A GUIDE

TO
TEACHING-LEARNING- EVALUATION

MANUAL

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Of
PARVATIBAI CHOWGULE COLLEGE

INTRODUCTION

At Chowgule College, Teaching and Learning is central to work as faculty, so that students achieve excellent progress, and are curious to learn more and increase their understanding of the world and are able to have a part to play in it. Consequently, faculty never stops learning, unswerving in the drive to be masters at what we do.

The assessment of teaching and learning can be viewed as two complementary and overlapping activities that aim to benefit both the quality of student learning and the professional development of the faculty. Assessing learning alone is not sufficient because the ultimate success of students is also dependent upon their motivation and commitment to learning. Similarly, assessing only teaching behaviors and course activities is not sufficient because qualities of the faculty may be appreciated by students but not optimally helpful to their learning and growth. Done in tandem, assessing teaching and learning can help faculty improve and refine their teaching practices and help improve students' learning and performance.

Learners therefore need the very best teaching to ensure that they remain on track and are able to take the right next steps to secure a future of sustained employment. To be successful, all types of learning programmes, including internships, must be underpinned by teaching, learning and assessment that are at least good. Overall, employers must be confident that their future employees receive good quality training and assessment so that they have a solid foundation of skills that they can build on as they progress through their careers. The importance of consistently good or outstanding teaching, combined with high quality assessment, which leads to very effective learning, has never been more significant in every type of provision.

With this backdrop in mind the IQAC of the college decided to prepare a Teaching-Learning and Assessment Handbook wherein an attempt is being made to streamline and standardise well known, time tested and accepted Teaching-Learning and Assessment Methodologies that the College faculty has used successfully. The handbook largely describes the various teaching-learning and assessment methodologies by elaborating the mechanisms, processes and situations in which each teaching-learning and assessment methods can be used and applied. Keeping in mind with the College mission the key focus has been for effective integration of technology to enhance learning, teaching and assessment processes.

TEACHING –LEARNING METHODS

The College believes in an amalgamation of styles brought to it by the various faculties. From regular classroom discussion models followed in almost all the classes, the College also follows the hands-on practical approach wherever necessary. Adding to these conventional approaches the new innovative and recent teaching-learning models is also encouraged. The College thus creates a well-rounded, wholesome, and enjoyable in/out of classroom teaching-learning experience.

The following are some of the approaches followed by the Faculty in the various departments of the College. Over 10 methods of teaching were identified and the following is a comprehensive list of the various teaching methodologies that is explained in a template as follows:

- NAME OF THE TEACHING METHOD:
- DEFINITION:
- OBJECTIVES:
- WHEN TO USE IT:
- HOW TO USE IT/IMPLEMENTATION/WORKING:
- REFERENCES:

(I) NAME OF THE METHOD: LECTURE METHOD

DEFINITION:

It is an oldest method of teaching applied in an educational institution This teaching method is one way channel of communication of information. This is done by an oral presentation given by an instructor to a body of students on a particular subject. Many lectures are accompanied by some sort of visual aid, such as a slideshow, a word document, an image, or a film.

OBJECTIVES:

- achieve/deliver new subject knowledge
- developing habit of concentration among the students.
- achieve higher order cognitive objectives (ie, application, analysis, synthesis and emulation)
- motivate students to get interest in the subject

WHEN TO USE IT:

Visual aid, such as a slideshow, a word document, an image, a film or a black/white board teaching.

HOW TO USE IT/IMPLEMENTATION/WORKING:
In this form of teaching, a teacher prepares material to be taught prior to the class, organizes material and disseminates information to the audience. Teacher talks and the student listen.
The same Lecture Method as above can also be used with added complements of teaching aids to enhance the lecture, for example charts, posters, PowerPoint presentations, audio and video. Teacher presents and the student listen.
REFERENCES:
http://www.studylecturenotes.com/social-sciences/education/382-lecture-method-of-teaching-definition-advantages-a-disadvantages-
http://www.digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1182&context...

(II.) NAME OF THE METHOD: INTERACTIVE METHOD

DEFINITION:
Interactive teaching is a two-way process of active participant engagement with each other, the facilitator, and the content. Engage participants in learning activities that lead to a higher level of understanding and result in the participant's ability to apply what he learned on the job.

OBJECTIVES:
Interactive learning actively engages the students in wrestling with the material. It reinvigorates the classroom for both students and faculty. Lectures are changed into discussions, and students and teachers become partners in the journey of knowledge acquisition' involve students actively in learning process. In addition the Interactive Learning does the following:

- Make students to share knowledge and ideas
- allow learners to address questions
- Keeps groups attentive and involved

WHEN TO USE IT:
Any time

HOW TO USE IT/IMPLEMENTATION/WORKING:
There are plenty of Interactive Methods available. The Interactive teaching learning model with a selection of any one or a combination of methods mentioned below:

Group Discussion Model
This is one step away from the basic lecture method. Here the teacher engages the class, through discussion by breaking up a large group of students or

engaging a small class in a guided exchange of ideas, experiences, responses etc, to reach an understanding of the study material.

Inquiry Based Model

Here the teacher uses questions to bring the student to an understanding of the study material. Rather than presenting facts or statically giving information the teacher will pose problems, scenarios, case studies to the students.

Cultural Knowledge Model

This mainly can be used in literature classes. In this approach the teacher uses cultural comparisons to bring about an understanding of the study material. Best used for Languages and Social Sciences.

Besides the above the above three models, the following are also some Interactive Teaching-Learning Approaches:

1. Think/Pair/Share

Establish a problem or a question. Pair the students. Give each pair sufficient time to form a conclusion. Permit each participant to define the conclusion in his or her personal voice. You can also request that one student explain a concept while the other student evaluates what is being learned. Apply different variations of the process.

2. Brainstorming

Interactive brainstorming is typically performed in group sessions. The process is useful for generating creative thoughts and ideas. Brainstorming helps students learn to pull together. The various Types and Techniques of interactive brainstorming include:

- Structured and unstructured
- Reverse or negative thinking
- Nominal group relationships
- Online interaction such as chat, forums and email
- Team-idea mapping
- Group passing
- Individual brainstorming

3. Case Study

In Case Study Sessions the participants come together in session groups that focus on a single topic. Within each group, every student contributes thoughts and ideas. Encourage discussion and collaboration among the students within each group. Everyone should learn from one another's input and experiences.

4. Incident Process

This teaching style involves a case study format, but the process is not so rigid as a full case study training session. The focus is on learning how to solve real

problems that involve real people. Small groups of participants are provided details from actual incidents and then asked to develop a workable solution.

5. Question & Answer Period

On the heels of every topic introduction, but prior to formal lecturing, the teacher requires students to jot down questions pertaining to the subject matter on 3×5 index cards. The lecture begins after the cards are collected. Along the route, the teacher reads and answers the student-generated questions. Some tips for a good session are as follows:

- Randomize — Rather than following the order of collection or some alphabetical name list, establish some system that evokes student guesswork concerning the order of student involvement.
- Keep it open-ended — If necessary, rephrase student questions so that participants must analyze, evaluate and then justify the answers.
- Hop it up — Gradually increase the speed of the Q & A. At some point, you should limit the responses to a single answer, moving faster and faster from question to question.

REFERENCES:

https://feaweb.org/_data/files/eAdvocate/August/interactiveteaching.pdf
http://study.com/academy/lesson/what-is-interactive-learning-overview-tools.html
http://education.cu-portland.edu/blog/tech-ed/5-interactive-teaching-styles-2/

(III) NAME OF THE METHOD: GROUP DISCUSSION

DEFINITION:

A *Discussion Group* is a group of individuals with similar interest who gather either formally or informally to bring up ideas, solve problems or give comments. Group activity carried out by the participating individuals. It is an exchange of ideas among the individuals of a group on a specific topic.

OBJECTIVES:

- Produce a range of options or solutions, addressing a particular problem or an issue.
- Generate a pile of ideas by examining issues in greater depth, looking at different dimensions of these issues.
- Broaden the outlook of the participants through cross-fertilization and exposure to new and different experiences and ideas and enrich their understanding of the issues under discussion.
- Develop their skills in interpersonal communication and in expressing their views in a clear and succinct manner.
- Effective means of changing attitudes through the influence of peers in the group
- Valuable means of obtaining feedback for the training team on verbal skills, motivation level and personal traits of the participants and characteristics of the group

WHEN TO USE IT:

- Whenever comparisons required
- Need for collective decisions
- Required to assess the student's capabilities on communication, knowledge on given topic, reasoning and listening skills, assertiveness, patience etc.

HOW TO USE IT/IMPLEMENTATION/WORKING:

- Setting up the Groups
- Planning a Group Discussion
- Preparation of Group Reports
- Presentation and Consolidation of Group Reports

REFERENCES:

http://hubpages.com/education/Group-Discussion-limitations

(IV) NAME OF THE METHOD: DEBATE

DEFINITION:

Debate is a formal contest of argumentation between two teams or individuals. More broadly, and more importantly, debate is an essential tool for developing and maintaining democracy and open societies.

OBJECTIVES:

Skills:

- To understand and communicate various forms of argument effectively in a variety of contexts.
- To develop the ability to analyze controversies, select and evaluate evidence, construct and refute arguments.
- To become critical thinkers and communicators.

Intellect:

- To learn theories that seek to explain the process of communicating arguments with people.
- To clarify one's personal and social values through confrontation with the value judgements of others.
- To participate effectively in situations where decisions must be made.

Social:

- Promoting school and community relations through participation in an intellectual activity.
- Meeting and interacting with students from other schools in the context of a social and intellectual activity.
- To realize the simultaneous opportunities for leadership and group participation.

WHEN TO USE IT:

Debate is a method of formally presenting an argument in a disciplined manner. It provokes the students to think and express their opinions, thoughts, ideas, etc. The elements of the debate being logical consistency and factual accuracy. As a result, some degree of emotional appeal to the students can be achieved.

HOW TO USE IT/IMPLEMENTATION/WORKING:

When a teacher uses the debate as a framework for learning, s/he hopes to get students to conduct comprehensive research into the topic, gather supporting evidence, engage in collaborative learning, delegate tasks, improve communication skills, and develop leadership and team-skills—all at one go.

Your teacher will usually identify three or four speakers for each team. Teachers prefer to have four speakers per team for wider participation. Thus in a tutorial group of 15–20 students, about half the group will be actively participating in the

debate. Your teacher may draw lots to select the speakers and ensure that the vocal students are not chosen by default. To 'mobilise' the rest of the group for the debate, your teacher may assign tasks such as conducting research into the topic to provide support for the speakers. This ensures that each student is involved somehow and optimises participation among group members.

Speakers in a debate have well-defined roles. For example, the first speaker explains in clear terms what the topic means to the respective teams. The second speaker re-affirms the proposition's line and rebuts the opposition's first speaker. And so the debate proceeds with speakers having to make their points within the given time. Remember that overall, your teacher will be assessing various matters, including the cogency of your arguments/rebuttals and the manner in which you present them within a limited time (like in real life).

Your teacher may persuade some of his/her colleagues to be adjudicators at the debate. This may drive you to perform even better, as the audience is an 'external' one, and you will be encouraged to 'rise to the occasion'. The teacher/Department may also offer a token prize to the winning team and the best speaker.

In the process of preparing for the debate, you would have got to know and understand your peers better, been involved in delegation/sharing of tasks, researched issues, assimilated material, summarised points, improved your communication skills and sharpened your ability to see issues from various perspectives. The latter is especially true where you had to support a proposition you did not yourself believe in. You will also find out more about human nature and your own strengths and weaknesses as a result of working together with your peers. In the face of all these benefits, winning (the debate that is) is really not everything!

At the end of the day, a larger majority of students would have obtained a better grasp of the topic and learnt not only more, but also more effectively. This way is preferable to traditional teaching/learning methods, such as passively listening to the teacher's 50-minute lecture/drone or writing a 2000-word essay on the topic concerned, don't you think? It is a form of experiential learning which you will remember well, simply because you were an *active* participant in the learning process.

REFERENCES

http://www.whsfa.org/debate/goals-objectives
http://www.cdtl.nus.edu.sg/success/sl11.htm

(V). NAME OF THE METHOD: CASE STUDIES

DEFINITION:

The Case Study method is training by solving specific cases. The essence of this method is a collective analysis of a situation, finding a solution and a public defence of said solution. In the process of reviewing the cases, students gain the skills of teamwork, independent modeling of the solution, independent reasoning and defending their opinion.

OBJECTIVES:

The objectives are listed as follows:

- Provide account of actual problem/situation an individual/group has experienced
- Provides a means of analyzing & solving a typical problem
- Open-ended proposition that asks the basic question – "What would you do?" – Solution must be practical - the best you can come up with under the circumstances
- Effective method of provoking controversy & debate on issues for which definite conclusions do not exist.

WHEN TO USE IT:

Many students are more inductive than deductive reasoners, which mean that they learn better from examples than from logical development starting with basic principles. The use of case studies can therefore be a very effective classroom technique.

HOW TO USE IT/IMPLEMENTATION/WORKING:

In the most straightforward application, the presentation of the case study establishes a framework for analysis. It is helpful if the statement of the case provides enough information for the students to figure out solutions and then to identify how to apply those solutions in other similar situations. Instructors may choose to use several cases so that students can identify both the similarities and differences among the cases.

Depending on the course objectives, the instructor may encourage students to follow a systematic approach to their analysis. For example:

- What is the issue?
- What is the goal of the analysis?
- What is the context of the problem?
- What key facts should be considered?
- What alternatives are available to the decision-maker?
- What would you recommend — and why?

An innovative approach to case analysis might be to have students Role Play the part of the people involved in the case. This not only actively engages students, but forces them to really understand the perspectives of the case characters. Videos or even field trips showing the venue in which the case is situated can help students to visualize the situation that they need to analyze.

REFERENCES

https://feaweb.org/_data/files/eAdvocate/August/interactiveteaching.pdf
http://www.bu.edu/ctl/teaching-resources/using-case-studies-to-teach/

(VI). NAME OF THE METHOD: LAB WORK / PRACTICAL

DEFINITION:

By 'practical work' we mean tasks in which students observe or manipulate real objects or materials or they witness a teacher demonstration. Practical Work for Learning comprises a set of resources exemplifying three different approaches to practical work: argumentation, model-based inquiry, and science in the workplace.

OBJECTIVES:

Practical work can:

- Motivate pupils, by stimulating interest and enjoyment
- Teach laboratory skills
- Enhance the learning of scientific knowledge
- Give insight into scientific method and develop expertise in using it
- Develop 'scientific attitudes', such as open-mindedness and objectivity

WHEN TO USE IT:

It is useful here to consider the key objective of your practical classes. For example: If understanding theories, concepts and processes is key then it may be possible to substitute alternative activities when a student is unable to carry out a practical task. For example, it may be sufficient if students observe processes (in real time, or via AV resources) rather than actually conduct them. If it is crucial that students be able to perform the activities in question (e.g. skills based learning outcomes rather than theory based) then it may be necessary for all students to perform the task in question.

HOW TO USE IT/IMPLEMENTATION/WORKING:

Practical as any teaching and learning activity should be demonstrated. This can be done by physically doing/demonstrating the experiment which involves at some point the students in observing or manipulating real objects and materials. In the first category are practical tasks whose main aim is to enable students to observe an object or material or event or phenomenon, to note some aspects of it, and perhaps be able later to recall these. Whatever work has been done during practical's is to be recorded.

REFERENCES:

http://www.nuffieldfoundation.org/practical-work-learning/teaching-and-learning-using-practical-work
http://www.slideshare.net/prashantmehta371/laboratory-method-of-teaching-2516011
https://www.tcd.ie/CAPSL/TIC/guidelines/teaching/classroom.php

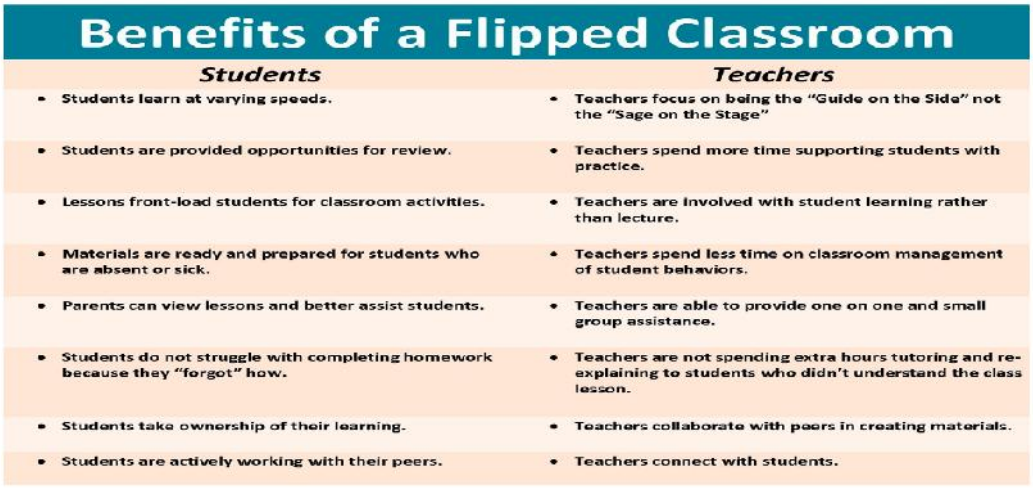
(VII). NAME OF THE METHOD: FLIPPED LEARNING

DEFINITION:

Flipped Learning is a pedagogical approach in which direct instruction moves from the group learning space to individual learning space, and the resulting group space is transformed into a dynamic, interactive learning environment where the educator guides the students as they apply concepts and engage creatively in the subject matter.

OBJECTIVES:

- Increases student-teacher interaction
  - Engages students effectively in the classroom.
  - Helps students of all abilities to excel
  - Allows students to pause and rewind their teacher
  - Allows teachers to know their students better in terms of their strengths and weaknesses.
- 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.



Benefits of a Flipped Classroom

Students	*Teachers*
• Students learn at varying speeds.	• Teachers focus on being the "Guide on the Side" not the "Sage on the Stage"
• Students are provided opportunities for review.	• Teachers spend more time supporting students with practice.
• Lessons front-load students for classroom activities.	• Teachers are involved with student learning rather than lecture.
• Materials are ready and prepared for students who are absent or sick.	• Teachers spend less time on classroom management of student behaviors.
• Parents can view lessons and better assist students.	• Teachers are able to provide one on one and small group assistance.
• Students do not struggle with completing homework because they "forgot" how.	• Teachers are not spending extra hours tutoring and re-explaining to students who didn't understand the class lesson.
• Students take ownership of their learning.	• Teachers collaborate with peers in creating materials.
• Students are actively working with their peers.	• Teachers connect with students.

Figure 1.1: Benefits of a Flipped Classroom
Source: http://hlwiki.slais.ubc.ca/index.php/Flipped_classroom

WHEN TO USE IT:

The flipped classroom approach gives a model for making more class time available for active learning. During class, you want to limit the amount of time you lecture, and increase the time students spend applying the day's material to interesting problems. Leverage the fact that everyone is in the same place at the same time by asking students to work collaboratively on problems, giving each other support and feedback. The main idea is to give your students a first exposure to the day's topic that sets them up for deeper learning during class.

HOW TO USE IT/IMPLEMENTATION/WORKING:

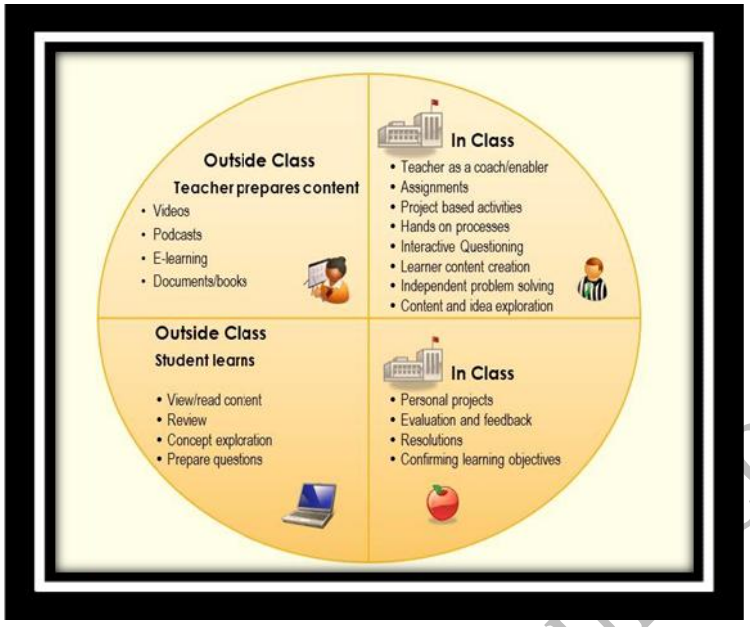


Figure 1.2: Learning Cycles of the Flipped Classroom
Source: https://ileighanne.wordpress.com/2013/01/28/learning-cycles-of-the-flipped-classroom/

Step 1: Provide an opportunity for students to gain first exposure prior to class.
The mechanism used for first exposure can vary, from simple textbook readings to lecture videos to podcasts or screencasts. For example, Grand Valley State University math professor Robert Talbert provides screencasts on class topics on his YouTube channel, while Vanderbilt computer science professor Doug Fisher provides his students video lectures prior to class (see examples here and here. These videos can be created by the instructor or found online from YouTube, the Khan Academy, MIT's OpenCourseWare, Coursera, or other similar sources. The pre-class exposure doesn't have to be high-tech, however; in the Deslauriers, Schelew, and Wieman study described above, students simply completed pre-class reading assignments.
Example video from Doug Fisher

Step 2: Provide an incentive for students to prepare for class.
In all the examples cited above, students completed a task associated with their preparation and that task was associated with points. The assignment can vary; the examples above used tasks that ranged from online quizzes to worksheets to short writing assignments, but in each case the task provided an incentive for students to come to class prepared by speaking the common language of undergraduates: points. In many cases, grading for completion rather than effort can be sufficient, particularly if class activities will provide students with the kind of feedback that grading for accuracy usually provides. See a blog post by CFT Director Derek Bruff about how he gets his students to prepare for class.

Step 3: Provide a mechanism to assess student understanding.
The pre-class assignments that students complete as evidence of their preparation can also help both the instructor and the student assess understanding. Pre-class online quizzes can allow the instructor to practice Just-in-Time Teaching, which basically means that the instructor tailors class activities to focus on the elements with which students are struggling. If automatically graded, the quizzes can also help students pinpoint areas where they need help. Pre-class worksheets can also help focus student attention on areas with which they're struggling, and can be a departure point for class activities, while pre-class writing assignments help students clarify their thinking about a subject, thereby producing richer in-class discussions. Importantly, much of the feedback students need is provided in class, reducing the need for instructors to provide extensive commentary outside of class. In addition, many of the activities used during class time (e.g., clicker questions or debates) can serve as informal checks of student understanding.
Step 4: Provide in-class activities that focus on higher level cognitive activities.
If the students gained basic knowledge outside of class, then they need to spend class time to promote deeper learning. Again, the activity will depend on the learning goals of the class and the culture of the discipline. For example, Lage, Platt, and Treglia described experiments students did in class to illustrate economic principles, while Mazur and colleagues focused on student discussion of conceptual "clicker" questions and quantitative problems focused on physical principles. In other contexts, students may spend time in class engaged in debates, data analysis, or synthesis activities. The key is that students are using class time to deepen their understanding and increase their skills at using their new knowledge.

REFERENCES:

Bishop J. L. and Verleger M. A., 2013, The Flipped Classroom: A Survey of the Research 120th ASEE Annual Conference and exposition, June 2013. Paper ID # 6219

Berrett D (2012). How 'flipping' the classroom can improve the traditional lecture. *The Chronicle of Higher Education*, Feb. 19, 2012.

Brame, C., (2013). Flipping the classroom. Vanderbilt University Center for Teaching. Retrieved 9th July, 2016 from http://cft.vanderbilt.edu/guides-sub-pages/flipping-the-classroom/.
http://www.cirtl.net/node/7788

(VIII). NAME OF THE METHOD: PROBLEM SOLVING

DEFINITION:

The process of working through details of a problem to reach a solution. Problem Solving may include mathematical or systematic operations and can be a gauge of an individual's critical thinking skills.

OBJECTIVES:

Problem based learning will provide you with opportunities to

- Examine and try out what you know
- Discover what you need to learn
- Develop your people skills for achieving higher performance in teams
- Improve your communications skills
- State and defend positions with evidence and sound argument
- Become more flexible in processing information and meeting obligations
- Practice skills that you will need after your education

WHEN TO USE IT:

In PBL, your teacher acts as facilitator and mentor, rather than a source of "solutions."

Problem based learning can be used to provide you with opportunities to:

- Examine and try out what you know
- Discover what you need to learn
- Develop your people skills for achieving higher performance in teams
- Improve your communications skills
- State and defend positions with evidence and sound argument
- Become more flexible in processing information and meeting obligations
- Practice skills that you will need after your education

HOW TO USE IT/IMPLEMENTATION/WORKING:

The following is a simplified model--more detailed models are referenced below.

The steps can be repeated and recycled.

Steps two through five may be repeated and reviewed as new information becomes available and redefines the problem.

Step six may occur more than once--especially when teachers place emphasis on going beyond "the first draft."

1. Explore the issues:

Your teacher introduces an "ill-structured" problem to you.

Discuss the problem statement and list its significant parts.

You may feel that you don't know enough to solve the problem but that is the challenge!

You will have to gather information and learn new concepts, principles, or skills as you engage in the problem-solving process.

2. List "What do we know?"
What do you know to solve the problem?
This includes both what you actually know and what strengths and capabilities each team member has.
Consider or note everyone's input, no matter how strange it may appear: it could hold a possibility!
3. Develop, and write out, the problem statement in your own words:
A problem statement should come from your/the group's analysis of what you know, and what you will need to know to solve it. You will need:

- A written statement
- The agreement of your group on the statement
- Feedback on this statement from your instructor.
  (This may be optional, but is a good idea)

Note: The problem statement is often revisited and edited as new information is discovered, or "old" information is discarded.
4. List out possible solutions
List them all, then order them from strongest to weakest
Choose the best one, or most likely to succeed
5. List actions to be taken with a timeline

- What do we have to know and do to solve the problem?
- How do we rank these possibilities?
- How do these relate to our list of solutions?
  Do we agree?

6. List "What do we need to know?"
Research the knowledge and data that will support your solution
You will need to information to fill in missing gaps.

- Discuss possible resources
  Experts, books, web sites, etc.
- Assign and schedule research tasks, especially deadlines
- If your research supports your solution,
  and if there is general agreement, go to (7). If not, go to (4)

7. Write up your solution with its supporting documentation, and submit it.
You may need to present your findings and/or recommendations to a group or your classmates.
This should include the problem statem

With PBL, your teacher presents you with a problem, not lectures or assignments or exercises. Since you are not handed "content", your learning becomes active in the sense that you discover and work with content that you determine to be necessary to solve the problem.

REFERENCES:

http://www.studygs.net/pbl.htm
https://www.verywell.com/what-is-problem-solving-2795485

(IX). NAME OF THE METHOD: POGIL

DEFINITION:

Process Oriented Guided Inquiry learning (POGIL) is a structured approach that requires students to work in self-managed teams to explore content in a manner that requires them to solve problems, conduct analysis, and cooperate to draw valid conclusions.

OBJECTIVES:

- Students work in small groups on specially-designed activities intended to develop mastery of both course content and key process skills.
- Targeted process skills include: information processing, critical thinking, problem solving, teamwork, communication, management, and assessment.

WHEN TO USE IT:

Because students are using the content to solve a structured problem or set of questions rather than being given the content via a lecture, they are more like to grasp the relevance of the content.

HOW TO USE IT/IMPLEMENTATION/WORKING:

(1) Groups (3-4 students) can be generated several ways:

- randomly
- heterogeneous groupings based on grades
  a) high, low, and middle
  b) high and middle; middle and low

(2) Group members rotate through group roles over a period of time

- keep groups together (unless major problem) for a unit
- Give incentives to make sure all group members put in efforts understand concepts – bonus point on quizzes all students in a group
- Manager – actively participates, keeps team on task, distributes work/responsibilities, assures that team members participate and understand
- Recorder – actively participates, prepares written reflection/self-assessment report in consultation with team
- Reporter – actively participates, communicates with instructor and presents reports to the class when necessary

The POGIL approach includes:

1.) Faculty provided-model and related content;

2.) Specific problem or defined set of questions for small groups to solve/answer with little guidance from the instructor. While there are any number of student-centered classroom techniques, POGIL is unique in that it makes students responsible for their own learning, in collaborative teams, so it

helps them develop group process skills while they are gaining content knowledge.

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Lee, Virginia S. (2012). *Inquiry-guided learning: New directions for teaching and learning*. San Francisco Jossey-Bass.

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EVALUATION MODES

METHODS OF ASSESSMENT TO BE USED FOR THE COURSES AT PARVATIBAI CHOWGULE COLLEGE

To check the understanding of the students and to improve student learning, measuring the learning outcomes in knowledge, skills, attitudes and beliefs becomes an important factor. Assessment therefore is an on-going evaluation process aimed at checking the same. The design of assessment indirectly determines the quality of their learning. For the Intra-Semester Assessments (ISAs) of the course, the following assessment methodscan be used based on the intended learning outcome of the course.

Parvatibai Chowgule College is constantly pursuing excellence in Teaching-Learning-Evaluation so that it caters to different types of learners and also bring about qualitative change across the departments in the institute. In view of this the IQAC of the College organized several workshops on blooms taxonomy, Problem based learning, ICT in teaching etc. For enabling faculty members to adopt different modeds of evaluation to assess the students, the IQAC organised two workhops in July 2018 on "Modes of Evaluation/Assessments- I" and Modes of Evaluation/Assessments- II" on 6th July 2018 and 20th July 2018 respectively. The resource persons for the workshop were IQAC members Dr. Nandini vaz Fernandes and Dr. Sachin Moraes. The faculty members were explained 10 different modes which can be adopted for assessment of students. The resource person explained the structure, the process, guidelines for teachers, guidelines for students and rubrics for all the 15 modes.

1. OPEN BOOK EXAM (OBE)
2. MULTIPLE CHOICE QUESTIONS (MCQ)
3. STUDENT PRESENTATIONS
4. SHORT-ANSWER QUESTIONS
5. ASSIGNMENTS
6. PORTFOLIOS
7. CASE STUDY
8. GOBBET
9. POSTER / CHART / MODEL
10. CONCEPT/MIND MAPS
11. ASSIGNMENT
12. PRACTICAL
13. PROBLEM BASED LEARNING
14. PROJECT BASED LEARNING
15. ENACT/SKIT/DEMO

These modes can be chosen based on the intended learning outcome of the course

STRUCTURE AND PROCESS OF CONDUCTING THE ASSESSMENTS:

The following approach should be adopted for conducting the different modes of assessment.

1) OPEN BOOK EXAM (OBE):

***What it is*:** Open book exams allow student to take notes, texts or resource materials into an exam hall. It is focused on one's ability to:

- Find and apply information and knowledge and
- Think critically (assessing higher cognitive abilities of a student).

OPTION 1:

Structure:

- Maximum marks: 20
    - Time duration: 60 minutes.
    - No. of questions: 04
    - Type of questions:
        - Q1- from higher order of Blooms taxonomy
        - Q 2 and Q 3: essay type questions.
    - Type of test: May be Restricted (1 book / 1 set of notes) or unrestricted (unlimited documents / text books).

OPTION 2:

Structure:

- Maximum marks: 20
    - Time duration: 60 minutes.
    - No. of questions: 02
    - Type of questions:
        - Q1 and Q 2 both from higher order of Blooms taxonomy.
    - Type of test: May be Restricted (1 book / 1 set of notes) or unrestricted (unlimited documents / text books).

Process:

- Exam will be conducted during the regular lecture schedule.
- Permitted material: Books, Reference material, CLAAP notes, web resources.
- Use of electronic devices, such as laptop, tab, I pad, palmtop, smart watches, mobile phone, or any other electronic device/ gadget at the examination hall/room, will be permitted at the discretion of the course faculty.
- Candidates will not be allowed to consult their fellow examinees or exchange their study material/notes, etc. with each other in the examination hall nor communicate with each other for any purpose.
- Assessment will be based on the student's ability to effectively answer the questions in the stipulated time.

