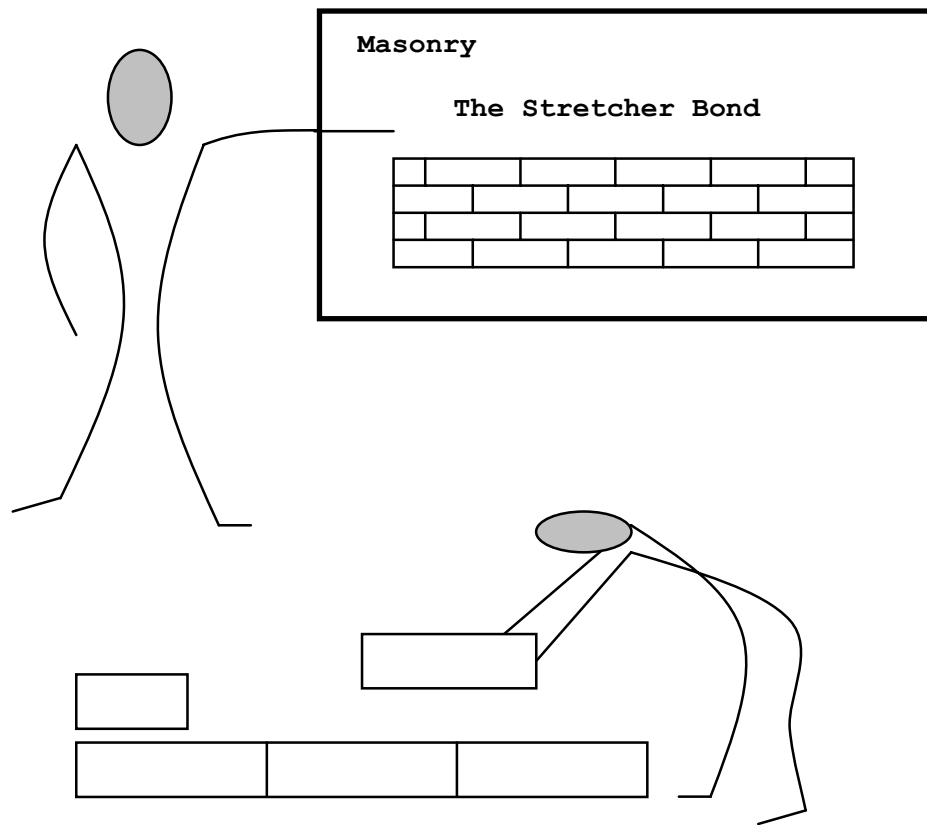


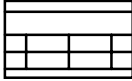
TEACHING IN THE TVET SYSTEM



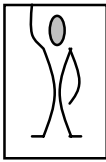
A CONCEPT FOR THE TRAINING OF VOCATIONAL TEACHERS

Robert Schrembs

For the use of this book:



This sign is the symbol for a lesson form. It announces that the explanation is based on the example in the first section and should help to make explanations concrete.



This symbol indicates an experiment that was done to give a proper explanation or shall be seen as a request for doing a practical exercise.

Depending on the organisation to which an institution belongs, there are different terms in use. In this book, Vocational Training Centre, Technical Training Centre, Technical Training Institute, Vocational School and Vocational Training Institute... are used synonymously. The same goes with the terms for the staff: (Vocational / Technical) Teacher, (Vocational / Technical) Trainer, (Vocational / Technical) Instructor...

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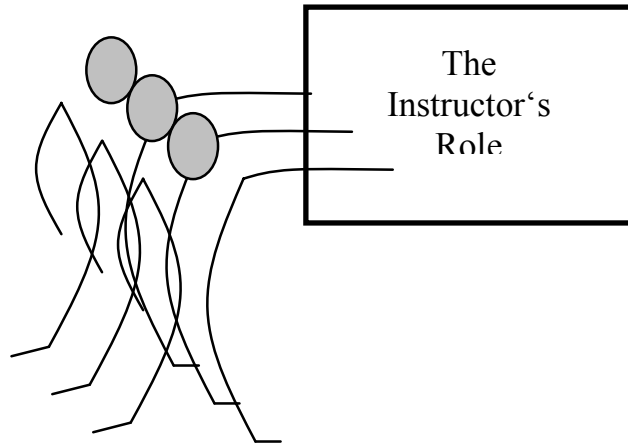
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1 The Particular Role of an Instructor

The qualification of teachers at technical and vocational schools and training centres are different from those of the general educational sector. Instructors are not only teachers or educators. They are craftsmen and sometimes they have to work as advisors, in particular, as business advisors. Hence, an instructor has to have a variety of abilities.



1.1 Personal Competencies

Instructors are not born as instructors, they have to be trained. Some people might have a particular talent for teaching but most people don't. However, teaching can be learnt. A major prerequisite for this is that a person wants to teach. Someone who is urged to teach can never be a good teacher. Apart from abilities that can be trained, a teacher should have some character capabilities.

A model instructor has a well-balanced personality and is not temperamental. This will help trainees to build up confidence in the instructor and lead to a good mood in the classroom. He / she should have natural authority and be able to guide young people. What is meant is the art of dealing in human relations. To be able to move individuals forward for their best efforts. Being a leader requires having a sense of responsibility. Furthermore it is helpful to love justice and be objective and co-operative. Patience is essential.

Indeed, it is hard to find somebody who unites all these characteristics. However, everybody who is teaching young people should consider these as goals to be achieved in his job.

1.2 Pedagogical Competencies

This type of qualities can be acquired during the teacher training course. It can be regarded as the contents of a teacher's apprenticeship.

First of all a teacher must be able to choose the correct and most important topics of a trade. Not everything can be learnt within the period of training. The second step is to group these topics into logical units and prepare proper lessons with it. Planning and running a lesson requires competencies in the whole field of teaching techniques. The most important are covered in this book. He should be able to transfer theoretical knowledge as well as practical skills.

In addition to the transfer of knowledge, an instructor has to advise the students mainly in the field of job finding or self-employment. Sometimes students even look for advice in personal affairs.

1.3 Professional Competencies

These abilities include the professional skills. A teacher should have acquired them during his own apprenticeship as a craftsman and his working experience.

He / she must be a master of his / her trade. To be a master does mean being a model. It is not enough to be a craftsman but a good craftsman. An instructor should always keep his / her eyes open for changes and developments in his / her trade. Instructors should always be up-to-date and interested in further training and upgrading. It is very necessary to have a wide range of general knowledge too.

Finally, there are organisational and administrative duties which an instructor has to do.

1.4 Styles of Leadership

<i>Features</i>	<i>Autocratic</i>	<i>Democratic</i>
<i>Guidance</i>	<p>It is the instructor who is guiding. He / she gives orders what to do and what to leave. The teacher is the undisputed master of the situation. Initiatives of the students are not tolerated. The teacher provides the information he / she declares to be important. The teaching style is usually the presenting one.</p>	<p>The instructor tries to integrate the students. He / she wants to encourage trainees to develop their own initiative. The organisation of the classes is done in co-operation with the trainees. Trainees get comprehensive information to enable them to build up their own opinion. Teaching style is the developing and discovering way.</p>
<i>Esteem</i>	<p>The trainees are not regarded as partners and instructors normally insist on sovereignty. Teachers don't place confidence in the trainees. The teacher's attitude is pessimistic and the atmosphere is cool.</p>	<p>Teacher and students regard themselves as partners. The teacher is open to problems of the students. The instructor presumes the trainees' willingness to learn. His attitude is optimistic. The atmosphere reflects mutual acceptance.</p>
<i>Praise / Rebuke</i>	<p>The teacher has often something to criticise. He punishes quickly when his / her orders are not fulfilled. High achievers are presented as models.</p>	<p>The students are urged to control themselves. The instructor investigates the reasons for any failures. The criticisms are objective and constructive. He / she praises often and avoids punishment.</p>
<i>Consequences</i>	<p>Initially it allows the transfer of a lot of knowledge. However, trainees are not very motivated and feel uncomfortable and under pressure. Students become receivers, their own initiative is killed, and creativity is blocked. Trainees develop a negative attitude towards the teacher.</p>	<p>The speed of learning is lower in the beginning but increases quickly. Trainees learn autonomously. They develop interest in learning. Spontaneity and creativity are promoted. The students feel comfortable. The mood among trainees is relaxed. There is "fair-play".</p>

2 An Excursus to Educational Psychology

Learning can happen always and everywhere. What is called teaching can be defined as *planned and organised learning*.

Educational psychology provides knowledge and information to optimise learning processes. Educational psychology for teacher training is focussed on optimising the circumstances in school. Apart from educational policy, it is the qualification of teachers which gets priority. Psychological knowledge shall enable them to reach the highest level of efficiency in their teaching efforts.

Learning is part of the human "information technology". Information has to be received, saved (scientifically called "coding") and shall be recalled. Receiving and coding. Together constitute the actual learning process. Recalling of information is named *performance*. New impressions or additional knowledge permanently influences coded information in our brain. Knowledge varies through experience. To be able to remember facts ("decoding") after a certain period depends to a great degree on the way it was coded. Sometimes one can only remember some details but with the time everything is remembered. Hence, coding and decoding cannot be compared with a tape-recorder, which replays exactly what was recorded.

Within this excursus it is not possible to cover all aspects of educational psychology. The intention is to introduce some areas, which are closely connected to our teaching routine. Our major concern as instructors is to transmit knowledge that trainees are able to learn and to remember easily. Instructors can promote this.

In the first place it is important to have some knowledge about the human *memory system*.

2.1 Memory And Information Processing

The human memory system has three components: the sensory memory, the short-term memory and the long-term memory. When

information comes for e.g. in pictures, a written text, spoken words or a song, it will either be coded or forgotten again.

☞ Sensory memory

It can save information for only less than *one second*. It helps to transmit in-coming information to the short-term memory. For example: while reading these sentences you have already forgotten the words with which the last sentence or even this sentence started. These words were only in the sensory memory and helped us to identify the information.

☞ Short-term memory

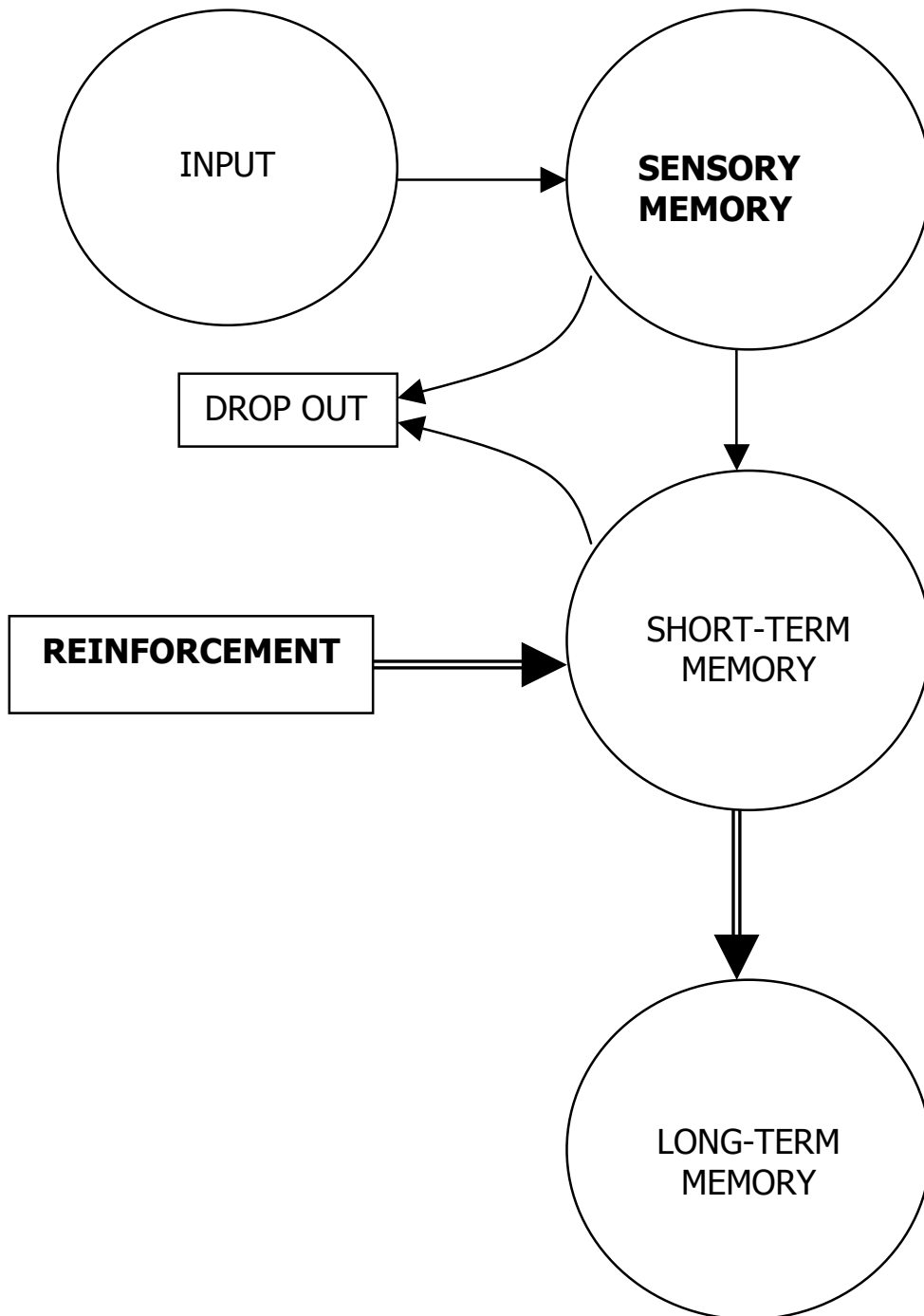
It can save information for about *15 seconds*. The capacity of the short-term memory is limited to 7 items. While information is in the short-term memory it can be *reinforced* (e.g. By frequent repetition). This means that we are coding this information to store it in the long-term memory – we try to *learn* it! This coding can be influenced positively e.g. through visualisation and assimilation. How fast and easy we learn depends on the type and intensity of the reinforcement received. When the information is not reinforced it will drop out again.

It has to be acknowledged that coding does not only occur willingly. For example someone had a car accident. This accident was so terrible that the incident itself had such a reinforcing character that the person always sees the terrible pictures and cannot forget them, even if he / she wanted.

☞ Long-term memory

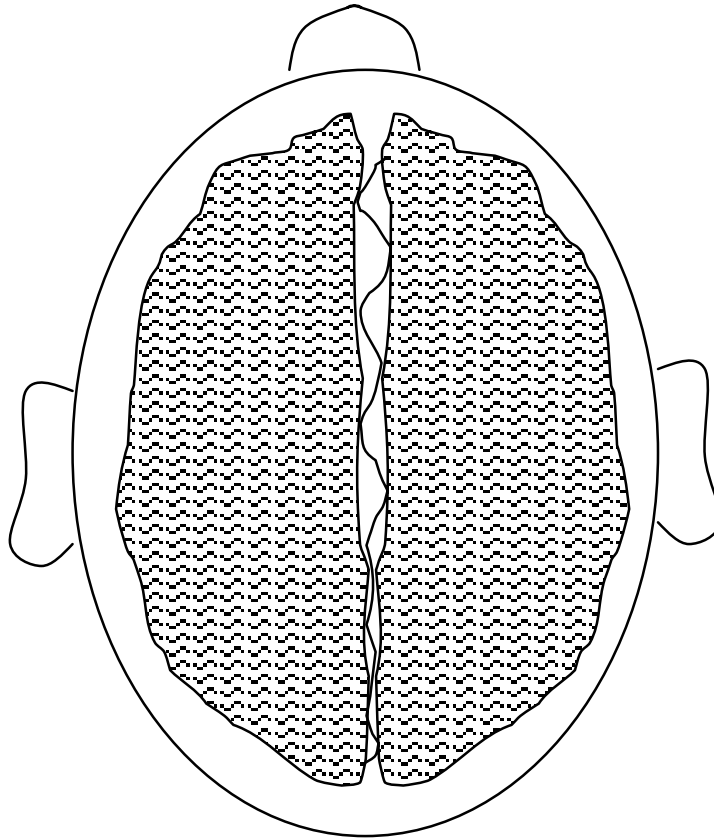
It can save information for a very long time, even for lifetime. The capacity of the long-term memory is generally unlimited. Whether information can be remembered (decoded) easily or not depends on the way it is coded. Sometimes information is lost because we cannot find the key to the right door in our brain. In addition, misuse of alcohol and drugs can destroy the brain cells where information was stored.

Information Processing



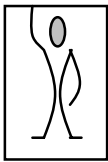
2.2 Visualisation

Experiments showed that the human brain (cortex) can be divided into two parts (hemispheres). The two hemispheres take over different tasks and react on different inputs.



Left hemisphere	Right hemisphere
Connection to consciousness	No connection to consc.
Linguistic	Musical
Conceptual	Visual
Arithmetic	Geometric
Analytical	Homogeneous
Abstract	Concrete

To demonstrate this essential difference, an experiment was done in several workshops (following an experiment on eidetic from DÜKER). The participants were divided into two groups. Everybody was asked to do a simple line drawing. However, one group got only a written description of the picture whereas the second group got the picture itself. Both groups could study their information for 5 minutes and then had to put it away and were allowed to start drawing.



If you want to do the experiment on your own, just study the following text for five minutes, put the book away and try to draw the picture. When you are finished, continue with the book.

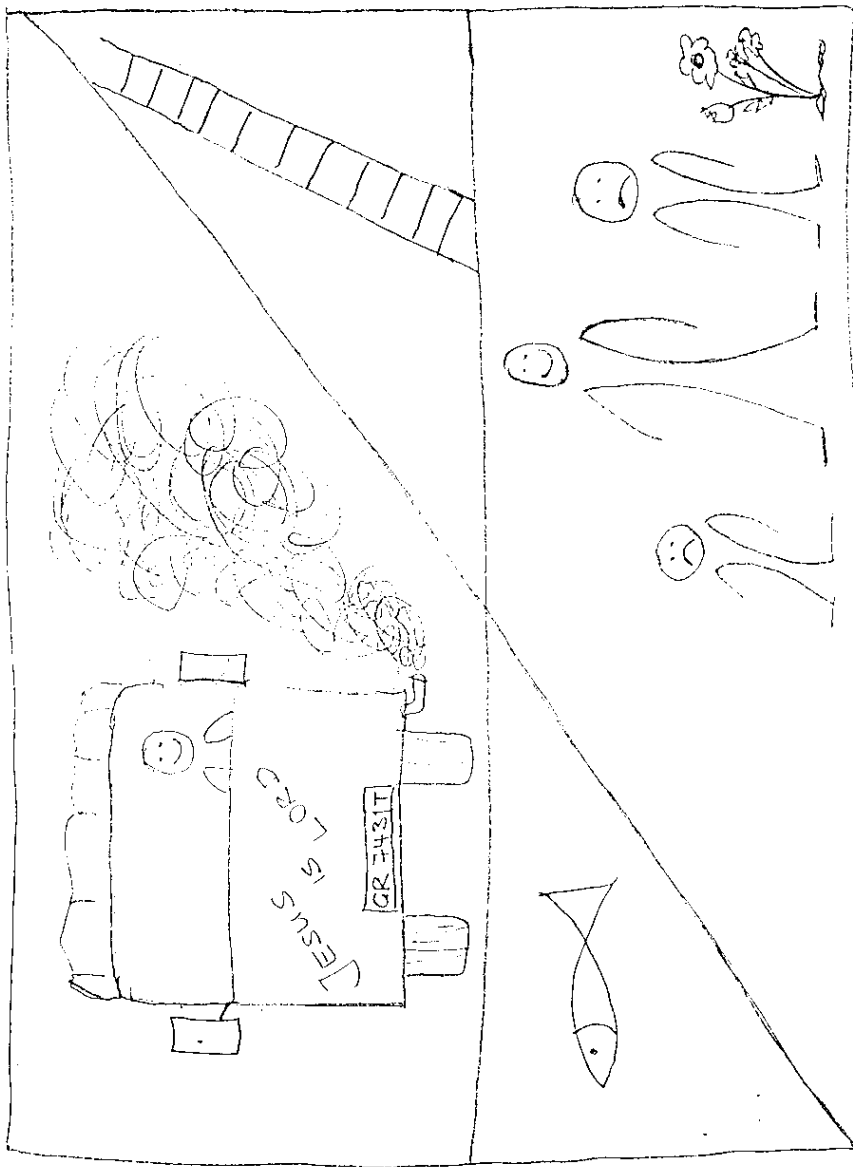
Experiment 1

“The picture is a line drawing. It is rectangular, landscape. A horizontal line in the middle and a diagonal line leading from the left bottom corner to the right top corner divide the picture into 4 sectors.

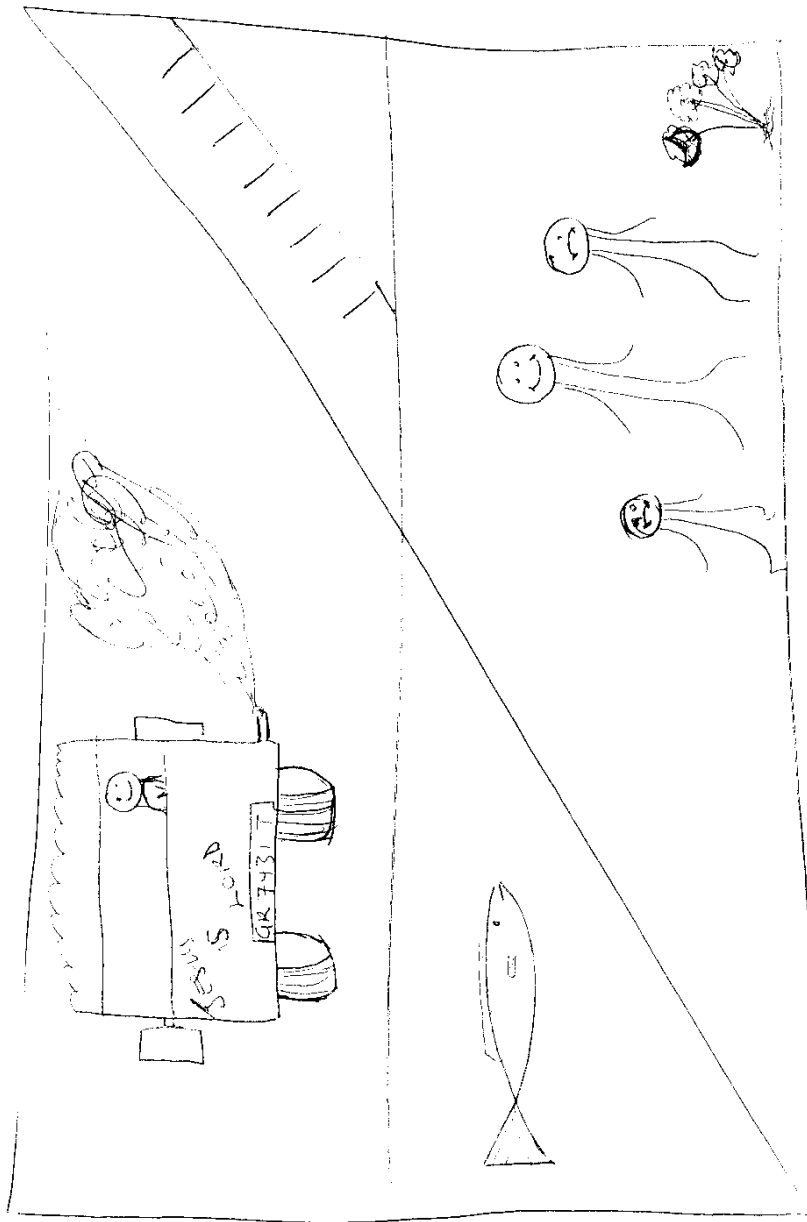
In the left top sector you see the front of a truck with 2 mirrors, a smiling driver and the plate. The truck has the licence number: GR 7431 T. The front shows the inscription: JESUS IS LORD, diagonally written in capital letters. On the driver’s side there is a huge smoke from the exhaust. The right top sector shows a ladder going from the bottom to the corner. The bottom left sector shows a fish swimming from right to the left. In the bottom right sector you can see three matchstick men and a bunch of flowers on the right. The person in the middle is the tallest and is laughing. The person on the left is the smallest. He looks sad. The right one is also looking sadly.”

“Study this text for five minutes. Then put it away and start drawing without the help of the text!”

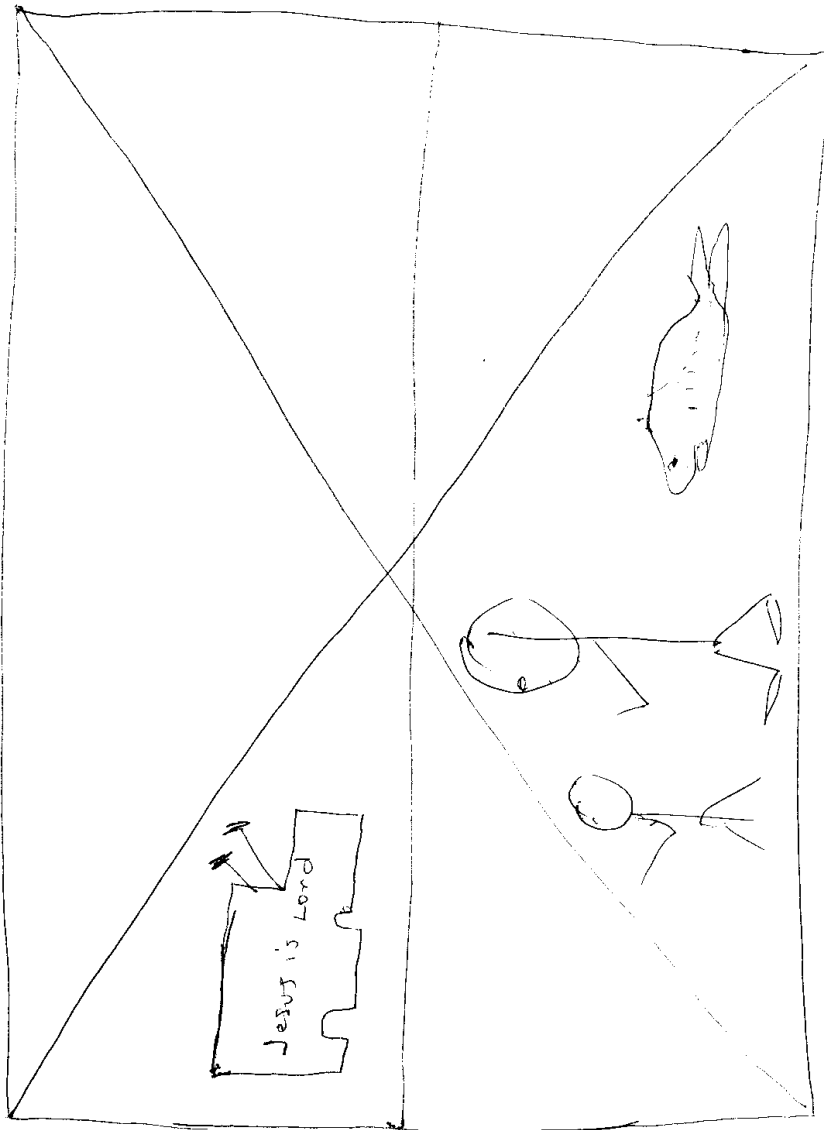
The second group was allowed to study the original picture shown on the next page. After 5 minutes they had to take it away and start drawing too.



Model drawing



Drawing of a participant who saw the picture



Drawing of a participant who had only the text

Conclusion

The experiment shows that sometimes pictures can explain things much better and easier than words. Long explanations do not have the effects that a picture can have. Those persons who had only the text had first to transfer the written information and create a picture. The written information was only directed to the left hemisphere of the cortex. They had to make an abstract information concrete. This process was so difficult that finally the information could not be coded. The second group saw the picture. The right hemisphere is well prepared to take up this type of information. Coding is easy and the results are overwhelming.

Whenever an explanation cannot satisfy trainees it might be that it was done the wrong way. A picture can say more than thousand words.

2.3 Assimilation

New information can be coded easily when it can be assimilated with something familiar. It justifies why teachers start a new lesson by referring to the last one. An experiment shall demonstrate this, too.

Experiment 2

A test group was shown a shelf with 6 drawers, providing space for the following products:

Vegetables	Drugs	Minerals
Tools	Fruits	Chinese

Then one person was given a basket with the following items in it:

- 1 bottle of Coca Cola
- 1 package of Aspirin
- 5 tomatoes
- 1 pineapple

- 6 porcelain cups
- 1 hammer
- 1 video-cassette
- 1 litre of milk
- 5 potatoes
- 1 mini accumulator

The person was asked to store the goods in suitable drawers.

Result

The person did not have problems to store the Coca-Cola, the package of Aspirin, the tomatoes, the pineapple, the porcelain cups, the hammer and the potatoes. She found a suitable place for everything but had problems with the video-cassette, the milk and the mini accumulator. She did not know where to store the milk and the video because they didn't seem to have an appropriate place. The person did not know what a mini accumulator is.

The person was then asked to store the left items somewhere. At the end of the workshop the person was asked to retrieve the videocassette from the shelf. It took some time to remember where the videocassette was, whereas the participant was able to find the aspirin immediately.

Conclusion

Our brain can be regarded as storage too. When there is new information coming in which has already a background, this information is easy to store (code). Storing this new information somewhere can make it difficult to find it (decode it) again later on.

Therefore we should always try to give information in a familiar context. Isolated knowledge is dead knowledge! The same goes for unstructured knowledge. If the drawers of the shelf did not have labels or the bag with the tomatoes was not transparent, it would be difficult to store these items.

3 Course introduction

The following teacher training course can have as a title „how to plan and run a lesson successfully“. A successful lesson means that at the end of the lesson the instructor was able to download his knowledge and the trainees really understood what was taught. As we saw in the last chapter, the human being's mind is limited in learning. We cannot process all the information we are given. The instructor as master of the subject has the task of pre-selecting information for the trainees and to make the knowledge trainee-oriented. It means that the information that is given to the learner has to be organised and systematically planned. This is a main condition for the students to be able to pick up the new knowledge easily. It is our aim, to make the trainee a skilled person during his apprenticeship. The importance of Vocational Training has already been explained above. Consequently the instructor has to check permanently whether he was clearly understood or not. Time is wasted when a lot of information is given but not understood by the trainees. The more interesting a lesson is the higher the motivation of the trainees to learn. Variation makes a lesson lively. Therefore several methods of teaching and teaching aids will be introduced. „Plenty fish does not spoil the soup“ is a Ghanaian saying. It is suitable for a lesson too. This course's aim is to make teaching more efficient on the one hand; on the other hand it shall make teaching easier for the instructor. For this course section not to become too abstract it is preceded by a lesson and most examples refer to this lesson plan. In the beginning a lesson form will be introduced. There exist various types of lesson forms and many teachers have developed what is suitable for them. The following one was developed and modified in some of the courses that were held with Ghanaian colleagues and declared to be convenient.

3.1 The lesson form

A lesson form should help the trainer to structure the lesson so as to be a guideline. It should cover all information needed to run this particular lesson. When planning a lesson with the help of this form, always remember to do it as easy as possible. So please write down any information you might need.

The form is divided into three sections: (A) the information line, (B) the blackboard notes and (C) the lesson course.

(A) The information line

It is so-to-speak the administrative part. It keeps information about the department and trade for which the lesson is planned, the subject and the date and last but not least, the topic of the lesson. This makes it easy to store information and find it again.

