

Africa Medical College



Report on One Day Capacity Building Training “Learning- Teaching Methods and Students’ Assessment”

14th January 2023

June 2023
Addis Ababa

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Africa Medical College

Report on One Day Capacity Building Training for Teaching and
Technical Staff

“Learning-Teaching Methods and Students’ Assessment”

January 14, 2023

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PREFACE

Africa Medical College is a private higher education institution committed to becoming “one of the 10 leading private higher education institutions (HEIs) providing education and training, research, and community services in the health sector nationally in 2025”.

To attain this vision, the College has hired the most qualified academic staff, furnished its laboratories with the latest medical equipment and tools and purchased up-to-date online and hardcopy books for the library. It is however understood all these facilities and tools are of no value unless the academic staff are equipped with knowledge and skill of the current teaching learning methods and strategies. The purpose of this workshop was, therefore, to arm the academic and technical staff of the College with the latest methods and strategies of teaching and learning and students’ assessment.

The training was offered by two prominent university professors, Assoc. Professor Dr. Frdisa J. Aga, from Addis Ababa University, Institute of Educational Research (IER) and Assoc. Professor Yosef Shumi from Kotebe University of Education on January 13, 2023 at the College’s Graduate library. The scholars presented theories, principles, methods, strategies of teaching and learning, planning and classroom tests along with their rich, personal experience on which participants discussed and deliberated actively.



The workshop commenced with an official opening speech by Dr. Mekonnen Belay, VP of the College. He highlighted the importance of skill in teaching methodologies and student assessment for effective teaching-learning to produce sufficiently trained citizens who can be useful to society and the country in general. He also conveyed to participants that methods of teaching and learning are required with a particular emphasis on making the connection between theory and practical application and they are required to make all their level best to participate in and contribute to the training.

Dr. Mekonnen promised to all those present at the workshop that the College will do everything in its power to increase the capacity of teachers in employing active learning strategies to significantly enhance students’ learning experiences.

Finally, Dr. Mekonnen thanked the Head of Quality Assurance Office and all those who worked hard to make the training a reality. It was observed that the workshop was attended by more than twenty academic and technical staff.

PRESENTATION ONE

1- Theories, Principles, Planning, Methods and Strategies of Teaching and Learning at HE: Training for Teachers and/or Management

By Firdissa Jebessa Aga (PhD)¹



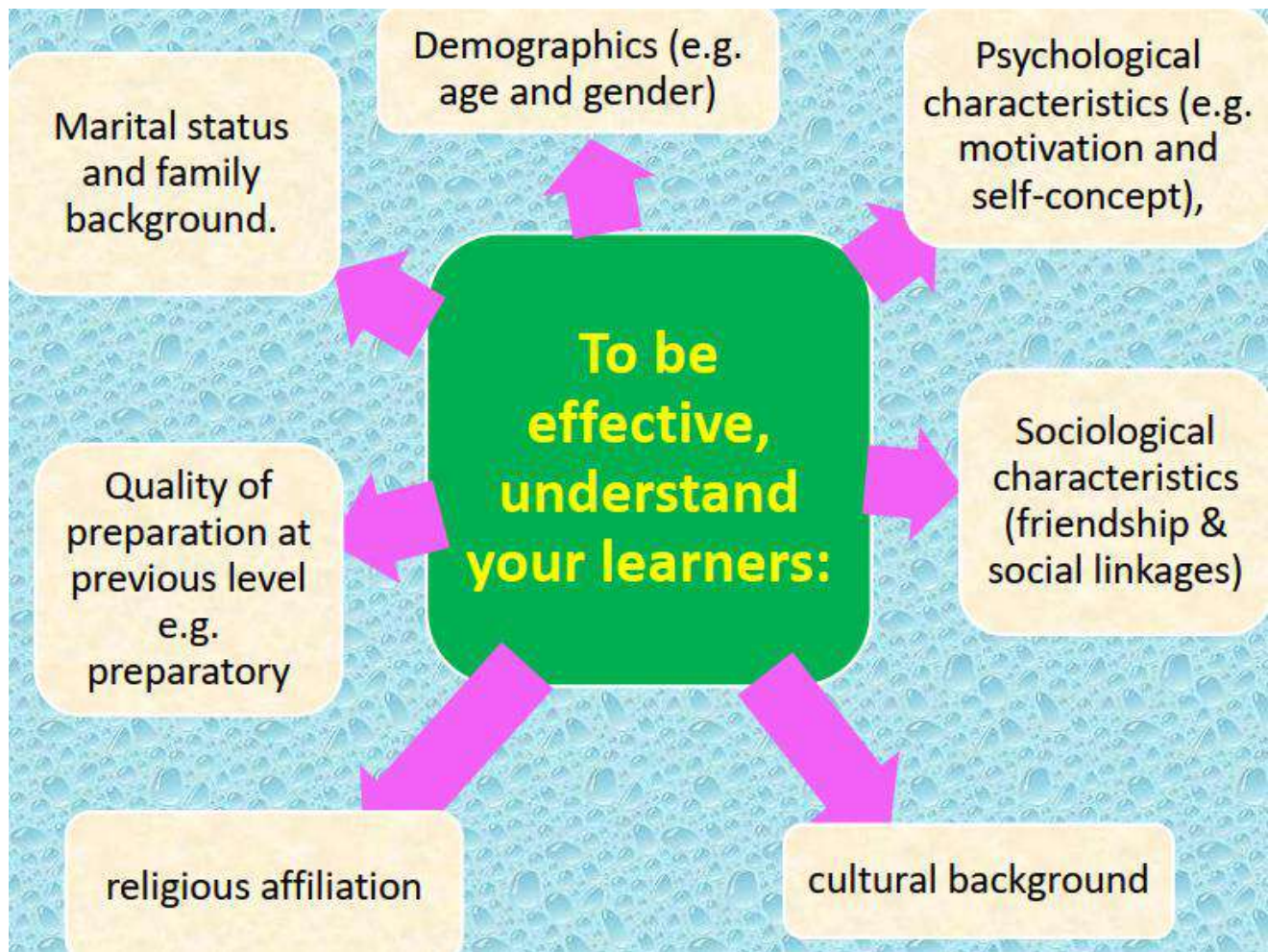
Teaching, at a Higher education (HE), requires knowledge of 1) theories and principles of teaching and learning, 2) planning/designing instruction, 3) implementing using appropriate methods and strategies, and 4) assessing of learning and evaluation of outcomes.

This presentation addresses only the first three major aspects:

1.1. Theories and Principles of Teaching Learning

Teaching, as an art and a science, is a rule governed activity. It is defined differently from different perspectives. For instance, Idealist philosophers, Pragmatists, Naturalists, and Modern pedagogues define teaching differently.

¹ Associate Professor, Institute of Educational Research,
Addis Ababa University



Changes that come as a result of Transition from secondary to higher education are:

- Physical, psychomotor,
- Socio-affective,
- Emotional,
- Intellectual (cognitive) and
- Inspirational changes.

All these changes affect learning, communication and engagement. The transition is characterized by more freedom, meeting diverse background, independent study, engaging in different activities, diverse language, styles, lives, habits, knows and supports to each other and sharing experiences. Students also introduce themselves to each other and form intimacy.

There are far more variability in terms of the type of people one interacts with. Some of them are ability to use knowledge, solve problems, and generate new knowledge and ability to communicate their knowledge to others clearly and working at the frontiers of knowledge

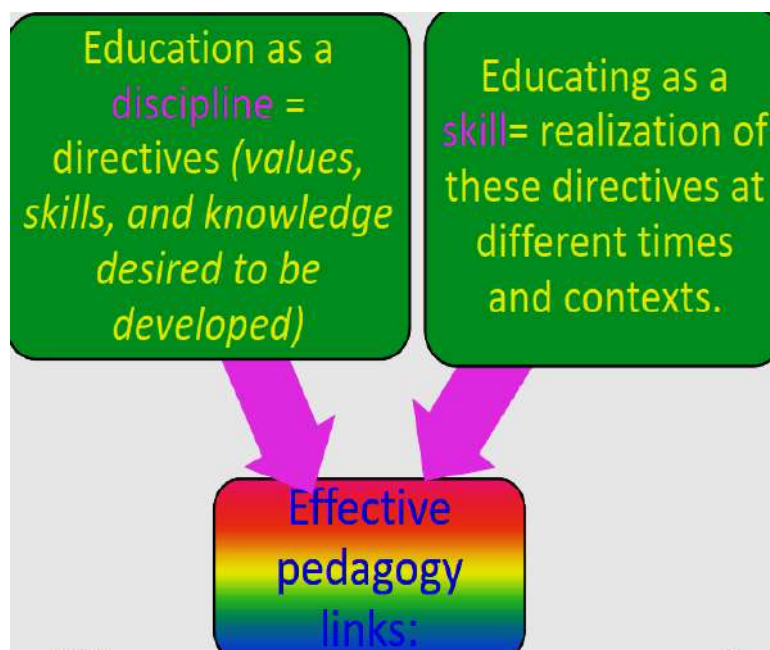
1.2.Expected Teaching Characteristics of a Teacher in a Higher Institution:

1. Good knowledge of the subject he/she teaches;

2. An understanding of how students learn;
3. A concern for students' development;
4. A commitment to:
 - scholarship;
 - work with and learn from colleagues;
5. Continuing reflection on professional practice
6. Intellectual curiosity; honesty

HEIs should educate students to become:

Well informed & deeply motivated citizens, who can think critically, analyze problems of society, look for solutions to the problems, and accept social responsibilities.



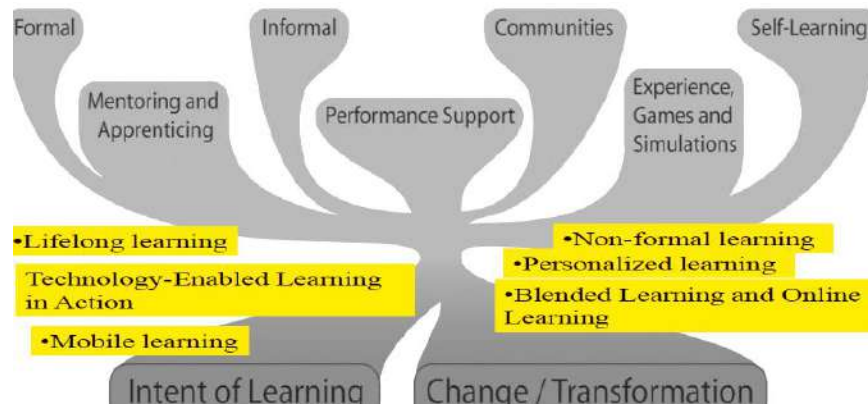
Why do people learn?

People learn to remain globally competent and develop engaged citizens, learning institutions and weave the 21st century competencies and expertise throughout the learning experience.

Learning in this era challenges theories of teaching and learning.

- Paradigm shift move from instructor to learner-based education,
- Learning is a constructive process, involving the active construction of knowledge in formal, non-formal, and informal learning,
- Technology enhanced limitless dimensions of learning.

Limitless Dimensions of Learning



Learning Specific

1. What is learning?
2. How do you conceive by understanding?
3. When do we use our knowledge effectively?

Learning

Learning is a relatively permanent change in behavior of a person (the learner) (thinking, skill, emotion, spiritual, action) an internal process which occurs in the learner. It takes place in three stages- the:

- a) motivation stage,
- b) acquisition stage
- c) Performance stage.

The conceptions of learning show more variety than the usual ones. Säljö (1979) found five different conceptions:

- a) Learning as the increase of knowledge
- b) Learning as memorizing
- c) Learning as the acquisition of facts or procedures
- d) Learning as the abstraction of meaning
- e) Learning as an interpretative process aimed at the understanding of reality.

Q. Which conceptions do you prefer? Why?

1.3.Learning Styles of Students

Learning styles refer to individual typical ways of processing information and seeking meaning.

A- Learning Styles

Learning Styles	Strengths
Convergent	Practical application of ideas
Divergent	Imaginative ability and generation of ideas
Assimilative	Creating theoretical models and making sense of disparate observations
Accommodative	Carrying plans and tasks that involve them in new experiences

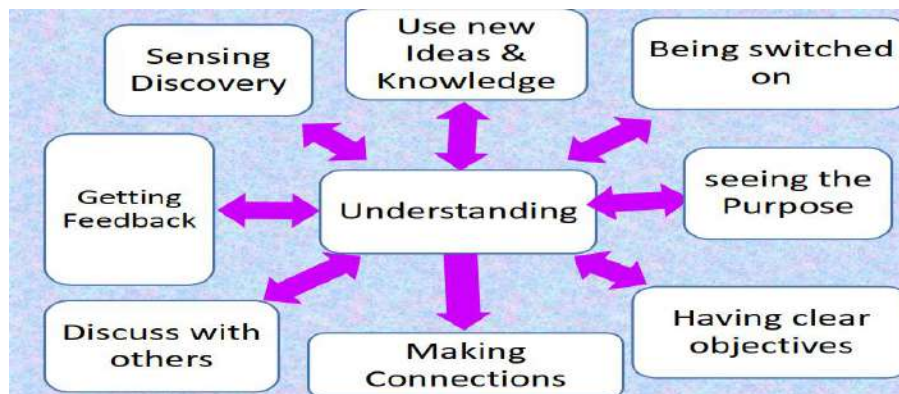
B Learning Styles

Learning Styles	
Activists	Linguistic intelligence
Reflectors	Spatial intelligence
Theorists	Musical intelligence
Pragmatists	Bodily-kinesthetic intelligence
Logical-mathematical intelligence	Interpersonal intelligence
Naturalist intelligence	

1.4. Learning from Students' Perspective:

1. Surface approach to learning (atomistic learning)
2. Deep approach to learning [holistic learning]
3. Strategic learning

The above knowledge of principles, styles, theories, etc. enhance understanding. Understanding is more than just knowing. It is the ability to use knowledge in new contexts, to solve unfamiliar problems. It is knowledge that is richly-connected, well-structured and useful. We use our knowledge effectively if it is highly structured and richly connected.



1.5. Importance of Teaching for Understanding

In the changing world in which we live we need people who:

- Are life-long learners,
- Are problem solvers,
- Are creative thinkers,
- Are effective communicators, not only 'know' but can use their knowledge.
- Need people who understand.

Understanding develops when learners:

- Process information,

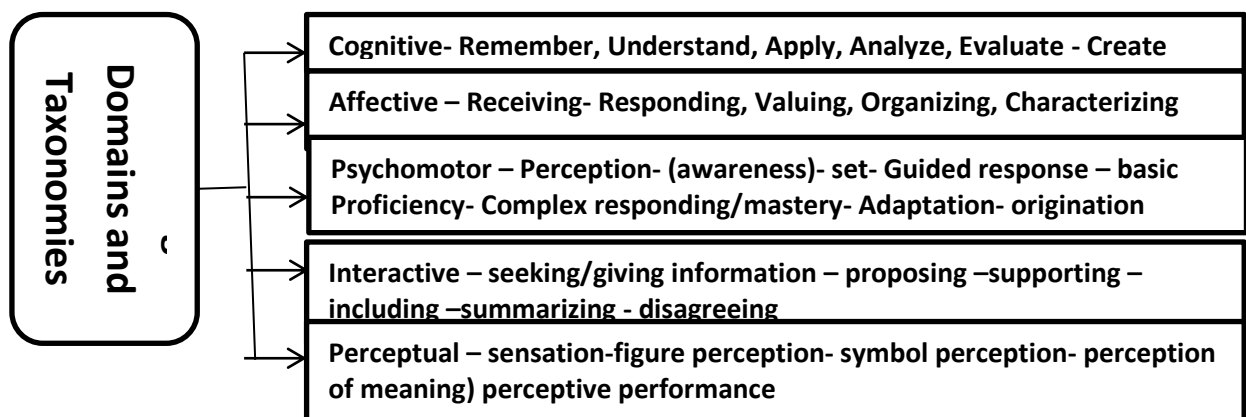
- Think about it,
- Question it, use it,
- Connect it to their existing knowledge and personal experiences;
- Have clear learning objectives,
- See the purpose of what they are learning,
- Get regular feedback and have the opportunity to interact with others.

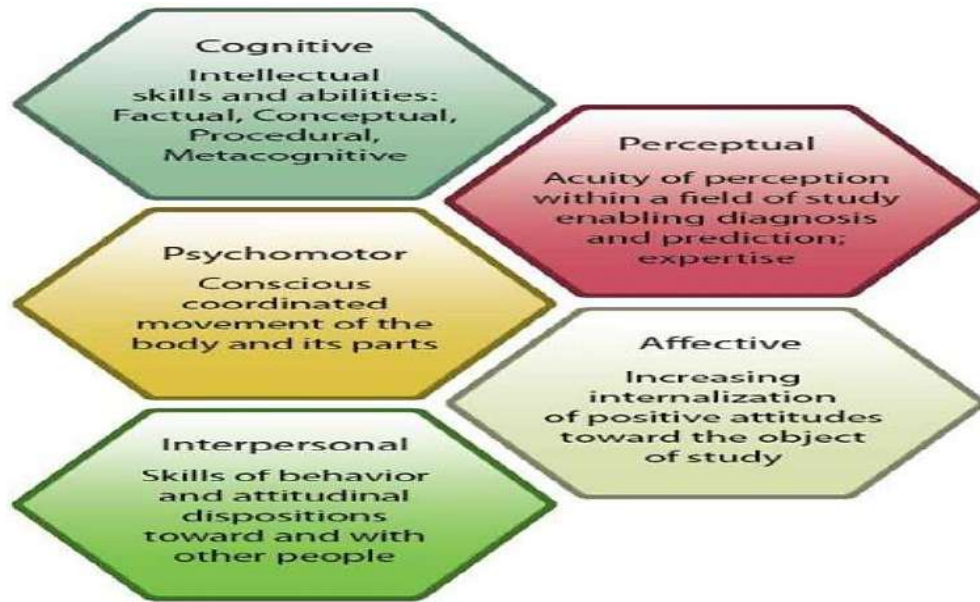
1.6. Foundations of Education

Q: How have history, philosophy, sociology and culture, psychology and innovations affected our notions of the purposes of education, of communication skills and Pedagogy?

