

## Definition

learning = change of behavior  
due to experiences

learning theory = behavior theory  
to explain and to predict behavior

Through learning we acquire new...

...knowledge

we **know** more than before

...skills

we **do** things better than before

...attitudes

we hold a different **opinion** than before

...patterns of behavior

we **behave** differently than before

Learning can be categorized according to the...

...cognitive area

head

development of ideas and concepts

...psychomotor area

hand

development of movement

...affective area

heart

development of values and attitudes

Different ways of learning...

... of human beings

trial and error

observation and imitation

repetition

instilling something in the mind

insight

repeated perception

adaptation

....

Different ways of learning...

... of animals

conditioning  
reinforcement  
trial and error

## Learning theories: 2 major schools of thinking

### Behaviorism

focus on human behavior and its conditions;

learning is based on forming associations between stimuli and responses;

emphasis on measurable and observable components of human behavior

### Cognitivism

focus on brain activities such as cognition and insight;

learning is a process of discovering and understanding relationships, of organizing and re-organizing information into meaningful patterns;

emphasis on perception, decision making, processing of information, understanding, problem solving

## The three steps of human learning

We have not learned something until we have...

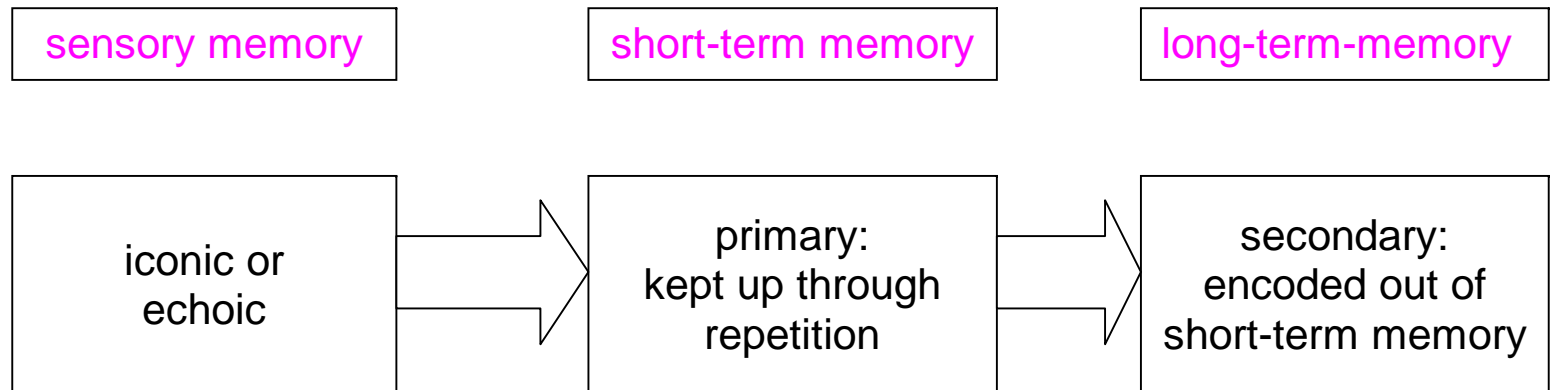
instilled it in our mind

appreciated it

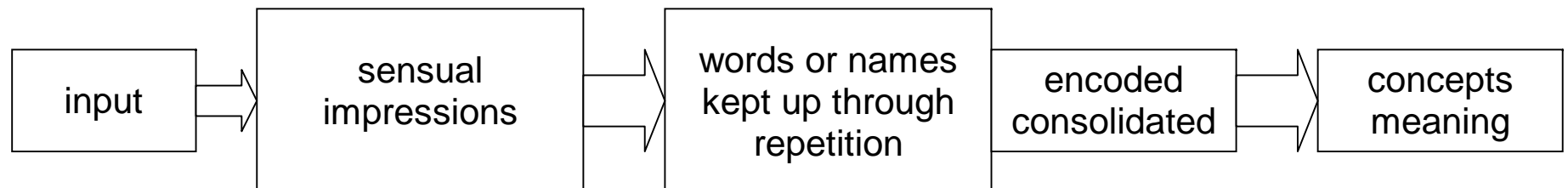
experienced it

## The three components of the memory – a model

### Type of memory



### Content of memory





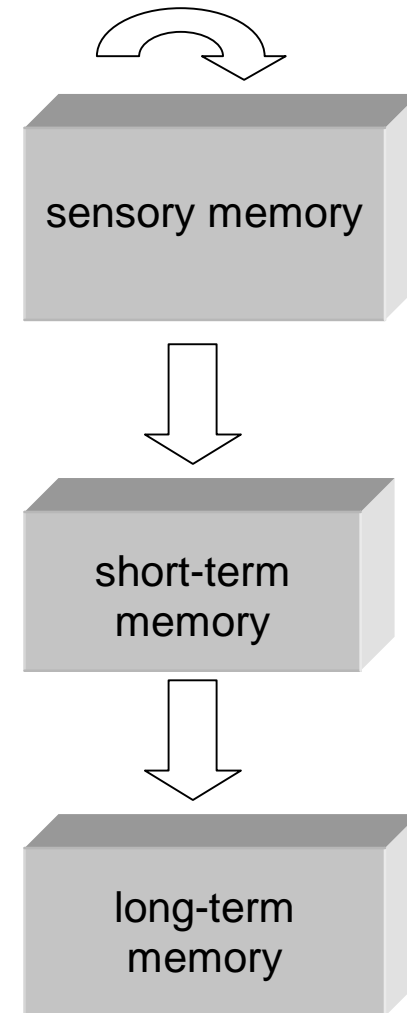