(B) The blackboard notes

When speaking of a blackboard it is not necessarily a blackboard. It doesn't matter which type it is. Sometimes it is a whiteboard or whipe-board or even a chalkboard. This field is where the teachers write down the notes that will later on be written onto the board in the classroom. In a later chapter you will get more information on how to use a chalkboard.

(C) The lesson course

This part shows the actual order of events during a lesson. It is based on the „four-step-method“ that will be explained later.

C1 contains the opening of the lesson. It tells the user how to begin the lesson, how to introduce the new topic. In the four-step-method it is called preparation or introduction.

C2 represents the presentation step.

C2.1 shows the specific objectives (introduced in chapter 7)

C2.2 gives information about how the objective will be treated, how the instructor plans to go about this matter. The various possibilities will be treated later as well.

C2.3 tells you which method is intended to be used and the teaching aids you need for this particular step of the lesson. In case this lesson plan will be used, let's say one year later, the instructor just has to look to this section to see what items are needed to run this lesson.

C2.4 contains questions or other tasks that give a feedback

C2.5 schedules the time

C3 contains information about the way the instructor wants to run the application step.

C4 bears the ideas for the final check-up.

Maybe it is better to introduce this form at the end of the course, because most of the expressions might be new to some readers and the explanation is found in later chapters. To present it in the beginning shall provide a better overview and make it easier to understand the given examples in the right context.

3.2 A model lesson

The following lesson is out of the subject THEORY. It is about THE DANGERS THROUGH ELECTRICITY. The main reason why this example was chosen is that this topic is suitable for almost every trade except those areas where is no power at all. Dressmakers may use electrical sewing machines or at least an iron. People of the catering field use a cooker. Carpenters and joiners have several woodworking machines. The concrete mixer is used in the whole masonry field and electrical welding is common in all „metal trades“. The briefing of the lesson shall show how the instructor planned to go about this topic. Details of the lesson plan will be explained more intensively in the subsequent chapters.

Introduction / Preparation

The instructor starts the lesson by showing a chart (see chart # 1). It shows a person shivering after touching a faulty concrete mixer (dressmaker may use an iron, carpenters a band saw and so on). The trainees are asked to describe what they see. This will lead to the topic: DANGERS THROUGH ELECTRICITY. The topic will be written on the chalkboard. As it is Ghanaian custom, a definition of electricity is given. The trainees are asked how electricity can influence their work. Trainees could also comment on the saying „electricity is a good man and a bad man“. The result might be a sentence as it can be seen on the lesson plan: „electricity is helpful in various trades. It makes machines run and gives light“.

Presentation

The teacher stated three specific objectives for this lesson and treats them one by one.

First he wants the trainees to be able to enumerate some sources of accidents through electricity. Therefore he is reading an article (fake) in a newspaper (see „daily graphic“) and after that he asks the questions noted in the lesson plan. The answers will be written on the chalkboard. The question „What other types of accidents can happen“ gives the trainer a feedback whether the trainees understood or not. When he is satisfied, he will go to the next objective.

Trainees should be able to explain the electrical shock. For this reason the teacher shows two types of cables and continues referring to the lesson plan, ending with a question about fuses to check understanding.

The last step is to make trainees alert to the importance of workplace safety. This will be done in group-work. The trainees are given 10 minutes to discuss among themselves in various groups, how an accident can affect an individual, his or her family and his or her employer. The groups write their answers on cards (explained in

chapter 13) and the group leader presents the results. To get a feedback, some trainees should comment on the statements.

Application

This is the time when trainees apply the new knowledge. They were asked to create some safety regulations. The results are fixed on the chalkboard.

Final check-up

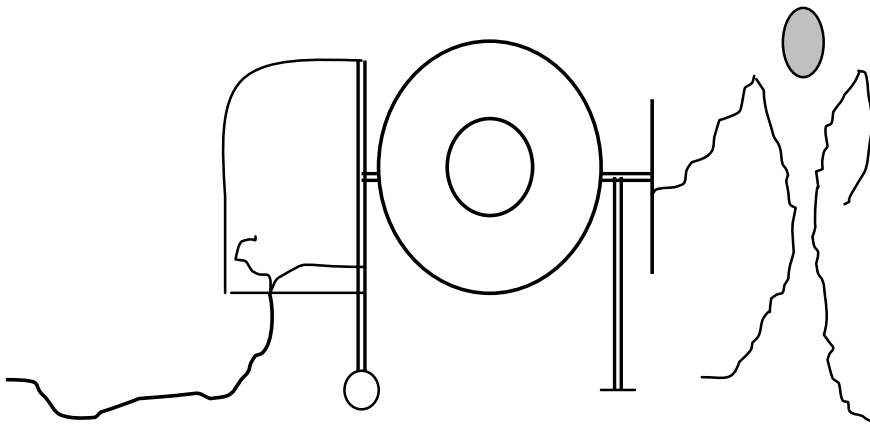
This step can be seen as a short summary of the whole lesson. In this case asking the question „Why can even somebody’s family be afflicted by an accident through electricity“ does it. Most of the trainees should be able to answer properly by explaining that it can hurt a person or even kill him/her. The family will be affected because a family member is without income temporarily, and so on. END OF THE LESSON.


"DAILY GRAPHIC"



Last Monday a report of the Korle-Bu Teaching Hospital in Accra was published. The spokesman of the hospital said that within the last two weeks 16 persons have been treated because of accidents at the workplace. Most of them had an electrical shock. The man said that 10 persons were using a faulty machine and got a shock from it. Another 3 persons touched a cable that was old and not properly isolated. The hospital's official explained that at least one person was drunk and was shocked when he tried to connect a concrete mixer with the socket. He wanted to remove the safety of the socket with a nail. He further said that this person was very lucky, because the high voltage could even have killed him. The speaker reminded people to be careful when operating electrical machines.










(This article is not a true story. It was written to be used as a teaching aid in a lesson)

CHART # 1



Department	Trade	Subject: Theory	Topic: danger through electricity	Date
DANGER THROUGH ELECTRICITY				
<p>But accidents can happen when:</p> <ul style="list-style-type: none"> - machines are faulty - cables are faulty - people are careless 	<p>When someone gets an electrical shock, currency flows through the body and injures the person.</p> 	<p>Electricity is helpful in various trades. It makes machines run and gives light.</p> <p>There are many consequences of an accident:</p> <ul style="list-style-type: none"> - for the person: he / she can seriously be injured or even die - for the family: it loses manpower and income - for the company: it loses an employee and cannot finish the job 	<p>Safety Regulations</p> <ol style="list-style-type: none"> 1. Check machines before using it! 2. Check wires for faults! 3. Never consume alcohol during working hours! <p style="text-align: center;">XXXXXXXXXX</p> <p style="text-align: center;">ALWAYS BE CAREFUL!</p>	
Preparation: showing chart # 1: electrical shock. Question: please comment this chart, or: what happens to this person? Who has ever had an accident? 5 min.				
Objectives (1-3)	Presentation	Method/ T - aids	Check-up	Time
<p>Trainees should be able to enumerate three sources for accidents with electricity (1)</p> <p>Trainees should be able to explain the electrical shock (2)</p>	<p>Instructor reads an article (fake-article) from the Daily Graphic about accidents at the workplace. Trainees shall listen and were ask questions:</p> <ol style="list-style-type: none"> 1. Did you watch any accident at the workplace before? 2. How many people were involved in accidents in this article? 3. How did these accidents happen? <p>Instructor shows two cables to the class. One is all right, one is faulty. Trainees can see that the rubber is spoiled and the wire is free. Questions:</p> <ul style="list-style-type: none"> - Which of the cables would you prefer? - Why would you prefer this one? <p>What would happen if you got in contact with that wire (faulty) and it was connected to the socket?</p>	<p>Developing way</p> <ul style="list-style-type: none"> - Newspaper article <p>Developing way</p> <ul style="list-style-type: none"> - new cable - faulty cable 	<p>What were the reasons for the accidents mentioned in the newspaper?</p> <p>Why do electricians use fuses?</p>	<p>5 min.</p> <p>5 min.</p>
<p>Trainees are willing to argue for workplace safety (3)</p>	<p>Class will be divided into three groups. They were given the following task: An accident has many consequences. Try to find out what consequences there are: 1. For the person, 2. For the family, 3. For the company. Discuss it within the group and take it down on the zopp-cards.</p>	<p>Discovering way</p> <ul style="list-style-type: none"> - Group work - zopp-cards - markers, pins 	<p>Please comment on these statements</p>	<p>15 min.</p>
Application.				
Let's figure out some safety regulations. Instructor writes results on the blackboard				
Final check-up				
Question: Why can even somebody's family be afflicted by an accident through electricity?				
				10 min.
				5 min.

Department	Trade	Subject:	Topic:	Date
 				

Preparation: Objective	Presentation	Method/ Teaching aids	Check-up	Time
				
				
				
				
				
Application. Final check-up				

4 Lesson Preparation

A good lesson preparation is everything, a bad one is nothing. A sound planning takes a long time and a lot of work. But once done, it will serve you for a long period and make your teaching easy. A well-styled lesson will arouse the interest of the students. This prevents disciplinary problems in the classroom and raises the amount of items learnt. An instructor can even spontaneously run the lesson e.g. when called to replace a sick colleague. A lesson preparation is a very comprehensive task. It requires farsightedness because this lesson plan will be the foundation for testing at the end of a period. The objectives, the check-ups and the blackboard notes can be very useful when composing any trade test or other test. It gives the trainer the guarantee that the questions are at an adequate level so that trainees will not be overtaxed or feel treated unjustly. The following chapters shall assist instructors with the lesson preparation and show why it is necessary to have one.

4.1 Principles for Effective Lesson Planning

A lesson should follow various rules. The most important thing is that a lesson has to be structured. The importance of structure was already explained in the part about educational psychology. A fix scheme for a lesson has various advantages for trainees, as well as for instructors.

A fix structure gives the trainees a feeling of safety and the possibility for orientation. It is the wish of every instructor that the trainees follow the lessons. This is however not always the case. No person can always concentrate the way the teacher expects. Various thoughts might be in a trainee's mind which an instructor will never find out, but might be important for a trainee. It can be problems within the family any other trouble, or the trainees might just be thinking of their girl / boyfriend.

This has nothing to do with the teacher him/herself but is a normal and natural thing. Even if a trainee did not listen for a while, he / she would be able to follow the teacher's intention. This will at least help to keep up the motivation.

To organise a lesson also means, that the instructor progresses gradually. The new knowledge is arranged in logical units. In this way the trainee can easily understand it, because it allows him to process this new information. He will be able to add unknown facts to familiar ones and so upgrade his knowledge step by step. According to Educational Psychology, this method helps to improve the learning process and raises the quantity of remembered items.

The division of the lesson into several small units allows the instructor to check his own efforts. Furthermore it enables him/her to check step by step whether the trainees are following or not. This will enable the teacher to change the strategy, where necessary. Basic knowledge has to come before specific knowledge. Only when the basic knowledge is there - and of course understood, does it make sense to go on. One cannot do step two before step one. Detecting that trainees did not get the message at the end of the lesson is too late. But discovering lack of knowledge after a short sequence allows the teacher to repeat or explain in detail to be sure that he can proceed with the next step. However, arranging a lesson this way has some difficulties too.

There is no common scheme that is best for every lesson. What is introduced with the lesson format is one way. Within a teacher's life he or she may change the strategy several times and try new ideas. Instructors as well as students are individuals. What is suitable for one is not necessarily convenient for somebody else. Everybody will once develop his own scheme for a lesson. But for the beginning, experience has shown that the format used in this course provides a good guideline.

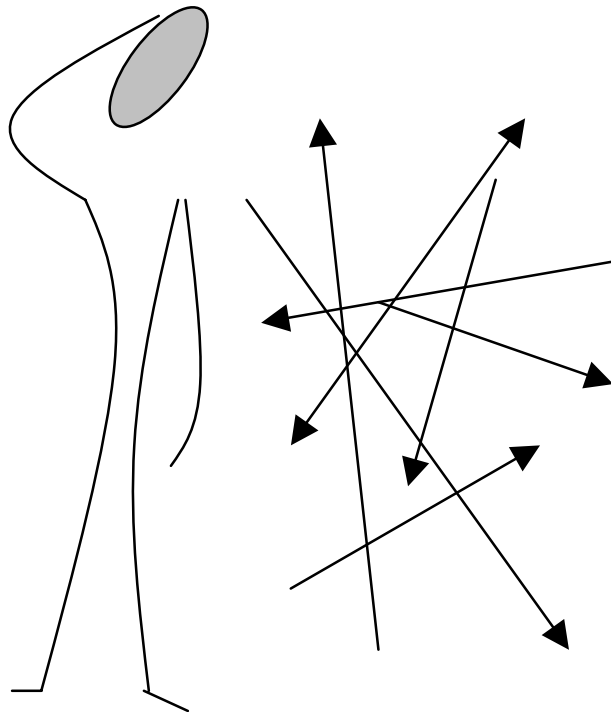
The order cannot be kept in every situation. This will depend on the subject being taught. Some educationists argue that a fix lesson scheme may make the lesson boring. They say that a schema does not allow for variation. Teachers might not be able to react to trainees' interests that may come up while teaching and this may limit the instructor's creativity. This will however depend on the experience of the instructor. New instructors might have more problems of this

nature. One should remember that a lesson scheme is not a recipe that guarantees good performance but should be seen as help for teachers to organise their work. The 4-Step-Method can therefore be described as a reasonable foundation for the success of theoretical lessons in vocational training.

When organising and preparing a lesson, there are several principles that should be considered.

The Principle of structure

This principle can also be called the "central thread". To structure knowledge means to split it into logical units. This enables the students to understand easily. Teaching matters of this type can also be learnt and remembered easily. The trainees are furthermore educated to identify new problems and solve them. It supports a holistic education for problem-solving. Unstructured knowledge on the other hand is harder to learn and easier to forget. Pedagogues refer to unstructured



knowledge as isolated knowledge. As we learnt in an earlier chapter, it is difficult to get this type of information into the long-term memory. Whereas facts being included in a logical relation to others are “very resistant against forgetting” (Skowronek).

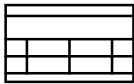
Some ideas which might help to realise the principle:

- show how the new issues are connected



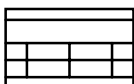
During the lesson trainees get quite a good perception about how big the consequences of an accident can be and the fact that it could happen to them as well. It is nothing that happens only to other people. Everybody is confronted with electricity almost every day.

- Explain the connection with other situations



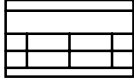
The danger through electricity is not only existent at the workplace. Many people have to work on sites or in other people’s homes, where it is not always possible to check machines. It is not everybody who is aware of the possible dangers. Wherever trainees come into contact with electricity there is an invisible danger.

- Explain the aim of the lesson



The aim of the lesson is to prevent the trainees from being injured. Besides the trainee, a lot more people are affected by any injuries. If there was enough time, a role-play can be exhibited. The classroom is the place where a trainee got an electrical shock. What has to be done? The person might be taken to hospital – there you have costs from the treatment; doctors and nurses have additional work and so on.

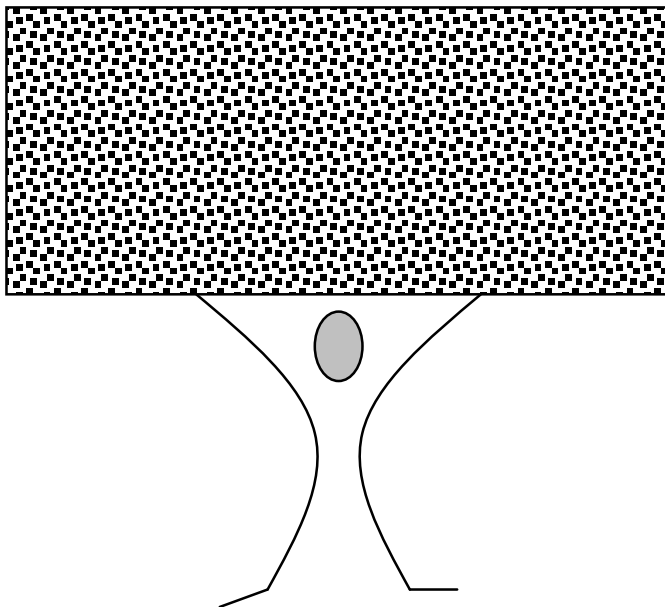
- Arrange the data clearly



It can easily be seen from the blackboard that there are five units of information. The heading and subheading that give an overview of the topic. Below are various reasons why accidents happen. In the middle, students get an explanation on what happens when somebody gets an electrical shock. In a next block they are informed about the far-reaching consequences an accident can have. The very right unit shows how to behave to avoid a disaster.

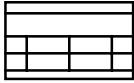
“Isolated knowledge is dead knowledge” (Brunnhuber)

The Principle of comprehensibility



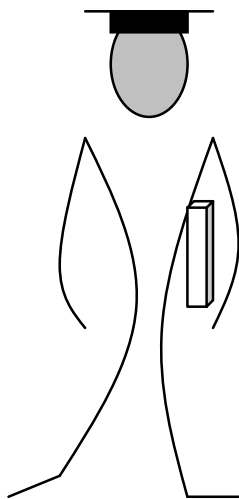
Most of the information is new to the trainees. Instructors have a higher level of knowledge than trainees. So they have to prepare the subject matter to the level of the trainees so that they are able to understand. Do not feed students with irrelevant information. Reduce it to what is

necessary for every individual.



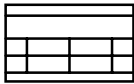
The definition of electricity is very clearly presented. It is not a technical definition but sufficient for a trainee in the field of e.g. dressmaking. It is for sure not sufficient for an electrician. This person should know a lot more about electricity. In our example the lesson is about an electrical shock. So there is no need for a more detailed explanation of electricity. Regarding the "electrical shock" itself, trainees learn that currents flow through the human body. This is what everybody will understand and what is at the level of a mason. It was not sufficient if you would teach nurses or even doctors. They have to have a much wider knowledge of an electrical shock. Always bear in mind, whom you are teaching! You get more information about this issue in the chapter "Didactic Reduction".

The Principle of Science-Orientation



When planning a lesson the instructor has to check whether the subject matter is on the actual level of scientific research. Whatever the trainer teaches must not be inconsistent with any commonly accepted knowledge and has to be in harmony with the actual level of research. The last century brought plenty of new technology. New products and techniques flooded the market. The best example for this development is the information technology. About 25 years ago the size of a computer filled one complete room of a house. Today a computer or Laptop can even fit in a briefcase and has much more capacity than the ones of "the first generation". The processors become faster so rapidly that one can scarcely purchase software for a ten-year-old computer. Thanks

goodness, the development does not go that fast in all our trades. But even there machine-technology keeps improving. An instructor should always try to have new information, to let trainees know that the master is up-to-date and so is their apprenticeship.



Dangers through electricity are the same as they were in the past. Electricity is used in more and more areas of our lives and especially our work. Craftsmen use electrical machines more frequently than in the former times. Therefore, the dangers through electricity will rise in the future.

An example out of the technical division shall be given too:

There are various methods of avoiding electrical shocks. In former times it was mostly fuses that were used. Nowadays electricians use the "circuit-breaker" in addition. It is a new technology that is easier to handle and more comfortable for the user. Nevertheless the fuses are still in use. Both safety precautions have advantages and disadvantages. An instructor of the electrical department who only explains the purpose of fuses and does not teach the circuit-breaker is not teaching at the current level of technological standard. As the application of this technology is very common now, it has to be part of the syllabus.

If instructors do not follow this principle it would lead to outdated explanations and instructors might lose the respect or confidence of the trainees!

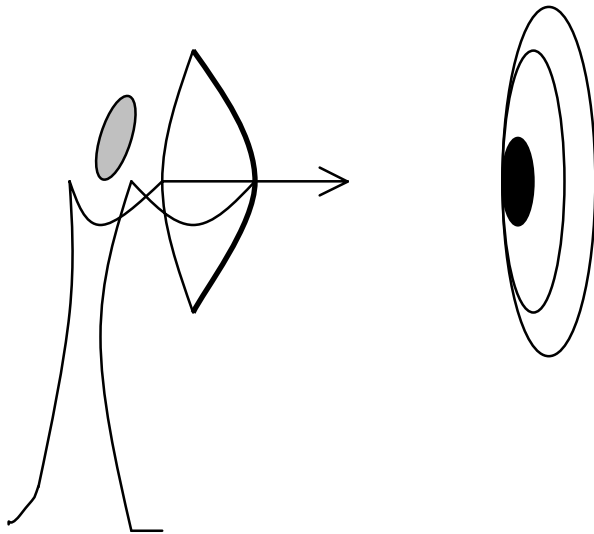
The Principle of Practice-Orientation

The situation during apprenticeship is different from the one that the trainees will face later. Whether they are employees or self-employed, the tasks will be unlike those they have in the Vocational Schools. The purpose of Vocational Training is to prepare the students for their life as craftsmen. Outside the Training Centres work might be arranged in

another way. Some facilities that were available in the Centre will not be there later on. A trainee might not have the possibility to practice with other facilities during his training time. People in other areas might have opposite tastes and wishes, so that products are not the same. The houses in the North of Ghana are different from those in the South. So it is with the dress.

Instructors should be aware that the trainees may move across the whole country in search of employment. This has to be considered when planning a lesson and through the entire teaching period. Always check whether the subject matter is close to reality that is the situation the trainee will be confronted with after his trade test examination. Make sure that things do not look too theoretically.

The Principle of Goal-Orientation



"One who does not exactly know where he wants to go to, must not wonder when he arrives at an unexpected destination" (Mager)

"Goal-orientation" is something everybody is talking about. There is no company, no organisation which does not have a workshop for "goal oriented project planning" within the last years. World-wide

hundreds of consultants are running seminars on this topic. What is convenient for the industry is convenient for the Vocational Training too. Not only in recent time when this topic became attractive for the economy, but for long time, it was a foundation in the education sector. Goals guide the trainee as well as the teacher. In Vocational Education

these goals are called objectives. They describe the expected behaviour of the trainee after having gone through the learning process. The question the instructor should ask himself is no longer WHAT should be taught, but WHY should something be taught. A trainee will learn a new theme easier when its purpose is obvious for him. When planning classes always ask yourself: "Why should a trainee learn this?"

In our example it is very obviously why the lesson is about danger through electricity. The instructor wants to protect trainees against injuries. So he informs them about the sources of danger, the consequences and how to avoid accidents.

The chapter about objective setting will provide more details on how to realise this principle.

The principle of check-up

This is very closely related to the principle of structure. The contents of the lesson should always make it possible for the instructor to get a feed-back, for him to know, whether he can continue with the matter or not. As we already heard it is not useful to go on, when basic knowledge is not understood. "Check-up" is a comprehensive section and will be treated in more detailed in chapter 10.

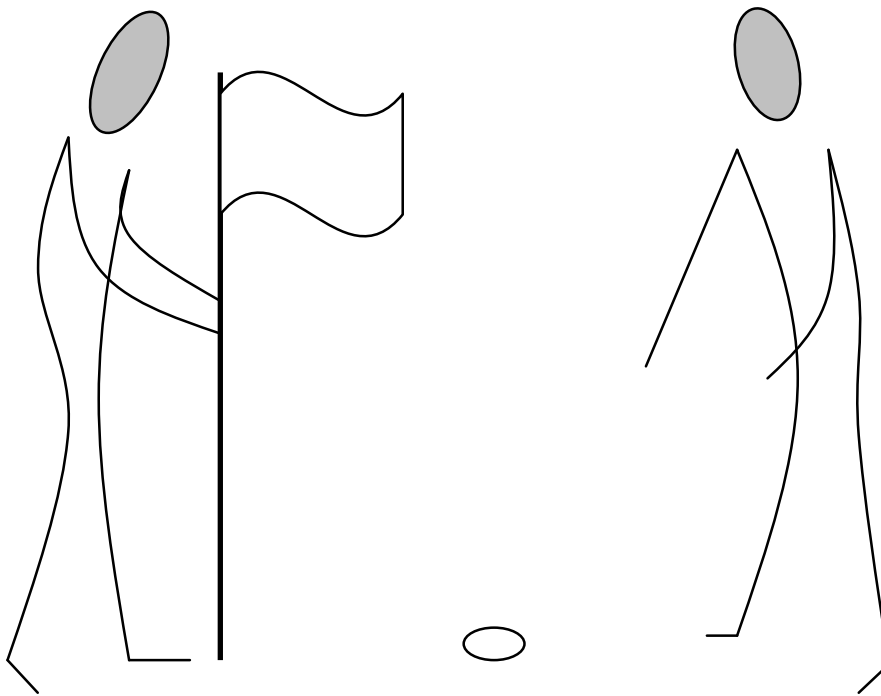
Our lesson plan has an extra column for this purpose (C4). It is arranged in such a way that after every teaching objective a short analysis in the form of a question, discussion or any other type of evaluation will reveal whether the students did understand or did not.

"What other types of accidents can happen" urges the trainees to think about what they heard and to look for other dangers. When trainees are able to respond to "Why do electricians use fuses" it is clear that they know about the electrical shock. A trainee can only argue for safety regulations when he / she

knows about the significance or consequences of an accident with electricity.

4.2 Objective setting

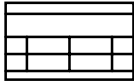
To do justice to the principle of goal-orientation, objectives are used for the lesson planning. The instructor states clearly what he wants to achieve and what he expects trainees to achieve or produce at the end of the period. This is stated in terms of observable or measurable behaviour. Objectives are not just helpful, but obligatory. They describe the trainee's behaviour or abilities after passing a lesson successfully.



Importance of objectives for the instructor:

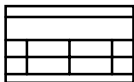
- objectives enable us plan thoroughly. It also helps the trainer to choose the appropriate "tools" to reach a precise aim. The

right choice of the method or the preparation of teaching aids will also be easier when a certain goal is set.



The presentation-step of the first objective (instructor reads...) particularly tries to cope with the first objective, that trainees should be able to enumerate three sources of accidents through electricity.

- *objectives allow an easy check-up*
a gradual teaching method makes it easier to review the effectiveness of teaching. Small steps are easier to check than complex matters. It helps to make corrections or additional information in time.



Check-up questions are foreseen after every step

- *objectives are the basis for a teacher's self-control*
After check-up the trainer is able to estimate the feed-back. Getting a positive feed-back will tell the instructor that things went well. Negative feedback reveals that trainees did not understand what was taught. Therefore it is up to the instructor to find out why the trainees did not understand. To look for an explanation may cover the following questions:
 - ☞ Was the teaching matter too comprehensive?
 - ☞ Was the teaching matter too complicated (above trainee's level)?
 - ☞ Did I use the right methods?
 - ☞ Did I follow my lesson plan?

Importance of objectives for the trainees:

- *Trainees get a clear perception.*

A manageable amount of new information transmits a feeling of comfort. Trainees don't feel overloaded and gain self-consciousness because the facts can be processed easily.

- *Trainees are able to control themselves.*
What goes for the instructor goes for the trainee too. They learn to estimate themselves, their abilities and the progress they have made in learning. He can prove on his own, whether he was only mentally absent or he wasn't adequately prepared or the teaching matter was too difficult for him. A necessary change in behaviour can only be reached, when the cause is obvious.

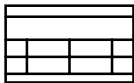
Types of objectives

There are several types of objectives. Within this course we will concentrate on two: the general objectives and the specific objectives.

General objectives

It can simply be named as the goal of the lesson. It represents the answer to the questions every teacher should ask himself when planning a class:

- ☞ "Why am I running this lesson?" or "What is the purpose of my efforts for this lesson?"
- ☞ "Which new behaviour do I expect from trainees after this lesson?"



The general objective is that the students are aware of the dangers and act accordingly.

The answers to the above mentioned questions out of our example are as follows:

1. The instructor wants to protect trainees against injuries and their consequences,
2. The instructor wants the trainees to be careful when operating electrical machines.

Specific objectives

These can be called targets within the general objective which one intends to achieve at a particular period. The specific objectives direct us through a lesson. When we talk about objectives in the subsequent paragraphs we mean specific objectives.

The classification of objectives

“Objective-taxonomy” is the expression used by the pedagogues. It demonstrates the domain the objectives can be related to. It deals with the question, how intensive trainees should be trained in a particular subject. The cognitive domain covers the field of understanding, thinking and knowledge. The affective domain deals with the attitude while the psycho-motor goes with physical action. While these three can be found even in old literature, the social scope is a quite recent addition to the taxonomy. It has been added because the social behaviour gains more and more importance in the daily working routine.

The higher the level within a scope of the classification, the more detailed and intensive the subject matter has to be considered during class. The classification is shown in the following chart.

4.3 Objective-Taxonomy

Scope	<i>Cognitive</i>	<i>Affective</i>	<i>Psycho-motor</i>	<i>Social</i>
Matter	Information and Knowledge	Attitude, Emotions and Values	Skills	Behaviour
Hierarchy	Knowledge Comprehension Application Analysis Synthesis Evaluation	Receiving Responding Valuing Organising Value concept	Imitation Manipulation Accuracy Organisation Control	Individual Partnership Group
<i>Example</i>	To interpret a chart	To have fun in maths	To use a plane	To work co-operative within a group
<i>Verbs</i>	Enumerate, allocate, distinguish, reduce...	Like, welcome, take pleasure from, enjoy...	Prepare, use, manufacture, construct...	Co-operate, help, share...

The cognitive domain

The cognitive domain is concerned largely with information and knowledge. It is based on a continuum ranging from mere knowledge of facts to the intellectual process of evaluation. Each category within the domain is assumed to include behaviour at the lower levels. There are six major categories within this domain.

Increasing level of complexity according to BLOOM:

1. *Knowledge*: This is based on recall and methods of dealing with recalled information.

2. *Comprehension*: This is the ability to grasp the meaning of material. It embraces 'translation' from one form to another (e.g. words to numbers), 'interpretation' (e.g. explaining, summarising), extrapolation (e.g. predicting effect, consequences).
3. *Application*: This involves the ability to utilise learned material in new situations. It necessitates the application of principles, theories, rules, etc.
4. *Analysis*: This involves the ability to break down learned material into component parts so that organisational structure is made clear. The analysis of relationships and identification of the parts of the whole is vital.
5. *Synthesis*: This refers to the ability to combine separate elements so as to form a new whole. Deduction and other aspects of thought are involved.
6. *Evaluation*: This concerns the ability to judge the value of material. Such judgements are being based on definite criteria.

Trainees should be able to enumerate three sources of accidents with electricity. This is the lowest level, meaning that the students just have to repeat things they have learnt before. It does not include an attitude.

The affective domain

The affective domain relates to attitudes, emotions and values. It is attitudinal in concept and ranges very widely from heeding the simple reception of stimuli to the complex ability to characterise by the use of value concepts. There are five major categories within the domain.

Increasing level of internalisation according to KRATHWOL:

1. *Receiving*: This involves attending e.g. heeding messages or other stimuli. Awareness and willingness to controlled attention are subsumed under this heading.
2. *Responding*: This involves the arousal of curiosity and the acceptance of responsibility in relation to response.
3. *Valuing*: This involves recognition of the intrinsic worth of a situation, so that motivation is heightened and beliefs emerge.
4. *Organising and conceptualising*: This involves the patterning of responses on the basis of investigation of attitudes and values.
5. *Characterising by value or value concept*: This involves the ability to see as coherent matters involving ideas, attitudes and beliefs.

Trainees who are willing to argue for safety regulations, belong to the 3rd level. They have more than the ability to do something, they have an intrinsic motivation to do it.

The psychomotor domain

The psycho-motor domain involves muscular and motor skills.