Guidelines for teachers:

- During course teaching, shift the focus from teaching a body of information to teaching how to process and apply it
- Model questions should be provided to students on CLAAP for reference of the candidates.
- Formulate 'good' questions. Ask '*why'* and '*how'* ratherthan '*what'* type of questions (Refer to Blooms taxonomy).
- Frame questions such that answers cannot be obtained by copying text directly from single section of the book.
- Review the questions framed by you and get one or two of your colleagues to react to them critically.
- Guide students not resort to rote learning, mark important passages in books, or bring along solved model questions etc.
- Explain the rubric of assessment to students beforehand,

RUBRIC OF ASSESSMENT:

	The student can be graded based on their ability of:		
	Comprehension (25%)	***Synthesis (25%)***	***Application (50%)***
Excellent (70% and above)	Demonstrated complete knowledge of concepts or principles of the course; showed a thorough and excellent understanding in interpretation of the content from textbooks, notes and other learning materials	Demonstrated excellent ability to look at an issue from different dimensions, and generated innovative ideas apart from searching from textbooks	Demonstrated competent ability to elaborate and reflect on what they have learned and applied it in the context of the questions
Average (69 – 50%)	*Reflected most of the knowledge or main points of concepts or principles; showed a good understanding in interpretation of the content from textbooks, notes, and other learning materials*	Showed good ability to investigate an issue from various dimensions; attempted to generate ideas apart from searching from textbooks	Attempted to elaborate, but mostly summed up what they have learned and applied it in the context of the questions
Below average (49 – 30%)	Showed partial knowledge of some points of the concepts or principles; showed a basic understanding in interpretation from textbooks, notes, and other learning materials	Showed fair ability to look at an issue from different dimensions, but mostly base on the resources from textbooks	Showed a general description of what they found from textbooks; attempted to apply what they have learned in the context of questions
Poor (below 30%)	Showed minimal knowledge of concepts or principles; showed a poor understanding in interpretation from textbooks, notes, and other learning materials	Showed very limited ability to investigate an issue from different dimensions	Showed a poor understanding of what they have learned and failed to apply it in the context of questions

2) MULTIPLE CHOICE QUESTIONS (MCQ):

***What it is*:**Multiple choice questions (MCQs) are a form of assessment for which students are asked to select one or more of the choices from a list of answers. MCQs are typically used for assessing knowledge only.MCQs are usually used as formative assessments during class.

OPTION 1: For assessing Knowledge

Structure:

- Maximum marks: 20
- Time duration: 10 minutes.
- No. of questions: 20
- Type of questions:
  - Choose the correct option
  - Incomplete sentence to be completed with options.
- Type of options:
  - 4 options for each question.
  - Of the 4 options 1 should be key and 3 distractors.
- Objective exams can be different in style. For example, multiple choice, true-false, matching and sentence completion are all objective exams.

OPTION 2: For Assessing understanding

Structure:

- Maximum marks: 20
- Time duration: 20 minutes.
- No. of questions: 20
- Type of questions:
  - Calculation based questions
- Type of options:
  - 4 options for each question.
  - Of the 4 options 1 should be key and 3 distractors.

Process:

- Exam will be conducted during the regular lecture schedule.
- Candidates are prohibited to bring in any electronic devices, such as laptop, tab, I pad, palmtop, smart watches, mobile phone, or any other electronic device/ gadget at the examination hall/room.
- Candidates will not be allowed to consult their fellow examinees or exchange their materials with each other in the examination hall nor communicate with each other for any purpose.

Guidelines for teachers:

- Avoid giving clues to the correct answer. The sequence of the questions can be changed to prepare more than 03 or more sets of question papers.

3) STUDENT PRESENTATIONS

***What it is*:**

Presentation is the process of showing and explaining the content of a topic to an audience or a group of audiences. It is often used to assess student learning in individual or group work / research projects. Presentation is an effective method to improve students at public speaking.

Structure:

- Presentation assessment usually consists of a topic for the student to research, discuss and present.
- Question and answer session is usually included after the presentation.
- This measures the ability of students to respond, think under pressure and manage discussion.
- Sometimes it is in this part of the presentation that the student shows his/her in-depth knowledge of the topic and presentation skills.
- A good presentation is usually expected to consist of:
    - Introduction/ Aims/Objectives
    - Major points and ideas explained and summarized
    - Results/Related points/Issues/or others depending on the topic
    - Conclusion – future work
    - The presentation should be present in the time allowed

Process:

- The rubric of assessment and guidelines should be made known to the students well in advance.
- The presentation will be presented by an individual or all members in the group.
- Presentation will be followed by questioning session.
- Cross-questioning of presenters many be both, by teachers and other students.

Guidelines for teachers:

- Use when the skills of live presentation when itsis relevant to the course outcome and when the audience for the presentation is likely to learn something from it.
- Assessment can be ideally undertaken within class time.
- Presentation takes relative amount of time for the students to present during contact hours, thus this is usually not the best method for a large class.
- Ensure the students know what the primary objective of the presentation assessment is.
- Expalin the structure and guidelines that need to be followed.

- Be clear and transparent about the assessment criteria/marking scheme, by uploading it on CLAAP and by announcing it to students before the date of assessment.
- Ensure that the presentation is the students's own work and not downloaded from webresources.
- A soft/hard copy of the student's presentation should be maintained by the course faculty.

Guidelines for students:

- All the students have to follow the defined structure of a student's presentation.
- All students have to compulsorily ask questions to presenter.
- The presentation is the students's own work and not downloaded from webresources.
- Read the assessmnet criteria and prepare for the presentation accordingly.
- Presentation may be presented by an individual or all members in the group, as instructed by course faculty.

RUBRIC OF ASSESSMENT:

Roll no.	Content (marks obtained are same for all group members) (30%)	Skills of presentation (Individual) (30%)	Ability to answer questions (Individual) (30%)	Asking questions to presenter (Individual) (10%)
1				
2				

4) SHORT-ANSWER QUESTIONS

***What it is*:** Short-answer questions are open-ended questions that require students to create an answer. They are commonly used in examinations to assess the basic knowledge and understanding (low cognitive levels) of a topic before more in-depth assessment questions are asked on the topic.

Structure:

- Short Answer Questions do not have a generic structure.
- Questions may require answers such as:
    - Complete the sentence,
    - Supply the missing word,
    - Short descriptive or qualitative answers,
    - Diagrams with explanations etc.
- The answer is usually short, from one word to a few lines.
- Often students may answer in bullet form.

Guidelines for teachers:

- Short Answer Questions are relatively fast to mark.
- Short Answer Questions can be used as part of a formative and summative assessment.
- Design short answer items which are appropriate assessment of the learning objective
- Make sure the content of the short answer question measures knowledge appropriate to the desired learning goal.
- Express the questions with clear wordings and language which are appropriate to the student population.
- Ensure there is only one clearly correct answer in each question.
- Ensure that the item clearly specifies how the question should be answered:
    - Student should answer it briefly and concisely using a single word or short phrase?
    - Is the question given a specific number of blanks for students to answer.
- Consider whether the positioning of the item blank promote efficient scoring.
- Write the instructions clearly so as to specify the desired knowledge and specificity of response.
- Set the questions explicitly and precisely.
- Direct questions are better than those which require completing the sentences.
- Questions which Requires working out:
    - For numerical answers, let the students know if they will receive marks for showing partial work (process based).
    - or only the results (product based), also indicated the importance of the units.
- Let the students know what your marking style is:
    - Is bullet point format acceptable?
    - Or does it have to be an essay format?

5) ASSIGNMENT:

What it is:

It is a technique which can be usually used in teaching and learning process.
It is an instructional technique comprises the guided information, self learning, writing skills and report preparation among the learner.

Types:

Different types of assignments have their own structure and features.

- Research essay
- Literature review
- Annotated bibliography
- Reflective journal
- Critical review or analytical review
- Case study
- Lab/practical or experiment write up
- Project report

Structure:

- Abstract
- Introduction
- Methods
- Results
- Discussion
- Summary
- References

OR

- Abstract
- Introduction
- Main text body
- Summary
- References

RUBRIC OF ASSESSMENT (With example of Assignment on 'My Family'):

Sr.No	Criteria	Excellent= 80-100%	Good= 60-79%	Fair= 40-59%	Poor =Below 40%
1.	Format- 6 Indicators (3 Mks)	5 to 6 are Provided	4 Indicators	3 Indicators	2 Indicators
2.	Abstract/Introduction (3 mks)	Abstract/ Introduction provides a comprehensive précis of the assignment with a proper co-relationship	Abstract/Introduction covers almost all the aspects of the assignment	Abstract/Introduction covers few aspects of the assignment	No Abstract is provided

3.	My Self	Covers all-4 aspects of the evolution of self and a detail co-relationship with other aspects	Covers 3 aspects of the evolution of self and a detail co-relationship with other aspects	Covers 2 aspects of the evolution of self and a detail co-relationship with other aspects	Covers 2 aspects of the evolution of self
4	Family	Covers all-4 aspects of the evolution of Family and a detail co-relationship with other aspects	Covers 3 aspects of the evolution of Family and a detail co-relationship with other aspects	Covers 2 aspects of the evolution of family and a detail co-relationship with other aspects	Covers 2 aspects of the evolution of Family

6) PORTFOLIOS

***What it is*:**

A portfolio is a collection of student's work which gives evidence to show how the student can meet the specified learning outcomes. A typical portfolio consists of work selected by the student, reasons for selecting these works and self-reflection on the learning process. Portfolio is a developmental process, thus it is not only the product that the student or teacher assess upon but also the learning process in which the student develops during the given period. Portfolio is an assessment method that monitors the growth and development of student learning.

Portfolio is an assessment method which gives students the opportunity to be responsible for their own learning. Students often develop a proud ownership of their work.

- It shifts teacher's focus from comparative ranking to improving understanding via feedback.
- Learning should not be all about the end result, portfolio is one of those assessment methods which allow students to demonstrate more than the end result – a process orientated method.
- A portfolio assessment is sometimes followed by an oral assessment.

Structure:

Two common Types of Assessment Portfolios:

1. **Documentation Portfolio** is to highlight the development and improvement of student learning during a given period of time. It often contains a range of artefacts from brainstormed lists to rough drafts to finished products.

2. **Process Portfolio** is similar to documentation portfolio, in which it contains all the evidences required to prove the learning outcomes in the given time, in addition, it integrates reflection and higher-order cognitive activities. It emphasizes metacognitive functioning and encourages students to become active participants in understanding their own learning. Process portfolio often contains documentation of reflection such as learning logs, journals and diaries.

Process:

- Ensure the students know what the objectives of the portfolio assessment are.
- Provide students the time period, guidelines, requirements, assessment criteria and if there are items that are not to be included.
- Give Feedback. It is very important for a good portfolio assessment.

RUBRIC OF ASSESSMENT:

The student can be graded based on their ability of	***Scores / Grading***			
	Excellent (70% and above)	***Average (69 – 50%)***	***Below average (49 – 30%)***	***Poor (Below 30%)***
1) Table of content (5%)	Table of Contents is complete and agrees with the locations of all work/artifacts	Table of Contents is present, but incomplete	Content given in haphazard manner	No Table of Contents. Papers have a confusing arrangement
2) Overview section/ Mindmap of the entire work done / outline of the procedure adopted. (20%)	- Includes proper Plan/ protocol. - Clear precise mindmap. - Well established protocols.	- Includes proper Plan/ protocol but haphazard representation.	- No Concrete work plan. - No standard protocol adopted.	-No methodology adopted, and is just documentation of text from web/book.
3) Main text/ Fieldwork outcome/ data representation/ documentation of findings (50%)	- Well documented data. - Clear and precise representation of all activities done to attain the learning outcome.	- Documented systematically but the data represented does not completely indicate achievement of learning objective	- Data just represented without clear interpretation or analysis.	- Incomplete data and necessary objectives not met.
4) Reflection on the learning, Summary and conclusion (25%)	Clear precise summary of workdone and learning outcome achieved	Summary of work done furnished but and learning outcome met partially.	Summary given. Reflection given does not meet the requirement of the objective of the course	Incorrect analysis / interpretation and conclusion

7) CASE STUDY:

***What it is*:** The aim of case study is to help students demonstrate the theoretical concepts in real-life issues. Students can also develop various generic skills, such as decision making and practical skills through the case study.

Structure: A case study may consist of the following sections:

1) *Objective:* The expected learning outcomes of the case that teachers want their students to develop (e.g. the application to the theory into a scenario).
2) *Description of the case*: It can be in the forms of diagram, newspaper journals and a scenario presented within a short paragraph. Of course, the case may not always be an exact mimic of real- life scenario. It is also possible that the case study is presented with some questions and instructions.
3) *Preparation and Analysis*: teachers can provide the case study and some related questions to student. Students have to prepare research materials and analyze the piece given in their own time.
4) *Discussion:* If case study is practiced as a group activity, students can discuss their analysis and opinions with other group members in different perspectives.
5) *Presentation*: Students may report their analysis, findings and discussion through short presentation, poster, essay, debate and worksheet.
6) *Conclusion*: Students conclude their findings and their views of the case.

Guidelines for teachers:

- Decide the topics, objectives, skills and learning outcomes that students will accomplish.
- Create a case that students can apply the theoretical concept, ensure it is actually feasible. Provide a few questions for students to do their analysis
- Decide the case study can be given as individual activity or group activity.
- As real-life cases are complex and open to different disciplines and opinions, there may be no right or authoritative answer in some scenarios, students may give answers that are innovative and out of the course context
- Make sure to provide guidelines and explanations to students as some of them may be unfamiliar with this teaching and learning approach.
- Clear grading criteria and also specify whether they need to present their analysis in the forms of oral presentation or short report, a poster or even debate with other groups.

Criteria	Poor (Below 30%)	Below average (49 – 30%)	Average (69 – 50%)	Excellent (70% and above)
1) Clear explanation of key strategic issues : 20% • The problems, scope, and seriousness was clearly identified in the discussions. • There was a well focused diagnosis of strategic issues and key problems that demonstrated a good grasp of the company's present situation and strategic issues. • Effective Executive Summary • Did not waste space summarizing information already found in the case.	Shows little understanding of the issues, key problems, and the company's present situation and strategic issues. Executive summary missing or poorly constructed	Shows some understanding of the issues, key problems, and the company's present situation and strategic issues. Executive summary inadequate	Shows adequate knowledge of the issues, key problems, and the company's present situation and strategic issues. Executive summary adequate	Shows superior knowledge of the issues, key problems, and the company's present situation and strategic issues. Effective Executive Summary
2) Valid arguments; analysis of financial performance with relevant supportive detail: 20% • Logically organized, key points, key arguments, and important criteria for evaluating business strategies were easily identified • Critical issues and key problems that supported the Case Analysis were identified and clearly analyzed and supported.	Critical issues and key problems that supported the Case Analysis were poorly identified, analyzed, and supported.	Critical issues and key problems that supported the Case Analysis were not clearly identified, analyzed, and supported.	Critical issues and key problems that supported the Case Analysis were partially identified, analyzed, and supported.	Critical issues and key problems that supported the Case Analysis were clearly identified, analyzed, and supported.
3) Appropriate analysis, evaluation, synthesis for the specific industry identified: 20% • There was complete data on which to base a thorough analysis • Key change drivers underlying the issues were identified. • Synthesis, analysis, and evaluations were clearly presented and supported in a literate and effective manner.	Analysis of key change drivers and the underlying the issues inadequate.	Analysis of key change drivers and the underlying the issues were not identified.	Analysis of key change drivers and the underlying the issues were partially identified	Analysis of key change drivers and the underlying the issues were clearly identified
4) Conclusions and recommendations are congruent with strategic analysis : 20% • Specific recommendations and/or plans of action provided. • Specific data or facts were referred to when necessary to support the analysis and conclusions. • Recommendations and conclusions were presented and supported in a literate and effective manner.	Effective recommendations and/or plans of action not provided. Specific data or facts necessary to support the analysis and conclusions was not provided.	Effective recommendations and/or plans of action inadequate. Specific data or facts were not referred when necessary to support the analysis and conclusions.	Effective recommendations and/or plans of action were partially provided. Specific data or facts were occasionally referred when necessary to support the analysis and conclusions.	Effective recommendations, solutions, and/or plans of action were provided. Specific data or facts were referred when necessary to support the analysis and conclusions.

5) Proper organization, professional writing, and logical flow of analysis. APA formatting:20% • Logically organized, key points, key arguments, and important criteria for evaluating the business logic easily identified. • Key points were supported with a well thought out rationale based on applying specific concepts or analytical frameworks to the data provided in the case. • Proper grammar, spelling, punctuation, 3rd person objective view, professional writing, and syntax.	Key points were poorly identified and supported with a well thought out rationale based on applying specific concepts or analytical frameworks to the data provided in the case. Grammar, spelling, punctuation, professional writing, and syntax needs significant improvement	Key points were not identified and supported with a well thought out rationale based on applying specific concepts or analytical frameworks to the data provided in the case. Grammar, spelling, punctuation, professional writing, and syntax needs improvement	Key points were partially identified and supported with a well thought out rationale based on applying specific concepts or analytical frameworks to the data provided in the case. Adequate grammar, spelling, punctuation, professional writing, and syntax	Key points were clearly identified and supported with a well thought out rationale based on applying specific concepts or analytical frameworks to the data provided in the case. Excellent grammar, spelling, punctuation, professional writing, and syntax

8) *GOBBET:*

***What it is*:** A gobbet can often be a passage of literature, an image, a cartoon, a photograph, a map or an artefact which provides a context for analysis, translation or discussion in an assessment.

- A gobbet can often be:
  - a passage of literature,
  - an image,
  - a cartoon,
  - a photograph,
  - a map or
  - an Artefact
- It should provide a context for analysis, translation or discussion in an assessment.

Time: As is decided by Course faculty (based on the rigour involved)

Structure:

Three gobbets are equivalent to one essay question in terms of time in an assessment. The art of setting a good gobbet assessment depends on the gobbet the assessor chooses. A good piece of gobbet must be carefully selected to illustrate a particular theme. An answer to a gobbet is not a summary or

paraphrase of the piece; unlike an essay it does not usually include an introduction and a conclusion. It is a precise and focused piece of writing that provides the context, meaning and signficance. Disciplines such as history or archaeology, geography, languages, physics, economics, maths, and biological science often use gobbets to assess students on their deep understanding of the subject, giving students the opportunity to think, extract and analyze.

Guidelines for teachers:

- Ensure the students know what the objectives of the assessment are.
- Inform students that the gobblet should involve evaluation of the information and not paraphrasing what is already in the piece.
- Students need to be advised to:
    - Include cross-references to any other primary sources, written.
    - feel free to answer in bullet-point form
    - Be PRECISE, CONCISE and STRICT about only sticking to relevant information.
- Provide students the time period, guidelines and assessment criteria.
- Along with the photo/map/scene/artifact, series of questions can be asked (lower and higher order of Blooms taxonomy).

- Eg: Students, may be told to analyse a map / photograph/scene / cartoon/ artifact to get the answer for the following:
    - What clues are in the picture to establish time and place?
    - What is happening in the picture?
    - What is the significance of the event?
    - What can and what cannot be learnt from the picture?
    - Why do you think the picture was produced?
    - What message is the picture trying to communicate?
- Prepare a structured marking sheet.

RUBRIC OF ASSESSMENT:

MARKING RUBRICS	*Excellent (70% and above)*	*Average (69 – 50%)*	*Below average (49 – 30%)*	*Poor (Below 30%)*
Context: (5%)	Outstanding grasp and a mature understanding of the gobbet and its contexts	Comments on the nature, authorship, and other material pertinent to the context and interpretation of the piece	Make some pertinent comments on the nature, authorship, and other relevant aspects of the gobbet.	Fails to expand on the nature, authorship, and other issues relevant to the gobbet.
Analysis: (30%)	Clear, coherent and compelling analysis	Demonstrates familiarity with the area under discussion	Demonstrates some familiarity with the area under discussion	May paraphrase rather than analyse the gobbet under discussion
Meaning: (30%)	Comprehensive coverage. This may be achieved by citation	Identify the point of the document or the theme that it illustrates	Identify the point of the gobbet – the subject or the theme which it illustrates	Fails to identify the point or the theme of the piece
Citation: (5%)	Economic and effective use of all material cited	Substantiates the points that are made from evidence	Contains some citation but not appropriately used to substantiate the piece	Contains no citation
Significance: (30%)	Identifies the gobbet's significance in an independent, distinctive, and authoritative way	Explores some of the significance of the gobbet with reference to such issues as typicality, representative ness, uniqueness, reliability, bias	Touches on the wider significance	Fails to identify the gobbet's wider significance

9) POSTER / CHART / MODEL:

***What it is*:**

Poster is the process of showing the content and the findings of a topic to an audience or a group of audiences at different times. It is often used to assess student learning in group research projects. Peer and tutor assessment can be used as part of the grading process.

Structure:

Poster assessment usually involves a topic for the student to research and present on a poster. Although question and answer sessions are uncommon, students are sometimes requested to stand by their posters to explain their findings. Poster assessments are expected to be brief and attractive.

Process:

- *A good poster usually expected to have the following two characteristics:*
  - *Good contents*
  - *Good and clear visuals*
  - *Creativity.*
  - *Concise summarize.*
- Explain the rubric of assessment to the students (can be uploaded on CLAAP / Google classroom).
- Ensure the students know what the primary objective of the poster assessment is, if not students may overspend their time on the visual effects, and not on the actual content.
- Poster assessment encourages creativity.

Guidelines for teacher:

- A poster can be assessed based on the criteria given to students before hand.
- Let the students know if they are required to be around for poster explanation.
- Let students know the assessment criteria and marking scheme, the students should also be aware of who is going to assess them – tutor, peers and/or self.
- A structured marking sheet should be provided for all assessors (if going to be asssesed by peers)

RUBRIC OF ASSESSMENT:

Criteria	*Excellent (70% and above)*	*Average (69 – 50%)*	*Below average (49 – 30%)*	*Poor (Below 30%)*
Presentation of Research (30%)	Prominently positions title/authors of paper thoroughly but concisely presents main points of introduction, hypotheses/ propositions, research methods, results, and conclusions in a well-organized manner Narration and/or answering of questions is engaging, thorough, and adds greatly to the presentation	Contains title/authors of paper adequately presents main points of introduction, hypotheses/ proposition, research methods, results, and conclusions in a fairly well-organized manner Narration and/or answering of questions is adequate and adds to the presentation	Contains title/authors of paper presents main points of introduction, hypotheses/ propositions, research methods, results, and conclusions but not as sufficiently and not as well-organized Narration and/or answering of questions is somewhat lacking	Title/authors absent Does not sufficiently present main points of introduction, hypotheses/ propositions, research methods, results, and conclusions and is not well-organized Narration and/or answering of questions is lacking
Visual Presentation (50%)	Overall visually appealing; not cluttered; colors and patterns enhance readability; Uses font sizes/variations which facilitate the organization, presentation, and readability of the research Graphics (e.g., tables, figures, etc.) are engaging and enhance the text content is clearly arranged so that the viewer can understand order without narration	Overall visually appealing; not cluttered; colors and patterns support readability Adequate use of font sizes/variations to facilitate the organization, presentation, and readability of the research Graphics (e.g. tables, figures, etc.) enhance the text content is arranged so that the viewer can understand order without narration	Visual appeal is adequate; somewhat cluttered; colors and patterns detract from readability Use of font sizes/variations to facilitate the organization, presentation, and readability of the research is somewhat inconsistent/distractions Graphics (e.g., tables, figures, etc.) adequately enhance the text Content arrangement is somewhat confusing and does not adequately assist the viewer in understanding order without narration	Not very visually appealing; cluttered; colors and patterns hinder readability Use of font sizes/variations to facilitate the organization, presentation, and readability of the research is inconsistent/distracting Graphics (e.g., tables, figures, etc.) do not enhance the text Content arrangement is somewhat confusing and does not adequately assist the viewer in understanding order without narration
Documentation of Sources, Quality of Sources (15%)	Cites all data obtained from other sources. APA citation style is accurate	Cites most data obtained from other sources. APA citation style is accurate	Cites some data obtained from other sources. Citation style is either inconsistent or incorrect.	Does not cite sources.
Spelling & Grammar (05%)	No spelling & grammar mistakes	Minimal spelling & grammar mistakes	Noticeable spelling and grammar mistakes	Excessive spelling and/or grammar mistakes

10) CONCEPT MAPS:

***What it is*:**

- A concept map is a hierarchical form of structure diagram that illustrates conceptual knowledge and their relationships within a specific topic from general to specific concepts.
- It consists of concept labels which are connected together by lines, these lines are labeled with directions.
- The core element of a concept map is a proposition, which consists of two or more concepts connected by a labeled link which are then branched out to form a larger structure that provides the whole picture.
- This may be considered as a component of other modes of assessments:
- Eg: Component of assignment, component of portfolio etc.

Process:

- Offer a topic / chapter to the students and make them draw concept maps of the entire chapter / topic.
- Students can draw the concept maps using softwares available(E-Draw, Mindmap etc).
- "Picture tells a thousand words"; graphic representations are usually easier to understand and retain.
- It can be used in a large class setting either individually or collaboratively, by giving the students a partially filled concept map, or a few concepts to fill on the maps.
- It is an active assessment.
- By understanding the whole picture, how each concept is related and sub-related to each other which are illustrated in a hierarchical framework, learners will find deep learning.

Guidelines for teachers:

- Introduce concept map to students if you are planning to use them as assessments.
- introduce concept map to them
- Demonstrate the use of softwares (method of construction).
- Ensure the students know what the objectives of the assessment are.
    - Provide students:
        - the time period,
        - guidelines,
        - requirements,
        - assessment criteria

Download the software from; http://www.edrawsoft.com/freemind.php

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Web Reference and Resources referred:

- Race, P., Brown, S., & Smith, B. (2005). *500 Tips on assessment.* Routledge Falmer Taylor & Francis Group: London and New York.
- Centre for Development of Teaching and Learning (CDTL), National University of Singapore http://www.cdtl.nus.edu.sg/Handbook/Assess/obe.htm
- Centre for Learning and Teaching, Manchester metropolitan University http://www.celt.mmu.ac.uk/assessment/design/open_book.php
- Learning and Teaching Resource Centre, The Hong Kong Polytechnic University http://www.polyu.edu.hk/assessment/arc/

BEST PRACTICES

BEST PRACTICE AREA: TEACHING LEARNING EVALUATION

1. **Tile of the Practice: FLIPPED CLASSROOM AS A COOPERATIVE LEARNING STRATEGY (CLS)**

2. **Objectives of the Practice:**
   To shift learners from passive learning (traditional classroom) to active learning (flipped learning, blended learning). To engage learners in higher order activities – cooperative and collaborative learning strategies, peer learning and problem based learning.
   a) To move students away from passive learning and towards active learning by encouraging collaboration and peer learning.
   b) To change the teacher's role from an information giver to a facilitator.

3. **The Context:**
   Certain content of the course is flipped so that students have access to it outside the classroom, which the facilitator uses change the instructional paradigm within the classroom from a lower-order construct to a higher-order construct. The flipped classroom methodology of teaching-learning encourages collaborative learning. The present Flipped Classroom practice is description of the process adopted by Mr. Andrew Barreto, of department of English.

4. **The Practice:**
   This method is being used in most of my courses, but I will give the example of the English Language and Literature course conducted at the sixth semester. This course is an elective for those who wish to learn about teaching.

   An unique video is created by Mr. Andrew to introduce students to Flipped Learning, https://www.youtube.com/watch?v=qY_-TDRoUUQ along with other OERs, uploaded into the institutional LMS – Google Classroom. The learners are then guided in the classroom through the salient features of Flipped Learning, and the various structures using Cooperative Learning Strategies.

   The method requires Out-of-class activities, In-class activities (CLS) and appropriate evaluations. Through this method, a variety of Web 2.0 tools are used to engage students. He used EdPuzzle, Poll Everywhere, along with the use of Google Classroom as formative evaluations, while using an ePortfolio as a final summative evaluation.

   - Outcomes: Students are self-learners, associated employable soft-skills and hard-skilss are honed as well.

- Question paper (CA) : Students have to create their own flipped class based on a topic of their choice, using web 2.0 tools to use in class, as well as CL Strategies, and creating an assessment which tests higher order thinking.

- Rubrics: Students are scored on Content (Use of content, appropriateness of amount of content, use of CLS), Structure (Use of AV medium, whether there is an introduction, body and conclusion, as well as link to previous or forthcoming material/oers), References (MLA styled), Engagement (Whether students are engaging with the material).


Links to videos: **https://www.youtube.com/watch?v=qY_-TDRoUUQ**

5. **Evidence of Success**

   Through this activity, the students were able to develop team-work skills. In addition, the students were able to self-learn several topics on the concerned subject/course. The success of this method prompted conduct of workshop on 'Flipped Classroom' for the Faculty of Lifesciences. The college also conducted many workshops on Flipped classroom.

   This method is currently followeb by multiple departments Viz. English, Zoology, Botany, Biochemistry, Biotechnology, Geography.

6. **Problems Encountered and Resources Required**

   a) **Problems Encountered:**

   - Encouraging the students to participate in the activity. It is sometimes difficult to motivate the students to participate wholeheartedly in the activity. Therefore, it is essential for the faculty instructor to identify resources that are interesting to the students.
   - Time allocation: The flipped classroom activity requires substantial time for its conduct. This is difficult in an environment where there are a limited

number of lecture slots available. Hence, this CLS activity cannot be conducted on a regular basis and on substantial amount of syllabus matter.

- In addition, it is also difficult to assess the students.

b) Resources Required:

- Resources pertaining to the syllabus in: (i) physical copy and/or (ii) Audio-Visual resources.

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BEST PRACTICE: TEACHING- LEARNING- EVALUATION

1. Title of the Practice: ASSIGNMENT WRITING AND EVALUATION

2. Objectives:

A systematic approach of assignment writing is devised with the main objective of enabling students to understand the method of academic writing and enhance their writing skills.

3. The Context

The process of assignment writing descrined here is the technique devised by Dr. Nandkumar Sawant. The practice involves methodical process of formulating an outline consisting of Abstract, Introduction, Discussion, Conclusion and Bibliography. The teacher also gives set of instructions which meed to be followed by the students.

The topic of assignment given bu t

4. The Practice

The teacher first gives the topic of assignment to the student. Formulation of the topic is also compreghensive which reflects exhaustive work to be done by the students. Good assignment topic aslo involves hands on activity by the students and incorporation of the report in the same.

The skeletal frame work of an assignment:

Write up	Assignment must contain the following: 1. Abstract 2.Introduction 3.Discussion 4.Conclusion 5.Bibliography
Expected References	Out of the references cited below, each assignment must contain at least 3 references. A total of five references are expected.
Unique References	• The aim here is to encourage all of you to research more than what might be normally taught in class. • Unique refereces are those that are not contained in the Expected Reference list. • Students that have references more than five references will be given due credit.
Writing Center Certification	• The aim is to assist you to improve your technical writing skills. • We urge you to use the assistance given free for you in The Writing Center. • They follow a process to enable you to better your writing, we urge you to follow this. • On successful completion they will certify your work. • This process takes time, and we urge you to make your appointments early. We will brook no excuses for not going.
Good quality bibliography	• This is a technical requirement for all academic writing world over. The more you do it, the better you get. We would like to urge all of you to acquire this skill as soon as possible. • For those whom bibliography writing is new, we would like you to look at the following website; http://www.ehow.com/how_5511177_examples-write-bibliography.html • A bibliography will be judged on the basis of this website
Working Groups/Batches	• The groups will continue to work as designated in the last semester. • Team work gives you an opportunity to work together, share your knowledge and improve your communication skills • Every Thursday lecture will be group review class.
Rubrics of assessment	A clear rubric is furnised as per the expected learning outcome.

Example of Rubric of assessment:

Sr No	Marks distribution	Marks	Total Marks
1	Title and Content	1	20 Mks
2	Abstract	2	
3	Introduction	2	
4	Main content	6	
5	Conclusion/Summary	1	
6	Mind map - Summary	2	
7	References (APA) & In text citation	2	
8	Overall presentation	2	
9	Writing center stamp	1	
10	Plagiarism report	1	
11	Marks deduction for late submission *(MINUS 1 MARK PER DAY , after 3 days assignment will not be accepted)*	-1	
PRESENTATION (on 30th September 2019)			10 Mks
1	Content	02	
2	Skills of presentation	05	
3	Ability to answer questions	02	
4	Asking questions to presenter (of Higher order).	01	

Other instructions furnished:

1. *Date of Assignment*
2. *Date Of Submission*
3. *Question*
4. *Expected Format*
5. *Method Of Submission*
6. *Maximum Marks*
7. *Late Penalty*
8. *Weightage & Distribution*
9. *List of Expected references:*

5. Evidence of Success

The evidences of success can be quantified through the following:

a) *Research publications* by Dr. Nandkumar Sawant published the effectiveness of such rigourous method of assignment writing.

> **Sawant N N**, Fernandes Dwayne, Patil V & Ferrao A (2018) **Student's Engagement In Learning: Student's Perspective Towards Assignment Writing,** An International, Peer Reviewed, Quarterly Scholarly Research Journal For Interdisciplinary Studies, 75-80.

b) *Faculty of Chowgule College Invited as Resource persons by other Colleges*:

Dr. Nandkumar Sawant was invited as resource person to conduct workshops for faculty members on assignment writing. The methodology adopted by him was also used as institutional template for assignment writing.

