

Active Learning Theoretical

1. Rationale of the session

- The different study and survey conducted before launching the project revealed the presence of insufficient level of teaching skills and absence of active learning in classroom;
- The baseline survey of the project also confirmed that the performance of teachers is not satisfactory in effective and efficient way of applying the active learning strategy in the teaching and learning process and promoting active learning in mathematics and science (M&S) lessons.

1. Rationale of the session

- Though the term “active learning (AL)” is now familiar and common among teachers, it is true that the implementation is not satisfactory (passive way of learning is still dominant) and sometimes the concept of AL is misconceived or causing misunderstanding among teachers.
- There is a need to have a clear common understanding on the issue and enhance it further, in order to foster the implementation of activity-based student-centered learning as much as possible in M&S subjects.

2. Objectives of the session

Theoretical part

By the end of the session, the participants will be able to:

- Explain why “Active learning (AL)” is promoted;
- Describe general definition and characteristics of AL ;
- Describe AL in science and mathematics lessons in Ethiopian context;

2. Objectives of the session

Practical part

By the end of the session, the participants will be able to:

- Design and implement appropriate AL techniques / strategies for a lesson;

4. Brainstorming (10 min)

Please wrote down in your notebook:

- 1) Whatever you know about “active learning”; and
- 2) How you promote “active learning” in your lessons.

5.1 Why we promote “Active learning”?

**AFTER TWO WEEKS WE
TEND
TO REMEMBER ...**

10% of what we read

READING

20% of what we hear

HEARING WORDS

30% of what we see

LOOKING AT PICTURES

PASSIVE

WATCHING A MOVIE/VIDEOTAPE

LOOKING AT AN EXHIBIT

50% of what we see and
hear

WATCHING A DEMONSTRATION

SEEING IT DONE ON LOCATION

70% of what we
say

PARTICIPATING IN A DISCUSSION

GIVING A TALK

ACTIVE

90% of
what we
say and
do

DOING A DRAMATIC PRESENTATION

SIMULATING THE REAL EXPERIENCE

DOING THE REAL THING

Adapted from: Edgar Dale *Audio-Visual Methods in Teaching*, Holt, Rinehart and Winston.

5.1 Why we promote “Active learning”?

- The research said that the passive involvement generally leads to a limited retention of knowledge by students, while greater learning is shown when students actively engaged in activities.
- If our students are required to obtain scientific and mathematical knowledge that is retained for long time and develop skills and attitudes that benefit them for their future life, we have to resort to active learning methodologies.

5.1 Why we promote “Active learning”?

Ethiopian curriculum framework & strategy paper

- Students are viewed as an active participants in its creation rather than passive recipient knowledge in the principle of constructivism;
- When students are actively engaged in the provided activities, they construct their understanding (new concepts) on a foundation of existing prior knowledge and experiences.

5.2 What is “Active learning”?

Definitions by different personnel

- **Active learning** refers to techniques where students do more than simply listen to a lecture. Students are DOING something including discovering, processing, and applying information (by Kathleen McKinney, Illinois State University).
- **Active learning** is generally defined as any instructional method that engages students in the learning process. In short, active learning requires students to do meaningful learning activities and think about what they are doing (by Michael Prince, Bucknell University).

5.2 What is “Active learning”?

- When learning is active, students do most of the work. They use their brains: studying ideas, solving problems, and applying what they learn. **Active learning** is fast-paced, fun, supportive, and personally engaging (by Silberman, M).

