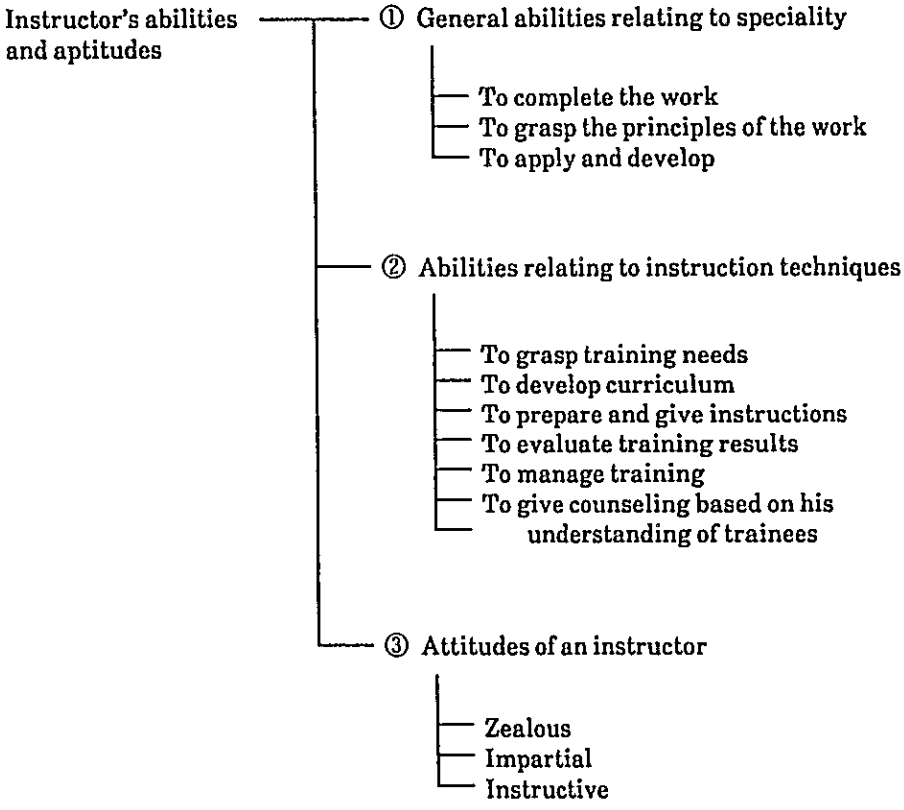


Fig. 1-4 Abilities and aptitudes required of an instructor

The experience shows us that instructors should have these abilities and aptitudes along with competence in a definite field. Instructors may have various attitudes according to a specific training environment. This Manual does not describe training for such "human" factors as instructor's attitudes. Attitudes can only be handled after discussing the values of attitudes, as well as their advantages and disadvantages, and an instructor's attitudes are not easy to describe. We conclude that an instructor's attitudes should be independently determined by every training establishment. Every instructor should try to acquire and maintain these abilities and aptitudes when giving training lessons. PROTS only handles the second category. If you already have abilities in any speciality, PROTS will allow you to acquire training skills and techniques. The rest to become an able instructor depends on yourself.

1-4 Instruction Skills/Techniques (Production Techniques Training): For What Purpose?

Have you ever thought why instruction skills/techniques is provided. First, it is given acquire the abilities needed to perform a job. Training that does not meet this requirement is meaningless. Instruction skills/techniques is carried out not to obtain certain qualifications or to enlarge one's scope of hobbies. Training provides an opportunity for trainees to lead a better life and to avoid accidents. Training also plays an important role for enhancing productivity, stabilizing a worker's life, and contributes to people's satisfaction in life. We should tell of more positive results obtained from training. Instruction skills/techniques will allow the trainees to improve their performance.

Instruction skills/techniques plays an important part in permitting us to do work only humans can do. At the beginning of this section, we showed that education and training are becoming more important at a global level.

Such instruction skills/techniques gives every worker the opportunity to modify and develop his own job in a positive way and to create his own life. You should assume the role of an instructor, keeping in mind this fundamental meaning of training, and not look for brilliant effects from instruction skills/techniques. We hope that you will work in the field, considering that all activities related to training will have this positive effect.

About OJT and OFF-JT

1. Characteristic of Man-of-Ability Training by OJT

- In working, a superior official does educational training of the subordinate.

【The strong point】

- Practical man-of-ability training and practical instruction can be performed.

- Detailed man-of-ability training and instruction can be performed.

- The plan of continuous man-of-ability training can be assembled.

- Man-of-ability training and instruction can always perform.

- The effect of OJT can judge instantly.

- Technology and know-how can be handed down (teach) .

- The reliance relation between a superior official and a subordinate can be establishable.

- The capability of a superior official's leadership improves.

【The weak point】

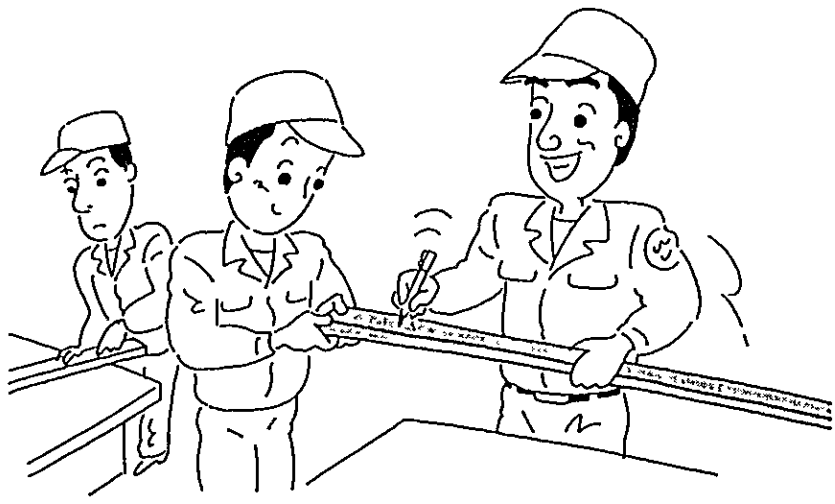
- OJT is influenced by the sense of responsibility to subordinate training of a superior official.

- OJT is easy to become instruction which gave priority to job execution over man-of-ability training.

- OJT tends to be short of the plan of guidance, and the method of guidance.

- The check and evaluation of an instruction result are difficult.

- An instruction result is influenced by individual and the human group relation.



2. Characteristic of Man-of-Ability Training by OFF-JT

- Man-of-ability training by educational training separated from work (place of work).

【The strong point】

- OFF-JT can concentrate and concentrate on study.

- Systematic and gradual knowledge and technology can be mastered for a short time.

- OFF-JT is possible to raise many study persons' capability on the level of a fixed level.

- Fellow study persons' mutual action works effectively.

- Opinion exchange is performed by fellow study persons, and self-educat ion is promoted.

- OFF-JT is possible to perform man-of-ability training systematically and intentionally.

- OFF-JT is possible to perform the study by the special leader.

【The weak point】

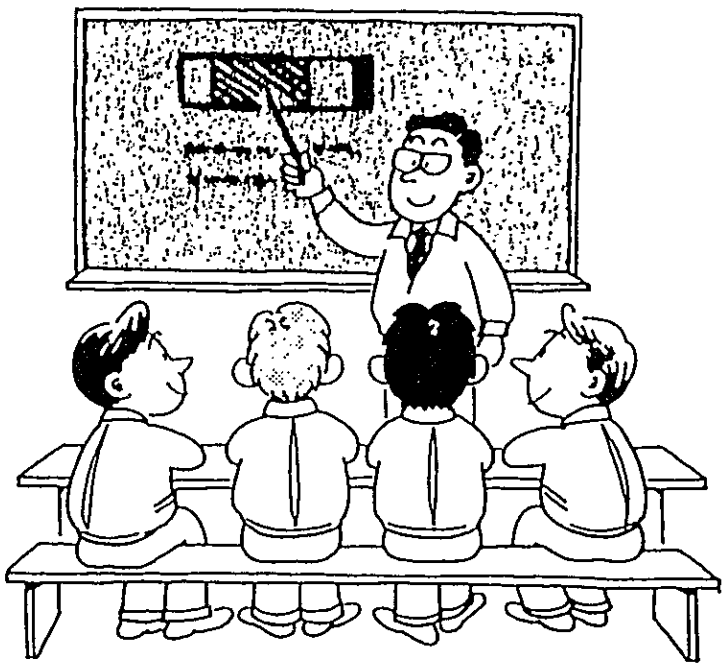
- OFF-JT does influence to the production by discontinuation of work activity.

- OFF-JT has a limit in correspondence according to a study attendance student's individuality and capability difference.

- OFF-JT has a limit in correspondence of practical and concrete work study.

- As for OFF-JT, special knowledge, special technology, an instruction work method, and preparation work are needed.

- As for JT, institution equipment (the hall), and much apparatus and teaching materials are needed.

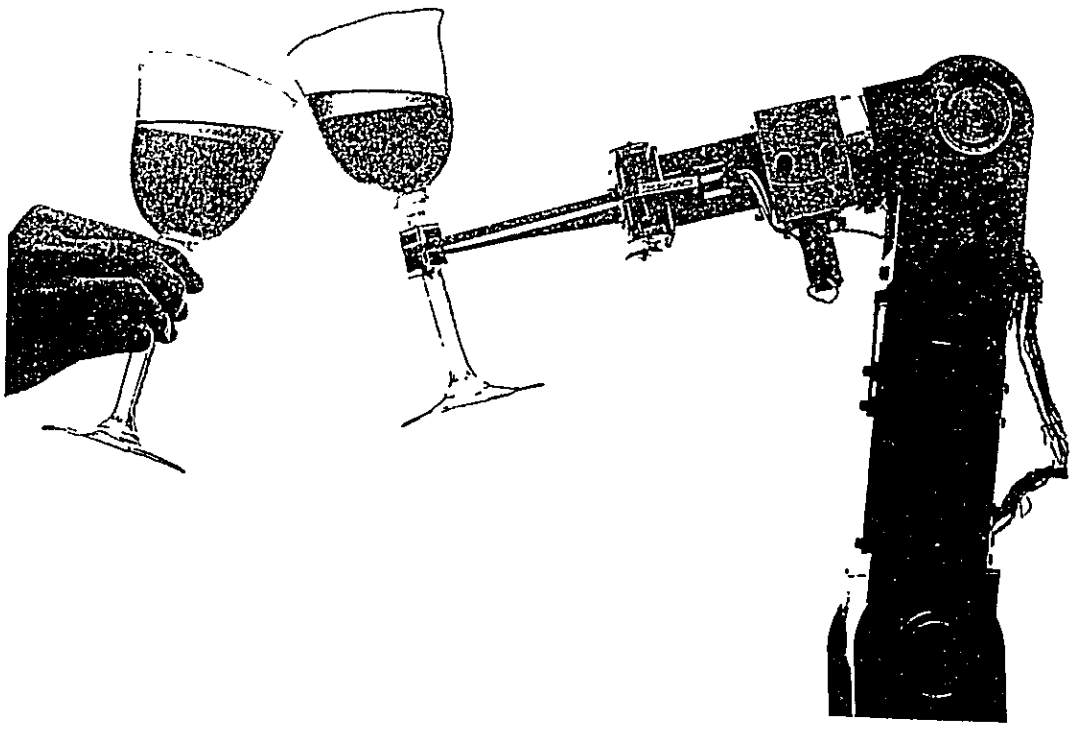


Instruction Skills/Techniques

We will review the concept of "skills" and "techniques."

The new era arising from technical innovations requires a new concept of skills and techniques.

This is the starting point for educational training.



2-1 What are the Techniques? What are the Skills?

Techniques and skills in a dictionary

The production techniques training system at which we are aiming covers all kinds of people and meets all contemporary requirements. To explain this training system, the definitions of the terms "technique" and "skill" should be reviewed. We should not be content to say that the definitions of these terms is our permanent theme for technical instructors. We cannot go further without defining these words. Otherwise, we will be misled.

What is a technique? The word "technique" ("gijyutsu") is defined in a dictionary (Japanese) as follows:

① means or method of applying a theory; ② means to process nature according to requirements of human life, etc.

"Skill" ("gino") is defined as:

"Ability to reflect one's techniques in one's work."

A "technique" refers to methods and means, while a "skill" is the ability to perform actual work. We will analyze these words further. Both "technique" and "skill," as Japanese words, contain an element that means "technique" ("gi"). This second "technique" ("gi") means:

① art, technique, arts and crafts; ② method; ③ skill, etc.

We can see that the second "technique" ("gi") as an element of the first "technique" ("gijyutsu") can mean the first "technique" and "skill". "Ability" ("no") means:

① can (as auxiliary verb); ② can do well, be familiar with; ③ well, in a good manner (as adverb); 4) function, power to do work, or capability to cope with a matter.

"Art" ("jyutsu") has the meanings:

① skill, science, art; ② means, method, procedure."

"Technique" ("gijyutsu") refers to the method or means with which a skill functions, while "skill" refers to a human ability. When we want to use our skills in production, we must use a definite means or method at the same time. Both technique and skill are incorporated by one single producer.

Is an engineer identified with a technician?

The above discussion seems to allow us to identify an engineer with a technician, but it is too early to conclude this. An engineer develops and improves production, while a technician takes part in actual production. It seems that the same person can be called an engineer or a technician according to the proportion of his task to which each function is related. In recent years, work has changed and "skill" is increasingly needed in most industries. As a result, one person often plays the roles of both engineer and technician. This tendency has been accelerated by innovations in microelectronics. Traditional technicians do not exist any longer. Such new technicians can be called "production technicians." We are going to describe a system of training skills and techniques for production, without separating skills from techniques.

2-2 What is Instruction Skills/Technqiues (Production Technique Training)?

Reason why it is difficult to learn a skill

Skill training involves problems that technique training never encounters. These problems result from the very nature of a skill. This section handles this point.

Because skill training is performed to acquire certain abilities, learning does not result unless trainees get individual experience during lessons. It is individuals who participate in training. Learning an ability involves a problem in itself: skills are always changing at every stage in a training course. Skills depend on a person's working style and vary with working conditions. No one but the expert can repeat his skills. If

any expert in manufacturing a product is no longer alive, his skills can only be imagined through his work. Skill is also a human attribute and is often difficult to describe. Many experts can only demonstrate their skills but cannot describe them. The skills of experts are also sometimes beyond the ability of others to describe them. As a result, many skills have not been systematized. In addition, a number of working conditions are required for skill training including equipment and materials. As long as skills are the preserves of individuals, it is not easy to control these working conditions. Moreover, a trainee should have a number of abilities at the beginning of training. Requirements of trainees are personality, nature, and inherent ability. All trainees, therefore, cannot learn a skill at the same speed.

Production technique training

In the conventional skill training or skill education, trainees have been given an opportunity to acquire the ability to perform certain jobs for the most part. This has been justified in consideration of the meaning of the term "skill." Traditional technique training has been performed to instruct trainees a production system for rational operations. This has also been justified by the meaning of the term "technique." However, most segments of contemporary industrial production often involve both techniques and skills. Therefore, training should be handled as technique/skill training. Instruction skills/techniques is performed to give trainees the ability to perform a given operation in a rational way. This training is a combination of skill training and technique training. We should call it "instruction skills/techniques," or rather, to avoid confusion with the conventional idea of training, "production technique training."

Contemporary industrial production and ideas of science, technique and skill

In a society that has reached a certain level of maturity, people may sometimes benefit from unexpected synergetic effects and sometimes face unknown difficulties. Production activities might look complex and cannot be covered by a simple cause-and-effect logic. So, the contemporary industrial production has developed on the basis of science, techniques, and skills. Production training should integrate these factors and be handled in an integrated way. In other words, the actual circumstances in contemporary industrial production should be grasped to develop educational training, regardless of preconceived ideas.

2-3 Types of Production Skills

Technician's behaviour model

There are countless skills: design, processing, operations, assembling, etc. How are such production skills (skills relating to production) classified?

> "In the workshop of a traditional pottery, the owner of which is sensitive and produces distinctive pieces. He is at work today as usual. Clay resembles a creature. It never looks the same twice. He touches the piece of clay to grasp its changing properties. It is hot and humid today. The clay dries quickly and it is necessary to supply water more often than usual. Having prepared the material, he places it on the potter's wheel, which soon begins to turn. Quiet concentration is observed in his eyes while he holds the material. Moulding is continued until the planned shape is obtained. In the moulding process, the physical force used changes and the material changes in accordance with the craftsman's idea, as if it were given life..."

A technician's behaviour is supposed to involve the following sets of organs.

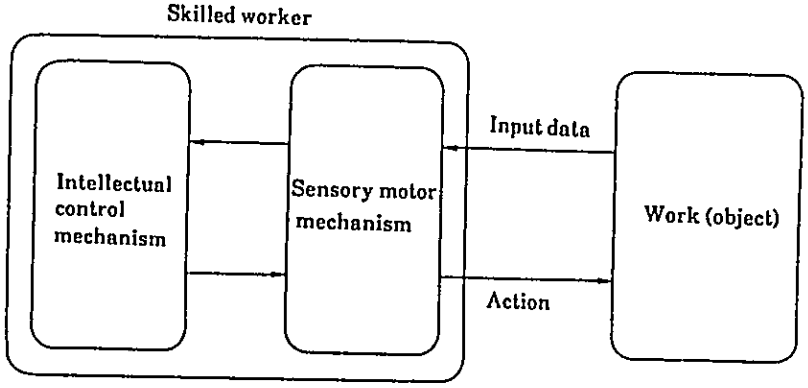


Fig. 2-1 Technician's behaviour model

Work develops when a technician acts on a given object (work), collecting data from it. A technician's work develops in relation to the object. The object varies with the technician. The object is plastic, and is regarded as an information transmitting station. The technician's behaviour consists of two communication processes. The technician receives information from the object through various sensory organs. This function is assured by the sensory motor mechanism. Information received is analyzed, evaluated, and sent back to the sensory motor mechanism. The technician acts on the object, using his hands and arms. In this way, we have a clear notion of the technician's behaviour. It is useful to recall that this is a virtual model, and that these mechanisms do not exist as such in a human body.

Sensory motor mechanism

It consists of a sensory mechanism and a motor mechanism. The former is divided into six organs corresponding to the five senses plus a sense of posture.

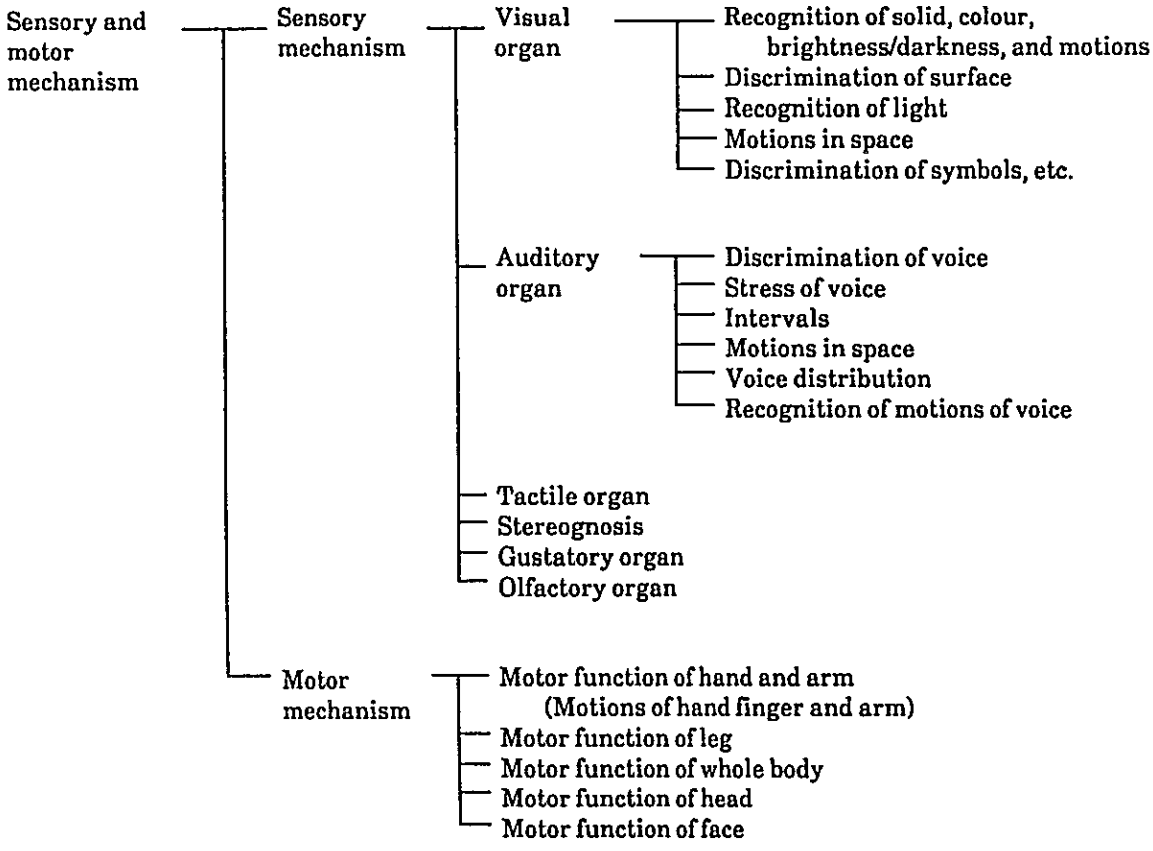


Fig. 2-2 Sensory and motor mechanism

The figure above does not show details of the organs other than the visual and auditory organs. In most cases, a combination of any of these capabilities is used. As skills are improved, information is collected through a greater number of sensing channels. These mechanisms act with the assistance of the intellectual control mechanism, which analyzes and evaluates. It is probable that the workings of these organs vary with the achievement level of trainee.

Intellectual control mechanism

It is illustrated by the following internal behaviour model of a technician.