Suggestions/Strategies for Promoting Teaching and Learning

- Building confidence in the College teacher
- Wait-time for learners: semesters are now truncated; They need adequate time to plan their learning adequate resources to promote T-L
- Consider learners' inputs to improve teaching
- Teaching students how to learn **"Don't give a fish but teach how to fish!"**
- Specify what is expected of the learner
- Clarify with the learners what their specific expectations are
- Win the learner's cooperation all through
- Start from where the learners are, i.e., rely on what they already know and use representations they are familiar with
- Put the learners in a situation in which they can realize something by themselves, do research,
- Provide learners with direct access to knowledge by ensuring that they have the necessary pedagogical tools at their disposals.
- Listen to them in order to change their ways and behaviors.





1.7. Basic rules/Principles of Teaching:

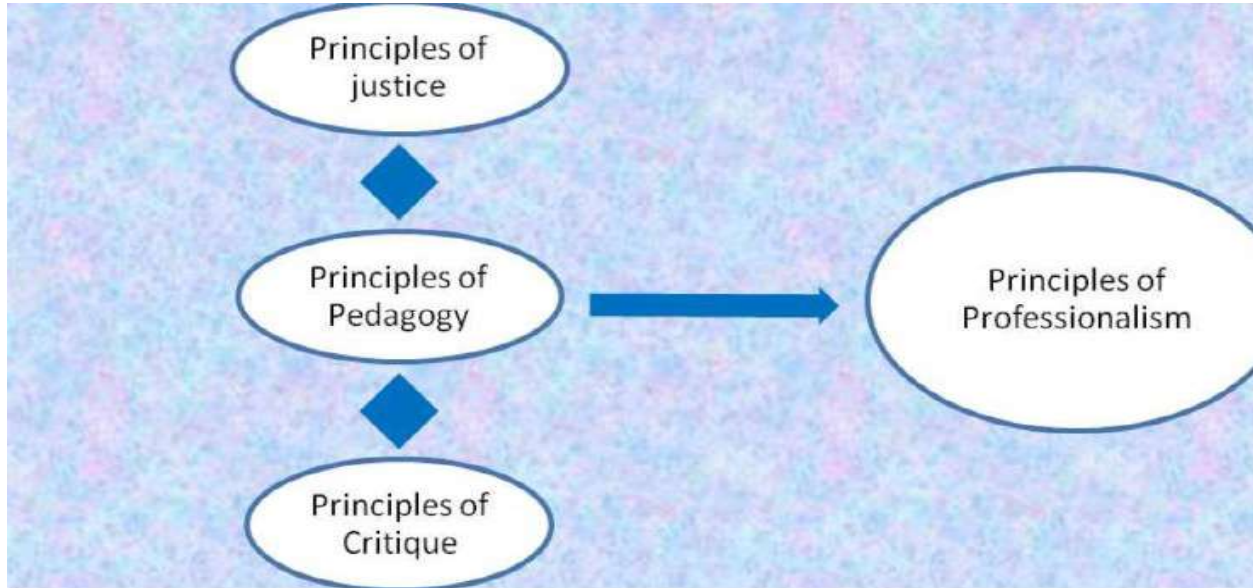
Proceed from:

- Simple to complex
- Concrete to abstract
- Near to far
- Known to unknown
- Actual to representative
- Empirical to relational
- Psychological to logical
- Inclusively
- Whole to parts or vice versa
- Inductive to deductive or vice versa

Other principles:

- planning lessons in line with the curriculum
- linking / connecting school learning activities to social/after school life
- Verbalization in instruction
- making instruction clear by using instructional media that appeal to senses
- Recognizing individual differences
- The principle of:
 - seeking economy of effort
 - defining the objectives of the lesson
 - acquiring knowledge but not inheriting
- The principle of applicability and durability of the results of learning: retaining, and applying knowledge, skills, & values in different situations.
- Perceiving how the components of the task are related facilitates memory.
- Practice in using information (not just repetition) helps the learner to remember the lessons.
- Evaluating the adequacy and accuracy of one's information is essential for a learner.

- Feedback enables the learner to adjust his/her performance so that it can be corrected.
- In learning complex skills, cues may help the learner complete the task and thus learn to perform the proper sequence of steps.
- Learning skills requires practice



<i>Theories of Teaching</i>	<i>Theory One Teaching as telling</i>	<i>Theory Two Teaching as organizing</i>	<i>Theory Three Teaching as making learning possible</i>
Focus	Teacher and content	Teaching Techniques that will result in learning	Relation between students and subject matter
Strategy	Transmit information	Manage teaching process; transmit concepts	Engage; Challenge; imagine oneself as a student
Actions	Chiefly presentation	Active Learning; Organizing activity	Systematically adapted to suit student understanding
Reflection	Unreflective; taken for granted	Apply skills to improve teaching	Teaching as a research like, scholarly process

1.8.Instructional Theory

Instructional theory and technology (ITT) ITT that support post-industrial education and training systems address:

1. Universal Methods of Instruction

2. Situational Methods of Instruction
3. Core Ideas for the Post-industrial Paradigm of Instruction
4. Task-Based Instruction
5. A Vision of the Post-industrial Paradigm of Instruction

1. Universal Methods of Instruction

There is a set of five prescriptive instructional principles that enhance the quality of instruction across all situations [Though the specific methods by which each principle is implemented must vary from one situation to another for instruction to be of high quality]: task- centeredness, activation, demonstration, application, and integration.

a) Task-Centered Principle

- Instruction should use a task-centered instructional strategy.
- Instruction should use a progression of increasingly complex whole tasks

b) Activation Principle

Instruction should:

- Activate relevant cognitive structures in learners by having them recall, describe, or demonstrate relevant prior knowledge or experience.
- Have learners share previous experience with each other.
- Have learners recall or acquire a structure for organizing new knowledge.

c) Demonstration Principle

Instruction should:

- Provide a demonstration of the skill consistent with the type of component skill: kinds-of, how to, and what-happens.
- Provide guidance that relates the demonstration to generalities.
- Engage learners in peer-discussion and peer- demonstration.
- Allow learners to observe the demonstration through media that are appropriate to the content.

d) Application Principle

Instruction should:

- Have the learner apply learning consistent with the type of component skill: kinds-of, how-to, and what-happens.
- Provide intrinsic or corrective feedback.
- Provide coaching, which should be gradually withdrawn to enhance application.
- Engage learners in peer-collaboration.

e) Integration Principle

Instruction should:

- Integrate new knowledge into learners' cognitive structures by having them reflect on, discuss, or defend new knowledge or skills.
- Engage learners in peer-critique.
- Have learners create, invent, or explore personal ways to use their new knowledge or skill.
- Have learners publicly demonstrate their new knowledge or skill.

1.9.Situational Methods of Instruction

Principles and methods of instruction can be described on many levels of precision, on:

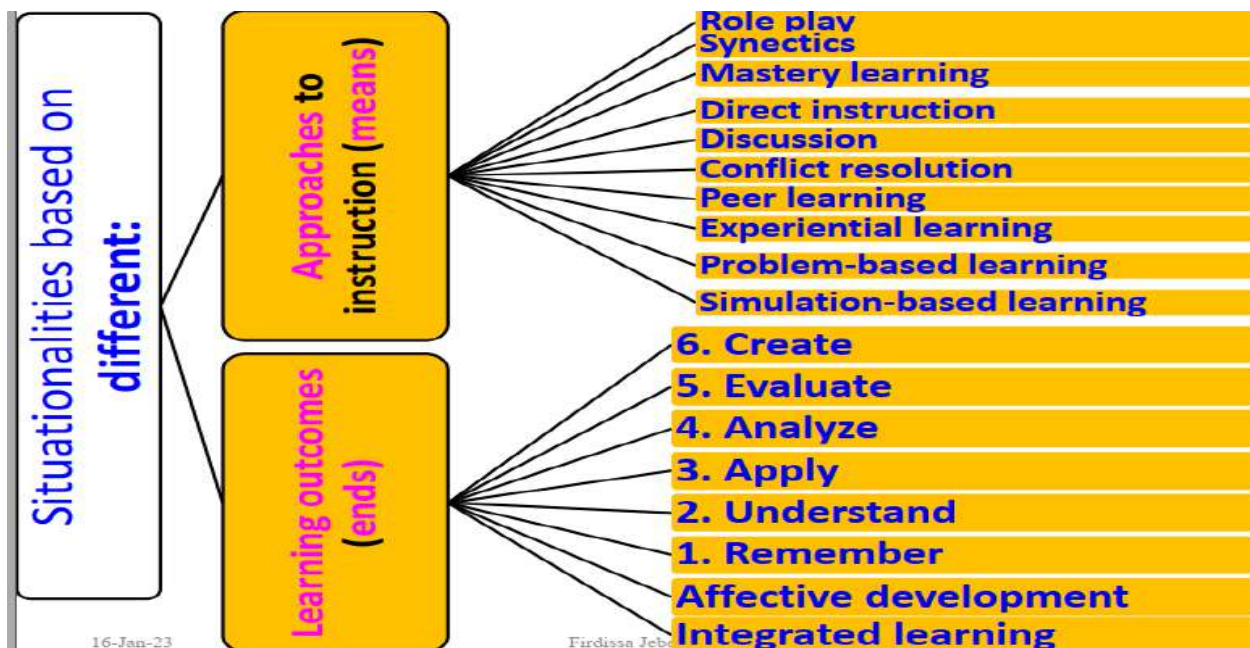
- Least precise level to provide coaching.
- Highly precise level, addressing recognition
 - Needs to be different for different situations.
 - The contextual factors that influence the effects of methods are referred as “situationalities.”

Challenges:

- To identify which situationalities are important for selecting each method,
- Methods may be combined into a “package deal” that is made up of an interrelated and interdependent set of methods, in which case we need to identify which situationalities are important for selecting each “package”

There are two major types of situationalities that call for fundamentally different sets of methods:

- different approaches to instruction (means)
- different learning outcomes (ends)



1.10. Core Ideas Paradigm of Instruction

There are core ideas characterizing post-industrial educational and training systems. The following are core ideas for the post-industrial paradigm of instruction VS the industrial-age paradigm of instruction:

- a) Learning-focused vs. sorting focused
- b) Learner-centered vs. teacher-centered instruction
- c) Learning by doing vs. teacher presenting
- d) Attainment-based vs. time-based progress
- e) Customized [new] vs. standardized instruction
- f) Criterion-referenced [with immediate feedback] vs. norm referenced testing
- g) Collaborative vs. individual
- h) Enjoyable [lifelong learning] vs. unpleasant

1.11. Task Based Instruction (TBI)

- Student engagement or motivation is key to learning.
- The quality and quantity of learning are directly proportional to the amount of effort the student devotes to learning.
- Whereas the industrial-age paradigm of education and training was based on extrinsic motivation, that of the information-age paradigm is based intrinsic motivation.
- To enhance intrinsic motivation, instructional methods should be learner-centered.
- Instructional methods should involve learning by doing, utilize tasks that are of inherent interest to the learner (which usually means they must be “authentic”), and offer opportunities for collaboration.
- This makes task-based instruction (TBI) particularly appropriate as a foundational instructional theory for the information-age paradigm of education and training.
- Student progress is based on learning rather than on time, students’ progress at different rates and learns different things at any given time.

Problems with TBI: [Difficulty]:

- a) Ensuring mastery [Difficult to assess and ensure that all students [in collaborative or team-based] have learned what was intended to learn.
 - a. Some student on the team may be loafers and do not learn much at all.
 - b. teammates often work cooperatively rather than collaboratively, meaning they each perform different tasks and therefore learn different things
 - c. As students are assessed on the quality of the team “product”, no idea as to who has acquired which competencies.]

- b) Transfer of skills and competencies [in TBI learners typically use a skill only once or twice in the performance of the project. This makes it difficult for them to learn to use the skill in the full range of situations in which they are likely to need it in the future]
- c) Automaticity [TBI does not address automatized in order to free up the person's conscious cognitive processing for higher-level thinking required during performance of a task.]
- d) Efficiency [much learner time can be wasted during TBI –searching for information, doing busywork, repeating the use of skills that have already been mastered, and struggling to learn without sufficient guidance or support]

1.12. A Vision of the Post-industrial Paradigm of Instruction

Instruction Task and Instructional Spaces imagine a small team of students working on an authentic task in a computer-based simulation (the “task space”). Soon they encounter a learning gap (knowledge, skills, understandings, values, attitudes, dispositions, etc.) that they need to fill to proceed with the task. Imagine that the students can “freeze” time and have a virtual mentor appear and provide customized tutoring “just in time” to develop that skill or understanding individually for each student (the “instructional space”).

- learning a skill is facilitated to the extent that instruction tells the students how to do it, shows them how to do it for diverse situations, and gives them practice with immediate feedback, again for diverse situations
- Students learn to generalize or transfer the skill to the full range of situations they will encounter in the real world.
- Each student continues to practice until she or he reaches the standard of mastery for the skill
- Upon reaching the standard, the student returns to the task space, where time is unfrozen, to apply what has been learned to the task and continue working on it until the next learning gap is encountered, and this doing-learning doing cycle is repeated

1.13. Instructional Theory for the Task Space

- There is much validated guidance for the design of the task space, including universal and situational principles for the task space
- Include guidance for selecting a good task at the right level of complexity, forming small groups, self-directed learning, what the teacher should do, how debriefing should be done, and more.
- Computer-based simulations are often highly effective for creating and supporting the task environment, but the task space could be comprised entirely of places, objects, and people in the real world (place-based learning), or it could be a combination of computer simulation and real-world environments.

1.14. Instructional Theory for the Instructional Space

Selection of instructional strategies in the instructional space is primarily based on the type of learning (ends of instruction) involved,

- a) For memorization, drill and practice is most effective, including chunking, repetition, prompting, and mnemonics.

- b) For application (skills), tutorials with generality, examples, practice, and immediate feedback are most effective
- c) For conceptual understanding, connecting new concepts to existing concepts in student's cognitive structures requires the use of such methods as analogies, context (advance organizers), comparison and contrast, analysis of parts and kinds, and various other techniques based on the dimensions of understanding required.
- d) For theoretical understanding, causal relationships are best learned through exploring causes (explanation), effects (prediction), and solutions (problem solving); and natural processes are best learned through description of the sequence of events in the natural process
 - These sorts of instructional strategies have been well researched for their effectiveness, efficiency, and appeal. And they are often best implemented through computer-based tutorials, simulations, and games.

1.15. Planning

This section outlines syllabus preparation, and teaching preparations, student-teacher interaction, and communications skills. In preparing the Material, active and adult learning principles have been considered implicitly and explicitly

Class teaching Preparation begins with planning. Plans, planning efforts, and planning methods vary widely in their styles and degrees of specificity among teachers. As there are many ways to plan - there is no single —best way of planning.

Planning serves:

- a) To make learning manageable, dividing instructional time and topics is considered to be useful.
- b) As a guide to action, and it is the key to excellence and to be effectiveness.

Though there are different approaches of planning at a HE, we drive the elements of planning Course syllabus/instructional design from national/institutional goals that stand as backstage of curricula and programs. We therefore, brief:

- a) Syllabus
- b) Instructional design
- c) Unit planning
- d) Lesson Planning

1.16. Syllabus Preparation

What is Syllabus? The term Syllabus is derived from the Greek word meaning "label for a book." Syllabus is "a summary outline of a discourse, treatise, or course of study or of examination requirements." [But more than an outline].

- a) The specification and ordering of content of a course or courses.
- b) A detailed blue print which consists of the main parts of a curriculum.

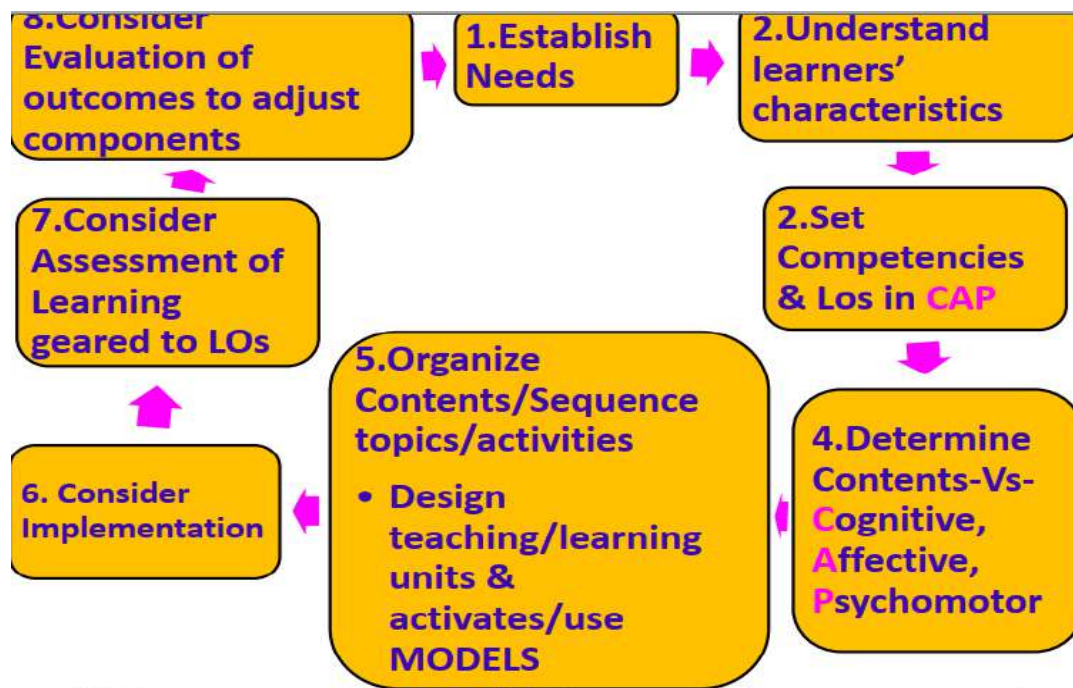
Whatever the conception we give, syllabus is the basis for developing the teaching and learning materials (modules) as well as the instruction. It reflects the module's ingredients, procedures, policies, standards and operations.