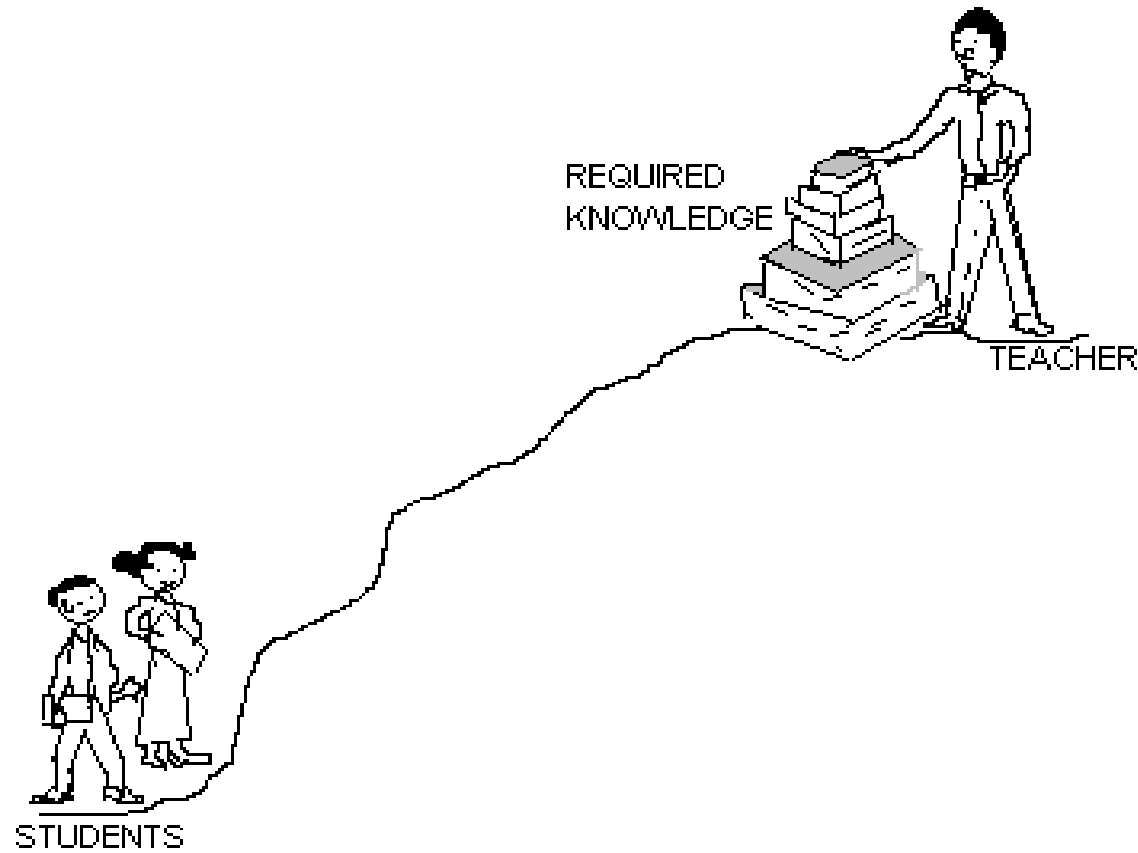
5.2 What is “Active learning”?