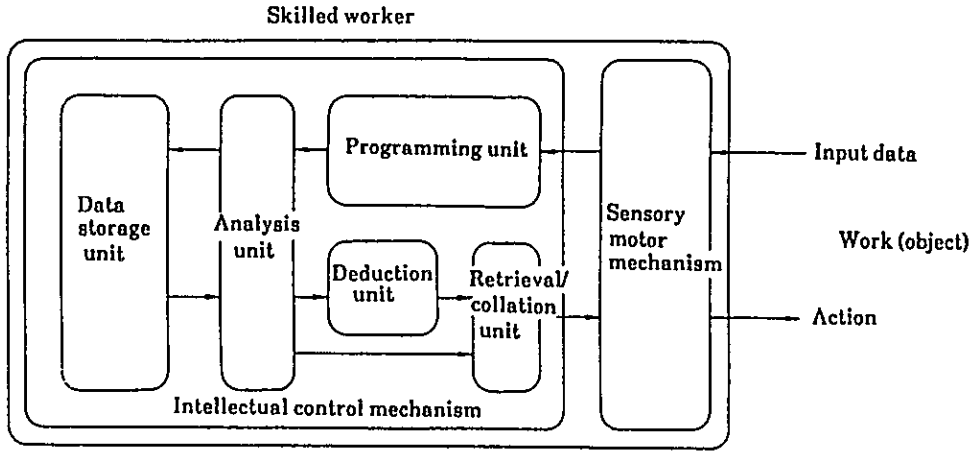


Fig. 2-3 Technician's internal behaviour model

An operation is carried out as follows: Information sent by the sensory motor mechanism to the intellectual control mechanism is analyzed in the analysis unit. After that, the retrieval/collation unit collates the information analyzed with the corresponding experience and related past data. The information is identified to find out if it has been encountered before, if it resembles any case experienced, or if it is a new case. Information is exchanged frequently between the retrieval/collation unit and the data storage unit. The latter is a memory unit. All events, principles, and rules that have been experienced are classified and stored in this unit. This unit probably contains indices or keywords for retrieval. If the technician has reached a certain high level of skill, such indices or keywords may be prepared in the manner he selects, which permits fast retrieval. In addition, new data will be stored in the data storage unit while the work is being performed. If newly obtained data is identical with any data on past successes during any action, the same action will be chosen again unless otherwise

recommended. The programming unit is immediately activated to give the required instructions or orders. If the data are not identical with data stored, analogic or useful data are extracted from data collected in the data storage unit, and the deduction unit is activated. In this unit, the best method or means are selected for the current case using the data. The unit judges that "as the condition is such, the work can be handled in such a way." Next, the programming unit begins to work. This unit assumes the arrangement of actual procedures to be followed. Signals are transmitted by the intellectual control mechanism to the sensory motor mechanism. This acts on the object (work) through the required sensory and motor channels according to instructions from the programming unit.

2-4 Sensory Motor System Skills and Intellectual Control System Skills

The number of modern skills has increased with industrial progress. Some traditional designations are no longer valid. Industries need to be reclassified. For the purposes of this paper, existing skills are classified into two categories according to the dominant mechanism (sensory motor or intellectual control; see the preceding section).

Sensory motor system skill is defined as a skill that mainly depends on human sensual and kinetic capabilities. An intellectual control system skill is defined as a skill that mainly depends on judgement and memory capabilities. The former includes skills relating to traditional handicrafts, processing, assembling, and machine operation. The latter includes skills relating to programming, designing, and controlling.

If we adopt such a new classification, conventional training methods that have handled all skills in the same way should be modified accordingly.

Traditional skills	Handicrafts, ceramics, braid, paperwork
Production skills requiring tools (mainly handicraft skill)	Fabric, crystal, production of chairs and furniture
Operating skills for machines and equipment	Operation of ships, aircraft and autos
Production skills requiring machines and equipment	Production activities in a variety of fields

Fig. 2-4 Examples of a sensory motor system skill

Sensory motor system skills

As shown in the table, skills belonging to this category include "production skills requiring tools," "operating skills for machines and equipment," "production skills requiring machines and equipment," etc.

The following internal behaviour model for the same potter describes a situation in which sensory motor system skills are applied:

"The potter grasps the water content of the clay through sense of touch.

He reads the rotation speed of the potter's wheel using his eyes and hands.

If the speed seems to be lower than that required.

He raises the speed, controlling it with his feet.

Moulding continues.

Moulding does not go well.

Why?

Because today the weather is dry?

He remembers several similar situations he experienced before.

He thinks of increasing the speed of the entire operation.

He will have to modify the process too.

He applies some water to his hands and increases the force applied.

He is trying to collect additional information through his visual sense and sense of touch.

He is forming the intended shape using his hands and assisted by his feet.

His retrieval/collation unit extracts data from time to time of experience and processing methods used successfully, and which are stored in the data storage unit.

Extracted data are transferred through the deduction unit and programming unit to the potter's hands, arms and feet."

It is probable that sensory motor system skills are directly transmitted to the programming unit without passing through the deduction unit. In certain creative skills, the deduction unit might occupy an important position.

Thus, training for sensory and motor skills should be based on the integrated use of the sensory, motor and intellectual control mechanisms. In practical exercises, it will be necessary to define these three mechanisms and take into account the best way to adapt them to actual working procedures. Such exercises may include "modalities of movement," "delicate tactile recognition," and "recognition methods."

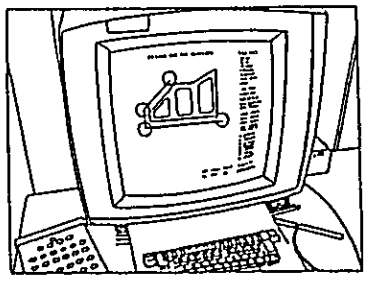
Intellectual control system skills

These skills are mainly based on intellectual elements. Such skills appear to be similar to techniques but in fact are not identical as shown above. They cover the fields shown in the following table. Building design and interior design consist of applying accumulated rules of thumb. Programming consists of applying principles and rules to practical fields. These fields are being expanded today.

Electric/electronic engineering	Sequential control, electrical engineering design, electrical system design for plants, machinery/equipment control, computer programming, machinery/equipment design, IC circuit design, information processing
Mechanical engineering	Programming for NC machine tools, machinery design, CAD/CAM, robot control, production machinery/plant design, various maintenance, production management, process control, part control, plant layout
Construction and applied engineering	Construction system design, structural planning, engineering planning, cost estimation, land plan, building consultation, coordinated program, colour coordination, interior design

Fig. 2-5 Examples of an intellectual control system skill

We will describe a technician's internal behaviour when he applies his intellectual control system skills, using a similar model. He works in the software design room where computer programmes are developed. His current task is to develop a programme for statistical calculations:



"The designer is analyzing a user's programme specifications.

He is reading the document.

He comes to know that simple methods are required for inputting, and that final results should be indicated graphically.

These graphs should be drawn for data by individual, product, and district.

The specifications require both time series and multi-variable analyses.

His experience shows him that applications should be preferred to sequential runs to make operations faster.

He plans to use a common language when writing subroutines.

He asks himself how he should have handled the operations.

He picks up the reference manual.

He decides to draw flowcharts.

If this part is first constructed ..."

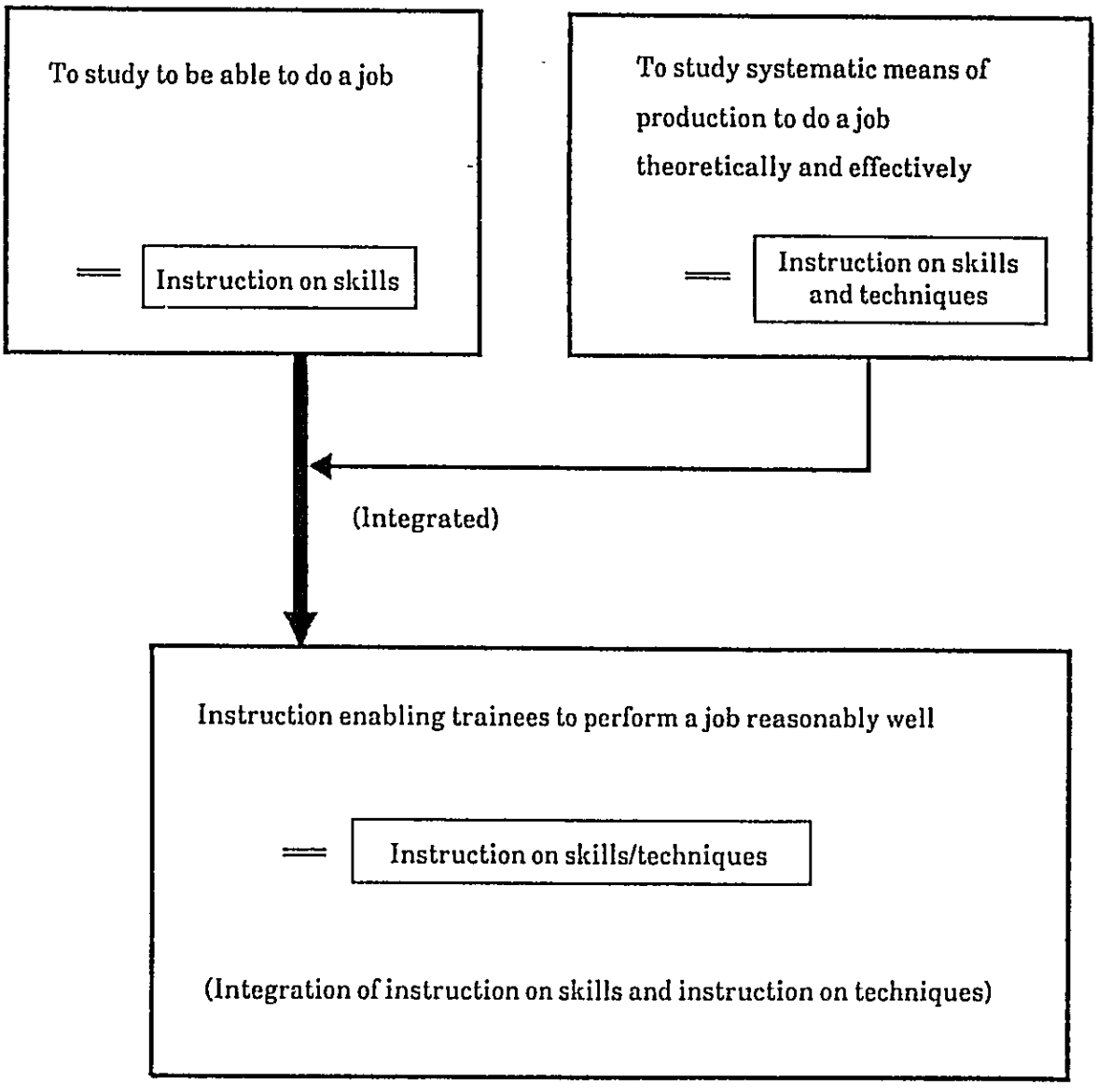
Most of the technician's behaviour is invisible to others, but all of his internal actions are directed toward his objective. He analyzes information obtained from the object and collates them with previous experience. The deduction unit plays an important role here. The direction in which such data move is always the same. Programming is performed in this way.

In training for intellectual control system skills, existing basic principles and rules of thumb should be outlined for trainees. What they learn is characterized by its abstraction. Concepts symbolized must be handled with great care. Instructors have to clarify the relationships between abstract and concrete objects. Finishing and specifications should also be analyzed.

It seems strange that in the past, training methods have not been studied separately for various types of skills. We assume that intellectual control system skills have been excluded from the consideration of instruction skills/techniques, because they have been handled in the wider category "engineer training." This was caused by a confusion of "technique" with "skill."

Readers should consider this.

What Instruction is given on Skills/Techniques?



What is the Purpose of Instruction on Skills/Techniques?

Enabling trainees to do a job

→ To lead an enriched life

→ Safety at work and enhanced efficiency

To improve techniques and skills

→ Higher efficiency of jobs done

→ To take back works to human beings from machines

To obtain abilities to build one's life, and develop and innovate in one's work

Problems in giving Instruction on Skills

1. The training is given independently, therefore, each trainee is taught separately.

2. The training is difficult to describe.

3. The training is not systematic.

4. There are many conditions required (places, tools and equipment and materials).

5. The trainees are demanded to have different kinds of abilities.

Identifying Training Needs and Drawing up Courses

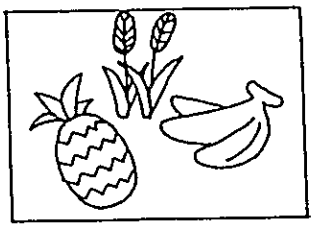
Contents

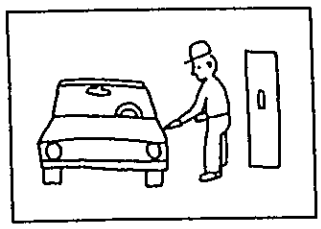
Meaning of Education and Training Needs

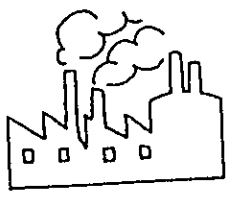
Education and Training Needs = Countries, Individuals, Enterprises and Groups

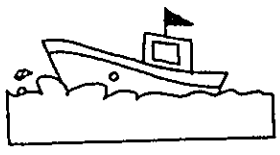
- Expectations of education and training
- Requirements, policies and objects of establishing training courses

= Basic requirements of education and training



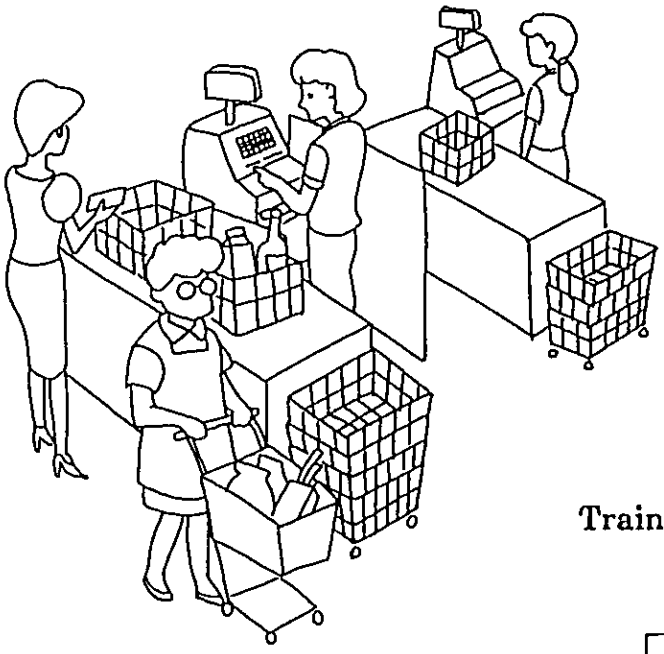


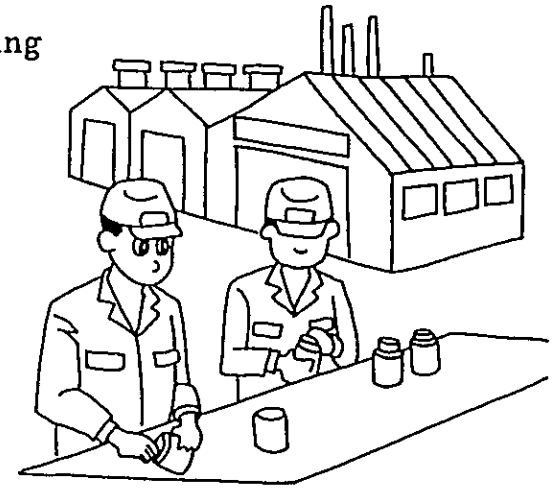




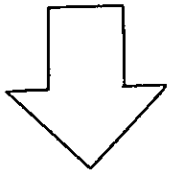
From Identifying Training Needs to Drawing up Courses

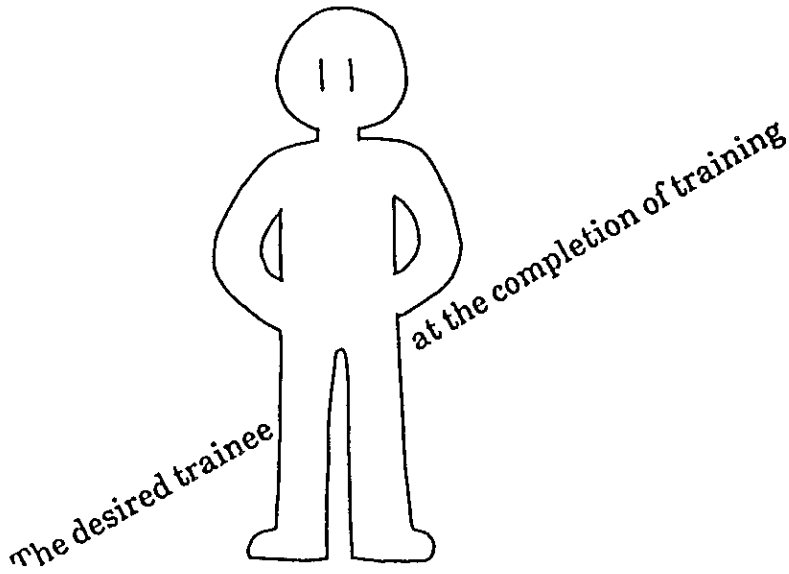
Basic Requirements of Education and Training



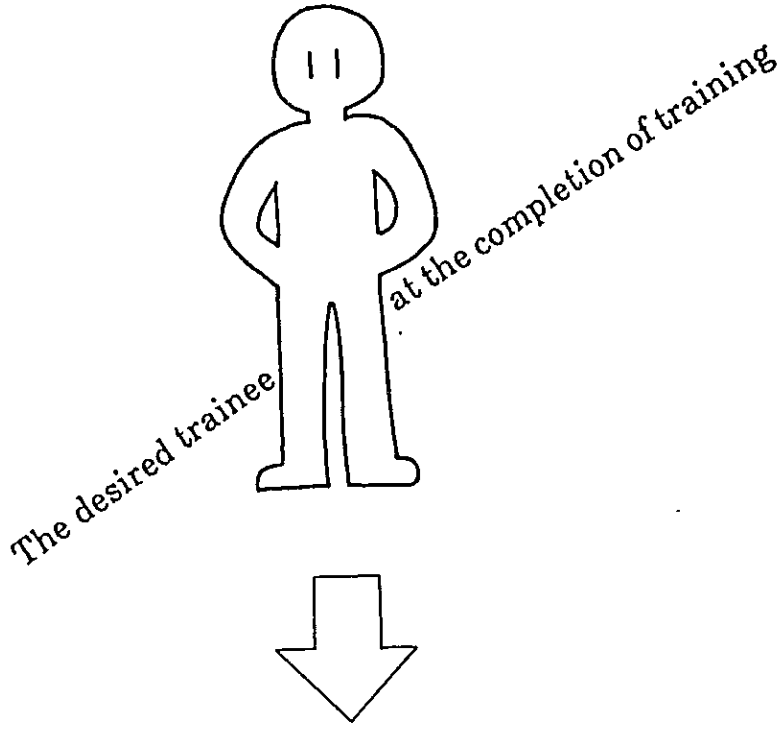


Training needs

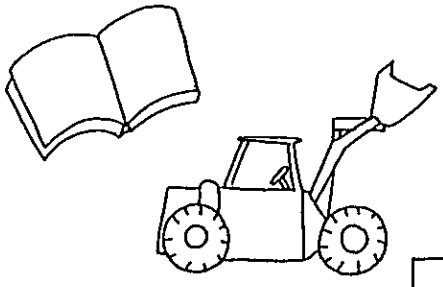


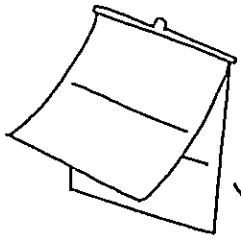


From Identifying Training Needs to Drawing up Courses



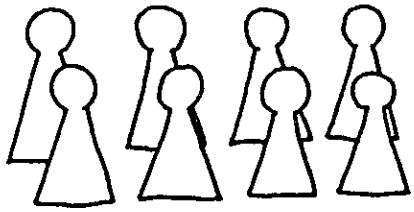
Drawing up courses





Training period

Number of trainees



Education and Training Needs of Countries, Enterprises, Regions and Individuals

Country (The conduct of state affairs)	Expansion and change of national policy International role and responsibility Change of national environment
Region (the conduct of regional affairs)	Solution of regional problems Expansion and change of regional policy
Enterprise (Management of enterprise)	Development of new projects Promotion of overseas expansion Introduction of new technology Change of lines Change of company policy (management policy etc.)
Individual (Home life)	Solution of life problems Employment, unemployment and change of occupation Construction of life stage, and expansion of life space Expansion of individual ability and talents

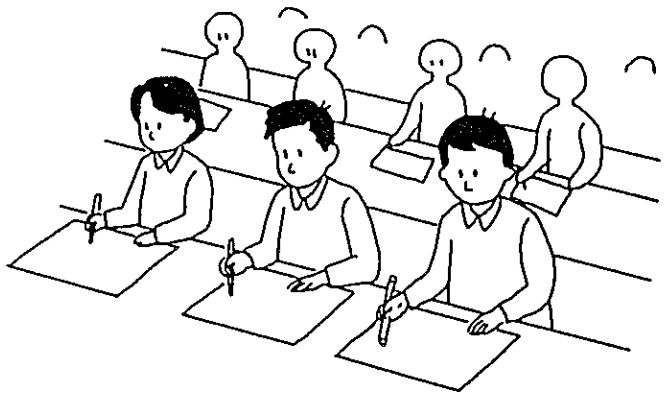
Three Methods of Identifying Training Needs

Identifying training needs

Research using literature

Research by interviews

Research by questionnaire



Method of Identifying Training Needs

Object	Research using literature	Research by questionnaire	Research by interview
National level	Various white papers, reports, documents with requests from various groups, books published for governmental service, various plans and research results, minutes of the House, committees, and Ministries.	Research on people, research by academics, research by the organs concerned, research by training interests.	Research by the persons in charge in each department, research for workers, research by service organizations, research by Ministry planning departments, research by Ministry policy planning departments.
Regional level	Various white papers, reports, documents with requests from various groups, books published for the purpose of self-governing service, various plans and research results, minute of assemblies, committees, and regional offices, research assembly results.	Research for inhabitants, research by academics, research by the organ concerned, research by training interests.	Research by persons in charge in each department, research for workers, research by service organizations, research by the office planning departments, research by the office policy planning departments.
Enterprise level	Various report documents, project reports, project documents, company policy, management project, minute books of conferences, production projects of works and establishments, and QC circle reports.	Research for the organization of work, research for the persons in charge, research for general employees, research for establishments.	Research for management, research for persons in charge in each department, research for establishments, research for the persons in charge, and research for planning department.
Individual level		(Route desire research) (Research on study requirements) (Research on living conditions)	(Route desire research) (Research on study requirements) (Research on living conditions)

Research on Instruction for Training Needs

① Have a general idea of training trends/needs -- build up a hypothesis.
② Establish the research items and framework.
③ Determine the research method.
④ Draw up the research project.

Research using literature

⑤ Make list of data according to the framework.
⑥ Collect literature according to the list.
⑦ Check the main requirements from literature.
⑧ Collect well-grounded data of every main point.