## The sequence of learning

Preparation phase      concentrating, perceiving

Acquisition phase      naming, understanding

Storage phase      repeating, encoding

Memory phase      abstracting, linking



## How to **prepare** information for storage

- Be conscious of **meaning**
- Learn **sensible** material
- **Structure** learning material
- Make **abstracts** from meaning
- **Link** unknown to known information
- Make use of **mediators**, particularly visuals

## How to remember information

- Organise material
- Portion material
- Repeat material
- Learn in intervals (short breaks at the beginning, longer breaks later)
- Make use of memotechniques
- Review material
- Application is the best revision

## Acquiring and remembering information

10% by reading

20% by hearing

30% by seeing

40% by seeing and hearing

60% by talking about it

80% by exploring and phrasing on your own

90% by exploring and overcoming difficulties  
on your own

## How learning is made enjoyable

- Motivate students
- Create interest in the subject
- Enhance curiosity of students
- Show links to personal life of students
- Create opportunities for achievement
- Give praise and recognition
  
- Show your own enthusiasm
- Enjoy teaching

Learning objectives should be...

**S**pecific                      stated in action verbs

**M**easurable                    indicating minimum level of concept response

**A**ttainable                    according to trainee potential and field of expertise

**R**ealistic                      resource- and reality-based

**T**ime bound                    be in coherence with the training timetable

## Taxonomy of learning objectives

educational policy

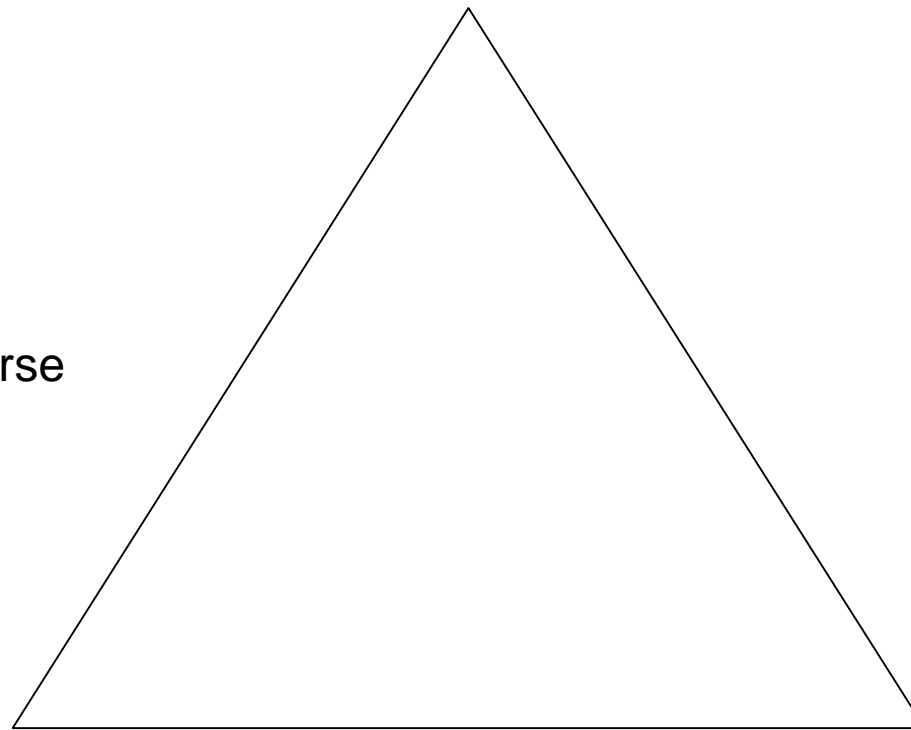
general objectives

subject / training course

rough objectives

actual teaching

specific objectives



## psychomotor

(hand)