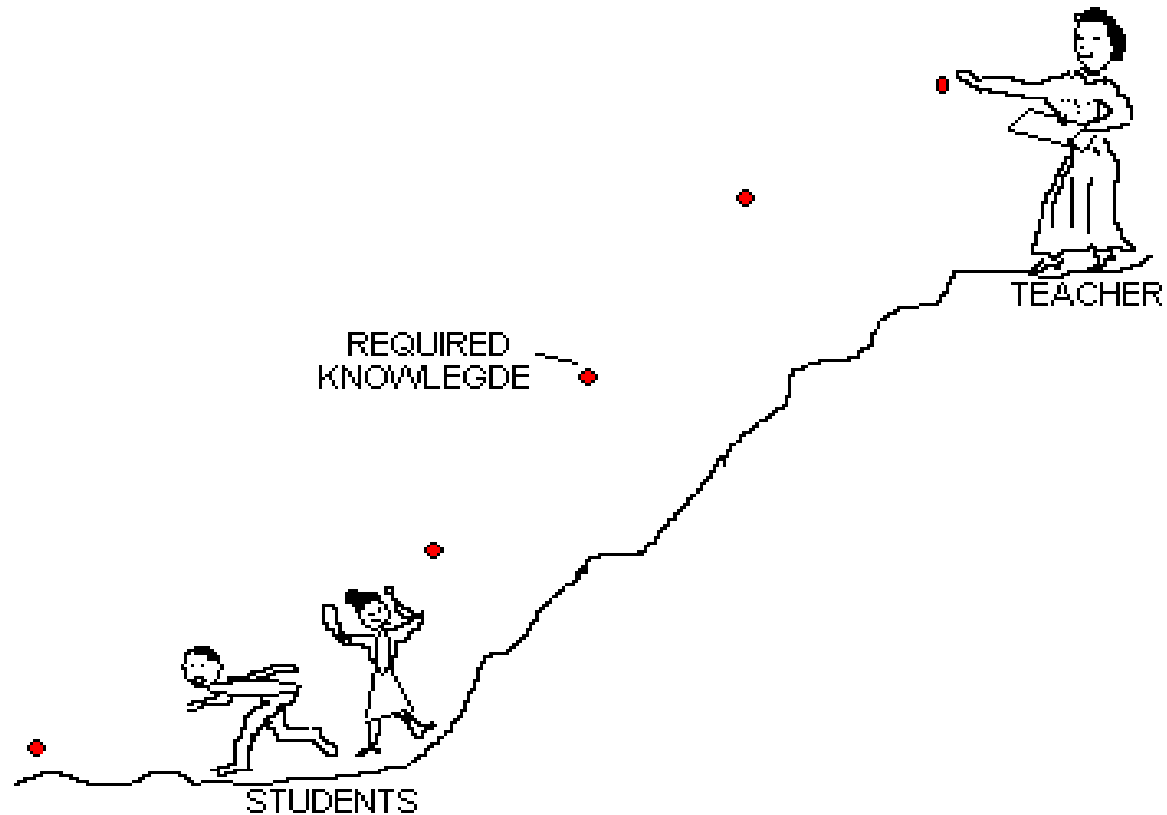
Difference between passive and active learning environment in M&S lessons

Aspect	Passive learning	Active learning
Source of knowledge	Teacher / textbook are the authorities-sources of all knowledge.	Real observations of the physical world are the authority.
Students' beliefs	Students' beliefs are rarely overtly challenged.	Student's beliefs are challenged.
Teacher's role	Teacher's role is as a lecturer.	Teacher's role is as a guide / facilitator in the learning process.
Interaction among the	Collaboration with peers often	Collaboration with peers in encouraged.