Purposes of a syllabus:

A syllabus serves to:

- a) Define the essential elements and focus of the course ;
- b) Delineate the goals and the objectives of the course;
- c) Describe the scope of the course (what topics will be addressed);
- d) Outline the organization/sequence and presentation of the course content to be covered;
- e) Define learner outcomes in objective terms;
- f) Outline assessment procedures and their contribution to the learning process;
- g) Establish clear rules and boundaries for performance;
- h) Suggest resources to promote successful learning experiences

What do we consider in Syllabus Preparation?





Practical components/features in Course/ syllabi Development and Implementation

- a) **Provide basic information:** year, semester, title and number, the number of units, the meeting time and location.

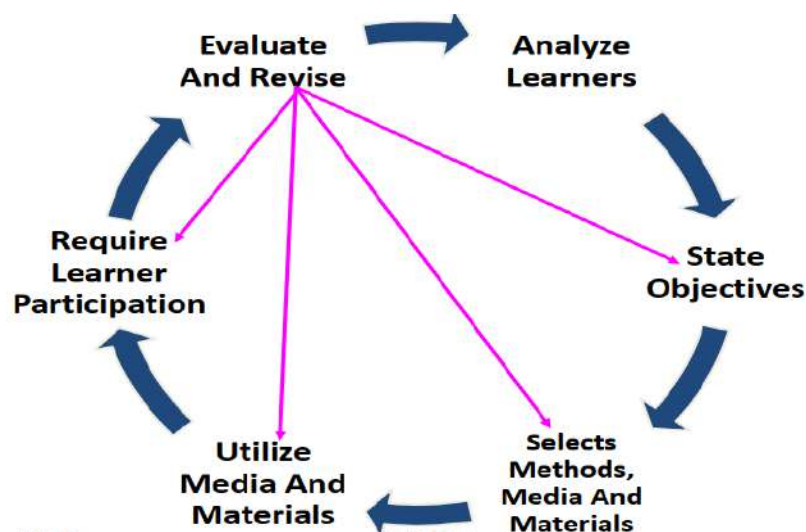
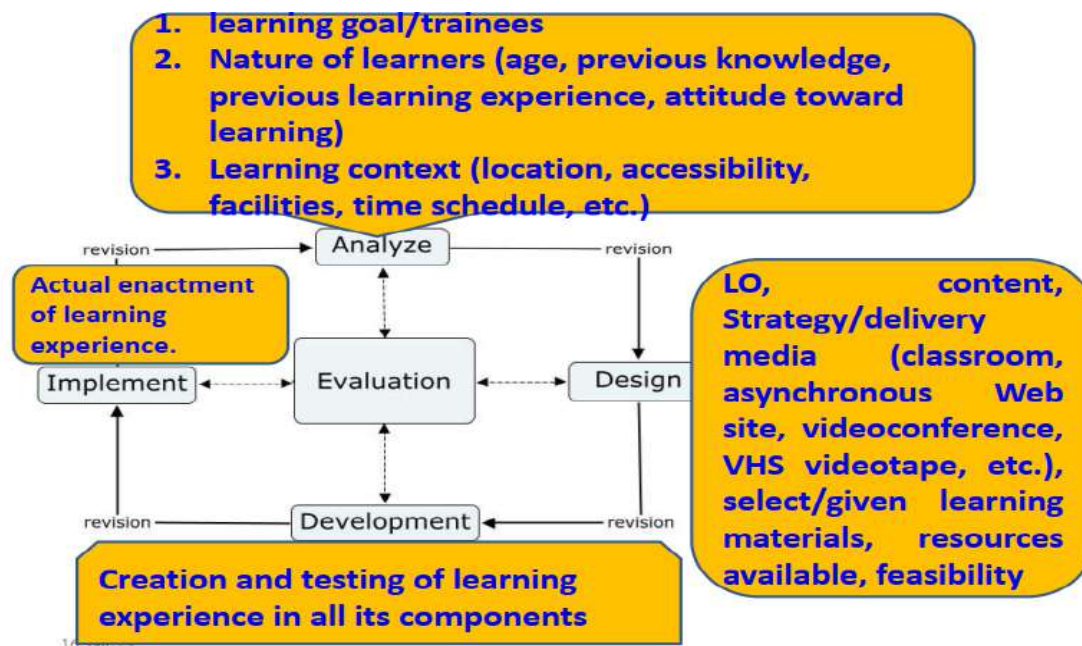
Course or section description

- a) Describe the prerequisites to the course (if any)
- b) Give an overview of the course's purpose/aims
- c) State the general learning goals or learning outcomes or objectives
- d) Clarify the conceptual structure used to organize the course
- e) Describe the format or activities of the course
- f) Specify the textbook and readings by authors and editions.
- g) Identify additional texts/materials or equipment needed for the course
- h) .List assignments, term papers, and exams
- i) State how students will be evaluated and how grades will be assigned
- j) Discuss course policies
- k) Invite students with special needs to contact you during office hours
- l) Provide a course calendar or schedule/ course schedule/weekly calendar/assignments

- m) Schedule time for fast feedback from your students
- n) List important drop dates.
- o) Estimate student workload
- p) Attendance, class participation, being late/missing assignments and exams, academic dishonesty, grading criteria, and other information that can be included.

1.17. Models in Planning/Designing

Among the available different models, we may briefly see few, including: ADDIE, ASSURE, ARCS, Gagne's Nine Events of Instruction, and RASE Models.

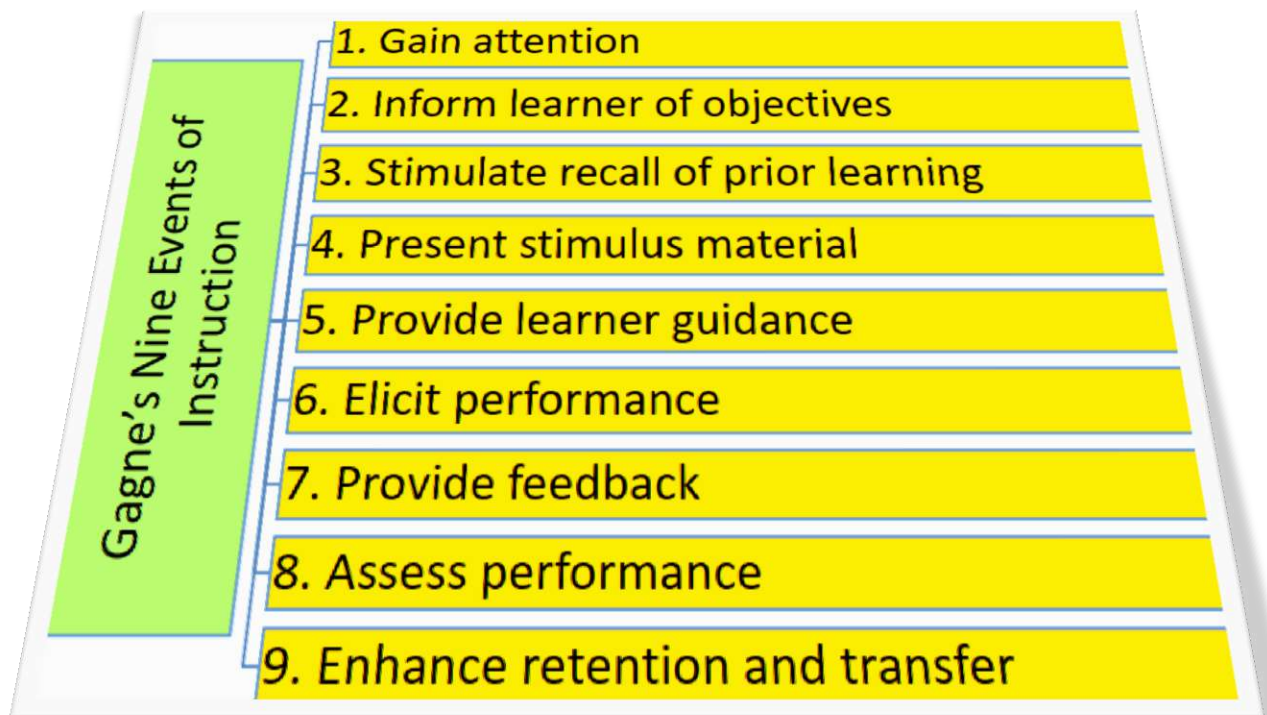


ARCS Model: Stands for:

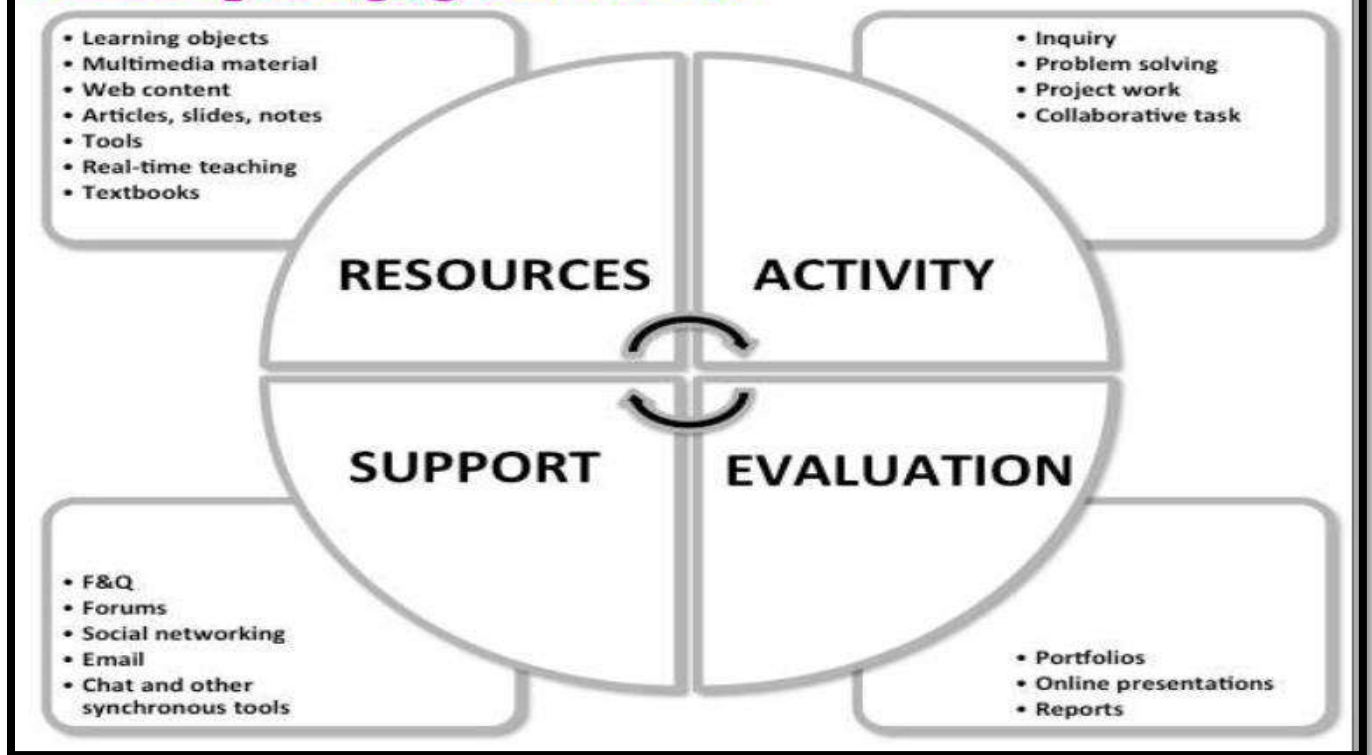
- a) Attention
- b) Relevance
- c) Confidence
- d) Satisfaction
 - addresses the layer of procedures.
 - is a model for motivational design as a fundamental condition for successful learning,

ARC translates the idea of the expectancy-value theory (see G. Vroom 1964), which defines effort as the major measurable motivational outcome- into four characteristics that a learning experience should have in order to make and keep learners motivated, i.e. to engage them actively (and intentionally) into the learning task. For an effort to occur in order to accomplish a task, two main conditions should subsist:

- i. The actor must value the task;
- ii. The actor must believe he/she can succeed at the task.



RASE pedagogical model



1.17.1. Unit planning

Unit planning is sorting out contents into blocks called *units* in a way that learning can be manageable. Parts of a unit plan, among others, include: subject of topic, rationale, instructional objectives, content, processes, resources, learning activities and evaluations/assessments.

1.17.2. Lesson planning

- An extension of unit planning.
- Not the same as activity schedules.
- Many different lesson plan formats from which to choose; the best one to use is determined by your specific instructional goals and teaching strategies.
- The better the teacher plans, the better the teacher.

Any given lesson-plan structure may be concerned with the following elements:

I. Class Information: Subject, Date, Students

II. Lesson Details

- Topic & Lesson Title
- Lesson Learning Outcomes

- iii. Learning activities (T & S)
- iv. Time Allocation
- v. Learning Resources
- vi. Introduction
- vii. Presentation
- viii. Conclusion (stabilization)
- ix. Evaluation/Assessment Details

Learning outcomes should be SMART

S	_____	Specific
M	_____	Measurable
A	_____	Achievable
R	_____	Relevant
T	_____	Time limited

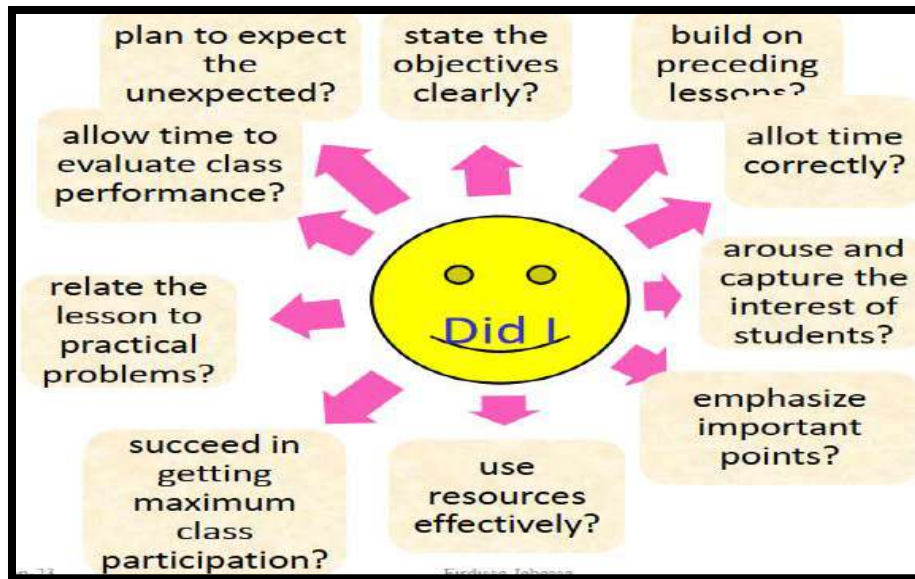
Of the above, contents and learning outcomes are crucial. Particularly, Learning outcomes include new knowledge, skill, and attitudes that result from accomplishing the course goals.

1. **Knowledge-based outcomes:** the acquisition of new knowledge, i.e. students is able to recall, describe and identify new knowledge; students are able to critically reflect, analyze or judge information and build upon prior learning.
2. **Skills-based outcomes:** the application of knowledge in similar or new content areas, i.e. students is able to apply concepts and operate, assemble, install, build, or conduct some type of process or manipulate objects or materials.
3. **Attitude-based outcomes:** the development of or a change in intrapersonal areas, i.e. students gain self-awareness and awareness of others; they question, justify, advocate, defend, challenge, endorse, dispute, and/or persuade about a condition, event or action.

Lesson Plan Self-Evaluation

Implement and ask questions: if you were to teach the lesson again, in what way(s) would you change it?

- The instructor makes any notes or comments regarding the session.
- Provides him/her with opportunity to appraise, or evaluate, the outcome of the presentation.
- Should be consistent with the daily lesson plan itself.