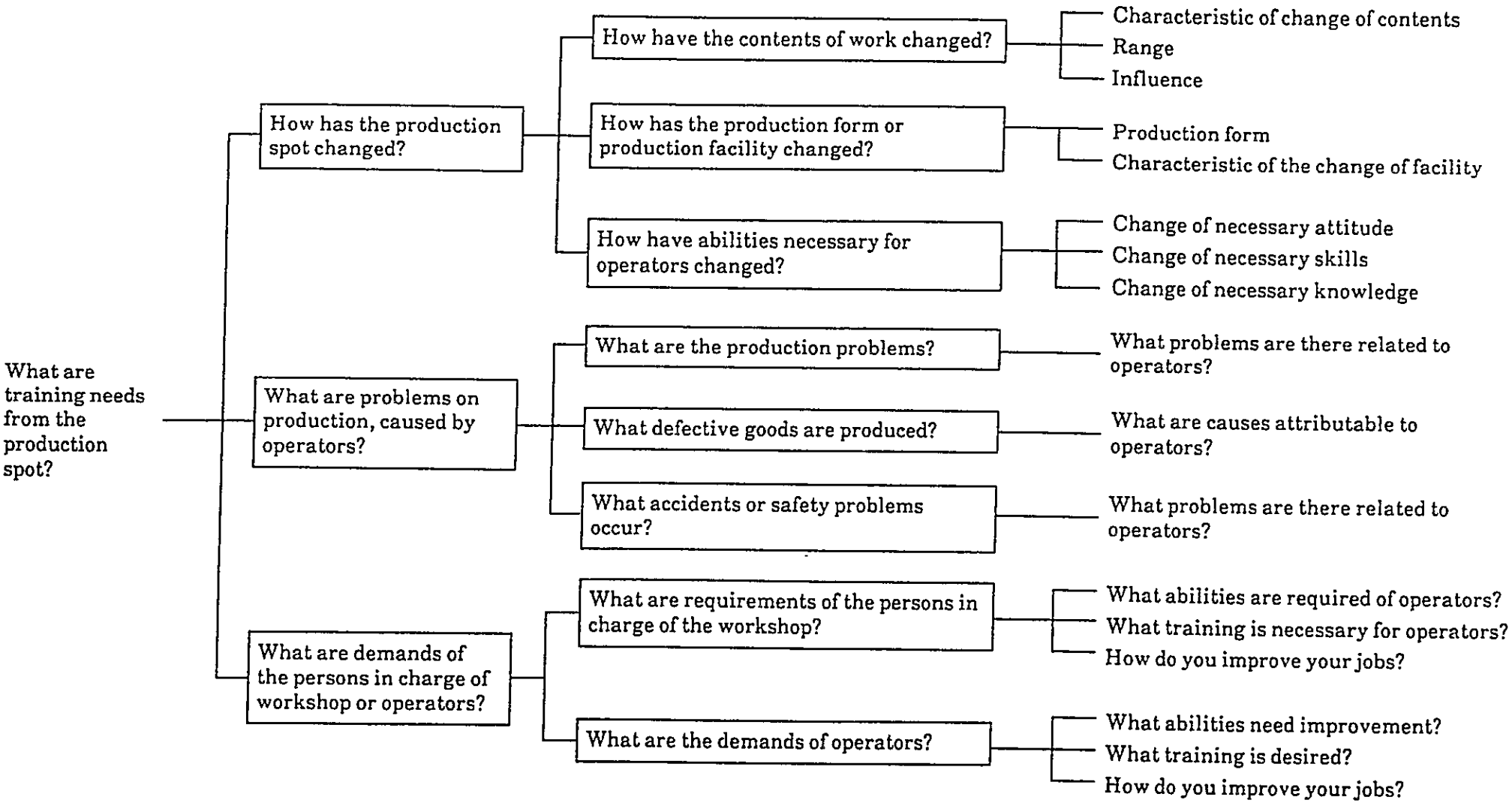
Research by questionnaire

⑤ Make questionnaire according to the framework.
⑥ Conduct research.
⑦ Analyze data.
⑧ Collect well-grounded data of every main point.

Research by interview

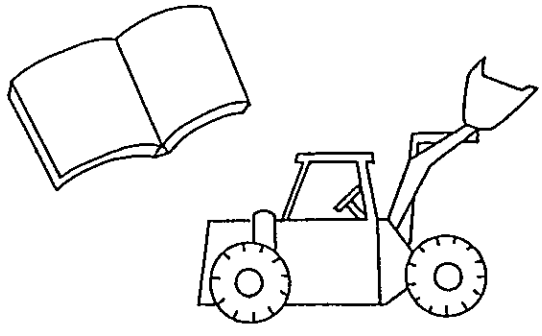
⑤ Prepare questions according to the framework.
⑥ Conduct the research.
⑦ Study data.
⑧ Collect well-grounded data on every main point.

⑨ Arrange results properly in view of items on education and training.


What are training needs from the production spot?
How has the production spot changed?
How have the contents of work changed?
Characteristic of change of contents
Range
Influence
How has the production form or production facility changed?
Production form
Characteristic of the change of facility
How have abilities necessary for operators changed?
Change of necessary attitude
Change of necessary skills
Change of necessary knowledge
What are problems on production, caused by operators?
What are the production problems?
What problems are there related to operators?
What defective goods are produced?
What are causes attributable to operators?
What accidents or safety problems occur?
What problems are there related to operators?
What are demands of the persons in charge of workshop or operators?
What are requirements of the persons in charge of the workshop?
What abilities are required of operators?
What training is necessary for operators?
How do you improve your jobs?
What are the demands of operators?
What abilities need improvement?
What training is desired?
How do you improve your jobs?

Keyword for Drawing up Courses

Item	Key word
Name of training course	Designation of faculty or duty to train, training level (basic, medium, etc.), training period (short, concentrated)
Number of trainees	The number of trainees/training session, the number of training sessions a year, the number of trainees a year, the number of long-term trainees (medium-term training programme)
Object of training	Participation conditions, qualification conditions, selection method, age limit, school career, readiness (necessity of training = basic scholarship, items to be studied beforehand)
Training place	Training facilities, sleeping accommodation, accommodation on study tour
Training period	Period and days required for training, the number of scheduled training hours, date training starts.
Cost of training	Expenses or budget for training; that is, expenses for facility management, person, wear and tear, travel and sleeping.
Person in charge of training	Coordinators, persons in charge of study, helpers, full-time or part-time duty, one's position, duty, career, age.
Main training method	Lecture mode, exercise mode, discussion mode, OJT OFF JT
Training objective (training needs)	Cause, necessity and objective of course. Effect and expectations of course. Meaning of the system of taking course. Characteristics of course, which needs to be specifically stated.



Training Course Plan

Item	Contents
Name of training course	
Number of trainees	
Persons trained (trainee)	
Training place	
Training period	
Person in charge of training	
Cost of training	
Main training method	
Training objectives (training needs)	

Specific Examples of Training Course Plan

A Method of Curriculum Developing Based on Ability Structure

Item	Contents
Name of training course	Training course for persons in charge of cash register
Number of trainees	30 persons/training, 4 training sessions a year conducted (120 persons in total a year)
Training place	○ ○ training centre
Person in charge of training	Full-time lecturers in ○ ○ training centre and part-time lecturers
Cost of training	¥2,400,000
Person trained (trainee)	New employees at the recommendation of each store, and candidates for future key employees
Objectives of training	Urgent improvement of abilities of persons in charge of cash registers in each store, in order to cope with the diverse requirements of customers. The main contents include skills for cash register work, service to customers and improving one's work.

Person in Charge of Cash Register in Supermarket

Training needs	① Persons in charge of cash register must be trained by OFF-JT method. There is a limit to OJT. ② Supermarkets need employees who do their jobs properly. ③ Supermarkets want to improve their jobs by training employees who do cash register peripheral duties.	
Courses	Course name	Training course for persons in charge of cash registers
	Number of trainees	20 persons/training, 6 training sessions a year (120 trainees/year)
	Training time	4 days (6 hours/day) = 24 hours
	Training place	○ ○ training centre
	Person in charge	Full-time lecturers and part-time lecturers in the head office training section
	Persons trained (trainees)	Employees for counter duty and cash register in charge. Readiness (employees with scholarship graduated from junior high school or higher)

Hotel Employees

Training needs	Orders and accounts using OA equipment have been increased due to technical innovation. Diversified users use hotels for multiple purposes. Therefore, hotels want employees, especially recruits, to handle those duties.	
Courses	Course name	Training course for waiters in restaurants
	Number of trainees	20 persons/training, 4 training sessions a year (80 persons/year)
	Training time	5 days (6 hours/day) = 30 hours
	Training place	○ ○ training centre
	Person in charge	Full-time lecturers and part-time lecturers in the head office training section
	Persons trained (trainees)	Waiters recruited in stores in each hotel

Drawing up a Training Programme

Contents

- Developing a Curriculum
- Instruction on Curriculum Development

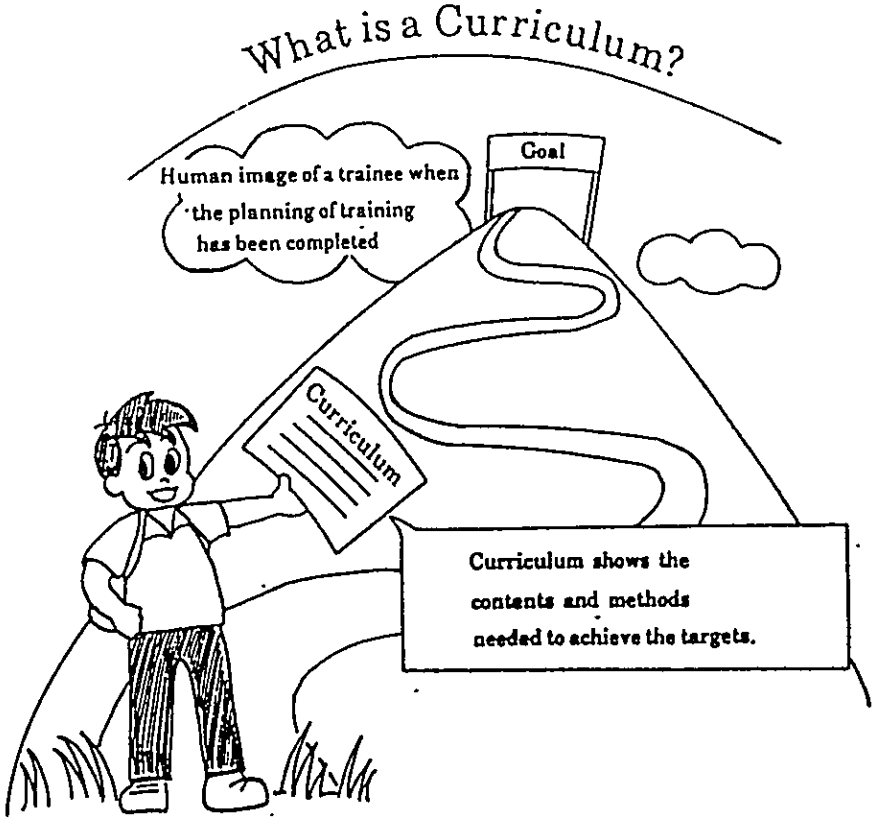
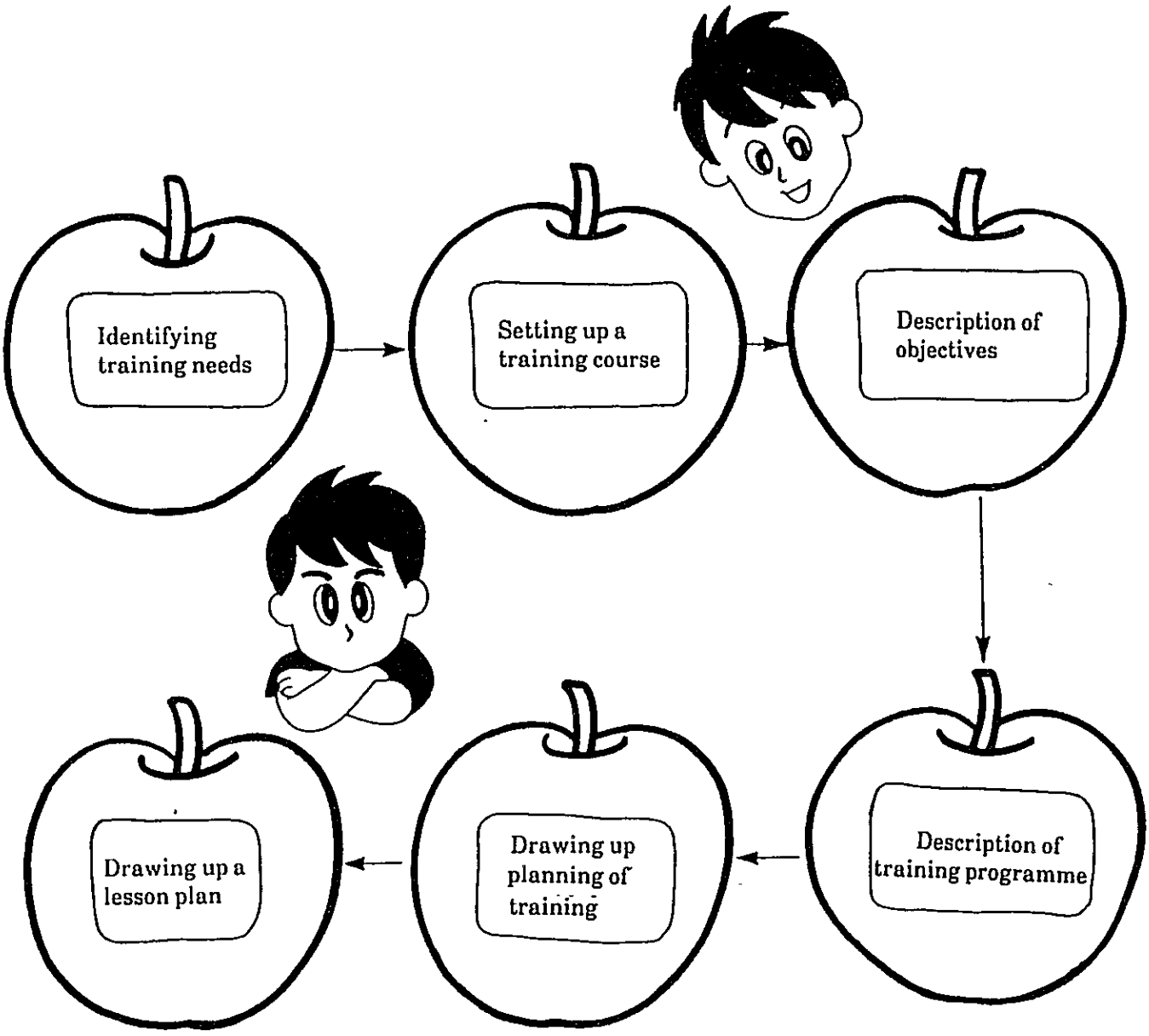
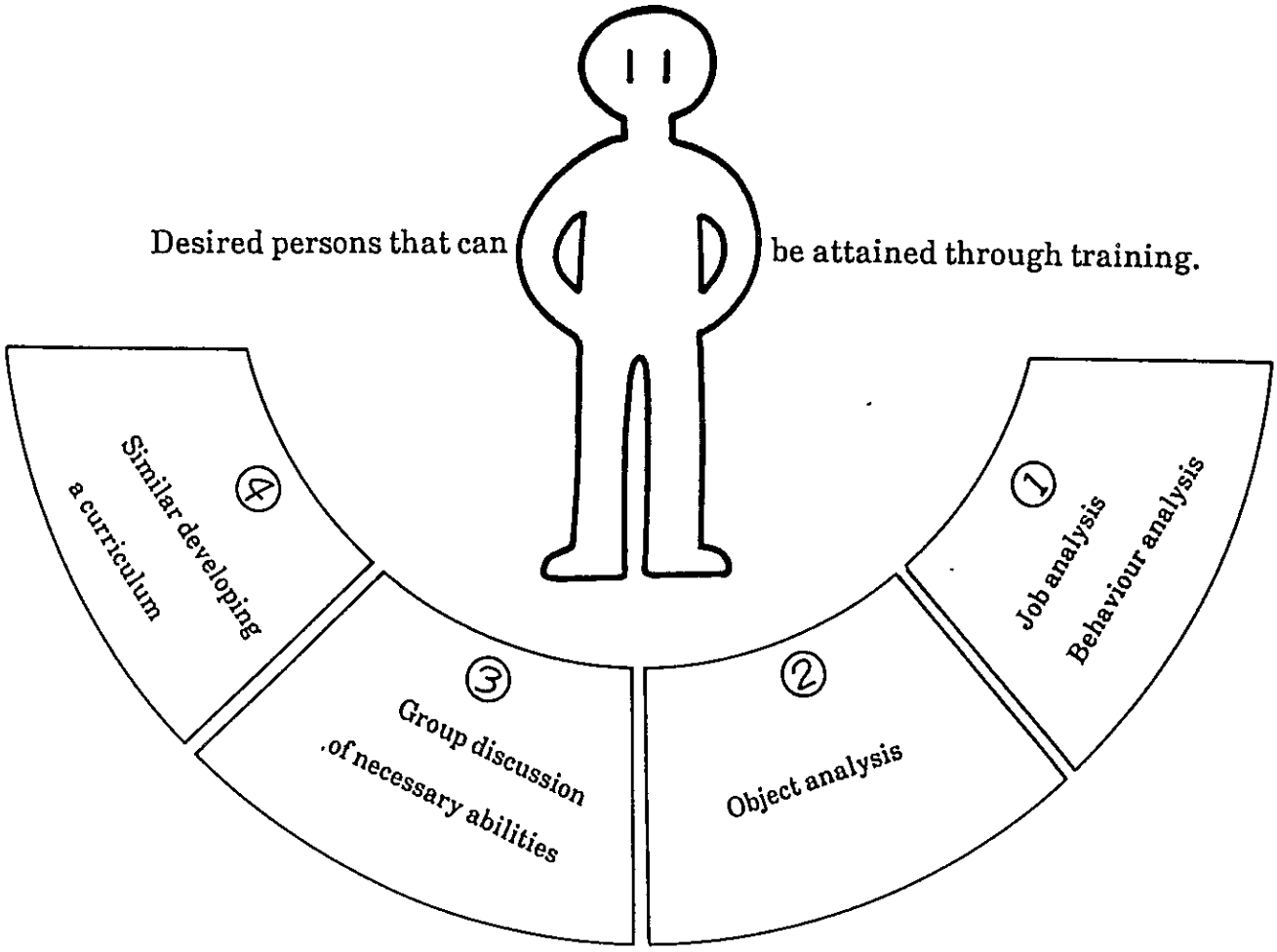


Fig. 4-1 What is a curriculum?

Flow of Developing a Curriculum



Four approaches describing training items



Description of Training Items (Performance Objectives)

1. Description by job analysis -- Example: VTECS of the Department of Labour etc.

   Method which describes abilities by analyzing actual jobs.

   (This method is limited to existing trades.)

2. Description by objectives analysis -- Example: Gaine, etc.

   Method which describes elements resolved out of the contents of objectives.

   (Description of practical business level is difficult.)

3. Description by discussing abilities needed for desired desired persons -- Example: DACUM of the Ohio State University etc.

   Method which describes abilities developed by brain-storming in a group of experts who are familiar with desired persons desired.

   (This method is available not only to existing trades, but also to future ones.)

4. Description by composing similar curriculums -- Example: A matter of cutting and pasting

   Method which describes the composition of existing curriculums

   (This method is limited to circumstances in which there are many programmes already developed.)

Summary of CUDBAS ①

1. List abilities of desired persons.

   (List abilities developed through vocational training.)

   ↓

2. Investigate the relations among these abilities.

   ↓

3. Decide the training level.

   ↓

4. Compile a diagram of abilities.

   ↓

5. Decide subjects, and arrange training objectives.

   ↓

6. Write a programme into the training shedule for the period.

   ↓

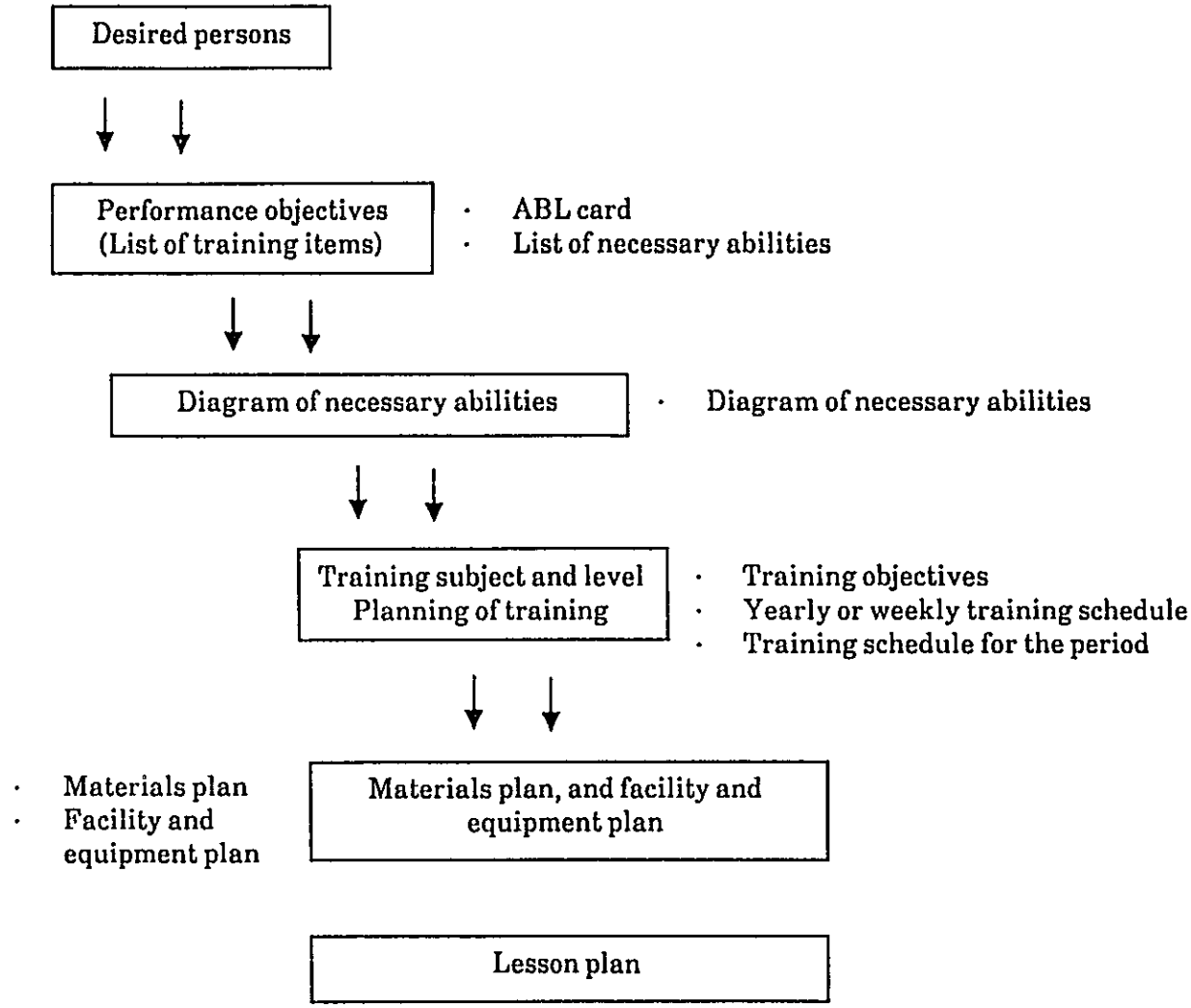
7. Drawing up a materials plan, facility and apparatus plan.