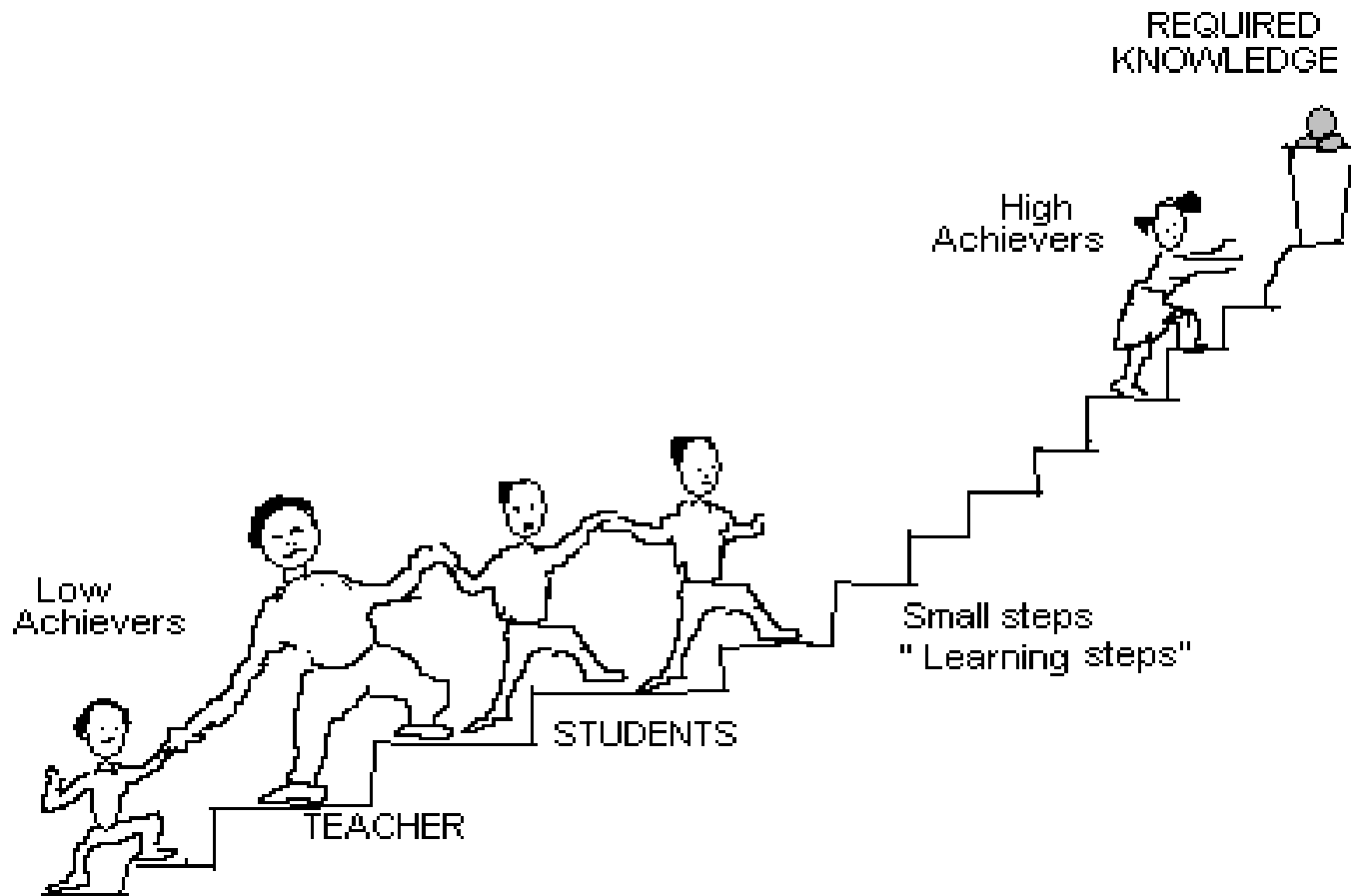
Aspect	Passive learning	Active learning
Experiments	Lessons often present the “fact” with little reference to experiment.	Results from real experiments are observed in understandable ways.
Lab work	Lab work, if any, is used to confirm theories “learned” in lecture.	Lab work is used to learn basic concepts.
Mode of learning	- Too focused on facts and rote memorization - The teacher used to get in front of students and do all the M&S.	- Students work on problems together in groups talk, argue and teach each other. - Mentally engage students in what the teacher is teaching.
Focus of the lesson	Focuses on what we are teaching.	Focuses more on what our students are learning.

Conceptual image of traditional mode of teaching vs. modern teaching method for active learning





Traditional mode of teaching - teacher gives ("throws") of the required knowledge to students.



Our ideal lesson - teacher prepares small steps and climbs together with the students.

5.2 What is “Active learning”?

Key characteristics of active learning

- High levels of participation
- Use of prior experience or knowledge
- Adoption of new perspectives and positions
- Contextualization of values and assumptions from different disciplines
- Peer support and peer learning
- Critical reflection on action and experience
- Greater ownership of and responsibility for learning
- Development of generic communicative skills

5.2 What is “Active learning”?

Through the baseline survey, it was recognized that our M&S lessons that promote student’s active learning should hold following seven (7) elements “**PASFACT**”

- ✓ P stands for **P**lanning
- ✓ AS for **A**ctivity-oriented **S**tudent-centered method
- ✓ F for **F**acilitation
- ✓ A for **A**ssessment
- ✓ C for **C**ommunication
- ✓ T for **T**eaching and learning aids.

P: Planning for lesson

- Lesson planning is a vital process of making effective teaching and learning. How meaningful is lesson heavily depends on the **quality of lesson planning**.
- Therefore, every lesson should start with lesson planning, including preparation of lesson plan, the preparation of necessary T&L materials.

