ACTIVE TEACHING – LEARNING METHODOLOGIES

Active learning as an approach engages students in what they learn. Students and their learning needs is the centre of active learning approach. Teaching has been changing under the influence of societal needs which require education to answer in making teaching more effective, fulfilling the requirements of the dynamic and complex reality by organising a learning process able to train students to operate in professional practice (Apel, 2003, 32). Today, the teacher from being a knowledge provider has changed into turning a student as a knowledge acquirer. The student is an active researcher in the process of knowledge building and application. An American author, Prince (2004), reflects that active learning can be achieved by any method of teaching which actively involves students into the process of authentic learning. Obviously, this approach of learning surpasses sheer memorizing of what has been taught in the class. The essence of such learning is in continuous intellectual participation in the learning process.

We at VNRVJIET, emphasize in using these active teaching methods to make classroom teaching more diversified. Through implementing these methods in the classroom we involve students directly and engage them actively in the learning process itself. Students get involved in all stages of planning, design, execution and evaluation. With applying this, the focus is on the learner and learning information, the learners' retention, communication skills, new learning resources and range of learning. The benefits to using such activities are many; including improved critical thinking skills, problem solving, increased retention and transfer of new information, increased motivation, and improved interpersonal skills.

A variety of methodologies for promoting "active learning" are used by the faculty. Here, the students read, write, discuss, and are engaged in solving problems in classrooms in order to nurture knowledge, skills and attitudes. In particular, they engage in higher-order thinking tasks as analysis, synthesis, and evaluation. The class curriculum mostly focuses on the responsibility of learning on learners. The Institute nurtures an environment conducive for student-centered learning. Students are encouraged to participate in various experiential and problem-solving methodologies for better and enhanced learning experience. Student centric collaborative learning methods are promoted and followed at VNRVJIET are given below:

- Think-Pair-Share,
- Flipped Classroom,
- Blended Learning,
- Group Discussions,
- Case Studies,
- Role Plays,
- Demonstrations,
- Concept Maps,
- Mini Maps,
- And structured learning groups and many more.

The teaching–learning process at VNRVJIET is offered through a holistic approach imbibing ***'The Seven Habits of Highly Successful People'*** at all levels.

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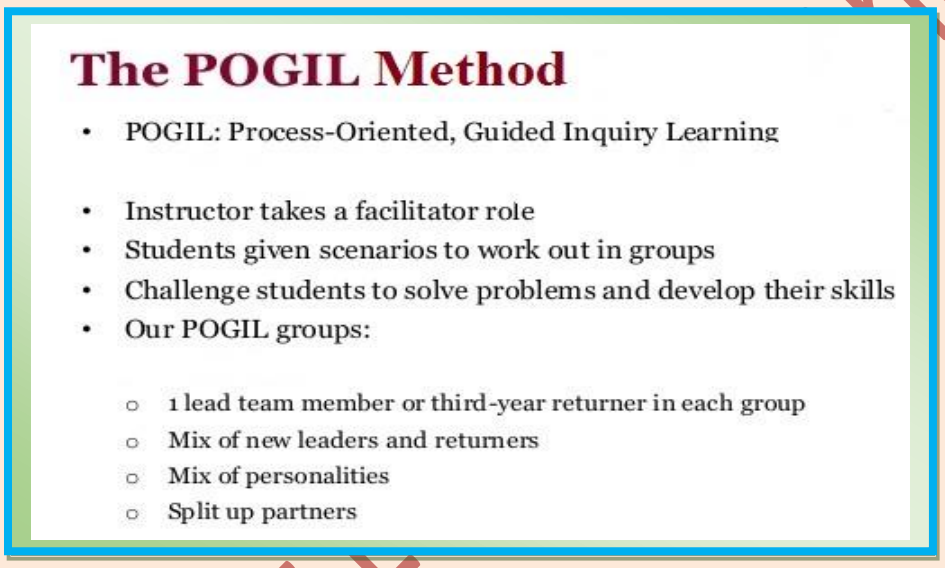
Important and complex contents are explained through a practical approach. A Student works on a topic through an experiment and gets the insight of the core concepts. This also strengthens the student learning capability and enhances the understanding of the grass root essentials of the subject. Let's discuss the various kinds of Active Teaching Methods used in the classroom.