   ↓

8. Drawing up a lesson plan

Summary of CUDBAS ②

(Results of training needs and setting up a course)



Developing a Curriculum Method Based on Necessary Abilities

1. Preparation:

   ① Developing a curriculum sheets ①②③④⑥ tow each

   Magnified chart of ③④ one each

   ② ABL cards 100 sheets, magnified magnetic cards for entry example number 3 sheets each

   ③ Tags 100 sheets

   ④ Paste 1 tube

   ⑤ Other equipment

   Room -- A quite, single room

   Fixtures -- Blackboards, desks, chairs

   ⑥ Documents on "Training needs and course institution results"

2. Group formation

   - The brainstorming group should consist of about 6 persons if possible. The members are required to be familiar with a vocation to be discussed, and to come from different fields. One of the members who is proficient in this development method is selected beforehand as a leader.
   - A good environment is prepared so that members can have a good session. It is effective to hold a discussion at a dormitory or a seminar centre in the suburbs.
   - Every member has the same rights and powers, and must complete the curriculum. Member, therefore, must refrain from attacking individuals.
   - The time required for developing a curriculum is generally about 4 hours for a short course. The time required for a long course of two years course, needs at least 2 days.

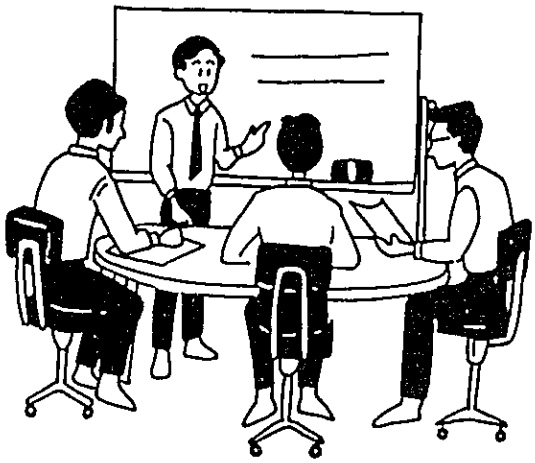
3. Guiding discussions

Preparations for discussions

① The object of the discussion and the final goal are given, and the member have a common purpose.

② Every member is introduced and is then required to publish relation so far, and the opinions on a vocation to be developed.

③ The leader briefly explains the instruction on developing a curriculum. (Data that contains the main points of instruction are processed.)



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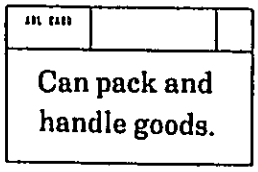
Discussion and work

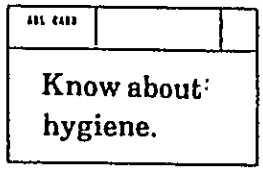
① Itemize abilities for the vocation to be developed in ABL cards.

- Show an example on a magnetic card, providing members with a better understanding.
- Get every member to fill up 10 sheets or more.
- Overlapping with the opinions of others is permitted.

② Arrange all ABL card for inspection, cards with overlapping opinions, and summarize the opinions suitably.

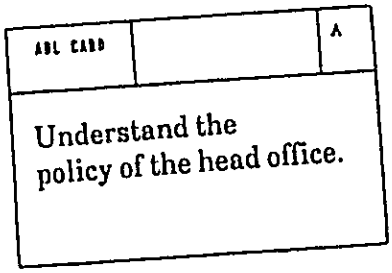
- Classify these ABL cards according to function (main vocation to be discussed) into duty (concrete, individual duties) and vocational idea (idea and behaviour that support the duty).
- All the members fill up new ABL cards while classifying existing cards. They eliminate overlapping cards and make unclear description clear.

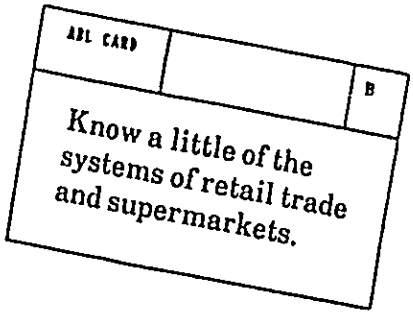


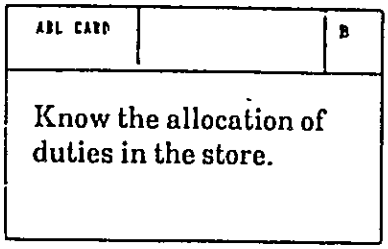


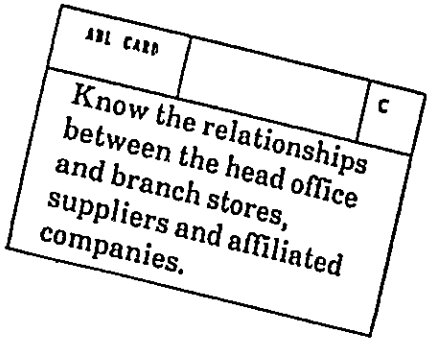
③ Arrange the cards classified by duty.

- Review whether or not there are enough cards to satisfy duties, functions, and ideas for vocation, respectively. If there are insufficient cards, discuss and complete them and add them to the cards reviewed.









④ Rank the importance of duties which affect actual jobs.

Enter the importance (goal ranks through training) in the cards.

A; Of most importance, familiar with or proficient.

B; Of least importance, usually known and done.

C; of not much importance, known roughly and having little experience.

⑤ Paste ABL cards onto Form ③ "List of Necessary Abilities" chart.

- As for the functional arrangement, place the cards in a descending importance.
- Arrange the ABL cards from left to right according to importance. Cards with the same rank may be arranged at the member's discretion.
- Enter the signal from the left in ABL cards.

  [The signal should be (Function No. - Duty No.) For example, enter [1-1] or [2-4].

Duty	Rank	Ability-1		Ability- 2		Ability- 3		Ability- 4		Ability- 5	
Can work as a checker.	A	1-1	A	1-2	A	1-3	A	1-4	A	1-5	A
		Can start, stop, manage and enter data with cash registers.		Can manage businesses surrounding cash registers (including the supply of shopping bags etc.		Can take care of the money in the cash registers.		Can supply change.		Can check sales.	

Ability- 6		Ability- 7		Ability- 8		Ability- 9	
1-6	A	1-7	A	1-8	A	1-9	A
Can manage goods without price tags or damaged.		Know the structure and handling of cash registers.		Can receive money and give change. (INC including payment by credit cards.)		Can put goods into a basket.	

⑥ After the cards are arranged, enter the arrangement in Form ③ by common consent.

- One of the member does this and copies are given to all of the members.

⑦ Tear off the cards and keep them separate. Next, classify them into groups according to their contents.

- Because the principal object is to classify the cards by their contents, the order of training is not considered at this stage.
- Consider the following items when arranging the cards.
  - Arrange the cards with strong relationships between duties and ideas close to the member.
  - Arrange the most important cards (Rank A of the level) before the others.
  - Consider the arrangement so that the cards are grouped by every function.
  - Consider the arrangement of the cards so that basic items precede applied items.
  - Because the functions used here are changed to training items later, change them if necessary.

⑧ Paste ABL chips (tags in which the ABL card number is filled in) in magnifying charts of diagrams for Form ④.

- Use blue cards for mainly practical abilities.
- Use yellow cards for mainly intellectual abilities.

⑨ Give a subject name to a group of ABL chips and enter the name in the chart.

Subject of training / Duty	1 Cash register operation method 1 2	2 Sales management 3 4 5 6	3 Practical cash register business 7 8 9 10 11	4 Service for customers 12 13 14 15 16 17	5 Nature and handling of goods 18 19	6 Outline of supermarket 20 21 22 23	7 Duties of checkers 24 25 26 27 28 29	8 Instruction for improving business 30 31
1 Can work as a checker.	1-7 1-1	1-3 1-4 1-5 1-8	1-9 1-10 1-11 1-6 1-2					
2 Can provide customers with good service				2-2 2-1 2-4 2 3 2-5 2 6				
3 Can handle goods and improve the work.					3-1 3-2 3-3 3 6			3-5 3-4
4 Know the roles and duties of the checker in a supermarket.						4-1 4-7 4-8 4-6 4-2 4-4 4-3 4-5		

⑩ Framing of training objectives

- Enter the ideal training time.
- The minimum unit of time should be 1h.
- Enter the contents of each group in Form ⑤.

Subject of training	1 Method of operating cash registers	2 Sales management exercise
Training time	4 hours	2 hours
Main method	Lecture and exercise	Exercise
Training objectives	① 1-2. [Rank A] Start, stop, manage and enter data with cash registers ② 1-7: [Rank A] Know the structure and handling of cash registers.	① 1-3. [Rank A] Can take care of the money in the cash registers. ② 1-4. [Rank A] Can supply change ③ 1-5. [Rank A] Can check sales. ④ 1-8. [Rank A] Can receive money and give change (including payment by credit cards.)

⑪ Framing a period of training (planning of training).

- Arrange the cards in view of the training effect. At this time, consider studying specific subjects intensively, collecting the subjects concerned in a group.
- Make a training schedule for the period for short-term training. Frame the timetable with a week which consists of 6 h × 5 = 30 h (in case of 1 week = 5 days).
- For long-term training, make a yearly and a weekly training schedule.

⑫ Make a Form ⑤ "Training Facility and Apparatus Plan" and a Form ⑥ "Materials Plan," if necessary.

↓

Checking the results

⑬ After all of the documents have been framed, check to see if the contents and are proper plans consists.

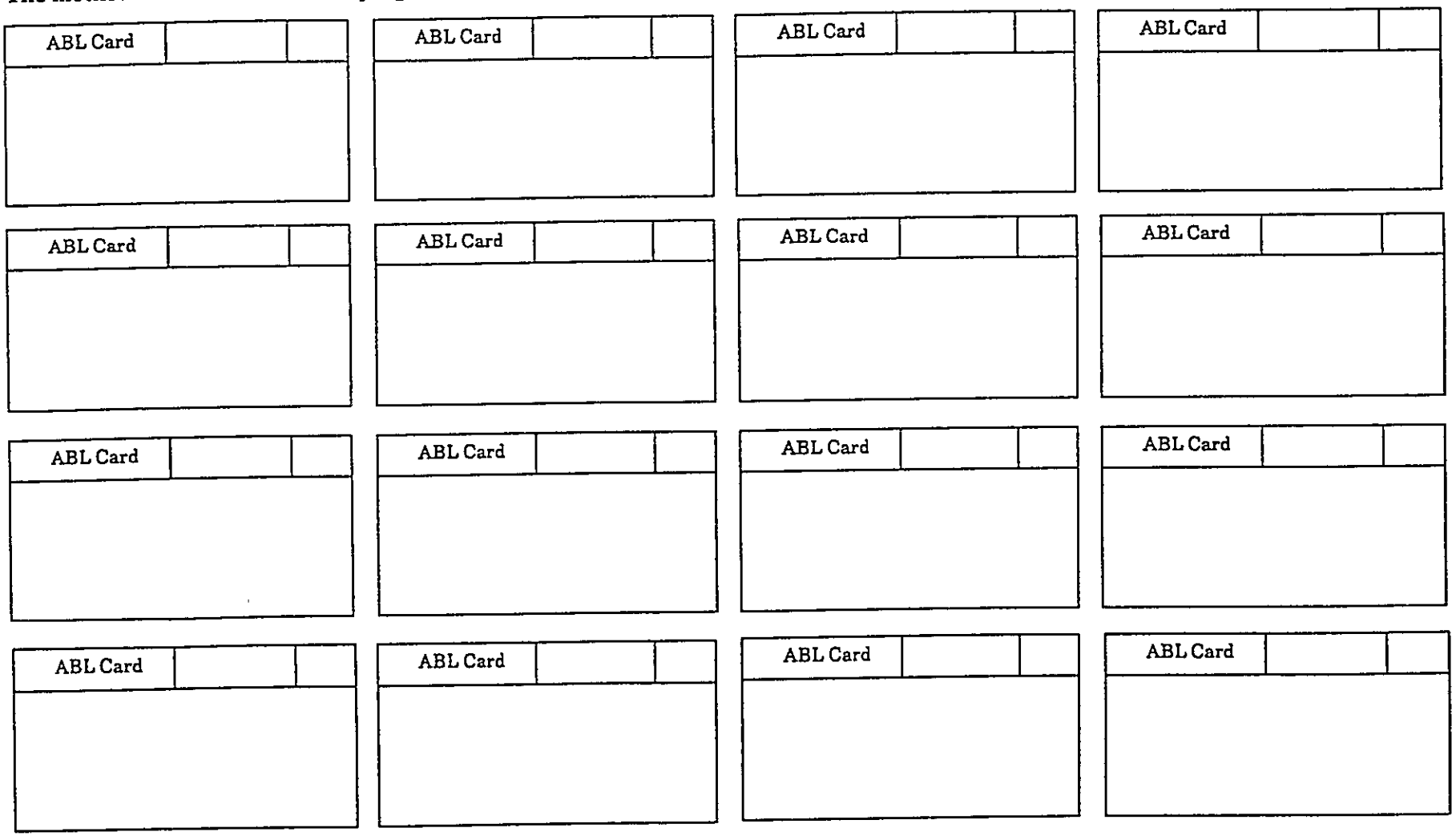
- Review these plans for consistency and accuracy.
- Enter the names of the persons concerned with developments in all documents.
- Copy the completed documents with covers, and give them to all of the members.

⑭ Share the results of the discussion and praise the efforts of all of the member before closing the discussion.

ABL Card

The method of curriculum developing based on ability structure

CUDBAS Form Type ①



List of necessary abilities

The method of curriculum developing based on ability structure

Name of training course:

CUDBAS Form Type ②

Duty	Level	Ability - 1	Ability - 2	Ability - 3	Ability - 4	Ability - 5	Ability - 6	Ability - 7	Ability - 8	Ability - 9
1										
2										
3										
4										
5										
6										
7										
8										

Structure Diagram of Necessary Abilities

Name of training course:

A method of curriculum developing based on ability structure

CUDBAS Form Type ③

Duty \ Subject of training	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1																																									
2																																								
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8																																								

Training objectives

Name of training course: A method of curriculum developing based on ability structure CUDBAS Form Type ④

Training subject	1	2	3	4
Training level				
Training time				
Main method				
Training objectives				

Training Facilities and Equipment Plan (Subject list)

A method of curriculum developing based on ability structure

Name of training course:

Name of training subject:

CUDBAS Form Type ⑤

Training item / Training facilities and apparatus name	①	②	③	④	⑤	⑥	⑦	⑧	Total

Training Schedule for the Period

A method of curriculum developing based on ability structure

CUDBAS Form Type ⑨

Name of training course: Period:

Time / Date	9:00 *	10:00 *	11:00 *	12:00 *	13:00 *	14:00 *	15:00 *	16:00 *	17:00 *

Training Schedule for the Period Entry Example

A method of curriculum developing based on ability structure

Period: 18~21 September 1989

Name of training course: training course for checkers

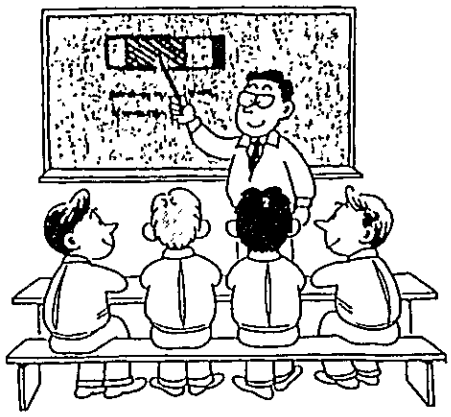
CUDBAS Form Type ⑨

Time / Date	9:00 ~ 10:00 ~ 11:00 ~ 12:00 ~ 13:00 ~ 14:00 ~ 15:00 ~ 16:00 ~ 17:00							
18 September (Monday)		The opening ceremony of course, and meeting	Customer service exercise [Nakamura]	Lunch	Method of operating a cash register [Shimizu]			
19 September (Tuesday)	Outline of supermarket [Suzuki]		Customer service exercise [Nakamura]	Lunch	Nature and handling of goods [Yokomizo]		Exercise on operating a cash register [Ota]	
20 September (Wednesday)	Duties of checkers [Yoshida]			Lunch	Exercise on operating a cash register [Ota]	Evaluation and meeting	Sales control exercise [Ota]	
21 September (Thursday)	Instruction in business improvement [Kikuchi]			Lunch	Outline of supermarket [Suzuki]		Evaluation	The closing ceremony of the course, and meeting

Basics for Teaching and Training

Contents

- Objectives and Principles of Teaching and Training
- Ways of Teaching and Training and Instructional Methods
- Basic Instruction Steps and Remarks

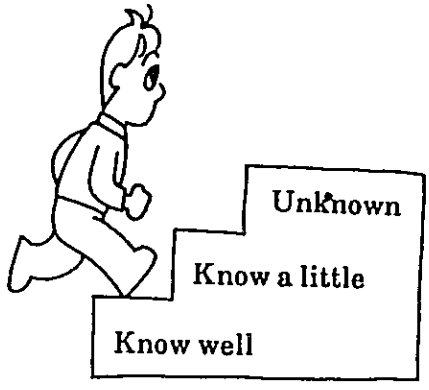


Principle of Learner-centred Instruction

1. Identify the differences among the trainees.
2. Introduce a presentation in connection with the ways trainees think, their desires and experiences.
3. Lead trainees to realize by themselves the need for training.
4. Make trainees interested in training.
5. Make trainees participate in training.

From Known to Unknown

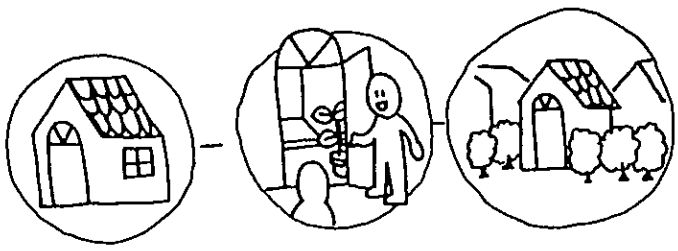
1. Make sure you check and understand the ability the experience and the background of each trainee.
2. Ascertain to what trainees understand based upon these findings.
3. Development from known to unknown.
4. Lead the trainees step by step.



Whole Picture - Its Parts - Whole Picture

(Briefing - Discussion in Detail - Summing up)

1. Demonstrate the objective, meaning and outline of the training with explanations of reasons.
2. Have trainees visualize the whole picture of the planning of training in their minds.
3. Presentation to connect what trainees learn with their ultimate targets.
4. Explain the contents in detail.
5. Make summarizes and show the trainees exactly what they have achieved so far.



Correlating Training with Problem-solving Approach

1. Allow trainees to consider how to solve the problems that are likely to occur in their work places or in their daily lives by asking them questions.
2. Examples cited should be always familiar to the trainees.
3. Let the trainees challenge problems that are actually difficult to solve.
4. The trainees should be asked questions that are neither too easy nor too difficult to answer.
5. Share the satisfaction of success or achievement with the trainees.

Five Basic Instruction Methods

(1) Clarify performance to make the trainees listen to a lecture, an explanation, a radio or television broadcast, recorded tapes — all these presentations should be clearly heard and understood by the trainees

The speaker should articulate his words clearly, distinguishing between processes and main points. He must also be careful not to explain too mush at a time — the need to repeat what is important should be recognized. Any new technical term should be defined before being used.

(2) Give demonstrations (performance, experiment)

The instructors performance of a task should be clearly demonstrated in the correct order, considering the position that would help the trainees remember very well. The main points should be repeatedly emphasized with big gestures.

(3) Make use of written materials including audio-visual aids

The contents should be correctly expressed logically with the main points emphasized. Itemized expressions are preferable. The materials should be made attractive, using as many pictures, photographs and drawings as possible. Add colours and make full use of light and shade.

(4) Let them actually try something for themselves (practice, exercise, experimentation, work, event and case study)

Make the trainees practice correctly from the beginning using actual methods and work places where possible. Practice should be repeated until he has acquired a skill completely. The instructor needs to check trainees occasionally to confirm the degree of their understanding so that he can give them the necessary advice and instruction.

(5) Ask them questions to get answers (question, discussion, report, presentation and oral question)

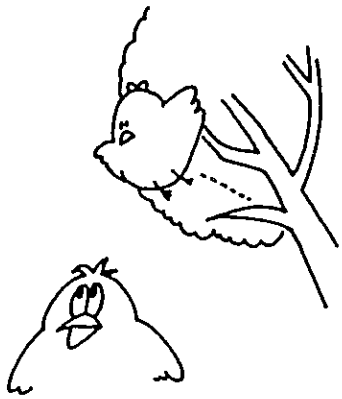
Questions answered with a 'yes' or 'No' should be avoided. Try your best to ask the trainees serious and comprehensive questions using the 5Ws1H method. Let them speak on the ways and methods and main points. Do not interrupt them. These five methods can be best utilized in combination with other methods.

For instance, the following variations can be considered in the case of 'written material.'