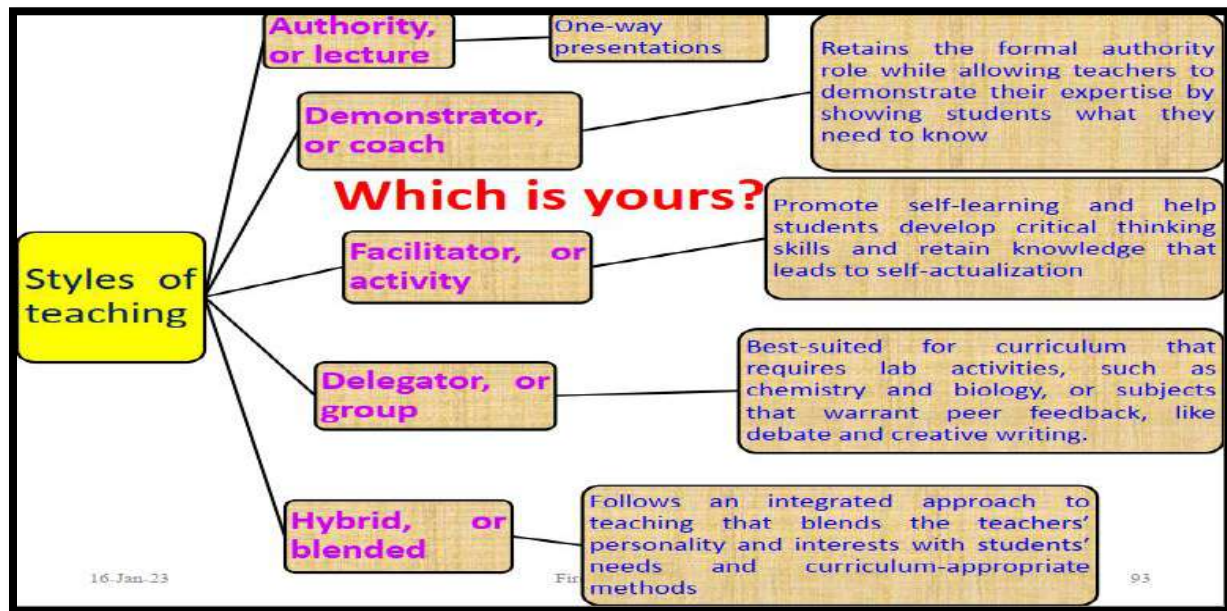
Class teaching preparation, therefore, begins with planning. Personal preparation also follows in all aspects. Teaching demands mental, physical, psychological, moral, pedagogical and personality preparations. All these can be realized when a teacher has clearly planned units and lessons.

1.18. Methods and Strategies of Teaching and Learning

Much of student learning success and teacher satisfaction with the process is derived from the quality of the **Methods and strategies of teaching and learning**. Effective **Methods and strategies** guarantee effective learning, which is based on effective teaching. Methods and strategies of teaching and learning call for:

- i. Considering education and educating.
- ii. Environments of learning by raising:
 - a) Who are our Learners?
 - b) What are the Learning Domains?
 - c) Teachers' Instructional Leadership Styles?
 - d) Different theories of learning
 - e) Learning for Understanding
 - f) Styles of teaching...?
 - g) Major Methods of Teaching ...?
 - h) Principles of Teaching ...?
- iii. Considerations to select appropriate methodology
- iv. Three basic classes of teaching /learning methods
- v. Three Approaches to Learning- Pedagogy, Andragogy, and Hautagogy

Each has different focus areas. Whereas Pedagogy deals with Reflection, i.e. what to learn (the product), andragogy deals with Critical Reflection, i.e. how to learn (the process). Finally, heutagogy deals with Reflexivity: the what, how, when (timing), where (context), why (the meaning), and who (who is involved and who controls the power) of learning. Along with these, styles of teaching, and understanding formation matter.



Behavior	Focus	Relationship with students
Laissez-Faire	Encourages students to disregard the prevailing cultural norms and "do one's own thing".	Non-interference with students' choice and actions; deliberately abstains from directing students or developing lesson plans, and avoids leading students.
Authoritarian or Autocratic	Preservation of traditional norms and working toward cultural transmission to generations to come.	Closely directs the activities of students; tells students what to think and what to do; consider him/her as active and students as passive recipients.
Democratic	Leading students in the study of significant problems	Respect each other, working together in 'give and take' principle.

The twenty first century has brought a cultural shift from an emphasis on teaching to an emphasis on facilitating learning. So, T-S interaction should enhance student-centered approach, which incorporates:

- assessment for learning,
- students' higher order thinking skills,
- encouraging learners to be independent

- developing strategies for consulting students about their education
- Considering Learning theories

The above realities enhance teaching learning for understanding which is more than just knowing. It is the ability to use knowledge in new contexts, to solve unfamiliar problems, knowledge that is: richly-connected, well-structured and useful.

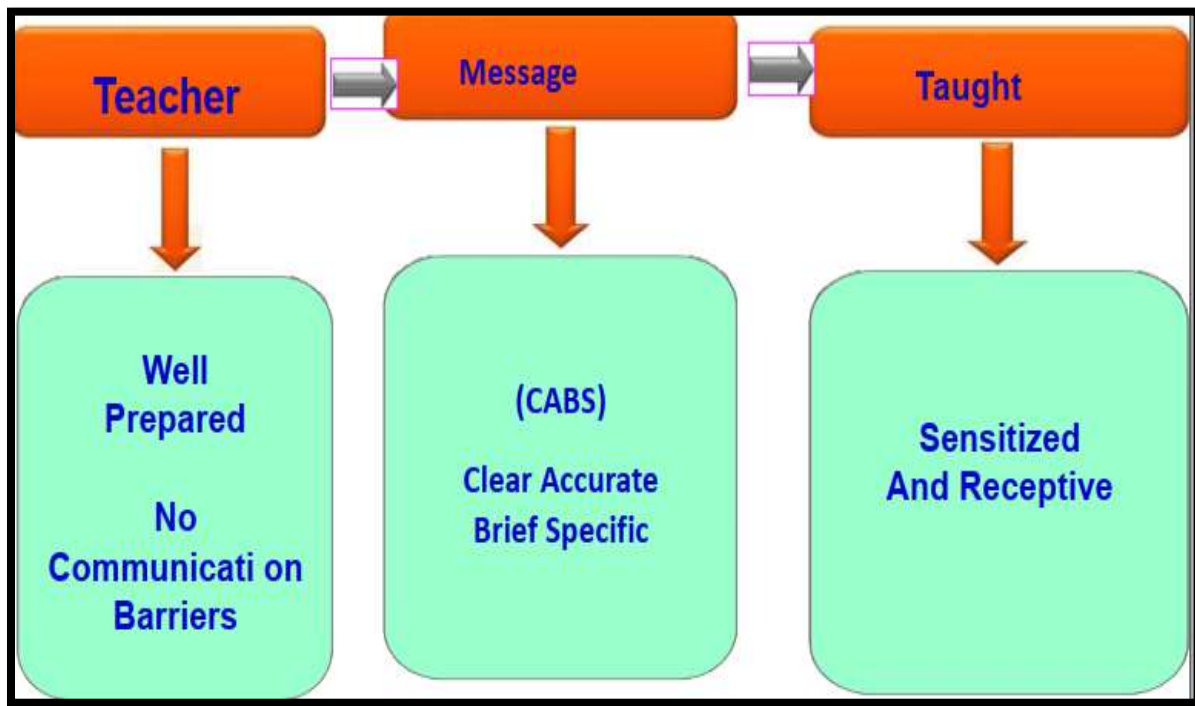
We use our knowledge effectively if it is highly structured and richly connected.

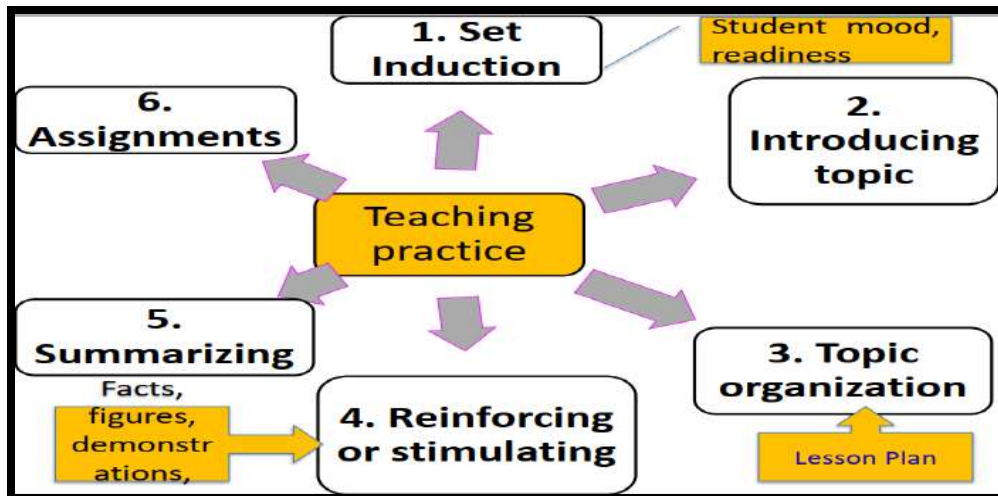
Importance of Teaching for Understanding

In the changing world in which we live we need people who are life-long learners, are problem solvers, are creative thinkers, are effective communicators, not only 'know' but can use their knowledge and we need people who understand.

To be effective, methods and strategies of teaching and learning should consider:

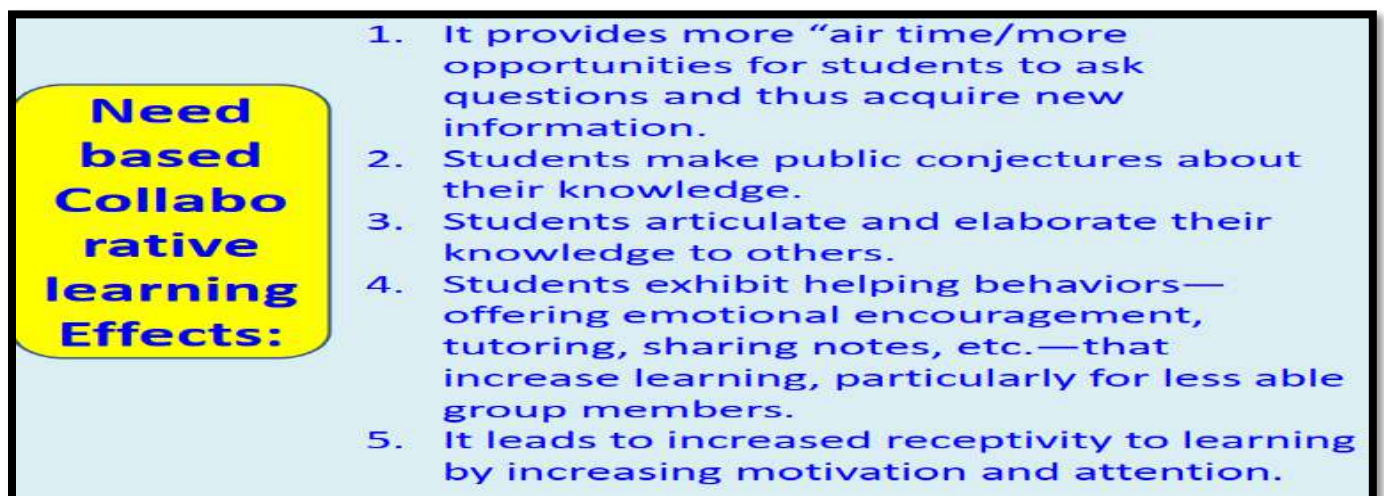
- teacher, message, and taught
- teaching practices
- the three basic classes of teaching /learning methods
- major methods of teaching
- styles of teaching
- active learning
- assessment categories
- feedback





The three basic classes of teaching/learning methods, each placing both the teacher s and students in radically different roles:

- i. Mass instruction methods /interactive study
- ii. Individualized learning methods/ independent learning (self learning)
- iii. Collaborative / group learning



Collaborative learning requires:

- Team work and team spirit
- consideration of Learning styles
- Safety leading to esteem
- Honesty
- Trustworthiness
- Communality of purpose
- Homogeneity of vision
- Peace of mind

Major Methods of Teaching

- Lecture Method
- Demonstration/performance
- Group discussion
- Role Playing
- Student independent study
- Question and Answer
- Project
- Problem solving
- Field trip
- Team teaching

Summary of Some Possible Teaching Strategies, Learning Activities and Assessment

Learning Outcomes		Teaching Strategy	Learner Activity	Assessing for Learning
Knowledge	Transmit / Inform	Lecture Reading Tutorial Researching	Reproduce learning Linking to theory Clarify and expand Self-directed learning	Essay exam Assignment; Open Book exam Reflective Journal Assignment
	Engage	Discussion Question & Answer Peer Teaching & Learning Web-based Teaching	Interpreting knowledge Clarify knowledge Providing multiple perspectives; self insight Exploring learning; Providing multiple perspectives;	Interview; Presentation; Viva Quiz Self and peer assessment; Portfolio; Project Computer Assisted Assessment
	Practice	Seminar Class Presentation Field Trip	Clarify knowledge Presentation skills Experiential	Presentation; Project Presentation Project
	Application	Laboratory Demonstration Games Problem solving Case Study Group work	Apply theory to practice Deepen understanding Exploring learning Transform knowledge Appraising; synthesising Transform knowledge	Practical Assessment; Lab Reports Practical Assessment Set problems in Exam Case Study Assessment Group Project

What is active learning?

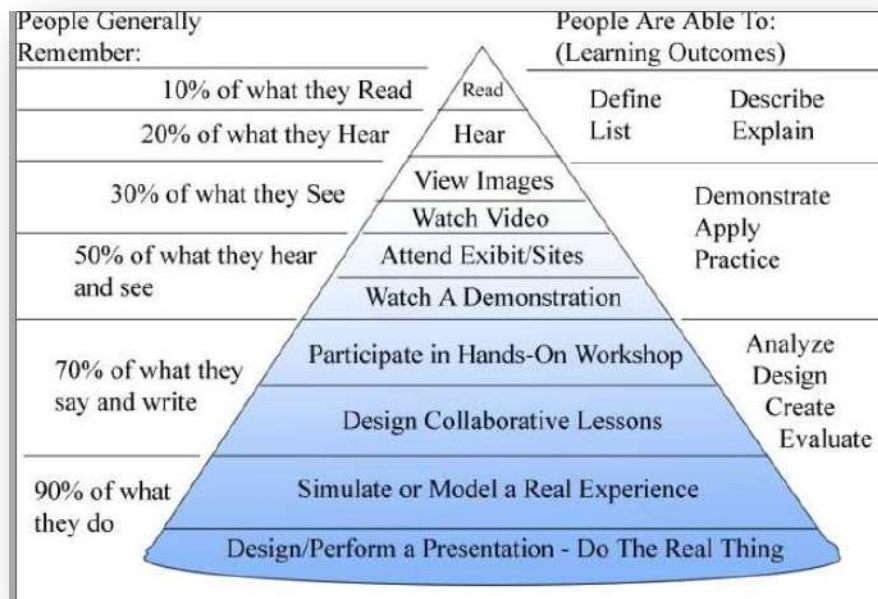
- Doing things and thinking about them.
- Knowing “what” and “how”
- Hear it, see it, ask questions about it, and discuss it with others.
- "do it" - figure out things by yourself,
- Read, write, discuss or talk about what you are.
- Learning, relate it to past experiences, apply it to your daily lives or

- Be engaged in solving practical problems.
- Must make what you learn part of yourself.
- Engage in higher-order thinking tasks
- The theoretical underpinnings of active learning are rooted in Constructivism.

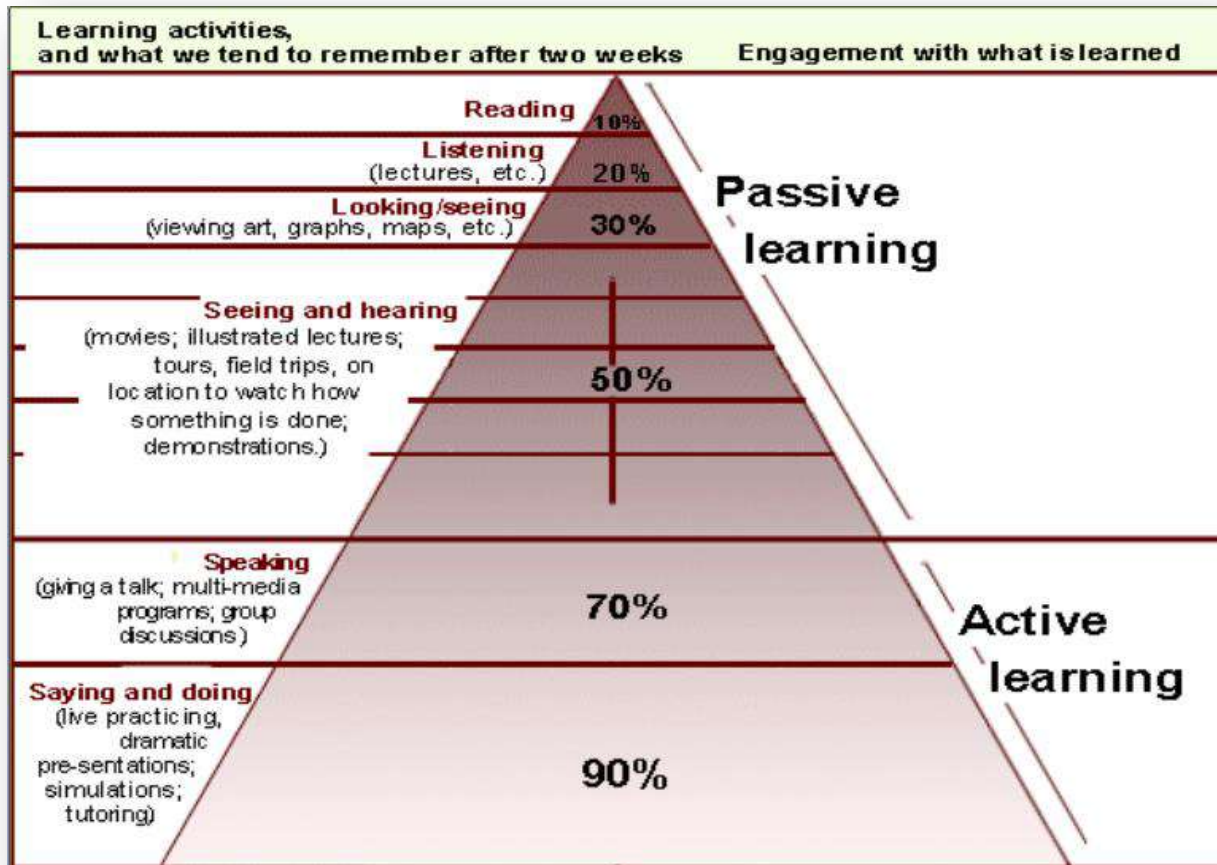
Why Active Learning?