- **POGIL**

POGIL, an ingenious teaching method has turned classroom just beyond books. The faculty is exposed to various teaching methodologies, by shredding their age-old mode of lecture-based teaching. They are equipped with innovative and creative teaching. Students are exposed to video and power point presentations that connect curriculum to industry and day to day life. Interactive, experiential, discovery learning, with lot of individual and group exercises is practiced through POGIL. The primary aim of implementing POGIL is to support educators with the implementation of student-centred learning environments.



In a POGIL classroom, students work in teams on guided inquiry exercises. The Process-Oriented component of POGIL is designed to meet the needs of the students. The Guided Inquiry component of POGIL explicitly enhances the analytical and critical thinking skills of the students. POGIL uses guided inquiry – a learning cycle of exploration, concept invention and application – as the basis for carefully designed materials which is used by the students to construct new knowledge. POGIL is a student-centered strategy; students work in small groups with individual roles to ensure that all students are fully engaged in the learning process. POGIL activities focus on core concepts and encourage a deep understanding of the course material while developing higher-order thinking skills. POGIL develops process skills such as critical thinking, problem solving, and communication through cooperation and reflection, helping students become lifelong learners and preparing them to be more competitive in a global market.

	Traditional Classroom	POGIL Classroom
Prof's Job	Lecture	Help students learn
Source of Material	Professor	Specially designed "Learning Cycle" Activities
Student role	Passive listener	Active group discussion
Learning	Memorize notes after class	Discover concepts during class, reinforce after class
Emphasis	Competition	Community, Co-operation

The students enjoy the best through POGIL sessions which is a unique learning method where they collaborate and construct knowledge.

Sample-1:

POGIL Activity- Business Economics

Learning objectives:

At the end of the activity the student will be able to

- Understand the cost behavior.
- Understand how fixed and variable costs behave and how to use them to predict costs.

I. Cost behavior of total costs

Cost of goods sold	25000
Rent	10000
Salesperson commission	27000
Salaries	20000
Property taxes	1500
Depreciation	1100
Repairs	100

The above stated costs are incurred during a month by XYZ Company when 2100 units were produced and sold.

Critical thinking Questions:

1. Identify from the above costs which would not change (fixed) in total based on the number of units produced.
2. Identify from the above costs which would change (variable) in total based on the number of units produced.
3. Can you define the behavior of total fixed cost?
4. Can you define the behavior of total variable cost?
5. Can you identify some more costs which would not change in total based on the number of units produced?
6. Can you identify some more costs which would change in total based on the number of units produced?

II. Cost behavior per unit

Statement

Activity level	1000 units sold	2000 units sold	3000 units sold
Sales	1,50,000	3,00,000	4,50,000
Total fixed cost	60,000	60,000	60,000
Total variable cost	70,000	1,40,000	2,10,000

Critical thinking Questions:

1. Calculate fixed cost per unit.
2. Calculate variable cost per unit.
3. Calculate selling price per unit.
4. Define the behavior of fixed cost per unit.
5. Define the behavior of variable cost per unit.
6. Complete the following chart to summarize fixed and variable cost behavior