perception

set-up

guided response

internalized response

complex response

## cognitive

(head)

knowledge

comprehension

application

analysis

synthesis

evaluation

## affective

(heart)

receiving

responding

valuing

transferring

creating



## Method

- = a **way** or **manner** of doing something;
- = the use of an **orderly system** as opposed to luck

## Teaching method

- = the way a teacher uses to **impart knowledge** to students
- = the way of **developing skills** and capabilities
- = the way of **facilitating exchange** of experiences

## The right choice of method

1. Does this method lead us to our **learning goal**?
2. Does this method fit to our **subject**?
3. Does this method address the **target group**?
4. Are all participants – teacher as well as students – able to **handle** the method?
5. Is it possible to **realize** this method?

## Didactical arrangements

20 – minutes – rule

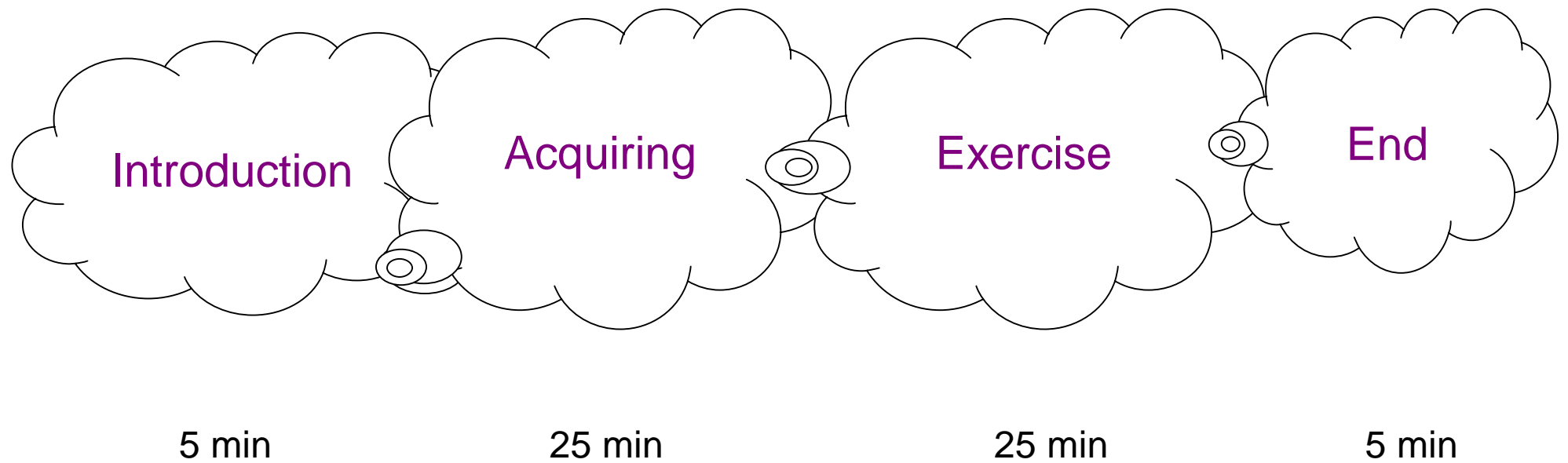
Teacher-centered	each part not longer than 20 min	e.g. lecture, presentation
Students-centered	each part not shorter than 20 min	e.g. group work, partner work

Alternation – rule

Receiving activities - giving activities

Breathe in - breathe out

## Basic structure of lessons



## Introduction

should

- orient and motivate
- connect topic to known subjects
- attract attention

## Acquiring

should

- impart topic
- illustrate topic (e.g. with experiment)
- guide to new insight

## Exercise

should

- apply new knowledge using variety of methods

## End

should

- summarize, repeat, generalize
- give prospect for coming lesson
- give test or homework
- check, assess, evaluate

## The four step method

1. Step:

Preparation of student

2. Step:

Demonstration and explanation

3. Step:

Student activity

4. Step:

Exercising and strengthening

## 1. Step:

### Preparation of student

- take away the shyness
- motivate
- show the objectives and tasks
- evaluate the knowledge
- familiarize with the work place
- give advice concerning safety