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BEST PRACTICE: TEACHING- LEARNING- EVALUATION

Title of the Method: PEER INSTRUCTION TEACHING METHOD

Concept:

Development of research-based teaching methodology which teachers use to evaluate student comprehension, provide ongoing feedback to improve their learning gains is important at all levels of physics instruction. Peer Instruction is one such interactive teaching methodology used for formative assessment. Peer instruction was introduced by Prof. Eric Mazur from Harvard University in the 1990s for the introductory physics courses. As stated by Eric Mazur "the fundamental role of implementing peer instruction in class is to exploit student interaction during lectures and focus student's attention on underlying concepts".

Objective:

1. To develop of research-based teaching methodology to evaluate student comprehension.
2. To provide ongoing feedback to improve learning gains of students.
3. To exploit student interaction during lectures and focus student's attention on underlying concepts".

Process:

The process described here is the technique adopted by Dr. Ashish Desai, from Department of Physics.

1. After a brief presentation by the instructor several multiple-choice questions known as concept tests are asked during the class.
2. The concept test is a conceptual question based on a core concept that is being covered in the course and is usually targeted to address student's misconceptions.
3. First, the students think individually and are given 2-3 minutes to answer the concept question.
4. After they report their answer, students work in a small group of three or four to discuss their individual answers to the question and to arrive at a consensus on the correct answer.
5. In order to reach consensus, students must explain their own reasoning and problem solving in support of their answer.
6. After the group discussion, students are then asked to individually answer the question a second time.
7. The entire class participates in the discussion led by student explanations of their group's findings before the instructor answers the question.

Courses implementing Peer Instruction teaching method:

1. Quantum Mechanics
2. Modern Physics

Outcomes:

1. Quantum Mechanics Conceptual Survey (QMCS) developed by Sam McKagan from University of Colorado and NIST, USA is a survey of students' conceptual understanding of quantum mechanics. It is intended to be used to measure the relative effectiveness of different instructional methods in quantum physics courses.
2. Normalized gain introduced by Hake in 1998 can be calculated to measure the effectiveness of the course in promoting conceptual understanding. Hake defined the average normalized gain as:

$$\langle g \rangle = \frac{\langle post \rangle - \langle pre \rangle}{100 - \langle pre \rangle}$$

Where $\langle post \rangle$ is the class average grade on the post-instruction test and $\langle pre \rangle$ is the class average grade on the pre-instruction test.This measure is commonly described as "the amount students learned divided by the amount they could have learned."

3. In this course QMCS was used to check the learning gain of students and the average normalized learning gain for the quantum mechanics course is, $\langle g \rangle = 0.275$ where the maximum possible gain is 0.68.

Problems and Challenges:

a. If the multiple-choice questions are not graded then all students may not always take these questions seriously and may not put the effort into getting the right answer.
b. If the questions are graded then the weaker students might answer by looking at answers of good students. Also, if the questions are graded then some students might not share their frank opinion to get more marks then their peers.
c. Getting students to study on their own and reflect on what was done in the class.
d. To measure the effectiveness of Peer Instruction teaching methodology results obtained over several years would have to be compared to the course on quantum mechanics which uses traditional teaching methodology.

Photographs:

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BEST PRACTICE: TEACHING- LEARNING- EVALUATION

1. Title of the Practice: Experiential learning *(Connecting the Book-View to the Field).*

2 Objectives of the Practice

- To understand the society from the perspective of the actors
- To experience social reality through the field
- To find solution to the problems
- To grow as a better informed and skilled student

Further: The objective of the practice is course and unit specific

Example 1: The TYBA students demonstrated social issues: The topics assigned were gender discrimination, substance abuse and AIDS.

Objective:

- To gain empathy towards the socially deprived groups
- To encourage and engage students to critically think on social issues through sociological perspective: Labelling theory, sub-cultural theory, structural theories etc.

Example 2: The students of SYBA were told to literate the illiterates under the paper title 'Sociology of education'. The students had to go to marginalised group or those people who are illiterate and teach them some basics like their names, signature, filling bank forms, etc.

Objective:

- To teach basic things to the section who is unprivileged.
- To encourage students to mingle with poor people.
- To get the understanding how to collect people when they require.
- To understand learning by doing.

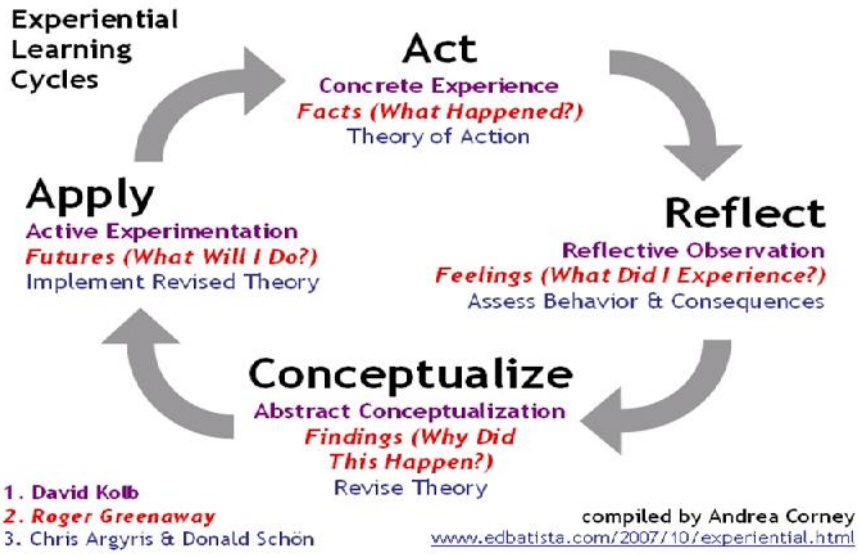
3. The Context

- *Sociology is the study of society, society cannot be trapped in the book, we at the department felt it was important to connect the book with the field so as to give the students the grasp of reality. The department made use of experiential learning in varied courses.*

- *Experiential learning is the process of learning through experience, and is more specifically defined as "learning through reflection on doing". Felicia, Patrick (2011). Handbook of Research on Improving Learning and Motivation. p. 1003. ISBN 1609604962.*

4. The Practice

The present practice described is the one followed in the department of Sociology.



- The above Cycle was used exactly in some courses and modified in others.

What was required?

- Kolb states that in order to gain genuine knowledge from an experience, the learner must have four abilities:
- The learner must be willing to be actively involved in the experience;
- The learner must be able to reflect on the experience;
- The learner must possess and use analytical skills to conceptualize the experience; and

The learner must possess decision making and problem solving skills in order to use the new ideas gained from the experience

Courses executed

1. literate the illiterates' under the paper titled 'Sociology of Education
2. SYBA had to do 'Young Sociologists Awareness Drive' under the paper title 'Family, Kinship and Marriage in India
3. SYBA/TYBA as part of the course 'Rural Sociology' created a 'Rural Newsletter' documenting the various aspects of rural life in Goa.
4. SYBA/TYBA as part of the course 'Women and Society in India documented the 'Unsung Heroines' in society
5. Role Play Fyba: Sociology of Religion
6. Teaching Sociology: Theory and Practice
7. Interview as Part of Qualitative Research Methods
8. Field Visit: Participant Observation and Interviews
9. Classical Sociology: Karl Marx
10. Social Concerns: Measures to deal with population problem and Problems facing Goa

5. Evidence of Success

- While it is the learner's experience that is most important to the learning process, it is also important not to forget the wealth of experience a good facilitator also brings to the situation.

- However, while a facilitator, or "teacher", may improve the likelihood of experiential learning occurring, a facilitator is not essential to experiential learning. Rather, the mechanism of experiential learning is the learner's reflection on experiences using analytic skills. This can occur without the presence of a facilitator, meaning that experiential learning is not defined by the presence of a facilitator.
- Yet, by considering experiential learning in developing course or program content, it provides an opportunity to develop a framework for adapting varying teaching/learning techniques into the classroom

(see Rodrigues, C. A. (2004). The importance level of ten teaching/learning techniques as rated by university business students and instructors. Journal Of Management Development, 23(2), 169-182

Example

Outcome 1:

- *The students were be able to visualize social issues by being an active participant in the role play*
- *The students were able to encounter issues through different perspectives*
- *The students got sensitive and sensitize the viewer's on socially deprived group*

Picture-1 *Picture-2*

Outcome-2

- *Students gathered lot of students who don't go to school because of poverty and to teach them some basics.*
- *Students used different ways to teach the small kids.*

Picture-1 Picture-2 Picture-3

6. Problems Encountered and Resources Required

Time and resources were a major constraint, however the students managed well.

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BEST PRACTICE: TEACHING- LEARNING- EVALUATION

Title of the Method: INQUIRY BASED TEACHING

Objectives:

1. To foster higher order thinking
2. To uncover and explore the hidden meanings and significance of a given cultural aspect of Cuisine
3. To know why cuisines develop and the role it plays in society
4. To develop team and leadership skills

Context: Culture is a complex concept that cannot be easily defined, the widely accepted definition is that 'Culture is everything that human beings have created around them in a given space'. The fact that culture as a concept is multidimensional, this makes teaching and learning about culture even more complex. Culture is dynamic and ever changing, The dynamic nature of culture brings a number of challenges and concerns for teachers trying to choose relevant teaching materials and activities (Savignon&Sysoyev, 2005). While textbooks often depict culture as static, the digital media, authentic products and texts provide a more dynamic environment through direct access to most current practices, perspectives, and products. The teachers' major task is to bring both language and culture in their social reality (Lange, 1999), in order to make sure that the students do not possess incomplete or outdated knowledge about the target language and its culture. With the development of the 3P model, according to Lange (1999), there is a new focus" on learner performance with products, practices, and perspectives" (p. 106).

This paradigm shift from passive receivers of information to active constructors of knowledge places the learners in the role of inquirers who investigate and discovers their own, as well as a second or third culture. In inquiry-based teaching, the students are engaged in meaningful learning that fosters higher-order thinking to assist students in uncovering and exploring the hidden meanings and significances embedded in culture. According to Tang (2006), "not only should students know the *what* and *how* about a culture, but also the *why*. It is the *why*, as has been argued previously, that enriches and sustains the memory about a second culture accumulated in the learning process" (p. 89). Since the Standards promote making meaningful connections and comparisons, it is important that students develop reasoning skills to make these kinds of connections and comparisons. One of the major goals for a teacher is create inquiry questions that provoke interest in the target culture and will lead to important discoveries about the culture and people and thus, develop understanding of culture.

Process:

The approach described here is that adopted by Dr. Sachin Moraes at the department of Sociology. He has modified it as per the requirements of the subject to achie the objectives.

The Class was divided in to four groups, selected by the group leaders. Each group consisted of 14 to 15 members. The teaching-learning process being outcome based ,an integrated approach of Continuous Assessment(C.A) through learning outcome was used. The Teacher introduced the idea of cuisine and its role in culture and varied theoretical aspects. Later the students were expected to research in groups and demonstrate their inquire using the three P's model of products, practices, and perspectives.

The continuous assessment was based on unit 3,

Unit 3: Understanding the Cuisines of Goa

3.1: The Sociology of food.

3.2: Portuguese influences in food.

3.3: Religious differences in cuisines.

3.4: Goan food its preparation (Sociological perspective)

Evidence of success:

This was based on the assessment, which involved demonstration and analyses of Goa Cuisine. Learners in their respective groups had to prepare four authentic main course dishes across any two religious communities and two sweet dishes and explain the preparation and its evolution using sociological theories of westernization, assimilation and adaptation, social significance and relevance and demonstrate the same. The students were assessed on the parameters using a rubric i.e. Creativity and Group Work, Authenticity, Presentation and Conceptualization. A total of 20 Marks were assigned. (See Appendix-3: Rubrics for Goan Cuisine)

Group Photographs

Group 1



Group 2




Group 3



Group 4




Problems and Challenges encountered

1. The teacher had to manage the varied group dynamics
2. Multiple types of learners needed to be oriented properly thereby making the process time consuming
3. Motivating all the students to perform and present the outcome was a challenge

Conclusion

Thus the students increased awareness and to develop their curiosity towards the target culture and their own, to make comparisons among cultures" (p. 19). Grittner (1996) acknowledges that culture learning should give students multiple opportunities to explore various facets of culture and make meaning of their discoveries. Students being actively involved in the discovery process develops students' ability for deeper thinking that promotes comparing and contrasting cultures and becoming "more aware of their own metacognitive processes and developed critical thinking skills". Thus, an inquiry approach to teaching allows students to ask questions that are relevant or particularly interesting to them, collect necessary information, create answers by investigation, generate a theory, present their findings to other students, and then formulate new questions that are derived from the original questions.

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BEST PRACTICE: TEACHING- LEARNING- EVALUATION

1. Title of the Practice: PROBLEM BASED LEARNING – TEACHING LEARNING EVALUATION

2. Objectives:

Problem-based learning (PBL) is a student-centered approach in which students learn about a subject by working in groups to solve an open-ended problem. This problem is what drives the motivation and the learning and is practised by teachers of 03 departments viz. Geography, Zoology and Economics extensively and 03 departments partially (Biotechnology, Biochemistry, Botany).

The main objective of the PBL, is improving the learning of our students. In addition to this general objective, we have other more specific objectives:

i) Development of team skills
ii) Development of conceptual skills
iii) Depth and focus of knowledge acquired
iv) Development of self directed study skills.
v) Improves critical thinking and problem solving

3. The Context

The present description of the best practice is PBL conducted by department of Zoology. All faculty members use PBL as mandatory T-L-E method. PBL is an instructional method in which students work in small groups to gain knowledge and acquire problem-solving skills. A major characteristic of PBL is that the problem is presented to the students before *t*he material has been learned rather than after, as in the more traditional 'problem-solving approach'. A second notable feature of PBL is that the problems are presented in the context in which students are likely to encounter the given (or a similar) problem in real life. It is this contextualisation of material which makes PBL an attractive strategy for the education of professionals

PBL encourages open-minded, reflective, critical and active learning; it acknowledges that both teachers and students have knowledge, understanding, feelings and a shared interest in the educational process.

4. The Practice

PBL fits best with process-oriented course outcomes such as collaboration, research, and problem solving. It can help students acquire content or conceptual knowledge, or develop disciplinary habits such as writing or communication. After determining whether your course has learning outcomes that fit with PBL, you will develop formative and summative assessments to measure student learning.

Next you design the PBL scenario with an embedded problem that will emerge through student brainstorming. Think of a real, complex issue related to your course content.

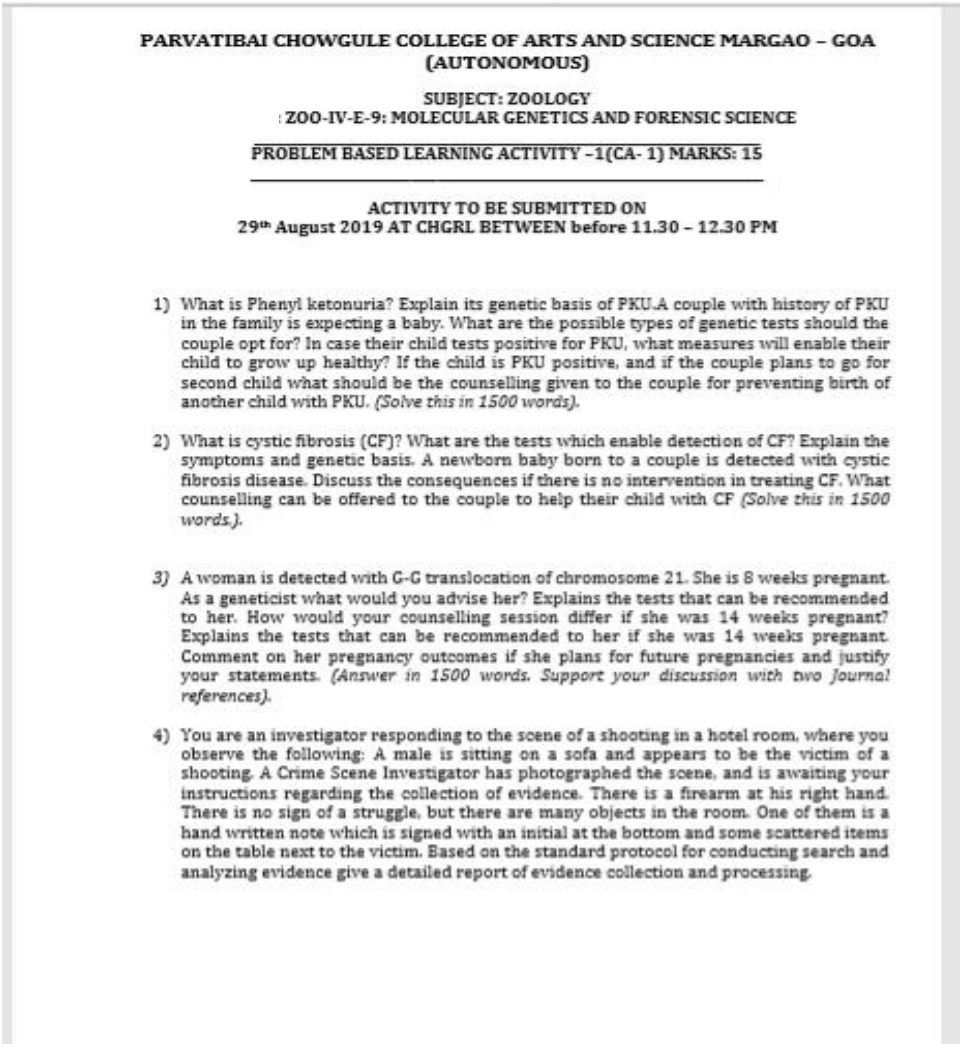
We develop a single scenario and let each group tackle it in their own way, or you could design multiple scenarios addressing a unique problem for each group to discuss and research.

Prior to adopting PBL as mode of teaching- evaluation, students are taught 'Steps of Problem Solving' and 'Thinking skills' (Logical thinking, lateral thinking and critical thinking). The students are the divided into groups of 5. Each group has one group leader. The execution follows the process described. PBL research begins with small-group brainstorming sessions where students define the problem and determine what they know about the problem (background knowledge), what they need to learn more about (topics to research), and where they need to look to find data, how to analyse it, how to critically evaluate and how to present the solutions in multiple perspectives. Therefore PBL serves as a very effective means of teaching-learning as students learn to reason, analyse, evaluate and create (Higher order learning – Blooms taxonomy).

PBL can also be used as an effective Evaluation tool. During the PBL assessment step, evaluate the groups' performances. Use rubrics to determine whether students have clearly communicated the problem, solutions.

Example of PBL at department of Zoology:

Given below is the PBL question posed to the students for the Course "Molecular Genetics and Forensic Science". These questions are posed to the students and the groups of students are expected to solve them by following the 'steps of problem solving'.



PARVATIBAI CHOWGULE COLLEGE OF ARTS AND SCIENCE MARGAO – GOA (AUTONOMOUS)

SUBJECT: ZOOLOGY
: ZOO-IV-E-9: MOLECULAR GENETICS AND FORENSIC SCIENCE

PROBLEM BASED LEARNING ACTIVITY –1(CA- 1) MARKS: 15

ACTIVITY TO BE SUBMITTED ON
29th August 2019 AT CHGRL BETWEEN before 11.30 – 12.30 PM

1) What is Phenyl ketonuria? Explain its genetic basis of PKU.A couple with history of PKU in the family is expecting a baby. What are the possible types of genetic tests should the couple opt for? In case their child tests positive for PKU, what measures will enable their child to grow up healthy? If the child is PKU positive, and if the couple plans to go for second child what should be the counselling given to the couple for preventing birth of another child with PKU. *(Solve this in 1500 words).*

2) What is cystic fibrosis (CF)? What are the tests which enable detection of CF? Explain the symptoms and genetic basis. A newborn baby born to a couple is detected with cystic fibrosis disease. Discuss the consequences if there is no intervention in treating CF. What counselling can be offered to the couple to help their child with CF *(Solve this in 1500 words.).*

3) A woman is detected with G-G translocation of chromosome 21. She is 8 weeks pregnant. As a geneticist what would you advise her? Explains the tests that can be recommended to her. How would your counselling session differ if she was 14 weeks pregnant? Explains the tests that can be recommended to her if she was 14 weeks pregnant. Comment on her pregnancy outcomes if she plans for future pregnancies and justify your statements. *(Answer in 1500 words. Support your discussion with two journal references).*

4) You are an investigator responding to the scene of a shooting in a hotel room, where you observe the following: A male is sitting on a sofa and appears to be the victim of a shooting. A Crime Scene Investigator has photographed the scene, and is awaiting your instructions regarding the collection of evidence. There is a firearm at his right hand. There is no sign of a struggle, but there are many objects in the room. One of them is a hand written note which is signed with an initial at the bottom and some scattered items on the table next to the victim. Based on the standard protocol for conducting search and analyzing evidence give a detailed report of evidence collection and processing.

PBL AND GOBBET

MOLECULAR GENETICS AND FORESIC SCIENCE

SAMPLE PBL

Group 1.

Name	Roll No	Sign
Melita Pereira	SU170029	
Bernice Ben Augustine	SU170033	
Shalini Kepkar	SU170035	
Kevin J D'Silva	SU170038	
Sayyoni Marojkar	SU170040	

Work Report

The discussions on the first three questions was done on 23rd August 2019. All the members contributed to these questions. The answers to the last two question were discussed on 26th August 2019. The first two questions was typed by Shalini and Sayyoni. The 3rd and 4th question was typed by Melita. Bernice and Kevin. The information to the gobbet was contributed by all the members and was typed by Kevin.

We ask team leader to submit report about the interactions and participation of all team members

Well written.

1. i What is Phenylketonuria? Explain its genetic basis of PKU.

Phenylketonuria (PKU) is an inherited error of metabolism caused by a deficiency in the enzyme phenylalanine hydroxylase. PKU is an autosomal recessive disorder, caused by mutations in both alleles of the gene for phenylalanine hydroxylase (PAH) which is found on chromosome 12. In the body, phenylalanine hydroxylase converts the amino acid phenylalanine to tyrosine, another amino acid. If PKU is not treated then phenylalanine can build up to harmful levels in the body, causing intellectual disability and other serious health problems. If two parents carry the gene, they have roughly a 25 percent chance of having a baby with PKU, a 25 percent chance that their child will not develop PKU or be a carrier, and a 50 percent chance that their child will also be a carrier of the disease.

ii) A couple with history of PKU in the family is expecting a baby. What are the possible types of genetic tests should the couple opt for?

Newborn blood testing identifies almost all cases of phenylketonuria. If the couple have PKU or a family history of it, the doctor may recommend screening tests before pregnancy or birth. It's possible to identify PKU carriers through a blood test. The baby should have a newborn screening test for PKU. Newborn screening checks for serious but rare conditions at birth. It includes blood, hearing and heart screening. With newborn screening, PKU can be found and treated early so babies can grow up healthy. The doctor can recommend another kind of test, called a diagnostic test. This test can check to see if your baby has PKU or if there is some other cause for abnormal test results.

SAMPLE PBL

iii) In case their child tests positive for PKU, what measures will enable their child to grow up healthy?

Following are the measures that would enable the child to grow up healthy:

- A lifetime diet should be followed with very limited intake of protein, since foods with protein contain phenylalanine. As the child lacks PAH, and the phenylalanine might get accumulated, it could result in health problems
- The child should be taking a PKU formula having a special nutritional supplement. This make sure that the child gets enough essential protein (without phenylalanine) and nutrients that are crucial for growth and general health
- There should be regular review of diet records, growth charts and blood levels of phenylalanine
- Blood tests needs to be conducted frequently to monitor phenylalanine levels as they change over time, especially during childhood growth spurts
- Other tests to assess growth, development and health should be conducted.
- The amount of phenylalanine that an individual with PKU can safely eat is so low, it's crucial to avoid all high-protein foods, such as milk, egg, cheese, nuts, soybeans, beans, chicken, beef, pork, and fish. Potatoes, grains and other vegetables that have protein should be limited.
- They should also avoid certain other foods and beverages, including many diet sodas and other drinks that contain aspartame (NutraSweet, Equal), since aspartame is an artificial sweetener made with phenylalanine.
- The regular infant formula and breast milk contain phenylalanine. Therefore babies with PKU instead need to consume a phenylalanine-free infant formula.

iv) If the child is PKU positive and if the couple plans to go for second child, what should be the counselling given to the couples for preventing birth of another child with PKU?

Parents should be advised to go for

a) Pre-implantation diagnosis: This is when eggs that have been fertilized in vitro (in a laboratory, outside of the womb) are tested for defects at the 8-cell (blastocyst) stage. Only non-affected blastocysts are implanted in the uterus to establish a pregnancy.

b) Using donor sperm or donor eggs: As PKU is an autosomal recessive disorder, the child can inherit it from either of the parents (child could be unaffected, affected or carrier). To avoid the child being affected, the couple can opt for donor egg or donor sperm.

c) Adoption: the parents can go for adoption. This allows them to have a family without the anxiety of potentially passing on the ailments to the next.

d) Becoming pregnant and having specific prenatal testing: prenatal testing will help them to detect any problems that could affect the, like birth defects or genetic diseases. The results can help you make the best health care decisions before and after the child is born.

e) If the woman is suffering from phenylketonuria, she should resume to a low-phenylalanine diet at least 3 months prior to pregnancy, and continue the diet throughout her pregnancy. This way PKU syndrome can be prevented. In other words, a healthy pregnancy is possible for women with PKU as long as she plan ahead and carefully monitors her diet throughout pregnancy.

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2. i)What is Cystic fibrosis [CF]

Cystic fibrosis is an inherited disease characterized by the buildup of thick, sticky mucus that can damage many of the body's organs. The disorder's most common signs and symptoms include progressive damage to the respiratory system and chronic digestive system problems. The features of the disorder and their severity varies among affected individuals. Mutations in the CFTR gene in chromosome number 7 cause cystic fibrosis. The CFTR gene provides instructions for making a channel that transports negatively charged particles called chloride ions into and out of cells. This condition is inherited in an autosomal recessive pattern, which means both copies of the gene in each cell have mutations. The parents of an individual with an autosomal recessive condition each carry one copy of the mutated gene, but they typically do not show signs and symptoms of the condition.

ii)Explain the symptoms and genetic basis.

Cystic fibrosis symptoms can vary from person to person, depending on the severity of the disease. For example, one child with cystic fibrosis may have respiratory problems but not digestive problems, while another child may have both. In addition, the signs and symptoms of in some newborns, the first sign of cystic fibrosis may be that they have difficulty passing their first bowel movement (meconium). This occurs when the meconium becomes so thick that it can't move through the intestines, sometimes causing a blockage. Parents may later notice their baby is not gaining weight or growing normally. The baby's stools may be especially bulky, bad-smelling, and greasy due to poor digestion of fats. Fibrosis may vary with age.

The most common symptoms of CF are:

SAMPLE PBL

1. Salty-tasting skin

People with cystic fibrosis tend to have two to five times the normal amount of salt (sodium chloride) in their sweat. Parents sometimes notice this symptom of cystic fibrosis first, because they taste the salt when they kiss their child.

2. persistent coughing, shortness of breath, wheezing

They may experience shortness of breath and have difficulty with exercise. Persistent coughing or wheezing is another possible symptom, especially when accompanied by frequent chest and sinus infections with recurring pneumonia or bronchitis. A child may have very thick phlegm (sputum). Infants and young children often swallow what they cough up, however, so parents may not be aware of it.

3. Poor weight gain in spite of excessive appetite

Pediatric cystic fibrosis may also have many of these symptoms. Growth delays often continue, and kids with cystic fibrosis tend to be significantly smaller than others their age.

4. greasy, bulky stools

Hard-to-pass stools can occasionally cause rectal prolapse. This means that part of the rectum protrudes, or sticks out, through the anus. About 20% of kids with cystic fibrosis experience this. In some cases, rectal prolapse is the first noticeable sign of cystic fibrosis. It's not very common in children without cystic fibrosis, but it does occur.

5. Nasal polyps or small, fleshy growths found in the nose

Some people with cystic fibrosis develop growths (polyps) in their nasal passages. They may experience severe or chronic sinusitis, which is inflammation of the sinuses. Their pancreas may become inflamed too; this condition is known as pancreatitis. Clubbing (enlargement or rounding) of the fingertips and toes eventually occurs in most people with cystic fibrosis, as well. However, clubbing also occurs in some people born with heart disease and other types of lung problems.

CF's obstruction of the lungs increases the risk of lung infections such as bronchitis and pneumonia, as it creates optimal conditions for the growth of pathogens. Obstruction in the pancreas can lead to malnutrition and poor growth. It has also been associated with an increased risk of diabetes and osteoporosis.

iii)A newborn baby born to a couple is detected with cystic fibrosis disease. What are the tests which enable detection of CF?

- Sweat Chloride Test

The sweat test, more appropriately referred to as the sweat chloride test, is caused when a defective form of a protein, known as cystic fibrosis trans membrane regulator (CTFR), obstructs the normal flow of water and mineral ions in and out of cells. When this occurs in the sweat glands, it prevents sodium from being reabsorbed into cells and causes chloride to accumulate in the sweat ducts. As the excessive amounts of sodium and chloride get pushed close to the surface of the skin, they combine to form salt. The level of accumulation on the skin, specifically, the chloride content can be used diagnostically to confirm CF.

- Genetic Testing

Genetic testing can also be used to detect cystic fibrosis by detecting specific genetic mutations associated with the disease

Cystic fibrosis is an autosomal recessive disorder, meaning that you need to inherit the CFTR mutation from both parents to have the disease. If you inherit only one mutation, you won't

5. Evidence of Success

The evidences of success can be quantified through the following:

1) *Research publications* by faculty in zoology (Dr. Nandini Vaz Fernandes): The department of Zoology has also researched PBL and devised an effective pedagogy of using PBL as effective T-L-E tool.
2) *Faculty of Chowgule College Invited as Resource persons by other Colleges*:
    a. Dr. Nandkumar Sawant and Dr. Nandini Vaz Fernandes – Conducted hands-on workshop for the faculty members of Gogate Joglekar College, Ratnagiri Maharashtra on 'Problem Based Learning- Pedagogical tool for T-L-E'.
    b. Dr. Nandkumar Sawant, Dr. Nandini Vaz Fernandes and Mr. Andrew Barreto- Conducted workshop for faculty members of Carmel College, Nuvem Goa on 'Integration of Blooms Taxonomy in T-L-E'
3) *Students progression in Foreign Universities:* 14 students from department of Zoology were selected for PG courses in Foreign Universities in UK, Canada, Australia and USA. The students gave feedback that the PBL method adopted in Zoology department enabled them to adapt to the foreign T-L-E techniques as it was similar.

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RESEARCH ARTICLE

STUDENT PERCEPTION OF EFFECTIVE TEACHING METHODOLOGIES FOR UNDERGRADUATE DEGREE COURSES - CASE STUDY FROM INDIA

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ABSTRACT

Many researchers are stressing on the need to change the teaching methodologies to make learning more effective. Various new modes of teaching are suggested especially in the field of medical sciences. The studies mostly focus on the need to adopt Problem-based learning in medical field. The present study was undertaken to see the effectiveness of various teaching methodologies in undergraduate degree college in India. Effectiveness was measured from the students perspective as this study was focused on the response of the students to the questionnaire prepared to evaluate the effectiveness of different modes of teaching. The modes evaluated were 'Lecture-based learning' (LBL), ICT supplemented lectures (ISL), Interactive Classroom method (ICM), Problem-Based Learning (PBL) and Multiple Teaching Mode (MTM). The present study indicated that LBL, ISL and ICM was not very effective method of teaching as it only fostered gaining of knowledge and comprehension. PBL method is good as it enabled triggering higher order thinking of blooms taxonomy in the students. But PBL, if adopted as the only method of teaching did not cater to the diversity of learners in a classroom. Therefore, we recommend MTM as the new effective method of teaching as it has a combination of LBL, ISL, ICM and PBL. On a Five-point-Lickert-scale, MTM was indicated to enable students to learn the correct method of data collection and investigation(4.45±0.75), transform data and develop logical argument (4.04±0.79), be more creative (4.33±0.90) and thus helped to improve proactive learning abilities. The present study thus demonstrates that PBL can be used as component of MTM for effective learning even for the undergraduate nonprofessional degree courses of Bachelor of Science or Bachelor of Arts.

Citation: *Dr. Nandini Vaz Fernandes*. 2016. "Student perception of effective teaching methodologies for undergraduate degree courses - case study from India", International Journal of Current Research, 8, (06), 33068-33071.

INTRODUCTION

In this era of multiple sources of knowledge gathering, the role of a teacher in undergraduate and postgraduate colleges should reflect a paradigm shift towards making classroom teaching learner centric. The role of a teacher should not merely involve

It is accepted that the feedback from students serves as an effective tool in developing teaching methodology and evaluation methods in undergraduate teaching (*Chavda et al., 2011; Bhosale UA et al., 2013*) and so the study was focused on the response of the students to the questionnaire. Thus, the

6. Problem encountered and resources required

A change of methodology like this implies difficulties of adaptation for both teachers and students, as it changes the traditional roles.

For teachers

- It can mean an increase in the workload, particularly in the evaluation work.
- Teacher has to devise higher order problems which is time consuming and involves a lot of thinking.