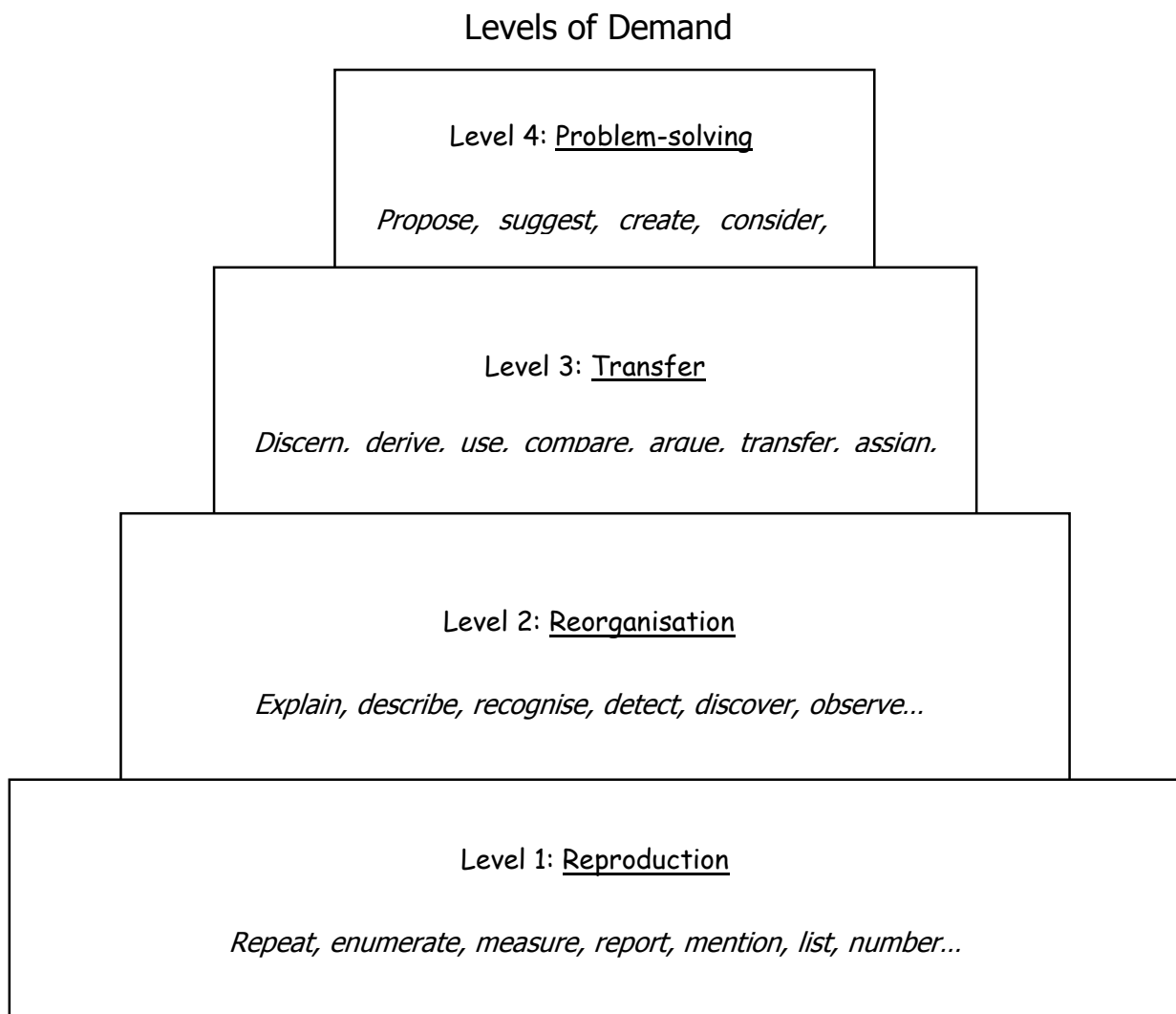
Increasing level of Co-ordination according to DAVE:

1. *Imitation*: These are the involuntary motor responses to stimuli. They are the basis for all types of behaviour involving bodily movement.
2. *Manipulation*: These are the inherent movement patterns built upon simple reflex movements and are the result of instructions.
3. *Accuracy*: The interpretation of stimuli so that they can be adjusted to the environment.
4. *Organisation*: The co-ordination of various movements to harmonious, complex activity.
5. *Control*: The operation becomes routine and an automatism. The movements look aesthetic.

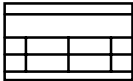


Take one of your lesson preparations and try to figure out which categories your objectives cover.

It isn't always possible to make this distinctive differentiation. This is theoretical in nature. Human behaviour is holistic and cannot be split up. A lot of objectives contain parts of every sector. In addition to this taxonomy there are some more types of classifications, which would surely confuse us than to give a clear perception. For our further studies we will concentrate on the four "levels of demand". They too mark the intensity a subject shall be taught. To fix each level, particular verbs are used for formulating the objectives. See following chart:

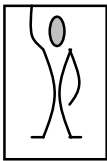


The level usually will be chosen to the required abilities according to the syllabi. Most of the syllabi used in the country do not co-operate. As a result it is the duty of the trainers, to decide which level to aim at. The masters should know which competencies have to be emphasised. It might be helpful to look at the trade test examinations. Since students are trained to pass the exams they might give a guideline for teaching level too.

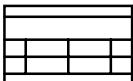


The trade test examination for dressmakers asks for an explanation on why an iron can cause an electrical shock. The answer is: When the wire connections are faulty within the iron, the currents will be on the chassis too. If somebody touches it, he / she would get an electrical shock.

To give this answer, the level that is chosen in our example would not be enough. "Trainees should be able to enumerate three sources for accidents with electricity" only demands, that the students are able to mention several sources, but not to explain them.



Find out to which level the specific objectives of the given example belong! Formulate the first objective so that it represents a higher level!



An additional example shall explain the level of demand more intensively.

There were three classes of the car mechanic trade. The lesson was about *types of cars*, but the level of demand was different.

In the first class the objective was on the first level, REPRODUCTION: *At the end of the lesson the trainees should be able to enumerate two types of cars.*

The teacher asks: Name two types of cars! The objective is reached, when the trainee can answer: "Mercedes-Benz and Daewoo Tico."

In the second class the objective was on the second level, REORGANISATION: *At the end of the lesson the trainees are able to describe two types of cars.* To reach the objective it is no longer sufficient for the trainee to say Mercedes-Benz and Daewoo Tico. On this level he must be able to describe it. For e.g. there are Mercedes-Benz and Daewoo Tico. The Mercedes is a big car with a lot of space whereas the Daewoo Tico is a small car with little space for loading.

In the third class, the objective was on the fourth level, Problem-solving: *At the end of the lesson trainees should be able to advise somebody on the type of car to buy.* At this level, even the previous knowledge of the second class is no more sufficient. To advise somebody requires more knowledge than to know something about the size of a car. To fulfil the objective a trainee must know more, e.g.: the Mercedes is a big and strong car, but is expensive too. It has lot of space and is very convenient for long travels. If you want to use the car mainly for the city, you might better buy a Daewoo Tico, which is small and easy to handle in small streets. The Tico is also much cheaper than a Mercedes-Benz.

Trainees who were in class one could not advise somebody, because the teaching was on a much lower level.

Rules for objective setting according to DUBS

Objectives usually should follow certain criteria. The features are as follows: A certain behaviour that is observable after the lesson, the circumstances under which this behaviour takes place and an assessment level. To reach this, teachers make use of the so-called SMART norm:

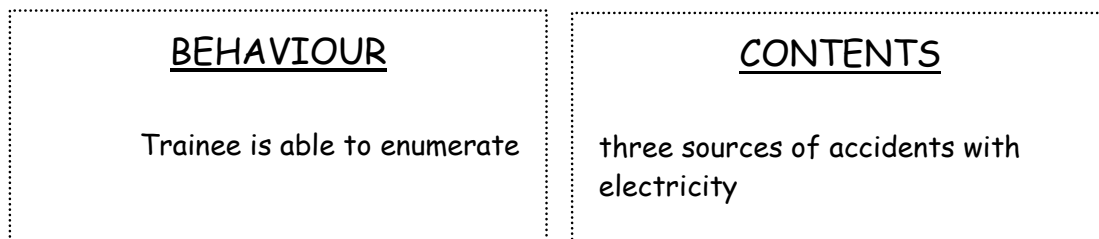
S = specific
M = measurable
A = attainable
R = realistic
T = time bound

The first objective in our example should therefore look like this:
"Trainees should be able to enumerate three sources of accidents with electricity by heart within one minute". It is not like this in our example. Nowadays the circumstances under which the behaviour takes place has lost its importance and the time bound aspect is commonly given by the time planning within a lesson. So the objective is reduced to what is stated in the lesson plan:

"Trainees should be able to enumerate three sources of accidents with electricity"

Rule 1:

Objectives are characterised by two components: the behaviour and the contents.



In several situations it was observed that trainers just noticed "enumeration" as objective. This is not a meaningful objective at all.

The contents component is missing thus making it absolutely useless. The same goes for the other side. "Accidents with electricity": the behaviour component is missing. Consequently it is useless too. To have a useful objective it has to look like shown above.

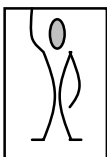
Rule 2:

Use *expressive* verbs exclusively to formulate an objective!

There are expressive verbs that are useful and inexpressive verbs that are useless to describe the desired behaviour of a student.

<i>Useless (inexpressive) verbs</i>	<i>Useful (expressive) verbs</i>
To know, understand, comprehend...	To enumerate, explain, distinguish...

A general example shall illustrate the use of the verb "to know":
"Almost everybody knows BILL CLINTON". But what does it really mean, to know Bill Clinton? Some of us will say, that he is the president of the USA. The president of Ghana may answer: "He is my American colleague". Others will say, he is an American Politician and so on. But this is not the end: His wife might say: "Nobody knows him really, except me!" His doctor might say, "I know him absolutely" and perhaps he does better than his wife. Probably he is considering his health.
 To get to a common answer at level 1, "REPRODUCTION", we use an expressive verb for our objective, namely recognise.
"Almost everybody recognises Bill Clinton". Showing a picture on which he is among several other people, leads to a collective result. His wife, his friends, his doctor, everyone will point at him and say: "This is Bill Clinton."

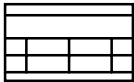


Which answers could be given if our second objective was like this: "Trainees know an electrical shock"?

Rule 3:

The behaviour shall be *measurable* or at least *observable*.

In the beginning the importance of the principle "check-up" was expressed. The groundwork for it has to be done within the objectives. The preceding example pointed out how difficult check-up can become, when e.g. using inexpressive verbs. Some objectives will be measurable, some will be observable.



Our first objective is accurate measurable: The aim is reached, when the students are able to mention three dangers (It is countable!)

The second one is observable: The aim is reached when a trainee is able to give a satisfying explanation of an electrical shock, according to the explanation that was given in the class. It is not countable but provable.

Rule 4:

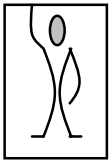
Avoid comprehensive statements!

Comprehensive statements allow comprehensive answers. The more precise a statement is, the easier it is to answer. To convert our first objective to a comprehensive one would lead to the following outcome: "Trainees should be able to enumerate the most important sources of accidents". Although an expressive verb is used, the answers can be of various types: Accidents with cars, accidents with machines, accidents in sports and so on. What is important for the instructor is not necessarily important for the students. Students may put emphasis on other areas.

Rule 5:

The used verbs shall represent the desired level!

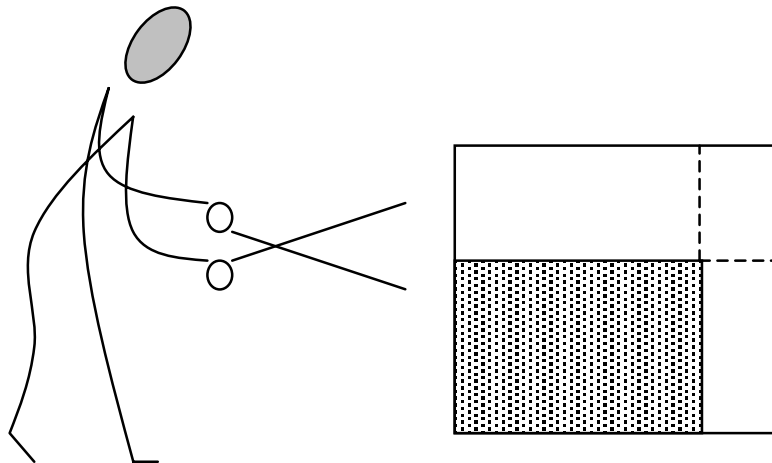
Examples for these verbs are given in the chart above: "The levels of demand".



Try to replace the verbs in the example with verbs of the chart, by keeping the same level.

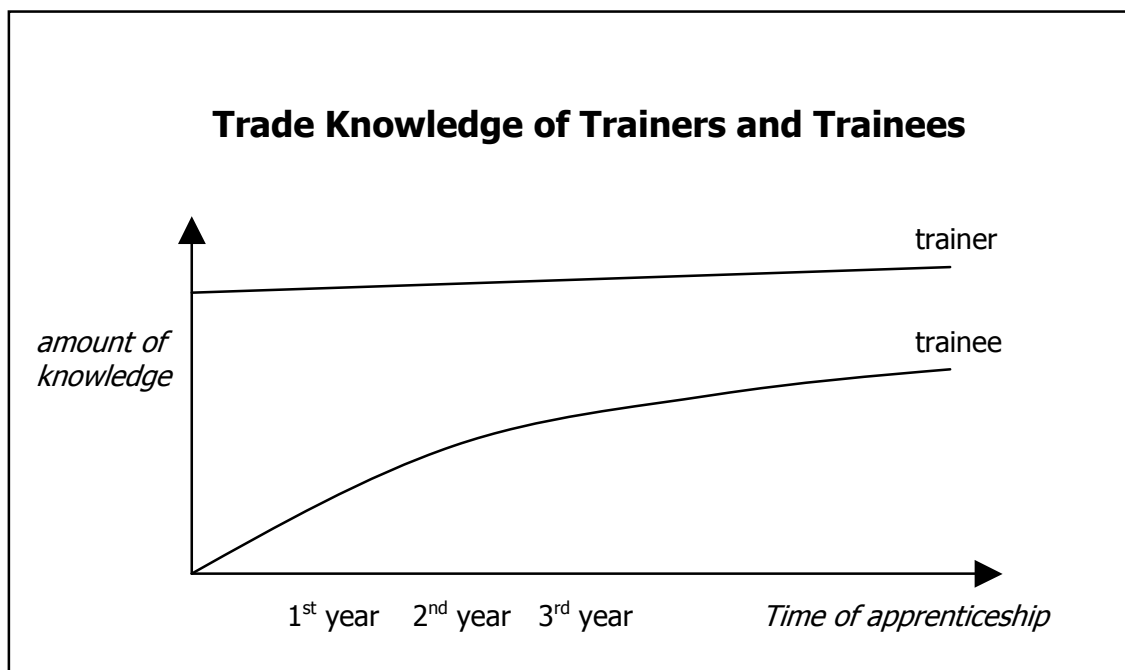
5 Didactic Reduction

Didactic is the science of teaching and learning. As the expression makes us assuming, something shall be reduced. Indeed, it is like this. What should be reduced is the teaching matter. This does not imply that it can be done arbitrary. Trainers have of course a wider and better knowledge than the trainees during their apprenticeship and even after it. Instructors have a lot more experience. This will sometimes lead to the situation where instructors teach on a level trainees do not understand. And in most situations the instructors don't even recognise it. For the instructors everything out of the trade is familiar. He is well-versed with

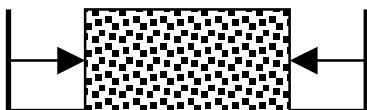


difficulties that might occur in "his field". But being an expert may lead to the situation that a problem is not identified as a problem. The trainer's daily routine is quite a new skill for the students. What is easily understandable for an instructor can be an insoluble task for the learner. The consequence for vocational education is the Didactic Reduction. The learning matter has to be reduced to the level of the students. These young people are in the class to learn a new trade. Sometimes it is coincidental for them to be, let us say, in a masonry class instead of a carpentry class. Maybe it was the only profession that a Vocational Training Institution offered. In the beginning most are absolutely newcomers without any previous knowledge of the trade. We therefore have to approach teaching slowly. Today there is a common saying: LESS IS MORE. What people want to express is that sometimes it is more helpful to teach only a small part, but to do it

properly than to try and cover everything and drift off. It is not always advisable to have too many irons in the fire. We should train them very well but bear in mind that within the time of their apprenticeship students will hardly reach the masters level. So there will always be a professional distance between trainer and trainee. The need for Didactic Reduction is present all the time. We have two types of Didactic Reduction: The *Vertical Didactic Reduction* and the *Horizontal Didactic Reduction*.



5.1 *Vertical Didactic Reduction*



The quantity of the teaching matter will be reduced.

Vertical Didactic Reduction wants to prevent a situation where the students are overloaded with information.

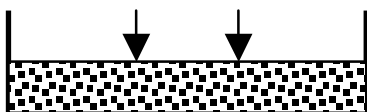
Not everything that belongs to the subject matter is really important for the trainee to know. Too much information will rather lead to confusion than to clear perception, as it was mentioned earlier already.



“Danger through electricity” is a wide field. Vertical Didactic Reduction requires that we leave out some aspects. What was left out is that there are many dangers with electricity: short circuits can cause fire; this has already devastated whole cities in history. Accidents can happen through faulty power-lines. There are several other consequences of an accident: at least the whole social system of a nation will be burdened. And it is not only the safety regulations that guard us: In the technical field there are many types of protections. There are fuses and circuit breakers as we already learnt, electricians apply the techniques of “earthing” and some more are used in the power plants.

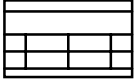
All this information was left out. The idea is to protect the trainees against accidents in the workplace. For this purpose the amount of information that was given is sufficient.

5.2 *Horizontal Didactic Reduction*



The level of the teaching matter will be lowered.

Horizontal Didactic Reduction wants to prevent the students from being overtaxed with difficult facts.



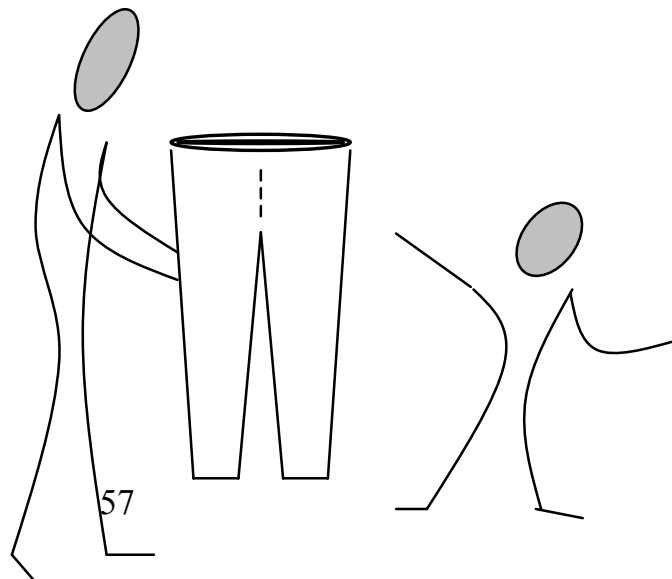
Two aspects of the lesson shall be spotlighted here. The first is the electrical shock. The explanation for the trainees is very easy: When someone gets an electrical shock, current flows through the body and injures the person. A doctor would certainly tell us that this interpretation is very primitive even if he does consider it as an interpretation at all. What goes on while a person is connected to a power source is very complicated. Books are written about the procedures within the body and the brain. But all this does not help us in our lesson. Not at all! It would just confuse the students if not the master too. Our clarification is basic. To show what happens when someone gets a shock: if a person touched a faulty machine, the current of this machine would flow through his/her body. This is painful; it injures people and can even kill them. That's what is important for the students. If the trainees have further interest, they will ask. Even though only very few people will be able to answer.

The second aspect that will be highlighted is the *definition*.

6 Definitions

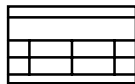
Scarcely one lesson in Vocational Education in Ghana does not begin with a definition. Even though the use of definitions is controversial, we take it as a matter of fact. But the definitions themselves are worth looking at it a bit closer.

Many definitions which are in use in the vocational sector are just copied, word by word, out of the dictionary. It came out several times that indeed colleagues of the same trade were not able to repeat the



definition other instructors used. It happened sometimes that the trainers were not able to reproduce their own given definition. How can this happen? Definitions of the dictionary are universally valid. The encyclopaedia tries to explain the word itself. The writers of a dictionary do not address it to a particular group of people but to everybody. Consequently it has to be formulated in a way that it is suitable for many situations. The more aspects it covers, the more information it has to contain. At the end it becomes difficult to understand the definition. Instructors on the other hand have a big advantage. They know the receivers of their message so that they can adjust it accordingly. They can cut off all that is confusing or just not necessary for the students.

Definitions are commonly used to explain unknown things. People normally make use of a dictionary when they do not know the meaning of a word. Therefore we mustn't forget, that frequently the students know what the instructor is talking about, e.g. when speaking about electricity.



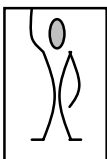
Our example is about electricity. The dictionary defines electricity as: "The energy which exists in a negative form in electrons and in positive form in protons, and also as a flowing current, usually of electrons / a supply of this energy to a household, etc., e.g. for heating and lighting / excitement, tension or expectation." Anticipating that instructors want to help trainees to learn a trade, what kind of help would it be, if we gave such a definition to the students. It has to be reduced to an understandable and helpful level as it is done in the example: "Electricity is helpful in various trades. It makes machines run and gives light." The definition is based on the question: "How can we benefit from electricity in our job?"

Another example that various trades like masons, painters, electricians and carpenters use shall demonstrate it additionally: It is about *scaffolding*. The dictionary gives us the following definition of scaffold:

“A framework of metal poles and planks used as a temporary platform from which building repair or construction is carried out.” Primarily this definition is not adequate to most situations in Ghana, where plenty of scaffolds are made of wood. Secondly there are several words used that might not exist in the trainees vocabulary: poles, planks, temporary. If this was the situation you would have to explain words of a definition that should explain an unknown matter! Isn't that completely contradictory? Can this really be helpful for a student? Hence a better definition should be found. As in the previous example a question can give support: “Why do craftsmen use a scaffold?” The answer is: “They use a scaffold when they have to work above men's height.” This answer contains more or less the same information as the definition does, just simpler. The fact that it is only used for working means, that it will be removed after the job has been done. This includes the fact that it is a temporary construction. A definition in a lesson might therefore look like this: *A scaffold will be put up when work has to be done above men's height.*

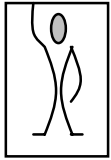
Some questions may guide instructors when putting down a definition:

- ☞ What is the purpose of ...?
- ☞ Why / where / when do we use ...?
- ☞ How can ... support our work?



Ask one of your colleagues whether he / she is able to give you a particular definition of the trade by heart!
Take a definition from your lesson preparations and try to re-write it with the help given above!

7 Motivation

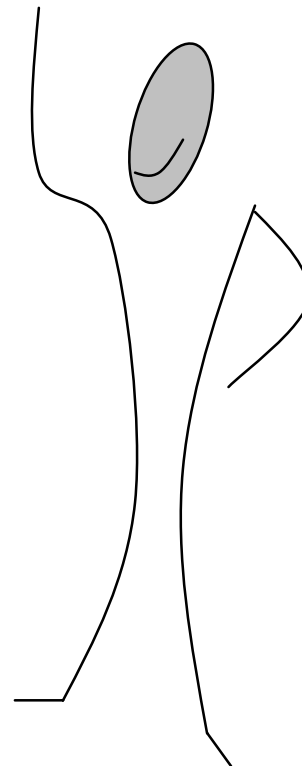


A simple exercise should stimulate us for this chapter. This practice was done in several workshops. But before continuing on the next page, do the exercise yourself:

You are supposed to go to a town you don't know very well to do a certain job. For your assistance you can choose one of the persons shown below, to join you. Give a statement, indicating whom of the two you prefer to accompany you. Furthermore justify why you want the person of your choice and why you refused the other person.



Mr. "A"



Mr. "B"

96 % of all participants expressed that they would like to travel with Mr. B. The instructors said that they took this decision because of the impressions the pictures made at them. They described the two persons as follows:

Mr. "A"	Mr. "B"
<ul style="list-style-type: none"> ☞ someone who often gets drunk and cannot control himself and behaves improperly ☞ someone who could cause problems when travelling with him ☞ a person who was feeble and weak ☞ someone who was abnormal and could not reason properly ☞ a person who was lazy and could not assist you in any way ☞ someone who was aimless and good for nothing ☞ a person whom you cannot trust 	<ul style="list-style-type: none"> ☞ someone who was very brilliant or clever ☞ someone who was smart and active ☞ someone who was an energetic person ☞ a person who was enthusiastic ☞ someone who had an aim and could help ☞ a person who could solve problems when travelled with ☞ someone whom you can trust to bring you back when travelling with him ☞ a person who was friendly and entertaining

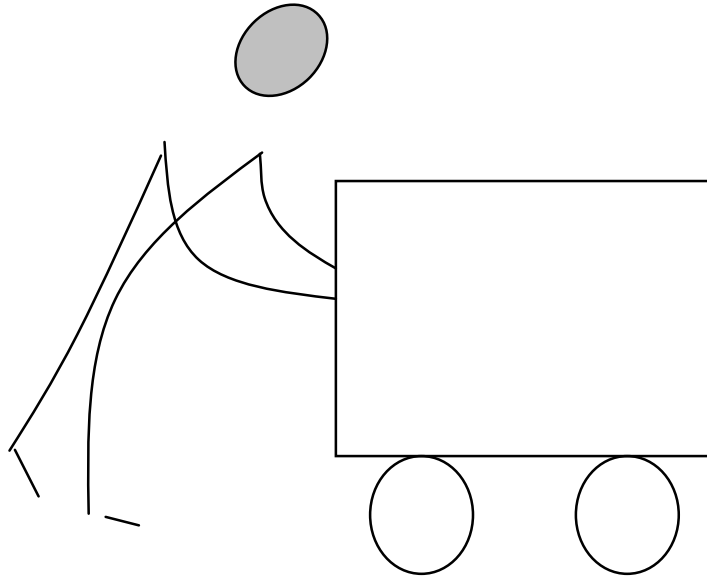
It is very interesting which impression was left behind from these two match-stick men. Summarising one can say that there was one main motive why most of the tested teachers wanted to go with " Mr. B". The picture gave the idea that "Mr. B" could be helpful to them and "Mr. A" could not. In a nutshell: "Mr. B" seemed to be motivated to go but "Mr. A" was not!

If simple match-stick men could impress people so highly, how would living person do then?

If trainees observe an instructor very well they will easily find out what the trainer's motives are or how motivated the teacher himself is!

8 Only a teacher who himself is motivated will be able to motivate trainees!

Even though motivation is not yet fully understood it is undisputed that the influence on human behaviour is immense, as the last exercise demonstrated clearly. Motivation is derived from the Latin word *movere* (= to move). It is the reason why people do things or



not; especially whether we do things with pleasure or even enthusiasm or without any interest. Many scientists were and still are engaged in motivation research. Consequently there are many theories and thesis about motivation. Therefore only a short introduction shall be given before concentrating on the "motivation to achievement" according to *Atkinson*, which can be called the most relevant type of motivation for success in the learning process.

8.1 Various Motivation Theories (according to OTT)

The Need-oriented Conception

Basic needs are part of motivation. They all have in common that there is something missing like hunger and thirst. These situations lead to an action to redress the person's balance. When somebody is off balance,

he/she always recognises the need and acts. This conception is adequate for our basic needs (hunger, sleep...) but it is not evident for the learning process.

The Incentives-Conception

The Greek Philosophy of Hedonism is the foundation for this conception. This philosophy says that a person's luck and goals are covered through the human being's desire for pleasure-seeking. To reach this a person will try to:

- ☞ avoid personal disadvantages
- ☞ gain personal advantages.

Consequently one tries to motivate a person in two different ways:

- Offering an attractive reward if the person takes a certain action
- Threatening somebody with punishment when he/she fails.

The differences at the individual level are huge and this makes it difficult to satisfy everyone. Usually it is money that is used as reward.

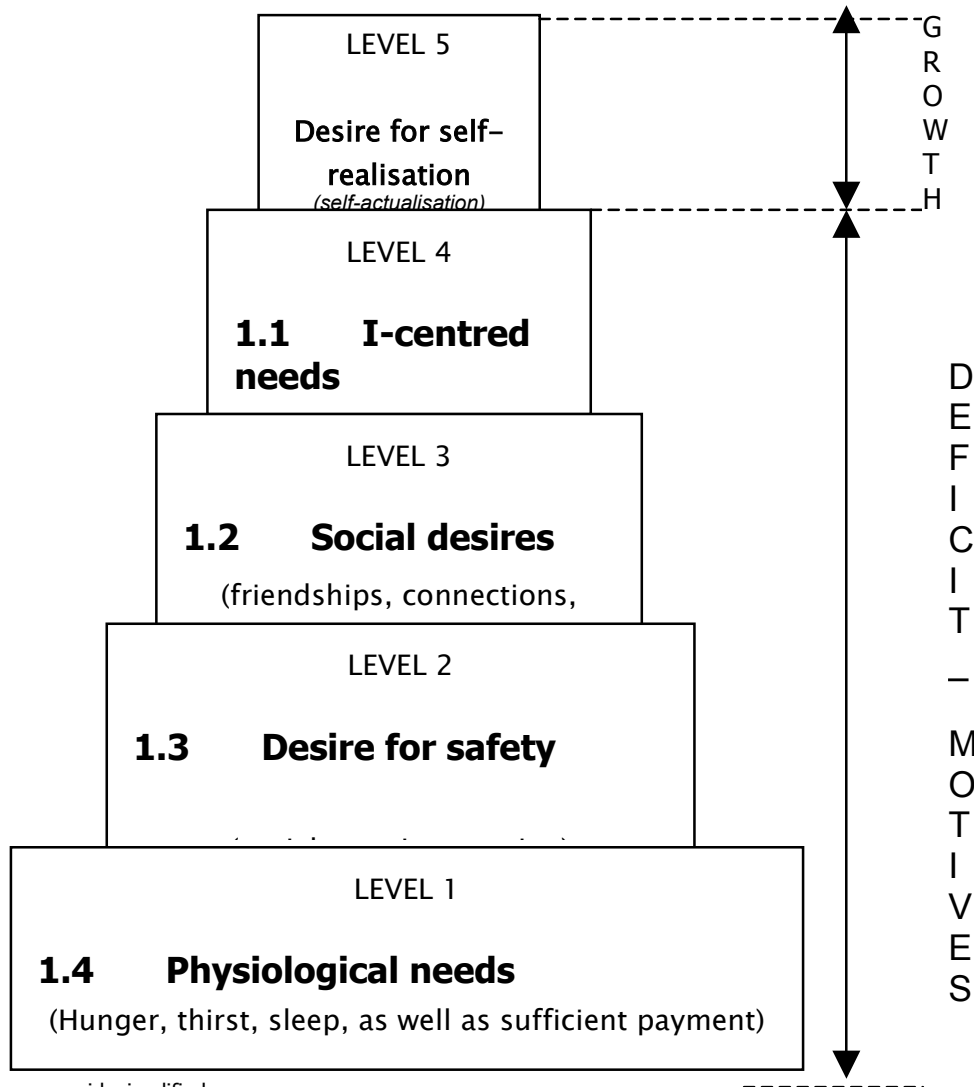
The Humanistic Conception

The central thread of this theory is the idea that a person's main motivation for all activities is the desire for a meaningful life. Several hypothesis became famous.