## 2. Step:

### Demonstration and explanation

- position the student so that s/he is standing in the same direction to the work piece
- demonstrate the whole procedure in original time
- in case of complicated procedures divide them into modules and teach them step by step
- repeat the demonstration and make single steps visible
- say what you are doing, how and why you are doing it in that way
- give the opportunity to ask questions



### 3. Step:

#### Student activity

- encourage the student to try it on his/her own
- don't interrupt the student in his/her first attempts
- make comments on serious mistakes
- precision is more important than speed
- let the student say what s/he is doing, how and why

## 4. Step:

### Exercising and strengthening

- give enough time to exercise
- acknowledge progress
- control that no mistakes are done during exercising
- change conditions of exercising
- slow adaptation to real working condition

## Questions as instruments for...

- Guiding the attention of students
- Arousing the curiosity of students
- Arousing the appreciation of problems
- Initiating thinking
- Saving of results
- Evaluating students
- Disciplining students

## Different kinds of questions...

concerning...

- Knowledge
- Process
- Relationship
- Content
- Comprehension
- Thinking

Open questions

Closed questions

## Questions to avoid

- Chain questions
- Leading questions
- Echo questions
- Trick questions
- Rhetorical questions

Demanding too much in...

- Factual way
- Linguistic way
- Intellectual way

Demanding too little

Question formulation	Effect
<p>Starting with an interrogative</p> <p>Why What Who When Where HoW</p>	<p>Make a problem evident</p>
<p>Only one question per sentence</p>	<p>Focus on one problem; not demanding too much nor too little</p>
<p>Short, precise questions</p>	<p>Get the problem fast</p>
<p>Give the question to the whole group</p>	<p>All students are included, start to think</p>
<p>Give enough time</p>	<p>Thinking without time pressure; chance to give reasons for the answer</p>
<p>Formulate open questions</p>	<p>Initiate thinking; opinion forming</p>

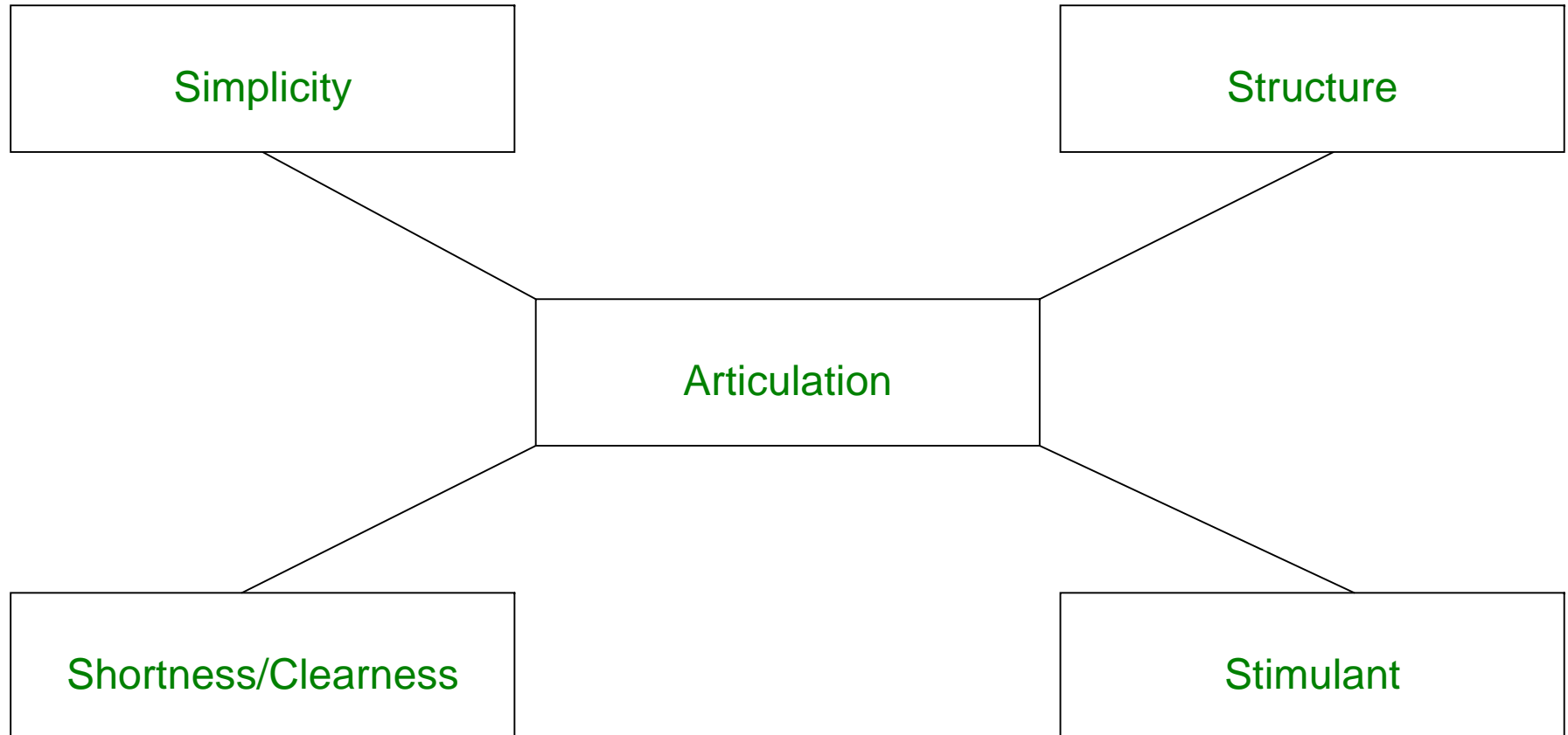
## Good questions...