Attention in lectures starts to wane every 10-20 minutes, to incorporate active learning as it:

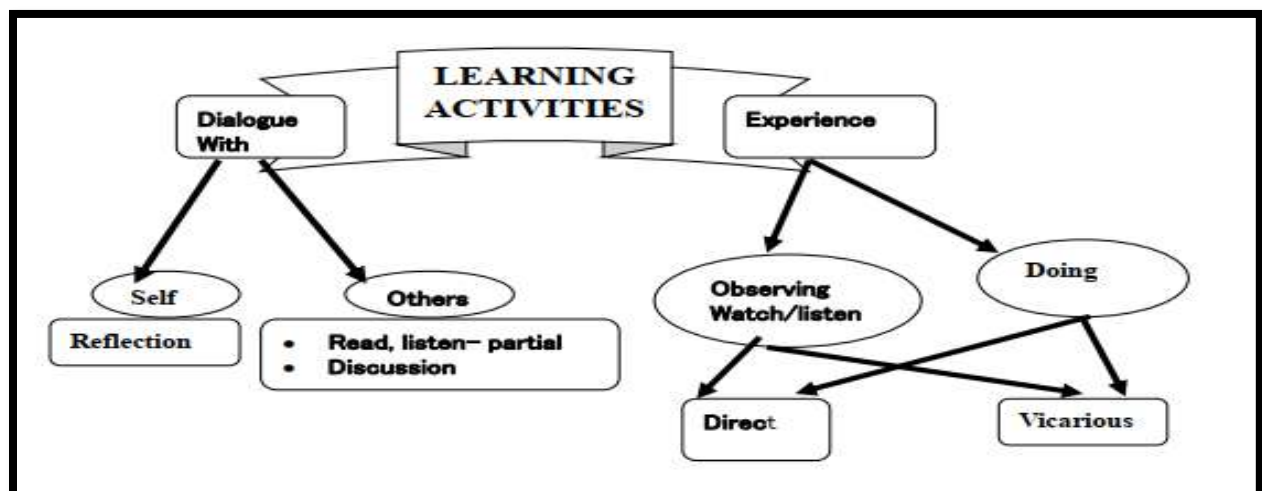
- Reinforces important material, concepts, and skills.
- Provides more frequent and immediate feedback to students.
- Addresses different student learning styles.
- Provides students with an opportunity to think about, talk about, and process course material.
- Creates personal connections to the material for students, which increases their motivation to learn.
- Allows students to practice important skills, such as collaboration, through pair and group work.
- Builds self-esteem through conversations with other students.
- Creates a sense of community in the classroom through increased student-student and instructor-student interaction.



Dale's Cone of Experience



All learning activities involve some kind of Dialogue or Experience



Various active learning activities/techniques for classes of any size may be used in conjunction with the traditional lecture format.

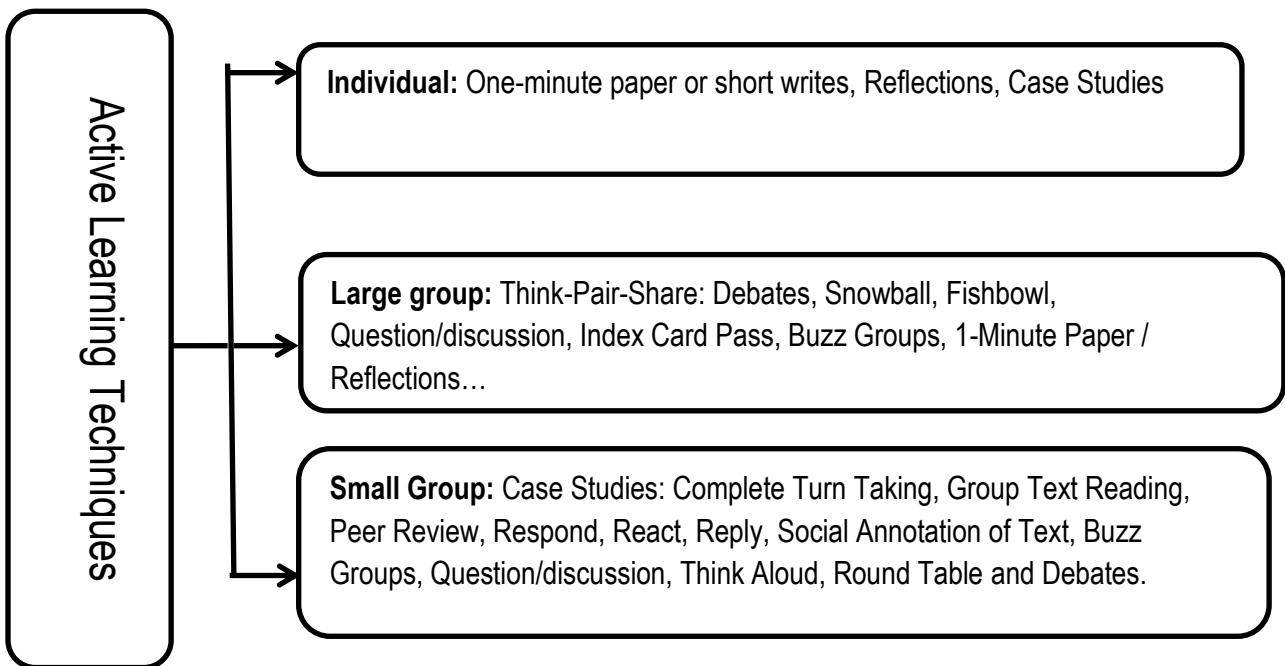
1. Think-Pair-Share: 2-5 minutes alone (think); 3-5 minutes pair; share their ideas to the class

2. Pro and con grid:

- List advantages and disadvantages of any issue. It helps students develop analytical and evaluative skills (students can search for two sides to the issue, and weigh the value of competing claims).

3. Wait Time

- Rather than choosing the student who will answer the question to be presented, WAIT before calling on someone to answer it.
- When the wait time is up, ask for volunteers or randomly pick a student to answer the question.



- Once students are in the habit of waiting after questions are asked, more will get involved in the process.

4. Brainstorming:

- When beginning a new topic, you might begin by saying "Tell me everything you know about..."
- Students generate ideas, you record on board or overhead.
- Acknowledge every offering by writing it down and save any critiquing until after the idea generation time is over.

5. Questions:

- Can occur at any time during the lecture (varying time at strategic points).
- Help to turn students into active participants, and to get a sense of their interest and comprehension.

6. Modeling analytical skills:

- Involves viewing and analyzing passages of text, paintings, sonatas, graphs, charts, artifacts, etc. together with your students. You should make sure students have a copy of the document in front of them (or visual access through slides or overhead transparencies), and then follow three steps: model the analysis, let the students practice it, and then give them feedback.

7. One-minute paper or short writes:

- Punctuating your class with short writing assignments is a powerful way to assess the degree to which students understand presented material. You might ask, "What was the most important thing you learned during this class?" "What questions remained unanswered?" or "Summarize the main point of today's lecture in one sentence."

8. Problem solving: demonstrations, proofs and stories:

- Begin a lecture with a question, a paradox, an enigma, or a compelling, unfinished human story.
- Solving the problem, depending on what it is or in what field, may require a scientific demonstration, a mathematical proof, an economic model, the outcome of a novel's plot, or a historical narrative. You refer back to the problem throughout the lecture, inviting students to fill in imaginative spaces in the story (or model) with their own solutions.
- Students fill in their successive answers passively, or the instructor elicits responses which are recorded on the board and discussed. Example questions include: "What do you think will happen?" "Which solution, outcome, or explanation makes the most sense to you?"

9. Student debates:

- Adds a participatory dimension to your lecture without compromising your control of the class. One strategy is to divide students according to where they happen to sit. Another approach is to ask them in advance to seat themselves in the section representing a particular side of the debate.

10. Role playing:

- Give a mini-lecture to establish the context and setting for the role playing. Then divide the class into a number of small groups of varying sizes (if you have a large class, you may have to assign duplicate roles). Each group is assigned a clearly delineated role and given a specific, concrete task – usually to propose a position and course of action. To bring closure to the topic, a debriefing exercise is necessary to help identify what students learned and make the transition to the next topic.

11. The Fish Bowl –

- Students are given index cards, and asked to write down one question concerning the course material. They should be directed to ask a question of clarification regarding some aspect of the material which they do not fully understand; or, perhaps you may allow questions concerning the application of course material to practical contexts.

- At the end of the class period (or, at the beginning of the next class meeting if the question is assigned for homework), students deposit their questions in a fish bowl. The instructor then draws several questions out of the bowl and answers them for the class or asks the class to answer them. This technique can be combined with others.

12 Jigsaw Group Projects –

- Each member of a group is asked to complete some discrete part of an assignment; when every member has completed his assigned task, the pieces can be joined together to form a finished project. For example:
 - a. Ethiopian geography: students can be grouped and each assigned a Region; individual students in the group could then be assigned to research the economy, political structure, ethnic makeup, terrain and climate, or folklore of the assigned Region.
 - b. In a chemistry course each student group could research a different form of power generation (nuclear, fossil fuel, hydroelectric, etc.). In both cases, the groups are reformed to complete a comprehensive report on both.

13. Student-led review sessions:

- Let the students do the work. Each student may ask at least one question related to the material he or she doesn't understand, and to try to answer a question raised by another student.

14. Games:

- Games such as jeopardy and crossword puzzles can be adapted to course material and used for review, for assignments, or for exams.

15. Analysis or reactions to videos:

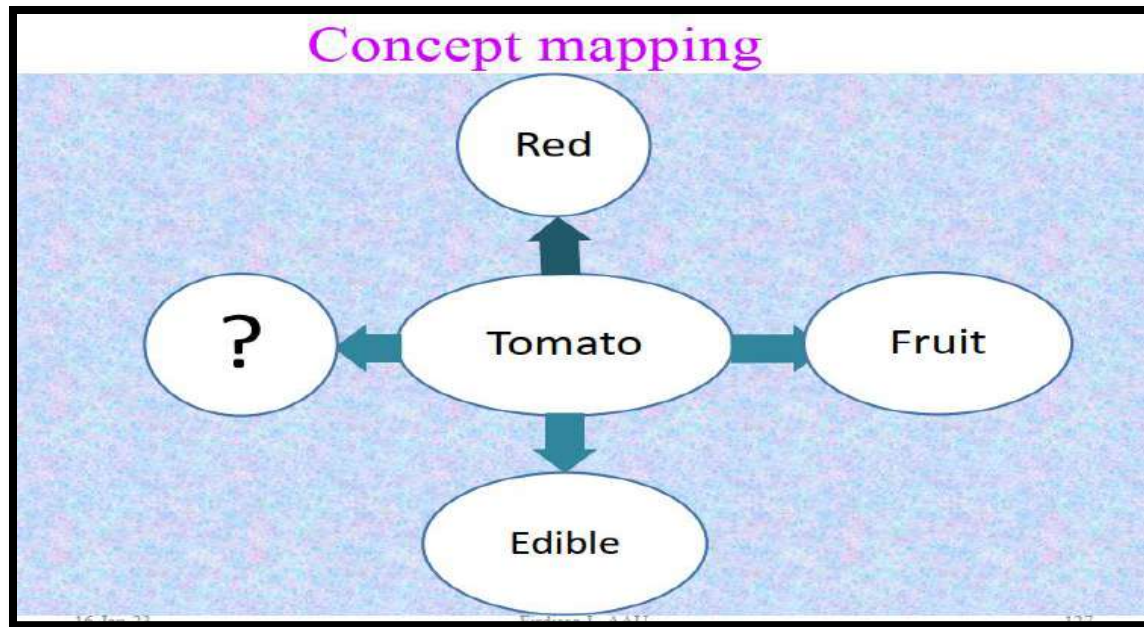
- After 5-20 minutes video, students work to answer critical questions, write a "review" or reaction, or apply a theory.

16. Buzz Groups:

- Are teams of four to six students that are formed to respond to course-related questions. They are effective for generating information and ideas in a short period of time.

17. Concept Mapping –

- A concept map is a way of illustrating the connections that exist between terms or concepts covered in course material; students construct concept maps by connecting individual terms by lines which indicate the relationship between each set of connected terms. Most of the terms in a concept map have multiple connections.
- Developing a concept map requires the students to identify and organize information and to establish meaningful relationships between the pieces of information



18. Mini-research proposals or projects; a class research symposium:

19 Analyze case studies

20. Keeping journals or logs and briefing critical reflection or analysis of each entry as well.

21. Write and produce a newsletter

22. Case Studies

23. Active Listening

24. What? So What? Now What?

25. Creative Writing

26. Group planning

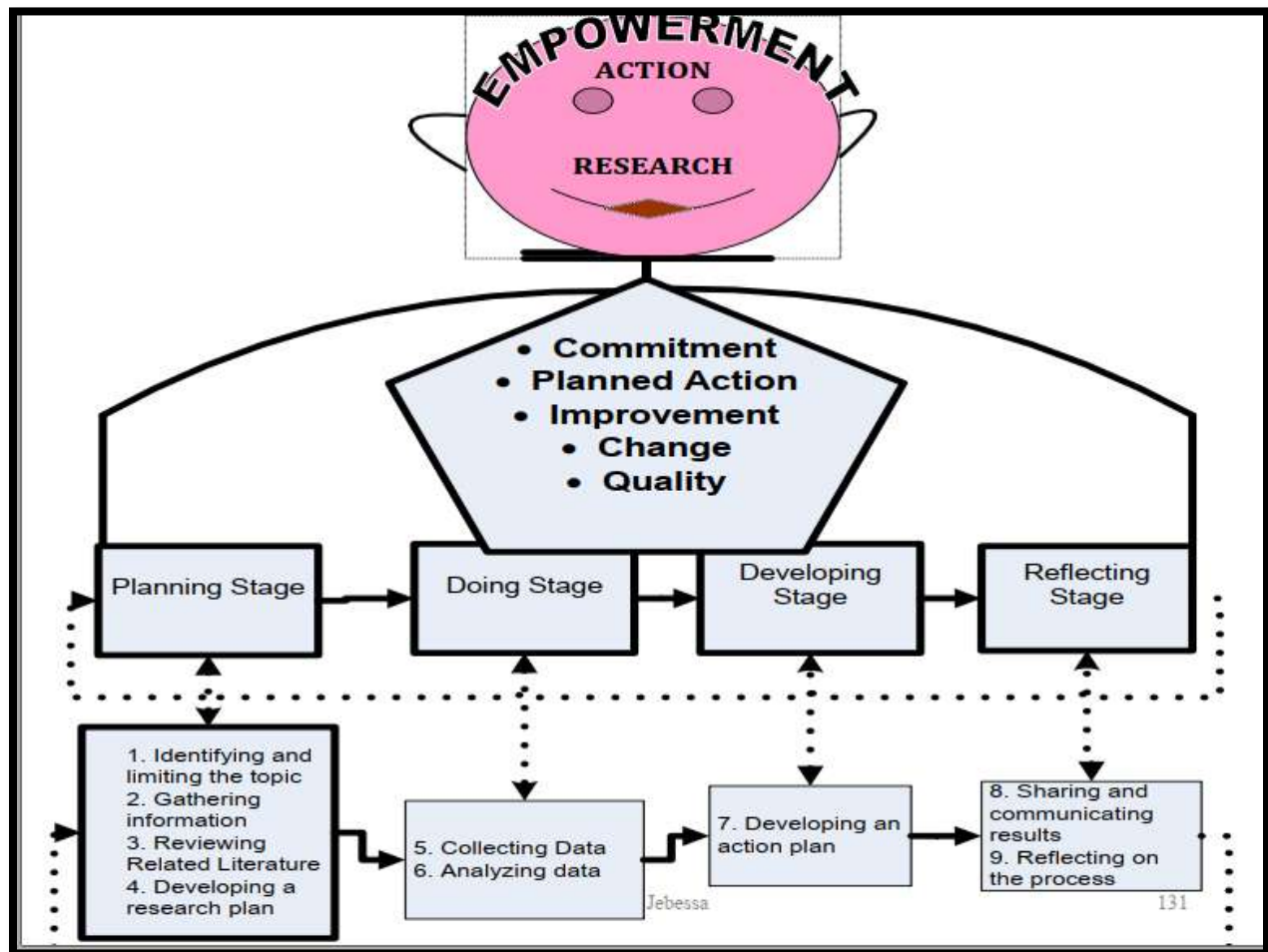
27. Peer Editing

28. Study groups

The modification of traditional lectures (Lecture/discussion)

- Consolidate notes by pausing three times for two minutes each.
- Insert brief demonstrations or short,
- Ungraded writing exercises
- Guided lecture,
- Ice breaker
- Independent work
- Interviews
- Making models and resources/teaching aids

- Pair/group discussion
- Ranking tasks
- Spider diagram
- Storytelling
- Demonstration
- Analyzing figures



Assessment Categories

- Assessment for Learning
 - Formative, CA, throughout the learning process for quality of learning
- Assessment as Learning
 - Learner empowerment metacognition process
- Assessment of learning
 - Summative for decision making

Giving effective feedback for effective learning

- Suggest
- Concerns
- Value
- Clarify

Giving feedback should be in a helpful and non-threatening way

The Ladder of Feedback is a protocol that helps us give useful feedback (to colleagues and to students) in a helpful and non-threatening way. If we climb the ladder step by step from the bottom we ensure that we fully understand what was intended before we comment.