☞ *The MASLOW Theory*

He says that men are guided by two factors: deficit-motives and ambition for growth. First the deficit motives have to be satisfied and subsequently the growth gains importance. There is the Maslow-pyramid which shows the order in which the desires have to be satisfied. This means that the needs on level one have to be satisfied, before concentrating on level two, and so on. However, when one focuses on this pyramid, several discrepancies are conspicuous with

regard to the different cultures: The order in Ghana or Africa in general might be different from the one presented below. Furthermore, a precise incision between social needs and desire for safety is not easily possible in an African country because it usually goes together. But even for western cultures, Maslow could only show problems but not give solutions.



Maslow-pyramid, simplified

☞ *The theory of HERZBERG*

Herzberg called his theory “the two factors theory”. In a research he was looking for factors that influences the satisfaction at the workplace. He called them motivators. He called factors that lead to dissatisfaction at the workplace hygiene-factors. They are listed in the following chart.

Motivators	Hygiene -Factors
1. achievement success	1. salary and status
2. acknowledgement	2. inter-personal relations
3. job-contents	3. management style
4. responsibility	4. company policy
5. opportunities for promotion	5. physical working conditions
6. opportunities for development	6. job guarantee

The so-called Pittsburg study showed, that motivators and hygiene-factors operate independently of each other. Highlighting the two scopes we recognise that motivators relate to the work itself and can therefore be called intrinsic motivation whereas the hygiene-factors describe the circumstances and therefore can be called the extrinsic motivation.

Additionally, the study indicated that motivators were mainly responsible for satisfaction while the hygiene-factors are for dissatisfaction.

Even though some results might be controversial, it is significant that satisfaction at the workplace is not exclusively a consequence of a good salary. The job itself and the perspectives for the future are very important too. This shows how substantial the attitude of teachers and trainees is in vocational education.

☞ *MC GREGOR's X-Y-theory*

Mc Gregor says that the type of instructor has big influence on the motivation of trainees. An authoritarian teacher has strict rules. He controls the teaching and does not allow much interaction of trainees. He is called the X-type, whose image of man is based on mistrust.

The Y-type's image of man is positive and defined by engagement and desire for self-realisation. This instructor has a co-operative style which gives room for trainees' activity and is motivating.

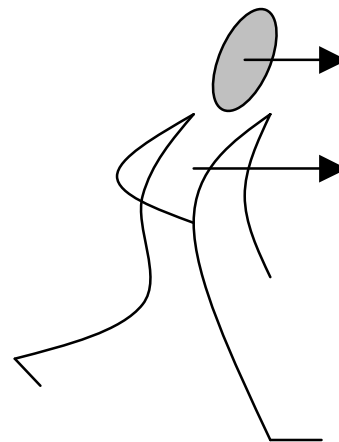
This thesis too is not a doctrine but shows that teaching exclusively in the "presenting way" (see chapter 11) is outdated.

The Cognitive Conception

It is based on the theory that people are naturally curious and want to achieve a certain aim. This goal can be called calculable, because e.g. an instructor can usually recognise the goal trainees have. This ability to estimate led to several motivational theories. A very important one for learning is the *motivation to achievement*.

8.2 Motivation to achievement (according to ATKINSON)

How intensively people work on the solution of a problem depends usually on two components: the *hope for success* and *the fear to fail*. This type of motivation is commonly known as the *intrinsic motivation*. This motivation is directly connected with the task itself. The first component of the intrinsic motivation leads to the result that people become proud after solving a task. Secondly they are ashamed when their efforts are fruitless. Intrinsic motivation can be considered as based on a natural curiosity.



There are three considerations which direct people when they want to be successful with a duty:

- ☞ the positive disposition of the person
- ☞ the subjective probability of being successful

☞ the incentive for being successful

Accordingly there are three considerations that direct people when they try to avoid a flop:

☞ the negative disposition of a person

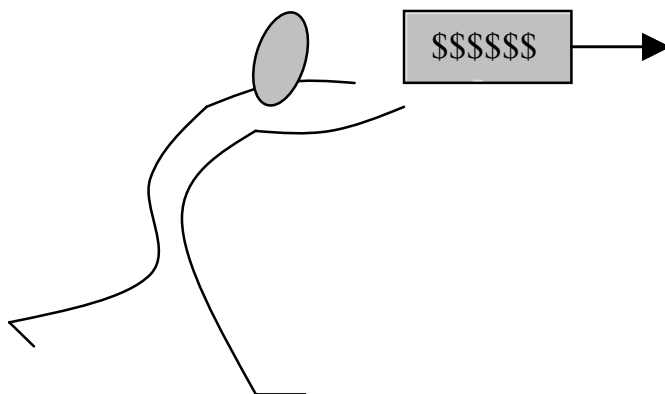
☞ the subjective probability of being unsuccessful

☞ the incentive for failure

Combining both groups of considerations we will have a cumulated motivation for achievement:

<i>When the hope for success is:</i>	<i>And the fear to fail is:</i>	<i>Then the final motivation to achievement is:</i>
High	Low	High
High	High	Medium
Low	Low	Medium
Low	High	Low

This results lead to the final thesis: Persons are highly motivated to work on the solution of a problem, when the hope for success is higher than the fear to fail.



However, even when the fear to fail is high, a high motivation to achievement can be existent, namely when an *extrinsic motivation* comes additionally. This type of motivation is called secondary or indirect motivation. It can

for e.g. be positive (by praise, good marks, or payment) as well as negative (by punishment, e.g. to stay longer or to do additional homework). They all are called *intensifier*.

The actual motivation to achievement is therefore the sum of intrinsic and extrinsic motivation:

$$\begin{array}{ccc} \text{Motivation to achievement =} & & \\ \boxed{\text{Hope for success – fear to fail}} & + & \boxed{\text{reward / penalty}} \\ \text{Intrinsic motivation} & & \text{extrinsic motivation} \end{array}$$

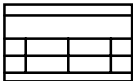
In general one can say that learning is easier when the motivation is intrinsic. For a lesson it does mean that trainees must be given the possibility of active participation and the chance to have lots of success. Accordingly a lesson should have several achievable goals. However, one has to be careful. When the level of the task is too low and the solution is easily identified then there is no challenge and the effect of intrinsic motivation can be lost. A general level cannot be given but this always depends on the class, the students, the circumstances and the task itself. These facts have to be taken into consideration all the time. The same task might have different effects in different classes. An instructor should always be ready to adjust a problem to the actual situation in which it shall be used. The effect of intrinsic and extrinsic motivation is obviously important for the learning process. Some tips should guide us to get students motivated.

There is no learning without motivation!

8.3 How to motivate trainees

☞ Tasks and questions should be relevant to the trainee's world!

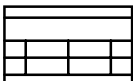
A situation that can really occur to the student gives a higher impact than an abstract, artificial one.



The danger of getting an electrical shock is possible all the time.

☞ Create a mood of tension and curiosity in the beginning of the lesson!

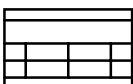
Start with something that draws the attention of the students.



"Chart # 1" does not immediately indicate what the lesson is about. It will take some time until trainees find out what shall be demonstrated with this chart. There is a kind of riddle in it which students will try to find out.

☞ Inform the students about your goals!

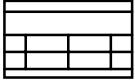
The trainees should be aware of the objective of the lesson.



It does not mean that a trainee shall be given the results. He/she should be informed about the "why" of the lesson. Our example could look like this: "Today we try to find out, why it is so important to be careful when operating with electricity."

☞ Use as many examples as possible!

Examples have the effect that information can be transformed from abstract to.



Let the trainees tell their experiences. For sure there will be somebody who has once got an electrical shock, or at least one of his / her friends or family members. Ask them in detail what happened and about the consequences. If they have no personal experiences, tell them about somebody out of your acquaintances. For e.g.: "A man did not come home from work. His family was waiting and it was already dark. The children were crying because they were hungry. Usually the father comes home with some food..." and so on.

☞ *Take trainees' questions serious!*

Always react to questions of the students. Asking lets the instructor know that trainees are interested and that they listened to what the teacher said. A question is a sign of curiosity. Making fun of a trainee because his / her question does not suit the topic is absolutely putting off the student! If there is the feeling that a question is not suitable, the reason might be that the instructor's explanation was confusing.

N.B.:

There are no stupid questions, there might only be stupid answers!

☞ *Do not forget to praise the students for correct answers!*

In most situations this is common practice in Ghanaian schools. Frequently the students are challenged to clap for a good answer. In some situations it was discovered that clapping as a sign of praise was used too frequently. It became a very monotone action and so lost its motivating character. If this is the case, try other methods. For e.g. make a rank for good answers, give points for a good answer, or even give a good mark for an answer, elect the answer of the day...

☞ Raise the level gradually

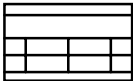
When you start from a low level, even students with low pre-knowledge can contribute to the solution of a problem. By going forward step by step the students will be upgraded accordingly and are not overtaxed.



The example makes that very transparent. In the beginning most of the trainees might know the possible dangers. The consequences of an accident are obviously very comprehensive and have to be worked out with the help of the group. To put up some safety regulations is yet on the level of transfer and can be seen as very difficult but solvable with the knowledge acquired within this lesson.

☞ Give trainees room for self-realisation

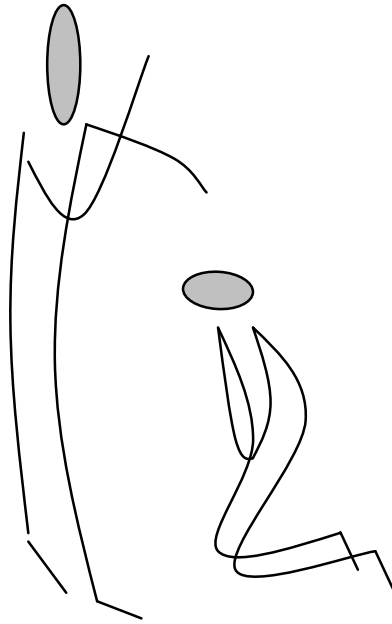
Young people have a somewhat "inner restlessness". Sometimes they want to try some thing themselves and not just listen to what the master says.



In our example there is a group-work where trainees are able to work autonomously. It does not mean that they can do what they want but that they are working on a task independently.

☞ Avoid punishment

Some people say that when a teacher is punishing a trainee, it is not more than a sign, that the instructor does not have proper pedagogical knowledge or is just overtaxed. A penalty usually creates a negative mood and this will not help to create a surrounding that promotes learning. It should only be used when the instructor does not have any other idea, what to do



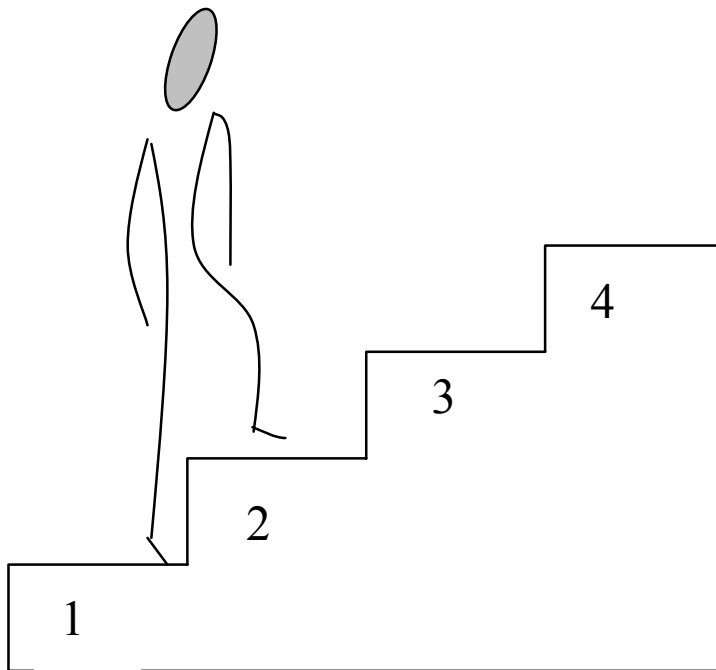
else. In some situations, teachers declare that it is necessary to punish somebody to set an example. In such situations, the behaviour being punished must be obvious to all. Make sure that the sentence is commensurate with the "offence". If somebody failed in a test, it is not helpful to let him / her go down on his knees. Find out why the student failed and give him / her an additional exercise. Punishment should always be the very last way of motivation!

"A divine curiosity is burning in every healthy child, but unfortunately withers in time" (Albert Einstein)

As teachers we should work hard to grow this threatened plant!

9 The Four-Step-Method

Each new studies in the educational sector brings new methods and ideas for the lessons. What goes for the general education goes for the technical and vocational education too. Actually the main concentration is on "holistic teaching" and "acting-oriented teaching". These methods usually require an immense amount of time for preparation. It also requires sophisticated equipment. Despite the fact that several training



institutes in Europe are working hard on the implementation of these new teaching methods they are still very difficult to introduce. Many already recognised that there is still a large gap between the theoretical concept and the practice. Some teachers already recognised that not all what is in the papers can be put into practice.

Nevertheless there are some older and time-tested methods which are still valid and in a lot of situations very convenient. One is the Four-Step-Method. In practical lessons there is also a four-step-method. This is related to the one in theoretical lessons. It is based on the so-called TWI-programme of the USA industries (TWI = training within industry) which was developed during World War II, when production had to be changed from civil driven to war driven. Later on several other countries adopted this concept. In practical lessons the four steps are:

☞ Preparation

All materials at the workplace have to be prepared, so that the practical instruction can take place without any interruption

☞ Demonstration

The instructor demonstrates with several repetitions at different speed the skill that should be learnt (psycho-motor domain).

☞ Reproduction

Trainees repeat the demonstrated action several times until they reach a certain level under permanent supervision of the instructor.

☞ Finish

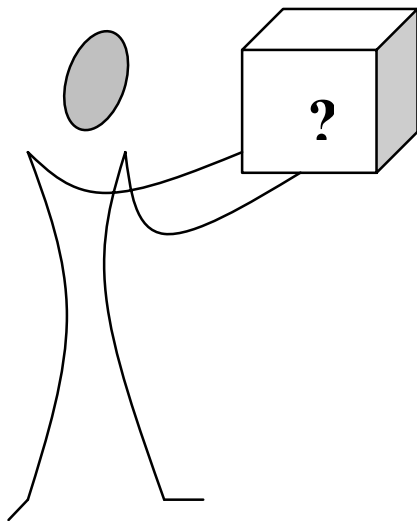
Trainees practice themselves. The instructor only helps when necessary.

The four-step-method for theory lessons has similarities that can be discovered in the following description. There are various reasons why a lesson has to be divided this way. A gradual procedure makes it easier to adopt the new learning matters. It will easily be implemented in the previous knowledge of the students and so, as learnt earlier, can simply be remembered. An arranged lesson helps the trainees to get a survey about the whole topic. Motivation will be kept up this way. So there is no doubt that the learning process improves when a lesson is well arranged. The way to do it cannot be fixed generally. There are too many variables and sometimes there are circumstances that do not allow us to proceed in the style that was chosen. It may be that trainees did not react the way the teacher expected and the answers that were needed to continue did not come, because the students were on the wrong track. Often, time is an element that cannot be calculated exactly. When a group work is done, trainees may need much more time than was scheduled. Here and there the level of trainees is so unequal that it takes a long period to explain things properly for everybody's understanding. Furthermore "external" influences can disturb the lesson plan. If suddenly there is light-off and the trainer planned to use an overhead projector, he might be in trouble explaining

things in another way. Heavy rainfall can make so loud that understanding somebody talking becomes impossible. All these factors may force the instructor to change his plan and to improvise.

Nevertheless, the four-step-method is a reasonable and proven way to structure and plan a lesson. It is not a dogmatic scheme but a generalisation of experiences because it applies to the teaching work-routine, method and ability. It is a logical way of presenting material that is suitable to most class sessions. All instructors should be familiar with it because it can even be seen as the foundation for other methods.

9.1 Step 1: Introduction



This part is also known as *opening, preparation, or set-up*. The main purpose of this section is to arouse the students' interest and to show a linkage between the teaching matter and the trainees. This is why some people call this phase *motivation*. In sports one would say *warm-up*. But telling the students that the following matter is important does not motivate. Much worse is to shout; "be quiet and listen, you have to know this". It might get silence to the classroom but that's all. A common

habit of many instructors is to begin with the sentence: "Today we want to learn something about...". This indicates that the trainees want to learn too, but very often this is only the teacher's wish! There are other more effective ways to begin a lesson: Repetition or connection to previous knowledge and confrontation with a problem.

Repetition or connection to previous knowledge

Familiar knowledge of the trainees should be activated. When you start with the result of the last lesson, the trainees can see a structure and can guess where you want to lead them.

Presentation of a Problem

Tausch found out that there are various psychological processes with the trainee as well as with the instructors, when somebody is confronted with a problem.

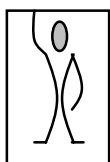
He/she has a first contact with the subject matter and pays attention unconsciously. There is a "tension", a feeling or even spontaneous interest in solving the problem. Sometimes you can see immediate spontaneous activity. The teacher should keep quiet as long as possible and let the trainees act or react.

The situation the trainee is confronted with should simply be interesting. There is no need for complicated experiments or exaggerations.

Try to find a natural or an interesting situation that might get the students curious.

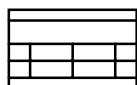
The preparation step should:

1. be adequate for the contents
2. be adapted to the intellectual level of the trainees
3. lead directly to the topic of the lesson
4. be as simple as possible
5. stimulate interest.



Check the preparation step of our example for the five demands!

Even though the first step is very important for motivation, the teacher must not stop trying to motivate. Motivation means arousing interest and keeping it upright. One has to remember that several instructors come to class every day teaching a new subject, expecting that trainees automatically show interest. It is not easy for people to concentrate for a long time. So take every possibility to encourage trainees and do not demand too much.



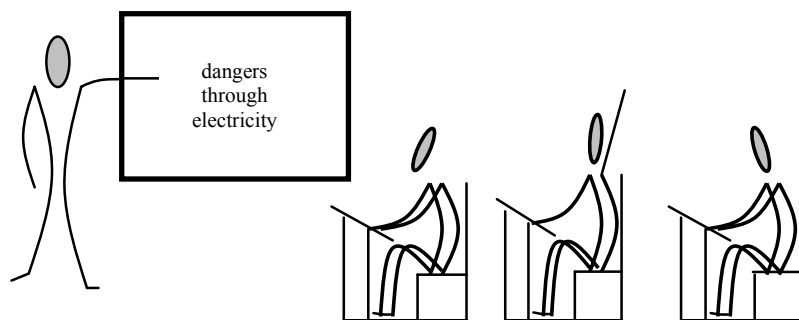
The lesson *dangers through electricity* could be “opened” in another way:

☞ Play a guessing game!

The instructor tells a story like this: A man was brought to a hospital. After the consultation the doctor said: “You have heart flutter and some signs of burning on your right hand. You were lucky that it was only a short contact”. Now the teacher asks: “Who can tell what has happened to this man?”

9.2 Step 2: Presentation

Now that the trainees are familiar with the topic of the lesson you have



to develop the subject matter logically. There are various aspects, which belong to the topic, and you must ensure that everything is discussed.

This part of the lesson represents the time, when trainees are confronted with new knowledge, which the teacher wants them to

learn. Meaningful learning anticipates understanding. Within a lesson it is the period which consumes most of the time.

Therefore follow your lesson planning. Start with the first objective according to your lesson preparation and go through it as you intended to do and finish it with a short check-up. Then go to your next objective and so on. Try to consider the following:

- ☞ Try to embody the trainees as much as possible and avoid lecturing. Everything that is discovered by the trainees themselves will be easier to be learnt.

- ☞ Do not give information by yourself when a student can do it easily. For e.g. when you have charts, do not explain it yourself immediately but ask a trainee whether he / she can comment on it or explain it.

- ☞ Take down trainees' answers on the blackboard immediately, when they are suitable. It demonstrates to the students clearly that they made an important contribution to the lesson. This is highly motivating and helps to create a good atmosphere in the classroom and promotes team spirit.

- ☞ Try to stimulate the trainees to think about the problem!

- ☞ Do not continue with the next objective when you have the feeling that trainees did not comprehend the last one. In such a case, take your time and explain again.

- ☞ Give additional examples when the subject matter seems not to be clear.

- ☞ Let one of the brighter students explain the topic if the others did not understand. Sometimes the youth have their own "language" or vocabulary and a trainee can explain better than an adult master.

☞ Always teach from known to unknown. This is the way to give justice to "ASSIMILATION".

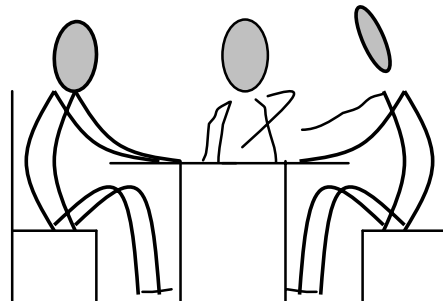
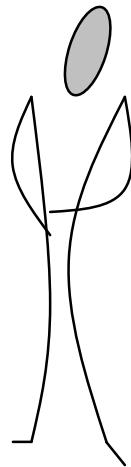


Look at the presentation-step of the example and try to find another way to develop at least one objective!

9.3 Step 3: Application

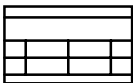
*I hear and I forget,
I see and I remember,
I practise and I understand!* (Chinese saying)

This is the time, when the learning process actually takes place. The trainees shall be given the opportunity to apply the new stuff in order to get the information into the long-term memory. As in the Chinese saying above, the best way to learn is to exercise.



The instructor can give the trainees a task that they have to solve on their own. This can be done in groups or individually (usually in Mathematics there is a lot of individual work, when trainees do some calculations on their own) or even together with the whole class. The trainer should now act as supervisor or moderator and leave it to the trainees to do the active part. It does not mean that it's break time for the instructor. He has to be among the trainees and help when help is required. Only major errors should be corrected during the problem-solving period. We all know the "learning by trial and error". This can happen during this time

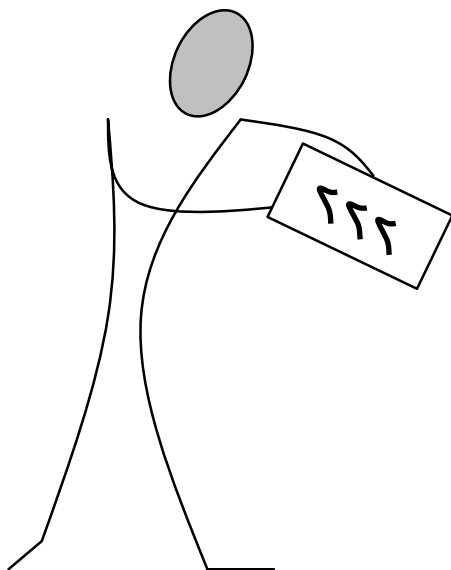
too. When the instructor detects that a student is completely on the wrong track, he should correct him / her. Otherwise the student will become frustrated and discouraged, when after working for a long period and he does not get any reasonable result. If you have the feeling that a trainee does not know how to go on, you should give a few hints that would guide him to the correct solution. It will help to build up his self-confidence.



In our example fixing some safety regulations covers the application. This could be done in group-work too. After the group-work the results must be collected and written on the blackboard.

9.4 Step 4: Check-up

Since there is a check-up after every objective during the presentation step, this step can also be named the “final check-up”. There are



various purposes for this phase. First of all, the instructor wants to find out, whether the lesson was successful or not. If the teacher was following his lesson plan and the advise given in the previous steps, there should not be a gap of knowledge anymore. Within this check-up, the concentration should be on the student’s ability to use this new information for his trade. Make sure that the trainees know about the context to which this particular learning matter belongs. A second main purpose of this step is reinforcement. By repetition or utilisation of the new facts, you

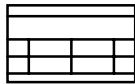
help the students to get this into the long-term memory. The learning process takes place already in the classroom and is not banned to homework. Check-up cannot only be done by writing or orally but also through a role-play.



Instead of asking, how somebody's family can be afflicted by an accident through electricity, you can organise a role-play in the classroom. Some trainees play the workers, one is the injured, another the doctor, the nurse, the family members and so on. The casting will show, how many persons are involved, when somebody has an accident at the working place.

When planning the fourth step, take into consideration the following:

☞ Make sure that the check-up does not only cover the WHAT, but even the WHY!



The trainees should not only know that they should be careful when operating with electrical power, but also why they should be careful. This is because it has many uncomfortable consequences not only for the person, but for others too.

☞ Ask questions or give exercises that are very related to the job!

☞ Ask questions that show the importance of the newly learnt matter!

☞ Do not use this step as a kind of assessment that could discourage the trainees. Bear in mind that it is a significant phase for the learning process, which should help to improve learning.

☞ It is very important that the entire lesson ends with a good atmosphere!

10 The Sphere of Action in Vocational Education (according to Roesch)

There are divers ways to run a lesson. The sphere of action classifies these ways according to the activity of the teacher and the students within the teaching and learning process. It describes the role the two groups – teacher and students – play in getting new knowledge during a class. It refers to the participation of the two in the lesson. The three ways of the sphere of action are known as a) the presenting way, b) the discovering way and c) the developing way. They are all very common in Technical Training. The method the teacher chooses depends on a variety of facts:

☞ *The objectives of the lesson*

Not every objective can be taught in every way.

☞ *The time that is available for a specific topic*

The scheme of work sometimes limits the time available to the instructors.

☞ *The topic itself*

The range of some topics might be too wide. This means that not every method is appropriate.

☞ *The properties of the trainees concerning learning*

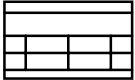
There are classes with trainees who learn fast and easily and others who have more difficulties in learning. Freshmen will learn differently compared to majored trainees.

☞ *The local circumstances*

Sometimes a certain way of teaching requires teaching aids that are not available.

The sphere of action is not obligatory for a whole lesson. The method you choose can change from one objective to the other or even within

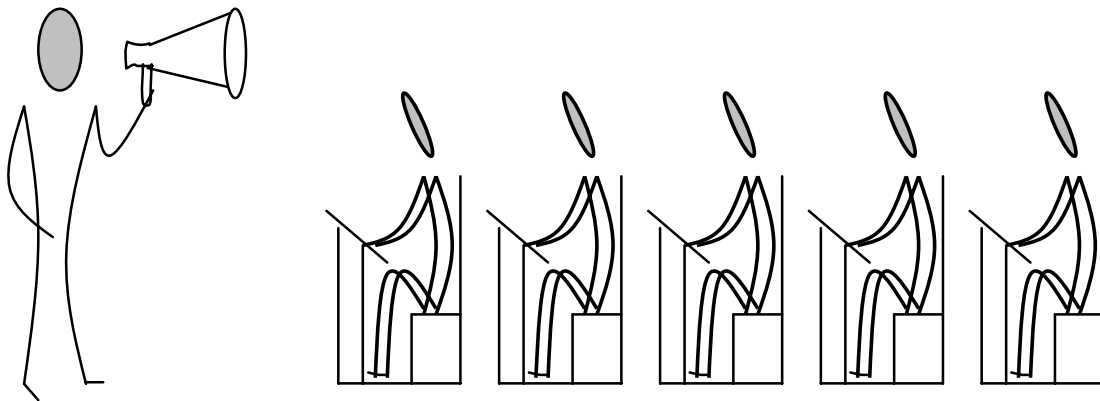
an objective. It is up to the trainer to choose the adequate “method”. About 99% of all lessons in Technical and Vocational Education and Training observed in Ghana run only one way, probably because most of the teachers made only this experience when they were at school or during their apprenticeship.



There are two styles selected in the example:
- Objective one and two: developing way,
- Objective three: discovering way.

10.1 The Presenting Way

What people commonly know as lecturing is defined as the presenting way. It is the traditional method of teaching where the instructor stands



in front of the class, gives information and explanations and sometimes asks questions. The students usually have to listen passively to the instructor’s remarks and answer questions here and there. It concentrates on the teacher’s activity and is absolutely controlled by the teacher. Last but not least, it is the most widely used method in all types of schools.

Characteristics of the Presenting Way

☞ *The presenting way is "time-saving"*

Since it has the style of a lecture the instructor does not expect any interruptions by the trainees. He can download the information as he prepared them without having to react to questions or interactions.

☞ *It gives information systematically, relevantly and basically.*

It is almost exclusively the teacher who is acting. He can prepare the learning matter according to the specific situation in the class, because he is aware of the strengths and weaknesses and the pre-knowledge of his trainees.

☞ *The trainee gets time for information processing.*

For the method to be "time-saving" there should be sufficient time left at the end of every step, so that trainees can process the given facts.

☞ *It is the oldest, traditional and longest lasting way.*

Everywhere in the world at every time you will find lessons which follow this character. It is the classical method in the Universities, where almost everything is done in lectures.

☞ *It informs in logical units.*

The teacher is the person who has the necessary skills for teaching the subject. He is aware of the information that was given to the students in former lessons and he knows what will follow. It is up to him to plan the lesson as a unit so that it suits perfectly into this scheme.

☞ *A huge amount of new information can be presented.*

When there is no time foreseen for the learning process itself, this method allows dropping a high quantity of facts. There is nobody who interrupts and the instructor controls the speed of his lecturing. The students might be ordered to learn at home and the whole time in school will be used for presenting information.

Problems of the Presenting Way

☞ *Risk that the trainee is demoted to the rank of a receiver, without having the possibility of active participation.*

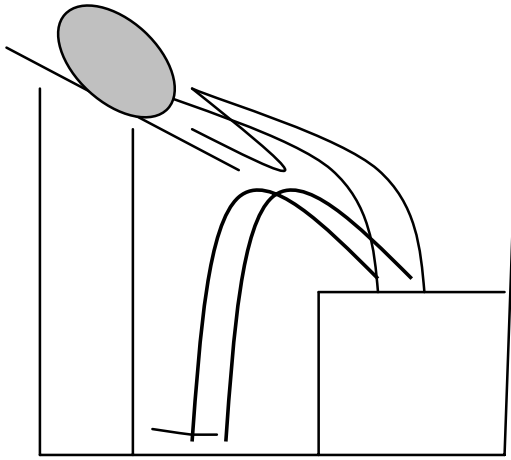
Human beings do not want to be outsiders. Most of us want to be insiders. This means we want to take part actively in the things that are going on. Democracy allows people to influence the political scene of a country, but dictatorship does not and usually people are not satisfied with this situation. In vocational training the presenting way can be compared with the features of a dictatorship. There is one single person who is acting and the others have to listen. Trainees get the feeling that they are only outsiders and it wouldn't make a difference whether they are in the classroom or they aren't. Being degraded to a receiver does not motivate the students very much.

☞ *Risk that trainees may not identify with the new knowledge.*

Getting information in lecture form reminds us about top-down-methods which are considered as very unpleasant. When someone else tells a person what to learn then people look at the teaching matter critically in the first place. It has the effect that some of the information will not be picked up.

☞ *Risk that the instructor holds long monologues which make the trainee lose his or her attention.*

When an instructor prepared a lesson in the presenting way, he / she lists the information that should be given and submits it to the students. The teachers knowledge about the teaching matter is usually



very big and one could talk and talk and talk, not recognising that it is becoming boring for the listeners. Sometimes we do not limit ourselves to the material we prepared but we extend it with additional information that comes to our mind while talking. The sense of time is very much depending on the part someone plays in the lesson. For people who have to listen and are so to speak inactive, a lesson can be

felt as a never-ending one. To the one who is talking, playing the active part, time seems to run away. While teachers move from class to class and have some variation this way, the students normally have to sit on the same chair at the same desk in the classroom the whole day which makes it very difficult to concentrate.