- make the class curious
- are answered lightly and fast
- show what is happening in the group  
(what the others think)
- touch common interest
- include the students' personality
- do not close an issue, they lead further
- show the targets
- make wishes visible
- may lead to a new question

## Bad Questions...

- are leading questions
- demand yes or no
- try to show up the lack of knowledge of others
- serve the self-portrayal of the teacher

# Comprehensibility of lectures





## Simplicity

- Speak in simple terms
- Avoid complicated formulation or foreign words
- Give explanations of specific terms
- Use simple constructed sentences

## Shortness/Clearness

- Use short sentences
- Be exact in what you say
- Be concentrated to the objective
- Be precise in your statement
- Give only important and necessary explanations
- Maximize your time

## Structure

### The visible structure

- State the topic
- Give reasons for topic
- Follow outlined structure
- Summarize

### The inner structure

- Logical flow of information
- Link different items
- No jumping from one idea to another
- Emphasize important, not unimportant items
- Red thread must be visible

## Stimulant

- Support statements by stories
- Use pictorial language, give examples
- Visualize statements
- Present data and facts by comparison
- Give own opinion
- Be creative in formulation
- Show own interest
- Create an atmosphere
- Include other opinions
- React to audience

## Articulation

### Voice

- speak loud and clear
- make pauses, especially when you move
- speak slowly
- apply verbal emphasis
- express enthusiasm

### Face

- face the audience
- look to the eyes of the audience
- don't look from the corner of your eye
- show facial expressions related to what you say

## Articulation

### Posture & bearing

vertical, frontal, open, not hidden  
stay with both feet on the ground  
raised head, but not snooty

### Arms and hands

resting position  
pictorial gestures according to the speech  
slow, quiet movement  
avoid movement below waist

### Movement

move goal-oriented, not at random  
calmly handle your tools  
control movements  
change the front sometimes, go beside the audience

## Main preparation steps

- Lay down theme
- Choose material
- Order it
- Structure it
- Limit it to essential part
- Make list of main points and facts
- Show red thread
- Estimate time frame
- Shorten

# Structure of lectures

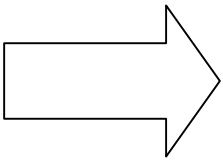
## Introduction-Mainpart-End

<b>Introduction</b>	Greetings, Theme, Objectives Organizational affairs Motivation
Transition to mainpart	
<b>Mainpart</b>  Central idea 1 Central idea 2 Central idea 3	4 Structural elements: <ul style="list-style-type: none"><li>• Signposts – important information</li><li>• Bridges – make links</li><li>• Fences – limit topic</li><li>• Markings – give meaning</li></ul> 4 Relaxation elements: <ul style="list-style-type: none"><li>• Questions</li><li>• Examples</li><li>• Comparisons</li><li>• Persons</li></ul>
Transition to the end	
<b>End</b>	Result/Conclusion Summarize Generalization/Prospects



## Functions of visualization

- Animation
- Information
- Documentation
- Illustration
- Securing of results



Enhancing

- Learning process
- Remembering information
- Retrieving information

## Some basic rules....

... for writing:

- Form columns
- Avoid whole sentences
- Use key words
- Avoid wide spacing between letters
- Avoid bold letters
- Use capital and small letters
- Same letter size for same importance
- Think of reading habits (top left to down right)
- Use only known abbreviations
- Check writing from the distance
- Show links by same colour and form

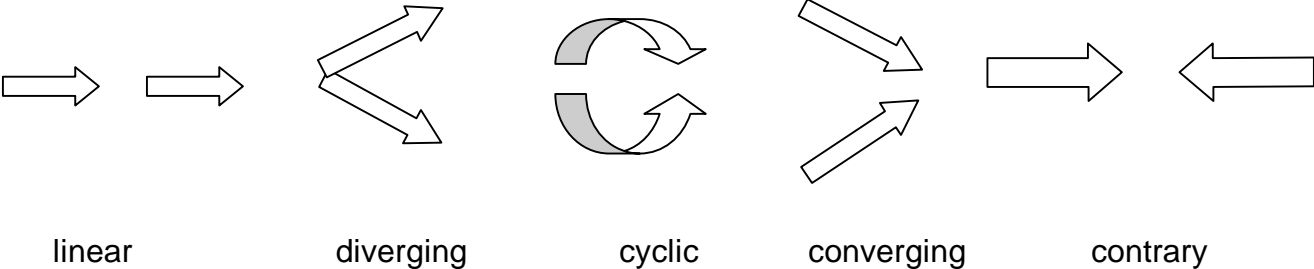
## Some basic rules....

### ...for colour coding

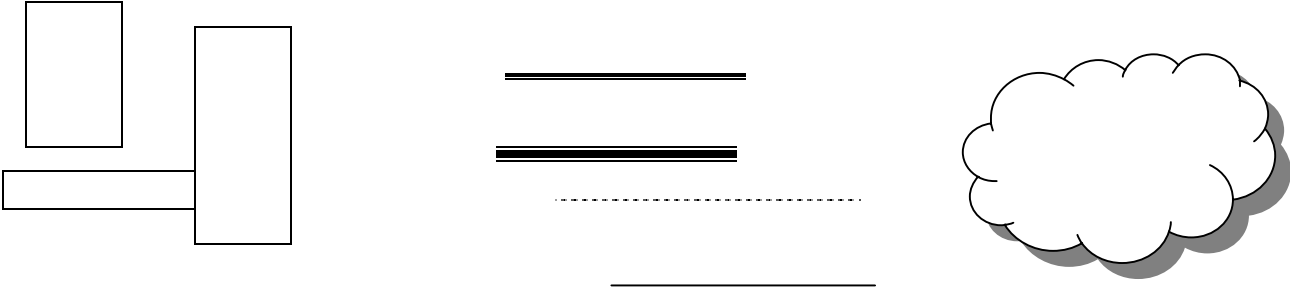
- Use neutral colour (black) for main parts
- Use red for calling the attention
- Use other colours (green, orange, blue) for emphasis
- Group according to colour (e.g. positive – negative)