A trainee write (practice)

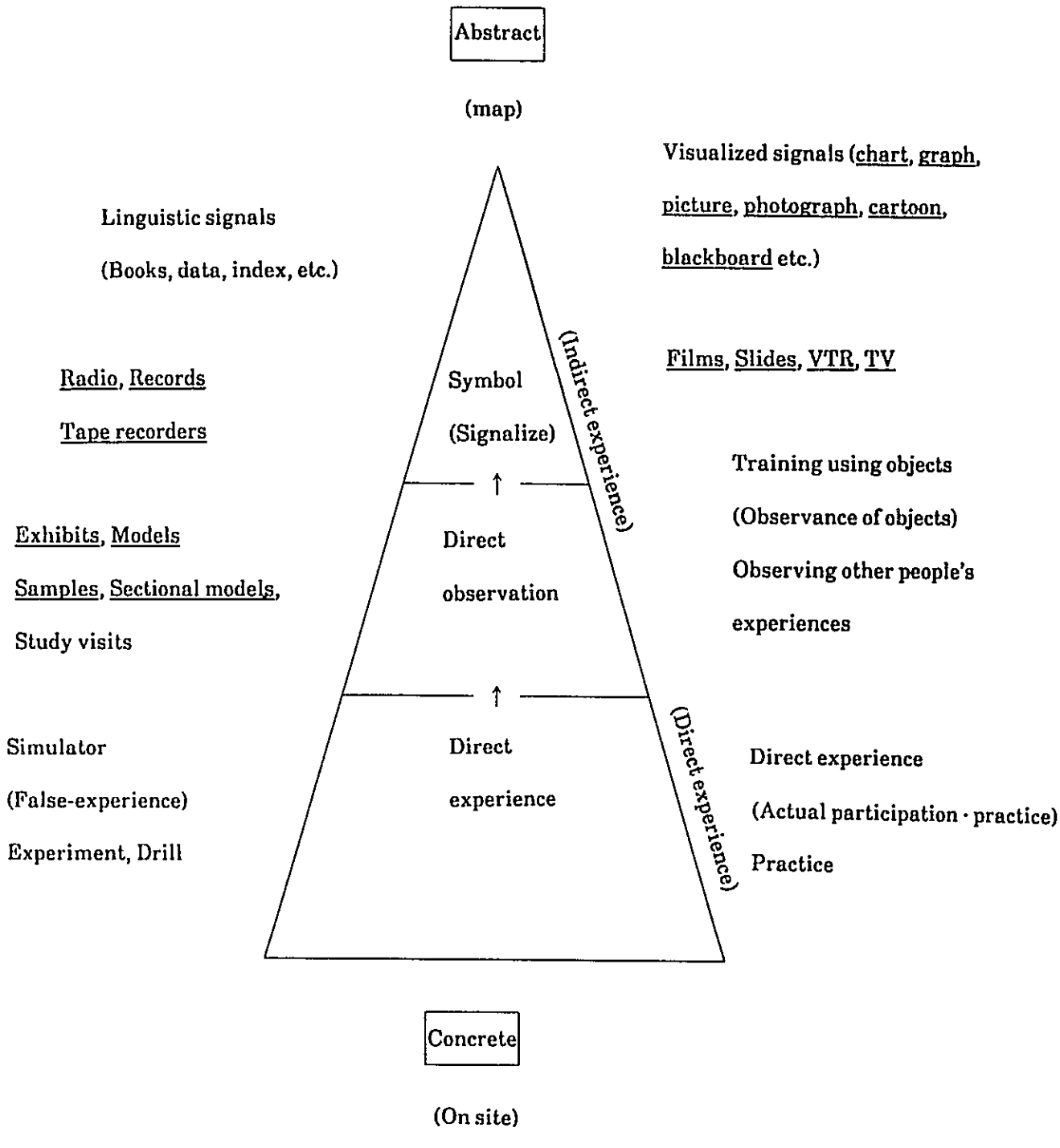
Let him read (a text book, reference book, work-sheet, print-out, bulletin, etc.)

Let him describe (a record, report, daily report, test-paper etc.)



Dale's Trigonal Pyramid

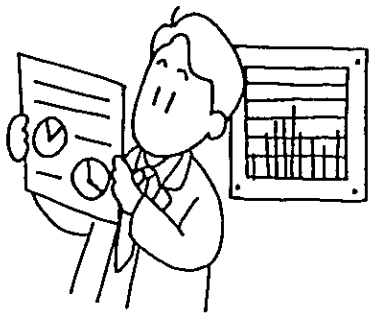
Audio-visual training materials and tools are utilized to concretely express what is abstract and to abstractly express what is concrete.



Four Steps of Coaching

First step: Introduction

- Attract the trainee's interest.
- Tell him the name of a job to do.
- Explain its relationship with what has previously been explained.
- Explain the importance of the work.
- Place him to the correct position.



Second step: Presentation

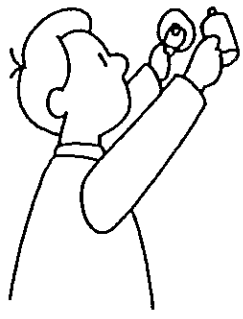
- Explain the main procedures in detail.
- Let him watch what you do and write.
- Point out the key points with reasons.
- Explain clearly, cautiously and patiently.
- Avoid making demands that are beyond his capacity.

Third step: Practice

- Let him practice and correct him when he makes a mistake.
- Let him explain the correct procedures while he is practicing.
- Let him state the key points while practicing.
- Let him explain the reasons why they are key points.
- To ascertain whether he has acquired what was taught.

Fourth step: Summing up

- Give summaries.
- Point out good points and bad points.
- Ensure that the impressions are clearly kept in mind.
- Allow him to ask you any questions.



Four Elements of Good Instruction

① Motivation

Finding out interests, reminding trainees of knowledge learned, and giving suggestions – all these consideration should be given to have the trainees feel inclined to learn more.

② Presentation

Explain what is going to be taught in various instruction methods.

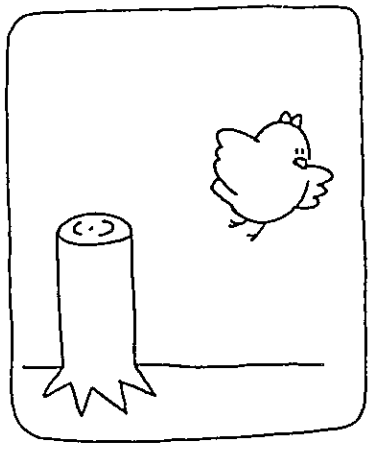
Also make sure of the order of instruction and key points to be emphasized.

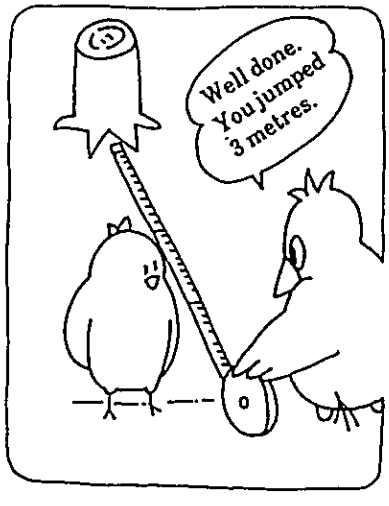
③ Application, Try-out performance

Let the trainees actually put into practice the knowledge they have learned. The extent of their learning, as a result, can be judged. If necessary, a presentation should be repeated until they have fully understood it.

④ Follow-up, Evaluation

Checking the trainee's level of understanding is required at every step from the beginning to the end of the training process. By judging the results, you are able to change the training approaches when necessary.





Four Steps of Group Training

First step: Introduction

- Attract the trainee's interest.
- Tell him the name of a job to do.
- Explain its relationship with what has previously been explained.
- Explain the importance of the work.
- Confirm if each trainee has placed himself correctly.

Second step: Presentation

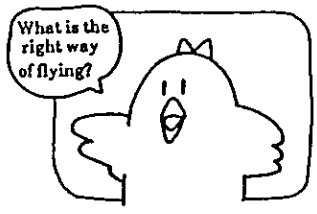
- Briefly explain the main procedures.
- Explain key points and reasons.
- Repeat the explanation if necessary.
- Check the extent of understanding.

Third step: Practice

- Let each trainee practice an exercise.
- Look out first, for success or failure.
- Ascertain procedures, key points and their reasons.
- Go into details gradually.

Fourth step: Summing up

- State summaries.
- Point out the good points and bad points
- Ensure that the impressions are clearly kept in mind.
- Allow trainees to ask you any questions.



About the stage of instruction

- A instructer must consider developing instruction by the most effective method , after a instructer determining the unit of instruction.

- Of course, there are many deployment methods of instruction by the contents of instruction, or teaching materials.
  Generally, a stage method is used for deployment of instruction.

- The instruction by the stage method is preparation, presentation, a practice (application), and a check . It is constituted by four stages.

- A stage method is process which makes planning of a teaching plan, and actual training in agreement.

[Four stages for instruction]

(1) The stage of preparation

- The stage of preparation is preparation of the heart required in order that a training student may receive training after this.

- The stage of preparation is never preparation of equipments.

- The stage of preparation is the leaving point of instruction.
  Therefore, a instructer must change a training student into the state of the standby which receives training.

- And, a instructer must think about what method which training student become the state of standby .

- A instructer must contrive about the method of promoting motivation , and the state of standby to a training student.

(2) The stage of presentation

- The stage of presentation is explaining and demonstrating new skill and new knowledge to the training student in the state of standby.

- in the stage of this presentation, a instructer must guide a training student using various teaching materials
Moreover, a instructer is demanded about various instruction technique.

- A instructer must use the work decomposition vote for practical-skill instruction,when a instructer shows a training student the contents of instruction.

(3) The stage of a practice (application)

- The stage of a practice is a stage that a training studing learned while works.

- That is, in practical-skill instruction, it is a practice, and, in subject-of-study instruction, it is application.

- Practice instruction is work which it is the way right and is repeated until it comes to be able to do about the shown skill.

- Study instruction applies the learned knowledge to a practical state and practicing it repeatedly.

- In this stage, training student's own activity is a subject. Therefore, a instructer must be made into the situation that a training student can always ask support.

-In practical-skill instruction, much time is required for this stage.

- In practical-skill instruction, a instructer must consider that required time changes with training students.

(4) The stage of a check

- The stage of a check is a stage where a training student's learning state is checked about the contents which the instructer guided.

- Moreover、a instructer makes a training student summarize the knowledge which the training student mastered.

- And makes a training student review the knowledge which the training s tudent mastered.

- And makes a training student arrange and collect the knowledge which the training student mastered.

- In the stage of a check,a instrcter must confirm abut whether a training student can do work、or must confirm how much training student mastered.

- A instructer must know a training student's study state in the stage of a check, and he must judge whether additional instruction is required.

- Further、a instructer must reexamine about the improving point of instruction technique.

[Meaning of four stages]

- In a life, we have always many opportunities said as a man.

- That business can be finished for a short time brings many profits on a society life.

- Also in the conversation with people, if the process of four stages is put on consciousness, efficiency will be improved by conversation very much.

- For a instructer, speaking in front of a training student is important work.

- Of course, a instructer must become skillful about these instruction stages.

- In order for a instructer to become skillful about this instruction stage, a instructer needs to create the teaching plan according to four stages of instruction.

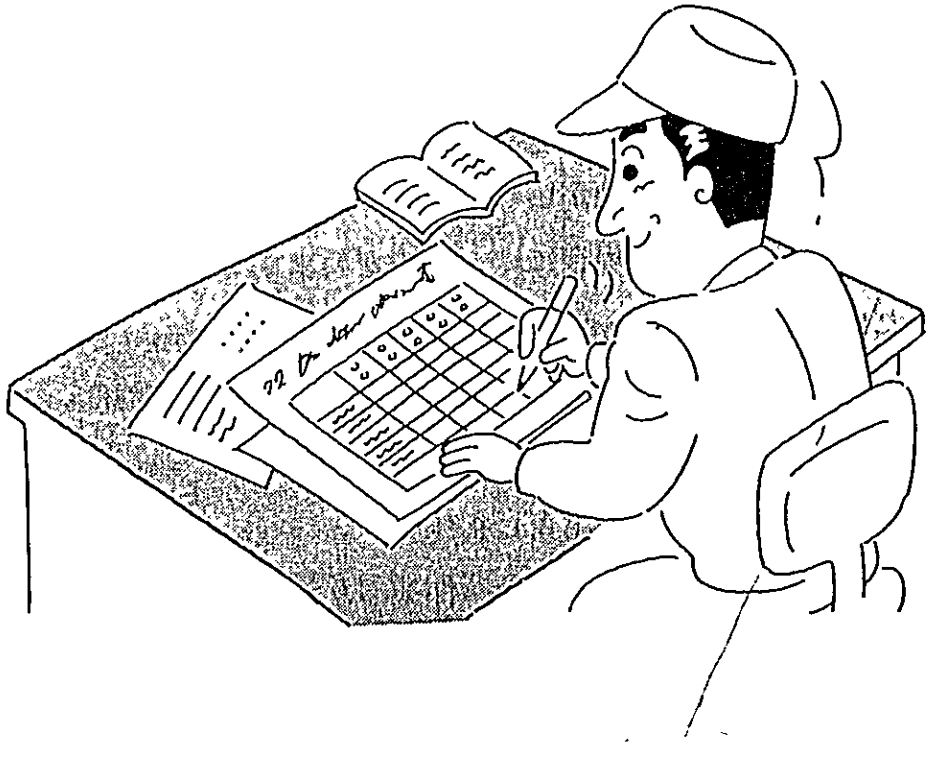
Four stages of instruction

Stage	Main point	Time
The first stage [Preparation]	1. Build the atmosphere which is frank. 2. Explain the main point of the lesson simply. 3. Make a training student to a feeling to hear.	Less than 6 minutes
The 2nd stage [Presentation]	The contents of lesson are explained in good order.	a minutes
The 3rd stage [Application]	A question response is performed.	b minutes
The 4th stage [Check]	The main point is collected.	c minutes

How to Draw Up an Instruction Plan

(The drawing-up method of a teaching plan)

Contents



The drawing-up method of a teaching plan

- A teaching plan is the memorandum which divides a subject of study and practical skill into an effective size (unit of instruction), and was planned according to the instruction stage (stage of instruction).

- Therefore, a teaching plan is used as a guidance document for training a training student.

- And, a training student is guided according to this teaching plan.

- In principle the teaching plan should be made the instructer training takes the charge of.

- The teaching plan made at once may be continued and used.
  However, necessity should be embraced and it should improve and amend.

[About the unit of instruction]

- In a training term, a training student will learn many contents.
  However, a training student cannot master many contents of training at once.

- Therefore, in fixed time, the knowledge and the skill of the amount of fixed need to be united and divided into a training student's acquisition capability.

- Call unit of instruction, the unit which divided the knowledge and the skill of the amount of fixed in fixed time.

1. How to Decide Unit of Instruction

(1) The unit of instruction must be suitable for a training student's acquisition capability.

(2) The unit of instruction is one unit of the training process which could be systematized. Therefore, it must have the title and the target. And, a target must be made into a suitable number.

(3) The unit of instruction must have the contents always new of instruction. And, the contents of instruction must relate to the unit of pre- instruction, and the unit of next instruction.

(4) The contents included in the unit of instruction must be a suitable size. In this case, it needs to take into consideration about a training student learning repeatedly.

(5) The unit of instruction must consider a training place and used teaching materials. The unit of instruction must be divided when a training place and used teaching materials must be changed.

2. Unit of Instruction in Subject-of-Study Teaching Plan

- Generally, a subject-of-study teaching plan is made per 1 hour. Because one lesson of the reason is 1 hour.

- If the training time of a subject of study is 100 hours, the teaching plan of a subject of study will become 100 sheets.

- It is difficult to draw up the teaching plan of 100 sheets at once.

- Therefore, for every lesson at each time, a instructer needs to draw up a teaching plan and needs to go.

3. Unit of Instruction in Practical-Skill Teaching Plan

- The unit of the instruction in a practical-skill teaching plan differs from a subject-of-study teaching plan, because it is accompanied by repetitive practice.

- The time in a practical-skill teaching plan increases more than the time in a subject-of-study teaching plan.

- Training time on 1day will be made into 3 hours in the morning, into 3 hours in the afternoon.

- When carrying out practical-skill instruction through the morning and an afternoon, the unit of instruction makes 6 hours less than.

- In this case, a instructer has draw-up necessity in the practical-skill teaching plan of 1 sheet in 6 hours.

- The unit of instruction will be made into less than 3 hours if the contents of practical-skill instruction are divided in the morning and an afternoon.

- In this case, a instructer must draw up the practical-skill teaching plan of 1 sheet in 3 hours.

- Practical-skill instruction trains two or more work in one lesson in many cases.

- In this case, a instructer must create a work decomposition sheet for every work.

- That is, plural work decomposition sheets are required for the draw up in the practical-skill teaching plan of 1 sheet.

Subject	Details	Contents	Time
1. Special Subject of Study			640H
①Machine engineering introduction			50H
	1. Machine Element		17H
	(1) Screw	-The principle of a screw、the kind of screw、the form and the use of a screw mountain	(2H)
	(2) Conclusion parts	-Bolt, nut, washer ·····	(3H)
	(3) An axis and a bearing	- An axis, an axial patch hand,·····	(3H)
	2. Mechanism and Movement		13H
	(1) A machine and a mechanism	- Transfer of movement、·····	(3H)

About the style of a subject-of-study teaching plan

Subject-of-study teaching plan

Instructer name　　No.

1. Title: what to guide.

2. Target: you are what purpose and to what extent you teach.

3. Time: the how many week it is.

4. Number of training students :the department of training, and number.

5. Place: a classroom、practice room、place of work.

6. Time required: The number of hours actually based.

7. Teaching-Materials:　a knowledge instruction vote No. 、A model、a slide、OHP.

Instruction stage	The main point and a method	Time
Preparation	The matter which emphasizes importance, and the matter which checks the contents already known are written.	
Presentation	The main point of an instruction matter is arranged in order, and is written. The method to teach is written、and how to use auxiliary teaching materials is written.	
Application	An exercise problem and the contents of a question are witten concretely.	
Check	The method of shifting to debate and examination from a question is written concretely. The main point is collected simply and written.	

Subject-of-study teaching plan (Example)

Subject-of-study teaching plan

Instructer name No.

1. Title :Pillar

2. Target :The knowledge of a pillar is made to master and the function which a pillar achieves is made to understand in a building.

3. Time :The 7th week May 12th, 1997

4. Number of training students :Department of construction 10 persons.

5. Place :Classroom.

6. Time required :1 hour

7. Teaching-Materials :A textbook (construction tree structure), teaching materials (a Japan cedar, a pine, in addition to this), a pillar model.

Instruction stage	The main point and a method	Time
Preparation	Check training student's knowledge about a pillar, being shown a timber and a pillar model.	5 minutes
Presentation	1. Kind of pillar.----- Teach abut a kind and a name (presentation of teaching materials). 2. Quality of the material of pillar.----- Teach about a use material kind, and the reason of selection (presentation of teaching materials). 3. Role of pillar.-----Teach about load and side pressure. 4. Durability of pillar.----- Teach about insect control, preservation from decay, and prevention of moisture. 5. Teach about the relation of a pillar and other material.	30 minutes
Application	1. Reason with straight pillar. If it has bent, what does it become?、it makes consider from use. 2. Determination of thickness of pillar. It makes consider from a construction regulation.	10 minutes
Check	The kind of pillar and ask about the load of a pillar. And asks the reason abut the load is equal. TThe main point is collected, asking a question.	5 minutes

Subject	Details	Contents	Time
2. Basic Practical Skill			600H
③ Construction basic work			425H
	1. Chipping work		4H
	(1) How to use a vise	- Operation and how to use of a vise.	(1H)
	(2) Hammer shake	- The right posture and action , a continuation blow and stabilized	(1H)
	(3) Chipping	- The right posture and action , a continuation blow and stabilized	(1H)
	(4) Cutting of a thin board	- The way of cutting of the thin board by the chisel	(1H)
	2. Finishing of a file		32H
	(1) ・・・・・・	・・・・・・・・・・・・	・・・・

[The unit of instruction]

・How to use a vise	The unit of instruction	1 H
・Hammer shake	The unit of instruction	1 H
・Chipping	The unit of instruction	1 H
・Cutting of a thin board	The unit of instruction	1 H
・Total of Chipping work	4 units	4 H

About the style of a practical-skill teaching plan

Practical-skill teaching plan

Instructer name　　No.

1. Title: what to guide.

2. Target: you are what purpose and to what extent you teach.

3. Time: the how many week it is.

4. Number of training students :the department of training, and number.

5. Place: a classroom, practice room, place of work.

6. Time required: The number of hours actually based.

7. Teaching-Materials: Work Instruction Vote No. or a knowledge instruction vote, equipment, a tool, material, etc.

Instruction stage	The main point and a method	Time
Preparation	The matter which checks degree of comprehension is written about the contents learned in the subject of study.	
Presentation	No. and No. of a work decomposition sheet are used.	
Practice	The main point in the key point of a work decomposition sheet is written. The way of a practice is written.	
Check	It comments on a good point and a bad point, and the contents of a conclusion are written. A product and a work attitude are criticized, and the contents of a conclusion are written. Only the main point of work is collected simply and written.	

Practical-skill teaching plan (Example)

Practical-skill teaching plan

Instructer name No.

1. Title:Chipping work

2. Target:The method of using a chisel is made to master.

3. Time: The 2nd week.

4. Number of training students : Department of automobile maintenance 10 persons.

5. Place: practice room

6. Time-required: 7 hour.

7. Teaching-Materials: Work Instruction Vote No. 45 a knowledge instruction vote, a chisel, a vice.

Instruction stage	The main point and a method	Time
Preparation	1. Hear it about the quality of the material of a chisel, a kind, and a use. 2. Emphasize importance of chipping work.	10 minutes
Presentation	The position of a leg. How to have. The angle to apply. Work decomposition sheet No50.	30 minutes
Practice	Main-point: 1. Smoothness of chipping side. 2. Posture and accuracy of blow. Method : 1. It does at a simultaneous signal. 2. Next, make training have each one.	300 minutes
Check	Criticizes about the smoothness of a chipping side、and collect the main point about the blow direction, blow power, etc.	20 minutes

Contents of a Lesson Plan

① Theme of Lesson (Material and clear topics of lesson)

Objects of training and practice

② Persons forming the subject of lesson (details the objects of training)

Number of trainees, their readiness, course, grade

③ Training place (place where lesson is given)

Training place used, room for practice, name of production site, restrictions at the site.