For the students

- Participation and equal involvement and contribution in discussions by all students is an issue. Department devised means to monitor active involvement of all students.
- At first they may become disoriented. However guided learning helps students to channelize their work and learn effectively.

PBL when used as T-L-E mode, enables students to understand, analyze and interpret the result. This practice also helped students to modify the procedures.

***

BEST PRACTICE: TEACHING- LEARNING- EVALUATION

Title of the Method: INQUIRY BASED TEACHING

Objectives:

1. To foster higher order thinking
2. To uncover and explore the hidden meanings and significance of a given cultural aspect of Cuisine
3. To know why cuisines develop and the role it plays in society
4. To develop team and leadership skills

Context: Culture is a complex concept that cannot be easily defined, the widely accepted definition is that 'Culture is everything that human beings have created around them in a given space'. The fact that culture as a concept is multidimensional, this makes teaching and learning about culture even more complex. Culture is dynamic and ever changing, The dynamic nature of culture brings a number of challenges and concerns for teachers trying to choose relevant teaching materials and activities (Savignon&Sysoyev, 2005). While textbooks often depict culture as static, the digital media, authentic products and texts provide a more dynamic environment through direct access to most current practices, perspectives, and products. The teachers' major task is to bring both language and culture in their social reality (Lange, 1999), in order to make sure that the students do not possess incomplete or outdated knowledge about the target language and its culture. With the development of the 3P model, according to Lange (1999), there is a new focus" on learner performance with products, practices, and perspectives" (p. 106).

This paradigm shift from passive receivers of information to active constructors of knowledge places the learners in the role of inquirers who investigate and discovers their own, as well as a second or third culture. In inquiry-based teaching, the students are engaged in meaningful learning that fosters higher-order thinking to assist students in uncovering and exploring the hidden meanings and significances embedded in culture. According to Tang (2006), "not only should students know the *what* and *how* about a culture, but also the *why*. It is the *why*, as has been argued previously, that enriches and sustains the memory about a second culture accumulated in the learning process" (p. 89). Since the Standards promote making meaningful connections and comparisons, it is important that students develop reasoning skills to make these kinds of connections and comparisons. One of the major goals for a teacher is create inquiry questions that provoke interest in the target culture and will lead to important discoveries about the culture and people and thus, develop understanding of culture.

Process:

The Class was divided in to four groups, selected by the group leaders. Each group consisted of 14 to 15 members. The teaching-learning process being outcome based ,an integrated approach of Continuous Assessment(C.A) through learning outcome was used. The Teacher introduced the idea of cuisine and its role in culture and varied theoretical aspects. Later the students were expected to research in groups and demonstrate their inquire using the three P's model of products, practices, and perspectives.

The continuous assessment was based on unit 3,

Unit 3: Understanding the Cuisines of Goa

3.1: The Sociology of food.

3.2: Portuguese influences in food.

3.3: Religious differences in cuisines.

3.4: Goan food its preparation (Sociological perspective)

Outcome:

This was based on the assessment, which involved demonstration and analyses of Goa Cuisine. Learners in their respective groups had to prepare four authentic main course dishes across any two religious communities and two sweet dishes and explain the preparation and its evolution using sociological theories of westernization, assimilation and adaptation, social significance and relevance and demonstrate the same. The students were assessed on the parameters using a rubric i.e. Creativity and Group Work, Authenticity, Presentation and Conceptualization. A total of 20 Marks were assigned. (See Appendix-3: Rubrics for Goan Cuisine)

Group Photographs

Group 1



Group 2




Group 3



Group 4




Problems and Challenges encountered

1. The teacher had to manage the varied group dynamics
2. Multiple types of learners needed to be oriented properly thereby making the process time consuming
3. Motivating all the students to perform and present the outcome was a challenge

Conclusion

Thus the students increased awareness and to develop their curiosity towards the target culture and their own, to make comparisons among cultures" (p. 19). Grittner (1996) acknowledges that culture learning should give students multiple opportunities to explore various facets of culture and make meaning of their discoveries. Students being actively involved in the discovery process develops students' ability for deeper thinking that promotes comparing and contrasting cultures and becoming "more aware of their own metacognitive processes and developed critical thinking skills". Thus, an inquiry approach to teaching allows students to ask questions that are relevant or particularly interesting to them, collect necessary information, create answers by investigation, generate a theory, present their findings to other students, and then formulate new questions that are derived from the original questions.

Method 2:
Connecting the Book-View to the Field through Experiential learning
Department: SOCIOLOGY

1. Title of the Practice

Teaching Learning: Connecting the Book-View to the Field.

2 Objectives of the Practice

- To understand the society from the perspective of the actors
- To experience social reality through the field
- To find solution to the problems
- To grow as a better informed and skilled student

Further: The objective of the practice is course and unit specific

Example 1: The TYBA students demonstrated social issues: The topics assigned were gender discrimination, substance abuse and AIDS.

Objective:

- To gain empathy towards the socially deprived groups
- To encourage and engage students to critically think on social issues through sociological perspective: Labelling theory, sub-cultural theory, structural theories etc.

Example 2: The students of SYBA were told to literate the illiterates under the paper title 'Sociology of education'. The students had to go to marginalised group or those people who are illiterate and teach them some basics like their names, signature, filling bank forms, etc.

Objective:

- To teach basic things to the section who is unprivileged.
- To encourage students to mingle with poor people.
- To get the understanding how to collect people when they require.

- To understand learning by doing.

Outcome:

3. The Context

- *Sociology is the study of society, society cannot be trapped in the book, we at the department felt it was important to connect the book with the field so as to give the students the grasp of reality. The department made use of experiential learning in varied courses.*
- *Experiential learning is the process of learning through experience, and is more specifically defined as "learning through reflection on doing". Felicia, Patrick (2011). Handbook of Research on Improving Learning and Motivation. p. 1003. ISBN 1609604962.*

4. The Practice

- The above Cycle was used exactly in some courses and modified in others.

What was required?

- Kolb states that in order to gain genuine knowledge from an experience, the learner must have four abilities:
- The learner must be willing to be actively involved in the experience;
- The learner must be able to reflect on the experience;
- The learner must possess and use analytical skills to conceptualize the experience; and

The learner must possess decision making and problem solving skills in order to use the new ideas gained from the experience

Courses executed

1. literate the illiterates' under the paper titled 'Sociology of Education
2. SYBA had to do 'Young Sociologists Awareness Drive' under the paper title 'Family, Kinship and Marriage in India

3. SYBA/TYBA as part of the course ‘Rural Sociology’ created a ‘Rural Newsletter’ documenting the various aspects of rural life in Goa.

4. SYBA/TYBA as part of the course ‘Women and Society in India documented the ‘Unsung Heroines’ in society

5. Role Play Fyba: Sociology of Religion
6. Teaching Sociology: Theory and Practice
7. Interview as Part of Qualitative Research Methods
8. Field Visit: Participant Observation and Interviews
9. Classical Sociology: Karl Marx
10. Social Concerns: Measures to deal with population problem and Problems facing Goa

5. Evidence of Success

- While it is the learner's experience that is most important to the learning process, it is also important not to forget the wealth of experience a good facilitator also brings to the situation.
- However, while a facilitator, or "teacher", may improve the likelihood of experiential learning occurring, a facilitator is not essential to experiential learning. Rather, the mechanism of experiential learning is the learner's reflection on experiences using analytic skills. This can occur without the presence of a facilitator, meaning that experiential learning is not defined by the presence of a facilitator.
- Yet, by considering experiential learning in developing course or program content, it provides an opportunity to develop a framework for adapting varying teaching/learning techniques into the classroom

(see Rodrigues, C. A. (2004). The importance level of ten teaching/learning techniques as rated by university business students and instructors. Journal Of Management Development, 23(2), 169-182

Example

Outcome 1:

- *The students were be able to visualize social issues by being an active participant in the role play*
- *The students were able to encounter issues through different perspectives*
- *The students got sensitive and sensitize the viewer’s on socially deprived group*

Picture-1

Picture-2

Outcome-2

- *Students gathered lot of students who don't go to school because of poverty and to teach them some basics.*
- *Students used different ways to teach the small kids.*

Picture-1

Picture-2

Picture-3

6. Problems Encountered and Resources Required

Time and resources were a major constraint, however the students managed well.

7. Notes (Optional)

Department of Computer Science

Teaching-Learning Methodology

By : Dr. Shaila Ghanti

Title : Flipped Learning

Introduction : The name of the Cooperative Learning Strategy (CLS) that will be used/ In-Class Activity is Think Pair Share (TPS)

Objectives of the method :

- To understand the need of digital data encoding for data transmission on a network.
- To design an efficient encoding method that can be used in digital data transmission.

Problem / Topic that was given to students :

Data Encoding

Procedure

Based on the basics of digital data transmission on computer network(students are supposed to read and come prepared) , I would give them the below mentioned scenario and the following 3 tasks will be performed by students.

- Each student has to individually analyze, innovate and propose (write) the best method that can be used for data encoding indicating the advantages and disadvantages.
- Form a pair with your neighbor, discuss both the proposed methods. Then propose (write) an improved version.
- Each group will be asked to present their proposal.

In-Class Activity:

Imagine there are two groups of students standing on the terrace of the building. These buildings are separated at such a distance where the voice of students cannot reach from one building to another. But there is a need to communicate amongst each group. Each group has a torch that can be used to communicate by switching on and off of torch light where each group can see the light. They can code these lights information in advance as used in straight encoding.

- Say if the light is 'ON' then the information sent and interpreted as '1'
- Say if the light is 'OFF' then the information sent and interpreted as '0'

The particular combination of 1s and 0s has a special message. Example: 1010 means "Are you all joining us for dinner?"etc.

The problem was if the code was 1001, it was difficult for the receiver group to identify if it was 101, 10001 or 11. The same problem occurs in straight encoding. How to overcome the problem of straight encoding? Propose the innovative method.

Out-class Activity:

Students should go through the PPT related to Data communication fundamentals

Outcomes

Students exactly understood why it is not possible to send data (1s and 0s).

They get involved actively in discussion.

Students came up with very innovative methods of encoding. Few encoding methods they proposed are actually used. Some were similar to Manchester encoding etc.

Problems Faced: -

- This method was followed by Dr. ShailaGhanti

Best practice: Teaching- Learning- Evaluation

1. Title of the Practice: CONDUCT OF PRACTICAL COMPONENT OF A COURSE

2. Objectives

To provide students a comprehensive understanding of practical knowledge. T he content is locally relevant and prepares students for entrepreneurship and self-employment. This practice also promotes research-based learning and enables students to design and conduct experiments and analyze results critically.

3. The Context

The department of Zoology introduced new format of Journal which is a comprehensive document of learning. The conduct of practicals is also done in specific manner to promote research and application of the learned concepts.

4. The Practice

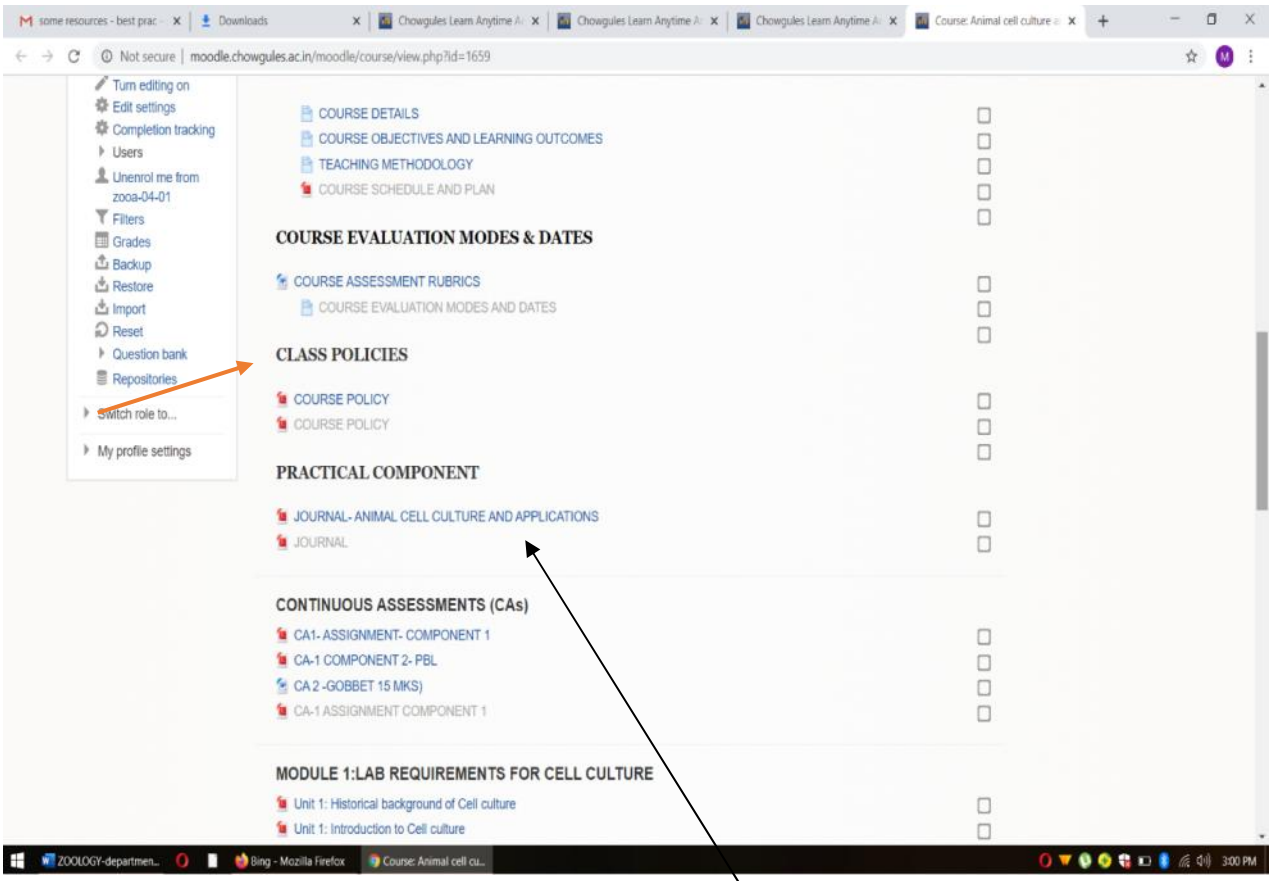
The Practical component of the Courses is designed to deliver content and learn skills in an effective manner. The department not only devised pedagogies for conduct of practicals, but also devised means of making practicals a better learning experience for students by introducing practicals with 'Prelab' work to be done at home followed by conduct of practicals in the laboratory. Being an autonomous institution, the department also devised means of redesigning practicals in order to enable students to understand application of the learned concepts and promote research.

Journal: The journal is designed to be a comprehensive document of learning. All procedures are given as an E-Journal. However, the students have to perform experiments/ procedures and analyze and interprete results critically. All observations are entered in the journal with pen and if errors in findings occur, students have to make noting as to why the results differed from the expected. The students are also given opportunity to pen down their reflection of the learning process and precautions that they need to take to conduct a specific procedure/experiment. The learning experiences are followed by feedback, reflection and follow-up.

Prelab: Every experiment has preliminary questions that students are assigned prior to the conduct of practical to obtain prior knowledge and the interpretation of the experiment to be conducted in the practical laboratory.

Laboratory session: For the practical purpose, the students are grouped into five members each, to develop technical, cognitive and team work skills. Online journal is made available to the students on CLAAP *(Chowgule's Learn Anytime Any place – Moodle of Chowgule College serving as resource portal).* Before the conduct of practicals, students are expected to do the Prelab work- preliminary learning, which involves answering questions given as prelab work and reading about the concepts so that they understand the basics of the experiment. This practice helps students to understand and get a good idea about the experiment to be conducted and also to interpret the results obtained during the experiment/ activity. It involves opportunity to carry out experiments, field-based activities and project-based learning. Students then perform the experiment in groups and record their observations. The interpretations are supported by references and the same is recorded in the journal. References are listed in the APA format.

We have observed that this interactive new method helps students in improving skills in collecting, analyzing, interpreting and presenting findings.



Online Journal Uploaded in CLAAP – Resource portal (Moodle) of Chowgule College.

The online Journal is downloaded, Printed and bound by students before the commencement of practicals of each semester.

Parvatibai Chowgule College of Arts and Science
Autonomous
Accredited by NAAC with Grade A' (CGPA Score 3.41 on a 4 Point Scale 3rd cycle)
Best affiliated College-Goa University Silver Jubilee Year Award

ZOO-E-02: Basic Microbiology and Fundamentals of Animal Biotechnology JOURNAL

DEPARTMENT OF ZOOLOGY

NAME: Shaunya Gail Mascarenhas.

ROLL No: SU180096.

SUBJECT Zoology.

CLASS: SYBSc.

SEMESTER: III

PERIOD AND YEAR:: 2019-2020.

First Page of the Journal

Recording of Observation and writing down the interpretations of the results

PRELAB work given for the practical

Gogol Margao Goa, India – 403602
www.chowgules.ac.in

Date: 13.09.19

LAB EXERCISE 7 & 8 : IDENTIFICATION OF PRODUCTS OF METABOLIC PATHWAYS OF MICROBIAL CELLS

PRELAB:
- Collect information on:
  - Principle of positive and negative results for:
    - Indole production test
    - Methyl red test
    - Vogues Proskeur test
    - Citrate Utilization test
  - Application of IMViC test.

AIM: To identify the product of metabolic pathways of microbial cells (IMVic test).

INTRODUCTION: On the basis of the biochemical properties and enzymatic reactions in the presence of specific substrate bacteria can be identified. IMVic test consists of four different test namely:
(a) Indole production test
(b) Methyl red test
(c) Voges-Proskauer test
(d) Citrate utilisation test

TEST 1: INDOLE PRODUCTION TEST:

Principle: Positive test- formation of a pink coloured ring after the appropriate reagent is added. As indole reacts with aldehyde in the reagent and forms a pink coloured ring. Indole is produced along with pyruvic acid and ammonia.
Negative - No colour change is observed even after the addition of all the appropriate reagents are added. Indole does not react with the aldehyde.

REQUIREMENTS:
Tubes containing Tryptonebroth, Kovac's reagent, dropper, inoculating loops, *bacterial culture.*

PROCEDURE:
1. Take around 3ml of Tryptone broth in test tube A and test tube B.
2. Inoculate the test tubes A with bacteria X and the other with Bacteria Y
3. Incubate the inoculated tubes at 35°C for 24-48 hours
4. After incubation period, add 1ml of Kovac's reagent to each tube.
5. Mix the contents well and allow the tubes to stand.
6. Examine the tubes to check the colour in the reagent layer(top layer).

RESULT:
Test tube A(bacteria X): Positive (formation of a red colour ring)
Test tube B bacteria Y): Negative (formation of a yellow ring)

INFERENCE:
Bacteria in testtube A was tested positive for indole test production test, as a red coloured ring was formed on addition of Kovac's reagent; while bacteria in the test tube B was tested negative as the red coloured ring was not formed, but instead a yellow ring was seen.

TEST 2: METHYL RED TEST:

Principle: Positive - The formation of a red coloured ring on addition of methyl red reagent, as methyl red is an indicator which stays red in colour at a pH of 4.4 or less and the glucose is utilised. A stable acid produced.
Negative - The lack of red colour after addition of the reagent methyl red, as methyl red does not remain red in colour at a pH more than 4.4.

REQUIREMENTS:
Peptone glucose broth, methyl red indicator, sterile test tubes, nichrome loop, droppers, bacterial culture.
(Preparation of peptone glucose broth: Peptone 7g; glucose 5g, potassium phosphate 5g and distilled water 1000ml sterilized by autoclaving).

PROCEDURE:

1. Take 2 tubes with peptone glucose broth (3ml) and mark them as A and B.
2. Inoculate test tubes A with bacteria X and the other with Bacteria Y.
3. Incubate at 35ºC for 24 – 48 hours.
4. Add 3 drops of methyl red indicator in each tube and observe the colour change.

RESULT:

Test tube A(bacteria X): Positive; Red colour.
Test tube B bacteria Y): Negative; yellow colour.

INFERENCE:

The bacteria in test tube A was tested positive for methyl red test, as there was a change in appearance of the red colour on addition of methyl red.
Bacteria in test tube B was tested negative because there was a change in colour appearance from red to yellow after addition of methyl red reagent.

TEST 3: VOGES-PROSKAUER TEST:

Principle: Positive - A pinkish red colour is observed at the surface of the tube as acetoin reacts with VP reagent to give the red colour. Bacteria produces acetyl methyl carbinol from glucose.
Negative - A lack of pinkish red colour is observed at the testtube surface. As acetoin does not react with VP reagent.

REQUIREMENTS:

Peptone glucose broth, sterile test tubes, nichrome loop, VP reagent 1 (napthlol solution), VP reagent 2 (40% Potassium hydroxide), droppers, *E.Coli* culture, bacterial culture.

(Preparation of peptone glucose broth: Peptone 7g; glucose 5g; Potassium phosphate 5g and distilled water 1000mL sterilized by autoclaving).

PROCEDURE:

1. Take 2 test tubes with peptone glucose broth (3ml) and mark them as A and B.
2. Inoculate test tubes A with bacteria X and the other with Bacteria Y
3. Incubate at 35ºC for 24-48 hours.

4. Add 12 drops of VP reagent 1 and 2-3 drops of VP reagent 2 to each test tube.
5. Shake the tubes for 30 seconds to expose the media to oxygen.
6. Allow the reaction to complete for 30-60 minutes.
7. Observe the tubes for change in colour for the VP test.

RESULT:

Test tube A(bacteria X): Negative. No colour change/colourless
Test tube B bacteria Y): Positive. Red colour.

INFERENCE:

The test is positive for bacteria Y from testtube B which shows that the bacteria produces acetyl methyl carbinol from glucose that is later converted to diacetyl which rise to the reddish pink colour polymer. Whereas test tube A with bacteria X is negative as no colour change was observed.

TEST 4: CITRATE UTILISATION TEST:

Principle: Positive - When there is any growth on the medium with or without the change in colour of the medium; usually a green colour. Alkaline carbonates and bicarbonates are not produced.
Negative - Where there is no growth on the medium and there no colour change of green is observed, but rather the slants remain blue as alkaline carbonates and bicarbonates are produced.

REQUIREMENTS:

Simmon's citrate agar slants. Inoculating loops. *bacterial* culture, droppers, etc.

PROCEDURE:

1. Take 2 sterile tubes and add Simmon's citrate agar to prepare slants.
2. Mark the tubes as A and B.
3. Inoculate test tubes A with bacteria X and the other with Bacteria Y.
4. Incubate the slants at 37ºC for 24-48 hours.
5. Observe the slants for colouration of the medium.

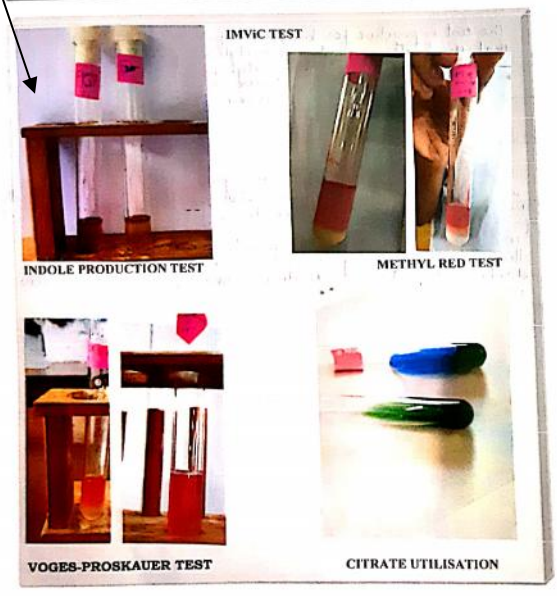
Clicking images of results obtained and sticking on the journal

RESULT:

Test tube A(bacteria X): Positive, green colour
Test tube B bacteria Y): Negative, blue colour

INFERENCE:

The Bacteria in testtube A was tested positive for the test, thus showing the production of alkaline carbonates and bicarbonates giving rise to the green colour. While, the test was negative for bacteria Y in testtube B, since no the slant gave rise to a blue colour.



List of References

REFERENCES:

- Osborn D. (2019) Microbiology-IMVic Series Retrieved from Iowa state university microbiology undergraduate program. https://www.microlabstate.edu/videos/microbiology-011-imvic-series
- Baeman C (2007) IMVic test. Microbiology. Retrieved from https://www.austince.edu/microbiology/imvic.php.

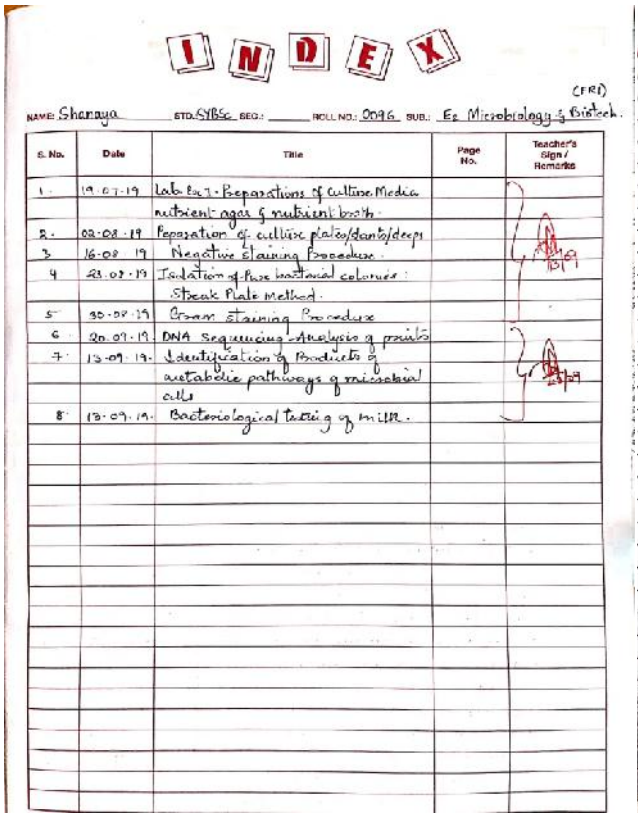
SPECIAL POINTS OF INTEREST

- Do not discard the testtubes soon after the tests are done.
- Note down and label the correct initials on the testtubes to avoid mixing.
- Carry out the tests carefully ensuring complete sterilization and maintaining the bacterial sequence to enable the isolation of a particular colony only.
- In indole test, the reagents should be added from the sides to observe the colour change.

Name/Bacteria used	Indole Production test	Methyl red test	Voges Proskauer test	Citrate utilisation test	Inference
Bacteria I	Positive	Positive	Negative	Negative	E-coli bacteria
Bacteria II	Negative	Negative	Positive	Positive	Klebsiella bacteria

Special Points noted by students as a summary of their learning

Scanned copy of Pre lab work recorded in the lab note book:



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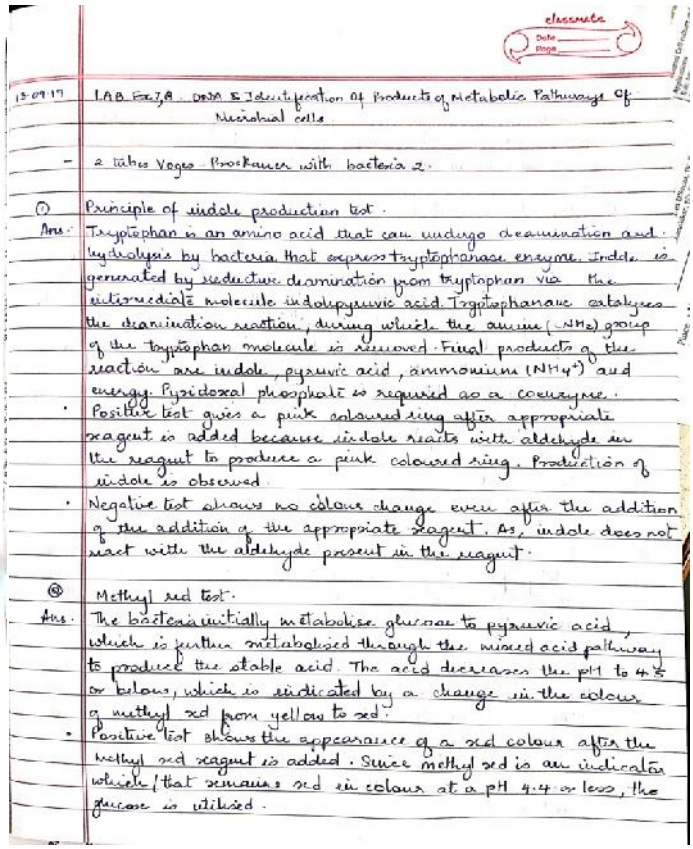
NAME: Shanaya STD: SYBSc DEG.: ROLL NO.: 0096 SUB.: Ec Microbiology & Biotech.

S. No.	Date	Title	Page No.	Teacher's Sign / Remarks
1.	19.07.19	Lab Exp 1 - Preparations of Culture Media nutrient agar & nutrient broth.		
2.	02.08.19	Preparation of culture plate/slant/deep		
3	16.08.19	Negative Staining Procedure.		
4	23.08.19	Isolation of Pure bacterial colonies : Streak Plate Method.		
5	30.08.19	Gram staining Procedure		
6	20.09.19	DNA Sequencing - Analysis of results		
7	13.09.19	Identification of Products of metabolic pathways of microbial cells		
8	13.09.19	Bacteriological testing of milk.		



classmate Date Page

13.09.19 LAB Exp 8 - DNA & Identification of Products of Metabolic Pathways of Microbial cells

- 2 tubes Voges Proskauer with bacteria 2.

① Principle of indole production test.

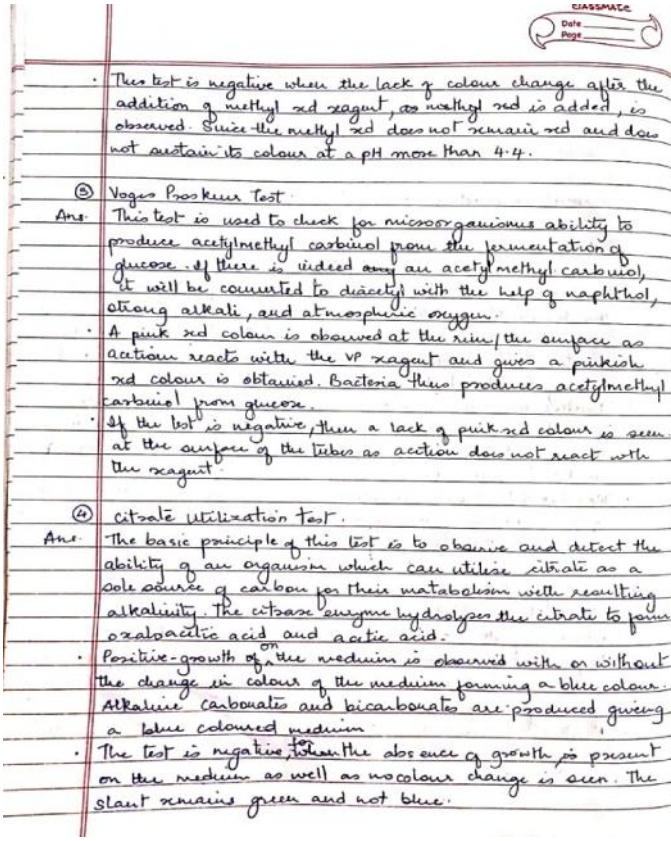
Ans: Tryptophan is an amino acid that can undergo deamination and hydrolysis by bacteria that express tryptophanase enzyme. Indole is generated by reductive deamination from tryptophan via the intermediate molecule indolepyruvic acid. Tryptophanase catalyses the deamination reaction, during which the amine ($-NH_2$) group of the tryptophan molecule is removed. Final products of the reaction are indole, pyruvic acid, ammonium (NH_4^+) and energy. Pyridoxal phosphate is required as a coenzyme.

- Positive test gives a pink coloured ring after appropriate reagent is added because indole reacts with aldehyde in the reagent to produce a pink coloured ring. Production of indole is observed.
- Negative test shows no colour change even after the addition of the addition of the appropriate reagent. As, indole does not react with the aldehyde present in the reagent.

② Methyl red test.

Ans: The bacteria initially metabolise glucose to pyruvic acid, which is further metabolised through the mixed acid pathway to produce the stable acid. The acid decreases the pH to 4.5 or below, which is indicated by a change in the colour of methyl red from yellow to red.

- Positive test shows the appearance of a red colour after the methyl red reagent is added. Since methyl red is an indicator which / that remains red in colour at a pH 4.4 or less, the glucose is utilised.



classmate Date Page

- This test is negative when the lack of colour change after the addition of methyl red reagent, as methyl red is added, is observed. Since the methyl red does not remain red and does not sustain its colour at a pH more than 4.4.