☞ *Risk that the contents are too much, so that the trainee is not able to get all the new information.*

The probability that teachers could overload a lesson when lecturing was already described in the upper paragraph and the consequences of overloading and overtaxing too have been explained in former chapters (didactic reduction, the effect of structure)

☞ *If there is no change in style, the trainees lose motivation because the lesson becomes monotonous.*

Monotony has the effect of fatigue. Hearing the same voice all the time is very similar to meditation. It makes people switch off their mind. Students will start to dream with their eyes opened. For an instructor who is lecturing most of the time it is not obvious how many of the trainees are really following the teacher's talk. When the talk is one-sided the trainees will lose interest in the lesson and motivation can only be reached extrinsically.

☞ *Trainees' initiative is killed and trainees complete the stages of learning passively.*

Technical and Vocational education wants to train young people for self-employment too. When they have their own business, these former trainees have to work and take decisions on their own. People do not have this kind of abilities and have to be trained. If they always learnt in the presenting way and are used to being receivers, it would become difficult for them to start their own activity.

When the Presenting way should be chosen

☞ *When lesson time is limited.*

As this method is absolutely teacher-centred he / she is the pacemaker. The instructor can decide on the amount of knowledge that shall be given. At least even a handout in the form of an information sheet can be dropped. Please bear in mind that information was only downloaded. No learning process took place during this time. You cannot expect that the students will have understood what they were told, even if they answered with "Yes Sir" or "Yes Madam" to the question "Did you get me?" If you taught this way you have to make sure that the learning matter is easy enough and trainees have enough time to review work at home alone.

☞ *When much information has to be given out.*

The same annotations as there are in the above paragraph come with this point too. The more information is given and the shorter the time provided, the lower the learning process of the students is likely to be.

☞ *When dealing with a large number of trainee.*

As we will see later, it is not always possible to teach in the other styles that will be introduced. When you have more than 40 or 50 trainees in one class it can become difficult to handle the situation in another way

than the presenting way. If this is the situation then do not be too fast. Reduce the teaching lesson for a period to a manageable size.

☞ *When resources are insufficient.*

Lecturing does not require any technical resources. It is the speech of the instructor that is given and notes will be put down on the blackboard. There is usually no need for any sophisticated equipment, except the teacher wants to use some for explanations. Usually it is a simple talk and can take place everywhere.

☞ *When dealing with new trainees.*

Many teachers are not familiar with other teaching techniques than the presenting way, nor are trainees. Both groups usually did not experience any other methods. This means in the very beginning you might have to teach in the "old style" when having a new class.

☞ *When a new topic is being introduced.*

Other methods usually build on previous knowledge. When introducing an absolutely new topic, where the trainees have no pre-knowledge the introduction is commonly done in the presenting way. In this situation an instructor can't count on the co-operation of the students and chooses the lecture style.

Remarks on the presenting way

Summarising, one can say that the presenting way has many advantages for the teacher but few for the students. It requires only very little time for preparation compared to other methods. This is only one of many reasons why most of the instructors teach this way. Furthermore, because lecturing is very economic in preparation it might have several justifications. Some instructors do live far from the school and have to travel every day so that time available for preparation is

short. Some centres operate double-stream in line with the policy to get more skilled young people. This engages teachers longer in school and cuts time for lesson planning. In addition, teaching is not the only duty that instructors have in a vocational education institute. There are some more responsibilities for almost every trainer in the centre.

Some teachers might prefer the presenting way of teaching because it allows an “easy living”. There is no need for a long preparation and while lecturing, trainees can hardly ask questions that may throw the teacher off balance.

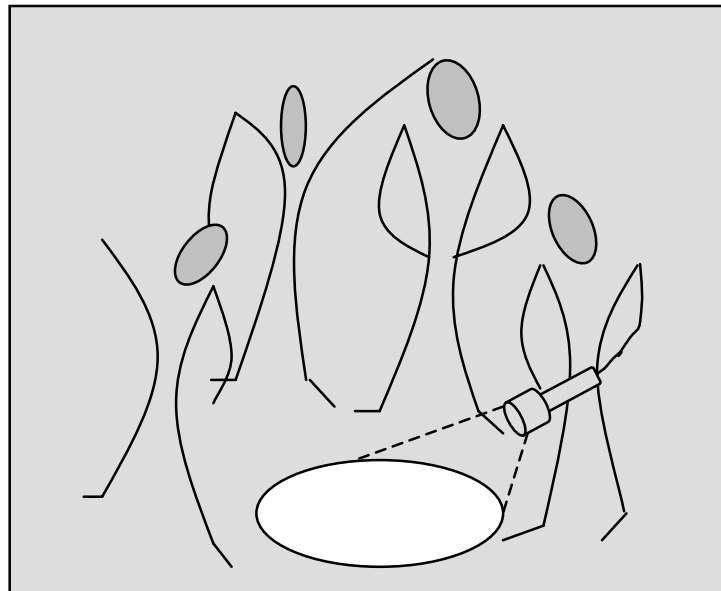
In most cases teachers use the presenting way because they are just not familiar with other methods. Often they did not experience other teaching methods during their own school time.

Whatever the reason is, it is obvious that the time has come, to start with something “new”.

10.2 The discovering way

In contrast to the presenting way, where activity is on the teacher’s side, the discovering way is trainee-concentrated.

At the beginning of a lesson or a new objective within a lesson, the trainer gives exact information on what the next goal is. Working out a solution then becomes the duty of the students.



This does not mean that the instructor is superfluous. Trainees cannot do the instructor’s job. The teacher therefore has to prepare the subject matter in a way that students get the necessary help to come

to a meaningful result. Sometimes the previous objectives in a lesson give enough information to solve the problem. Other aids that can be given include books and work sheets. After some time the results will be presented and discussed. While trainees are working, the teacher always has to be available for the trainees in case they need his help.

Characteristics of the discovering way

☞ *It is up to the trainees to find the solution*

Of course it is the instructor who guides the trainees. By preparing the necessary equipment for the students he / she already gives the direction on how to proceed. However, it is eventually the trainees who have to go the last step on their own. Finally, it is the students' job to come to a conclusion. People learn and remember easier all the things that they worked out on their own. When trainees work on the solution of a problem they will easily apply this knowledge later on in their trade.

☞ *The instructor is in the background and is called when trainees need him.*

While using the discovering way, the performance of the instructor is quite different from the usual situation. The instructor this time can be regarded as a facilitator or moderator. As the students do the active part, the trainer is somehow passive. He only intervenes when he discovers a major error or when asked to help by the students. Being in the background does not mean to be inactive or having a break. The teacher always has to be the master of the situation.

☞ *Trainees discuss various possibilities among themselves.*

When looking for a solution within a group of people one has to find a common agreement. Therefore trainees will come out with several proposals and they have to discuss them. At the end many ideas from the students lead to the final solution.

☞ *The work is shared and the students present the results in their own way.*

Different ideas lead to different strategies. It is the trainees' decision whether to choose one strategy or to follow several concepts. When doing so they have to organise their work autonomously. This has to be the case when presenting the results of their job. They have to find an arrangement among themselves on how to present their work.

☞ *All information is researched by the trainees.*

In contrast to the presenting way, where usually the solution will be given to the students and many other facts that belong to the topic are left out, the trainees have to filter and prove the whole information that is given. It is not only the given information that has to be understood but even all the contributions of the entire class.

Problems of the discovering way

☞ *It takes a lot of time.*

All the procedures mentioned in the above chapter take time. It is time-consuming when the trainees and not the instructor control the classroom situation. Trainees usually require time to organise themselves. Taking a lot of time does not mean that this time is wasted. A learning process is already taking place when trainees are engaged in finding a solution, as we already heard earlier on.

☞ *The instructor requires more time in preparation.*

This method can only be successful when trainees have the necessary "outfit", which has to be well prepared. The instructor has to think of all the ideas that might come from the students and supply the right information. If this is not done, trainees would be disoriented and then the time could be regarded as really wasted time, because trainees

cannot discover the meaning of their job and the goal they should reach.

☞ *Instructor may lose control over the trainees.*

A teacher's job is not easy at all. Some instructors have a so-called natural authority, which helps them to get the necessary respect of the trainees. Some do not and so they have to build up authority by knowledge. A person who is a master of his trade will always be respected. If there is no authority and the instructor always has problems with the behaviour of the class, he / she may be in a bigger trouble with the developing way. With this method a teacher leaves the activity in the hands of the students and will then have even more difficulties running the class in a reasonable atmosphere.

☞ *Necessary materials should be available.*

When the class is supposed to work independently, everybody has to get the material that is necessary to do the job. If there were not sufficient papers, books and so on trainees cannot do their work and usually start to disturb others. Within a short time there will be a big mess in the classroom and it will not be easy to return to the normal situation. In some centres it is often difficult get the indispensable material, because there are no books at all or there is no photocopier etc.

☞ *Trainees become confused when they have little knowledge about the topic.*

When a topic is very comprehensive and trainees cannot get an overview above the context, they may also lose the goal. Not knowing what one is exactly doing cannot only confuse people but even irritate them. In a mood like this no trainee is able to learn and the atmosphere does not create a surrounding that promotes learning at all. Whenever there is the feeling that the knowledge of the trainees about the topic is too little, one cannot expect satisfactory results.

☞ There is the tendency for the instructor to be lazy.

Some teachers are not familiar with the situation where trainees work on their own for a long period. They use the time to do other things and forget to support the trainees. Instead of being around and at the students' disposal some trainers leave the classroom for a rest.

☞ Trainees have to be trained in this method.

This type of teaching might be new not only to many instructors but also to most of the trainees. Therefore when applying this method for the first time in a class it has to be explained in detail. This will take a lot of time. Once it is explained the class will be able to work this way for the time of their apprenticeship and even longer. In the beginning the instructor has to be patient and allow the trainees to adopt new ideas.

☞ Risk of overtaxing

When the class is not well prepared and teaching aids are not appropriate, trainees will be overtaxed. This may at the end discourage the students.

When the discovering way should be chosen

☞ When dealing with matured trainees.

Matured trainees are those who are well-versed in the topic and are familiar with the teacher. A teacher has to know the class (behaviour) and the level of efficiency. The preparation has to use this knowledge. If there are freshmen, a trainer cannot estimate the reaction of a class and will have difficulties to prepare a lesson this way.

☞ When dealing with a small number of trainees, so that control is maintained

At universities where sometimes several hundred students join a course you can hardly find the discovering way. Normally lectures are used. In vocational training there are often not more than about 30 trainees in one class, which can be considered as a tolerable number. When trainers and trainees are familiar with this method it can be adequate for up to 50 pupils.

☞ When materials are available in sufficient number.

Sometimes the “necessary tools” are very easy to get. Sometimes one does not need any materials at all. In our example, the knowledge of the previous objectives and the information that there are three groups who might be afflicted (the person him / herself, his / her family / the company) were sufficient for matured trainees to come to a reasonable result. When cards, pins and markers are not available, the results can be noted on a piece of paper and later presented on the blackboard.

☞ When enough time is available

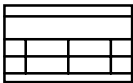
Very often teachers think that there is not sufficient time for this method. However, with the traditional teaching method a lot of time is needed, to repeat and repeat again, because the students didn't understand the subject matter. The time factor can indeed be a problem when the method is newly introduced. Having used it once, the time should be considered secondary, because there is a learning process taking place during the lesson.

Remarks on the discovering way

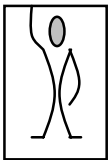
The discovering way has a number of possible difficulties, but has many advantages too. Awareness of the problems that can occur will already help to avoid them.

This type of teaching gives more to the trainees than just the transmission of new trade knowledge. The way the students learn helps them to work on solutions in general. Vocational education should in many cases lead to self-employment, where these past-trainees have to work autonomously from the very beginning. This can be learnt with the discovering method. The trainees are forced to work together to come to a solution which helps to build up social competencies like co-operation. As there are contributions from many trainees to the same topic, a wide range of information around the whole issue will be spotlighted and discussed, so that the students get a holistic view of the teaching matter.

Surely, the preparation for the instructor has to be more intensive and will take more time than usual. However, materials once prepared will serve you for a long time. Although the teacher cannot go on break during the time trainees are operating, he / she can relax a bit, at least not being forced to talk. The more often this method is used and the more the students are familiar with it the more relaxing it will become for the instructor.



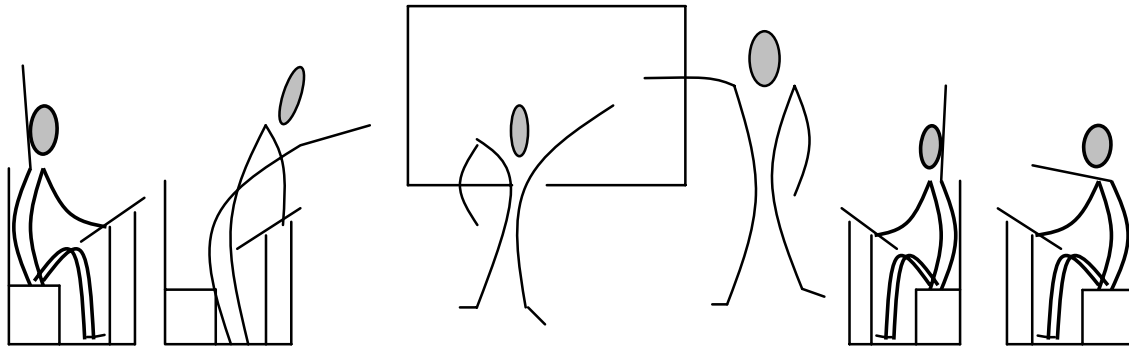
In our example the discovering way has been chosen for the third objective. It is done in group-work. The trainees have to find out what consequences an accident has for various parties. The information to find out was given in the previous period of the lesson. A hospital was already mentioned, and there was the discussion with family members too. So no more material is necessary.



When it becomes obvious that trainees are not able to handle this problem (consequences for various parties) which materials could be given to the trainees to make the task manageable for them?

10.3 The developing way

This way can be considered as a combination of both the discovering



and the presenting ways. It tries to unify the advantages of the others and to reduce the number of problems that could occur. Compared to the other methods where activity was either concentrated on the instructor or the trainees, here it is spread to both. It means that most of the time the trainer and trainees are active. One can call it a co-operative style where responsibility and duties are distributed to every party. However, make sure that this distribution is somehow equal, so that the trainees do not get the feeling that they have to do the instructor's job.

Characteristics of the Developing Way

☞ *The instructor and trainees are partners.*

It does not mean that trainees have the same rights as the teacher. In every company there is a senior partner and a junior partner. Junior partners do not have the same rights as the seniors. However, being the junior gives the feeling of being taken serious. It will show the trainees that their opinions and their ideas are important. Co-operation

will make the class more lively and fruitful and the participation of trainees in the teaching will rise gradually.

☞ *The instructor acts as a facilitator.*

As the developing way contains items of the other two ways, the instructor's job does too. At one moment he / she will be a lecturer, while at another he / she will act like a moderator. It always depends on the situation. But even when trainees are doing the most active part, it is not break time for the teacher. He / she has to keep the track all the time. The trainees should never get the feeling that they are left alone with any task.

☞ *The trainees interact among themselves.*

When a lesson is teacher-centred all answers and contributions of the trainees are directed to the instructor. Observing a class in a developing style one can see that there are discussions and exchange of views among trainees, because they have their ideas and have to explain and defend them, when classmates ask questions. These discussions have to be supervised by the instructor.

☞ *The instructor and trainees are active throughout the period.*

In the presenting way it is usually the instructor who is talking, except when trainees are answering a question here and there. In the discovering way it is mostly the students who are active and the master is in the background. This concentration on only one of the two parties is not existent in the developing way. It is a to-and-from between trainees and teacher and trainees among themselves.

Problems of the developing way

☞ *It takes more time than the presenting way.*

It is true that this way is more time-consuming. However, it has already been explained that: Time-consuming does not mean time-wasting. The more experience trainees and teachers have with this method the less relevant will be the time factor.

☞ *Sufficient materials and tools must be available.*

Whether this is important or not will depend on planning and preparation. When thinking about how to run a lesson on time, there should be enough time to prepare the necessary materials. It is not every lesson that has to be done this way. Existing ones can be modified a bit and then contain part of a new teaching style. In a later chapter we will learn some more about teaching aids.

☞ *Lectures may turn into argumentative session.*

This is only a problem, when a discussion gets out of control or does not involve the subject matter. The more discussions are on the topic, the more the trainees will learn.

When appropriately applicable

☞ *ALMOST ALWAYS!*

This teaching method is nearly possible all the time. There are only some cases, where it can become inconvenient.

➤ When the topic is absolutely new

If trainees do not have any pre-knowledge of the topic, it is difficult for them to co-operate, because there can only be very few contributions from the students and it will automatically turn into a presenting style.

- The number of trainees is too large

When dealing with a very big class (let's say above 50) it is no longer possible to involve many of the trainees. While the teacher is communicating with some of the students the others will withdraw themselves.

- Lack of time

Sometimes teachers might be under time pressure. There is still a large number of topics to teach and there is not sufficient time available. In this situation the information transfer and the learning process have to be split. In the training centre the teacher will present the knowledge and explain quickly, and the trainees have to learn everything at home. However, be aware that the learning itself will not be as efficient as it would have been with the developing way.

Remarks on the Developing Way

In summary, one can say that the big difference between the developing way and the traditional teaching lies in the involvement of the trainees. The students should no longer be seen just as receivers but as partners. Many of the lessons that are held in Technical Education and Vocational Training could be transformed into developing style lessons with only some modifications. Very often there are many situations where students could take over the part the instructor usually plays. For e.g. when a chart is shown, one can ask a trainee to try to explain what he sees. Normally this is what instructors do. However, some teaching aids and some situations in a class are so obvious in their intention that a student can do it too.

10.4 Final annotations

Of course, leaving behind the traditional way of teaching and starting something new will be more work. However, as already mentioned it does not mean that all previous preparations and lesson plans have to be thrown away. Many of them can still be used and some of them can be overhauled. And finally, nobody will expect that every lesson has to be changed at once. If one lesson a week were modified it would be a progress. Naturally every input will have an output.

☞ *A better and easier learning for the trainees*

As the learning process already happens partly in the classroom, the knowledge of the trainees grows faster without spending more time with homework. This will have the result of further motivation and engagement.

☞ *A good mood in the classroom*

The more effective teaching is, the higher the acceptance of the trainees. Being actively involved shows trainees that they were part of and contributing to a successful lesson. This will provide team spirit. It is motivating and makes students attend classes willingly.

☞ *Better results*

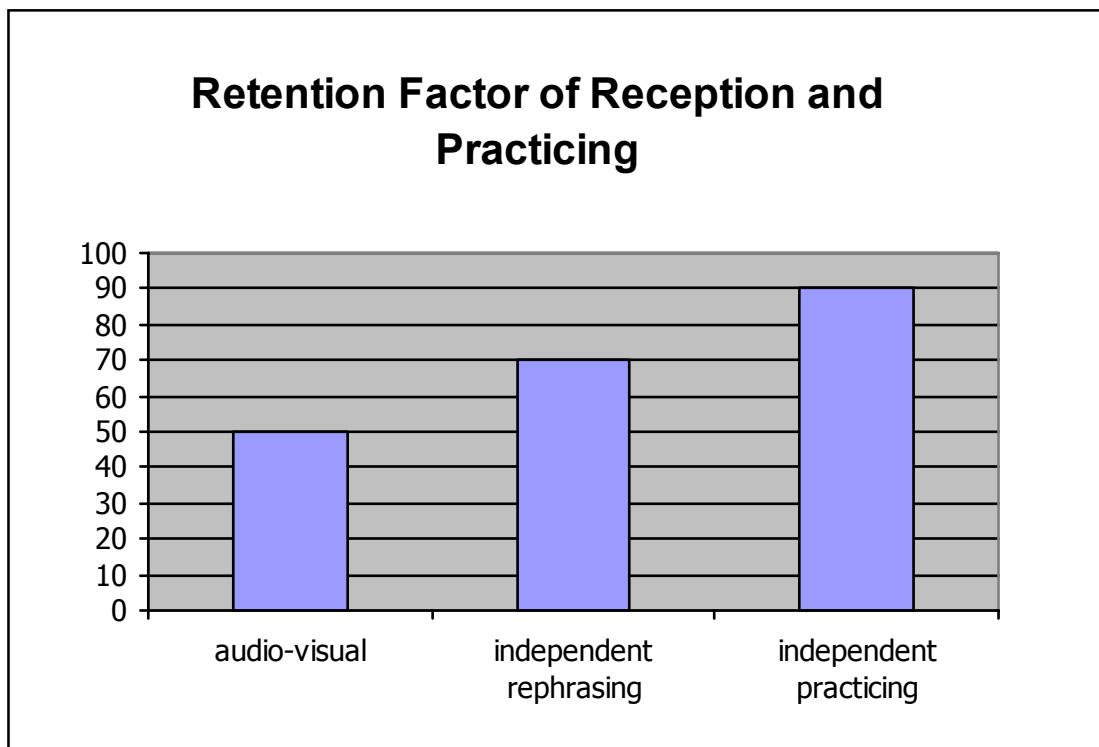
Everything that is encouraging trainees to learn and participate actively in the lessons will bring higher efficiency in learning. Things will be remembered easily and this will lead to better results in class tests and the trade testing examinations.

☞ *Good reputation*

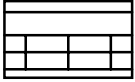
The opinion of trainees should normally not be considered too much, when talking about the reputation of a teacher. The students have a different way of assessing the achievements of an instructor. Usually they are influenced by issues that have little to do with the teaching.

Asking pupils why a teacher has a high reputation regularly will get you one answer: "We learnt a lot from this instructor". If the final result (having got a good apprenticeship and having passed the examinations) is positive, most of all the inconveniences are passé and forgotten. What remains is whether there was success or not. A good reputation of instructors will result in a good reputation of the whole training institute. This will encourage more young people to attend the institute. Obviously it is a circle and it is nobody else than the instructor who should give the initial impact to improve the present situation by reviewing his teaching style.

Active involvement of trainees is very important for the learning process as the following chart shows.



The chart shows very impressively that even proper use of teaching aids is not as effective as active participation of the students.



In our example only the developing and discovering ways are used. One can easily see that the level is rising gradually and that the progress of the lesson depends on the contributions of the trainees. It is important that the students always give an explanation for their contributions: "Which of the cables would you prefer?" – "Why would you prefer..." . If not so, the lesson would turn into a guessing game and there was no learning process. The students should be involved throughout the whole lesson. At the end every trainee will have the feeling that the result which is noted on the blackboard is part of his / her own effort. The notes on the blackboard when developed step by step makes it easy to recapitulate how it was built up. The trainees can then recognise how they themselves were guided gradually to a common goal.

Presenting	Developing	Discovering
Concentrates on teacher's activity. Absolutely controlled by the instructor.	Activity is concentrated on instructor and trainees. (co-operation)	Concentrates on trainees' activities.
The instructor intensively controls trainees.	Instructor gives the impulse, he/ she is the initiator	Trainees decide on their own what they will do
The instructor plays the main role. He is the transmitter of information	New knowledge is won in common work	Trainees decide on their own how they will proceed
The instructor presents, explain, shows, illustrates	Instructor is a facilitator	Instructor is in the background
Objective setting is done by the instructor	Trainees are able to participate as partners	Trainees do the objective setting
Instructor offers a whole lot of information	The instructor guides the trainees	Trainees make proposals
Instructor presents complex knowledge systematically	Instructor gives instruction to the trainees	Trainees solve problems on their own
Instructor prefers cognitive and affective objectives	Trainee is interactive	Trainees share work, work together

The Sphere of action in Vocational Education, main features.

11 The Social Action in Vocational Training

In recent times, the focus of vocational training has shifted from one which is teacher centred to one that is more student-oriented-teaching in which the students themselves are actively involved. Instructors have to break away from the prejudice that a lesson was good when the instructor talked most of the time.

Teaching is above all a form of communication. The instructor communicates with trainees and trainees among themselves. Communication among trainees should be encouraged. Three fundamental forms of communication or social actions in vocational training are *Class Teaching, Partner Teaching and Group Teaching*.

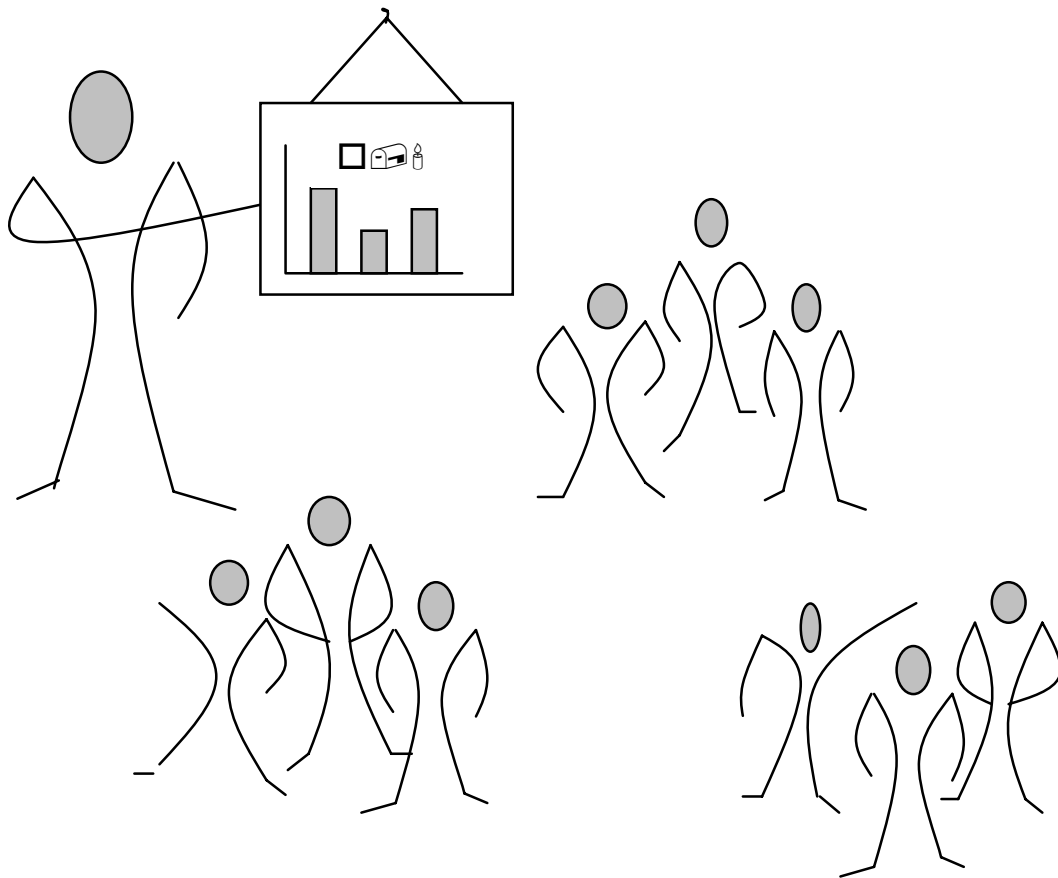
11.1 Class teaching

This is the most common and classical way of teaching. It means that the teacher addresses the whole class at the same time. Everything he / she is saying is directed to everybody in the classroom in the same way. Nobody is excluded or given any other duties. In a nutshell, the entire class is involved in the same task.

Class teaching usually does not respect the abilities or deficiencies of particular students. Bright trainees are addressed the same way as trainees who do not learn easily. This means that class teaching has to go on a well balance level so that everybody can follow. However, this is not always possible. Sometimes as teachers we have to accept that there is a small percentage of dropouts. This is a very critically statement but reducing the level too much or concentrating on particular trainees will lead to the neglect of the rest of the class. Within class teaching, the instructor has control over the entire class. In contrast with other forms of teaching he has only to concentrate on one main group and is not busy with several different assemblies as it is the case in, for e.g. in group-work.

11.2 Group Teaching

In group teaching, the class will be split up into several groups temporarily. There is a lot of research work about the implications of group-work. One effect, which is commonly known for example, is the group dynamics. It has to do with the process of mutual influence



among the group members. The achievement of a group is more than the sum of the potential of every single group member. "Together we are strong" is a common saying. There are various types of groups according to the causality of their formation and the level of interaction. The class in total is for e.g. a so-called formal group, because it is formed by organisational necessities and has a particular purpose. The "group-work group" is a *secondary group* and might even be called a *team* under certain circumstances. It is organised rationally to solve a

certain task. Additionally, we have primary groups (for e.g. a family) and informal groups (for e.g. a clique).

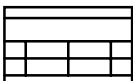
Types of Group-work

Depending on the task the groups were given there are two types of group-work: the *common-job group-work* and the *job-sharing group-work*. Which type of group-work he / she chooses depends on the teacher's intention.

The Common-job Group-work

When there is a new and important subject matter, this is the type, the teacher should decide to use.

Common-job means that all groups are working intensively on the solution of exactly the same problem. All groups are given the same task, the same questions and the same materials. At the end of the group-work the group leader will present the results as requested at the beginning of the group-work. It has the advantage that all trainees are going through the same topic and get nearly the same information. This influences the learning process. On the one hand the students approach the learning matter during the period of the group-work. When presenting the results, every group-leader will give the group's solution of the problem with his / her own words. This embodies a repetition, which means reinforcement. When various groups are working on the same task, another positive side-effect is that the output is higher because more groups means more ideas, more statements and more contributions. After a group-work like this, usually every trainee should be familiar with the new knowledge, without additional homework.



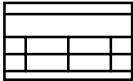
Objective 3 of our example is supposed to be reached with a group-work. To do it the common-job way means that all groups have to deal with the three questions: a) what consequences does an accident have for the person, b) what

consequences does an accident have for the family and c) what consequences does an accident have for the company? Every group has to think about the three fields. The ideas will be discussed within the group and later on presented to the rest of the class, when group-work has ended. After that they will hear the results of the other groups, which will normally be quite similar to their own and therefore be considered as confirmation of their own work. In addition, different conclusions might come out, which one group has not considered.

The Job-sharing Group-work

When a common knowledge of the topic is existent and all trainees are familiar with the general solution of a particular problem, this type of group-work can be chosen to work out special details.

Every group is working on a part of a solution. At the end of the group-work, the group-speakers present the result of their group and thereby inform their classmates of the group's work. Every group works out one part of a comprehensive statement. At the end of the lesson, when every group gives its results, the partial contributions are assembled to a final completion like pieces of a puzzle to a picture. This form of group-teaching is more time-saving than the other one, because every group has only part of the job to do. When compared with the common-job type, the learning process is not as intensive, because there is no repetition and the part of the solution which is found out through other groups is usually given in the presenting way, which was already discovered as less effective than other ones. In addition, the output is normally lower, because there are fewer people engaged with one task.



Looking at our example, even a job-sharing group-work can lead to a satisfying solution of objective 3. In this case, one group has to find an answer to the question "what consequences does an accident have for the person?", the second group "what consequences does an accident have for the family?" and group 3 "what consequences does an accident have for the company?". At the end of the period, the various group speakers present their results to the entire class. The instructor is supposed to put the answers on the blackboard, so that at the end of the group-work the answer is completed on the board. The effect will be that less time is needed, because the tasks of the groups are smaller than with the other type. On the other hand, the various group members are only confronted with part of the solution during the period of the group-work.