④ Training materials and equipment (apparatus and materials to be prepared)

Equipment, facilities, apparatus, tools and consumables for practice

⑤ Media required (apparatus and materials to be prepared)

Screen, OHP, VTR and monitor TV, varied projectors

⑥ Training materials (types and quantities of the training materials)

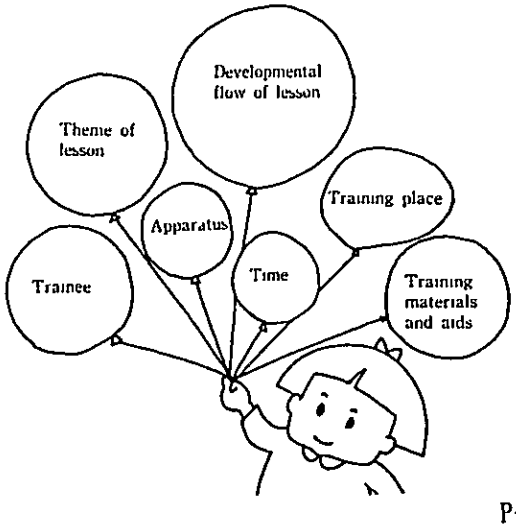
Printed matter, TP film, video tapes, etc.

⑦ Duration of lesson (hours required for lesson)

Hours work time and total time.

⑧ Development (main contents to be developed in the lesson)

Classification, time required, training materials, contents of writing on board, question items, reactions of trainees expected, key words, figures and question important points for instruction, etc. deciding the flow of lesson.



How to Draw Up an Instruction Plan

Instruction plan

Good lecturers cannot produce results without having made preparations. Great instructors are famous for their scrupulous preparations. Unlike lectures given by celebrities, educational lectures should be given so that the audience can correctly grasp their content. Preparations are necessary and tools for such preparations are training plans.

There may be some issues that must be determined or defined prior to training. Such matters constitute the framework of an instruction plan. Instruction plans describe basic training elements, including subjects, detailed content, materials, equipment, flow, and schedule.

Form of instruction plan

An effective form should be used for drawing up instruction plans. We will present a simple form. Form 1 permits precise descriptions to be made. The title is mentioned in the "Instruction item" column. The outline of the flow is mentioned in the "Main points of instruction" column: main terms, questions to trainees, and words to be written on the blackboard. Expected responses and actions that may be created by instruction items are mentioned in the "Trainee's activities" column. Training materials and their numbers are mentioned in the "Training materials" column.

Example of ① (1)

Classifi-cation	Time	Points of instruction	Activities of trainees	Training materials
● Enter contents	● Enter scheduled time in minutes.	● Write the developmental flow of the lesson.	● Write down the activities of trainees expected.	● Write the types and numbers of training materials used.

Example of ① (2)

Classifi-cation	Time	Points of instruction	Training materials	Remarks
				● Write down in detail the points of instruction.

Example ②

Classifi-cation	Time	Points of instruction	Training materials

Example ③ (1)

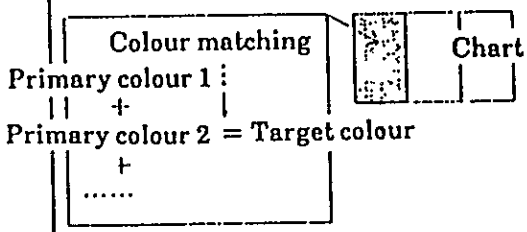
Classifi-cation	Time	Points of instruction

Lesson plan form

The form shown at the top of the figure can be used as a standard lesson plan of the training centre. It can be used by instructors other than the author(s) to obtain passable results. It can also be used for study lessons. Form 2 is suitable for a simplified lesson

plan. Form 3 may be used only by the author(s) of existing plan(s) for summarizing it (them).

The following example can be used for your trial:

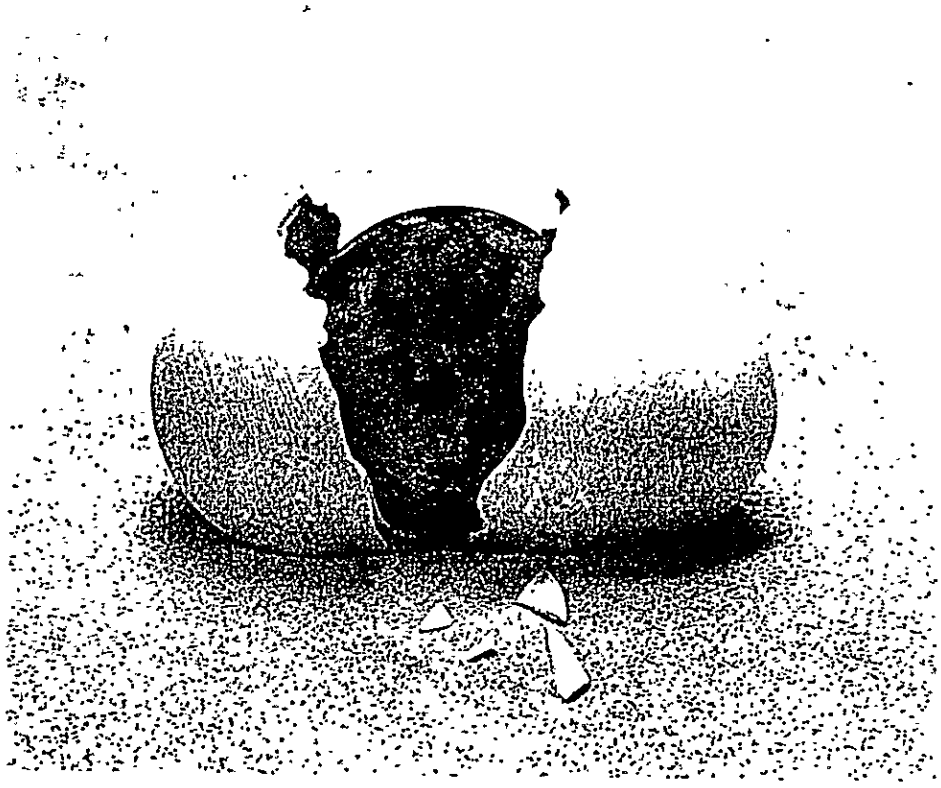
Contents	Time	Essential points of instructions	Trainees' activities	Training materials
Clarification	5 min.	Role and importance of colours in industrial products · Show colour pictures of cars. "You can see many different colours. Which colour do you like best?" · Describe why colour is one of important qualities of industrial products. What is colour matching? · Show a book of colour samples for car bodies. "These different colours are in fact made of several basic colours." · Show the primary colours in the book of colour samples. "These basic colours are called primary colours." · Writing on the board Use one-third of the board.  "Colour matching means making the same colour as the target one using different primary colours."	Answers expected White, red, blue	Colour picture Book of colour samples

Lesson Plan (Example) ②

Classification	Time	Main point of instruction	Training material
Clarification 1. Individual differences and measurement errors (Question) (giving a demonstration on a blackboard)	6 min.	"It becomes hot." What is the temperature today? [● Answers expected are written on a blackboard.] "Here is a simple thermometer. It is a liquid crystal thermometer." "It is ○ ○°C now." "An alcohol thermometer is now used, and the temperature is read on the thermometer." [● Some trainees try to read the temperature.]	Measures temperature by sense through the skin.

Developing Training Evaluation

Contents



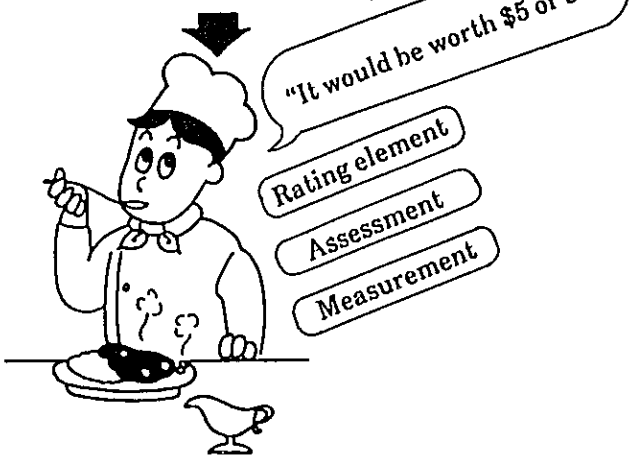
What is Evaluation?

Valuation

Valuation

Evaluation for value decision,

classification and selection.

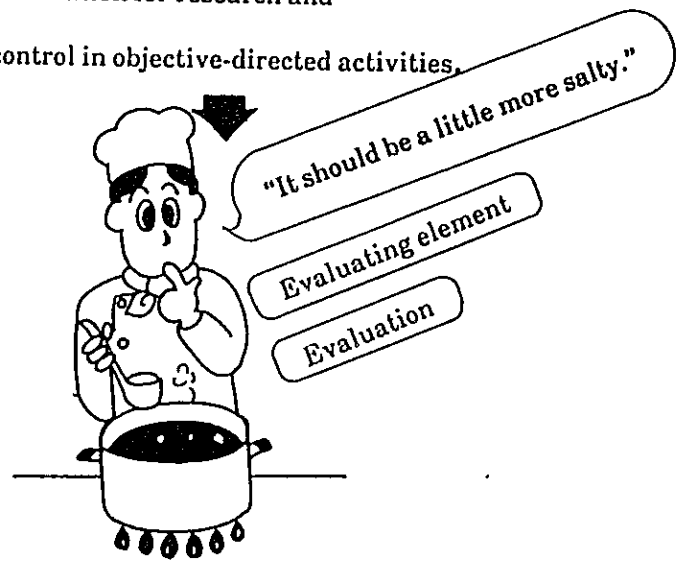


Evaluation

Evaluation

Evaluation for research and

control in objective-directed activities.



What is Training Evaluation?

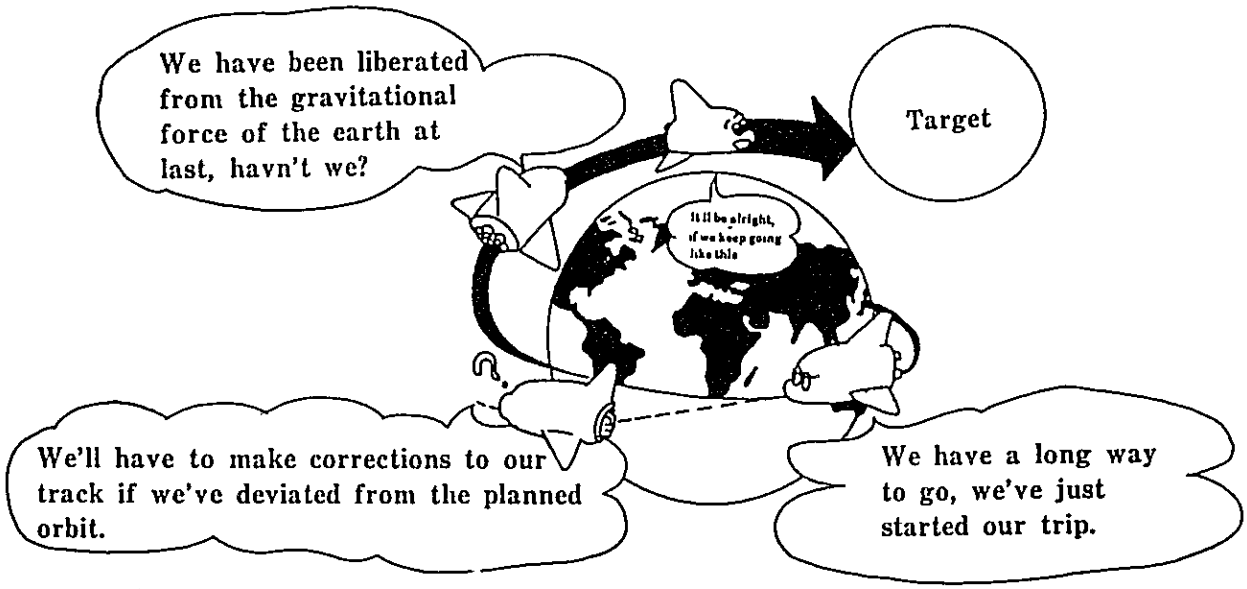
Training evaluation is the valuation and adjustment needed to achieve the objectives of educational values.

Training Evaluation:

- It involves a series of activities to collect and analyze the data needed for effectively carrying out training activities and to reflect them in training.
- Concretely, it includes clarifying the targets and determining, analysing, judging and interpreting the present condition.
- Main purposes are:
  (1) To clarify the extent of the trainees' understanding
  (2) To confirm the extent to which training aims are achieved
  (3) To know the progress of training
  (4) To know the adequacy of training programme and guiding method

As a result, it should be reflected in training management, result management and improvement of instruction.

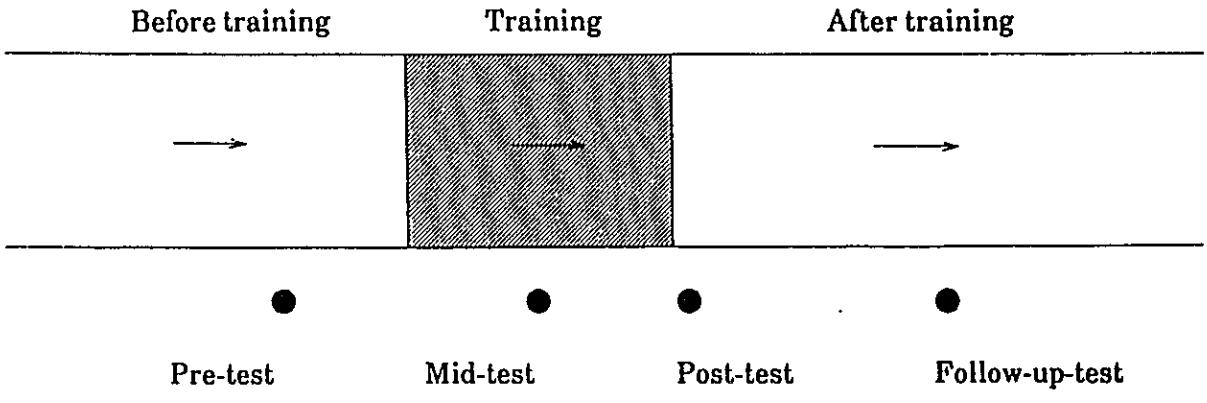
1. **To clarify the trainees' extent of understanding**
   - To clarify the individual trainee's extent of understanding
   - To inform the trainee of the extent of his own progress
   - To motivate the trainee to study
2. **To confirm the extent training aims are achieved**
   - To clarify the difference between the aim and the present state
   - To adjust the development of training in relation to the aim



3. **To know the progress of training**
   - To adjust the progress of training
   - To change and adjust the whole planning of training
4. **To know the adequacy of the planning of training and the instructional method**
   - To examine the effect and efficacy of the training
   - To examine the adequacy of the guiding method, materials and subjects
   - To examine new guiding methods
   - To examine the adequacy of the planning of training

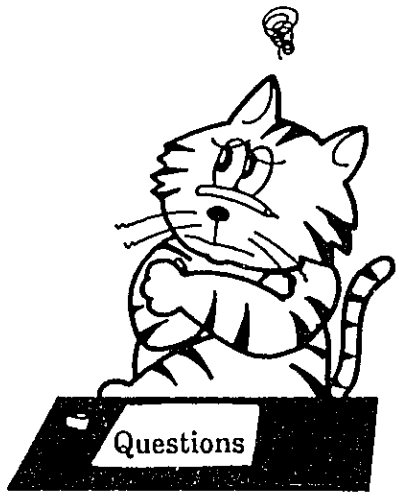
Kinds and Periods of Tests

No.	Kinds of tests	Periods and purpose	Utilization for training results	Utilization for training
1	Pre-test	Before training To know readiness	(Selection) Motivation	Modification of contents and planning of training
2	Mid-test	In the course of training To know the extent of understanding	Improvement of instructional methods Motivation Discovery of trainees with difficulties and countermeasures	Improvement of instructional methods
3	Post-test	At the end of training To recognize completion	Recognition of promotion or completion Modification of following training	Modification of the whole planning of training
4	Follow-up-test	A certain period after completion To confirm the training results	Confirming the effects of training	Modification of the whole planning of training

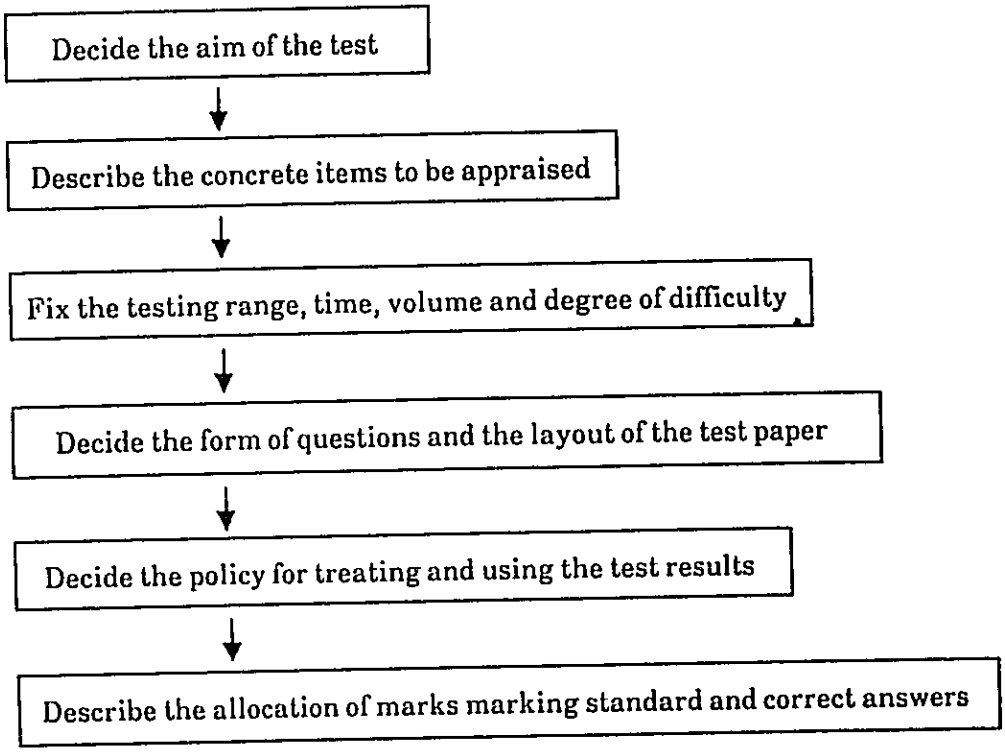


Conditions Evaluation Tools Must Fulfill

① Validity	Can correctly measure what is required to be measured.
② Reliability	The same value can be obtained every time.
③ Objectivity	Differences by markers are small.
④ Usability	Easy to perform in terms of time and cost.



How to Prepare Questions for a Test



N.B.

(1) The questions should represent the content of training. (The validity of the contents should be retained.)

(2) The level of questions should be reasonable. (Should be adequate for the aim of training.)

(3) The test form should be chosen to comply with the aims and items of evaluation.

(4) The degree of difficulty may vary for the problems as a whole.

(5) Avoid questions which can be answered by memory.

(6) Avoid questions that are easy to misunderstand.

(7) Simplify terms and instructions in test questions.

(8) Give an example of the answer if necessary.

(9) Clarify the space in which the answer to be written.

(10) When a certain operation is given, show it clearly.

(11) Model answer should be prepared beforehand.

(12) Decide the mark and marking standard beforehand.

Kinds of Paper Tests

- Essay type test
- Objective test
  - Recall type test
    - Simple recall type
    - Completion type
    - Correction type
    - Rearrangement type
  - Recognition type test
    - True-false type
    - Multiple choice question
    - Matching type
    - Completion by choice type

Skill Test

1. Outline

This is a method for measuring skill levels by confirming if the examinee can perform the operation in practice or determine important elements to carry it out.

2. Merits and demerits

(1) It is effective to identify difficult points in the operation and defects in education and training.

(2) It is difficult to make a subject represent the skill to be appraised.

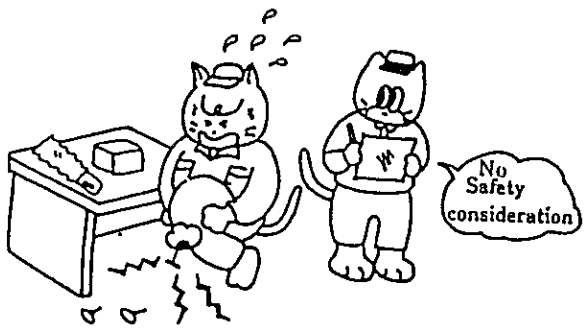
(3) Materials and place are needed to perform the test. It takes time and money.

(4) It is hard to make the test conditions uniform.

(5) Marking may be subjective.

3. Kinds of technical test

Skill test
- Operation test: manufacture, assembly, measurement, operation, etc. (Operation sample method)
- Element skill test: sensitivity judgement, classification, etc.
- Paper test: operation planning, arrangement, circumstantial judgement, etc.



How to Prepare Test Questions for the Operation

Determine the purpose of the test.

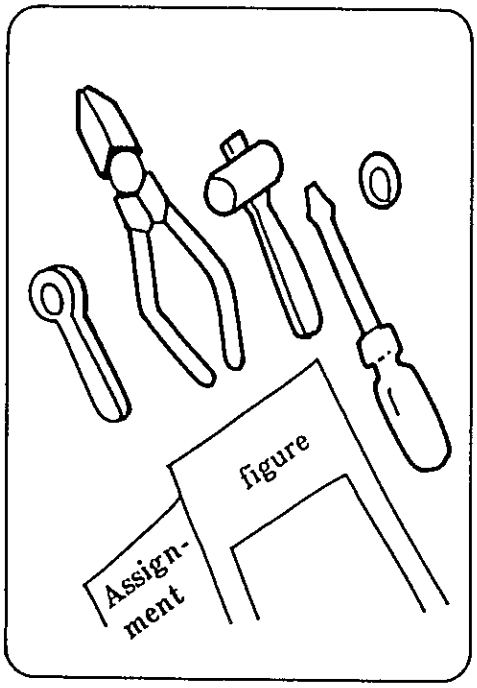
↓

Analyse the items to be evaluated and describe skill elements and levels.

↓

Plan the construction of the test questions on the basis of each element and level.