1st step= CLARIFY step

2nd step = to ensure that we VALUE the work. We highlight the strengths and acknowledge the effort that has gone into the work.

3rd & 4th=steps (CONCERNS and SUGGESTION) are equally important. Even if the work is of a high quality there will always be room for improvement. If we are to help our colleagues or our students grow we must not be afraid to challenge them, to suggest ways to improve or to extend work that may already be of a high quality.

PRESENTATION TWO

2- Planning and Constructing Classroom Test

Yoseph Shumi²



2.1. Planning Classroom Test

Effective classroom testing begins with a test plan that describes in specific terms the instructional objectives and content to be measured, and the relative emphasis to be given to each intended learning outcomes .In order to prepare quality test items, planning is necessary.

Why test plans are important?

Good tests do not just happen. They require adequate and extensive planning so that the instructional objectives, the teaching strategy to be employed, the textual material, and the evaluative procedure are all related in some meaningful fashion. Our main goal in classroom testing is to obtain valid, reliable, and useful information concerning student achievement. The likelihood of preparing valid, reliable, and useful classroom tests is greatly enhanced if a series of basic steps is followed.

2.2. Basic Steps in Classroom Testing

1. Determining the purpose of testing
2. Developing the test specifications
3. Selecting appropriate item types planning of the classroom test.
4. Preparing relevant test items
5. Assembling the test
6. Administering the test

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7. Appraising the test

8. Using the results

2.2.1 Test plans are important for the following reasons:

- a. It helps ensure that the test is appropriate for the intended purpose. If it is written properly, it helps to ensure the success of the other steps in the process.
- b. It is useful for ensuring that the test is representative of the content and skills to be tested.
- c. It is important in guiding the development of the test. "To develop a test without a test plan would be like trying to build an office without architectural blue prints."
- d. It can be useful when selecting items from an item bank to construct alternative forms of the test.

2.2.2 The Purpose of Classroom Testing

The most crucial decision the teacher has to make is "Why am I testing?" That is why the first step in planning classroom test is determining the purpose of testing. Classroom tests can be used for a variety of instructional purposes. The various uses of tests and other evaluation instruments can be classified under four basic types of classroom evaluation. These types are: placement evaluation, formative evaluation, diagnostic evaluation, and summative evaluation. Because classroom tests are useful in all four areas, this classification system provides a convenient basis for considering the role of test purpose in planning classroom test.

A. Placement evaluation

It is the evaluation of student entry performance in a sequence of instruction. It is used at the beginning of a course or a unit to:

- Determine Learning Readiness.
- Aid in instructional planning and
- Make Advanced Placements.

For this purpose or function we use a variety of techniques: readiness tests, aptitude tests, pretest on course objectives, self - report inventories, observational techniques and so on. These tests are limited in scope (a limited area will be covered by the test). The items of these tests tend to have low level of difficulty. These tests serve as a basis for remedial work or for the placement of students in special groups.

B. Formative evaluation

It is the evaluation of students learning progress during instruction. It is used periodically during instruction. Its purpose is to provide continuous feedback to both students and teacher concerning learning success and failures.

- Feedback to students provides reinforcement of successful learning and identifies the specific learning errors that are in need of correction.
- Feedback to the teacher provides information for modifying instruction and for prescribing group and individual remedial work.

For this purpose we use mastery tests and observational techniques. These tests cover limited sample of learning tasks. The test items tend to have item difficulty that varies with the segment of instruction.

C. Diagnostic evaluation

It is the evaluation of students learning difficulties during instruction. It is used as needed during instruction. Diagnostic evaluation is concerned with the persistent or recurring learning difficulties that are left unresolved by the standard corrective prescriptions of formative evaluation. The main aim of diagnostic evaluation is to determine the causes of learning problems and to formulate a plan for remedial action. For this purpose we use diagnostic tests and observational techniques. These tests cover limited sample of specific errors. The test items have low level of difficulty.

D. Summative evaluation

It is the evaluation of students' achievement at the end of instruction. The main purpose of summative evaluation is to determine the extent to which instructional objectives have been achieved and is used primarily for assigning course grades or for certifying students' mastery of the intended learning outcomes. It also provides information for judging the appropriateness of the course objectives and the effectiveness of the instruction. The techniques used in summative evaluation are determined by the instructional objectives, but they typically include teacher-made achievement tests, ratings on various types of performance (e.g., laboratory, oral report) and evaluation of products (e.g., themes, drawings, research reports). These tests cover broad sample of all objectives. The test items tend to have a wide range of difficulty.

2.2.3 The Role of Objectives in Education

Instructional objectives are statements that describe what students are expected to be able to do after instruction. There are many reasons for stating and using instruction objectives in the teaching-learning process among which

- a) Clearly specified instructional objectives help teachers to plan, evaluate and determine learning outcomes.
- b) Students will learn more easily if they are told what they are expected to learn and how they will be expected to demonstrate that learning has occurred.
- c) Clearly specified instructional objectives help teachers to construct assessment instruments or tests to compare level of achievements.
- d) Clearly specified instructional objectives help teachers to select appropriate instruments that will produce correct information, fact or data so as to make decisions concerning curriculum implementation, teaching methods, teaching materials and school conditions (feedback) etc.

2.2.4 Classification of Objectives

Instructional objectives are classified into three main domains: cognitive, affective, and psychomotor domains.

1. The cognitive domain includes those objectives which deal with the recall or recognition of knowledge and the development of intellectual abilities and skills. The cognitive taxonomy contains six categories of objectives arranged in hierarchical order on the basis of complexity of task - from simple to complex (knowledge, comprehension, application, analysis, synthesis and evaluation).

2. The affective domain is concerned with changes in interest, attitudes, and values and the development of appreciations and adjustment. It is divided into five categories arranged in hierarchical order on the basis of level of involvement - the degree of internalization of each objective required ; from least internalized to most internalized (receiving, responding, valuing, organization , and characterization).

3. The psychomotor domain- which is concerned with the development of skills through the movement of the body with the cooperation of mind and feeling. It includes generally physical activities such as writing, typing driving, drawing, etc. Thus, the psychomotor domain includes objectives related to muscular or motor skill, manipulation of material and objects, and neuromuscular coordination. It is divided into seven categories arranged in hierarchical order on the basis of neuromuscular skills - from least complex to most complex (perception, set, guided response, mechanism, complex overt response, adaption, and origination).

These categories of cognitive, affective and psychomotor domains are useful guide for developing comprehensive list of general and specific instructional objectives. See the attached Appendix for a summary of the categories in the cognitive, affective and psychomotor domains of the taxonomy. One should study carefully the descriptions of the three domains for developing instructional objectives.

- **Stating Instructional Objectives**

Instructional objectives or learning outcomes are stated in terms of what the students are expected to be able to do at the end of the instruction. For instance, after teaching them on how to solve quadratic equations, we might expect students to have the skill of solving any quadratic equation. A learning outcome stated in this way clearly indicates the kind of performance students are expected to exhibit as a result of the instruction. This situation also makes clear the intent of our instruction and sets the stage for assessing students learning. Well stated learning outcomes make clear the types of students performance we are willing to accept as evidence that the instruction has been successful.

- **General and Specific Objectives**

General instructional objectives are intended outcomes of instruction, which are written in general enough terms to encompass a set of specific learning outcomes.

Characteristics of General Instructional Objectives

- a. not specific in nature,
- b. not observable easily at the end of the period or instruction
- c. difficult to measure easily at the end of the period, and
- d. sources for identifying instructional objectives

Examples

- Knows basic concepts
- Understands facts and principles
- Shows awareness on the importance of learning
- Appreciates the roles of science in our daily life
- Demonstrates skill in using printing machine
- Operates a power saw effectively and skillfully

Specific objectives are intended outcomes of instruction, which are stated in terms of specific and observable student performance. Some educators use: performance objectives, behavioral objectives, specific learning outcomes and measurable objectives to describe specific instructional objectives.

- **Characteristics of Specific Instructional Objectives**

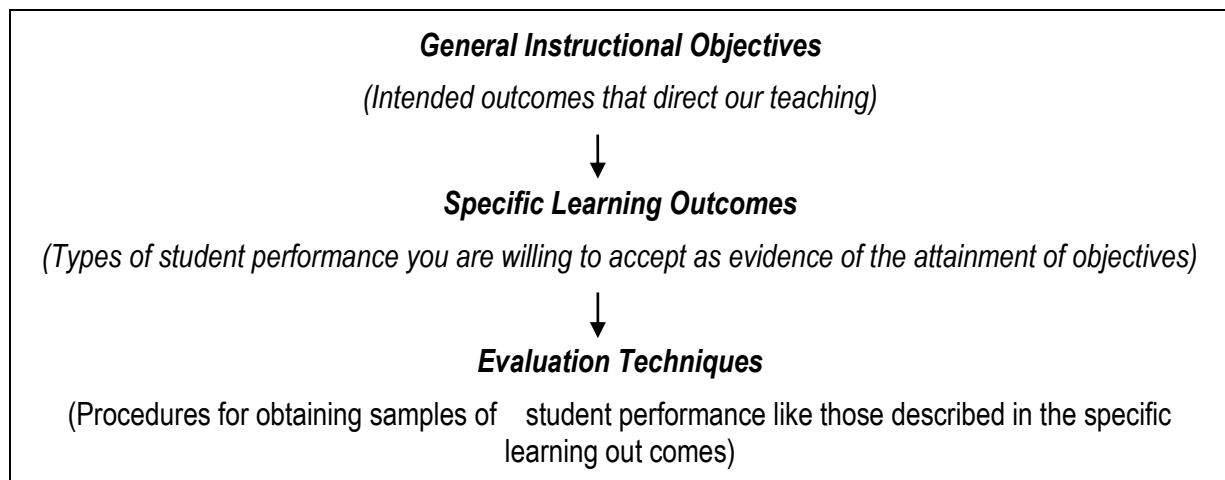
- a.They are observable at the end of the period or instruction.
- b.They serve as basis for constructing tests.
- c.They focus on specific ideas or concepts.
- d.They show what is expected from the learner clearly.
- e.They can be derived from the general instructional objective.

Examples

- Describe the principles of assessment
- Explain the difference between test and measurement
- Follow instructions while operating on a machine
- Reads the manual of photo copy machine
- Draws the graph of linear equation
- Writes routinely all safety rules of workshop

Relation of Evaluation Procedures to Objectives

The key to effective evaluation of student learning is to relate evaluation procedures as directly as possible to the intended learning outcomes. This could easily be accomplished if the general instructional objectives and specific learning outcomes have been clearly stated in terms of students' performance. It is then simply a matter of writing or selecting evaluation instruments that provide the most direct evidence concerning attainment of learning outcomes. The sequence of steps shown below summarizes the general procedure of relating evaluation techniques to instructional objectives.



The following examples illustrate how the performance indicated in the specific learning outcome is related to the evaluation techniques.

1. Specific Learning Outcome: Identifies the function of a given body structure.

Relevant Test Item:

Which one of the following is the function of kidneys?

- A) Eliminate body wastes C) Maintain respiration
- B) Improve the circulation of blood D) Stimulate digestion

2. Specific Learning Outcome: Identifies common uses of weather instruments.

Relevant Test Item:

Which one of the following instruments is used to determine the amount of moisture in the air?

- A) Altimeter B) Barometer C) Hygrometer D) Radar

3. Specific Learning Outcome: Define common terms of educational assessment

Relevant Test Item:

In one or two sentence define the following terms.

- i) Assessment ii) Test iii) Measurement iv) Evaluation

Preparing Test Blueprint (Table of Specifications)

A table of specification is a two way chart or grid that relates the instructional objectives to the subject content. A representative sample of pupil performance is more likely to result if a set of specifications is used in planning the test. This frequently takes the form of two-way chart called a table of specifications.

The major purposes of the table of specifications are:

- To define as clearly as possible the scope and emphasis of the test;
- To relate the objectives to the content, and
- To construct a balanced test.

Also, the table of specifications may prevent the teacher from testing only those content areas and taxonomical levels where it is easy to develop test items.

The building of a table of specifications includes:

- a) Selecting list of instructional objectives,
- b) Outlining contents of the course,
- c) Drawing a two-way chart.

The list of instructional objectives describes the types of performance the students are expected to demonstrate (e.g., knows, understands, applies) and the course content indicates the area in which each type of performance is shown. The final step in building a table of specifications is to prepare a two-way chart that involves objectives along the horizontal axis and the content along the vertical axis. Each cell within the table of specifications indicates the percentage and/or number of test items to be devoted to the objective and the content area that are opposite to the cell. The relative emphasis to be given to each objective and each content area should, of course, reflect the emphasis given during the instruction. In assigning relative weights, both the importance the teacher attaches to the objective and the amount of instructional time devoted to it can serve as guide lines. Thus, in order to draw the table, the teacher must determine:

- d) The total number of periods allotted for the subject matter;
- e) Periods allotted for the unit (chapter); and
- f) Total number of items (questions) to be used.

Example

Assume that Ato Kebede will spend 20 periods on the unit, Money and Banking, and he wants to prepare a 50 item test on this unit. The unit has four major topics. He plans to spend 2 periods discussing the forms and functions of money; 8 periods on operation of Banks; 6 periods on the roles of the Federal Reserve System; and 4 periods discussing the state regulation of Banks.

In teaching this unit, Ato Kebede will be concerned with four instructional objectives: the students' ability to (1) recall information; (2) understand basic concepts and principles ;(3) apply concepts and principles; and (4) interpret data. The relative emphasis placed on each of these instructional objectives will be 20, 40, 30, and 10 percent respectively. Ato Kebede must now assign values to each of the 16 cells. How?

One can use the following formula to determine the number of questions to be drawn from each topic/ chapter.

$$N = \frac{B \times C}{A}, \text{ where } N = \text{numbers of questions required for each topic/chapter}$$

B= periods allotted for the unit

C= total number of questions

A= Total number of periods allotted for the subject

Table of Specifications for a 50- Item Test on the Unit Money and Banking

Content Areas	Periods Allotted	Instructional Objectives				Total No of Items
		Knowledge (20%)	Understanding (40%)	Application (30%)	Analysis (10%)	
Forms & Functions of Money	2	1 item	2 items	2 items	0 item	5
Operation of Banks	8	4 items	8 items	6 items	2 items	20
Roles of the Federal Reserve System	6	3 items	6 items	4 items	2 items	15
State Regulation of Banks	4	2 items	4 items	3 items	1 item	10
Total	20 periods	10 Items	20 Items	15 Items	5 Items	50 Items

Ato Kebede now has a blueprint to guide him both in teaching this unit and in constructing a test on this unit.

Selecting Appropriate Test Format

Classroom tests in general could be classified into three types: written test; performance test; and oral test.

Selection of Appropriate Item Types

The items used in classroom tests are typically divided into three general categories: written test, oral test, and performance test. There is no conflict among these three item types. Each type should be used where most appropriate, with appropriateness determined by the learning outcomes to be measured and by the unique advantages and limitations of each item type. Therefore, the nature of the test items selected should depend chiefly on the nature of the outcomes to be measured. The specific rules for preparing relevant test items will be discussed in the section that follows.

Written tests are test items presented to the learner either on the blackboard or in a printed form. Written tests could be categorized into subjective and objective based on the nature of the test items constructed. Objective tests will be further sub-divided into supply item (completion and short answer), selection item (True-false, matching, and multiple choice). On the other hand, subjective or essay test will be classified into extended and restricted response essay.

Factors to Consider When Selecting an Item Format

The following factors should be considered when selecting item format or type.

- Purpose of the test,
- Time (the time available to prepare and score the test),
- Numbers tested (Number of pupils to be tested),
- Age of pupils,
- Teacher's skill (your skill in writing the different types of items), and
- Physical facilities (the physical facilities available for reproducing the test).

2.3 Preparation of Classroom Test

2.3.1 True-false test (alternative-response) items

This is the most commonly used form of objective test being in use at all levels of education. It is used to measure simple learning outcomes. It consists of declarative statement that the student is asked to mark true or false, yes or no, right or wrong, correct or incorrect fact or opinion and agree or disagree. The task of the student is to select one of the two possible answers. The most common use of true false item is in measuring the ability to identify the correctness of statements of facts, definitions of terms, statements of principles, and the like.

Advantages and Limitations of True-False (Alternative-Response) Items

Advantages

- a) They are good for young children and /or pupils who are poor readers.
- b) They allow for adequate content sampling. This means that broad content sampling is possible in a relatively short testing time. They can sample the domain of content extensively.
- c) They can be scored quickly, reliably and objectively.

Limitations

- a) They are susceptible to guessing. With only two alternatives, a pupil has a 50-50 opportunity of selecting the correct answers on the basis of chance alone.