# Examples of design elements

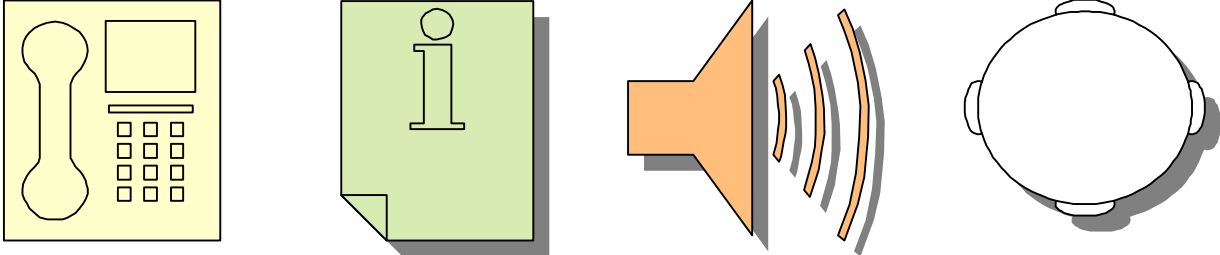
## arrows



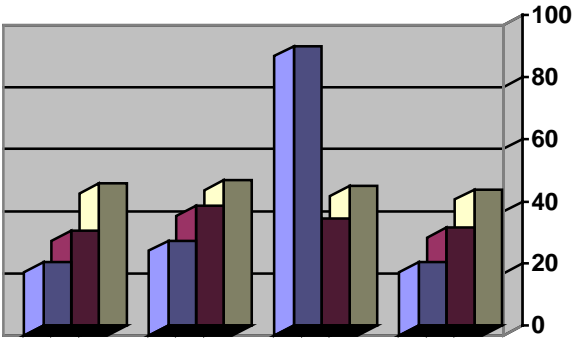
## rectangulars, lines, stripes, clouds



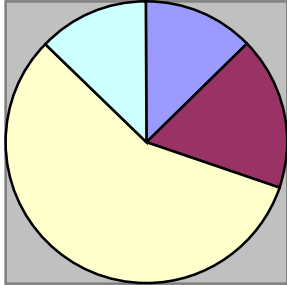
## pictograms



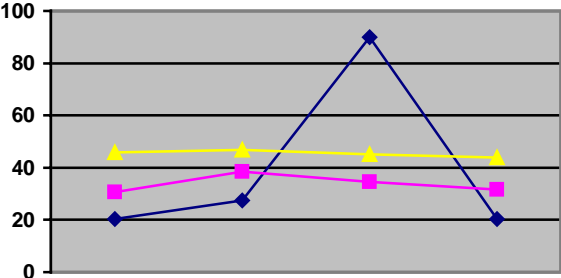
charts



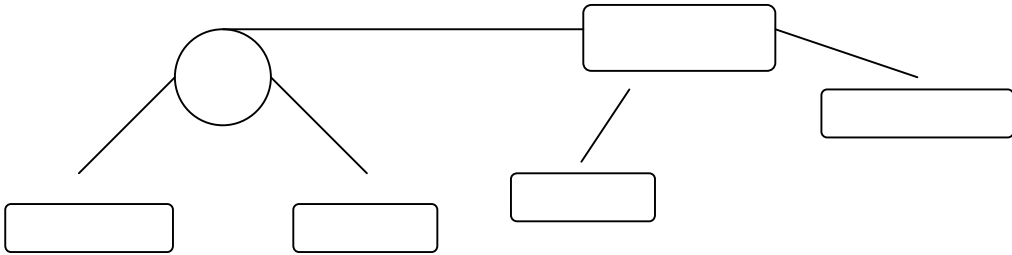
Column chart: comparison of sizes



Pie chart: the whole and its parts



Curve chart: visualizing developments



Organigram/flow chart: visualizing structures and procedures

## Requirements for teaching

### Address all senses

- Multi channel information
- Allow for cognitive and affective perception
- Facilitate active visualization

### Link teaching to reality

- Use originals
- Combine originals with media
- Combine theory and practice
- Incorporate professional experience