↓



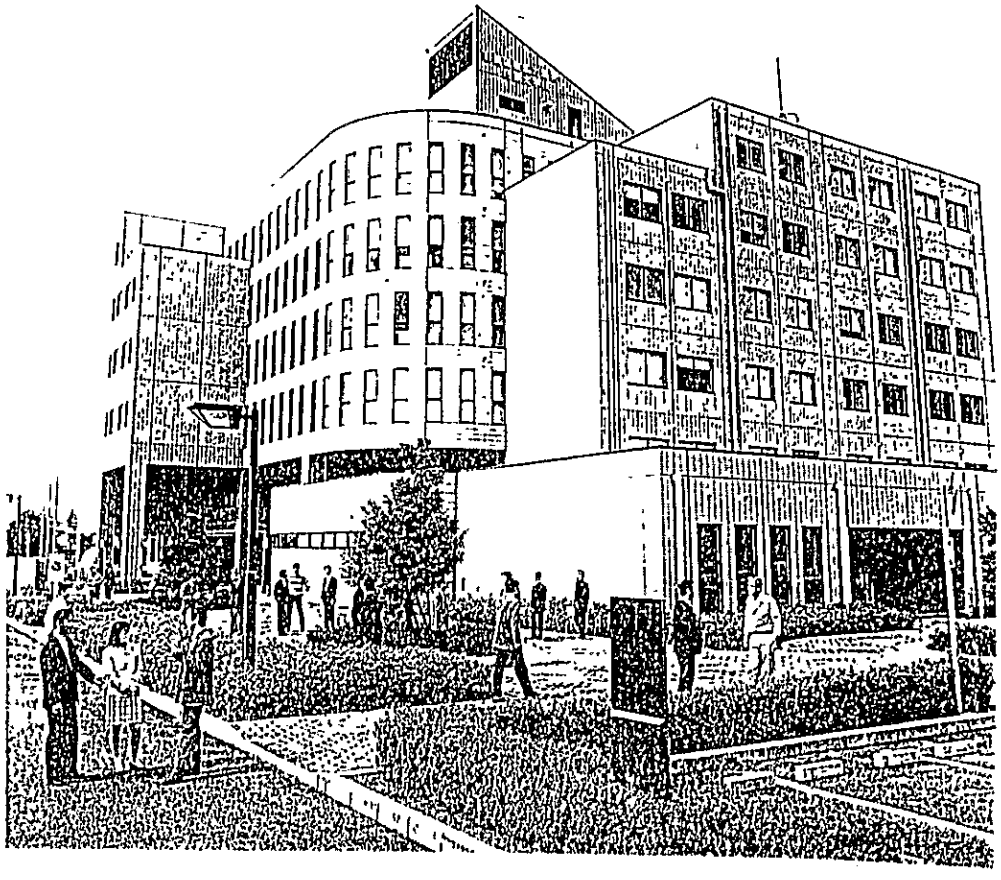
Give a figure and instruction for the assignment and enumerate the necessary machines, tools and precautions.

↓

- Describe the allocation of marks, marking standard, and marking method.

Method of Training Management

Contents



Training Management

1. Training Management

The term 'management' means making the utmost use of personnel, equipment and facilities of training institutions in order to attain their objectives.

① Training management

'Training management' means to systematically combine and utilize both personnel at the training institution and the functions of its facilities based on the basic policy of the training institution so as to attain the objectives of training.

② Objective of management

The objective of management is to implement various training on skills and techniques to produce excellent skilled workers.

③ Objects of management

The objects of management are personnel, materials, and money: every trainee, piece of equipment and facility including training materials at a training center, and how to use the money required for training in general. Furthermore, training performance, records, and evaluation are also included.

④ Basic method of training management

The basic method of training management is to follow the cycle of plan, do, and check.

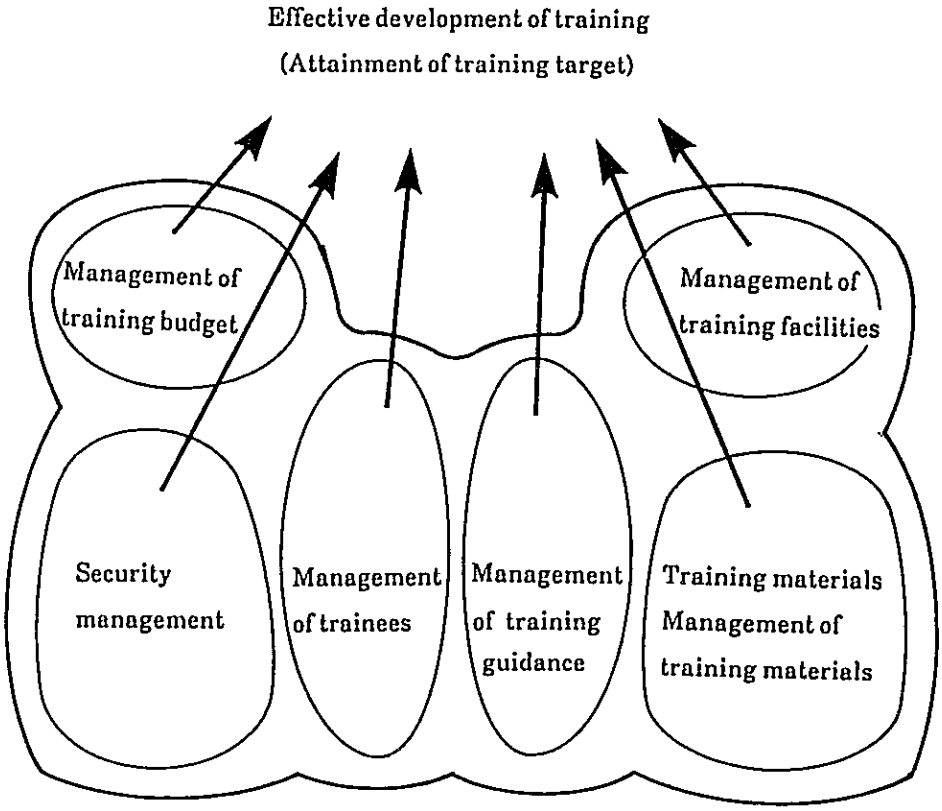
⑤ Rules and standards of management

Rules and standards of management are specified by the training institution or its superior organization.

⑥ Manager

Training managers include not only organizational managers but also those appointed depending on the requirements of management objects and dimensions. Instructors for training are naturally included.

The Object of Management



Steps of Training Management

Steps of training management are as follows:

1. Research

What is needed is to always have a good grasp of trends of technology, demand and supply of engineers, relationship between economic trends and technical progress, and trends of the nation and society.

Moreover, you have to do research into both what you can actually do and cannot, accurately grasping facilities, equipment and materials of a training institution, and the levels of its instructors.

2 Plan

The target has to be clarified before it is documented. It is required to make the ultimate target clear. Training plans include various kinds of plans; long range plan, short range plan for intensive training such as for specific projects, a plan of training hours, a procurement plan of training materials for training and revision of the plan when necessary, and a budgetary plan for expenses required.

3. Schedule

Whens, wheres, whos, and whats are practically determined in the training plans by each year, month, week, and hour.

Training is carried out based on the scheduled training programmes.

4. Implementation

The implementation of training consists of 3 steps: preparation, dealing, and following-up.

① Preparation

This means preparatory work for launching training including research on trainees' readiness, lists of trainees, a guidance summary, a record of the instruction, text-books, training materials, fixtures, materials, and arranging lecture rooms, practice rooms and other facilities.

② Doing

This is the implementation of training. Training has to be carried out within the limits of planned contents, training hours, and budgets.

⑨ Following-up

It is required to record attendance and absence of trainees, their performance, general use of training equipment and materials, and other important matters. This information is used for the evaluation of trainees and trainings.

5. Report

The actual results of implementing training are to be reported in the specified form as an official report.

6. Check

A check acertains whether the training is being carried out as scheduled and helps it proceed with the plan.

7. Evaluation

We have to see whether the training has been implemented as initially planned or if expenses have been kept within the budget, using the training target as a measuring standard.

An evaluation is supposed to be made of a training course, as well as every trainee and instructor. In evaluating the performance of trainees, we take account of the results of the study, attitudes in studying, attendance rate, and examination results for specific items.

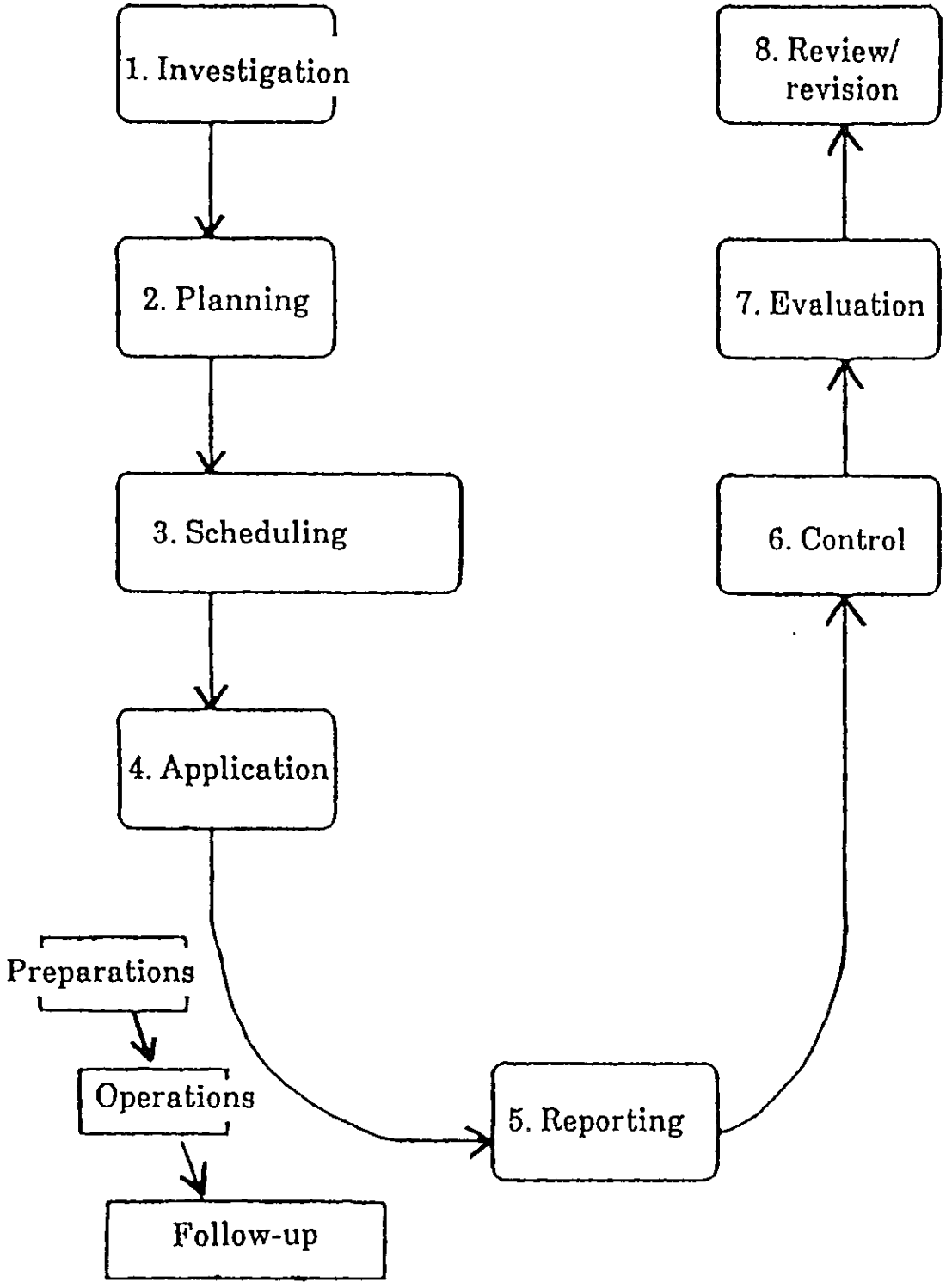
The methods of evaluation are varied including paper test, practical test, and exercise test. To make the evaluation more comprehensive, other facts such as attitude to study, attendance rate, instructor's comments and other opinions from observers are also taken into consideration.

8. Revision

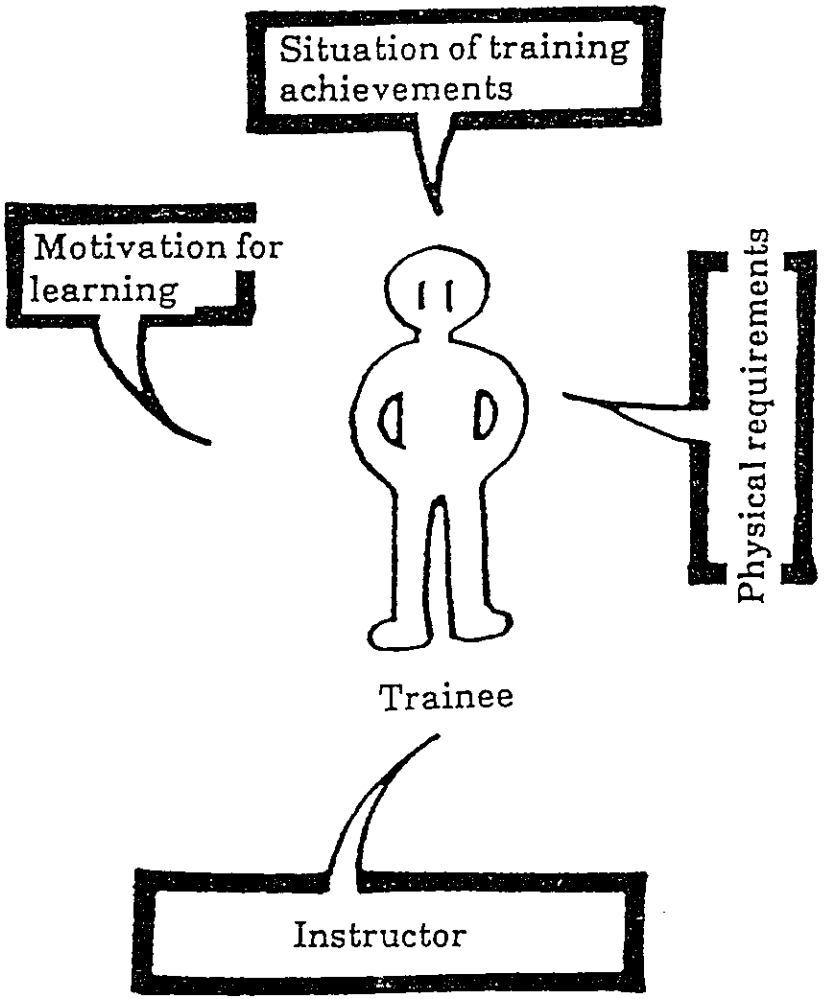
The training plan should not be revised easily for unimportant reasons; for instance just to avoid training that has become stereotyped. A revision could be accepted when training needs have been changed or when you have other important reasons such as budgetary or efficiency constraints.

In revising it, you have to bear in mind that the change will have an effect even on facilities, training materials, and equipment.

However, you should not hesitate in doing it for fear of the effects when you find it absolutely necessary. What you should consider is the attainment of the training target first.



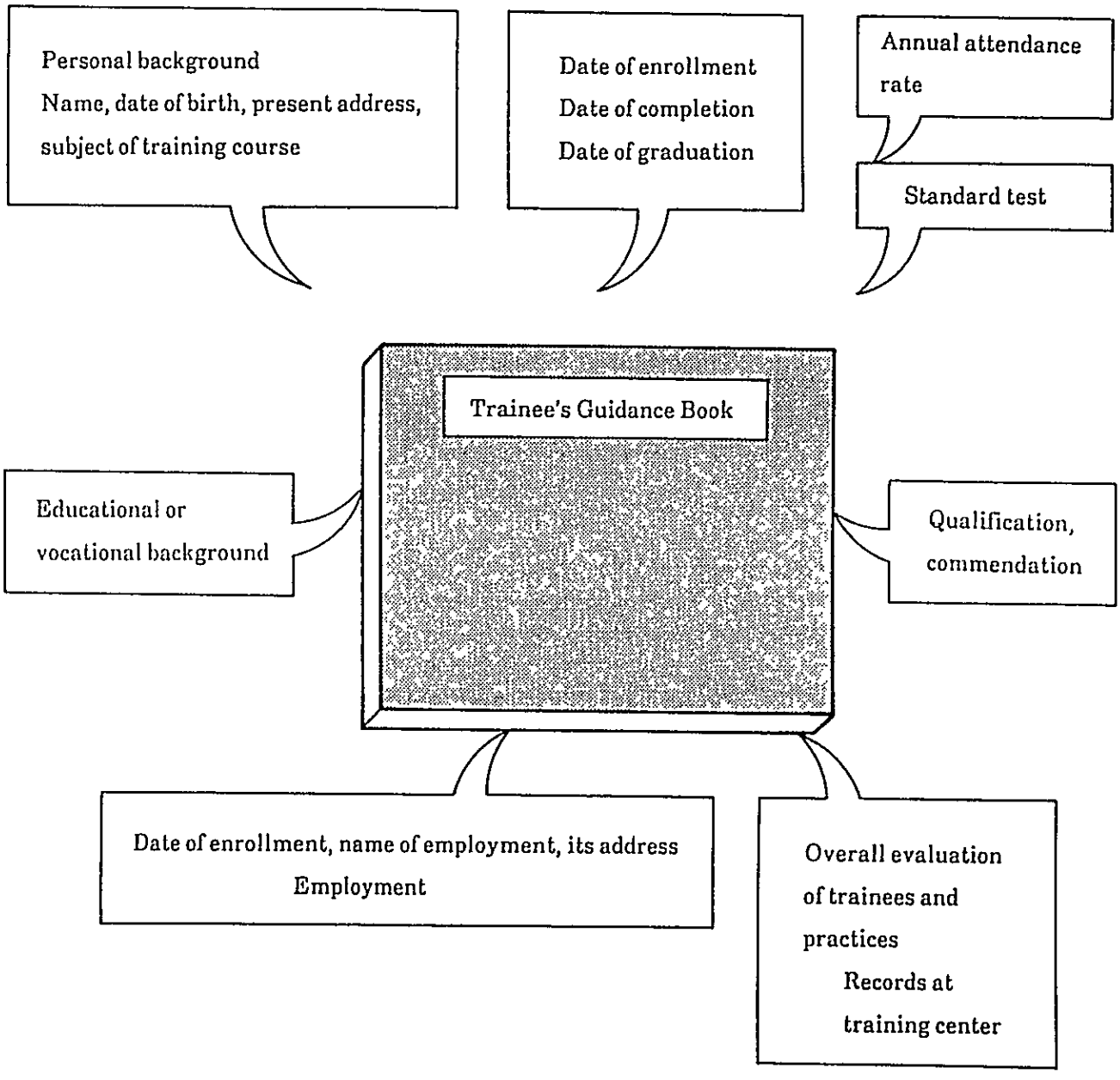
Stages of training management



Trainee management

Contents of the Trainee Guidance Book

Contents of guidance for trainees



Trainee Guidance Book (Face)

① ID No.				Training centre	
② Type of training	Ordinary course	First class · Second class	⑫ Date of enrollment Date of graduation	Enrollment Leaving school Graduation	
	Training for changing job	Changing job, mine, request, achievement (Training centre requested)			
	Others		⑬ Leaving school	Reason for leaving	
③ Training subject		Course	④ Training Period	Year Month	
⑤ Name				Male · Female	
⑥ Date of birth					
⑦ Permanent address					
⑧ Present address					
⑨ Employment office					
⑩ Training period requested	From:	To:			
⑪ Social security	Unemployment allowance etc.				
	Skilled worker aid fund				

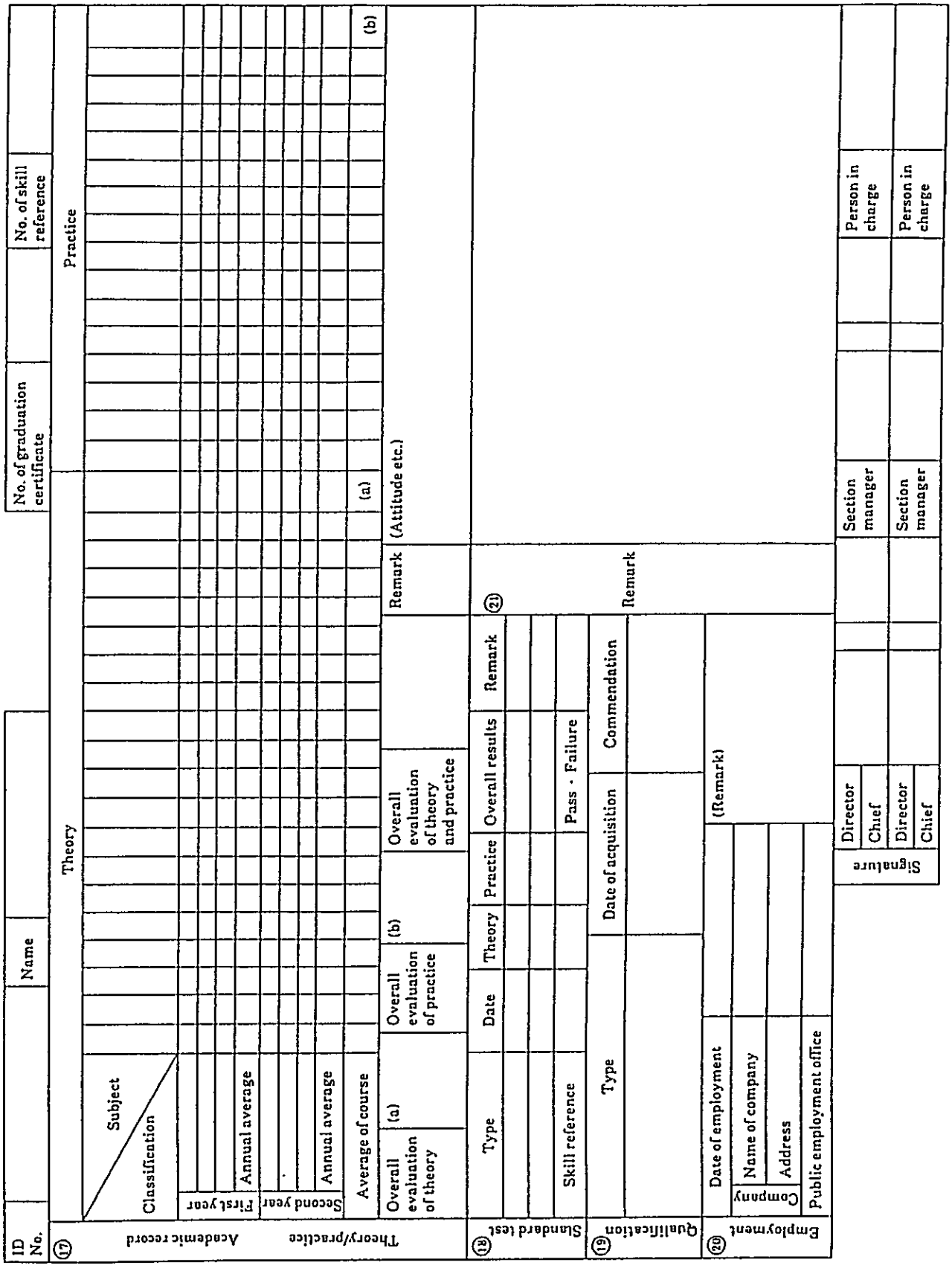
⑭ Academic background

Name of school	Specialty	Period	Date of graduation	
Name of school attending	**Specialty**	**Period**	**Date of enrollment**	**Remark**
Employment	**Address**		**Period**	**Remark**
			From: To:	