Use * for changes # for stays the same

Cost	In total	Per unit
Fixed		
Variable		

III. Computation

Prepare a statement for 2600 units sold and 4500 units sold

	2600 units sold	4500 units sold
Sales		
Fixed cost		
Variable cost		

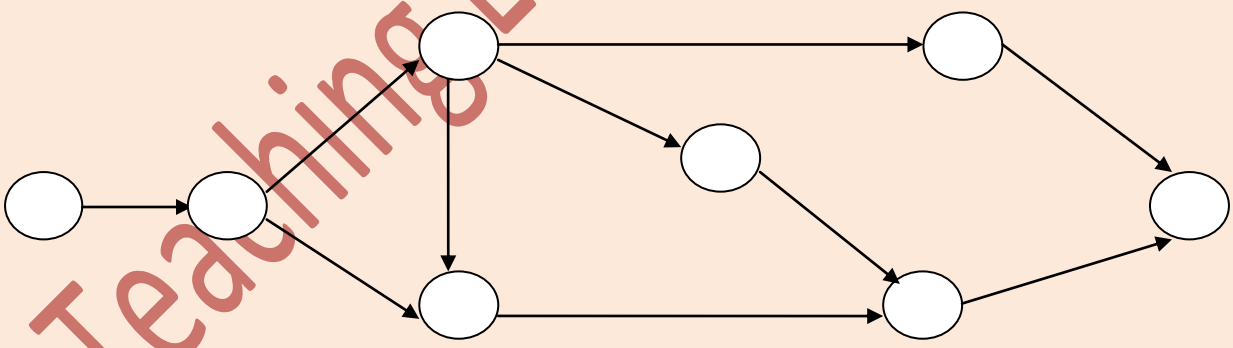
Sample-2 Mathematics

Network diagrams

At the end of the activity, student will be able to:

- Understand about network diagrams
- Draw the network diagram

Model



Activity: ⟶ Node: ◯

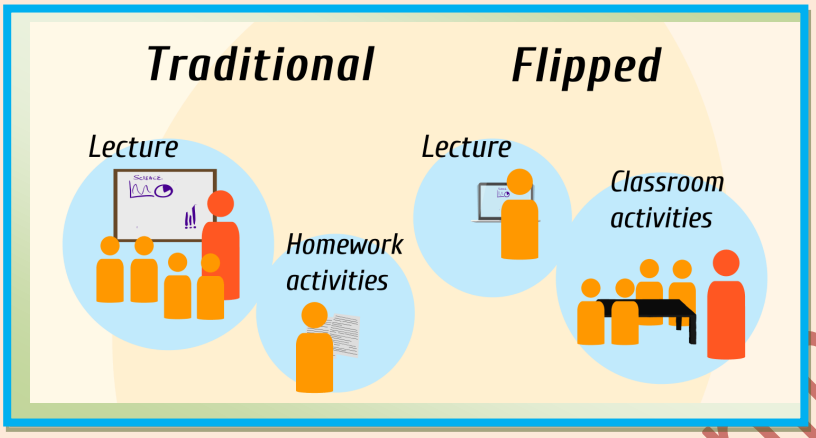
Questions

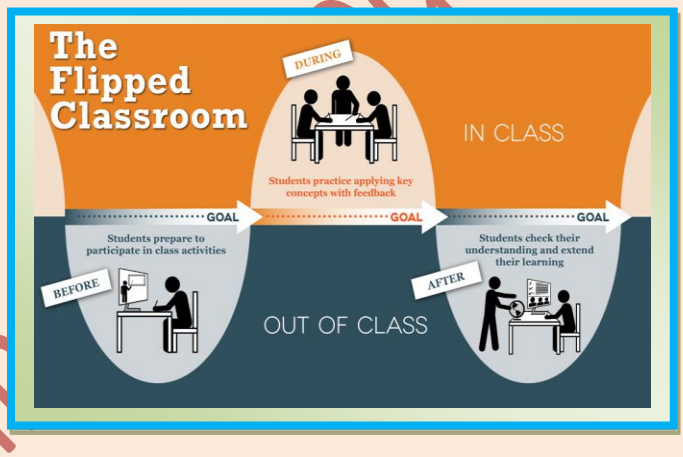
1. Define an activity
2. Define node
3. Number the nodes based on the flow of the activities
4. Name each activity
5. Write down the rules of drawing the network
6. Based on the rules, draw a network from the follwing information

Activity	A	B	C	D	E	F	G	H	I	J
immediate predecessor	-	A	A	C	B	C	D,E	F,G	B	H,I

FLIPPED CLASSROOM & BLENDED LEARNING

The faculty employ flipped classroom and Blended learning formats to encourage active learning among students. In these pedagogical models, the typical lecture and homework elements of a course are reversed. Flipped classroom draws on concepts as active learning, student engagement, hybrid course design, and course podcasting. The value of a flipped class is in the repurposing of class time into a workshop where students can inquire about lecture content, test their skills in applying knowledge, and interact with one another in hands-on activities. During class sessions, instructors function as advisors, encouraging students in individual inquiry and collaborative effort.