③ Voges Proskauer Test

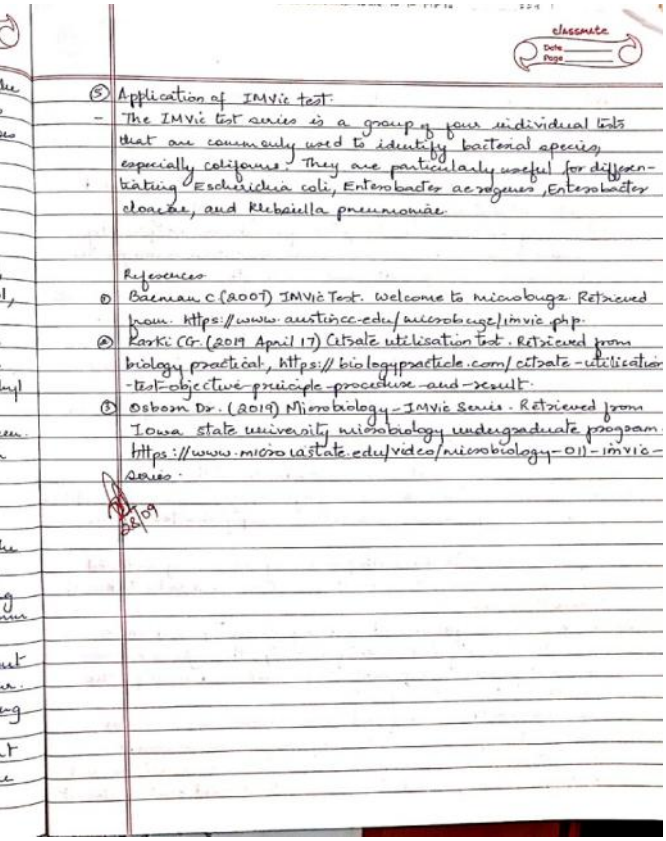
Ans: This test is used to check for microorganisms ability to produce acetylmethyl carbinol from the fermentation of glucose. If there is indeed any an acetylmethyl carbinol, it will be converted to diacetyl with the help of naphthol, strong alkali, and atmospheric oxygen.

- A pink red colour is observed at the rim / the surface as reaction reacts with the VP reagent and gives a pinkish red colour is obtained. Bacteria thus produces acetylmethyl carbinol from glucose.
- If the test is negative, then a lack of pink red colour is seen at the surface of the tubes as reaction does not react with the reagent.

④ Citrate Utilization test.

Ans: The basic principle of this test is to observe and detect the ability of an organism which can utilise citrate as a sole source of carbon for their metabolism with resulting alkalinity. The citrase enzyme hydrolyses the citrate to form oxaloacetic acid and acetic acid.

- Positive - growth of on the medium is observed with or without the change in colour of the medium forming a blue colour. Alkaline carbonates and bicarbonates are produced giving a blue coloured medium
- The test is negative when the absence of growth is present on the medium as well as no colour change is seen. The slant remains green and not blue.



classmate Date Page

⑤ Application of IMVic test:

- The IMVic test series is a group of four individual tests that are commonly used to identify bacterial species, especially coliforms. They are particularly useful for differentiating Escherichia coli, Enterobacter aerogenes, Enterobacter cloacae, and Klebsiella pneumoniae.

References

① Bacman C (2007) IMViC Test. Welcome to microbugz. Retrieved from https://www.austincc.edu/microbugz/imvic.php.

② Parki CG (2019 April 17) Citrate utilisation test. Retrieved from biology practical, https://biologypracticle.com/citrate-utilisation-test-objective-principle-procedure-and-result.

③ Osborn Dr. (2019) Microbiology - IMViC Series. Retrieved from Iowa state university microbiology undergraduate program https://www.microbiostate.edu/video/microbiology-011-imvic-series.

5. Evidence of Success

Students were able to understand, analyze and interpret the result. This practice also helped students to modify the procedures. Curretlt all faculty members of department of Zoology follow this method of conduct of practicals.

This method of conduct of practicals was initiated by Dr. Nandini Vaz Fernandes. Thereafter, the method was followed by all faculty members of department of Zoology. A workshop was conducted by Ms. Madhu Balekai to share this method with faculty of Life sciences too. Such protocol is now followed by three departments of the college.

Dr. Nandini Vaz Fernandes also received Research project on innovative method of Pedagogy of conducting Practicals for biological sciences. This research project is funded by Goa-DST and DHE.

6. Problems Encountered and Resources Required

- Implementation of the practice required extensive work on part of the faculty members to design the practical, such that it will improve critical learning, research and employability skills.
- Some experiments require time beyond the allocated hours.

7. Notes (Optional)

This process can be replicated if teachers are trained through hands on workshop, focusing on Blooms taxonomy, redesigning practical curriculum, creating journal with appropriate prelab work and then enabling teachers to understand integration of blooms taxonomy in the conduct of practicals.

***

BEST PRACTICE AREA: TEACHING LEARNING EVALUATION

1. Title of the Practice: LEARNING THROUGH ENACTING (PRACTICAL COURSE) (FORENSIC INVESTIGATION OF CRIME SCENE)

2. Objectives

To help students apply theoretical concepts of forensic investigation learnt in the classroom to field activity. It also promotes team work spirit and critical thinking skills in solving problems. This practice also promotes research-based learning.

3. The Context

The present best practice given here is adopted by Ms. Tessa Vaz, of Department of Zoology. The activity is from a course on Forensic science. The Practical activity requires to be designed in a manner that will promote research and application of the learned concept, enables students to analyze the different aspects of the activity and use theoretical concepts to solve the problems in a group. The practical needs to be in line with the concepts taught in theory so that the students are able to work through it on their own.

The type of experiment taken for this activity should be field based (outdoor) and should be simple enough for students to comprehend and solve the given problem. This helps to evaluate traits such as the depth of the knowledge, skills, application of principles to problem solving, creativity, ability to communicate and ability to face unknown situations etc.,

4. The Practice

Students were well aware of the activity weeks before the practical. They were required to do the basic research to understand the concepts involved before the experiment in relation to the activity as given in their preliminary work on the journal. This helps the students to revise the basic knowledge pertaining to the subject. On the day of the practical students assemble with all the necessary material required which is mentioned in advance on their journal. The students were then divided in groups for analyzing the experiment and recording observations during a span of 2 hours. The assessment was carried out based on the report that is submitted which gives a detailed explanation of all the steps taken to record the observations and the techniques involved in successful completion of the activity. The activity has to be based off of the components taught in theory and make it easier for the students to apply the theoretical knowledge in the hypothetical situation staged during the practical.

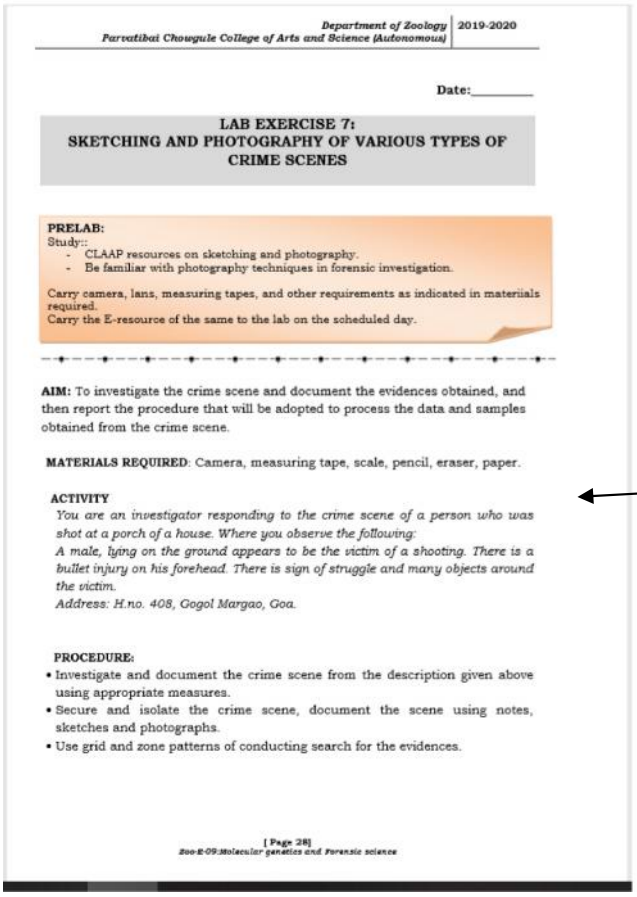
Example: Enactment of a Crime Scene.

A crime scene enactment was planned at a specific location on the campus. The scene involved identifying a student to act as victim shot dead. The evidences were assembled in specific places and a natural crime scene like scenario is created.

Preliminary requirements are explained in the journal. How the students need to proceed with the forensic investigation is laid down in the online journal. Students are then divided into groups of 05. Each group had to investigate the crime scene based on the theory taught to them in class. This activity expects students to apply all the theoretical knowledge learnt by them, to investigate the crime scene. The students have to do the crime scene evaluation, Photography, perspective drawings, collection of forensic evidences as per forensic protocols, decide the type of medical analysis that needs to be done to obtain forensic data required to investigate a crime.

The students perform the activity and submit a Portfolio report on the same.

Journal Instructions Given:



Department of Zoology | 2019-2020
Parvatibai Chowgule College of Arts and Science (Autonomous)

Date:_____

LAB EXERCISE 7:
SKETCHING AND PHOTOGRAPHY OF VARIOUS TYPES OF CRIME SCENES

PRELAB:
Study::
- CLAAP resources on sketching and photography.
- Be familiar with photography techniques in forensic investigation.

Carry camera, lans, measuring tapes, and other requirements as indicated in materials required.
Carry the E-resource of the same to the lab on the scheduled day.

AIM: To investigate the crime scene and document the evidences obtained, and then report the procedure that will be adopted to process the data and samples obtained from the crime scene.

MATERIALS REQUIRED: Camera, measuring tape, scale, pencil, eraser, paper.

ACTIVITY
You are an investigator responding to the crime scene of a person who was shot at a porch of a house. Where you observe the following:
A male, lying on the ground appears to be the victim of a shooting. There is a bullet injury on his forehead. There is sign of struggle and many objects around the victim.
Address: H.no. 408, Gogol Margao, Goa.

PROCEDURE:
- Investigate and document the crime scene from the description given above using appropriate measures.
- Secure and isolate the crime scene, document the scene using notes, sketches and photographs.
- Use grid and zone patterns of conducting search for the evidences.

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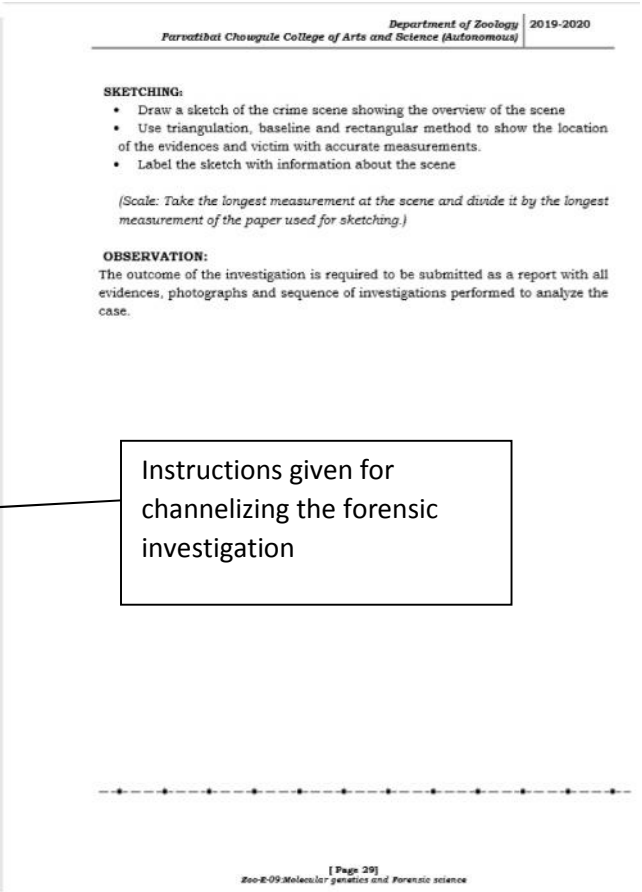
Zoo-E-09:Molecular genetics and Forensic science



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Parvatibai Chowgule College of Arts and Science (Autonomous)

SKETCHING:
- Draw a sketch of the crime scene showing the overview of the scene
- Use triangulation, baseline and rectangular method to show the location of the evidences and victim with accurate measurements.
- Label the sketch with information about the scene

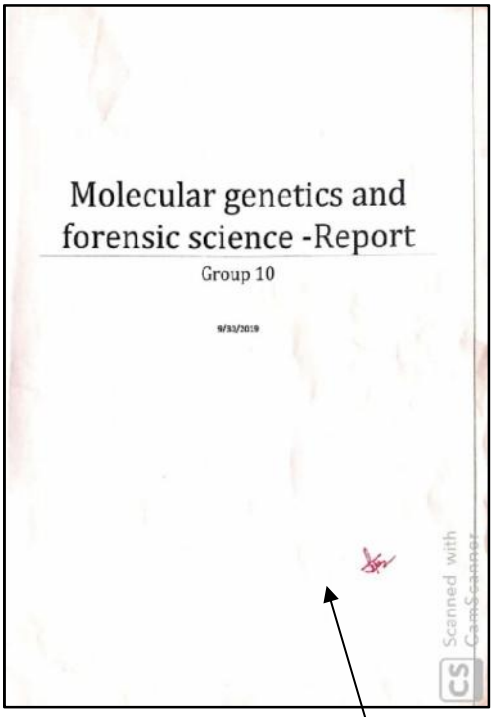
(Scale: Take the longest measurement at the scene and divide it by the longest measurement of the paper used for sketching.)

OBSERVATION:
The outcome of the investigation is required to be submitted as a report with all evidences, photographs and sequence of investigations performed to analyze the case.

[Page 29]
Zoo-E-09:Molecular genetics and Forensic science

Instructions given for channelizing the forensic investigation

Report Submitted by student:



Molecular genetics and forensic science -Report

Group 10

9/33/2019

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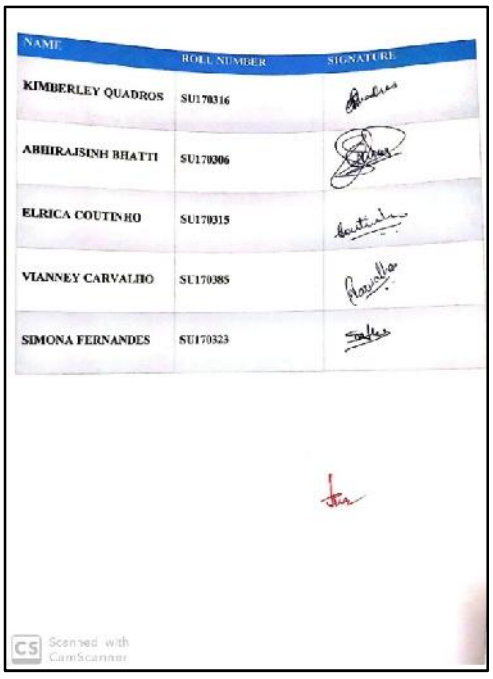

NAME	ROLL NUMBER	SIGNATURE
KIMBERLEY QUADROS	SU170316	
ABHIRAJSINH BHATTI	SU170306	
ELRICA COUTINHO	SU170315	
VIANNEY CARVALHO	SU170385	
SIMONA FERNANDES	SU170323	

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Report submitted by group of students

Overview Picture: 1

Overview Picture: 2

Overview Picture: 3

Overview Picture: 4

Evidence Number: 1

Evidence Number: 2

Forensic evidences collected by students from the crime scene

Crime scene report

Date: 16 September 2019

Time: 13:45pm

Address: H.no. 408, Gogol Margao, Goa.

Case no.: 6874A2F69

Case type: Homicide

Weather: 23°C

The crime scene is in the front porch of the victim's house. The weather conditions on arrival was 23-26°C with slight precipitation.

A dead body of an adult male was found in the porch of house. The victim appeared to be in his twenties and no source of identity was acquired from the crime scene. Since the crime scene was in the porch of the house, it can be considered an outdoor crime scene. The victim was shot dead and blood was flowing from the head region. His face was lying towards the ground.

The initial responder is Mr. Clark Kent, the neighbor of the victim. Mr.Clark heard some arguments arising from the house and then heard 2 gunshots and rushed toward the entrance of the victim's house, only to see the victim fallen on his face and blood flowing out into a pool. He immediately called the authorities at 12.58pm and reported the crime. No other persons were seen by him at the crime scenehowever, a few other neighbors had also gathered outside the house by the time the authorities had got there. All other witness statements were taken by another officer, Mr. Scott Lang, which revealed that the victim lived alone in his house and didn't have many visitors. In addition to the first responder, all other witnesses described the same chain of events beginning from the arguments and ll on the 2 gunshots.

The first detective arrived at the crime scene at 13:52pm and immediately ordered for the crime scene to be sealed off and determined any possible entries and exits that may have existed to and from the victim's house and also ordered for these to be sealed off and guarded. The entire area of the crime scene was measured from end to end and measured about 8. 36.8.ft x 21.ft said.

Report written and submitted

Evidence Number: 3

Evidence Number: 4

Evidence Number: 4

Evidence Number: 4

Evidence Number: 5

Evidence Number: 5

Summary of the crime scene

The crime scene occurred on the 16th of September at H.No. 408, Gogol Margao Goa. A dead body of a adult male in the age of twenties was found in the porch of a house. The crime scene was considered as an outdoor crime scene science it occurred outdoors. The case was a murder where in the victim was shot in the head and blood was flowing from the head region. The initial responder claimed that he heard arguments from the house and also heard two gunshots and rushed to the victim's house only to see him lying dead on the floor with blood rushing out from his head. He immediately reported the crime to the authorities, according to him there were no other victims at the crime scene. All other witness reports were noted down by an officer, Mr Scott Lang revealed that the victim lived alone and didn't have much visitors.

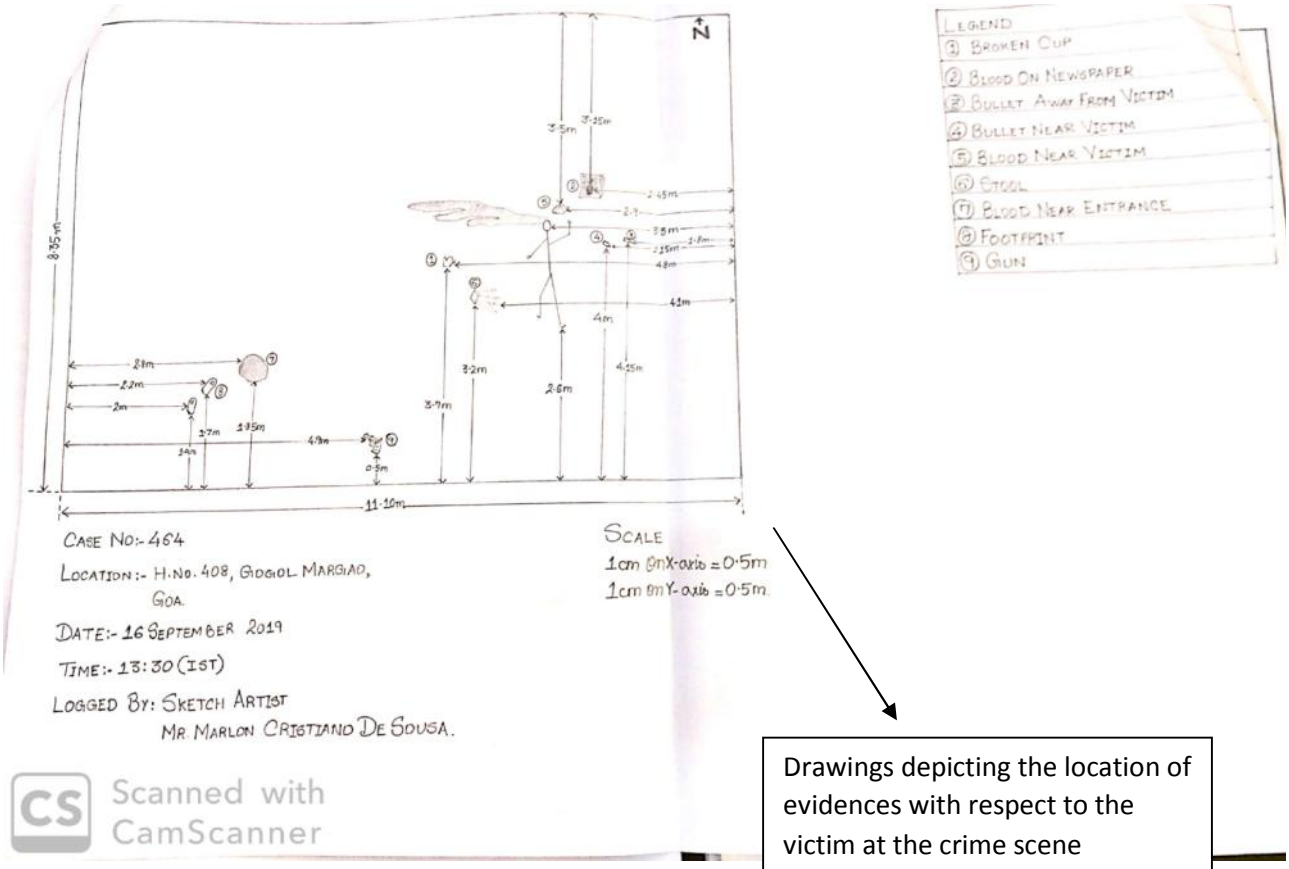
The first detective arrived at 13:52pm and ordered the crime scene to be sealed off and guarded. The forensic team which consisted of a sketch artist, photographer etc were employed at the crime scene. They found out evidences like guns, bullet shells, newspaper, stool etc and transported them to the laboratory with much possible care for futher investigation.

The sketch artist Mr. Bruce Banner drew a sketch using baseline method as well as overview sketch. The photographer had clicked overview pictures as well as closeup pictures of the evidences. The investigation was carried out with proper methods with protective inorder to prevent any contamination. The evidences were numbered with cards, a search for trace evidences and other samples was also done.

Vianney Carvalho

SU170385

T.Y. B.Sc Zoology



Drawings depicting the location of evidences with respect to the victim at the crime scene

5. Evidence of Success

- Students were able to work in their groups to solve the activity given to them.
- They were able to write a good report based on the different components related to the activity.
- The same was assessed as a continuous assessment for practical's

6. Problems Encountered and Resources Required

Implementation of the practice required extensive work on the designing of activity.
To ensure that students are well versed with the concerned topic they have to be taught in details in theory class before portraying it as an activity.

***

Department of Geography and Research Centre
ParvatibaiChowgule College (Autonmous) Margao – Goa

1.Teaching Method: **Collective Critical Cartography**

2. Introduction : Collective Critical Cartography (CCC) or mental mapping is a set of new mapping practices and theoretical critique grounded in critical theory. It differs from academic cartography in that it links geographic knowledge with practical knowledge about the surrounding.It is a process which use collaborative methods to complete or rewrite information which transmitted by traditional maps (and last but not at least, the world view which is mediated by them). Collective critical cartography or CCC is a method which uses co-operative mapping as a tool.

3**. Objective**: The following were the objectives :
1. Develop mapping skills
2.Apply theoretical knowledge to practical knowledge
3. Understand signs and symbols in Mapping
4.Work in teams

4. Procedure
1.An activity on mental mapping was carried out with fifteen Post Graduate students of Geography of ParvatibaiChowgule College (Autonomous), Margao-Goa of the year 2018-19 These students were divided into three groups. The main aim of the activity was to mobilize the knowledge of a particular community about the surrounding area, which can then be improved and made more efficient. Therefore, the college campus area was taken into consideration as a particular community..
2.To start with the activity, a map of a particular area, a set of trigger questions (where is the canteen, gym, football ground, parking lot, danger zone of high electric lamp posts etc) and a series of signs and symbols are required to be prepared.
3.The activity of collective mapping was carried out based on three stages: 1) Prefield work, 2) Field work and 3) Post-field work.

Pre field work

In the Pre-field work, three groups were formed; each group consisted of five members. Group leaders were selected from within the groups. The map (Google Map with streets) of Chowgule College campus, colour paper strips and stationery was provided to each group and the instructions of the activity were given. An example of how a mental map should be prepared was delivered.

Field Work

During the fieldwork, respective group leaders conveyed the instructions of the activity to their respective group members which was then followed by a group discussion among the members to set trigger questions. All the group members contributed their work collectively, identified and figured out different features, places, attributes on the map which were then symbolically represented on the map. The group members had to draw a rough sketch with symbols symbolizing the cultural features, places and attributes on a chart paper and coloured sticky notes along with the name of the symbols were attached on the chart paper. The session of the activity was for one and half hour. A final sketch of a mental map representing.

Post Field Work

In Post-field work, all three groups reported back with their respective mental maps prepared by them and to know what was worked and how. This part of the activity is very important because learning is then shared and a debate emerges from the distinct points of views. Comparisons of all three maps were done by the groups. In the process of comparison, there was identification of unknown features that varied from each group. Elements such as roads, landmarks etc are important in mental maps because people use these features to orient themselves and to navigate within a place or region. The last step was to systematize all three maps to one common map. From all three maps, the information from different groups was condensed into one common map

Post-Graduate students engaged in the activity

Outcomes :

Firstly, It was noticed that each group had different perceptions about the surrounding area of the campus. Hence, this practice helps to understand how humans look at the particular area and process the information internally and externally

Secondly, the most important skill acquired by the students were, how to work together in a group, the communication between team members and most importantly how to imagine and memorize the geography of one's surroundings.

Thirdly, Collective Critical Cartography is a process of knowledge production and transformation. It is not just the "final product" but the process itself can involve learning together and producing new knowledge by bringing together multiple perspectives, by

connecting different personal maps, or by creating collective maps through rotation, negotiation or consensusAccording to KaminiRaikar, "*Collective mapping is a fun based learning activity which helps one to think and produce a picture of a particular location or place*"andApurva Desai remarked that, "*Though I am a part of my college for three years, I thought I knew everything around the campus. But after this activity I learnt some new elements that existed in my college which I never knew before*".

The question is where this engages and enhances teaching-learning of geography. Based on the above responses, it can be firmly stated that this activity helps one to think and produce a picture of a particular place, to explore things in greater detail and to provide greater understanding of places. Secondly, the most important skill acquired by the students were, how to work together in a group, the communication between team members and most importantly how to imagine and memorize the geography of ones‟ surroundings.

Evidences : The following is published article :

Scholarly Research Journal for Interdisciplinary Studies,
Online ISSN 2278-8808, SJIF 2016 = 6.17, www.srjis.com
UGC Approved Sr. No.49366, JAN-FEB, 2018, VOL- 5/45

COLLECTIVE CRITICAL CARTOGRAPHY- A TOOL IN GEOGRAPHICAL STUDY

Nandkumar Sawant, Adrian Ferro, Apurva Gauns Desai & Delcia D'Souza
Department of Geography and Research Center, Parvatibai Chowgule College (Autonomous), Margao-Goa

Writing an assignment is never easy but the process does become less arduous and more focused through experience and reflection. To a certain extent assignment writing is a skill learned through practice. An assignment should be a succinct presentation of your own thoughts, analysis, research findings and so on, regarding a particular topic or issue, supported by or with reference to existing literature.

Different institutions and courses may require different levels and amounts of work. However there are some commonly accepted standards expected of written presentations and essays at a graduate diploma level

Expectation

1.Learn to work in teams
2.Learn desk research
3.Develop writing skills
4.Develop logical and critical thinking .

***

BEST PRACTICE: TEACHING- LEARNING- EVALUATION

1. **Title of the Practice: CASE STUDY AS METHOD OF LEARNING**

2. **Objectives of the Practice:** The aim introducing 'Case study' as a method of learning is to help students demonstrate the theoretical concepts in real-life issues. In addition, the students are exposed to various real-world local issues pertaining to the subject. The underlying principles of this practice include:
   - Helps students visualise a problem.
   - Give student the opportunity to analyse the case and adopt appropriate practice methods based on classroom teaching.
   - Inculcates problem solving skills through data analysis.

3. **The Context**

   The 'case study' analysis given here is that of the process adopted by Mr. Stephen Dias of Department of Zoology. It helps the students apply theoretical, class-room knowledge into the field. The entire process involves channelization of students investigation of a topic/incidence by the teacher, and making students responsible for their own learning by inquiry based method of conducting investigation and drafting the analysis.

   However there are several issues the creep up when designing and implementing the case study:

   a) Shortlisting topics to align the case studies with the syllabus (difficult when student number in the class is high).
   b) Helping the students understand certain secondary principles required for the study.
   c) Students generally find it difficult to apply statistical models on the data due to inexperience. This hinders the analysis of data.
   d) In addition, some students also fail to understand the case study topics.

4. **The Practice**

   Stages of design and implementation:

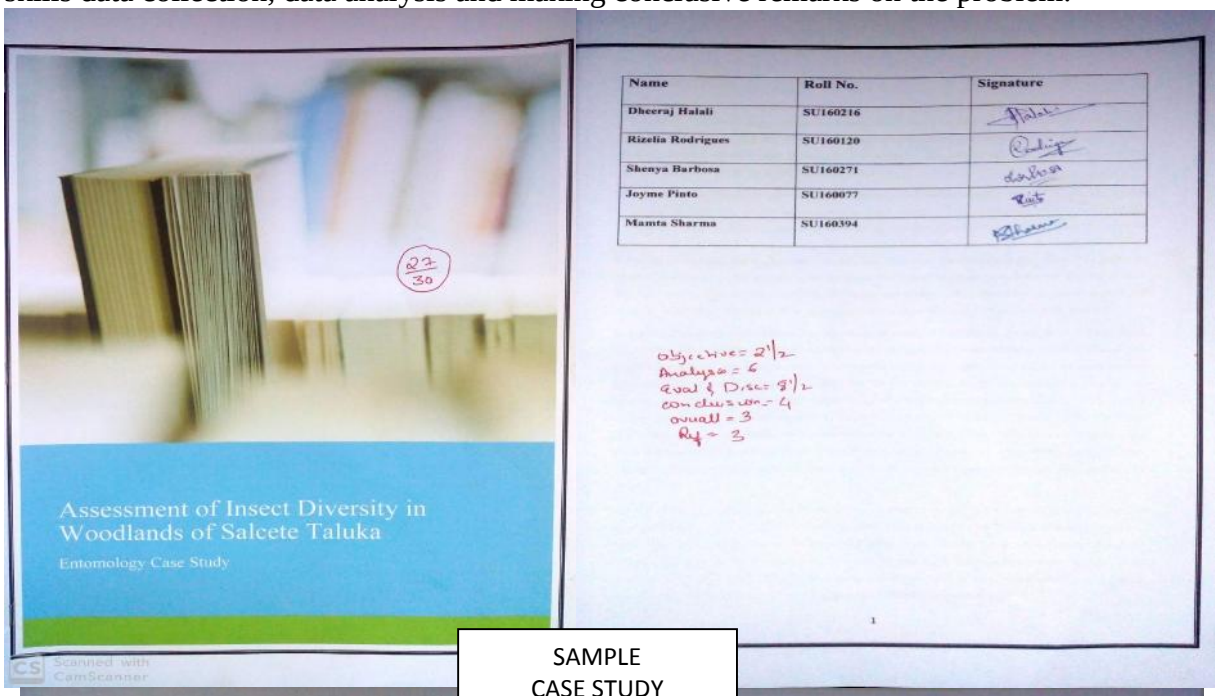
   a) Identification of the case study topics: Case study topics are identified by the concerned faculty in-charge. This identification is done in such a way that the faculty shortlists topics pertaining to real-world issues and ensures that the topics are aligned with the course syllabus.
   b) Distributing the topics amongst the students: The case study topics are randomly given to the students. At this time, the students are explained as to what they are expected to conduct the case study and the rubrics of assessment are also mentioned to the students.
   c) Group work: The case study mode of evaluation demands group work. The students work in groups of five. This inculcates group work to the students.
   d) Time given for report submission: From the day of declaration, 20 days are given to the students to identify their field sites and survey protocols, data collection, data analysis and report submission.
   e) Role of faculty after declaration of topics: After the first five days of declaration, the groups meet the faculty in-charge with all the issues which they encounter and the faculty listens to the same. The faculty makes sure that only valid issues are addressed. The faculty however, also holds informal meeting with the students throughout the course of the case study so as to make sure that the students are able to conduct the study.
   f) Field study: The students then conduct the surveys and compute the data.
   g) Report submission: The students submit their findings in the form of the report. The report arrangement is strictly aligned with the rubrics of assessment *(declared to the students before declaration of the topics for the case study).*

h) Evaluation: The students are evaluated based on the submitted report; and the plagiarism and groups activity reports. The case study report is strictly evaluated based on the rubric of assessment.

The aforementioned case study analysis helps the students identify certain challenged and/or issues pertaining to the country. As much of the teaching is not restricted to an Indian context, through the case study, the students are able to identify and iron down principles that are specialised in context to the country. The shortcomings of the study are mentioned in (3) and (6).