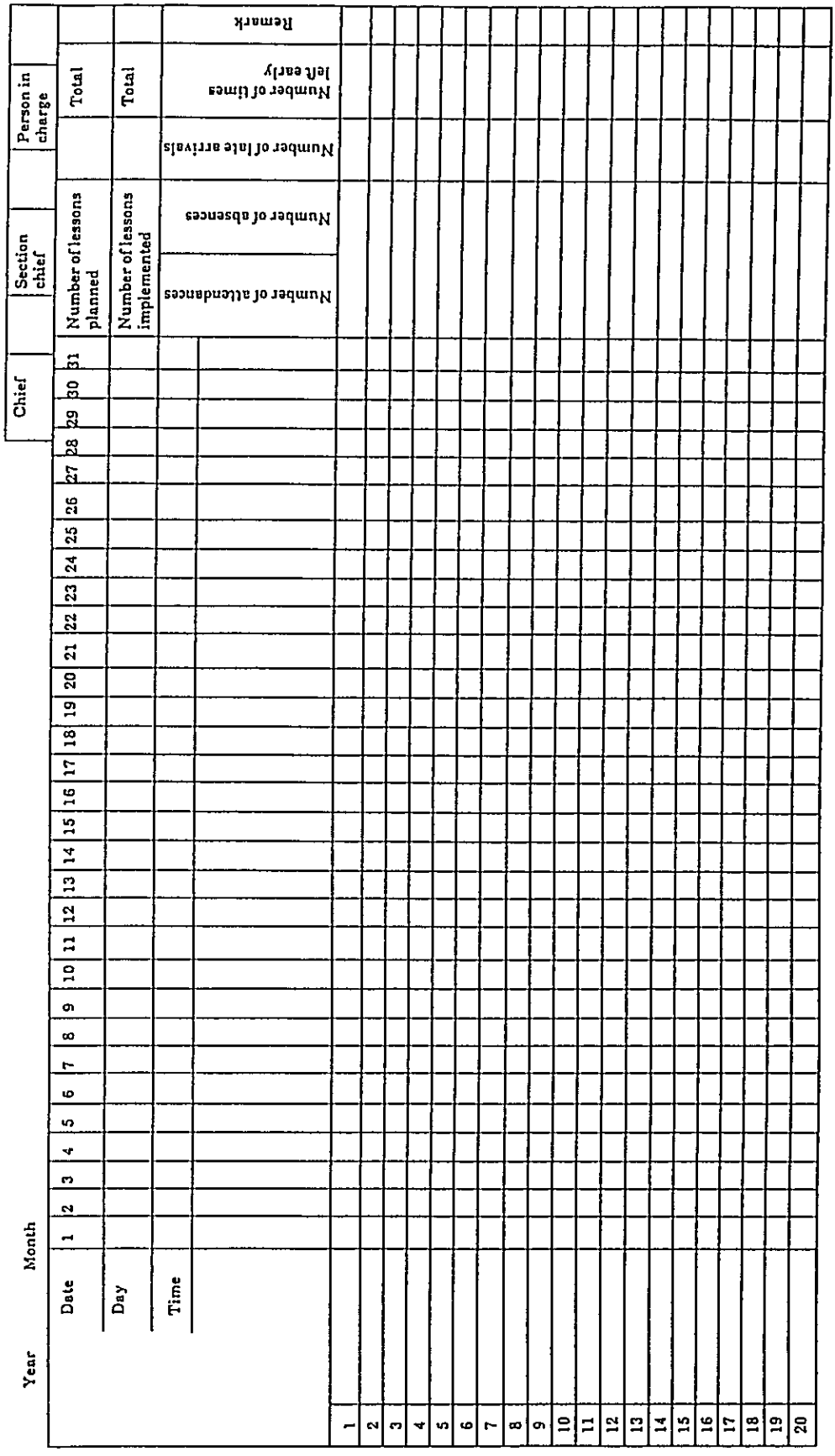
⑮ Attendance and absence

Classification \ Year	1st year	2nd year	Total	Remark	⑯ Date photo taken
Training hours					
Attendance					
Absence					
Late arrivals Leaving early					

Trainee Guidance Book (Back)



A Roll Book


Year
Month
Date
Day
Time
Chief
Section chief
Person in charge
Number of lessons planned
Number of lessons implemented
Number of attendances
Number of absences
Number of late arrivals
Number of times left early
Remark
Total
Total
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Record Book of Training Subjects Taken

Year: ____________ Subject: ____________ Specialty: ____________

Subject: ____________ Instructor: ____________ Signature

Section chief	Section chief	Section chief	Section chief
Dates	Dates	Dates	Dates

Subject of training / Trainee's name																																									Subtotal number of lessons absensed	Total number of lessons absensed	Number of attendances
Date of implementation																																											
Trainee's name																																											
1																																											
2																																											
3																																											
4																																											
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List of Trainee's Study Record

Training course: _____ Semester: _____

Training subject: _____

	Name / Date	Theory					Average (theory)	Practice					Average (practice)	Remarks
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														

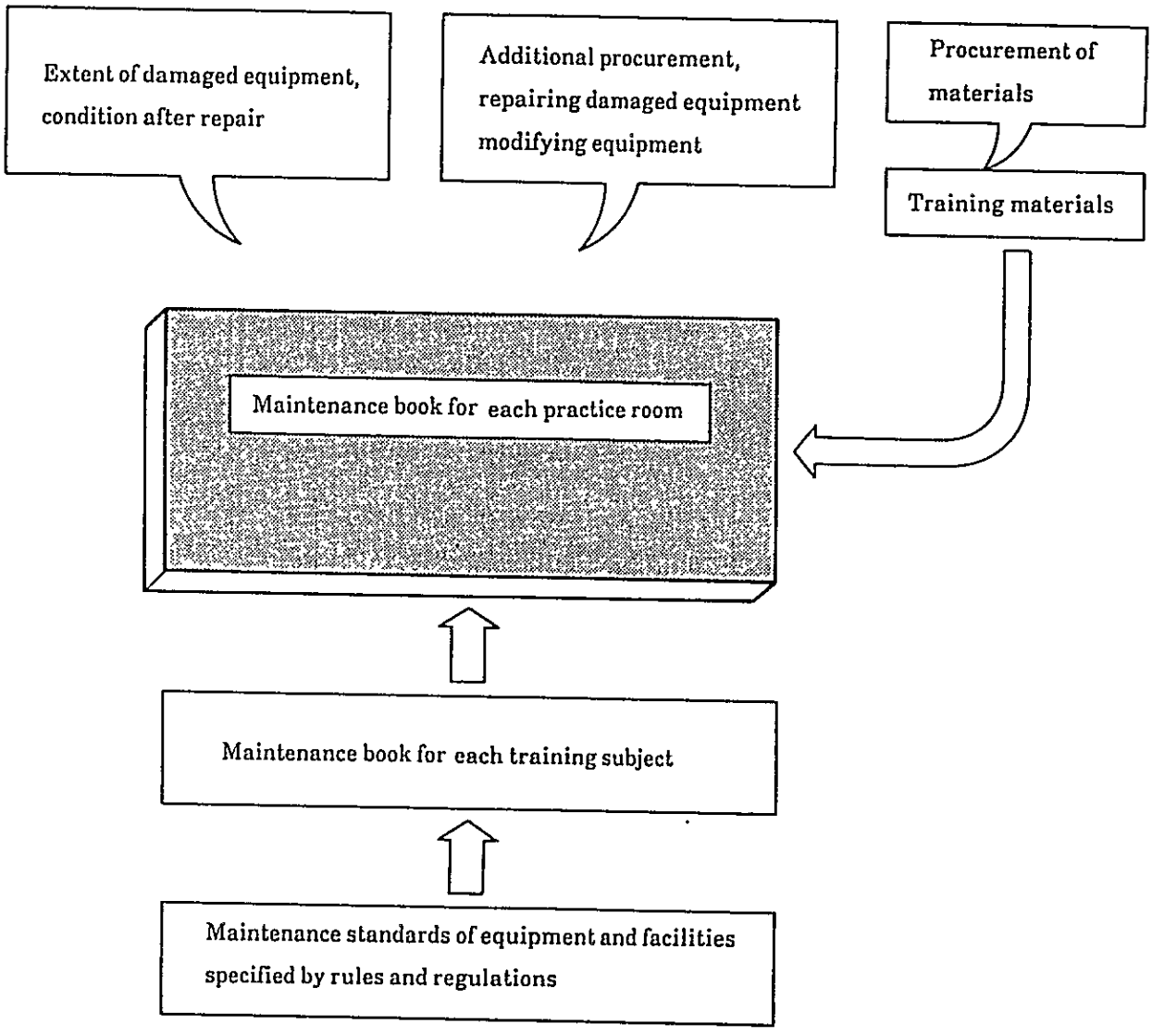
Training Progress

Date: _____

Person in charge: _____

Period	Training subject	Contents of training	Instructor	Remarks
1				
2				
3				
4				
5				
6				
7				
8				

Equipment, Tools, and Materials Required for Training



Maintenance Standard of Equipment, Tools and Devices

Classification	Training subject	Type of business the training is aiming for	Details of equipment ·						
			Object	Name of equipment and tools	Remarks	Quantity			
						First group		Second group	
						When training is provided for 30 trainees as a unit	When training is provided for 60 trainees as a unit	When training is provided for 30 trainees as a unit	When training is provided for 60 trainees as a unit
				Logic circuit testing equipment	Panel development parts: plug-in type	2 sets	2 sets	2 sets	2 sets
				Electronic circuit testing equipment	Panel development parts: plug-in type	2 sets	2 sets	2 sets	2 sets
				Pulse circuit testing equipment	Panel development parts: plug-in type	2 sets	2 sets	2 sets	2 sets
				Computer element testing equipment	Including computer-controlled testing equipment	2 sets	2 sets	2 sets	2 sets
				Automatic testing equipment	Level control, pressure control, humidity control	1 set	1 set	1 set	1 set
				Sequence circuit control	Contact or contactless (including control panel, model, sensor, load, accessories)	1 set	1 set	1 set	1 set
			Machinery	Function generator	Standard type	6 units	10 units	6 units	10 units
				Pattern transmitter	Colour-bar & dot bar	6 units	10 units	6 units	10 units
				Sweep marker transmitter	TV channel 1~12, FM radio	6 units	10 units	6 units	10 units
				Low frequency transmitter	10 Hz~1 MHz	15 units	25 units	15 units	25 units
				Standard signal transmitter	Including spot signal for AM and FM	15 units	25 units	15 units	25 units
				FM stereo signal transmitter	Standard type	1 unit	1 unit	1 unit	1 unit
				Standard voltage and current generator		1 unit	1 unit	1 unit	1 unit
				Amplifier	30~10,000 Hz 3~150 kHz	3 units	5 units	3 units	5 units

Maintenance Ledger of Training Equipment

Date: _____

Subject: _____

Person in charge: _____

No.	Training equipment	Standard	Q'ty	Date of acquisition	Manufacturer	Place of installation

Maintenance Ledger of Training Tools and Devices

Date: _____

Subject: _____

Person in charge: _____

No.	Training equipment	Standard	Q'ty	Date of acquisition	Manufacturer	Place of installation

Maintenance Ledger of Training Fittings and Fixtures

Date: _____

Subject: _____

Person in charge: _____

No.	Training equipment	Standard	Q'ty	Date of acquisition	Manufacturer	Place of installation

Description Sheet of Damage/ Repair/Modification

Subject: _____

Person in charge: _____

No.	Training equipment	Standard	Q'ty	Date of acquisition	Manufacturer	Place of installation

Material Plan

No.

Date: Dept.: Course: Year:

Head of training center	

Training subject / Lesson plan No. / Required quantity / Name of material, dimensions											Total		
	Q'ty	Q'ty	Q'ty	Q'ty	Q'ty	Q'ty	Q'ty	Q'ty	Q'ty	Q'ty	Q'ty	Cost	Amount

Example of Calculation Sheet for Materials and Expenses

Practice subject / Time / Requirement per person / Article	Cutting work 10 h Q'ty	Cutting work 10 h Unit price	Cutting work 10 h Amount	Filing work 10 h Q'ty	Filing work 10 h Unit price	Filing work 10 h Amount	Drilling and tapping work 5 h Q'ty	Drilling and tapping work 5 h Unit price	Drilling and tapping work 5 h Amount	Blanking and marking-off work 10 h Q'ty	Blanking and marking-off work 10 h Unit price	Blanking and marking-off work 10 h Amount	Marking-off work for cutting 5 h Q'ty	Marking-off work for cutting 5 h Unit price	Marking-off work for cutting 5 h Amount	How to use scissors 5 h Q'ty	How to use scissors 5 h Unit price	How to use scissors 5 h Amount	How to use cutting machine 5 h Q'ty	How to use cutting machine 5 h Unit price	How to use cutting machine 5 h Amount	Bending work 5 h Q'ty	Bending work 5 h Unit price	Bending work 5 h Amount	Total
Mild steel plate	kg 3	¥ 75	¥ 225				kg 1	¥ 75	¥ 75	kg 0.3	¥ 75	¥ 23							kg 0.7	¥ 75	¥ 53				¥ 376
Shaped steel				kg 1	¥ 80	¥ 80				kg 1.5	¥ 80	¥ 120													200
Mild steel bar							kg 0.5	¥ 90	¥ 45																45
Handle of hammer	piece 0.5	450	225																						225
Chisel (6 inches, 15 cm)	piece 0.5	300	150																						150
Saw edge (10 inches, 25.4 cm)							piece 1	50	50																50
Handle of file				piece 0.5	45	23																			23
Drill							piece 1	380	380																380
Sand paper				piece 1		80	80																		80
Filing				piece 0.1		1570	157																		157
Wire brush				piece 0.2		150	30																		30
Oil for cutting								l 1/10	660	66															66
Tap								piece 0.1	500	50															50
Cardboard													piece 1	30	30	piece 2	30	60							90
Galvanized steel													piece 1/15	1400	93	piece 1/15	1400	93				piece 1/15	1400	93	279
Marking-off pin													piece 0.5	950	475										475
Total			600			370			666			143			598			153			53			93	2676

Area of Training Facilities

Classification	Training subject	Type of business the training is aiming for	Details of equipment						
			Object	Name of equipment and tools	Remarks	Quantity			
						First group		Second group	
						When training is provided for 30 trainees as a unit	When training is provided for 50 trainees as a unit	When training is provided for 30 trainees as a unit	When training is provided for 50 trainees as a unit
Manufacturing electrical equipment and electrical work	Electronic equipment		Building and other construction	Classroom, practice room, measurement practice room,	Construction should be electric wave shut-out type.	60 m²	100 m²	60 m²	100 m²
						350 m²	535 m²	230 m²	335 m²
						53	70 m²	53 m²	70 m²
				Tool room, dressing room, warehouse, tools and material room		30 m²	40 m²	30 m²	40 m²
						17 m²	20 m²	10 m²	17 m²
						25 m²	38 m²	15 m²	22 m²
						33 m²	43 m²	20 m²	33 m²
						17 m²	17 m²	10 m²	10 m²

Environmental Maintenance of Facilities

Examples of brightness by work

Nature of work	Brightness of working materials Unit: Lux	Overall brightness Unit: Lux	Reference for other type of job
Super precision	1000~5000	50~100	Watch repair, precision forming, embroidery, precision processing
Precision	300~1000	40~80	Finishing, machine process, drawing, printing auto-servicing
Medium	150~300	30~60	Easy assembly, cast moulding welding, tool woom, dressing room
Rough	70~100	20~40	Carpentry (rough cutting), cast, corridor, staircase, warehouse

Colours of facilities

1) Below the height of the eye — Dark colours are recommended to avoid dazzling and stains

2) Above the height of the eye — Bright colours are better for effective lighting

3) Colour co-ordination — Use a colour that is suitable for the nature of the work, making use of the atmosphere a colour creates. For instance, light blue for the high temperature practice room and light yellow for active practice room.

4) Piping, wiring, equipment and tools, warning colours for dangerous places

Proper use of colours often makes work easier and contributes to increased security. It also for clear distinctions and comparisons. When the government or other organizations specify standard of colouring, we have to follow it.

Improvement of noise level

1) Improve noise level of machines and equipment that are sources of noise.

2) Separate machines and equipment that are the source of noise.

3) Use anti-noise protection devices

Example – noise level

Noise level Decibel	Typical noise	Noise level Decibel	Typical noise
0	Minimal audible sound in sound-proof room	70	Ordinary machining workshop, crowd
10	Whisper from 2 meters ahead	80	Inside elevated train
20	Very quiet room	90	Noisy workshop
30	Quiet private office	100	Noise heard of train passing through station
40	Quiet conversation	110	Rock drill (within 1 meter)
50	Office	120	Can manufacturing, Riveting work
60	Normal conversation	130	Noise causing ear ache

Classroom Management

1) Desks and chairs should be placed so that every trainee can clearly see the blackboard

2) Properly illuminate the classroom giving consideration to natural and artificial light

3) Keep temperature and humidity within the limit of a standard

4) Keep classroom well-ventilated

5) Keep classroom free from noise

6) Clean classroom everyday to keep it clean and tidy

Responsibilities of Security Promotion Committeeman

Responsibilities of Security Promotion Committeeman

1) To take actions to protect trainees against danger and hazards to health

2) To investigate the causes of accidents occurred during training to prevent recurrence

3) To prevent accidents from occurring during the training

Measurement of Working Environment

Job name	Contents of measurement	Duration
Extreme heat/cold/ high humidity	Temperature, humidity and radiant heat in the workshop	Two weeks
Noise	Noise level	One month
Particulates	Density of particulates in the air of the workshop	Six months
Radiant rays	Dosage of exterior radiant rays	One month
Specific chemical substances	Concentration of chemical substances in the air of the workshop	Six months
Organic solvents	Concentration of organic solvents in the air of the workshop	Six months

Periodical Check Sheet

II Each Training Subject

Training subject:	
Date of check:	
Person in charge:	Manager:

	Item	Judgement	Situation	Measurement	Date of measurement done/manager's signature	
	A Practice room					
	1 Floor					
	(1) Bumps					
○	(2) Oil or water drops					
	(3) Drainage					
	2 Passage					
○	(1) Securing passage with white line (width more than 80 cm)					
	(2) Bumps					
○	(3) Oil or water drops					
○	(4) Stumbling blocks (width 80 cm or below, height 180 cm or lower)					
	3 Staircase					
○	(1) Damage					
○	(2) Banisters					
	4 Openings etc.					
○	(1) Installation of enclosure					
○	5 Natural and artificial lighting					
	6 Air volume per person and ventilation					
	7 Noise and vibration					
	8 Harmful dust, gas, and steam					
○	9 Keeping things in order					
	B Working motion					
	1 Setting standard for safe work					
○	2 Wearing guards					
○	3 Clothing					
	C Machinery					
	1 Transmission					
	(1) Installation of cover and enclosure					
○	(2) Hardrails for railway crossings and bridges					
	(3) Engine shut-out devices					
	(4) Signal to start operation					
	(5) Sealing of belts					
	2 Machine tools					
	(1) Enclosure for rotation-processing substances					
○	(2) Tightening screws					
○	(3) Checking grinding stones					
	(4) Dust collector for grinding machines					

	Item	Judgement	Situation	Measurement	Date of measurement done/manager's signature	
	2 Wiring					
○	(1) Coating, appearance					
	(2) Prohibition of fixing codes					
	3 Wiring tools					
◎	(1) Fuses (within approved amperage)					
◎	(2) Covers for covered switches					
○	(3) Exclusion obstacles to switch operation					
F	Footing					
	1 Materials					
	(1) Materials					
○	(2) Installation of working floor					
◎	(3) Indication of maximum loading tonnage					
	2 Footings made of logs and steel pipes					
○	(1) Connecting wells					
	(2)					
	3 Suspended footings					
	(1) Suspending wire ropes					
	(2) Suspending chains					
○	(3) Working floor					
G	Tools					
○	1 Damage to tools, rift, peeling, loose handle					
	2 Moving ladders					
◎	(1) Damaged materials					
◎	(2) Anti-loosening devices					
	3 Step-ladder					
◎	(1) Damages on materials					
◎	(2) Maintaining certain angle between foot and flat level					

(1) Mark ○: daily, mark ◎: weekly, no mark: monthly check

(2) In the column of 'situation' fill in unsafe conditions

(3) Measurements for conditions are recorded in 'measurement.'

(4) After check job is done, it has to be approved by the manager. When a measurement is taken, approval of the manager is also needed.

(5) For items of I General Security and Sanitation, a person appointed by the head of the training center is supposed to take action, while those for II are implemented by Security Promoter.

(6) This check sheet is to be comprehensible. For practical purposes, please make your own through discussions.

Security and Sanitation Check List

Reference

Security and Sanitation Check List

Date:

Person in charge:

Manager:

I General security and sanitation Good or pass: Bad: ×

Item	Judge-ment	Item	Judge-ment
1 Cleanliness (1) General cleaning (2/year) (2) Dealing with harmful substances and dirt (3) Washroom (including rinsing-mouth facilities (4) Eye rinsing facilities (splash type) (5) Dressing room (6) Bathroom (limited to the work that makes workers dirty) (7) Toilet (hand wash facilities) 2 Health and sanitation facilities (1) Keeping tools and materials in good condition (disinfectant, burn medicine, splint, stretcher etc.) (2) Health room 3 Health check-up (1) At enrollment (2) Periodical check-up (3) Special health check-up (4) Maintaining personal record 4 Health consultation 5 Gymnastics		6 Accidents (1) Record of how it occurred (2) Analysis of the cause (3) Prevention of the same kind of accident 7 Fire protection ◎ (1) Fire-prevention and fire-fighting facilities (2) Evaluation and fire-fighting training (3) Alarm devices ○ (4) Dealing with flammables (5) Chimney (6) Checking of anti-lightning devices ○ (7) Anti-fire preparations at places where naked flames are used. 8 Dormitory (1) Dormitory rules (2) Evaluation facilities (3) Evaluation and fire-fighting training (4) Alarming devices (5) Cleanliness (6) Wash room (with hand-washing facilities) and toilet (7) Sanitary management of dining hall, and kitchen (8) Health check of kitchen workers (9) Toilet for kitchen workers (10) Keep out of kitchen	