Broadly, the flipped classroom model describes the teaching structure that the students have watched a video, watched a ppt before and discuss the answers with their peers. The key benefit of the flipped classroom model is that it allows for students to work at their own pace if that is how the teacher chooses to implement it. In some cases, teachers may assign the same videos to all students, while in others, teachers may choose to allow students to watch new videos as they master topics. But despite this potential for more student-centeredness, flipped classroom focuses on how learning should happen and what information students need.

Sample 1:English

Out-of-class Activity

Learning Objective(s) of Out-of-Class Activity:

The student will be able:

- To define and give an example of a cause and an effects.
- Would be able to generate ideas
- List various causes and effects
- Logically connect using transitional devices

URL of the Video: https://youtu.be/ZmLMILDVsZM

License of Video: Standard YouTube License

Duration: 5 Minutes

Learning Objective	Assessment Strategy	Expected duration (in min)
To define and give an example of a cause and an effect.	Elicitation	5 Min
Would be able to generate ideas	Elicitation	10 Min
List various causes and effects	Write the various causes and Effects	25 Min
Logically connect using transitional devices	Use transitional devices	---

In -class Activity

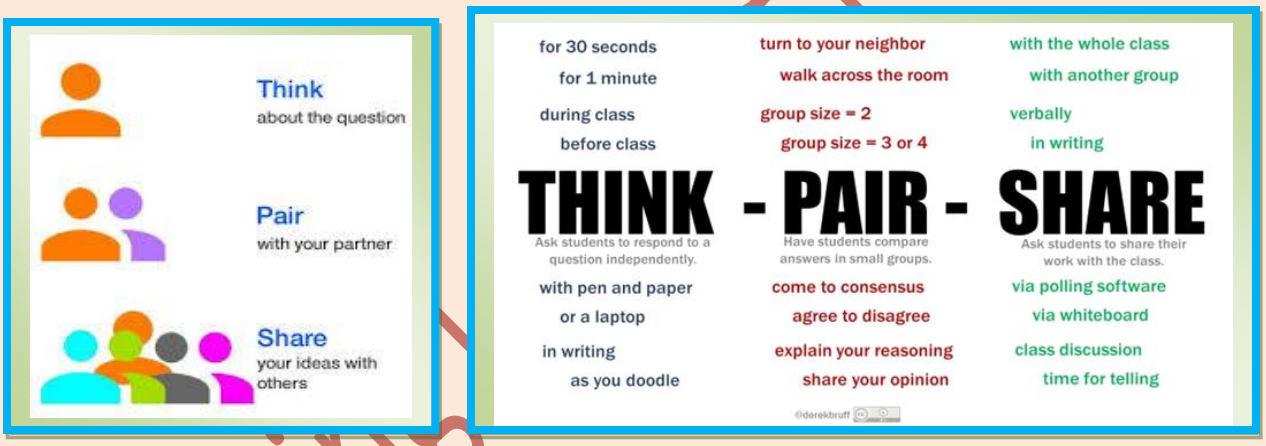
Learning Objective(s) of Out-of-Class Activity:

The student will be able:

1. Team activity demonstrating the importance of coherence
2. Think-Pair-Share
3. Peer Review

➢ **THINK-PAIR-SHARE**

Think-Pair-Share is a learning method in which students collaborate by thinking individually about a topic or an answer to a question and then sharing it among them. It is an interesting activity in which students collaborate, work together and resolve the given problem or assignment. In this methodology, students think individually about the problem and share their ideas with classmates. Here, the facilitator poses a question or problem to the class and the students are given time to think and come out with their response. Then, they are paired with other students to discuss and share their views. Pairs of students are asked to share their conclusions and reasoning to the larger group, which can be considered as a starting point to promote discussion in the class as a whole.



This learning strategy promotes classroom participation by encouraging a high degree of pupil response, rather than using a basic recitation method in which a teacher poses a question and one student offers a response. The concept of **'Think'** time and the initial opportunity to talk about a response with a single peer reduces the anxiety and inhibition of some students. For Example, Ask students to think or write about an answer for one minute, then turn to a peer to discuss their responses for two minutes. Ask groups to share responses and follow up with facilitator's explanation. By asking students to explain their answer to a partner and to critically consider their partner's responses, helps students articulate newly formed mental connections.