## Requirements for teaching

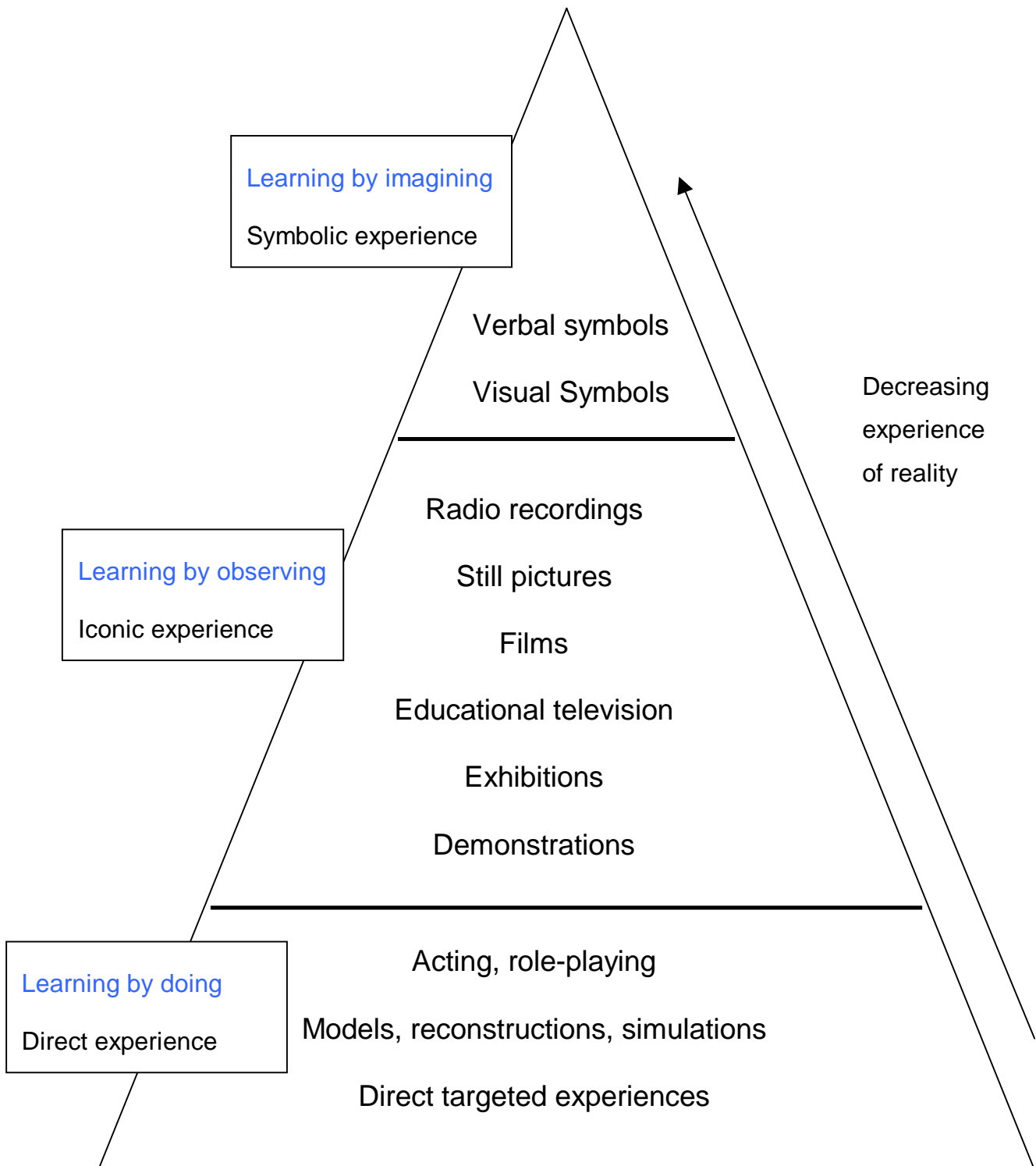
### Observe teaching principles

- Show only the essentials
- Simplify complex and complicated processes
- Proceed from the simple to the complicated
- Proceed from the known to the unknown
- Proceed from the concrete to the abstract

### Involve students

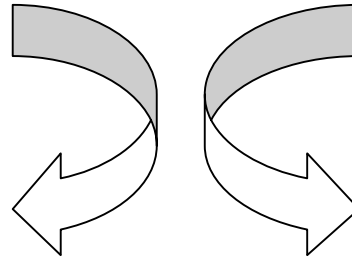
- Avoid ready made solutions
- Allow students' to work independently with media
- Encourage teamwork

# The hierarchy of media in teaching





## Control



... shows **teacher** results of his/her work

... gives **teacher** clues for further lesson design

... **student** can assess performance and own status of development

... **student** receives praise and/or incentive to change behavior

Main goal:

**stimulation of high learning results**

Control should be...

objective  
comparable  
evaluatable

## Control should...

...correspond to learning  
objectives:

cognitive

affective

psychomotor

time

quality

quantity

## Kinds of Control

- Regular control
- Control questions
- Exercises

- Performance controls
- Tests

- Pieces of work
- Examinations

## 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 the load and will break down.

## The Use of Scaffolds

### Definition:

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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.

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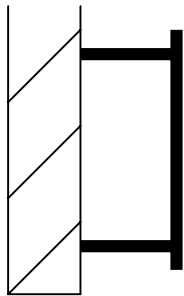
Scaffolds can carry workers and material but one must be careful not to put too many loads like blocks and motor so that the planks cannot carry the load and will break down.

## The Use of Scaffolds

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

Types of scaffolds

### Dependent Scaffold



Are fixed onto the Building and cannot Stand alone.

Are more stable but Cannot be erected Freely.

### Independent Scaffold



can be erected without connecting It to a building.

can be erected everywhere but Are not as stable.

**Do not overload scaffolds! Be careful when working on them!**

## The two sides of the brain

Left

Logic brain

cReativ brain

Right

Speech

Creativity (new combinations)

Calculations

Artistic activity

Intellectual Analysis

Musical ability/Rhythm

Reading

Emotions

Writing

Comprehension

Naming

Perception of abstract patterns

Ordering

Spatial abilities

Sequencing

Facial expressions

Complex motor sequences

Holistic ability

Critique

Intuition

Evaluation

Images

Logic

Colours



Mind map