5. Evidence of Success

An assessment of the reports indicates that the students have been successfully able to understand the case study topic. In addition, it is also evident that the students have successfully acquired the skills data collection, data analysis and making conclusive remarks on the problem.

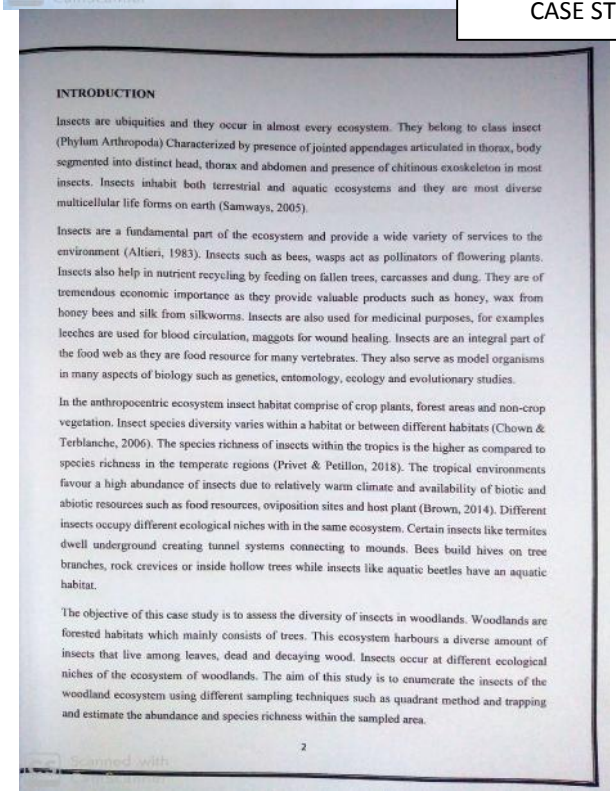


Assessment of Insect Diversity in Woodlands of Salcete Taluka

Entomology Case Study

Name	Roll No.	Signature
Dheeraj Halali	SU160216	
Rizelia Rodrigues	SU160120	
Shenya Barbosa	SU160271	
Joyme Pinto	SU160077	
Mamta Sharma	SU160394	

SAMPLE CASE STUDY



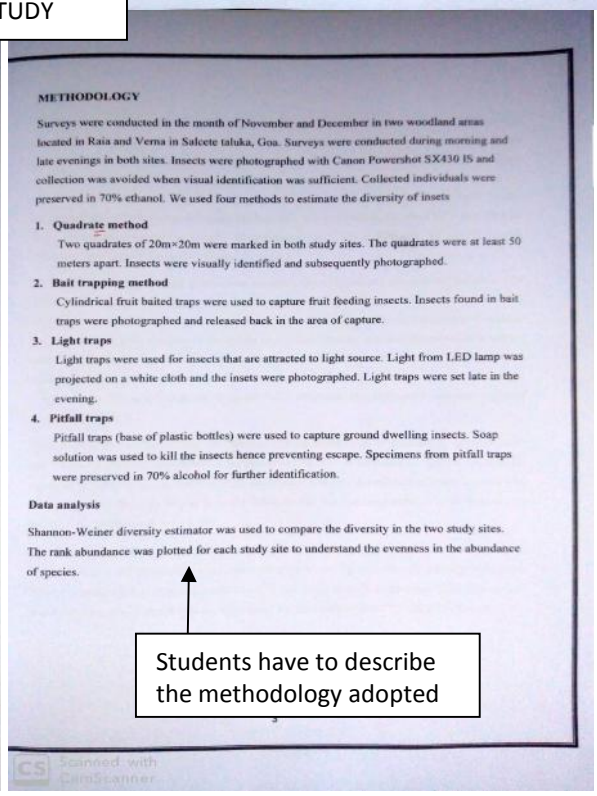
INTRODUCTION

Insects are ubiquities and they occur in almost every ecosystem. They belong to class insect (Phylum Arthropoda) Characterized by presence of jointed appendages articulated in thorax, body segmented into distinct head, thorax and abdomen and presence of chitinous exoskeleton in most insects. Insects inhabit both terrestrial and aquatic ecosystems and they are most diverse multicellular life forms on earth (Samways, 2005).

Insects are a fundamental part of the ecosystem and provide a wide variety of services to the environment (Altieri, 1983). Insects such as bees, wasps act as pollinators of flowering plants. Insects also help in nutrient recycling by feeding on fallen trees, carcasses and dung. They are of tremendous economic importance as they provide valuable products such as honey, wax from honey bees and silk from silkworms. Insects are also used for medicinal purposes, for examples leeches are used for blood circulation, maggots for wound healing. Insects are an integral part of the food web as they are food resource for many vertebrates. They also serve as model organisms in many aspects of biology such as genetics, entomology, ecology and evolutionary studies.

In the anthropocentric ecosystem insect habitat comprise of crop plants, forest areas and non-crop vegetation. Insect species diversity varies within a habitat or between different habitats (Chown & Terblanche, 2006). The species richness of insects within the tropics is the higher as compared to species richness in the temperate regions (Privet & Petillon, 2018). The tropical environments favour a high abundance of insects due to relatively warm climate and availability of biotic and abiotic resources such as food resources, oviposition sites and host plant (Brown, 2014). Different insects occupy different ecological niches with in the same ecosystem. Certain insects like termites dwell underground creating tunnel systems connecting to mounds. Bees build hives on tree branches, rock crevices or inside hollow trees while insects like aquatic beetles have an aquatic habitat.

The objective of this case study is to assess the diversity of insects in woodlands. Woodlands are forested habitats which mainly consists of trees. This ecosystem harbours a diverse amount of insects that live among leaves, dead and decaying wood. Insects occur at different ecological niches of the ecosystem of woodlands. The aim of this study is to enumerate the insects of the woodland ecosystem using different sampling techniques such as quadrant method and trapping and estimate the abundance and species richness within the sampled area.



METHODOLOGY

Surveys were conducted in the month of November and December in two woodland areas located in Raia and Verna in Salcete taluka, Goa. Surveys were conducted during morning and late evenings in both sites. Insects were photographed with Canon Powershot SX430 IS and collection was avoided when visual identification was sufficient. Collected individuals were preserved in 70% ethanol. We used four methods to estimate the diversity of insets

1. **Quadrate method**
   Two quadrates of 20m×20m were marked in both study sites. The quadrates were at least 50 meters apart. Insects were visually identified and subsequently photographed.
2. **Bait trapping method**
   Cylindrical fruit baited traps were used to capture fruit feeding insects. Insects found in bait traps were photographed and released back in the area of capture.
3. **Light traps**
   Light traps were used for insects that are attracted to light source. Light from LED lamp was projected on a white cloth and the insets were photographed. Light traps were set late in the evening.
4. **Pitfall traps**
   Pitfall traps (base of plastic bottles) were used to capture ground dwelling insects. Soap solution was used to kill the insects hence preventing escape. Specimens from pitfall traps were preserved in 70% alcohol for further identification.

Data analysis

Shannon-Weiner diversity estimator was used to compare the diversity in the two study sites. The rank abundance was plotted for each study site to understand the evenness in the abundance of species.

Students have to describe the methodology adopted

RESULTS

37 species belonging to nine orders were observed across both study sites. A total of 22 species distributed in seven orders were recorded during the survey in site 1 (Raia, Salcete, Goa). Order Hymenoptera was most dominant with seven species of which six species were ants and a honey bee species. Lepidoptera was represented by four species of which three species were moths and one butterfly species of family Lycaenidae. Yellow Crazy Ant, *Anoplolepis gracilipes* (Order: Hymenoptera), was the most abundant species with 145 individuals followed by Asian Weaver Ant, *Oecophylla smaragdina* (Order: Hymenoptera) with 113 individuals. Of the 18 species recorded, four species are spiders (Order: Araneae).

18 species belonging to eight orders were recorded from the second site (Verna, Salcete-Goa). Order Hymenoptera and Diptera were dominant with four species from each order. Lepidoptera was represented by one moth species and two species of butterflies of family Lycaenidae *Castalius rosimon* and *Chilades pandava*. *Drosophila sp.* (Order: Diptera) was the most abundant species with 76 individuals, followed by *Oecophylla smaragdina* with 52 individuals. Two species of spiders belonging to two different families were observed. Order Orthoptera was only found in site 1 with one species of grasshopper. Whereas Order Mantodea and Hemiptera was only reported from site 2 in Verna.

Rank abundance plot for the two sites showed uneven distribution of abundance. Abundance in site 1 was more evenly distributed as compared to site. The *Anoplolepis gracilipes, Oecophylla smaragdina, Drosophila sp.* showed high abundance however abundance of other species was relatively lower. Shannon-Wiener diversity index for site 1 was estimated to be 1.697 whereas for the site 2 it was observed to be 1.381.

Out of the four methods used to study insects, most species were observed in quadrate method. Beetles (Order: Coleoptera) and bugs (Order: Hemiptera) were predominantly found in light traps. Only one species (*Drosophila sp.*) was found in bait traps in both study sites. Only one species *Anoplolepis gracilipes* was found in pitfall traps whereas no insect was found in Verna site.

Order	Species	Abundance
Hymenoptera	*Oecophylla smaragdina*	113
	Anoplolepis gracilipes	145
	Ant species	5
	Ant species	2
	Ant species	7
	Ant species	2
	Honey bee	2
Diptera	Housefly	6
	Fly species	8
	Drosophila sp.	80
	Mosquito	14
Coleoptera	Beetle sp.	1
	Beetle sp.	1
Odonata	*Agriocnemis pygmaea*	1
Orthoptera	Grasshopper	1
Lepidoptera	Moth species	1
	Line blue	1
	Day Flying Moth	1
	Moth species	1
Araneae (Spiders)	*Oxyopes sp.*	1
	Epeus indicus	1
	Chrysila sp.	1
	Uloborus sp.	1

Table 1: Number of species found during the survey and their abundance in Site 1 (Raia).

SAMPLE
CASE STUDY

RESULTS

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Order	Species	Abundance
Hymenoptera	*Oecophylla smaragdina*	52
	Honey bee	2
	Wasp	1
	Ant Species	2
Diptera	Housefly	4
	Fly species	1
	Fly species	1
	Drosophila sp.	76
Coleoptera	Beetle Species	1
	Beetle Species	1
Mantodea	Praying Mantis	1
Odonata	*Orthetrum sabina*	1
Hemiptera	Bug Species	1
Lepidoptera	*Castalius rosimon*	1
	Chilades pandava	1
	Moth	1
Araneae (Spiders)	*Horsillia sp.*	1
	Oxypes sp.	1

Table 2: Number of species found during the survey and their abundance in Site 2 (Verna).

Students need to demonstrate their abilities of data tabulation and representation

SAMPLE
CASE STUDY

Figure 1: Number of species in each order found in Site 1 (Raia)

Figure 2: Number of species in each order found in Site 1 (Verna)

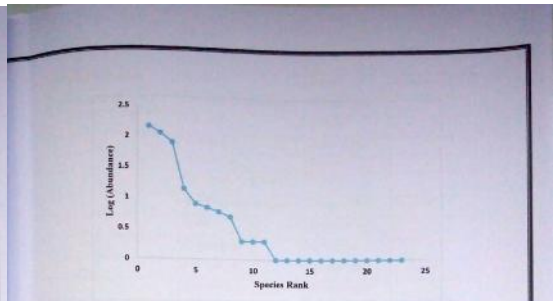

Figure 3: Rank abundance plot depicting uneven distribution of insects in site 1 (Raia).

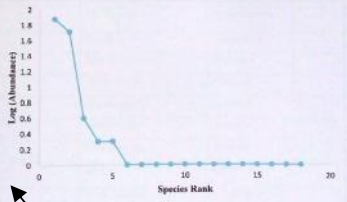

Figure 4: Rank abundance plot depicting uneven distribution of insects in site 2 (Verna).

Students expected to graphically represent data and analyse it statistically.

SAMPLE CASE STUDY

Method of collection	Species	Order	Abundance
Quadrate method	*Oecophylla smaragdina*	Hymenoptera	113
	Housefly	Diptera	6
	Line blue	Lepidoptera	1
	Unkown sp.	Diptera	8
	Agriocnemis pygmaea	Odonata	1
	Anoplolepis gracilipes	Hymenoptera	83
	Moth	Lepidoptera	1
	Grasshopper	Orthoptera	1
	Ant species	Hymenoptera	5
	Ant species	Hymenoptera	2
	Day Flying Moth	Lepidoptera	1
	Ant species	Hymenoptera	7
	Ant species	Hymenoptera	2
	Honey bee	Hymenoptera	2
	Beetle	Coleoptera	1
	Mosquito	Diptera	12
	Oxyopes sp.	Araneae	1
	Epeus indicus	Araneae	1
	Chrysila sp.	Araneae	1
	Uloborus sp.	Araneae	1
Light Trap	Beetle	Coleoptera	1
	Moth species	Lepidoptera	1
	Mosquito	Diptera	2
Bait Trap	*Drosophila sp.*	Diptera	80
Pitfall Traps	*Anoplolepis gracilipes*	Hymenoptera	62

Table 4: Number of species and the relative abundance in different sampling methods in site 1 (Raia).

EVALUATION AND DISCUSSION

We conducted assessment of insect diversity in woodland areas of Salcete Taluka in Goa. Diversity of insects and abundance was enumerated from two woodland sites located in Raia and Verna. Quadrate method, light tapping, bait trapping and pitfall traps were used to study the insect diversity. Insect diversity was relatively higher in Raia with 23 species as compared to Verna which showed presence of 18 species. Order Orthoptera was only found in Raia site whereas order Mantodea and Hemiptera were only found in Verna site. This may have occurred due to the less sample size hence the asymptote may not have reached. Hence more samplings are required to document the diversity. Shannon-Wiener index for site 1 was relatively higher which indicated that site 1 is more diverse as compared to site 2.

Rank abundance plot showed uneven distribution in abundance which implies that certain species were highly dominant whereas abundance of most of the species was low. Abundance in site 1 was more evenly distributed than site 2 however the general trend of abundance distribution was similar in both study sites. Due to similar habitat structure and geographic location, the observed trend is likely to remain similar in the two study sites. It is necessary to understand the diurnal and nocturnal activity of insect species to estimate the distribution pattern in abundance. We only used light traps to study the nocturnal insects. Hence, widening the collection and study methods are likely to relay cues on the actual diversity and abundance trends.

Out of the four study methods used viz. quadrate method, light trapping, bait tapping and pitfall methods, most insects were observed in quadrate method. Hence this method can be used to study insects. However, specific insect species like Hemipterans and Coleopterans were mostly found in light traps which can be missed in quadrate method. Pitfall traps were most effective to trap ground dwelling predators. In woodland areas, we only found one species of ant *Anoplolepis gracilipes*. In conclusion, quadrant methods are more effective in woodland ecosystems however other methods such as light trapping are useful to attract certain species that may not be found in quadrant method.

Since we did not have sufficient sapling size, more sampling effort is required to estimate the diversity and abundance of insects. Also, the time of the surveys were not same hence it may result in differences due to diurnal activity of insects. Methods that were used to collect/study insects were prone miss certain species hence more methods such as pheromone traps, light traps with UV and mercury laps are essential to assess the diversity of insects.

Critical evaluation and discussion of the results in scientific manner is required.

CONCLUSION

We conducted assessment of insect diversity in woodland habitat in Salcete Taluka, Goa. A total of 37 species of insects were observed representing nine orders. Site 1 in Raia was more diverse as compared to study site in Verna. Shannon-Wiener index for site 1 was 1.679 which was relatively higher as compared to site two wherein the estimate was 1.381 which indicated higher diversity in Site 1. The rank abundance plot showed uneven abundance of species in both study sites however abundance was more evenly distributed in site 1 as compared to site 2. This indicate that some species are highly abundant whereas abundance of other species is fairly low. We also analyzed which sampling methods is most suitable to study insect diversity. We observed that quadrate method yielded high number of species during the survey hence it is a suitable method to study insect diversity. However, certain species like Hemipterans were only found in light traps hence a conjugation of different techniques is essential to study the diversity. In conclusion, we recorded 37 species of insects in nine different orders in two study sites. Study sites did not differ much in species richness and the abundance was unevenly distributed. Since we conducted limited number of surveys, more samplings are essential to reach asymptote in species richness.

Line Blue (Lepidoptera)

Moth (Lepidoptera)

Unknown species (Diptera)

Unknown Species (Diptera)

Praying Mantis (Mantodea)

Grasshopper (Orthoptera)

(Images: Dheeraj Halali)

SAMPLE
CASE STUDY

REFERENCES

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Kuno, E. (1991). Sampling and analysis of insect populations. *Annual review of entomology*, *36*(1), 285-304.

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Privet, K., & Petillon, J. (2018). Differences in tropical vs. temperate diversity in arthropod predators provide insights into causes of latitudinal gradients of species diversity. *bioRxiv*, 283499.

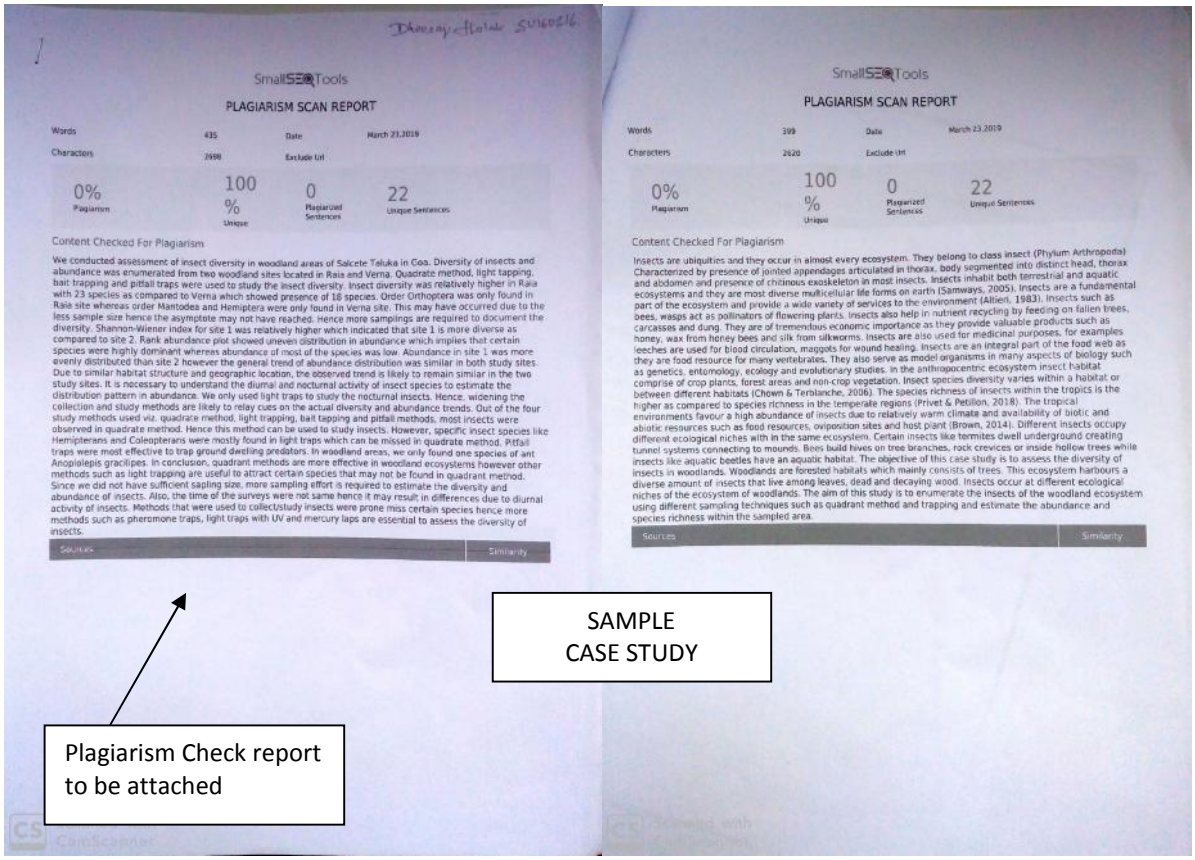
Samways, M. J. (2005). Insect diversity conservation. *Cambridge University Press.*

Case Study Report

All members of the groups were present for the field surveys carried out for the case study. Field surveys were carried out two times in Raia and Verna. Bait trapping and pitfall traps in Raia were set by all the members whereas pitfall traps were set in Verna by Rizelia. Light trapping were monitored by Joyme and Shenya in Raia. Dheeraj photographed insects in the light traps in the evening. Introduction for the case study was written by Rizelia and Mamta. Methodology was done by Shenya and JoymeData analysis and results were done by Dheeraj. Discussion and conclusion was done by Dheeraj and Rizelia

Name	Roll No	Signature
Dheeraj Halali	SU160216	
Rizelia Rodrigues	SU160120	
Shenya Barbosa	SU160271	
Mamta Sharma	SU160394	
Joyme Pinto	SU160077	

Report submission on group member interactions and contributions is mandatory



6. Problems Encountered and Resources Required

a) Problems Encountered:

- Identification of field sites: In some of the instances, the students are not able to identify field sites based on their case study topic. In such instances, the concerned course faculty helps the students narrow down and identify the field sites.
- Issues with stakeholders: As many of the case study topics involve surveying sites for data collection, in some cases, the students do not get permission from stakeholders. This can lead to a change in field site and/or a change in the entire topic.
- Tools required for data collection: As many data collection protocols are available, the students are unable to acquire tools for data collection. In such instances, the students are forced to make DIY tools for data collection.
- Analysis of data: As the case study requires the students to analyse their data to make viable conclusion, in many instances, the students are unable to compute their data.

b) Resources Required:

- Field guides.
- Equipment for data collection.

7. Notes (Optional)

This method can be adopted for courses which have field based component, incidences which exemplify the theoretical knowledge taught etc. (Eg. Environmental Science, Ecology, Wildlife biology, Social Sciences etc).

***

Department of Computer Science

Teaching-Learning-Evaluation Methodology

By Mr. V.C. Kumaresh

Title:

Group Activity.

Introduction:

The learning method was implemented to PGDCA Students for the course Digital Marketing. The topic allotted was Email Marketing. 10 Students were divided into 3 teams(3+3+4).Each team was given different study materials related to the topic - Email Marketing, (onepower point slides and one youtubevideo). No evaluation was carried out.

Objectives of the method:

- *To work together and collaborate with the team.*
- *To take advantage of peer to peer learning*

Problem / Topic that was given to students:

Email Marketing.

Procedure:

Three teams were formed. Each team selected will select their representative. Each team was given the link of ppt slides and a video as the resource materials. All students have to go through the resource materials at home/out-of class.

The students have to meet with their team members during the class hour and discuss various aspects of the email marketing for 30mts, from what they have gone through from the resource materials. The selected representative from each team has to present the discussions and observations made by his/her team.

In-Class Activity:

a) *Each team should select a representative.*
b) *The team members should discuss what they have done in out-of class activity and compile the key points.*
c) *Representatives from each team should present the compiled information orally to the entire class.*

Out-class Activity:

a) *Each team has to go through the slides and video given in the links as the out-of class activity.*
b) *Each student should make the key points and come for in-class activity.*

Outcomes:

a) *Students could able to interact with their classmates related to the subject.*
b) *Their own ideas and thoughts were discussed in the group.*

Problems Faced:

a) *Out-class activity was not done by the students in-spite of giving more time.*
b) *Need to allot more time for them in the lab as an out-class activity.*
c) *Have to monitor and guide them.*
d) *Time for in-class activity was not sufficient. Given more time.*

Kumaresh V.C.
Associate Professor
Department of Computer Science.

BEST PRACTICE AREA: TEACHING LEARNING EVALUATION

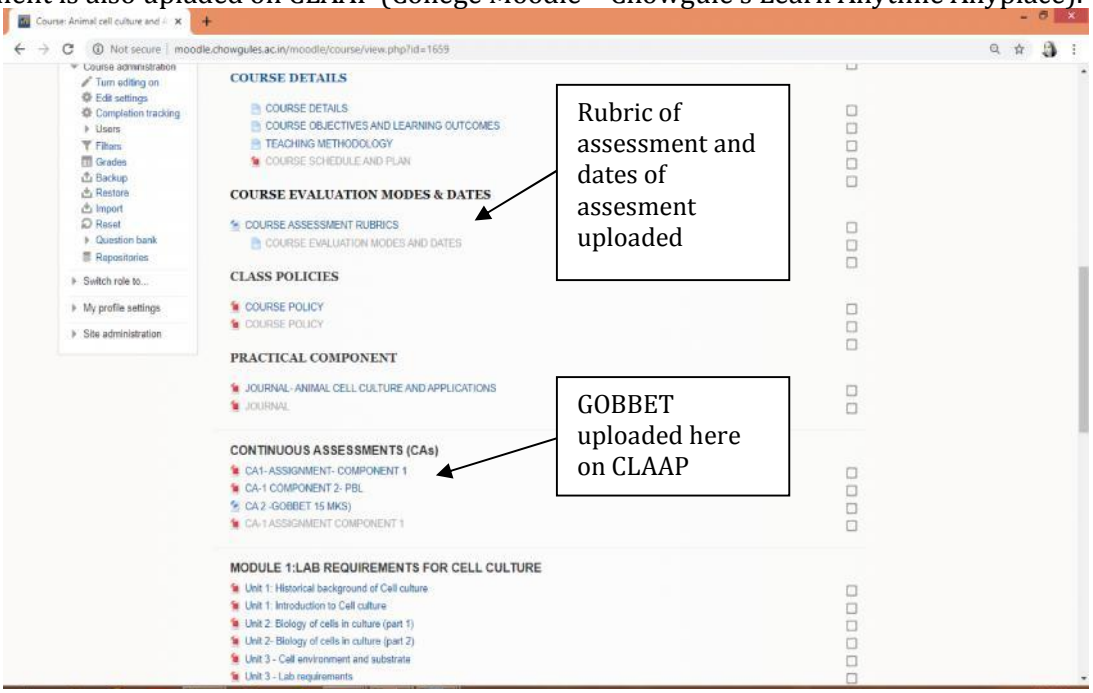
Best practice: <u>Teaching-Learning-Evaluation</u>

1. Title of the Practice: GOBBET AS AN EVALUATION METHOD.

2. Objectives of the Practice: The main objective of this evaluation practice is to evaluate the undestanding of learning and assess the analytical skills of students.

3. The Context:
'GOBBET' refers to a passage of literature, an image, a cartoon, a photograph, a map or an Artefact which provides a context for analysis, translation or discussion in an assessment**.** The students are given set of instructions.

4. The Practice:
Gobbet as a mode of assessment, if effective tool to encourage the students to work as a team and analyse content of Gobbet rationally. The practice promotes leadership qualities and group collaboration / team work along with helping students understand the core concepts and applications of the same. The activities are initiated by assigning of students into groups followed by activities by giving set of guidelines and explaining the rubric of assessment. All the matter related to assessment is also upladed on CLAAP (College Moodle – Chowgule's Learn Anytime Anyplace).



Provide students the time period, guidelines and assessment criteria. Along with the photo/map/scene/artifact, series of questions can be asked (lower and higher order of Blooms taxonomy).

Ensure the students know what the objectives of the assessment are.
Inform students that the gobblet should involve evaluation of the information and not paraphrasing what is already in the piece.

<u>Students need to be advised to:</u>

Include cross-references to any other primary sources, written.
feel free to answer in bullet-point form
Be PRECISE, CONCISE and STRICT about only sticking to relevant information.
Rubric of Assessment:

MARKING RUBRICS	*Excellent (70% and above)*	*Average (69 – 50%)*	*Below average (49 – 30%)*	*Poor (Below 30%)*
1) Context: (5%)	Outstanding grasp and a mature understanding of the gobbet and its contexts	Comments on the nature, authorship, and other material pertinent to the context and interpretation of the piece	Make some pertinent comments on the nature, authorship, and other relevant aspects of the gobbet.	Fails to expand on the nature, authorship, and other issues relevant to the gobbet.
2)Analysis: (30%)	Clear, coherent and compelling analysis	Demonstrates familiarity with the area under discussion	Demonstrates some familiarity with the area under discussion	May paraphrase rather than analyse the gobbet under discussion
3) Meaning: (30%)	Comprehensive coverage. This may be achieved by citation	Identify the point of the document or the theme that it illustrates	Identify the point of the gobbet – the subject or the theme which it illustrates	Fails to identify the point or the theme of the piece
4) Citation: (5%)	Economic and effective use of all material cited	Substantiates the points that are made from evidence	Contains some citation but not appropriately used to substantiate the piece	Contains no citation
5) Significance: (30%)	Identifies the gobbet's significance in an independent, distinctive, and authoritative way	Explores some of the significance of the gobbet with reference to such issues as typicality, representative ness, uniqueness, reliability, bias	Touches on the wider significance	Fails to identify the gobbet's wider significance

5. Evidence of Success

GOBBET
ZOO-E-5: ANIMAL CELL CULTURE AND APPLICATIONS
CA 2 (15 MKS) – TO BE SUBMITTED ON 10th February 2020

1) See the image given below. Identify the process that it describes. Explain every step/event numbered from '1 to 11'. Comment on the significance of the process.

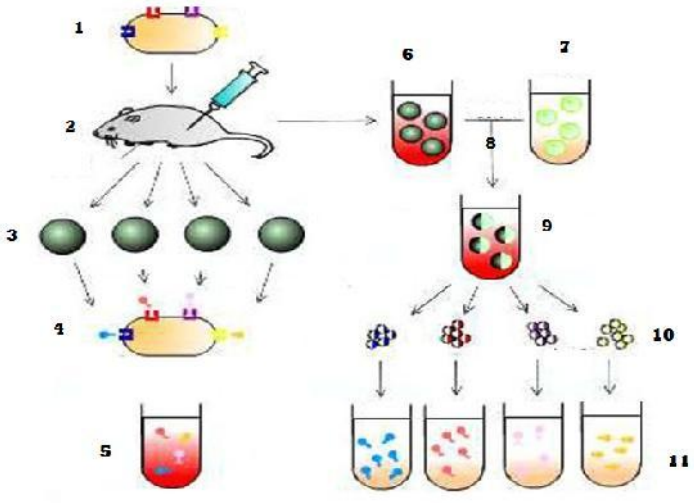


Figure 1: Gobbet

2) **Analyse the image 2. What is it indicative of? Compare and contrast the 4 portions of the image viz. A,B.C and D and give justification as to when such a phenomena can occur.**

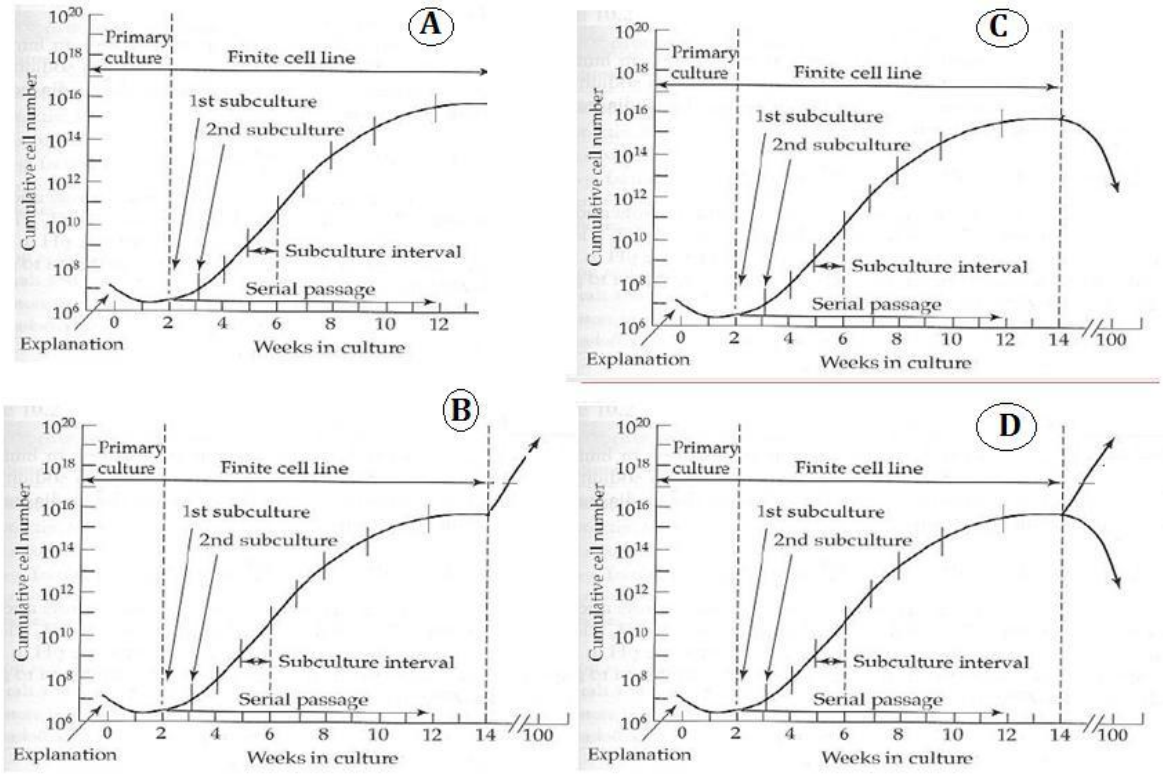


Figure 2: Gobbet

3) **Given below is an image with clippings of lab and the procedure conducted. Looking at the sequence of events from A to F, describe the procedure conducted and steps incolved.**

Figure 3: Gobbet

4) **What do you understand by the term hybridoma technology? What are the valuable products obtained from Hybridomas as of today. Suggest an alternative method to obtain valuable products instead of hybridoma technology.**

Course faculty: Dr. Nandini Vaz Fernandes Ms. Madhu Balekai Ms. Prasanna Naik Gaonkar

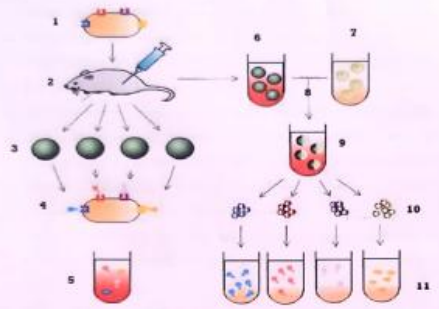
The Answers Submitted by students:

GOBBET

CA-2

COURSE TITLE- ZOOIV-E-5- ANIMAL CELL CULTURE AND APPLICATIONS
GROUP 6
SEMESTER IV
CLASS – SYBSC

1) See the image given below. Identify the process that it describes. Explain every step/event numbered from 1-11. Comment on the significance of the process.