Activity -1 **THINK –PAIR- SHARE ACTIVITY**

Domain: English

Topic: Cause and Effect Essay

Target Students: I BTECH

Think Phase - [Duration -10 Minutes]

Question: Construct a coherent cause and effect paragraph about a topic of your choice using the rhetoric pattern of Cause and Effect and transitional devices

What will Teacher do: guides them to generate ideas

What will students do – Students would individually brain storm – Generate ideas-List various causes and effects-Logically sequence them

Deliverable from this Phase: Generate ideas

Pair Phase - [Duration -10 minutes]

Question: Pair up and share various causes and effects

What Instructor does: guides them to construct the paragraph

What student does: Generate more ideas and construct the paragraph

Deliverable from this Phase: Generate ideas and construct the paragraph

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Share Phase - [Duration -10 minutes]

Question : Share the paragraph with the class and also knows about various ideas.

What will Teacher do- facilitate opportunities to all the students

What will students do – Students would share their paragraphs with the class

Deliverable from this Phase: Share the paragraph with peers

Activity -2 **THINK –PAIR- SHARE ACTIVITY**

Domain: Engineering Chemistry

Topic: Corrosion

Target Students: I BTECH

1. Buying a bread, bicycle, food etc., we are paying for corrosion. Justify.

   Think (5 minutes): Think individually and identify the reason for corrosion.
   Pair (5 minutes): Pair up and compare your answers.
   Share (10 minutes): Each group share their answers with the class and see for the answers.

Inputs:

a) What is corrosion?
b) What are the causes for corrosion?
c) How it is going to affect the lives of human beings?

2. Plastics are inseparable from our lives. Enumerate.

   Think (5 minutes): Think individually and identify the reason for corrosion.
   Pair (5 minutes): Pair up and compare your answers.
   Share (10 minutes): Each group share their answers with the class and see for the answers.

Inputs:

a) What are plastics?
b) What are the types of plastics?
c) How plastics have become an integral part of our lives?

➢ **LEARNING MANAGEMENT SYSTEM (LMS)**

The institute Learning Management System (LMS) is utilised by the trained faculty for the administration, documentation, tracking, reporting and delivery of educational courses. It facilitates the faculty to deliver lecture notes, video lectures, conduct tests and other assignments, track student progress, and manage documentation through Moodle, MOOCs, Screen Casting, Word Press, Wiki, etc.

SCREEN CAST

Screen casting gives learning a whole new lease of life. Gone are the days when students had to attend in-person lectures and drop-in workshops for gaining knowledge. Now, they can stay at home and take online courses. Moreover, it is possible to download video lessons to review offline. A screencast is basically a recording of what is happening on a user's screen as well as the user's narration. It is very useful for teaching and demonstrations or for integrating technology in education. With the growing popularity of YouTube as a media outlet, screen casting has become an important tool for providing demonstrations and tutorials. Screen cast is an advanced technology that makes use of computer applications and their properties. It enhances the concept of traditional instruction and training. Screen casting enables students to watch detailed process of lesson. It also provides audio narration and guides the students in deeper understanding of the demonstrated topic. Screen cast acts as a study material for the course, and the lecturing style is equivalent to the traditional instructor led demonstration. This is an effective way to get more video views and attract more learners as well.

The student is at the heart of the teaching-learning process, being its key beneficiary. The teaching faculty, usually, engage students through quiz, group discussion, debate, seminars, and video Presentations. Apart from these pedagogies, the faculty members actively engage the students through several activities such as Learning by Doing (LBD), Model Based Learning, Role Play, Language Games, Field Trips, Videos, Films, Presentations and Visuals Problem Solving Games, Quiz and other Brainstorming Activities. All the classrooms and Laboratories in the institute are ICT enabled. Majority of the faculty deliver through this platform.

- **SHOW AND TELL**

'Show and Tell' is an open arena for the students to exhibit, explain projects and present their ideas. The concept involves showcasing and presenting innovative ideas and projects that are developed by students in different labs to motivate other students. The Show and Tell initiative provides an opportunity to give a demonstration along with micro-talks structured into 10-20 minutes. This concept tries to create a space where innovative ideas are shared and shaped creating a concrete possibility for research. During this demonstration, the suggestions/inputs given by the peers/faculty are incorporated to elevate the quality of the project/idea. Some of these demonstrations further lead to product based innovation. II and III BTECH students present their posters at SHOW and TELL.