- b) They are limited to the measurement of simple learning outcomes. This means that they are unsuitable for measuring complex learning outcomes.
- c) Specific determiners (a type of irrelevant clue) are more prevalent in true-false items than in any other objective-item format. Specific determiners generally appear because the item writer wishes to have a completely true or false statement.
- d) They are susceptible to acquiescence response set; that is, subjects tend to develop a pattern of responding (true) in somewhat automatic form without really giving thought to the item.
- e) They lend themselves most easily to cheating. If a student knows that he/she is to take a T-F test, it does not require much effort to work out a system in which one of the better student signals a T versus F answer.
- f) They are more susceptible to ambiguity and misinterpretation than any other selection type objective item, thereby possibly resulting in low reliability.

Suggestions for Preparing True-False Test Items

- a) Use statements that are absolutely true or false in the student's environment.
- b) Do not use terms that will provide clues about the right answers.
- c) Avoid using negative statements and specially double negatives. Where it is imperative that negative word be used it should be underlined, capitalized or italicized.
- d) *Poor Item:* (T) F None of the steps in the experiment was unnecessary.
- e) *Better Item:* (T) F All of the steps in the experiment were necessary.
- f) Avoid too long and complex sentences.
- g) Avoid statements that are partly true and partly false.
- h) True and false statements should be approximately equal in length.
- i) The number of true and false statements should be approximately equal (40-60%).
- j) Avoid including two ideas in one statement unless cause-effect relationships are being measured.
- k) Avoid placing items in a systematic order (for example; T F T F..., T T F F..., and so on).

2.3.2 Matching test items

Matching item test consists of two parallel columns with each word, number or symbol in one column being matched to a word, sentence, or phrase in the other column. The items in the column for which a match is sought are called premises. On the other hand, the items in the column from which the selection is made called responses. When the numbers of items in the premise and response columns are equal, it is called simple or perfect matching. But when there is unequal number of items in the premise and response column, it is considered as complex or imperfect matching. Matching test items are used to measure the ability to identify relationships between things. Wherever learning outcomes emphasize the ability to identify the relationship between two things, and a sufficient number of homogeneous premises and responses can be obtained, a matching exercise seems most appropriate.

Examples of relationships considered important by teachers, in a variety of fields, include the following:

Persons----- Achievements

Dates----- Historical Events
 Terms ----- Definitions
 Rules----- Examples
 Symbols----- Concepts
 Authors----- Title of the book
 Machines----- Uses
 Plants or Animals----- Classification
 Principles----- Illustrations
 Objects----- Names of objects
 Parts----- Functions

The matching exercise has also been used with pictorial materials in relating pictures and words and in identifying positions on maps, charts, and diagrams. The number of premises and responses in each list for a single matching exercise should ordinarily range from 5 to 12, the optimum size being 5 to 8 items per matching exercise. With the typical matching exercise, imperfect matching can be obtained by including a few more or a few less responses than premises. In either case, the directions should instruct the pupil that each response may be used once, more than once, or not at all.

Example

Directions: Column A contains description of major categories of learning outcomes in cognitive domain while Column B contains categories of cognitive domain. Match the categories in Column B with their appropriate descriptions in Column A and write the letter of your choice in the space provided to the left of each item. Each category in Column B may be used once, more than once or not at all.

Column A	Column B
__1. Solving quadratic equations.	A) Analysis
__2. Stating the definition of terms.	B) Application
__3. Writing a well-organized senior essay.	C) Comprehension
__4. Judging the value of written material.	D) Evaluation
__5. Identifying the main idea of a paragraph.	E) Knowledge
__6. Computing item difficulty using $P = R/T \times 100$.	F) Synthesis
__7. Describing the meaning of concepts in one's own words.	

Advantages and Limitations of Matching Items

Advantages

- a) It provides a space saving.

- b) It is easy to construct.
- c) It can be scored quickly, reliably and objectively.

Limitations

- a) It is restricted to the measurement of factual information based on rote learning.
- b) It is highly susceptible to the presence of irrelevant clues.
- c) It is difficult to find homogeneous material relevant to the learning outcomes.

Suggestions for Preparing Matching Test Items

- a) Specify the directions as clearly as possible in order to avoid confusion in matching the responses and premises.
- b) Present similar items in each column (i.e., use homogeneous materials in matching items).
- c) The items in both columns should be randomly distributed and should give no clues.
- d) Place all the items for one matching on the same page.
- e) Include an unequal number of responses and premises and instruct the students that responses may be used once, more than once and not at all.
- f) Keep the list of items to be matched brief and place the shorter response on the right (The response should be shorter than the premises).
- g) Provide one and only one correct answer.
- h) Randomize the position of correct answers and avoid making patterns of any form.
- i) The matching items should not be less than 3 and greater than 15. If possible arrange items into various parts like part I, part II, etc.
- j) Choose distracters or incorrect listings that will appear plausible to many examinees.

2.3.3 Supply test items

The purpose of this form of test is to determine a student ability to recall or recognize the appropriate term, concept, phrase, word, number, symbol, etc. to complete a statement. The supply type of test item is suitable for measuring a wide variety of simple learning outcomes. In the area of mathematics and science, however, manipulation of mathematical symbols and balancing equations can be measured. The short answer and completion items are both supply type of test items. In the case of the short-answer item a direct question is used, while the completion item consists of an incomplete statement.

Examples

Short answer items

1. What is the chemical formula for water? _____
2. What is the value of x in the equation $2x + 6 = 5$? _____

Completion items

1. The chemical formula for water is _____.

2. In the equation $2x + 6 = 5$, the value of x is equal to_____.

Advantages and Limitations of Supply-Type Test Items

Advantages

- a) The supply type test item is one of the easiest to construct.
- b) A more important advantage of the supply -type test item arises out of the fact that the pupils must supply the answer. This reduces the possibility that pupils will get the correct answer by guessing.

Limitations

- a) It is unsuitable for measuring complex learning outcomes.
- b) Scoring may not be quick, easy, routine, and accurate because of the variety of acceptable answers.

Suggestions for Preparing Supply Test Items

1. The wording must be clear and specific enough to avoid ambiguous responses.

Poor item: World War II ended in_____.

Better item: World War II ended in the year _____.

2. There must be only correct answer.

3. Avoid too many blank spaces in the same sentence.

Poor item: The _____ type of test item is usually _____ more_____ than the _____ type.

Better item: The supply type of test item is usually graded more objectively than the_____ type.

4. Place the blank either at the end or near the end of a statement.

5. Avoid long statements.

6. Blanks for answers should be equal in length and in a column to the right of the questions.

7. When the answer is to be expressed in numerical units, indicate the unit of measurement.

8. Provide for short, simple and specific responses such as a word, a date, or a number.

9. Do not take statements directly from text books.

2.3.4 Multiple Choice Test Items

A multiple- choice test item consists of a problem and a list of suggested solutions. The problem may be stated in the forms of direct question or incomplete statement and is called the stem of the item. The list of suggested solutions may include words, numbers, symbols, or phrases and are called alternatives. The correct alternative in each item is the answer or the key. The incorrect alternatives are named as distracters. Multiple-choice is the most widely used test item. It can effectively measures simple and complex learning outcomes. The multiple choice item is the most versatile type of test item available. It is

extremely flexible. It can measure a variety of learning outcomes from the simple to the complex and it is adaptable to most types of subject matter content. It has such wide applicability and so many specific uses that many standardized tests use multiple-choice items exclusively.

Examples

Direct Question Form

Which one of the following is the lowest level among the subcategories of cognitive domain?

- A) Analysis B) Comprehension C) Evaluation D) Knowledge

Incomplete Statement Form

The lowest level among the subcategories of cognitive domain is_____

- A) Analysis B) comprehension C) evaluation D) knowledge.

Varieties of the Multiple-Choice Format

The most frequently used variations of the multiple-choice item are the correct answer type and the best answer type.

1. The correct answer type

This is the simplest type of multiple choice item. The student is told to select one correct answer listed among several plausible, but incorrect, options.

Example

Which one of the following numbers is the additive inverse of 5?

- A) -5 B) -1/5 C) 1/5 D) 5

2. The best -answer type

There are times, where it is more difficult, if not impossible, to express one unequivocal right answer within the limits of the multiple-choice format. For example, "the major factor to be considered in selecting town for a state capital," does not lend itself to the single correct answer format. And yet there still may be one answer that is "best". When this is the case, the best-answer variation is useful. The directions are similar to those of the single correct answer except that the student is told to select the best answer.

Example

Which one of the following factors is given most consideration, when selecting a city for a state capital?

- A) Climate B) Highways C) Location D) Population

Questions of the Why varieties and the How varieties tend to reveal a number of possible reasons, some of which are clearly better than the others. Measures of achievement in these areas, then, become a matter of selecting the best answer. That is why the best answer type of multiple-choice item tends to be more difficult than the correct-answer type.

Advantages and Limitations of Multiple Choice Items

Advantages

- a) It is the most versatile type of test item.

- b) It can be scored quickly, reliably and objectively.
- c) One major advantage of multiple-choice item over the true -false item is that pupils cannot receive credit for simple knowing that a statement is incorrect; they must also know what is correct.
- d) Compared to true-false items, multiple choice items have a relatively small susceptibility to score variations due to guessing because the probability of guessing a correct answer depends upon the number of options.
- e) It is relatively free from response sets. That is, pupils generally do not have a tendency to favor a particular alternative when they do not know the answer.
- f) A major advantage of the multiple-choice item over the matching item is that the need for homogeneous materials is avoided. In many content areas it is difficult to obtain enough homogeneous material to prepare effective matching exercises. This problem is avoided with multiple-choice items, since each item measures a single idea.
- g) The use of a number of plausible alternatives makes the results amenable to diagnosis. The nature of the incorrect alternatives selected by pupils provides clues to factual errors and misunderstandings that need correction.

Limitations

- a) The multiple choice item, like other paper and pencil tests, measures whether the pupil knows or understands what to do when confronted with a problem situation, but it cannot determine how the pupil will perform in actual situation. In other words, it measures problem-solving behavior at verbal level only.
- b) The multiple -choice item shares a basic limitation with other types of selection items. Since it requires selection of the correct answer, it is not well adapted to the measurement of some problem-solving skills in mathematics and science, and it is inappropriate for measuring the ability to organize and present ideas.
- c) The multiple-choice item has a limitation not common to other item types. That is, the difficulty of locating a sufficient number of incorrect but plausible distracter.

Suggestions for Preparing Multiple -Choice Test Items

- a) The stem of the item should be meaningful by itself and should present a definite problem.
- b) The item stem should include as much of the item as possible and should be free of irrelevant material. Avoid repetition of words in the options.
- c) Use negatively stated item stem only when significant learning outcomes require it. In most cases it is more important for the student to know what the specific item of information is rather than what it is not.
- d) All of the item should be grammatically consistent with the stem of the item.
- e) An item should contain only one correct or clearly best answer.
- f) All distracters should be plausible. One factor contributing to the plausibility of distracters is their homogeneity. If all of the alternatives are homogeneous with regard to the knowledge being measured, there is much greater likelihood that the distracters will function as intended. To

increase the difficulty of a multiple-choice item, increase the similarity of content among the options.

- g) Verbal associations between the stem and the correct answer should be avoided.
- h) The relative length of the alternatives should not provide a clue to the answer. Thus, keep the length of all alternatives approximately equal.
- i) The correct answer should appear in each of the alternative positions approximately an equal number of times, but in random order. In other words, the test constructor has to rotate the position of the correct answer from item to item randomly.
- j) Use special alternatives such as "none of the above" or "all of the above" sparingly. Use the option "none of the above" sparingly and only when the keyed answer can be classified unequivocally as right or wrong. Do not use this option when asking for a best answer. The use of "all of the above" is fraught with such difficulties that it might better be discarded as a possible alternative. When used, some pupils will note that the first alternative is correct and select it without reading further. Other pupils will note that at least two of the alternatives are correct and thereby know that "all of the above" must be the answer. In the first instance pupils mark the item incorrectly because they do not read all of the alternatives. In the second instance, pupils obtain the correct answer on the basis of partial knowledge. Both types of responses prevent the item from functioning as intended.
- k) Include from three to five alternatives (two to four destructors plus one correct/best answer) to optimize testing for knowledge rather than encouraging guessing. It is not necessary to provide additional distracters for an item simply to maintain the same number of destructors for each item.
- l) Arrange the alternatives as simply as possible. Although the responses could be placed after the stem in run on fashion, it is preferable to list them in some order below the stem (alphabetical if a single word, in ascending or descending order if numerals or dates, or by length of responses). This makes it easier for the student to read the material. Thus, avoid item with alternatives in tandem (one behind another) and arrange the alternatives in vertical list to help the students see the choice.
- m) Avoid overlapping alternatives.
- n) The test item should be independent. The information presented in one item should not provide the answers to other questions. Similarly a student should not have to answer 1 and 2 correctly as prerequisite to answering item 3 correctly. Each item should test for a separate piece of information.

2.3.4. Essay Test Items

The distinctive feature of essay items is the freedom of response permitted the student. The examinee is free to select, relate, and present ideas in his/her own words. Essay test is useful for measuring those aspects of complex learning outcomes which cannot be measured by objective test items.

Classification of Essay Questions

Based on the amount of response expected from the learners, essay test could be sub-divided into restricted and extended response type.

Restricted Response Essay Items

It tends to limit both the contents and the form of pupil response. The content is limited by restricting the scope of the topic to be discussed. The terms used in writing the items are describe, define, classify, list etc.

Example

Describe the relationship between measurement and evaluation. Your answer should be a quarter of a page in length.

Extended Response Essay Items

The pupil is generally free to select any factual information that he/she thinks is pertinent, to organize the answer in accordance with his/her best judgment, and to integrate and evaluate ideas as he/she deems appropriate. Scoring is a challenge due to extended nature of the response. The terms used in writing extended response essay are discuss, explain, express, etc.

Example

Explain what you think should be included in a school testing program. Illustrate with specific types of tests, giving reasons for your test selection. Your essay should be about 200 to 300 words in length (or 1 to 2 pages).

Advantages and Limitations of Essay Questions

Advantages

- a) It provides a measure of complex learning outcomes that cannot be measured by other means.
- b) A second advantage confined largely to the extended response question, is the emphasis given to the integration and application of thinking and problem-solving skills.
- c) It is relatively easy to prepare essay test than to prepare a multiple-choice test.

Limitations

Essay questions have several limitations that severely restrict their use.

- a) The most serious limitation is unreliability of the scoring. The scoring tends to be unreliable.
- b) A closely related limitation of essay questions is the amount of time required for scoring the answers. Scoring essay test-answer is time consuming.
- c) Another shortcoming of essay questions that restricts their efficient use is limited sampling they provide. Essay test provides poor/limited content sampling.

Suggestions for Preparing Essay Test Items

- a) Ask questions, or set tasks, which will require the student to demonstrate his/her command of essential knowledge.
- b) Define the examinee's task as completely and specifically as possible without interfering with measurement of the achievement intended.
- c) Give more specific questions that can be answered more briefly.
- d) Avoid giving the examinee a choice among optional questions, unless special circumstances make such options necessary.

- e) Score the question by writing an ideal answer to it.
- f) Restrict the use of essay questions to those learning outcomes which cannot be measured by objective items.
- g) Indicate an appropriate time limit for each question, including the mark for each item.

Suggestions for Scoring Essay Items

The following suggestions can be used effectively to increase reliability of scoring.

1. Prepare an outline of the expected answer in advance. This should contain the major points to be included the characteristics of the answer (e.g., organization) to be evaluated and the amount of credit to be allotted to each.
2. Use the scoring method which is most appropriate. There are two common methods of scoring essay items. One is analytical method (or point method) and the other the rating method (or global method).
 - With analytical method, each answer is compared to the ideal answer in the scoring key and a given number of points assigned in terms of the adequacy of the answer.
 - With the rating method, each paper is placed in one of a number of piles as the answer read. These piles represent degrees of quality and determine the credit or mark assigned to each answer. If six points allotted to the item, for example, seven piles might be used ranging from seven points to none. Usually between five and ten categories and used with the rating method.
3. Decide on provisions for handling factors which are irrelevant to the learning outcomes being measured. Try to disregard irrelevant factors. If neatness is not a criterion, then it should not influence scores. When handwriting is not a part of the objective measured, then handwriting should not be a factor.
4. Evaluate all answers to one item or question before going on to the next item. Score the same test items at the same time for all students; for example, read and score all answers for item number 1 before you start reading the responses to item number 2. The "halo effect" is less likely to form when the answers for a given student are not evaluated in continuous sequence.
5. Evaluate the answers without looking at the student's name. Score each test anonymously so that the identity of the student is not a factor.
6. Read each set of answers through without interruption when possible. Fluctuations in the feelings and attitudes of the reader are lessened when no external interference occurs.

Finally, if essay tests are used, teachers are obligated to score the tests with as much reliability and objectivity as possible.

2.4 Assembling, Administering, and Scoring Test

Assembling the Classroom Test

The preparation of test items for use in a classroom test is greatly facilitated if the items are properly recorded, if they are written at least several days before they are to be used, and if extra items are constructed. This simplifies the task of reviewing, selecting, and arranging the items in final test form. Writing test items early makes it possible to put them aside for a time before reviewing them for defects.

Constructing extra items makes it possible to eliminate those items found to be defective. It also provides some latitude in fitting the final draft of the classroom test to the test plan.