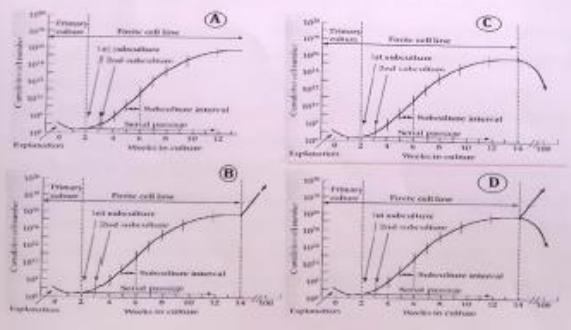
➢ The process described below is production of monoclonal antibodies (mAB) using hybridoma technology. Monoclonal antibodies are antibodies made from identical immune cells that are clones of unique parent cell (Kind T, 2007). They are derived from a single B- cell clone that recognise and bind to a single, unique epitope of an antigen . The steps involved in their production are described below-

1- Selecting an antigen having multiple epitopes- This antigen is responsible for producing multiple antibodies.
2- Immunisation of mice- the mouse is injected with the specific antigen that acts as an immunogenic protein for testing the antiserum . This is done via intraperitoneal immunisation or subcutaneous immunisation. This will trigger the immune system to produce antibodies against that specific antigen. These antibodies are produced and isolated from the spleen.
3- Isolation of different spleenocytes from the spleen of mouse - these are lymphocytes capable of producing specific antibodies. They are isolated via intraperitoneal immunisation
4- Formation of antigen- antibody complex- Since every antibody binds to its specific unique binding site on antigen (depicted in the picture with different colour) the spleenocytes containing various paratopes fuse with antigens containing the respective epitopes and form an antigen antibody complex.
5- Blood suspension containing Antibodies-We can obtain the antibodies from the antigen-antibody complex through Blood screening. This antiserum contains polyclonal antibodies which bind to multiple epitopes of a given antigen
6- Test tube containing spleenocytes having antibodies – These are normal cells having controlled growth and possess the property of producing antibodies. Since blood exists as suspension, we allow the spleenocytes to centrifuge and resuspend in lysine solution. This is done to preserve the cell integrity, allow cell growth and make the cells compatible for fusion with myeloma cells.
7- Test tube containing Myeloma cells- These are cancerous plasma cells having the property of uncontrolled growth but do not produce any antibodies. These act as fusion partners.
8- Fusion of the spleenocytes and myeloma cells- After ensuring they are present in appropriate ratios, mix both the cells and allow them to centrifuge. After removing the supernantent, poly ethylene glycol (PEG) is added to the pellet to allow adherence between both the cells for proper fusion.
9- Formation of hydridomas- The fusion of a normal spleenocytes with cancerous blood cells called myloma cells, results in the formation of new hybrid cells called hybridomas. They possess the property of immortal and indefinite growth as well production of the desired antibodies.
10- Selection of monoclonal antibodies- Inorder to retrieve fused cells, they are subjected to HAT (Hypoxanthine Aminopterin and Thymidine) selection. Since the fused cells are resistant to HAT medium, only these cells will grow thereby separating them from unfused cells and giving rise to pure colony of hybridomas. These hybridomas are cultured and cloned to produce identical daughter cells
11- Production of monoclonal antibodies – After obtaining pure hybridoma cells, the identical daughter cells secrete the immune products called monoclonal antibodies. . Different test tubes containing different types of antibodies, but they are derived from the same hydridoma cells ,hence the produced antibodies are monoclonal in nature.

➢ The significance of hydridoma technology is mentioned below:-

1. In vivo diagnostics -alternative way for diagnosing and monitoring the progression of a disease through the analysis of biomarkers within the body.
2. Highly specific imaging like Positron emission tomography, magnetic resonance imaging fluroscent molecular tomography and ultrasound.
3. Used for monoclonal antibody production and exploiting the therapeutic potential in the form of metabolic ativators , inhibitors and immuno-modulators.
4. mAbs are used intreating autoimmune disorders like and inflammatory disorders like myocanditis , Crohn'sdisease, HIV and cancer as well as immunosupression during organ transplant.
5. mAb's are conjugated with flurophore or a drug to deliver cargo to specific targets. They can help in targeted drug delivery for immunology and oncology studies through (ADC's) and targeted biologics in the form of chimeric antigen called T-cell therapy(CAR-T) where they target T cells to a tumor associated antigen through single chain variable fragments expressed on the surface of the T –cells (Tan, 2019).
6. They are used in research purposes and analyzing human lymphocytes, MHC antigens, antigenic differences between virus and viral related proteins (Bian, 2013).

2) Analyze the image 2. What is it indicative of? Compare and contrast the 4 portions of the image viz. A, B, C and D and give justification as to when such a phenomena can occur.



- The above images show a typical cell growth curve for cultured cells. Each image displays subculture of primary cell culture to form secondary culture. Continuous passaging of cells leads to the establishment of a cell line having finite growth for a certain period of time. But after undergoing the stationary phase, the fate of these cell lines differ(except for portion A) as mentioned below as mentioned below:-

A- Ideal growth curve of cells showing stationary growth phase.

B- Transformed cell line-Cell line undergoes transformation to form an immortal cell line. This is, due to mutation which leads to infinite and uncontrolled cell growth and increase in cell number.

C- Finite cell line undergoes senescence- Cell death due to reduction in viable cell number as a part of natural progression of cell cycle. This phase is also called decline phase.

D- Cell culture with certain cells either undergoing senescence (finite cell line) or transformation (continuous cell line).

- The similarities between all 4 portions of the image are given below:-

- Each curve shows sigmoid pattern of proliferation depicting a relationship between the cumulative cell number and the weeks for which cells are cultured.
- Continuous passaging of primary cells leads to the formation of finite cell lines in each curve.
- Each image shows different phases of cell growth i.e.
  a. Lag phase- The initial phase where no cell growth occurs but cells take time to get adapted to their culture environment. The length of this phase depends on the growth phase of the cell line at the time of cell culture and seeding density (In all 4 portions, nearly 2 weeks).As per the curve, this time period coincides with the time period of primary culture.
  b. Logarithmic phase- The actual phase of cell growth, where cells proliferate and cell growth exponentially increases with increase in cell density. As the cell population is most viable during this phase (in this case, around 2-12 weeks), it helps in assessing the various cell functions. As per the figure, all cell are sub cultured and passaged during initial period of this phase i.e. 1st subculture at 2 weeks(beginning of secondary cell culture) followed by 2nd subculture at 3 weeks and so on till 9 subcultures. Each subculture occurs after specific time period known as subculture intervals.
  c. Stationary Phase- As cells start attaining confluency, cell growth ceases and cells are most susceptible to injury at this phase. As per the curve, after 12 weeks, the cells undergo stationary phase.

- As mentioned above, the 4 portions of the curve differs based on the cell behaviour after establishment of finite cell line. Each curve shows different pattern of growth of cell line depending upon the type of cells cultured and environmental fators.

Image A- shows the cells in a stationary phase. The stationary growth phase results from a situation in which growth rate and death rate is equal. The number of new cells created is limited by the growth factor and as a result the rate of the cell growth matches the rate of cell death. The result is a smooth horizontal linear part of the curve during the stationary phase. An expoonentially growing cell can enter the stationary phase due to a growth-limiting factor such as the depletion of nutrient or due to the accumulation of waste (Kolter R, 1993).

In image B, a transformed cell line is obtained when the cell line undergoes conversion to a state of unregulated growth in culture. The cells undergo transformation and acquires the ability to divide indefinitely and thus, it becomes a continuous cell line. The continuous cell lines are transformed, immortal and tumorigenic. It occurs spontaneously or through mutations arising due to interaction with viruses, oncogenes, radiation or drugs and chemicals. Hence the curve once again increases linearly and exponentially after finite cell line (Smith JR, 1992).

In image C, Cell senescence is the final, common pathway for actively dividing cells which leads to the reduction in the number of viable cells in the culture. Cell death is not due to the reduction of nutrients, but to the natural progression of the cellular cycle. By imposing a growth arrest, senescence limits the replication of the old or damaged cells. Senescent cells undergo many other phenotypic alterations such as metabolic reprogramming, chromatin rearrangement, or autophagy modulation. Senescence is a stress response that is often triggered by a persistent DNA damage response and can be induced by a wide range of intrinsic and extrinsic insults, including oncogenic activation, oxidative and genotoxic stress, mitochondrial dysfunction, irradiation, or chemotherapeutic agents. hence the curve tapers down after finite cell line (Nicolas Herranz, 2018).

In Image D, the curve shows 2 different growth patterns. Some cells undergo deterioration due to senescence whereas some cells continue to proliferate at an enhanced rate and show exponential growth due to cell transformation. Most of the cells will undergo fixed number of population doublings and these cells are known as finite cells while some cell lines that undergo transformation and acquire the ability to divide indefinitely, becomes a continuous cell line due to mutation (Dowd, 2019).

3) Given below is an image with clippings of lab and the procedure conducted. Looking at the sequence of events from A to F, describe the procedure conducted and steps involved.

- The events occurring in the above images take place while sub culturing adherent cells. After obtaining cells from primary cell culture, they are subcultured multiple times to obtain secondary cell culture and cell lines. The cells are obtained via cell dissociation methods(mechanical or enzymatic) followed by viable cell count , determining optimal cell density and preparation of new culture vessels for passaged cells.

Based on the images, the steps are mentioned below:-

- ✓ This procedure takes place in a cell culture laboratory as seen in image A. This laboratory is a single use facility and must be separated into an area specifically reserved for handling quarantine material, free of contamination. The main function is to maintain sterile environment as well as appropriate temperature for producing cells in a safe and efficient manner. It must be an air conditioned room consisting of CO_2 incubators, laminar air flow, liquid nitrogen freezer, refrigerator, balance, centrifuge , inverted microscope, hemocytometer, washing sink and osmometer.
- ✓ Image B shows a biosafety cabinet called lamina air flow hood, that provides aspectic and sterile environment for cell culture and protects the operator from aerosol. It consists of highly specialised HEPA (high efficiency particulate air) filters that filter the airflow. As seen in the picture, there are specialised T-flasks made out of polysyterene containing the spent culture media placed within hands' reach. All the solutions and equipments must be sterile. Most importantly, the operator must wear sterilised gloves, masks and laboratory apron to ensure no contamination takes place while working.
- ✓ Using a sterile pipette, the laboratory worker is pouring the media in specialised flasks made out of sterile polystyrene material called T- flask.
- ✓ As seen in image C, the spent cell culture media from the culture vessel is removed using sterilised pipettes (one time use).
- ✓ Rinse the solutions using balanced salt solution while ensuring osmolarity and pH for preserving cell integrity is maintained.
- ✓ Now remove the traces of salt solution by rinsing with wash solution.
- ✓ After discarding the wash solution from the vessel, subject it to sufficient cell dissociation reagent like trypsin or trypLE to one side of the T-flask for cell adherence and coverage of complete cell layer.
- ✓ The culture vessels mentioned in the image D are designed for storing cell culture medium. The cell culture medium is GMEM (Glasgow Modified Essential Medium) EMEM (Eagle's Minimum Essential Medium) and DMEM(Dulbecco's Modified Eagle Medium) which are supplemented by hormones and growth factors like platelet derived growth factor(PDGF) serve as nutrients and source of energy for cell growth. These include T-flask, petri plates and conical tubes of different sizes, shape, coating and lids. The coatings such as collagen, gelatine and fibronectin help in providing the cells with natural environment condition These are made out of special plastic material like polystyrene, Teflon or polyacrylamide that can withstand cell culture conditions and low efficient working (M.Koh, 2013). They are discarded after one time use.
- ✓ Image E shows CO_2 incubator that provides completely closed sterile environment with suitable temperature, humidity and CO_2 to the growing cells.
- ✓ Tilting the flasks in a gentle manner, such that all cells in the flask are completely dissociated. To confirm this, observe them under microscope, where they appear round in shape.

- ✓ After almost 90% of cell dissociation , incubate the culture vessel at room temperature for 2 minutes, once again add complete growth medium using a new sterile pipette several times to ensure the entire cell layer covers the surface.
- ✓ Now transfer the cells to a conical tube and centrifuge them at a high speed. Discard the supernatant containing any minute traces of growth medium or dissociating agent.
- ✓ Resuspend the pellet in growth medium while gently pipetting to ensure all cells take up the medium.
- ✓ Now take a small portion of the pellet and use a hemocytomete or any cell counter to do a viable cell count. Use trypan blue stain for indicating the ratio of live to dead cells (thermofisher, 2018).
- ✓ The image E displayed screen depicts spindle shaped cells tagged with a fluorescent marker (green nuclear dye that is permeable to cell membrane thereby staining the nucleus) to detect presence of viable cells.

4) What do you understand by the term hybridoma technology? What are the valuable products obtained from hybridomas as of today. Suggest an alternative method to obtain valuable products instead of hybridoma techology.

Hybridoma technology refers to the production of antibodies in large amounts for diagnostic or therapeutic use (Jr, 2018). It features effective usage of innate functions of both immune cells and cancers, allowing production of hybridoma cells, which continuously generate monoclonal antibodies specific to antigens of interest. For the generation of hybridoma cells, B lymphocytes must be somatically fused with myeloma cells using various technologies (Masahiro Tomita, 2011).

The valuable products obtained from hybridoma as of today are monoclonal antibodies. the applications of the monoclonal antibodies are as follow:

a) Diagnostic Applications-

- MAbs may be employed as diagnostic reagents for biochemical analysis or as tools for diagnostic imaging of diseases.
- Detects the protein of interest either by western blotting or immunofluorescence
- Used in cardiovascular diseases and deep vein thrombosis
- Radiolabelled MAbs can be used to locate 1° and 2° metastatic tumours
- Used in immunosuppressive therapy
- Used in pregnancy testing kits in detecting the urinary levels of human chorionic gonadotrophin.
- It also helps in the hormonal analysis of thyroxine, triiodothyronine and thyroid stimulating hormone for thyroid disorders (W J Payne, 1988).

b) Therapeutic Applications

- MAbs are laboratory produced molecules engineered to enhance or mimic the immune system's attack on cancer cells. they are used to carry drugs and radioactive or toxic substances to cancer cells (Saljoughian, 2019).
- It is used in the immunosuppression of organ transplantation.
- In the treatment of AIDS, autoimmune diseases, malignant leukaemia, B-cell lymphoma
- Used in the preparation of vaccines, particularly against certain viral strains or against some parasites.
- The toxins can be coupled with MAbs to form immunotoxins and is used in therapy (Aryal, 2017).

c) Protein purification

MAbs columns can be prepared by coupling them to cyanogen bromide activated Sepharose. The immobilised MAbs in this manner are very useful for the purification of proteins by immunoaffinity method.

An alternative method to obtain valuable products instead of hybridoma technology is the recombinant DNA technology. Recombinant antibodies (rAbs) can be generated in vitro through gene manipulation or production of synthetic genes (Fedarko, 2015). After synthesising a gene, capable of artificially producing antibody for the given antigen, using Polymerase chain reaction to increase the production, transforming a plasmid to carry the gene of interest and insert into the cancerous cell lines(myloma or lymphoma) will directly result in uncontrolled growth of new cells giving immunology products. Recombinant DNA technology is playing vital role in improving the health conditions by developing new vaccines and pharmaceuticals. It offers new opportunities for innovations to produce a wide range of therapeutic products with immediate effect in the medical genetics and biomedicine by modifying microorganisms, animals, and plants to yield medically useful substances (Suliman Khan, 2016).

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TEACHING-LEARNING METHODOLOGY

PROCESS ORIENTED GUIDED INQUIRY LEARNING (POGIL)

Process oriented guided Inquiry learning (POGIL)

- A student-centered approach to Science instruction
- Widely used as a method of Learning in especially in Chemistry
- Chemistry Department has adopted POGIL as a teaching method
- Year of implementation: 2016-2017 onwards
- Year of approval from BoS: 2018-2019

Objectives of POGIL

- A POGIL activity is designed to be used with self-managed teams that employ the instructor as a facilitator of learning rather than as a source of information.
- A POGIL activity guides students through an exploration to construct, deepen, refine, and/or integrate understanding of relevant disciplinary content.
- The application and development of at least one of the targeted process skills is embedded in the structure and/or content of a POGIL activity.

Method

- Students are pre-apprised of prerequisites for a particular POGIL activity.
- Students are divided into groups ranging from 6-10.
- Each group has a Manager, Recorder and Speaker.
- The students have to answer a Questionnaire on a Topic not covered in class by doing group discussion.
- The onus is to arrive at the correct answer based on contributions from Group members
- Learning objectives, Concepts and prerequisites are specified.
- The prerequisites have to be satisfied by the students.
- Usually the concerned topic is introduced briefly to the students and at times additional information is provided in the middle and starting from lower order questions the move is made on to higher order questions.
- The solutions to the questions are discussed at the end of session and also the process and pathways in which the students reached at the solutions are discussed in detail.
- Breakup of a POGIL activity during a 60-minute lecture

  Introduction – 5 minutes

Team formation - 5 minutes

Worksheet solution – 40 minutes

Discussion – 10 minutes

Outcomes

- Student-centered method
- Enhances the group learning ability of students
- Enhances student engagement and interaction
- Students move on from illogical and at times stray thinking to a logical thinking
- Analysis and application ability of students is enhanced
- Students tend to answer higher order questions with comparative ease as compared to a normal class teaching method

Designed by: Dr. Sachin B. Kakodkar

Course: CHE-III.C-5 Comprehensive Chemistry-I

POGIL WORKSHEET

MIGRATION OF IONS

LEARNING OBJECTIVES

- Be able to explain the concept of migration of ions.
- Identify the movement of ions.
- Determine the direction of the movement of ions.
- Design of experiments of similar types.

CONCEPTS

- Ions
- Movement of ions
- Anode and Cathode

PREREQUISITES

- Concept of ions
- Electrodes

Lodge's Moving boundary method and **Movement of colored ions** were two experiments that demonstrated movement of ions towards oppositely charged plates.

1. Lodge's moving boundary experiment

Experiment showing the migration of H^+ ions as indicated by the movement of the red boundary through the agar-agar jelly.

The apparatus used consists of a U-tube which has a long horizontal portion. It is fitted with electrodes in the side limbs. The horizontal portion is filled with a jelly of agar-agar treated with a trace of alkali. This is then made **red** by addition of a few drops of **phenolphthalein**. When the jelly is set, dilute sulphuric acid andsodium sulphate solution are added in the two different limbs of the tube. On passing the current, **gradual discharge of the red colour**is observed.

Q.1 In which limbs sulphuric acid and sodium sulphate solution are added?

_____

_____

Q.2 Identify the migrating ion responsible for discharge of red colour and state its type.

_____

Q.3 State the role of phenolphthalein in above experiment.

_____

_____

Q.4State the reason for the discharge of red colour.

_____

_____

_____

Q.5 Draw arrows in above diagram to indicate the direction of migration of ion.

(USE GREEN COLOUR PEN)

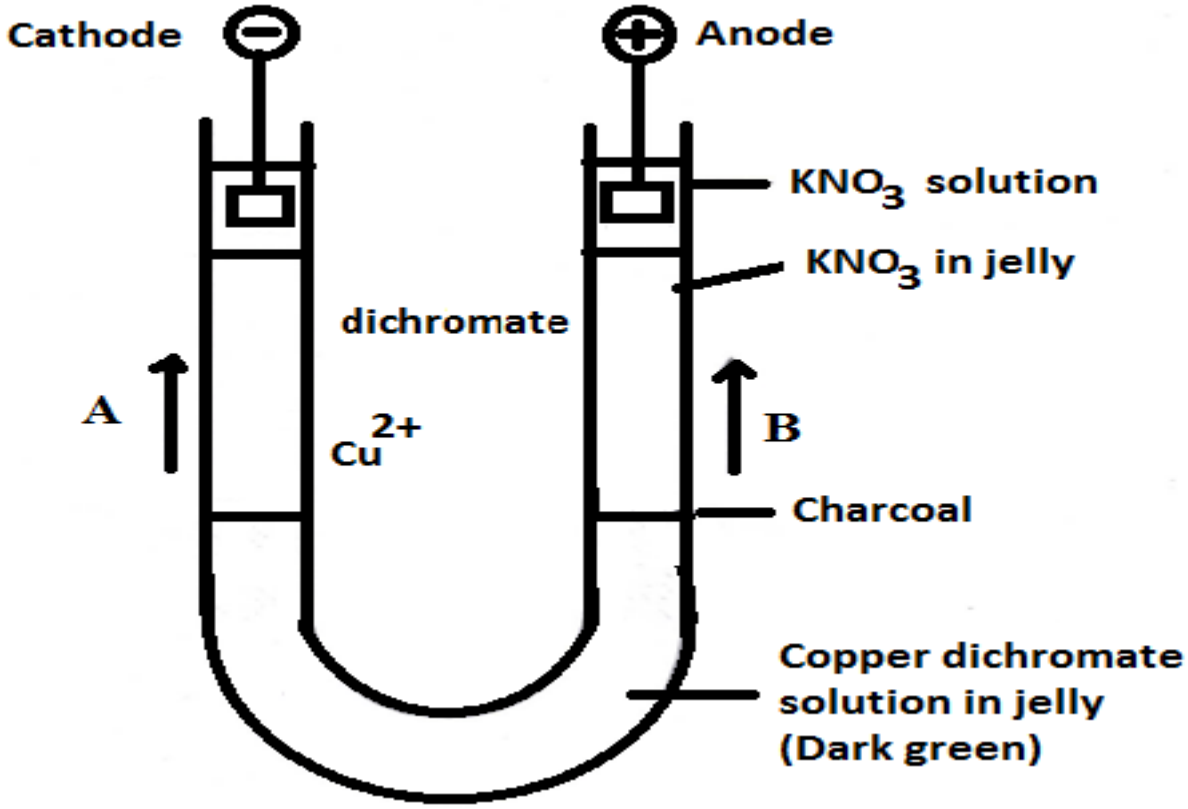
Q.4Identify the limb to which the ion migrates.

_____

_____

Q.6 Demonstrate migration of an oppositely charged ion than one demonstrated in the above diagram with a neat labeled diagram.

2. Movement of coloured ions



The lower part of a U-tube is filled with a 5 percent water-solution of agar-agar with a small amount of **copper dichromate ($CuSO_4$+ $K_2Cr_20_7$).**The dark green colour sets to a jelly. The surface of the green solution in the two limbs of the U-tube is marked by a small amount of charcoal. In both the limbs is then placed a layer of solution of potassium nitrate and agar-agar. This is also allowed to set. Over this second layer is placed some solution of potassium nitrate in pure water and the two electrodes are inserted in it. As the current is turned on, rise of blue colour and reddish yellowcolour is seen in the two different limbs.

Q.1 State the reason for the rise of blue and reddish yellow colour.

_____

_____

_____

Q. 2 Match arrows A and B in the figure with blue and reddish yellow colour.

_____

_____

Q. 3 In which limb will blue colour rise?

_____

Q. 4 In which limb will reddish yellow colour rise?

_____

Q. 5 Indicate arrows in the above figure to designate Cu^{2+} and dichromate presence in the limbs.

(USE GREEN COLOUR PEN)

Q. 6 What is the role of jelly in the above experiment?

_____

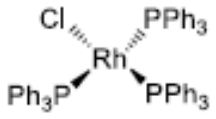
_____

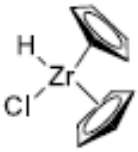
_____

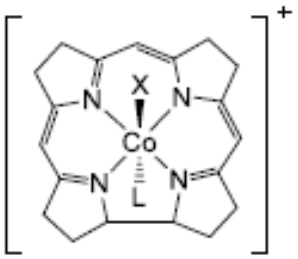
PRACTICAL PROBLEMS

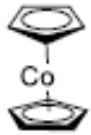
Problems Session – Electron Counting in Transition Metal Complexes and Clusters

I. For each of the following complexes, calculate:
   a. The oxidation state of the metal
   b. The electronic configuration of the metal (d^n)
   c. The total number of electrons of the metal





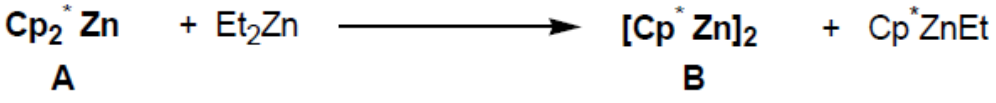




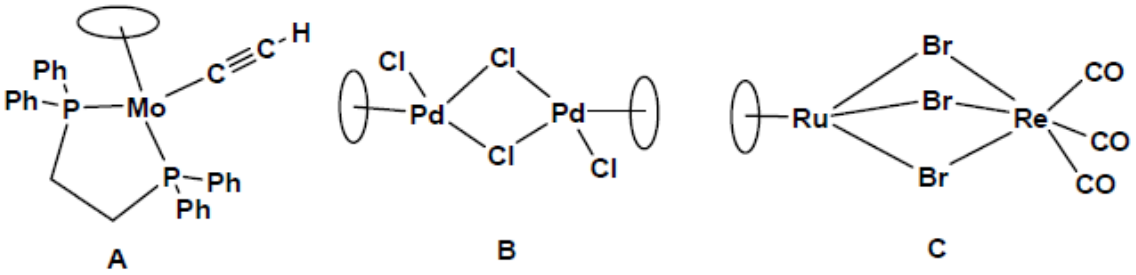
2. Determine the number of metal-metal bonds in the following clusters;

$[Mn_2(CO)_{10}]$ $[Re_3Cl_9(\mu_2\text{-}Cl)_3]^{3-}$ $[Ru(CO)_4]_3$ $[[ReCl_4]_2]^{2-}$

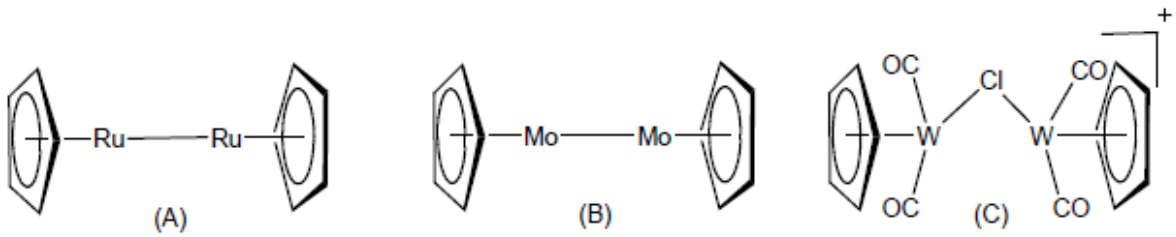
3. Compounds A and B in the given equation obey the 18 electron rule. Draw structures of compounds A and B clearly indicating hapticity of Cp^*. Also indicate oxidation state of Zn in both A and B.



4. Given that it shows the highest hapticity possible, find out the missing planar, unsaturated and conjugated carbocyclic hapto ligands in the following compounds, all of which obey the 18 electron rule.



5. Four chlorine ligands are missing in each of the given skeletons of dimeric compounds A, B and C. Given that all of them obey the 18 electron rule and no additional metal-metal bonds are present, attach the missing Cl ligands on the complexes in the most appropriate manner.



6. Count the electrons in the following compounds and indicate the electron count per metal unit.

Designed by: Dr. Sachin B. Kakodkar

Course: CHE-III.E-6 Polymer and Colloid Science

POGIL WORKSHEET

PARVATIBAI CHOWGULE COLLEGE OF ARTS AND SCIENCE
(AUTONOMOUS), MARGAO-GOA

POGIL WORKSHEET

THERMODYNAMICS OF FREE RADICAL POLYMERISATION

Class: S. Y. B. Sc. **Semester:** IV

Subject: Chemistry **Paper:** CHE-IV. E-6 Polymer and Colloid Science

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Free radical polymerization proceeds through three steps.
Gibbs free energy change is used to predict the feasibility of a process.
Prerequisites: Chemical Thermodynamics, Chemical equilibrium, Chemical kinetics, Polymerisation

---

1. **State the three steps involved in free radical polymerization.**

2. **State the symbols for Enthalpy, Entropy and Gibbs free energy?**

3. **Are the above functions State functions? Justify your answer.**

4. **Identify the relation between Gibbs free energy and enthalpy?**

5. **Comment on the heat involved in initiation and propagation steps.**

6. Predict Gibbs free energy change (ΔG_p) for polymerization process if ΔH_p is heat of polymerization and ΔS_p is entropy of polymerization.

7. If E_p is energy of activation of polymerization and E_{dp} is energy of activation of depolymerization, predict value of heat of polymerization.

8. Is heat of polymerization positive or negative? Justify your answer.

9. Is entropy of polymerization positive or negative? Justify your answer.

10. Will Gibbs free energy change (ΔG_p) be positive or negative? Justify your answer.

POGIL ACTIVITY

1. Which of the following relationships between absorbance and %Transmittance is **incorrect** ?
   a) $A = \log_{10} 100 / \%T$
   b) $A = 2 - \log_{10} \%T$
   c) $A = \log_{10} 1 / \%T$

2. In the equation, $A = \varepsilon bc$, what quantity is represented by "ε" ?

   a) Absorbtivity
   b) Molar absorbtivity
   c) Path length

3. Why is it generally preferable to use absorbance as a measure of absorption rather than % Transmittance?

   a) Because %T cannot be measured as accurately as absorbance
   b) Because %T is dependant on the power of the incident radiation
   c) Because absorbance is proportional to the concentration of the analyte, whereas %T is not.

4. Does a compound with high molar absorbtivity have a higher or lower limit of detection than a compound with low molar absorbtivity?

5. How does the percent transmittance of a solution vary with (a) increasing concentration and (b) increasing path length?

Numerical Problems:

1) A solution of Tryptophan has an absorbance at 280 nm of 0.54 in a 0.5 cm length cuvette. Given the absorbance coefficient of tryptophan is 6.4×10^3 LMol-1 cm-1 . What is the concentration of solution?

2) A solution shows a transmittance of 20%, when taken in a cell of 2.5 cm thickness. Calculate its concentration, if the molar absorption coefficient is 12000 dm^3/mol/cm.

3) Calculate the molar absorptivity of a 1 x 10 -4 M solution, which has an absorbance of 0.20, when the path length is 2.5 cm.

4) The concentration of yeast t-RNA in an aqueous solution is 10 M. The absorbance is found to be 0.209 when this Solution is placed in a 1.00 cm cuvette and 258 nm radiations are passed through it. a) Calculate the molar absorptivity b) What will be the absorbance if the solution is 5 M? c) What will be the absorbance if the path length of the original solution is increased to 5.00 cm?

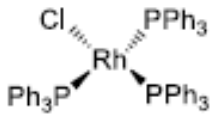
5) A $CaCO_3$ solution shows a transmittance of 90%, when taken in a cell of 1.9 cm thickness. Calculate its concentration, if the molar absorption coefficient is 9000 dm^3/mol/cm.

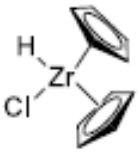
6) The absorbance of a Cu sulphate solution containing 0.500 mg Cu/mL was reported as 0.3500 at 440 nm. a) Calculate the molar absorptivity, on the assumption that a 1.00 cm cuvette was used. b) What will be the absorbance if the solution is diluted to twice its original volume.