Advantages of Group Teaching

Apart from variation during a lesson, group teaching has many positive aspects, which can be divided into three groups.

Intellectual procedures

☞ *Trainees go into the tasks more intensively.*

Since the students have to solve a problem on their own. The fact that they have to present the results to the entire class later on will encourage them to work on the task intensively.

☞ *Trainees express themselves.*

When the group finds a solution during a discussion it has to be formulated in the form of a sentence. This will help to express the learning matter in their own words. When they use their own

vocabulary it is easy for their classmates to understand. At least, being forced to bring an answer to paper is a training in the English language.

☞ *Trainees learn rules of discussion within a group.*

A group can educate its members. Even when one participant is the group speaker, all of them are on the same level. There is nobody of a higher rank and so trainees learn to accept rules easily because there is no order from any authority. They recognise the urgency of a certain behaviour that is necessary for the group to be effective.

☞ *They hear the opinion of their comrades*

Within a group smaller than the entire class, more trainees can come out with their opinion and the students get to know each other better.

☞ *They learn to work independently.*

Very often it is only the goal which is given in a group-work. The solution is somehow indicated through the given teaching aids, but it is up to the trainees to use these aids the right way. This is a small step to guide trainees to learn to organise their work themselves and to be self-reliant.

☞ *They learn how to solve problems in general.*

A comprehensive objective of vocational training or education in general is to promote the ability to solve problems. It is one of the most important things in life and is very important during the time of apprenticeship.

☞ *They are challenged and therefore develop ambition.*

The effect of a challenge was already explained in the chapter about motivation. When the challenges are on an adequate level it leads to the development of ambition.

Social Procedures

☞ Trainees stay in close contact with their comrades and help each other.

A smaller group is not as anonymous as the entire class. The students recognise the importance of everybody's contribution and help one another.

☞ Students consider the opinion of the other group members

One important rule for living together in peace and harmony is to listen to and to respect other peoples' opinion. They learn that for a common solution it is important to get several point of views, which will be discussed and analysed and finally form the best consensus.

☞ Trainees take group-decisions.

A group-decision has an added advantage that because of the various contributions every group member has formed a part of the decision.

☞ There is identification with the group and the results of the group's work.

As the solution of the problem was a common decision, every participant is responsible for this group-decision in the same way. This becomes very obvious when the group leader is presenting the results to the entire class. Sometimes there is a criticism from other classmates. Almost immediately another member of the group starts speaking either to give more information or to defend the group-leader's remarks.

☞ They develop their own roles for the work within the group, they learn to respect and control these roles.

Usually these types of roles are given by the school authorities and the youth has to abide by it. These top-down orders are not as willingly

adopted as compared to when they are developed by the trainees themselves.

☞ *They get a feedback on their own performance.*

Normally there is a reaction from both the classmates and the teacher. It enables the participants to analyse their job and their behaviour during group-work. Trainees can see that a good co-operation lead to good results or they will understand why they failed.

Emotional Procedures

☞ *Trainees get higher satisfaction because the work was self-controlled.*

Even when the instructor is around the whole time, the group's job is done independently. They are not under the direct supervision of the instructor. So trainees feel free to express themselves, not fearing any restrictions by a teacher. Additionally, they recognise that they are able to solve problems without the interference of a trainer.

☞ *Even reserved persons may give their opinion.*

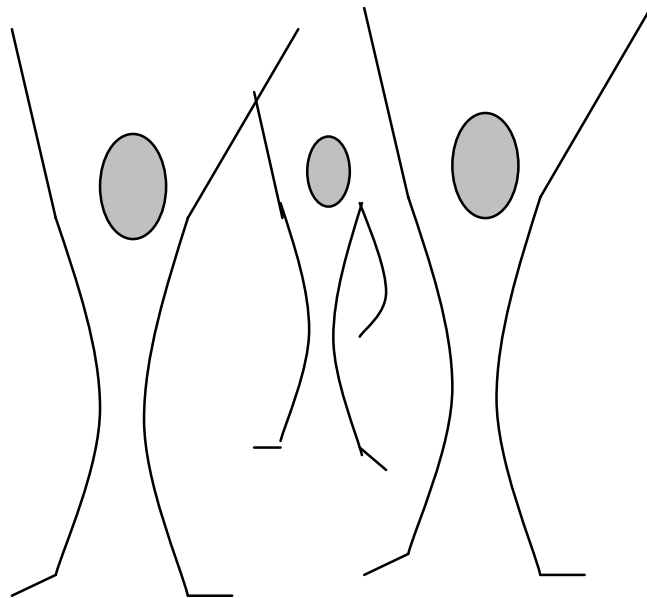
A class can be referred to as being homogeneous but there are still various types of persons in that class. You have the whole range from very calm to hyperactive. Normally the calm ones do not attract attention during classes. Only when a teacher directs a question to such a person will he / she answer. Nobody knows the reasons for this behaviour and often the contributions of these persons are very valuable. Being calm does not mean knowing nothing. In a group smaller than the entire class, those trainees might be encouraged to contribute actively.

☞ *Shy people lose some of their fears.*

When they get a positive feedback during group-work sometimes shy persons gain self-confidence and dare to answer in a bigger auditorium too.

☞ *Even trainees who are not very effective can enjoy the success of the group.*

Self-confidence is often a question of success. The more successful someone is, the higher his / her self-confidence becomes. People who usually are not very active do not have many opportunities to enjoy the feeling of success and so suffer from low self-confidence. Within a group-work all members will share the success even when one person did not contribute much.



☞ *Usually trainees are highly motivated.*

All what we heard up to now has a positive influence on the motivation of the trainees. It is not only the variation in teaching, the change of methods, but also the possibility for the trainees to work in an atmosphere which is not as strict as a teacher-centred lesson.

Disadvantages of group teaching

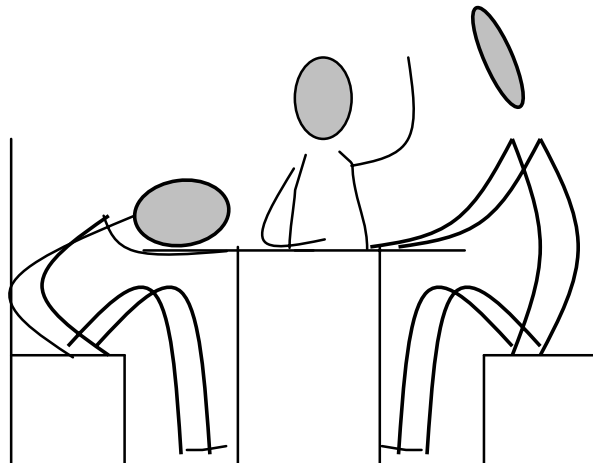
The many advantages of group-teaching became apparent in the last paragraphs. The negative aspects of group work seem almost insignificant when compared with the positive aspects. On the one hand, they are of organisational nature and on the other hand they do not affect the intellectual, social and emotional procedures of a group work. Nevertheless, they shall be mentioned and explained.

☞ *Sometimes the conditions for group teaching are difficult.*

Small classrooms and lack of materials can make the realisation of a group-work laborious. If the classroom is too small, the discussions of one group may disturb the other. Upcoming disturbances in one group can be contagious to other groups. Disturbances may also occur when there are inadequate materials and the students become bored or start looking for materials from the other groups.

☞ *Some trainees may use the chance to "hide" in the anonymity of the group.*

During class teaching an instructor always has an eye on the entire class. Every student gets the feeling that he / she is under the supervision of the instructor and behaves according to this. While supervising a group-work, the teacher has to go from group to group to offer assistance. So he / she is not able to control the whole class. Some people



might use the opportunity of being out of the trainer's control to relax or even doze. This problem usually occurs when group-work is introduced to trainees as a new type of teaching.

☞ *In the beginning group-work takes time and the results might not be very satisfying!*

Both trainees and instructors have to learn more about group-work. As we shall see later on, there are various terms when a group is formed. Those procedures take much time in the beginning, but are easily learnt later on, when trainees are familiar with the new sphere of action in the classroom.

Composition of the Groups

When a group is being formed it means that people will come closer than is usually the case. The process of forming a team of several individuals comes with four steps: forming – storming – norming – performing.

☞ *Forming*

This phase is reflected in the careful approach adopted by everybody, to find out which behaviour is adequate and tolerated. During this period there is a major concentration on the group leader. The members do not work on the problem itself but define regulations and ways for co-operation.

☞ *Storming*

Minor conflicts which will be a setback for the group leader may arise. The task will be regarded very critically and this is likely to affect progress of work.

☞ Norming

It is the time for finding a group-identity. Several opinions will be discussed and the collaboration gradually becomes friendly and loyal.

☞ Performing

The group members now concentrate on the solution to the problem. Proposals are discussed constructively and there is mutual acceptance.

Types of Constellations

Depending on the intention of the teacher, there are several possibilities of group formation.

☞ According to natural circumstances.

It means that in this case the instructor does not have anything special in mind for separating or grouping particular students. So trainees form groups according to their names in alphabetical order. Sometimes the various rows of the benches in the classroom are used in forming the group: Row 1 = group 1 and so on. This is a common way, because not much time will be wasted for the procedure of group forming. On the other hand it may have negative influence on the effectiveness of the group, because the group-members may not understand each other well or are all on a low level. When there are only underachievers in a group, only job-sharing group-work should be done and this particular group should be given an easier task. If it was a common-job group-work, this group would have difficulties to come to a conclusion or would identify that their solutions are of lower quality than the ones of the high achievers. This may discourage the trainees.

☞ *According to the affection of trainees.*

The instructor allows the trainees to pick each other. This will in the beginning excite the students, because friends come together. But it might not be very useful for the effectiveness of the group's performance. Often when friends meet, they have other things to discuss than to work on the given task.

☞ *According to the interests of the students.*

This is frequently used to support a competent outcome especially when the tasks have something to do with the trainees' interests. But it is not always possible to find out what the common fascination is based on.

☞ *According to the achievement of the trainees.*

For a good mood in the classroom this is the most appropriate way to form groups. Try to mix students of high level with students of low level. All groups would be at the same standard and nobody has the feeling of being at a disadvantage. This is because sometimes group-work might be regarded as a kind of competition among trainees. Additionally low-achievers can benefit from high achievers.

☞ *According to gender issues.*

In recent times more and more female trainees enter so-called male dominated professions and the other way around. Usually these "newcomers" are in the minority. It is the teacher's task to integrate these young persons as properly as possible. If the fewer persons always form their own group it will give them a feeling that they have to stand their ground all the time.

Realisation of Group-Teaching

Before group-teaching can achieve the needed objective, the following have to be noted:

Group- teaching requires a good preparation to be successful!

☞ *Make sure that every participant has the necessary materials.*

When students do not have the equipment that is needed, they will start looking for materials somewhere else or will be engaged with something else. Both situations create a mess in the classroom and will spoil an atmosphere that requires working mentally.

☞ *Make sure that the instructions are clear so that everybody will understand.*

Unclear instructions will lead to confusion among students. As we learnt about the processes taking place during the formation of a group, there are already some complications to manage. Additional misunderstandings can lead to a complete blackout.

☞ *Make sure that the task is at an adequate level so that everybody can contribute to finding the solution.*

When the task is so difficult that only the best student in a group is able to contribute to the solution or he alone is working on the problem, it is no longer group-work and the identification with the group and everything which comes with it gets lost.

☞ *Arrange the classroom so that the formation of the groups can be done quickly.*

When a teacher knows the trainees of a class, he / she can arrange the trainees according to the groups he wants to have. It means that having found a well-balanced mixture of groups, the instructor can let

them sit in the same way during normal classes. The group formation according to normal circumstances will be turned around. If you place the members of group 1 in row one, you can combine two options: the normal circumstances and the achievement of the trainees.

☞ *Take care that you have a well balanced mixture of groups*

This point does not refer to the achievement of the trainees but to the behaviour and other group-work dynamics. One thing is to separate troublemakers. When there is only one good-for-nothing trainee in every group he / she will not be able to disrupt the effectiveness of the group. On the contrary: a group might be able to educate its members! On the other hand, when all the troublemakers in a class are in one group they will encourage each other and stir up the whole surrounding.

☞ *Try to get a good size of group.*

For effective working within a class, groups of 3-5 persons each are adequate.

☞ *Name a group leader.*

Do this before the group-work starts. When you do not do so, there will be confusion during the working period and especially at the end of the group-work, when somebody has to present the results to the entire class. Usually nobody wants to take over this responsibility and everybody pushes it to his / her neighbour.

☞ *Put down the order for the presentation!*

What goes for the naming of the group leader goes for the order too. Sometimes you can just arrange a kind of raffle. Write down numbers according to the number of groups on small pieces of papers and let the group-leaders draw one.

☞ *Announce whether you will give marks for the work or not.*

Some instructors want to put pressure on trainees when the progress of the group-work does not satisfy him / her by announcing that marks will be given. When this takes place after the group-work has already started, the students will regard it as penalty and build up a negative attitude towards group-work.

☞ *Tell the trainees the time that is scheduled for the job!*

It will help the students to organise their time management effectively. When group-work is limited to 5 minutes, the trainees recognise that the result of the group-work cannot be very comprehensive. On the other hand a scheduled time of 30 minutes will announce that an extensive answer is expected and not just one or two sentences.

☞ *Check the results of the various groups while trainees are doing the task!*

You can correct major errors in time so that trainees do not waste time working on a useless solution. If every group had the same task the teacher can have a look at the answers before the group leaders present their results. Call the group with the best solution to every question to come out.

In the group-work of our example there are three questions to answer: "What are the consequences for the person?", "What are the consequences for the family?" and "What are the consequences for the company?". Checking the results before presentation enables the teacher to know the best answer. If recognising that group one has the answer " a person can be seriously injured" and group two has the answer "there is no danger for the person" to the first question, than he / she may ask only group one for this answer but not two. This way the best results come out very fast and will be put on the board. If

there was time left the instructor could ask for the answers of the other groups to discuss them.

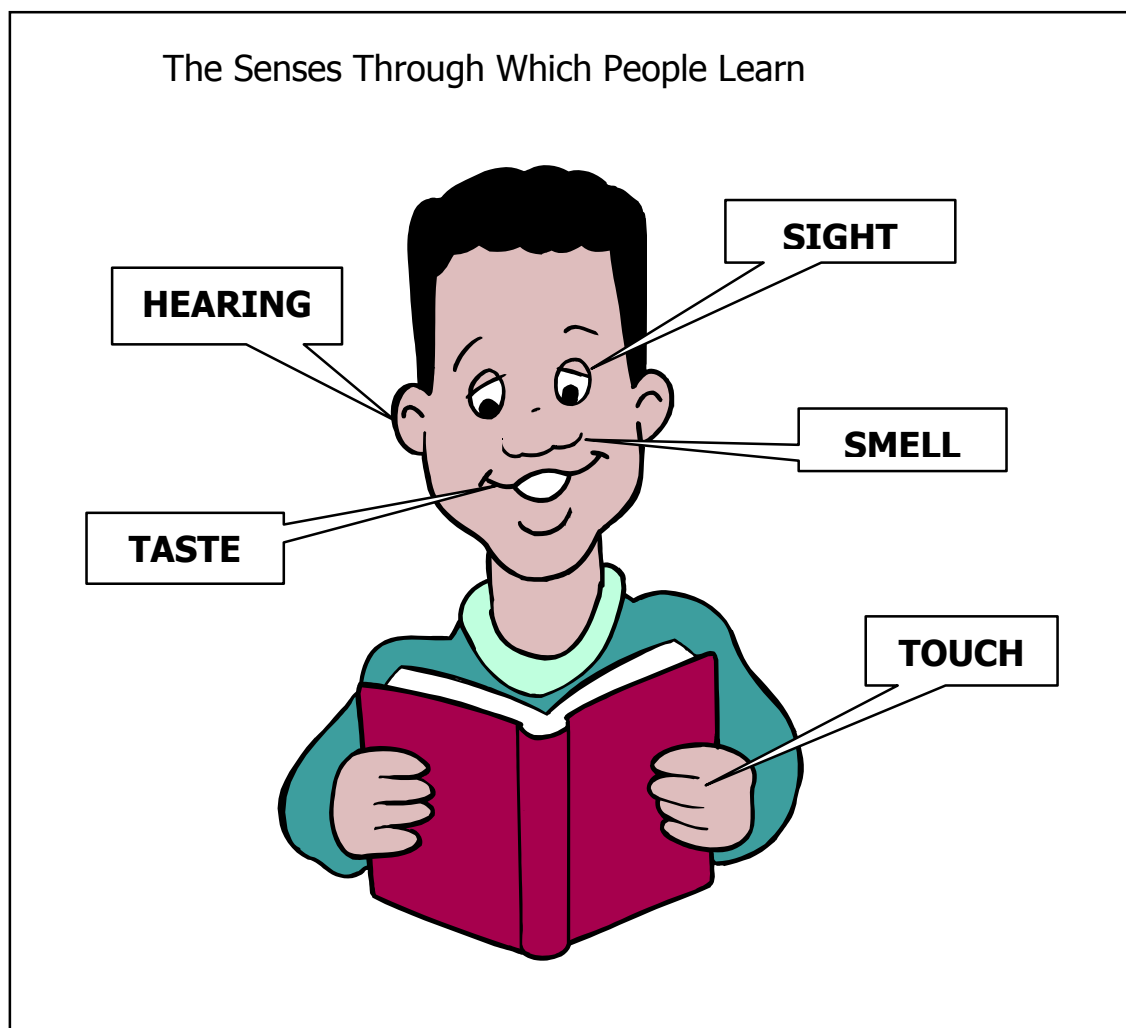
Wherever trainees will work in the future, they will have to collaborate with other persons. There are only few cases where people are working alone. To live and behave within a group is normally learnt and experienced within the family life. Working together means that people have to rely on other group-members and their job. A group's work can only be of high quality when everybody does his part well and the co-operation is perfect too. To reach this holistic objective of an apprenticeship, group-work within theoretical lessons can be of enormous help. In the beginning there might be several problems and only few output. This should not lead a teacher to drop this important form of teaching.

11.3 Partner – Teaching

Partner teaching means that two people are working together on one task. Even though not everything that applies to group-work goes for partner teaching, it is very similar to group-teaching. Some might say that this method of teaching is group-teaching namely with small groups of two persons. A task is given to two trainees who are sitting together. The process of forming this mini group wastes no time. By means of partner teaching, trainees can develop solutions independently and give each other mutual assistance. This type of teaching is mainly good for easy tasks, because there might be too few ideas coming out of two people.

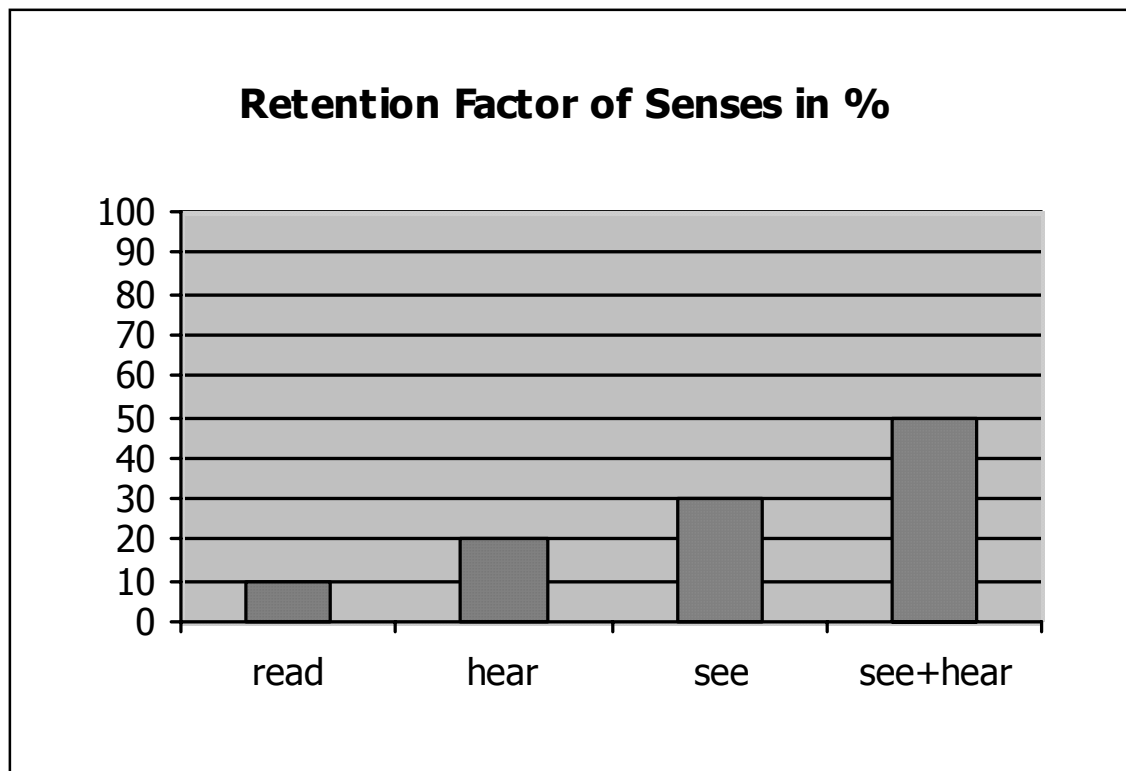
12 Teaching Aids

Teaching Aids are materials which the teacher uses in his / her lesson to make teaching and learning more effective. They are called *teaching and learning resources* or just *media* too. Just as everybody, the trainees learn through our five senses. The senses mostly utilised depends on the particular trade. The taste is very important for food processing jobs like catering and cooking but less significant for masons. Generally one can say that the more senses are involved in the teaching-learning process, the more efficient it will be (see chart below).



Every good instructor should use media as much as possible but the lesson should not become a multi-media-show. Teaching and learning resources are a help for the instructor but do not replace him / her. In particular when the teaching matter is very complex and abstract, media are a proper assistant to make things clear and concrete and last not least, make teaching and learning easier. Media have a motivational effect, because good media focuses the trainees' attention to the teaching matter. Compared to a pure verbal instruction, media liven up a lesson.

Teaching and learning resources are not always appropriate. They attract attention and can side-track too. Instructors should use media only when they support the learning process. One main criterion for the use of teaching aids is that they are adequate to the purpose. It doesn't make sense to have big effort for a small outcome. Often it is the



simple things which are most effective. Adequate means adequate to the circumstances at the training centre, adequate to the level of the

trainees, adequate to the teaching matter and adequate in general to the trainees' world. The major concentration in this chapter will be on the use of the chalkboard, cards, charts and work sheets, which belong to the group of the visual teaching aids. Other categories are aural and audio-visual media. Other ways to group media is to distinguish between hardware (e.g. overhead projector, TV) and software (e.g. transparencies, books). There are other forms of categorisation.

12.1 Visual Teaching Aids

Visual teaching aids are supposed to be received with the eyes. It may come together with verbal comments and explanations. Examples of visual media are blackboard, whiteboard, pin-board, charts, maps, pictures, flipcharts, slides, photos, overhead projector (+ transparencies), books and worksheets as well as models and originals.

The Blackboard

The blackboard is called chalkboard too. It is the classic teaching aid in every classroom. Even though many other media were developed for teaching and training, the chalkboard never lost its importance. This is because the chalkboard has many advantages.

Advantages of The Blackboard

☞ Availability

A chalkboard is usually available in every classroom. It is not necessary to carry it. As it is fixed, nobody can take it away, and so it is usable always. The blackboard will remain where it is after use and has not to be removed or stored at the end of a class.

☞ Easy Handling

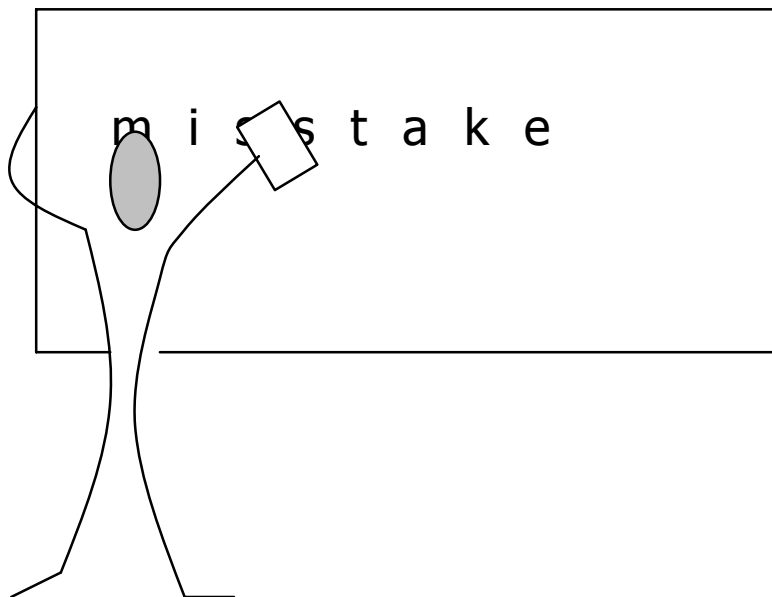
The use of a chalkboard does not require any sophisticated technical equipment (like a screen for the overhead projector). The necessary items like chalk, rulers and dusters or sponge are comparably cheap and easy to get.

☞ *Easy Use*

Working on the chalkboard is easy to learn and does not demand special technical abilities. With some exercises, every instructor should be able to do a readable writing on the blackboard.

☞ *Flexibility*

No other teaching aid allows us to correct spelling or mistakes as fast and easy as the chalkboard. Mistakes can be wiped out quickly. So the board stands for fast notes as well, which can be removed when the space is needed for the planned notes. The same goes for any changes or improvements which come during the lesson through the trainees or the teacher.



☞ *Gradual development*

Usually the blackboard notes are developed during the lesson. The trainees are not confronted with a sudden huge amount of information but can see a moderate progress of the final product and have the

possibility to follow this development. So it becomes easy for the trainees to recognise the context and get an easy survey.

☞ Spontaneity

Since it is available all the time and notes can be removed quickly it enables the teacher make spontaneous explanations (such as simple drawings) when necessary.

☞ Space

Wallboards, as some people call it too, are usually generous in their dimensions. They offer sufficient space for all kind of notes and enables us to structure the notes so that the students easily understand it.

☞ Catchiness

Some keywords like the heading are written on the blackboard at the beginning of the lesson and remain there usually up to the end of the lesson. This makes it easy for the students to remember such information.

☞ Orientation

The notes on the blackboard reflect the topic of the day and the context. Trainees will therefore be able to put new information in place, as the board is always there to assist them.

Disadvantages of the Blackboard

☞ Dust

It creates dust. Anybody who uses chalk has white and dusty hands and cloths too. Even the surrounding of the blackboard is usually covered with chalk dust.

☞ Conversion

A teacher who is writing on the board has always to turn round and show his back to the class. This might encourage some trainees to disturb because they are out of sight of the trainer.

☞ Cleaning

A chalkboard has to be cleaned properly. Very often it is only a duster that is used. The consequence is a grey-board instead of a blackboard. The more intensive the blackboard is used the more difficult it is for the students to read the words on the board.

☞ Handwriting

Some trainers have a handwriting that isn't easy to read. Some of these teachers do not recognise this, because they are used to their own style. However, a teacher is always an idol. This means trainees are likely to write down things exactly the same way that it is written on the board.

☞ Sustainability

What is written on the board makes a longer impression on the trainees. It can however be a big disadvantage. When mistakes are made on the board which are not identified. In this case the students might learn the wrong thing.

Rules for The Use of A Blackboard

☞ Placement

As the blackboard is usually fixed on the wall or is part of the wall, it cannot be moved. So the teacher must ensure that the school desks are arranged in such way that all trainees can see the board.

☞ Script

The writing has to be clear and big enough so that everybody can identify the words. Bear in mind that even trainees in the very last row have to be able to read it. Every good teacher goes to the back of the classroom inconspicuously from time to time for himself to check his writing. On the one hand he will see whether it is big enough and so readable for everybody and on the other hand it is much easier to identify spelling mistakes from the distance.

☞ Structure

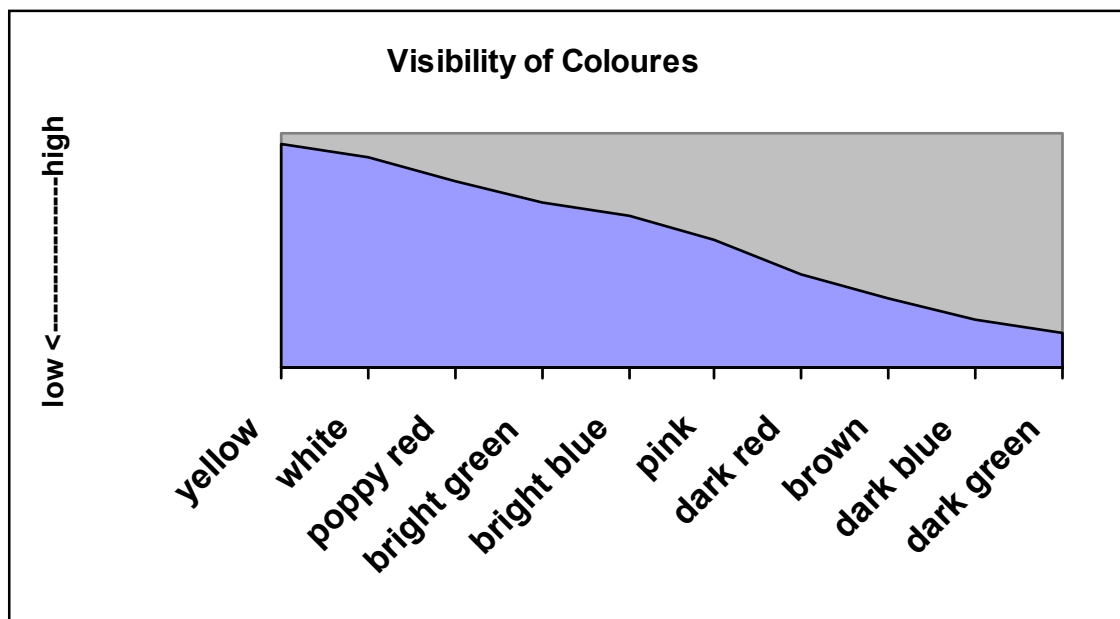
The notes on the blackboard should be clearly arranged. Students should be able to get the message easily. The blackboard should be an assistance to the trainees but not a closed book. Easy drawings can explain more than thousand words. (See an additional example at the end of the chapter).

☞ Progress

The final blackboard notes should be the result of a continuous process during the lesson. It means that the instructor should put down phrases whenever they are said. Do not wait up to the end of the lesson to write down the entire contents but make the notes of a trainee's answer immediately. It will encourage the trainees to further contribute and give him the feeling of having done something important for the outcome of the lesson. It also enables the trainees to follow the progress of the lesson.

☞ Colour

Chalkboards are normally dark green or black. Therefore coloured chalk has to be used thoughtfully. Some colours are almost invisible on a dark background (see chart below!). Colours should be used for highlighting important things and help in structuring the notes but not to make it funny! Make sure that the used colours are distinguishable.



Visibility of colours on a blackboard according to KNAPP

☞ Participation

Whenever possible a teacher should try to write down students answers literally. It will encourage students to participate actively in the class, give a positive feedback and helps improve their English language.

☞ Size

“Less is More!” Do not overload the blackboard. Try to keep things short and clear. The more you write on the blackboard the more difficult it becomes for the students to pick up the information.