P: Planning for lesson

- During the lesson planning, each teacher should consider the details of the lesson, incl. the **rationale** of the topics, the **pre-requisite knowledge** and **skills of students**, **specific objectives** of the lesson intended for students to acquire, the **flow of teaching and learning activities** and its **assessment**.
- In addition, the **reflection of one lesson** and **re-planning** of the lesson is the step **for making the lesson better**.

AS: Activity-oriented Student-centered method

- A lesson consists of different teaching and learning activities.
- The activities should be selected carefully to enhance student's interest, understanding and retention of knowledge and skills.
- In activities, the opportunities for students to interact in individual settings, pair, small groups and whole class are provided, depending on the nature of learning contents of the lesson, level and interest of students, and availability of T&L materials.

AS: Activity-oriented Student-centered method

- In each activity, the students should be active and act as central players.
- The students' participation is not merely physical movement (discussing, asking, answering, reading, listening, observing, doing experiments, etc.) but also invisible mental engagement (thinking).
- A teacher thus needs to facilitate a class in such a way that students themselves will be able to follow logical steps of learning and attain the set objectives.

AS: Activity-oriented Student-centered method

- A lesson should cater to the individual students' needs, as each student has his/her own level and pace of understanding.
- In this regard, teacher should know about their status of learning, e.g. where they are in learning a certain topics (pre-requisite knowledge, skills and interest), how they learn (at which points student may face difficulties, areas of common misconception), by how the students can be assisted to reach the conclusion or obtain learning points (students' thinking process).

F: Facilitation skills for learning activities

- To realize meaningful learning in each activity in a lesson, teachers' facilitation skill is essential.
- The purpose / objectives of the activity, the procedure, the precaution (in some cases) and the like should be clearly understood by the students.

F: Facilitation skills for learning activities

- The provision of clear and **constructive feedback** to the students' performance / responses is the key to **facilitate further learning of students.**
- Different ways of interaction among students and between teacher and students could be organized case by case in order to promote peer learning.

A: Assessment techniques to support and improve student's learning

- To provide better learning opportunities, teachers need to grasp the status of each student' learning.
- When planning lesson, teachers are able to plan lessons and its activities more appropriately, if they know prior knowledge and skills of their students.
- They are also able to take measures to the learning difficulties and common misconceptions.

A: Assessment techniques to support and improve student's learning

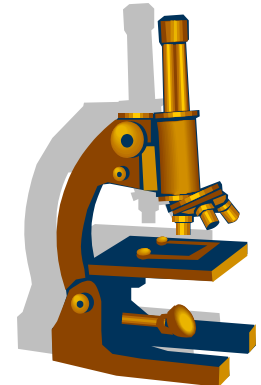
- In a lesson delivery, by checking and monitoring the student's learning in each activity in the lesson, teachers are able to provide necessary action and supports.
- At the end of the lesson, teachers need to confirm how the specific objectives intended by the lesson are attained by the students to take further action.
- These are the process of formative continuous assessment, which let teachers be well-prepared and flexible to realize student's better learning.

C: Communication skills

- To alleviate the language problem in medium of instruction (English) as much as possible, teachers need to make some counter measure to it.
- For examples, using plain and simple language, using techniques such as analogies and contextualization, and using visual aids (pictures, objects, models, charts, etc.) will be one way out.
- Use of praises and encouragement are effective way to motive student's learning.

T: Effective use of T&L aids

- The use of T&L aids in a lesson would help **teacher to teach** and students **to learn** better.
- Attention should be paid in selecting the materials so that they can **fit to the contents** and activities of the lesson, and **meet the objectives** of the lesson.



T: Effective use of T&L aids

- In some cases where there is **limitation** of resources, **improvisation** of the materials (Teaching and Learning Using Locally Available Resources: TALULAR) could provide the alternative.
- In addition, teacher themselves need to be familiar with tools / equipments (purpose of using and its operation) and chemicals / other materials (precaution for use and how to handle).

*Let's strive to promote "Active Learning" through **PASFACT!!***

Thank you!