Arrangement of Items in the Classroom Test

For most classroom purpose a satisfactory arrangement of items can be obtained by a systematic consideration of the following factors:

- i) the types of items used,
- ii) the learning outcomes measured, and
- iii) the difficulty of items

First and foremost, the items should be arranged in sections by item type. That is, all true-false item should be grouped together, then all matching items, then all supply type items, and so on. This arrangement provides for the fewest sets of directions; it is easier for the students since they can retain the same mental set throughout each section; and it greatly facilitates scoring. Where two or more item types or formats are included in a test, there is also some advantage in keeping the simpler item types together and placing the more complex item types in the test, as follows:

- i) True-false or alternative response items,
- ii) Matching items,
- iii) Supply type items,
- iv) Multiple-choice items, and
- v) Essay items.

Of course, beginning with the simplest items and proceeding gradually to the difficult items has a motivating effect on students. Moreover, encountering difficult items early in the test frequently causes students to spend a disproportionate amount of time on such items. With the items classified by item type an order of increasing difficulty can be obtained by arranging the sections of the test and by arranging the items within each section. On the whole, the most effective method for organizing items in the test is to:

- i) Form sections by item type;
- ii) Group the items within each section by the learning outcomes measured; and
- iii) Arrange both the sections and the items within sections in an ascending order of difficulty.

Preparation of Directions for the Classroom Test

First of all, the directions provided should be clear and concise, and should tell the students what they are to do, how they are to do it, and where they are going to record their answers. In addition, directions should tell the students the value of the items and the time to be allotted to the various parts or sections of the test. Whether written, oral, or both, the directions are a vital part of the test and should include at least the following points: the purpose of the test, time allowed for answering, basis for answering, and procedure for recording the answers.

A. Purpose of the Test

The purpose of the test is usually indicated at the time the test is announced or at the beginning of the semester when the evaluation procedures are described as a part of the general orientation to the course.

The only time a statement of the purpose of the test needs to be included in the written direction is when the test is to be administered to several sections taught by different teachers. Here a written statement of purpose assures greater uniformity.

B. Time Allowed for Answering

It is desirable to indicate to the students how much time they will have for the total test and how they distribute their time on each of the parts. Judging the amount of time students will need to complete a given test is not simple matter. It depends on:

- The types of items used,
- The age and ability of the students, and
- The complexity of learning outcomes being measured.

C. Basis for Answering

The directions for each section of the test should indicate the basis for selecting or supplying the answer. It is sometimes desirable to include sample test items correctly marked so that students can check their understanding of the basis for answering. This practice is especially desirable for primary school pupils, and also for students at other levels where complex items are used.

D. Procedures for Recording the Answers

Answers may be recorded on the test form itself or on separate answer sheets. Where the test is short, or the number of students taking the test is small, or the students are relatively young, answers are generally recorded directly on the test paper. For most other situations, separate answer sheets are preferred because they reduce the time needed for scoring, and they make it possible to use the test papers over and again if necessary.

Reproduction of the Classroom Test

Careful attention to the reproduction phase will not only make it easier for the examinee, but may also make hands coring much easier. The following should be considered during reproduction of classroom test.

- a) Space the items so that they are not crowded. In multiple-choice items, reading the stem becomes very difficult when items are tightly crammed together with options. For multiple-choice tests, the options should be placed in a vertical column below the test item rather than in paragraph fashion.
- b) Items should not be split with parts of the item on different pages.
- c) Unless a separate answer sheet is used, the space for answering should be down on side of page preferably the left.
- d) Test items should be numbered consecutively throughout the test.
- e) For the matching items and multiple-choice items, the material in the list to be matched and/or options to be used should be lettered.
- f) All illustrative materials used should be clear, legible and accurate.
- g) For matching items, have the two lists on the same page.

- h) If work space is needed to solve numerical problem, provide this space on the answer sheet or test booklet rather than having the students used scratch paper.
- i) It is desirable to proofread the entire test before it is administered.

Administering Classroom Tests

The guiding principle in administering any classroom test is that all students must be given a fair chance to demonstrate their achievement of the learning outcomes being measured.

i. Physical Conditions

The physical conditions such as adequate work space, quiet, proper light and ventilation and comfortable temperature are vital factors in administering classroom test. The physical condition should be as comfortable as possible, and the students should be as relaxed as possible.

ii. Psychological Conditions

The psychological conditions of students influence test results. Students, at all levels, will not perform at their best if they overly tense and anxious during testing.

Some of the things that create excessive test anxiety are the following.

- a) Threatening students with tests, if they do not behave.
- b) Warning students to do their best “because this test is important.”
- c) Telling students they must work fast to complete the test on time.
- d) Threatening dire consequences if they fail the test.

The means to overcome test anxiety is to tell to students that the test results are to be used to help them improve their learning. Moreover, students should be reassured that the time limits are adequate to allow them to complete the test. The time of testing can also be a factor influencing the test results. If the tests are administered just before “the big game”, the results may not be representative. Besides, in the case of individual students, fatigue, the onset of illness, or worry about particular problem may prevent maximum performance. Therefore, arranging the time of testing in terms of such factors and permitting the postponement of the test in individual cases, when appropriate, can enhance the validity of the results.

Suggestions for Administering a Classroom Test

The following suggestions for administering a classroom test consist mainly of things to avoid.

1) Do not talk unnecessarily before the test

Students are mentally set for the test and will consciously ignore anything not pertaining to the test for fear it will hinder the recall of information needed to answer the question. Thus, the well intentioned remarks fall on “deaf ears” and merely increase anxiety toward the test and cause hostility toward the teacher.

2) Keep interruptions during the test to a minimum.

It is sometimes desirable to hang a “Do not disturb-TESTING” sign on the outside of the door.

3) Avoid giving hints to students who ask about individual items.

If the item is ambiguous, it should be clarified for the entire group. If it is not ambiguous, the student should be told to answer it as best he/she can.

4) Discourage cheating, if necessary.

It might be necessary to discourage a cheating by special seating arrangement and careful supervision. Where good teacher-student rapport exists and the students view tests as helpful rather than harmful, cheating is usually not a problem.

Classroom Test Scoring Procedures

Some General Considerations for Scoring Objective-Type Tests

1. The scoring key should be prepared and checked well in advance.
2. If factors other than the correctness of the answer (such as spelling, grammar, or legibility of hand writing) are to be considered, they should be given a separate score.
3. As each test paper is scored, it is desirable to mark each item that is answered incorrectly. With multiple-choice items a good practice is to draw a red line through the correct answer of the missed items rather than through the student's wrong answers. This will indicate to the student those items he/she missed and at the same time will let him/her know what the correct answers are. Time will be saved and confusion avoided during discussion of the test.

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Appendix: Taxonomy of Educational Objectives

Table - Examples of General Instructional Objectives and Clarifying Verbs for the Cognitive Domain

<i>Illustrative General Instructional Objectives</i>	<i>Illustrative Verbs for Stating Specific Learning Outcomes</i>
<ul style="list-style-type: none"> • Knows common terms • Knows specific facts • Knows methods and procedures • Knows basic concepts • Knows principles 	<ul style="list-style-type: none"> • <i>Defines, describes, identifies, labels, lists, matches, names, outlines, reproduces, selects, states</i>
<ul style="list-style-type: none"> • Understands fact and principles • Interprets verbal material • Interprets charts and graphs • Translates verbal material to mathematical formulas • Estimates consequences implied in data • Justifies methods and procedures 	<ul style="list-style-type: none"> • <i>Converts, defends, distinguishes, estimates, explains, extends, generalizes, gives examples, infers, paraphrases, predicts, rewrites, summarize</i>
<ul style="list-style-type: none"> • Applies principles to new situations • Applies theories to practical situations • Solves mathematical problems • Constructs charts and graphs • Demonstrates correct usage of a procedure 	<ul style="list-style-type: none"> • <i>Change, compute, demonstrates, discovers, manipulates, modifies, operates, predicts, prepares, produces, relates, shows, solves, uses</i>
<ul style="list-style-type: none"> • Recognizes unstated assumptions • Recognize logical fallacies in reasoning • Distinguishes between facts and inferences • Evaluates the relevancy of data • Analyzes the organizational structure of the work (art, music, writing) 	<ul style="list-style-type: none"> • <i>Breaks down, diagrams, differentiates, discriminates, distinguishes, identifies, illustrates, infers, outlines, points out, relates, selects, separates, subdivides</i>
<ul style="list-style-type: none"> • Writes a well-organized theme Gives a well-organized speech Writes a creative short story • Proposes a plan for an experiment • Integrates learning from different areas into a plan for solving a problem • Formulates a new scheme for classifying objects (or events, or ideas) 	<ul style="list-style-type: none"> • <i>Categorizes combines, compiles, composes, creates, devises, designs, explains, generates, modifies, organizes, plans rearranges, reconstructs, relates, reorganizes, revises, rewrites, summarizes, tells, writes</i>
<ul style="list-style-type: none"> • Judges the consistency of written material • Judges the adequacy with which conclusions are supported by data • Judges the value of a work (art, music, writing) by use of internal and external criteria 	<ul style="list-style-type: none"> • <i>Appraises, compares, concludes, contrast, criticizes, describes, discriminates, explains, justifies, interprets, relates, summarizes, supports</i>

Table - Major Categories in the Affective Domain of the Taxonomy of Educational Objectives (Krathwohl, 1964)

Descriptions of the Major Categories in the Affective Domain	
1. Receiving:	Receiving refers to the student's willingness to attend to particular phenomena or stimuli (classroom activities, textbook, music, etc.). From a teaching standpoint, it is concerned with getting, holding, and directing the student's attention. Learning outcomes in this area range from the simple awareness that a thing exists to selective attention on the part of the learner. Receiving represents the lowest level of learning outcomes in the affective domain.
2. Responding:	Responding refers to active participation on the part of the student. At this level the student not only attends to a particular phenomenon but also reacts to it in some way. Learning outcomes in this area may emphasize acquiescence in responding (reads assigned material), willingness to respond (voluntarily reads beyond assignment), or satisfaction in responding (reads for pleasure or enjoyment). The higher levels of this category include those instructional objectives that are commonly classified under interest; that is, those that stress the seeking out and enjoyment of particular activities.
3. Valuing:	Valuing is concerned with the worth or value a student attaches to a particular object, phenomenon, or behavior. This ranges in degree from the more simple acceptance of a value (desires to improve group skills) to the more complex level of commitment (assumes responsibility for the effective functioning of the group). Valuing is based on the internalization of a set of specified values, but clues to these values are expressed in the student's overt behavior. Learning outcomes in this area are concerned with behavior that is consistent and stable enough to make the value clearly identifiable. Instructional objectives that are commonly classified under attitudes and appreciation would fall into this category.
4. Organization:	Organization is concerned with bringing together different values, resolving conflicts between them, and beginning the building of an internally consistent value system. Thus the emphasis is on comparing, relating, and synthesizing values. Learning outcomes may be concerned with the conceptualization of a value (recognizes the responsibility of each individual for improving human relations) or with the organization of a value system (develops a vocational plan that satisfies his need for both economic security and social service). Instructional objectives relating to the development of a philosophy of life would fall into this category.
5. Characterization by a Value or Value Complex:	At this level of the affective domain, the individual has a value system that has controlled his behavior for a sufficiently long time for him to have developed a characteristic life style. Thus the behavior is pervasive, consistent, and predictable. Learning outcomes at this level cover a broad range of activities, but the major emphasis is on the fact that the behavior is typical or characteristic of the student. Instructional objectives that are concerned with the student's general patterns of adjustment (personal, social emotional) would be appropriate here.

Table - Examples of general Instructional Objectives and Clarifying Verbs for the Affective Domain of the Taxonomy

Illustrative General Instructional Objectives	Illustrative Verbs for Stating Specific
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	Learning Outcomes
<ul style="list-style-type: none"> • Listens attentively • Shows awareness of the importance of learning • Shows sensitivity to social problems • Accepts differences of race and culture • Attends closely to the classroom activities 	<i>Asks, chooses, describes, follows, gives, holds, identifies, locates, names, points to, selects sits erect, replies, uses</i>
<ul style="list-style-type: none"> • Completes assigned homework • Obeys school rules • Participates in class discussion • Completes laboratory work • Volunteers for special tasks • Shows interest in subject • Enjoys helping others 	<i>Answers, assists, complies, conforms, discusses, greets, helps, labels, performs, practices, presents, reads, recites, reports, selects, tells, writes</i>
<ul style="list-style-type: none"> • Demonstrates belief in the democratic process • Appreciates good literature (art or music) • Appreciates the role of science (or other subjects) in everyday life • Shows concern for the welfare of others • Demonstrates problem solving attitude • Demonstrates commitment to social improvement 	<i>Completes, describes, differentiates, explains, follows, forms, initiates, invites, joins, justifies, proposes, reads, reports, selects, shares, studies, works</i>
<ul style="list-style-type: none"> • Recognizes the need for balance between freedom and responsibility in a democracy • Recognizes the role of systematic planning in solving problems • Accepts responsibility for own behavior • Understands and accepts own strengths and limitations • Formulates a life plan in harmony with his abilities, interests, and beliefs 	<i>Adheres, alters, arranges, combines, compares, completes, defends, explains, generalizes, identifies, integrates, modifies, orders, organizes, prepares, relates, synthesizes</i>
<ul style="list-style-type: none"> • Displays safety consciousness • Demonstrates self-reliance in working 	<i>Acts, discriminates, displays influences, listens, modifies, performs, practices,</i>

independently <ul style="list-style-type: none"> • Practices cooperation in group activities • Uses objective approach in problem solving • Demonstrates industry and self-discipline • Maintains good health habits 	<i>proposes, qualities, questions, revises, serves, solves, uses, verifies</i>
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Table - Classification of Educational Objectives in the Psychomotor Domain (Simpson, 1972)

Description of the Major Categories in the Psychomotor Domain

<p>1. Perception: <i>The first level is concerned with the use of the sense organs to obtain cues that guide motor activity. This category ranges from sensory stimulation (awareness of a stimulus), through cue selection (selecting task-relevant cues), to translation (relating cue perception to action in a performance).</i></p>
<p>2. Set: <i>Set refers to readiness to take a particular type of action. This category includes mental set (mental readiness to act), physical set (physical readiness to act), and emotional set (willingness to act). Perception of cues serves as an important prerequisite for this level.</i></p>
<p>3. Guided Response: <i>Guided response is concerned with the early stages in learning a complex skill. It includes imitation (repeating an act demonstrated by the instructor) and trial and error (using a multiple-response approach to identify an appropriate response). Adequacy of performance is judged by an instructor or by a suitable set of criteria.</i></p>
<p>4. Mechanism: <i>Mechanism is concerned with performance acts where the learned responses have become habitual and the movements can be performed with some confidence and proficiency. Learning outcomes at this level are concerned with performance skills of various types, but the movement patterns are less complex than at the next higher level.</i></p>
<p>5. Complex Overt Response: <i>Complex overt response is concerned with the skillful performance of motor acts that involve complex movement patterns. Proficiency is indicated by a quick, smooth, accurate performance, requiring a minimum of energy. This category includes resolution of uncertainty (performs without hesitation) and automatic performance (movements are made with ease and good muscle control). Learning outcomes at this level include highly coordinated motor activities.</i></p>
<p>6. Adaptation: <i>Adaptation is concerned with skills that are so well developed that the individual can modify movement patterns to fit special requirements or to meet a problem situation.</i></p>
<p>7. Origination: <i>Origination refers to the creating of new movement patterns to fit a particular situation or specific problem. Learning outcomes at this level emphasize creativity based upon highly developed skills.</i></p>

Table - Examples of General Instructional Objectives and Clarifying Verbs for the Psychomotor Domain

<i>Illustrative General Instructional Objectives</i>	<i>Illustrative Verbs for Stating Specific Learning Outcomes</i>
<ul style="list-style-type: none"> • Recognizes malfunction by sound of machine • Relates taste of food to need for seasoning • Relates music to a particular dance step 	<ul style="list-style-type: none"> • Chooses, describes, detects, differentiates, distinguished, identifies, isolates, relates, selects, separates
<ul style="list-style-type: none"> • Knows sequence of steps in varnishing wood • Demonstrates proper bodily stance for batting a ball • Shows desire to type efficiently 	<ul style="list-style-type: none"> • Begins, displays, explains, moves, proceeds, reacts, responds, shows, starts, volunteers
<ul style="list-style-type: none"> • Performs a golf swing as demonstrated • Applies first aid bandage as demonstrated • Determines best sequence for preparing a meal 	<ul style="list-style-type: none"> • Assembles, build, calibrates, constructs, dismantles, displays, dissects, fastens, fixes, grinds, heats, manipulates, measures, mends mixes, organizes, sketches
<ul style="list-style-type: none"> • Writes smoothly and legibly • Sets up laboratory equipment • Operates a slide projector • Demonstrates a simple dance step 	<ul style="list-style-type: none"> • (Same list as for Guided Response)
<ul style="list-style-type: none"> • Operates a power saw skillfully • Demonstrates correct form in Swimming • Demonstrates skill in driving an automobile • Performs skillfully on the violin • Repairs electronic equipment quickly and accurately 	<ul style="list-style-type: none"> • (Same list as for Guided Response)
<ul style="list-style-type: none"> • Adjusts tennis play to counteract opponent's style • Modifies swimming strokes to fit the roughness of the water 	<ul style="list-style-type: none"> • Adapts, alters, changes, rearranges, recognizes, revises, varies
<ul style="list-style-type: none"> • Creates a dance step • Creates a musical composition • Designs a new dress style 	<ul style="list-style-type: none"> • Arranges, combines, composes, constructs, creates, designs originates