☞ Design

Try to create a layout that trainees can easily copy into their exercise books. This has to do with the size itself, the use of simple words and sentences as well as simple drawings.

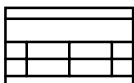
☞ Timing

Inform the students whether to copy the notes immediately or at the end of the lesson. Plan sufficient time for trainees to copy the notes. Mistakes can be avoided and learning will be promoted.

☞ Misuse

Do not send a trainee to the blackboard to make a fool out of him as a form of punishment. This will discourage trainees from participating actively. On the other hand praise trainees for a good performance on the blackboard. This will promote the students’ interest in finding a common solution to a problem.

A trainee’s exercise book is always the image of the chalkboard layout. Be aware therefore that it will be a reflection of the teacher him / herself.



On the following pages there are two chalkboard layouts to the same lesson. The original one, which was seen like this in a lesson and the modified type according to this chapter.

THE USE OF SCAFFOLDS

Definition:

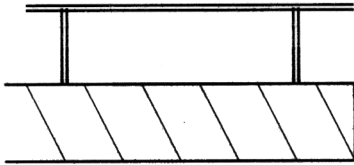
A scaffold is a framework of metal or wooden poles and planks used as a temporary platform from which building repair or construction is carried out. Dependent scaffolds are usually fixed on a house or a wall and cannot stand freely while there are poles only on one side of the scaffold while the other side is connected with the building, which gives it a proper stability. Independent scaffolds do not require the support of any wall or building because of having poles on both sides, which allow erecting them independently. Scaffolds can carry workers and material but one must be careful not to put too many loads like blocks and mortar so that the planks cannot carry all the load and will break down.

THE USE OF SCAFFOLDS

Scaffolds will be put up when work has to be done above men's height.
They carry persons and construction material.

Types of scaffolds

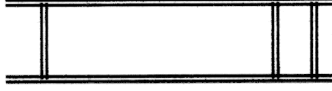
DEPENDENT SCAFFOLD



Dependent scaffolds are fixed onto the building and can not stand alone.

Dependent scaffolds are more stable but cannot be erected freely.

INDEPENDENT SCAFFOLD



Independent scaffolds can be erected without connecting it to a building.

Independent scaffolds can be erected everywhere but are not as stable.

Do not overload scaffolds and be careful when working on it!

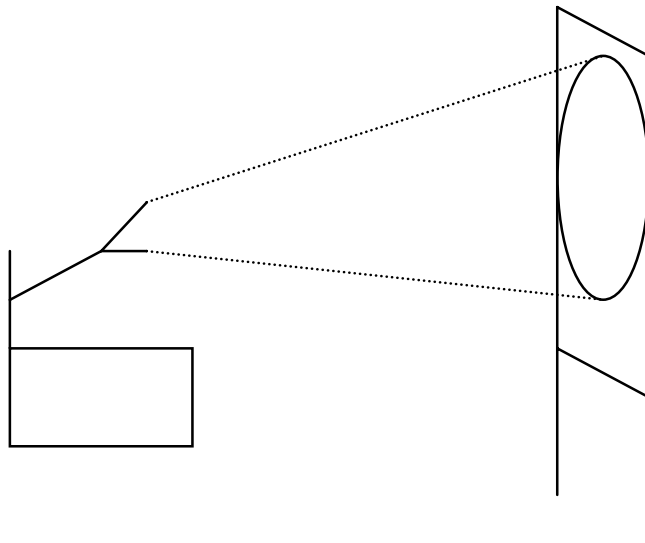
The Overhead Projector

The overhead projector has gained more and more importance in every kind of theoretical training. This is also true for vocational training. Most organisations recognise this development and provide their facilitators and the teaching staff overhead projectors. This is however a problem where electricity is not available all the time or where there is only one projector available at the institution. The use of the projector is similar to the blackboard even though there are different advantages and disadvantages.

Advantages of The Overhead Projector

☞ Projection

The picture of the overhead projector can be projected to a screen anywhere in the classroom or to a fixed point and can be used in addition to the chalkboard.



☞ Teacher's Stands

In contrast to the blackboard, the teacher does not have to turn around when writing onto the transparency and does not lose visual contact with the class. The transparencies are lying horizontal on the overhead projector and make writing easy and is therefore time-saving.

☞ Multiple Use

Transparencies can be used more often. Especially when reviewing a lesson a teacher can fall back on former transparencies. The transparencies are easy to store and therefore easily available.

☞ Pre-Manufacturing

Transparencies can be pre-manufactured at home without time pressure and one can thus achieve a perfect layout. Pre-manufactured models for several technical fields can be purchased.

☞ Combination

Transparencies can be used together with worksheets. This means that the teacher uses the worksheet as transparency and trainees can follow easily. When working with pre-manufactured transparencies and worksheets the teacher and the students can fill them together. In addition the trainer can explain things to the entire class by projecting the worksheet onto a transparency on the screen.

☞ Attraction

The bright light that will come from the overhead projector attracts the attention of the trainees automatically.

☞ Variation

The time for the information that will be given to the trainees can be flexible by switching the projector on and off. When switched off, the attention of the trainees will automatically return to the instructor.

☞ Overlay

The so-called overly-techniques means that transparencies can be covered and uncovered partly or completely by adding additional transparencies. These can be pre-manufactured too and allow the

instructor to concentrate on comments and explanations by reducing the writing job.

An extra advantage for the instructor is that with this technique, the covered part of a transparency is readable for the teacher on the projector table, but it does not appear on the screen so it is invisible to the students.

Additional information and help for the teacher can be written on the covering paper and is only visible to the trainer.

☞ Group-work

The students can use transparencies to write down the results of a group-work instead of using cards. At the end the results can be presented to the entire class by the use of the overhead projector.

☞ Comfort

The instructor can even sit when using the overhead projector.

☞ Models

Lesson models made of Plexiglas are available on the market and allow interesting and expressive demonstrations.

☞ Size

The size of the projected picture can be suited to the situation in the classroom, i.e. the size of the room or the number of trainees. Zooms can easily be done.

☞ Additional Equipment

Some producers of overhead projectors offer additional equipment for their sets, e.g. a device for the projection of slices.

Disadvantages of The Overhead Projector

☞ Availability

A regular and especially a spontaneous use of the overhead projector require that the equipment be easily available. This is only possible when an overhead projector is permanently present in every classroom. The projector is a sensitive machine and has to be protected from dust.

☞ Overloading

Transparencies, in particular when pre-manufactured, may lead to a fast presentation of information. In this case trainees are overtaxed because time for information processing is too short.

☞ Practice

The use of the overhead projector requires some practice. If not, there are several mistakes which can lead to confusion. When writing is too small or is done too fast it becomes unreadable. This can also happen, when the focus is not adjusted or the OHP is moved slightly so that the picture does not occur on the screen completely.

☞ Guidance

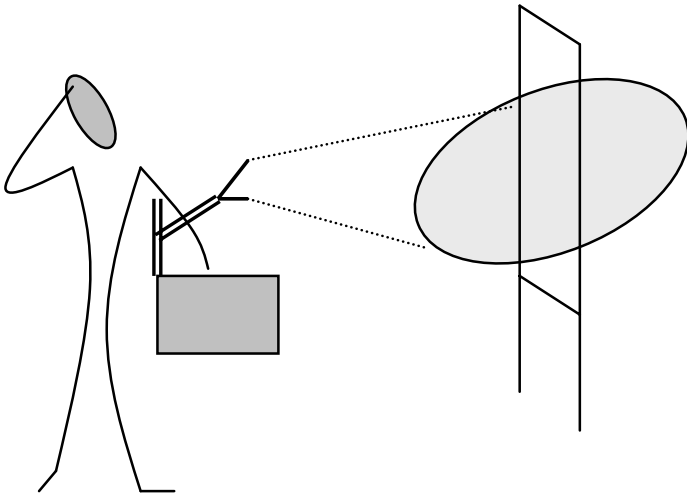
Concentration on the application of the OHP can suppress trainees thinking.

☞ Price and Correspondence

Industrial pre-manufactured transparencies and models are very expensive, difficult to get and often do not correspond with the plans of the teacher or the subject matter.

Remarks on The Use of The Overhead Projector (OHP)

Compared to other projectors the OHP's advantage is that the room does not need to be darkened. As a result the OHP is more or less unlimited in use. However, there are shortfalls. Because of its many positive features some teachers tend to overuse this device.



With an adjustable rack an OHP can be used while standing or sitting. Nevertheless the use of an OHP has to be trained. Since there is normally an average of 5 – 8 times zooming, a teacher has to practice and check how his writing appears on the screen. Since there is a projection through a mirror as part of the device, it is confusing when trying to move the

transparency while visually controlling it on the screen. When an OHP is installed, mark the projection area, so that you are able to adjust the transparency correctly on the projection table. Almost every OHP has implemented pins where transparencies can be fixed. Therefore they have to be punched before. The projector has to stand in a 90° angle to the screen, so that the picture is not distorted. Dust on the lens and projection table reduces the intensity of the light and leads to fuzzy pictures.

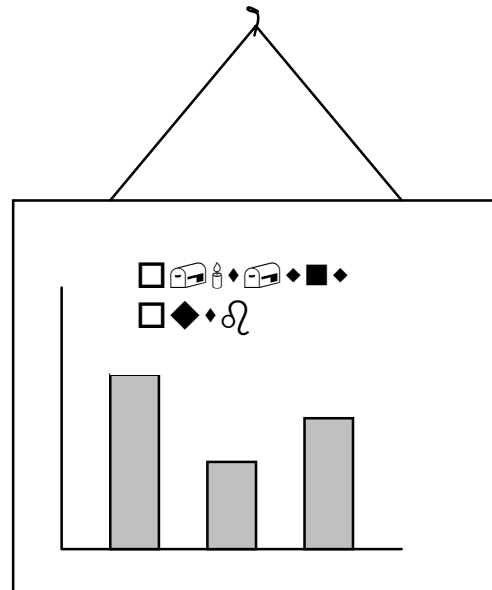
An OHP offers plenty possibilities and attracts attention. Therefore plan its use properly. An OHP cannot and should not replace the chalkboard.

The Use of Charts

Charts can be of good help for a teacher especially when an OHP is not available. Drawings and tables put on the blackboard vanish after wiping it. But often the same charts can be used in several situations. Charts put in poster form can be used frequently. It is easy to store and sometimes charts might remain in a classroom for a longer period. If so, they should be protected with any transparency or even with transparent paint.

Charts should not be overloaded. Concentrate on key words and topics. What goes for all the teaching matter goes for the charts too: if the trainees developed it themselves it would have a much higher learning effect. The preparation of charts could be done when the results of a group-work have to be presented to the entire class. In the beginning the outcome of trainee-made charts might not be very satisfying. After some practice a lesson can benefit immensely from this work. It is sometimes surprising to see, how much creativity students develop when challenged with such a duty.

One problem that is discovered very often is the fact that charts or especially the text itself is too small. This is because it is usually written and drawn on a table and the "manufacturers" are very close to the object. When the chart is later on fixed on the wall, it might be difficult for trainees sitting in the last rows of the classroom to read. To avoid this, remember that the minimum size of letters should be 2 inches!

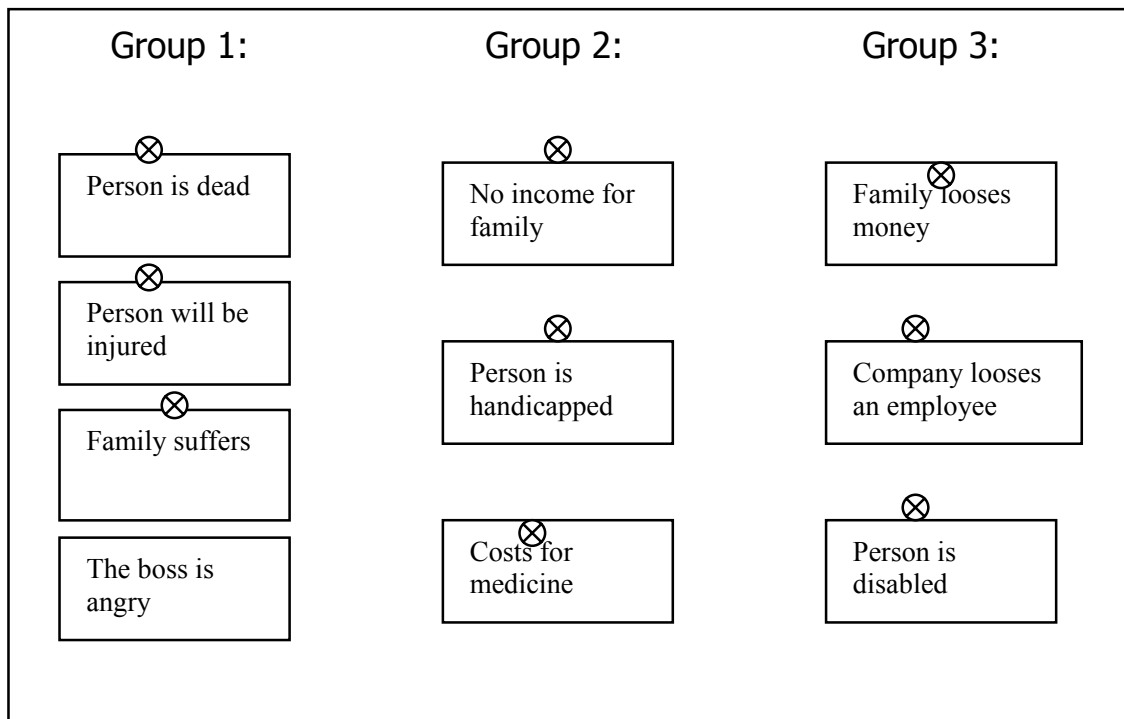


The Metaplan-Techniques

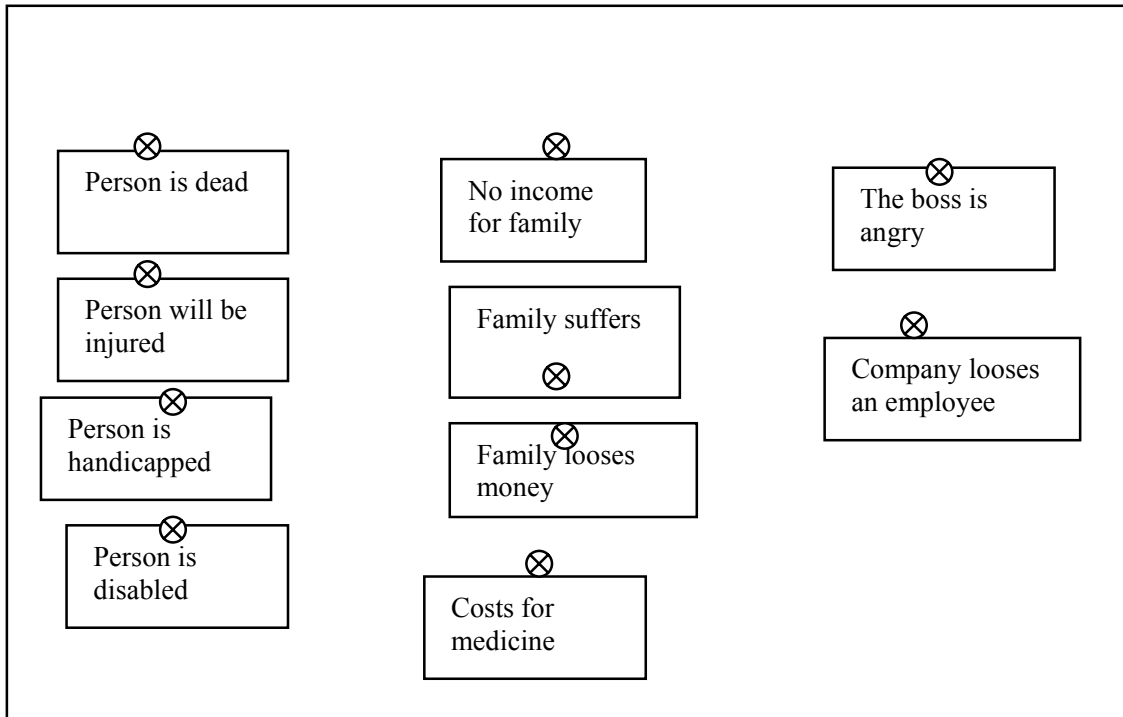
This is a method where one uses small cards of approximately 5 x 10 inches to write down key words and pin it on a pin-board later on. Normally it is used in group-work to summarise the results of the group. The group-leader pins the cards on the board one by one and gives additional explanations. Later on these cards can be rearranged or grouped differently, according to the intentions of the teacher. This procedure is even appropriate for collecting various ideas ("brain storming").



The example of our sample will be modified now. Trainees are not given the hint that several parties were involved in the accident (person, family, company), but were just asked to find out some consequences of an accident. Now the various groups came out with their ideas:



Now the teacher will ask the trainees to put cards with similar messages together. Then we will get the following layout on the pin-board:



After this arrangement, the instructor asks the students to find headings for these three groups which will be affected when a person has an accident. The result will be; An accident affects the person him / herself, his / her family and his / her company. And this is exactly what the objective of the lesson is about.

Everyone can easily produce the cards. When there is no carton available, normal paper can be used. Even the use of cement bags for cutting cards was observed once. There is no limit on innovation! One marker is sufficient for every group and will last long because it will only be used for some key words.

This method does not require any material that is difficult to get or is expensive. The carpentry section can easily manufacture pin-boards.

The Use of A Work-Sheet

A work-sheet offers another possibility for all trainees to actively participate in the lesson. Some years ago it was the matrix duplication technique which initiated the appliance of work sheets. Nowadays photocopiers are available in almost every institute, the use of work-sheets have thus become popular. The sheets which are usually given to each trainee or to a group, come in three different variations: as information sheets, for check-up and as job orders. Information sheets can contain technical texts or copies of newspapers and technical journals, recipes (e.g. for cookery), charts tables and so on. Sheets for check-up customarily consist of the exercise that should be done, whereas job sheets carry the orders for a work that should be done. Some might not identify a big difference between the two last types. The check-up sheet is commonly utilised in examinations while the job sheet can be used in a group work. What is common to all is that it is the teacher who is duplicating and distributing it to the students.

Advantages of Work-Sheets

☞ Easy updating

Compared to textbooks a work sheet can be updated easily. In addition it can always be adjusted to the actual needs of the particular teaching situation while a textbook tries to cover a whole topic. Work sheets can be reduced to an understandable quantity of facts. In a nutshell, work sheets can be properly planned while didactic reduction is taken into consideration. Where textbooks are not available for the entire class, the work sheet becomes even very important.

☞ Alleviation

Work sheets have the advantage that trainees do not have to copy the notes from the chalkboard or transparency but have it already in

printed form. Trainees therefore gain time which can be used for the task itself.

☞ Flexibility

When trainees are busy with reading or working the instructor can use the time to assist trainees individually or prepare the chalkboard's layout and so on.

☞ Correctness

Since it is prepared by the teacher, and later discussed in the class, a work sheet does not contain comprehension or spelling mistakes. It can be considered as a meaningful source for later repetition and learning.

☞ Clarity

Used as a job order, all the orders can be given exactly so that there are no misunderstandings and everybody can start working immediately. When everything is written down, trainees do not have to ask questions and therefore do not disturb other students.

☞ Focus

A work sheet normally ensures that the students concentrate on the task and work more intensively.

Disadvantages of Work Sheets

☞ Overloading

Many teachers want to make use of all the space that is on a work sheet and not to "waste" a single line. This will logically lead to the overtaxing of the students, because a clear structure will be lost and the user will be confused.

☞ Availability

Even though a photocopier is available at every centre, not every instructor might have easy access to the device. Sometimes it is the costs for maintenance and running costs that reduce the use of the copier machine.

☞ Time

A thorough preparation of a work sheet requires time. But what applies for the preparation of other teaching aids applies also for the work sheet; once prepared, it will serve you for long.

☞ Organisation

The use of work sheets in a class demand a more intensive planning of the lesson than an ordinary lesson does. Teachers with little experience in the use of media might find it difficult to use the work sheet in the beginning, because the class itself has to get used to it.

Annotations for The Use of Work Sheets

All the remarks made on the use of other teaching aids also apply to the use of work sheets. There is however one very important point to note: When using work sheets, make sure that every student is in possession of a file or folder to store all the distributed copies. To make storing easier, the papers should be punched before distribution. It is helpful for later use, to provide every sheet with an "information line", containing the subject, the teaching matter and the date of distribution.

Textbooks

The use of textbooks is unfortunately not very common in vocational training. Although technical books are on the market for almost every

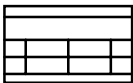
common trade, their distribution is not widespread. The use of textbooks is very important and a helpful contribution to the general education. Every book has the same structure with hints on the author and publisher, the contents, the chapters themselves and the index and appendix at the end. The use of textbooks will open the mind to reading books.

When books are not available for the entire class on a permanent basis, they can be distributed e.g. to group-works. Usually trade textbooks contain every information that is necessary for the apprenticeship and can be helpful for many situations in the class. Tasks could be solved with the help of textbooks, statements can be proofed and entire topics can be read through and reinforced. Textbooks are, last not least, a useful media in preparing for an examination and self-study.

The use of textbooks is therefore highly recommended!

Models and Originals

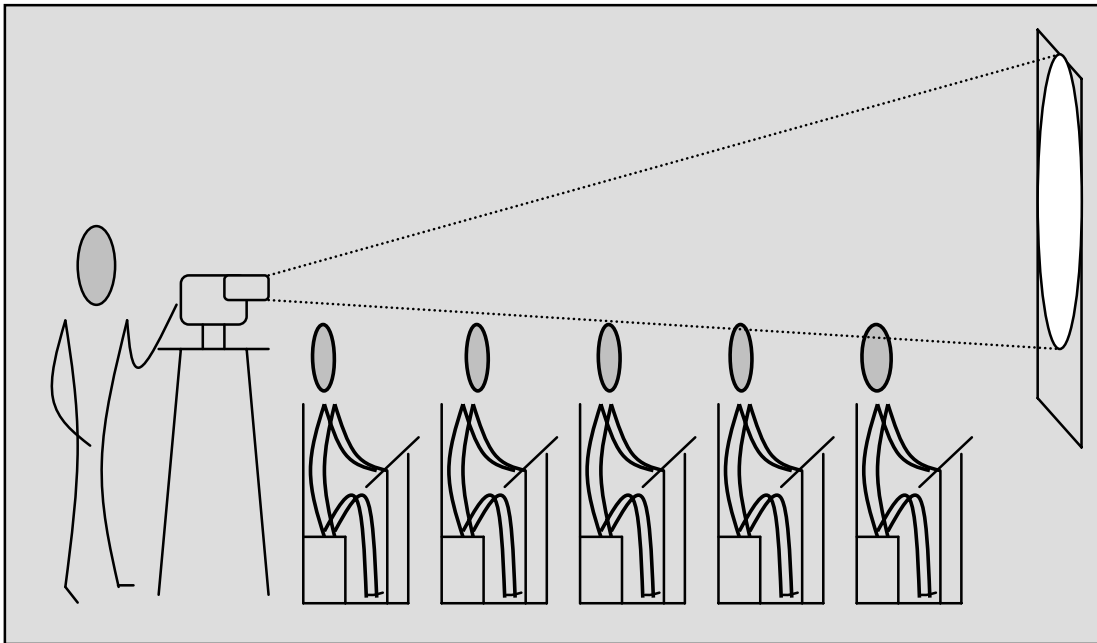
Models do usually replace originals when the later are too big or too small (some devices or details have to be zoomed to become visible), not transportable, too expensive or for any other. Models and originals allow the students an intensive observation of the teaching matter. Long explanations can be replaced by handing the item around so that every student can have a proper look at it. They make abstract descriptions concrete. Models and specially modified originals give an idea about the device and give clarification about how the object functions.



During the lesson about accidents through electricity the question about the way a fuse works came up. First of all, an instructor can hand around an original or dismantled fuse so that everybody can look at it from a short distance. Secondly, a model can be easily prepared out of carton or wood and the function can be demonstrated impressively.

The Use of Slides

Slides are a very nice possibility to visualise things and situations. However, showing slides requires a slide projector, a good screen, and last not least, slides themselves. Due to changing technology it has become more and more difficult to get ready-made slide series which are up to date. An alternative to slides which is also quite effective are self-made photos. To produce them however demands photographic equipment and a lot of experience. This is one reason, why the use of slides in technical training has become rare. In addition when showing the slides the classroom has to be darkened. This is not easy in many



situations. With the development of digital cameras the widespread use of computers, it is much easier to print particular pictures on transparencies and show them with the help of the OHP. However, as it is with every new technique this is still quite expensive.

As a result of the above mentioned reasons, the use of slides in vocational training will not be explained in detail in this book.

12.2 Aural Teaching Aids

These are media commonly directed only to hearing. The tape or cassette recorder and the records or compact discs fall under this category. Technical education has rarely any kind of pre-manufactured aural aid that could support teaching. So they will not be commented.

12.3 Audio-Visual Teaching Aids

The name already suggests the senses these media address. It is both the sight and the hearing organs. In generally we get this in cinemas or on TV. The main difference is that the classic film has to be projected and comes with the same problems as the slide projection (see earlier chapter). In recent times it is the television mostly in combination with a video-recorder, which brings us information or even entertainment the audio-visual way. The advantage this device has is that normally it is placed on a movable rack and is so available quickly without much effort. In addition there is no need to darken the room to be used.

Companies and other organisations meanwhile offer a wide range of short, technical video-spots that can be very useful to illustrate and demonstrate complex procedures. There are even ready-made trick-shots to explain things that cannot be seen.

There are some points that should be adhered to when using the video.

☞ Duration

The films should be of short duration. Watching a film means that trainees return to the stage of receivers and are not actively involved. The importance of trainee involvement in the lesson has already been discussed extensively.

☞ Contents

Ready-made films (for e.g. from the construction industry) have also the intention of advertising. Not everything that is shown necessarily

has to do with the topic of the lesson. A teacher has to watch and analyse the film intensively before showing it. He / she should be able to explain the contents and context of the film.

☞ Relation

A film must always refer to the topic of the lesson. Films which are of different trades or are just for entertainment do not have a place in teaching.

☞ Presentation

Films should be shown in sequences. Small breaks between the series have to be used for clarifications if necessary.

☞ Level

Films are exclusively useful when they are on the level of the trainees. If they are too difficult to understand they are no teaching aid because they aren't helping but confusing.

☞ Facilities

When using a video-recorder, make use of the technical facilities these devices offer, like slow motion and still frame.

☞ Discussion

Do not show a video without reviewing it. A teacher must ensure that everything that was shown was understood too.

12.4 Preparation of Teaching Aids

It was mentioned earlier that there are pre-manufactured media on the market. Normally we find three types.

The first group includes those produced by several companies of the trade. This means companies that produce a certain product for the trade (like bricks) and use it as promotion for this product. They are quite cheap or are available for free. Normally those ones are of good quality but do not only have informative character. They are produced and distributed because of public relation reasons too. Nowadays these are often videotapes.

A second type is professionally made media produced to make money. These are usually styled to reach a great number of customers and hence are commonly comprehensive. Often they are very costly.

The last stack are those which are produced by certain organisations, normally financed with public funds, for use in technical and vocational training. Usually they are given out on loan for only a short period. They are of high quality and in most cases very helpful. However, the procedure of borrowing them can be complicated and longwinded.

Consequently it is best to produce one's own teaching and learning resources. A teacher can prepare it according to the particular need and keep them for future use. There are certain criteria for a good teaching aid.

☞ Price

Media should be as cheap as possible. If it becomes too expensive for a teacher to produce teaching and learning resources he / she would stop doing it very soon. However, these media are not only helpful but also sometimes necessary. A transparency itself and two or three transparency-pens which are available as refillable ones already are all that is required. This is the same for charts. Once bought they will serve you for a long period. Models can be made of Paper or wood and are usually available at many centres. Photos can easily be copied on transparencies with every normal photocopier. With a normal size of

pictures, one can get up to 6 pictures on one transparency with only one copying process.

☞ Production

It is the best when a teacher him / herself can construct the teaching aid. After a while everybody will get some experience and the preparation of teaching aids become easier. For sure other colleagues will assist with their skills and facilities (e.g. by using the machines in the carpentry section). The production should be easy to handle and should not take too much time. An instructor has to decide whether the relation between input (of time and energy) and output (improvement of learning) is justified.

☞ Availability

A media should be present when needed. This means that it either has to be stored in the classroom itself or somewhere where it can be fetched quickly. This includes the fact that it even has to be easy to carry. It should not be too big or too heavy, unless it is placed on a certain location where every teacher can go with the entire class to watch it.

☞ Durability

The more time the preparation of a teaching aid consumes the longer it should last. Therefore every media should be constructed such that it is stable, long lasting so that it does not get spoilt when stored for a long time. It should be almost maintenance free so that it can be utilised immediately and does not require extensive repairing.

☞ Simplicity

Often it is the simple and easy things that have the best effects. Sophisticated teaching aids might be an eye-catcher but overtax the trainees. Even the teacher can be overtaxed when a teaching aid is too complicated and not used frequently. The instructor may take it to the

class but then realise that he / she has problems with the handling of the teaching aid. This goes in particular for the use of technical models.

☞ *Adaptation*

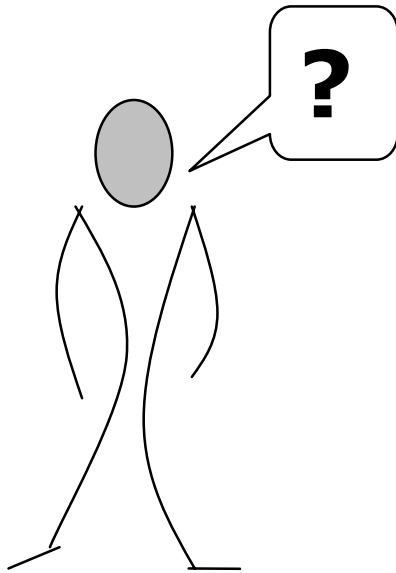
Media should be close to the reality of the students. Teaching and learning resource should help to explain things easier. A teaching aid that is out of the powers of a trainee's imagination is not very helpful. It might be interesting or attracting but not helpful. Adapted means furthermore that it is suitable for the circumstances and the culture.

☞ Relation

Never use a teaching aid for its own sake. The teaching aid and its use must always be related to the subject matter and the trade!

There is no general guideline for the preparation of teaching aids which tells an instructor how to prepare or when or which one to use. It mainly depends on the teacher's creativity and on his / her ideas. Ideas sometimes seem to come out of the blue and often at an inappropriate time. They vanish as fast as they came. A good teacher writes such an idea on a memo so that he can remember it later on. By so doing this teacher will very soon have a wide range of teaching aids at his / her disposal, which will make his / her teaching more lively, interesting and effective.

13 The Teacher's Question



Questioning is the most frequently used way to start an interaction between the instructor and the students. Nevertheless the use of questions in a lesson is contradictory. Some educational scientist call it outdated; According to GAUDIG; "The teacher's question is the tool that has to be seen very critically. It kills spontaneity, it guides too much and is forcing the trainees...". Others see it differently. DIESTERWEG maintains that "The teacher's question is an artefact that a teacher never can make perfect, but should try to improve his whole life. The teacher's question is one of the most important tools the teacher has."

Whichever opinion we agree with, as long as questions are substantial in our teaching, we have to ensure that the questions we ask are useful.

According to ROESCH there are various types of questions, e.g. searching question, developing question, dismantling question and some more. However, irrespective of the type of question, there is one reason why we ask questions; we want to get an answer. This is either to have a contribution to the lesson that helps us to reach the objective or get a feedback on whether the students did understand the teaching matter or did not. Another reason for asking questions is examination. Further questions are only "fillers" and generally useless for a class.

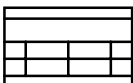
13.1 Meaningless Questions

Many teachers are generally afraid of not having sufficient stuff for a lesson. Consequently many lessons are already overloaded.

Meaningless questions, used as fillers because of not having any positive aspect for the lesson, are additional load for the students. As the following examples show, most of these questions do not bring any progress in a lesson and hence are superfluous. So are the answers. Therefore the questions should not be asked at all or rephrased.

☞ *The "Nil-Effect-Question"*

Many teachers want to get a feedback on their teaching that is why they ask questions such as: "Did you understand?" or "Did you get me?" or "Am I clear?". In Ghana, there was never any other answer than "Yes Sir / Madam". First of all this question is asked so frequently that students do not even think about it or recognise it as a serious question. They just answer automatically. A second reason for this answer is that many students are too shy to say "No Sir / Madam". In every course where teachers were confronted with this it became clear that the instructors were aware of this situation. Yet still instructors continue to ask such questions. What kind of feedback does an instructor expect when he asks a question and knows the students' answer already? There is no feedback at all! This question in vocational training is absolutely useless. Examples of the model lesson shall give us an idea on how to ask questions to check whether students understand or not.



The lesson has three objectives. Before moving forward to the next objective or the next step, a check-up is foreseen. Hence there are at least three situations where the teacher may want to get a feedback on his teaching. After objective one, we do not ask "Did you get me?" but;

"What were the reasons for the accidents mentioned in the newspaper?"

When you get the correct answer there is a positive feedback. Additionally it is repetition and so has a reinforcing effect on the learning process. When there is no correct answer it will show you that the students did not understand and you therefore have to repeat the chapter.

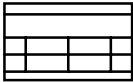
After the second objective the question is about the purpose of fuses. When trainees are able to explain it the instructor will know that trainees understood the information about the effects of an electrical shock.



Try to formulate check-up questions for the third objective!

☞ The "Directing-Question"

This is a question where a particular answer is expected. It means that when posing the question the trainees are automatically urged to provide an answer which is somehow already included in the question itself.



"Isn't it a good idea to use fuses?" When an instructor asks this question every student will answer "Yes, it is." What else should he / she answer. And what is the purpose of this question? It does not help the teacher nor the students. It is obvious that the trainer expects this answer. Hence asking questions such as this is useless. A better way is shown in our example; "Why do electricians use fuses?" This type of question urges the students to think about it. There is no answer included. The trainees have got to show what they can do. A correct answer from the students gives the teacher a positive feedback too.

☞ The "Definition-Question"

This type of question usually starts with; "What is a...". Hence the answer has to be a kind of definition. In an earlier chapter the difficulties that come with definitions were already explained and therefore will not be repeated again. (See chapter 8.3)

13.2 Characteristics of Effective Questioning

The following rules will help ensure that the output after asking a question is high.

☞ All questions require thought

To use a question as an effective “tool” during a class, it should be well planned. This is not always possible because sometimes the teacher has to react to situations during the class. He has to ask questions spontaneously. However, an instructor should always take some time to phrase a question properly. The better the question, the better the answers!

☞ Starting a question

Every question should start with a question word like when, why, how etc. Another way to start a question is to use words which were already introduced like summarise, justify, describe, explain, define, compare illustrate etc.

☞ Simplicity

Questions should be clear and easily understandable. Too complicated questions overtax the trainees. When they have difficulties understanding a question, trainees cannot concentrate on finding an answer. When you do not get any answer to a question, think about whether your question was precise enough.

☞ Logical sequence

Not every question is of the same level. Some are easy, others are more difficult. Arrange questions in a logical sequence. Easy questions should come before difficult ones.

☞ Avoid “multi-questions”

Ask only one question in one sentence! A Question like “Why and when do electricians use fuses” are “double-questions”. It is only one sentence but contains two questions. Trainees usually have difficulties to concentrate or think about two things at the same time.

13.3 The questioning procedure

It is not only the question itself that is the deciding factor for getting a useful contribution to the lesson. The behaviour of the instructor when asking a question is important too.

☞ *Ask the question to the entire group*

Do not start a question by calling on one student to provide an answer. For example: “Michael, please tell us why faulty cables are dangerous”. This will lead to the situation where only Michael thinks about the question. The rest of the class do not feel addressed. For them it is Michael’s problem now and they will relax.

☞ *Wait for some seconds*

Do not call the first student who raises his / her hand immediately. This would interrupt the other trainees’ thinking. Force yourself to observe some seconds of silence. Everybody will thus be able to concentrate and think.

☞ *Listen to the answer*

Look at the person while he / she is answering. It gives a feeling that the answer is important and will encourage all students to active participation. Not paying attention will have the contradictory effect. Trainees will get the feeling that the instructor is not very interested in the answer and will stop thinking about future questions.

☞ *React on the answer*

Never leave any question uncommented. It is very important for the entire class to know whether an answer was correct or not. Praise students for good answers but do not blame somebody for a wrong answer. This is discouraging.

☞ *Complete sentences*

Urge trainees to answer in a full sentence. It will help to improve their English.

☞ *Spread questions*

Use simple questions to involve trainees who are low-achievers. Direct the difficult questions to the high-achievers. By doing so, you give the entire class the chance to participate.

14 Testing and marking

One of the most important and most sensitive responsibilities of an instructor is testing and marking. Some might say it is the same as check-up. However, it is not. Check-up can be regarded as a general topic for the following three areas: checking of understanding, reinforcement of the learning matter, and testing and marking. Even though it is not very obvious, there is a difference between these two fields.

☞ Checking of understanding

The teacher who wishes to find out whether the taught knowledge has been understood uses this. It is usually conducted during and at the end of a lesson by written, oral or practical tests. It is useful for the trainee and enables the instructor to review the effectiveness of his teaching methods. The trainee himself will recognise whether he is on the actual required level or not. Its main task is to give a feedback on the teaching-learning process and progress.

The written check-up can be divided into two groups. We have the open or unrestricted answer and the restricted answer (some educational scientists add a third type, namely the half-restricted answer). The type of answers the instructor chooses depends on the objective. Unrestricted answers are used for the level *transfer* and *problem solving*. The questions should come with the verbs, which represent this level. (See 7.2.2.3!)

☞ Reinforcement of the learning matter

This type of check-up seeks to promote the learning process. It was described as the transfer of knowledge into the long-term memory in chapter 5. It can be achieved by a repetition of the learning matter, practise and application. We have already discussed the psychological aspects.

☞ Testing and marking

It can also be called examination. It is the process when the achievement of the trainees are tested and certified. Testing and marking is the main concern of this chapter.

14.1 Basic Issues

In the beginning it was mentioned that marking is a very sensitive issue. When trainees get the feeling that the marks they were given are not justified, a bad mood may come up in the class. The relation between the instructor and the students may deteriorate. However, testing and marking is inevitable. It has several functions.

☞ Feed-back

Marks are information for the teacher and the students. The teacher can form an impression about the quality of his / her teaching. When the average results of the entire class are very low the reason might not be an inferior achievement of the trainees. It can even be that the style of teaching is on a low level. Trainees too get a feed-back by marks. They can compare it with those of their classmates and see on which level they are.

☞ Information

Certificates containing marks offer employers the opportunity to make their mind about the achievements of the applicant. Parents also get information about the level of their child. Furthermore, it gives information whether somebody has the ability to enter the higher educational system or to stay in his / her job.

☞ Motivation

Good marks as well as bad marks can motivate trainees to learn more for the next test. While good marks normally are a challenge to the

trainees him / herself, bad marks put pressure on the student. Usually it is the parents who urge a child to learn more intensively.

☞ Disciplinary measure

Some instructors use marking as a method of punishing trainees when there are disciplinary problems in the class. From a pedagogical point of view this has to be abolished. Misusing marking for this purpose is a bad habit and a sign that the teacher is overtaxed. This unfair procedure humiliates the trainees and leads to mistrust and frustration.

14.2 The Quality of Testing And Marking

The most discouraging thing for a trainee is to be unable to perceive why he / she got a particular mark. When the mark is bad it is important for the trainee that the outcome of the mark is transparent. There are three main criteria for testing and marking: objectivity, validity and reliability.

Objectivity

This concerns mainly the teacher as a person. Sometimes instructors are influenced by a trainee's habit and may have prejudices against a student. These can be positive as well as negative. When they are positive a teacher might give a better mark to the trainee he likes, even though the answers are very similar to those of another trainee. When they are negatively influenced it may have a contradictory outcome. High objectivity exists when the marks of different teachers for a particular exercise of one particular student are equal.

Validity

A test always has to refer to the teaching matter. Only what was taught during a lesson should be examined. When marking, a teacher must not consider any good or bad contribution of a trainee. Sometimes when trainees are not able to answer a question correctly they write anything they know about the topic. However, since it is not the correct answer it has to be neglected.

Furthermore, it is important that the examination is set at the level of the trainees' knowledge.

Reliability

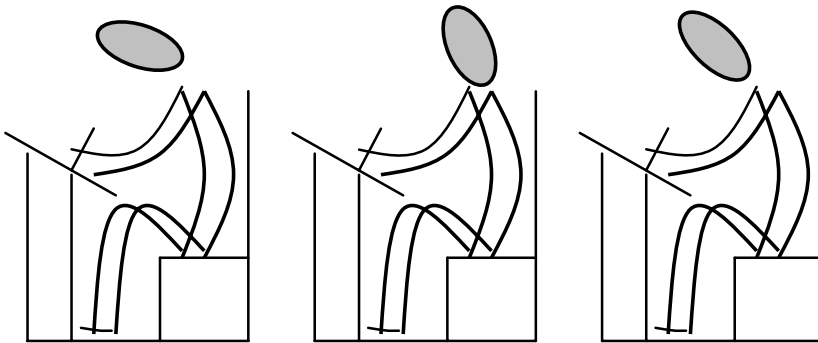
A test should bring results that are reliable. This means that the results of the trainees' examinations should represent the actual level of knowledge. Where every trainee is asked questions from a different field the test becomes unreliable. If there is only a single question in the whole test, the results cannot be representative. Similarly, when you ask only the people of one town, whether they like sports one cannot use the results to give a statement which applies to the whole nation. Asking the whole nation whether they like football does not mean that they do like other sports as well.

14.3 Types of Tests

All tests should fulfil the above mentioned criteria for tests of good quality. In vocational training we have three types of tests: the written test, the oral test and the practical test.

The written test

What is meant by a written test is normally the procedure where the entire class gets the same test. It usually takes place in the classroom under the supervision of a teacher. This form of testing gives equal conditions for every student and consequently leads to an objective assessment.



There should be silence during the testing period. This allows everybody to concentrate on his / her work. The trainee is expected to manage the time

him / herself and think about the questions. He / she does not necessarily have to answer according to the order of the questions. Hence trainees can answer "easy" questions first. This gives self-confidence for the more difficult ones. A trainee can collect his thoughts and write them down when he / she is sure about the answer. Normally trainees are not allowed to ask questions during the test and this has to be regarded as a disadvantage. Furthermore, a trainee does not get a feedback to his answers during the test.

Preparation of a Written Test

A written test is not only a test but a test of the teaching matter. A major concern therefore is that the questions should refer to the objectives of the lessons.

Some points shall give guidelines for the preparation of a written test:

☞ Determination of the test objectives

Make a clear statement on the area of the teaching matter which will be tested. Do not examine knowledge which was treated in the distant past or which does not belong to the subject. The tested matter should have been treated sufficiently within the class. Make sure that you know the intended results. It is good to prepare a suggested solution before the test starts. It should not only contain the correct answers but also the score for the correct answer!

☞ Representative questions

Inform trainees about the intention of the examination. The issues to be emphasised should be obvious. Questions should cover all the areas that a teacher declared relevant for the test.

☞ Characteristics of questions

Questions have to be clear, precise and easily understood. Avoid "double-questions"! There should be no room for misunderstandings. Use only words that every trainee understands. Choose an average level of difficulty for the questions.

☞ Quantity of questions

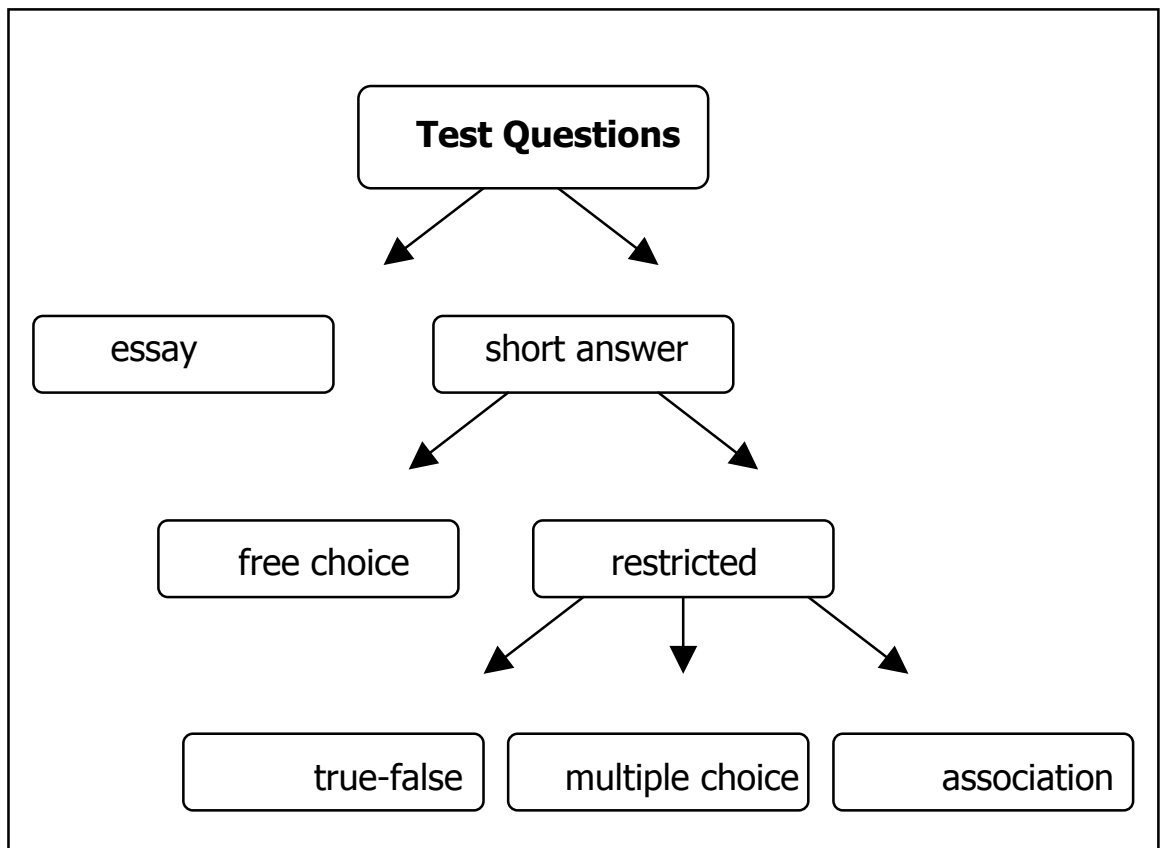
The more questions a test contains the more objective it becomes.

☞ Determination of the time limit

It will enable the trainees to manage the available time. Take the weak students into consideration when giving the time limit. Do not give too much time. Usually it shouldn't take a trainee more than twice the time the instructor needs to answer the questions.

Types of questions

There are two main types of questions that are used in tests; Essay questions and short-answer questions. The short answer questions are further divided into two groups; questions with restricted answers and questions with free-choice answers. The last group has again three sub-groups; true-false, multiple choice and association.



A) Essay Questions

An essay question has to be answered with a comprehensive statement.

“Discuss all the consequences of an accident through electricity!” This question cannot be answered with one word. He / she has to find the answers and bring them into form by writing a full essay.

This is a task that is on a high level. It urges the students to express themselves, which helps to develop their language. Furthermore, it has the advantage that trainees have to deal with the whole subject matter and this informs the teacher about the general understanding of the trainees. The teacher doesn't require much time to prepare a test with questions like this. However, there are disadvantages too. Essay questions require a certain level of linguistic ability. Some trainees might know the answers, but are not able to write them on paper because of lack of writing talent or poor knowledge of the English language. It is more difficult for an instructor to assess essays than short answers. Essays usually have always room for interpretations. Two different teachers can assess the same test differently. In addition, essays tend to be assessed according to their grammatical quality rather than according to their contents. It is difficult to guarantee reliability and validity. Consequently, essay questions should never be used exclusively in one test but supplemented with short-answer questions. For low-achievers, essay questions are difficult to answer.

B) Short-Answer Questions

These type of questions requires only short answers. These can be given in a free form or in a restricted form.

B1) Free Choice Questions

These type of questions forces the trainees to express themselves freely, but with only a few words or even drawings.

“Name one safety regulation!” Trainees should not give an own statement because the answer was given word for word within the lesson. However, there is still a “writing-job” to do. The answer to this type of questions can still be lowered, to enable even low achievers to answer correctly. For e.g.; “Complete the following sentence: When people get an electrical shock, currents

B2) Restricted Answers Questions

Unlike the free choice type where the correct answer has still to come from the trainee him / herself, the restricted type includes the correct answer in the list of possibilities. It is the trainee’s job to find the correct answer out of various possibilities.

There are three types of restricted answer questions.

➤ True-False Type

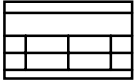
The trainees have to decide whether a given statement is true or false.

“A faulty cable can cause an accident. True ore false?”

A big disadvantage of this type of questions is that there is no room for creativity. Furthermore the chance even for an ignorant student to answer correctly is 50 %.

➤ The Multiple Choice Type

This type offers various answers to one question. Trainees have to find out the correct one.



"How can electricity support our work?

- a) it raises the quality of the job
- b) it makes the products more valuable
- c) it makes machines run"

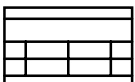
For this type of questions it is important that the false alternative answers are plausible too. It wouldn't really be a question if the alternatives to the correct answers were like this;

- a) I can connect my portable FM receiver
- b) I can recharge the batteries for my torchlight
- c) It makes machines run

The alternative answers should make sense and should not clearly show the correct answer. Even with this type of questions, trainees shall be urged to think about the correct answer. Therefore it is necessary for all answers to be very similar in length and form to the correct one. Furthermore it is necessary that the position of the correct answer varies (not always c!). Sometimes there are multiple choice questions where more than one answer is possible. This makes answering very difficult and is not convenient for vocational training.

➤ **The Association Type**

Several information has to be brought together in the correct form.



Bring the right components together!

- | | |
|----------------|---------------------|
| 1) the company | a) loss of income |
| 2) the family | b) severe injury |
| 3) the person | c) loss of employee |

The complete information on one objective is given already. Students now have to make the right links.

What goes for all types of restricted answers is that the assessment of the answers is quick and easy. However, the preparation of such tests is time consuming. Additionally, there is no room for creativity and all restricted answers allow a certain random chance for success. Finally, these tests are used for the lower level.

Fair Marking

It was mentioned already that testing and especially marking is a very sensitive task. The worst thing that can happen is for trainees to get the feeling that the test or the marks given are unjust. Trainees might be angry for a while when a test is very difficult but they soon forget this. Trainees will never forget unfairness! Some ideas can help to come to make the results objective.

☞ Amount of tests

The more tests, the better it is for the trainees. If there is only one test a year, a trainee who was in a bad mood on this day, might get a low mark and find it difficult to make up for this. If there are more tests, one bad mark doesn't count too much.

☞ Objectivity

Nobody is absolutely free from prejudices. But neither positive nor negative prejudices should influence a teacher when reviewing tests. Before starting a written test make small pieces of paper and write numbers on it according to the amount of trainees in the class. Distribute these note pads among trainees and tell them everybody should write his / her name on one of these papers and remember the number. Then collect these note pads and store them properly. Now tell the students they should not write their name on the examination

but the number. Then write the test and review it. After marking it, take the stored note pads with names and numbers and assign the names to the numbers on the examinations.

☞ *Suggested / sample solution*

It is obligatory to prepare a suggested solution before running the test. It has to contain the answers and the scores (see example!).

☞ *Transparency*

All assessments have to be provable. The teacher must be able to explain his decision properly. It must therefore be possible to appreciate and understand the standards being used.

Test on DANGERS THROUGH ELECTRICITY

Time limit: 15 min. max score: 29 p. Student's number: ____

1. How can electricity support our work? Tick the right answer !(2 p.)

- a) it raises the quality of the job
- b) it makes the products more valuable
- c) it makes machines run

2. How can electricity cause an accident? Give two reasons! (8 p.)

a) _____

b) _____

3. An accident has many consequences. Bring the right components together! (6 p.)

- | | |
|----------------|---------------------|
| 1) the company | a) loss of income |
| 2) the family | b) severe injury |
| 3) the person | c) loss of employee |

4. Complete the following sentence (3 p.):

When someone gets an electrical shock, currents _____

5. Name two safety regulations! (8 p.)

a) _____

b) _____

Test on DANGERS THROUGH ELECTRICITY

Time limit: 15 min.

max score: 29 p.

Suggested solution

1. How can electricity support our work? Tick the right answer! (2 p.)

- a) it raises the quality of the job
- b) it makes the products more valuable
- c) it makes machines run

2. How can electricity cause an accident? Give two reasons! (8 p.)

- a) *Through the carelessness of people*
- b) *Through cables that are faulty*

3. An accident has many consequences. Bring the right components together! (6 p.)

- | | | |
|----------------|---------------------|------------|
| 1) the company | a) loss of income | <i>1+c</i> |
| 2) the family | b) severe injury | <i>2+a</i> |
| 3) the person | c) loss of employee | <i>3+b</i> |

4. Complete the following sentence (3 p.):

When someone gets an electrical shock, currents *flows through the body and injures the person*

5. Name two safety regulations! (8 p.)

- a) *Checking machines before using it*
- b) *Never drink alcohol during working hours*

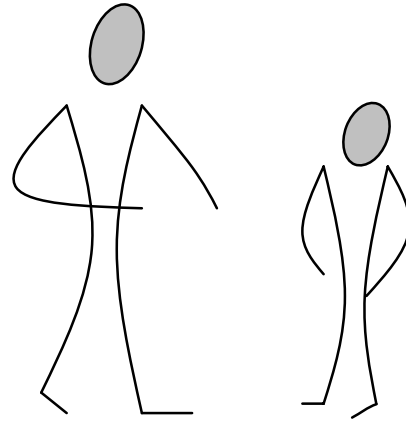
Score:

29-26 = A 25- 20 = B 19 - 14 = C 13 - 0 = D

Oral Tests

Oral tests are usually only for one single student at the time. The same conditions cannot be guaranteed for every candidate. In addition, the tendency to falsify the judgement because of feelings of sympathy or antipathy is higher than in written tests.

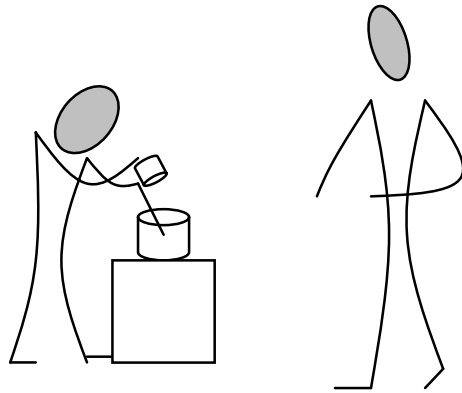
An oral test does not allow anonymity. However, there are advantages too. By using additional questions a teacher can give trainees some assistance during the testing period. There is an immediate feedback for the trainee through the reaction of the questioner. Last not least, it is easier to find out whether a trainee is just able to repeat information which he has learnt by heart or whether he understood the context of the subject matter. There are some dos and don'ts for oral testing.



- ☞ Try to create a positive atmosphere by being friendly and relaxed.
- ☞ Start with a smart small-talk and do not start immediately with test questions.
- ☞ Ask easy questions in the beginning. The candidate will get self-confidence.
- ☞ Do not deal too long with questions a trainee cannot answer.
- ☞ Confirm correct answers and praise as much as possible.
- ☞ Write down the questions which you want to ask.
- ☞ Make sure that you can explain your decisions.
- ☞ Finally respect all basic issues that go for every question.

Practical Tests

Practical tests are essential in technical education. It is not only the theoretical knowledge that is important for a craftsman but the practical skills in particular. It is not very easy to offer every trainee equal conditions but one should try hard to give everybody his / her chance.



How to Conduct a Practical Test

(from: "Runkel – How do I test and examine and how do I give marks")

There are special considerations that have to be taken into consideration when testing practical achievements. The test should follow three steps.

☞ Phrasing of the task

It has to describe exactly which concrete task the candidate has to fulfil.

☞ Requirements

It has to determine which functions the object has to fulfil when completed. Furthermore, this part can contain hints and roles for tools or material to be used. The time limit should be given.

☞ *Suggestions for the solution*

Sometimes there are many roads to success. However there might be one that is the most effective. It can make assessment easier.

That information has to be given to the trainees before the examination.

Example for a practical test

Terms of Reference

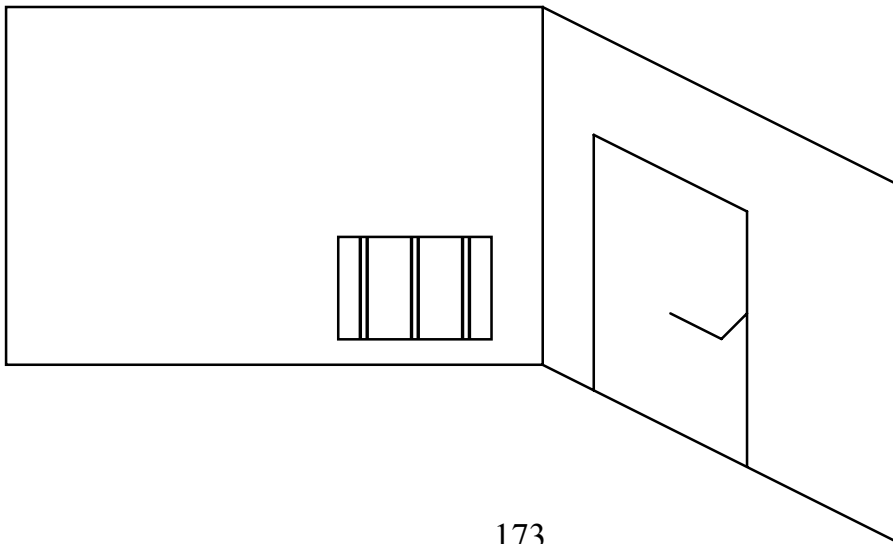
Task

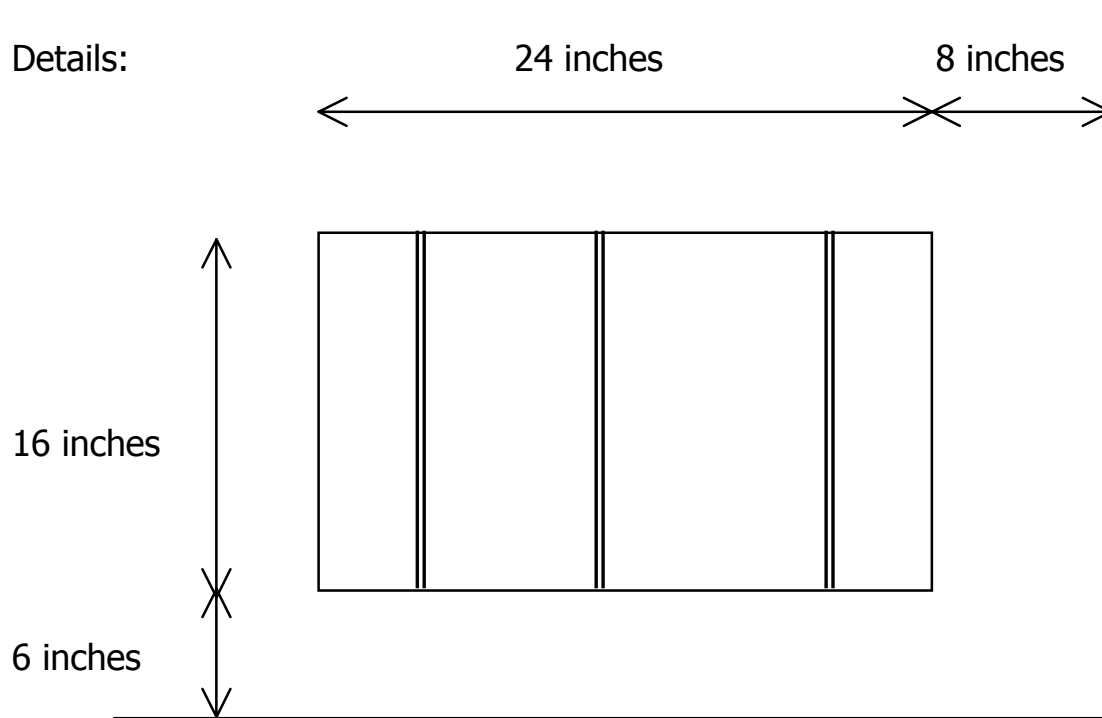
The opening in an installation shaft has to be covered by a suitable wooden flap. Behind it there are stop valves for a central water supply system. The opening is located in the corridor of a classroom building. Access must be possible for occasional maintenance work or in case of emergency.

Requirements

The flap must

- ☞ be accessible without the use of a tool or a key
- ☞ have an easy-to-maintain permanent surface
- ☞ blend optically into the overall appearance of the building (bright colour)
- ☞ be easy to produce for mass production
- ☞ not affect the function of the adjacent door when opened
- ☞ be capable of being manufactured in a period of approximately 4 hours in a medium-sized machine workshop





Thickness of the wall without plaster: 10 inches.

Suggestion

- ☞ Produce a drawing of the installation layout
- ☞ Select suitable materials
- ☞ Decide on hinging, retaining mechanism and hardware
- ☞ Determine machines to be used
- ☞ Manufacture the fame
- ☞ Manufacture the flap
- ☞ Assemble parts, incl. mounting hardware with functional test.

Assessment of the test object

When the time limit is over, the manufactured test objects have to be assessed. It is helpful to break down the analyses of the job into specific minor aspects, which are assessed individually. It is not only the general impression of the manufactured item that has to be proved but even singular parts that later on cumulate to a final score. It is obligatory to create an evaluation sheet that will guide you during the assessment and guarantee a fair and equal treatment of each student.

<i>Evaluation features</i>	<i>Solution to be achieved</i>	<i>Max. score</i>
Suitability of hand drawing	Overall drawing of installation layout, individual view of functioning components flap, frame	5
Choice of material, price, possibility of working and use of machine	Ready-coated ply-wood, 19 mm thick, edges with glued strip	20
Design	Flap opening upwards, angle of opening > 160°, magnetic catch on both sides, handle recessed	15
Dimensional accuracy of components	Dimensions must be selected so that material tolerance have no influence	15
Quality of working	Exact angles, clean working of edges, perfect mounting of hardware	15
Easy installation of solution	Fixing by means of countersunk screws and cover plate through outer frame	5
Easy functioning	It must be possible to open flap without tools or key, movable parts must have enough play	10
Production time	Overall time approx. 3.5 hours	15
<i>Total</i>		<i>100</i>

For a practical test it is always recommended that not only one but at least two persons examine the manufactured objects!

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