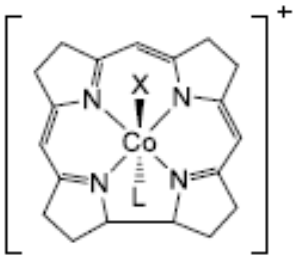
PRACTICAL PROBLEMS

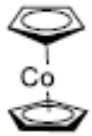
Problems Session – Electron Counting in Transition Metal Complexes and Clusters

I. For each of the following complexes, calculate:
   a. The oxidation state of the metal
   b. The electronic configuration of the metal (d^n)
   c. The total number of electrons of the metal







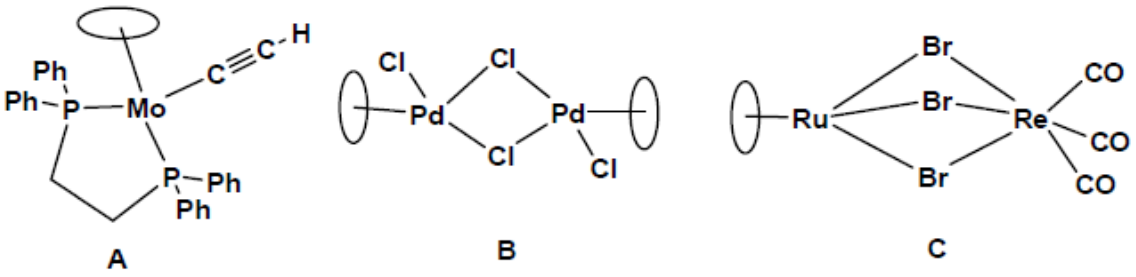


2. Determine the number of metal-metal bonds in the following clusters;

$[Mn_2(CO)_{10}]$ $[Re_3Cl_9(\mu_2\text{-}Cl)_3]^{3-}$ $[Ru(CO)_4]_3$ $[[ReCl_4]_2]^{2-}$

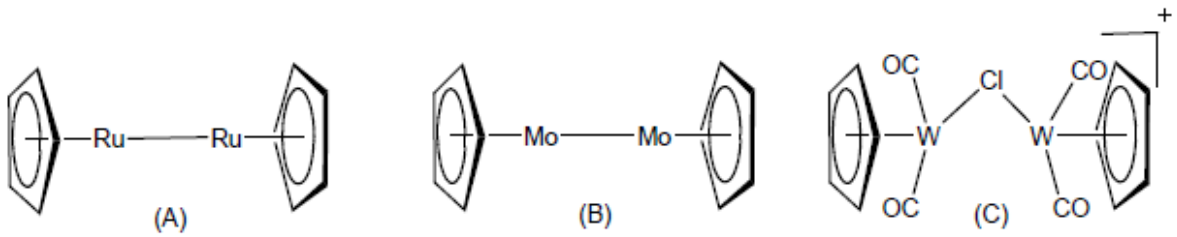
3. Compounds A and B in the given equation obey the 18 electron rule. Draw structures of compounds A and B clearly indicating hapticity of Cp^*. Also indicate oxidation state of Zn in both A and B.

4. Given that it shows the highest hapticity possible, find out the missing planar, unsaturated and conjugated carbocyclic hapto ligands in the following compounds, all of which obey the 18 electron rule.

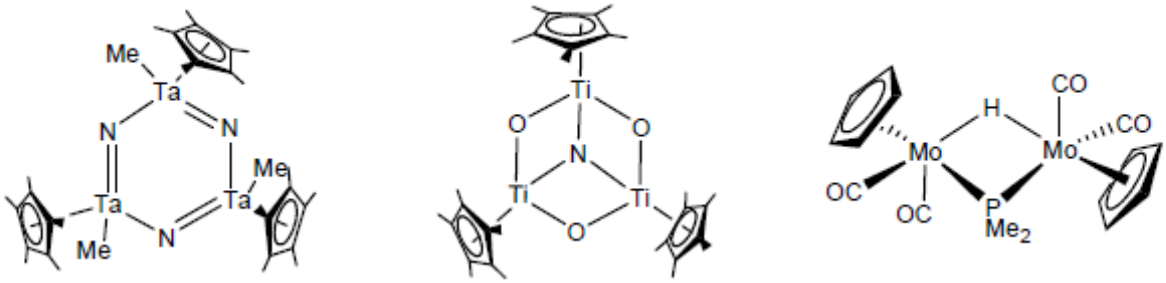


A B C

5. Four chlorine ligands are missing in each of the given skeletons of dimeric compounds A, B and C. Given that all of them obey the 18 electron rule and no additional metal-metal bonds are present, attach the missing Cl ligands on the complexes in the most appropriate manner.



6. Count the electrons in the following compounds and indicate the electron count per metal unit.



BEST PRACTICE AREA: TEACHING LEARNING EVALUATION

Best practice: <u>Project based practical</u>

1. Title of the Practice: Project based practical (Comparision Of Nutrient Labels)

2. Objectives

To enable students, learn and understand concepts through field work. At the end of the course students are able to analyze and interpret results. The students understand the importance of team work and comprehend the information attained for presentation.

3. The Context

This present practice is adopted by Dr.Nandini Vaz Fernandes and Ms.Tessa Vaz of department of zoology in the course 'Health and Nutrition" . This Practical requires to be designed in a manner that will enable students understand the theoretical concepts and its application. The activity is designed in such a manner that it enables students to analyze the different aspects of the activity and use theoretical concepts to solve the problems in a group.It helps them build team work and understand different food groups.

4. The Practice

This practice is a field based/ project based practical where in students are required to go out in the field during the practical hours and complete the project.

Example:<u>Comparison of nutritional labels if different food groups.</u>

This practical is a component of the course Health and Nutrition of TYBSC. It is in line with the concepts taught in theory as it requires them to interpret the results. Students should be taught about the different food groups and their importance indifferent diets, based on requirements of individuals specially those suffering from diet based diseases.

On the day of the practical students go to different supermarkets in their respective groups and assess the nutritional labels of a food group belonging to different brands. The distribution of the food groups for eg: noodles, jams, biscuits, flour etc. is done by the respective faculty prior to the day of the activity. The students analyze atleast 4 brands in each food group allotted to the group. After careful observation they compare the macro and micro nutrient quantities displayed on the nutrient label's and then submit their portfolio. This practical is a component of the continuous assessment for practical for which the students are evaluated based on their observations, results and the conclusions related to different diets.The students submit their results in a form of a portfolio and presentation followed by an interaction with the faculty and students in the class.

5. Evidence of Success

Students were able to work in their groups to solve the activity given to them. They were able to write a good report based on the different components related to the activity. They are able to evaluated and read nutritional labels .The same was assessed as a continuous assessment for practical's which had two components i.e portfolio submission and presentation.

COMPARISON OF NUTRITIONAL QUALITY OF JUICES ACROSS VARIOUS BRAND

Name	Roll no.	Signature
Reuben Rajdhyaksha	SU160152	
Rizelia Rodrigues	SU160120	
Leander Barreto	SU160108	
Prachita Sudhir	SU160127	
Decima Dias	SU160141	
Dheeraj Halali	SU160216	

Contents

Introduction

All packaged foods come with a nutrition label meant to provide you with the information essential to know exactly what you're eating. Understanding what's in the foods you consume helps you make healthier choices (Renee, 2017).

The nutrition label provides key information such as serving size, calories, total fat, saturated fat, cholesterol, protein, carbohydrate and vitamin content. The label also has a list of the ingredients. This data helps you stay on track with your everyday targets. It also helps you evade certain ingredients if you have a food intolerance or are following a diet that excludes certain components, for example dairy (Renee, 2017).

The current Indian government has suggested and proposed all drink companies of India to have at least 2% of fruit content in their drinks, so that it has some nutritive character added to it and along with to benefit the farmers working towards production of fruits in India. Mango has the biggest share in fruit juice industry with about 60% share and all other fruits altogether have the remaining percentage (Singh, 2018).

Dietary recommendations for healthy eating include the consumption of fruit juices whose beneficial health effects are due, in part, to vitamin C, a natural antioxidant which may limit the development of major clinical conditions including heart disease and certain cancers. However, many fruit juices also have phenolic compounds and carotenoids, some of which have antioxidant prospects and whose intakes have also been inversely related with heart disease and cancers (Gardner, White, McPhail, & Duthie, 2000).

The nutritional relevance of such phenolics is uncertain as they may be poorly absorbed and rapidly metabolised and thus have limited antioxidant ability in vivo. In contrast, vitamin C is highly bioavailable and is consequently one of the most important water-soluble antioxidants in cells, efficiently scavenging reactive oxygen species such as $O^{\cdot}_2$, $OH^{\cdot}$ peroxyl radicals and singlet oxygen. Moreover, by efficiently trapping peroxyl radicals in the aqueous phase of the plasma or cytosol, vitamin C can protect bio-membranes and low density lipoproteins from peroxidative damage. Consequently, when relating the antioxidant activities of fruit juices to disease risk and health, it is important to consider the contribution of vitamin C in addition to that of phenolic compounds with antioxidant activity in chemical systems (Gardner, White, McPhail, & Duthie, 2000).

Methodology

For this experiment, first we brainstormed certain ideas. We decided that the 5 brands would be Tropicana, Real, Minute Maid, B Natural and Ceres. We then chose the flavours to be Orange, Mango and Mixed fruit as these were readily available in most markets.

We further divided ourselves into groups and went to superstores and general stores. On finding any one of the brands with the same flavours mentioned above, we clicked picture of the Nutritional value. Once we got all the brands we tabulated the value and evaluated all the various brands for a certain flavour of juice.

To form the graphs, Excel sheet was used.

Results and Discussion

Orange Juice

1. Brand A (Tropicana)

Nutritional Information	Per 100ml
Energy	50 kcal
Total Carbohydrates	12.4 g
Sugars	12 g
Protein	0.1 g
Total Fat	0
Sodium	34 mg
Potassium	82 mg

2. Brand B (Real)

Nutritional Information	Per 100ml
Energy	54 kcal
Total Carbohydrates	13.5 g
Natural Fruit Sugars	6.7 g
Added Sugars	6.8 g
Protein	0.4 g
Total Fat	0
Calcium	4 mg
Iron	0.3 mg

3. Brand C (Minute Maid)

Nutritional Information	Per 100ml
Energy	54 kcal
Total Carbohydrates	13.6 g
Sugars	11 g
Protein	0
Total Fat	0

4. Brand D (B Natural)

NUTRITIONAL FACTS PER 100ml*	
ENERGY	56 kcal
PROTEIN	0.2 g
CARBOHYDRATE	13.8 g
OF WHICH:	
- NATURAL FRUIT SUGARS	6.3 g
- ADDED SUGAR	7.5 g
FAT	0 g
CALCIUM	8.3 mg
SODIUM	9 mg
POTASSIUM	83.9 mg
VITAMIN C	30.8 mg

Total trans fat content not more than 0.0 percent by weight.
Total saturated fat content not more than 0.0 percent by weight.

Nutritional Information	Per 100ml
Energy	56 kcal
Total Carbohydrates	13.8 g
Natural Fruit Sugars	6.3 g
Added Sugars	7.5 g
Vitamin C	30.8 mg
Total Fat	0
Calcium	8.3 mg
Iron	0.3 mg
Sodium	9 mg
Potassium	83.9 mg
Protein	0.2 g

5. Brand E (Ceres)

Nutritional Information	Per 100ml
Energy	100 kcal
Total Carbohydrates	22 g
Sugars	22 g
Dietary Fibre	0 g
Protein	1 g
Total Fat	0
Sodium	5 mg
Vitamin C	60 mg

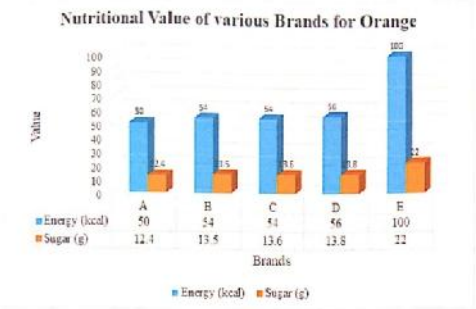


Fig: Graph depicting the sugar and energy of the 5 different brands for orange juice

In the graph given above:

- It is clearly noticeable that Brand E (Ceres) gives the highest amount of energy i.e 100 kcal per 100ml. The remaining four brands give pretty much the same amount of energy with Brand A (Tropicana) being the lowest with 50 kcal. Brand B (Real) and C (Minute Maid) give equal amount of energy, i.e. 54 kcal. Brand D (B Natural) gives 56 kcal.
- If we look at the sugar graph, the trend is the same with Brand E being the highest (22 g) followed by D (13.8), C (13.6), B (13.5), A (12.4).
- It is also noticed that Ceres has the highest amount of protein present with (1g), followed by Real (0.4g), B Natural (0.2g), Tropicana (0.1g) and lastly Minute Maid (0).

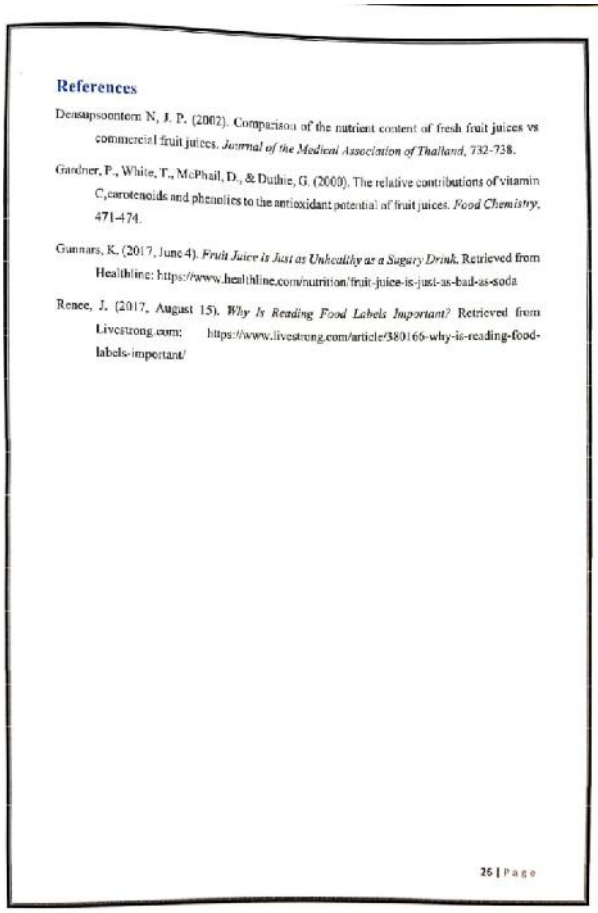
We would refer Brand E to a person who undergoes a lot of exercise or physical labour as s/he will require a lot of energy which will be obtained from the juice. We would also recommend Brand A to any patient who has a high sugar level or is diabetic as this particular brand had very sugar level.

Conclusion

While comparing the nutritional values for orange juice, it was seen that the energy level was seen highest in Ceres with 100 kcal and lowest in Tropicana 50 kcal. Real and Minute Maid give equal amount of energy, i.e. 54 kcal. B Natural gives 56 kcal. If we look at the sugar graph, the trend is the same with Ceres being the highest (22 g) followed by B Natural (13.8), Minute Maid (13.6), Real (13.5) and Tropicana (12.4). It is also noticed that Ceres has the highest amount of protein present with (1g), followed by Real (0.4g), B Natural (0.2g), Tropicana (0.1g) and lastly Minute Maid (0). Hence, we would recommend Ceres orange juice to a person who works out a lot exercise or undergoes immense physical activity.

Whereas, for Mango flavours across the brands it was seen that the energy level was similar throughout as well as the sugar level. We would recommend this flavour, irrespective of the brand, to young adults and teens who have a high energy requirement.

While evaluating the brands for mixed fruit flavour, the energy content was similar across Real, Minute Maid and B Natural, while Tropicana had the lowest amount of energy level. The sugar content showed similar trends. Hence, we would recommend Tropicana to people with a comparatively more sedentary lifestyle, followed by Ceres. People with high energy requirements would be recommended Real, B Natural and Minute Maid.



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Gunnars, K. (2017, June 4). *Fruit Juice is Just as Unhealthy as a Sugary Drink*. Retrieved from Healthline: https://www.healthline.com/nutrition/fruit-juice-is-just-as-bad-as-soda

Renee, J. (2017, August 15). *Why Is Reading Food Labels Important?* Retrieved from Livestrong.com: https://www.livestrong.com/article/380166-why-is-reading-food-labels-important/

6. Problems Encountered and Resources Required

Implementation of the practice requires the faculty to complete the respective modules before the activity is announced as the students have to understand the nutrients well

Food groups allotted should be easily available in nearby local supermarkets having atleast 3-4 brands of the required food products to make it feasible for the students. Students have to be given sufficient time during practical's to record and compile all their data in the form of a portfolio

***

Teaching learning methodologies practiced in the Department of Geology

Following are 3 methods used :

I. Title : Teaching with Google Earth

Concept: Earth is a free, downloadable application that works as a browser for all sorts of information on Earth. Google Earth provides an immersive and interactive experience for students to learn about our earth. We have used Google earth platform to cover the topics such as ''Morphology of the ocean floor'' in Marine Geology and Physical geology Courses.

These courses deals with the physical features on the Earth's surface which are usually described elaborately in words however the setback here is not every student has the ability to imagine and make a mental image based on the theory. This tool reduces the possibility of incorrect interpretation as it helps in direct visualisation in 3-dimension and also helps to understand the scale.

Objective:
The technique helps students for better understanding of its dimensions by 3D visualisation of the geological features.
The teaching method would provoke critical thinking among students.

Procedure:
Sample 1.

1. Google earth platform was used to study the bathymetry of the ocean floor. The imagery provided insights into the shape, size and features present in the ocean basins, the locations of various ocean features such as mid-ocean ridges, seamounts, locations of hotspots, trenches, ocean islands, and volcanic arcs were very apparent in the imagery provided by Google earth.
2. Vector Layers of earth surface model, plate boundaries, recent earthquakes, volcanoes in KML format were then overlaid on base map to study relationships of these ocean features to their tectonic settings.
3. The instructor may give a set questionnaire to the students to solve to assess their understanding and to promote/guide the interactive activity.

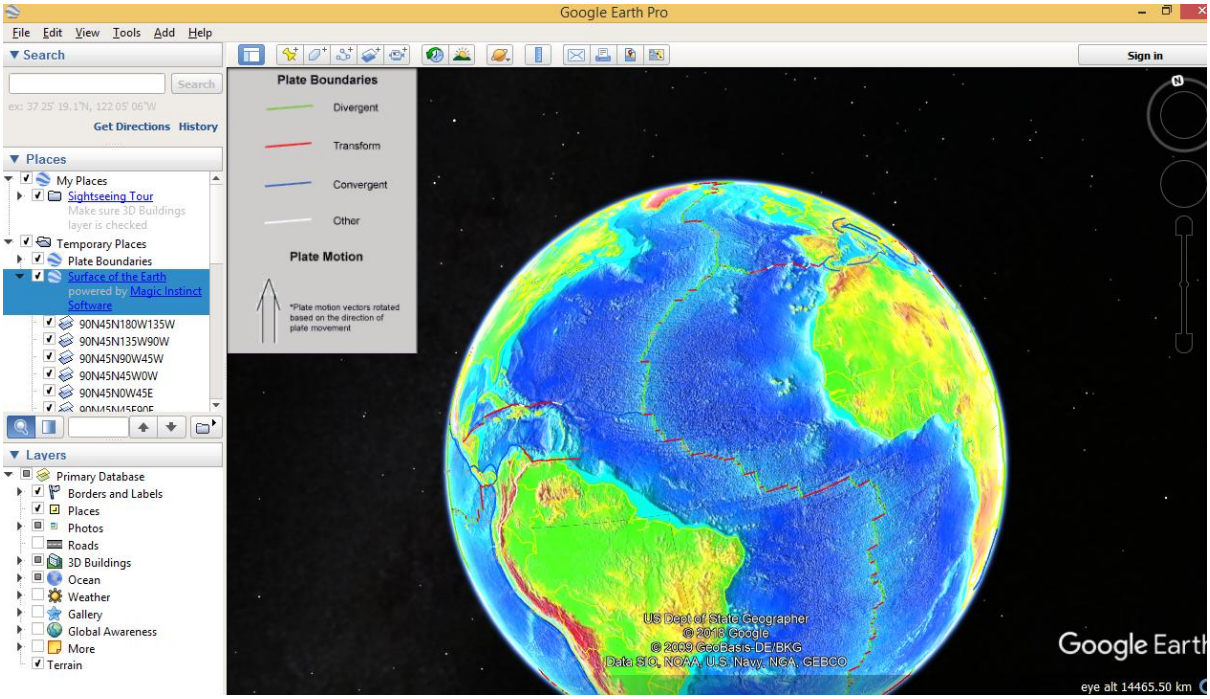

Figure 1: Mid-Ocean ridges. Earth surface model and plate boundary kml overlaid on Google earth depicting plate boundaries and their relation to ocean features

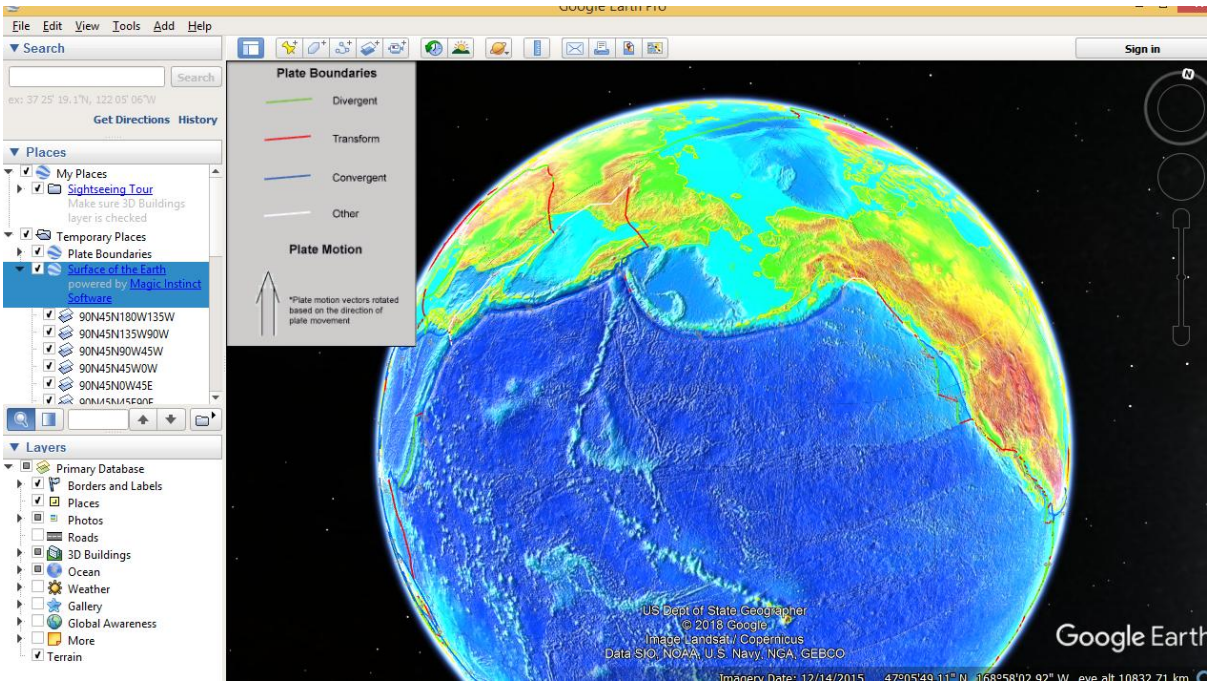

Figure 2: Linear chain of ocean islands and Volcanic arc. Earth surface model and plate boundary kml overlaid on Google earth depicting plate boundaries and their relation to ocean features

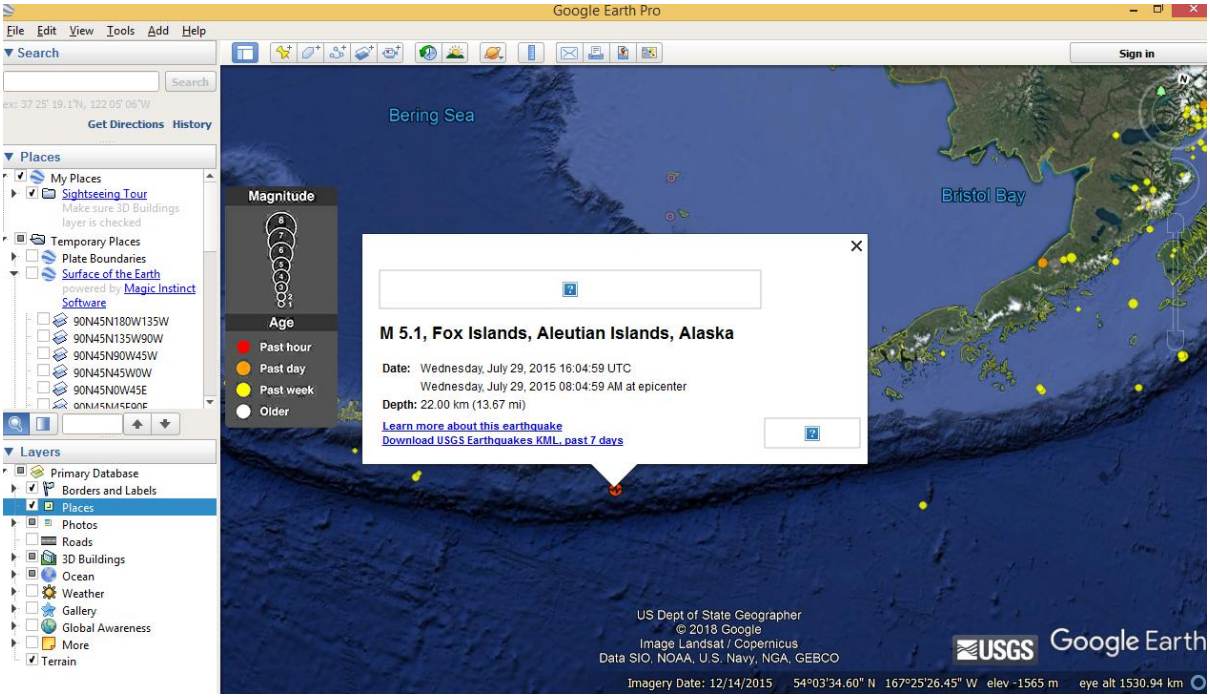

Figure 3: Imagery showing the location of epicentre of latest earthquake, kml updated by USGS.

Outcome: The students were able to actively engage in discussions with one another using the interactive Google Earth platform.

The students were able to access more information about the various attributes of features, such as magnitude time and place of Earthquake, volcanoes etc.

Challenges Faced: Method depends on Internet connection for live interaction of the features and therefore the process could slow down in the case of poor network.

Infrastructure development, involving a dedicated computer Lab with internet connection is required to enhance the experience.

Feedback: This above illustration was conducted by Mr Malcolm Afonso for one of the topics in course of Marine Geology. It resulted in enhanced interaction within the students and brought about new ways of critical thinking evidenced by the nature of questions that they were able to generate.

“The activity as fun and we enjoyed it”, One of the students from Second year 2016-17, Mr Rizlon Quadros commented.

II. Collaborative Learning: Flipped classroom

Concept:
Collaborative Learning is a teaching approach where the teacher facilitates learning by making the students engage in activities (in class or out of class) e.g. Group discussions, Debates, Group projects, Online Video, online discussion forums, online chats etc. In this kind of approach the students interact, evaluate, assess and guide one another to learn from each other as a group and create new knowledge.

Objective: To encourage students to express their views/ideas on the given concept/topic. It also helps to them to learn and appreciate other person's perspective. Thereby enhancing their communication skills and helps them identify gaps in learning.
The method is also very effective in building new ideas, testing them and providing solutions.

Prerequisite:
Content for the topic example Case studies, Documentaries, demonstration videos references, etc. Should be provided to the student.

Procedure: There are various methods by which Flipped classroom can be implemented. Following is one such illustration using "3 Step Interview".

Illustration: 3 step Interview
The said method was conducted the course "Natural hazards and Management" for the second year BSc Geology students by Malcolm Afonso on the topic -" Tsunami".

1. Documentary of the 2004 Indonesian Tsunami, titled "The wave that shook the world" https://www.youtube.com/watch?v=3YOf44bNzw4 was screened n the classroom.
2. Apart from this additional links were provided to the students to study more about the topic.
3. In the classroom students were divide in groups of three.
4. In each group one student was assigned the role of Investigator, one responder and one note and time keeper.
5. The students were encouraged to ask open ended questions.
6. After a set time of five minutes the students were asked to change roles and the process was repeated.
7. The notes generated were then summarised by one representative from each group.
8. The instructor then guided the discussion to emphasise/clear certain aspects that may have been missed out or may have been misinterpreted.

Some of the other methods include "Team-Pair Solo" and "Round Robin". Refer to blog post of Mr Malcolm Afonso for more details:
https://newageprofessor.blogspot.com/2017/11/collaborative-learning-flipped.html

Team-Pair Solo | Three-Step Interview | Round Robin

Outcome:

This resulted in enhanced communication skills like Listening skills and expression through verbal communication and note keeping.

Students were able to identify gaps in their understanding of the concepts

Practiced By / for: Mr Malcolm Afonso for the course “Natural hazards and Management”, “Marine Geology” and “Surveying and Field Geology”.

III. Field based Teaching and Assessment

Concept:
Geology been a field based subject, students are exposed to field training at various places of geological interest within and outside the state of Goa. The training includes field mapping and exposure to the different aspects of Structural Geology, Petrology, Mineralogy, Stratigraphy

Objective: For understanding of theoretical concepts and its variation in field.

Prerequisites: Knowledge of basic concepts in Structural Geology, Petrology, Mineralogy and Stratigraphy.

Procedure:
The basic concepts required for making meaningful field observations are taught in the first two years of the BSC Geology Programme.
These are supplemented with occasional field visits and identification of the features and making necessary measurements of the geological attributes.
In the Third year the students are taken for an exhaustive field study where in they are expected to identify the features at megascopic and microscopic level and correlate it with the concepts learnt earlier, thereby understanding the mode of thier formation.
An field report with all the findings and conclusions is mandatory based on which the student performance is assessed.

Outcome: The understanding of theoretical concepts and its variation on field

Challenges Faced: Currently the field study which is an essential requirement for the subject of geology is self funded by the students so the number of field studies are thereby limited.

Practiced By : Mr. H. S Nadkarni, Dr Meghana Devli, Ms Swati Ghadi, Mr Malcolm Afonso and Ms Magnolia Miranda (Department of Geology).

Department of Computer Science

Teaching-Learning-Evaluation Methodology

By : Mr. Gajanan Nial

Title :CA-2 (MCQ mode) Conducted fully online using Google Classroom

Introduction :CA-2 of two courses Operating Systems and Networks, and Mobile Computing for M.Sc. IT part I were conducted fully online in MCQ mode using the features of Google Classroom.

Objectives of the method :

- Use of ICT for evaluation process
- Exposure to online tests to help students get familiarized with future online tests such as UGC-NET/GATE and job related tests that are conducted online.
- Reducing the use of papers

Problem / Topic that was given to students :

- Units 3,4,&5 portions from the subject Operating Systems and Computer Networks

Procedure

- At the Computer Lab, each students was allotted a system with internet connection
- MCQ based questions were prepared by the instructor in advance using Google form
- Students got access to the test on Google Classroom through college login and password
- Students had to answer 40 MCQ based questions within one hour.
- Google classroom shuffled the questions to prevent students from cheating.

In-Class Activity:

- Answers and score were discussed with students

Out-class Activity:

- Students prepared for the online CA

Outcomes

Timestamp	Name:	Roll Number:	Total (Out of 40)	Total (Out of 20)
9/18/2019 13:04:22	MuzaffarShaikh	207	22	11.0
9/18/2019 13:04:56	garryfernandes	210	20	10.0
9/18/2019 13:05:18	AkshayDhargalkar	209	23	11.5
9/18/2019 13:12:24	SwellaGomindes	216	13	6.5
9/18/2019 13:12:41	GeetaliAeer	228	23	11.5
9/18/2019 13:13:01	Valdo Fernandes	192204	34	17.0
9/18/2019 13:13:18	VedankNaik	221	35	17.5
9/18/2019 13:13:23	KajalPatil	211	18	9.0
9/18/2019 13:14:04	SatwikBhagat	215	15	7.5
9/18/2019 13:14:14	AkshayChatim	208	21	10.5
9/18/2019 13:14:15	MangirishNaik	192205	35	17.5
9/18/2019 13:14:19	Saburi R. kamatbambolker	206	32	16.0
9/18/2019 13:14:42	UnnattiUmeshBhagat	214	20	10.0
9/18/2019 13:14:57	Rufina Pereira	218	33	16.5
9/18/2019 13:15:05	johnassaldanha	225	18	9.0
9/18/2019 13:15:16	Walwyn D Souza	203	23	11.5
9/18/2019 13:15:25	TerezaShalindamonteiro	226	16	8.0
9/18/2019 13:18:06	Pressy Pereira	223	20	10.0
9/18/2019 13:21:36	SACHIN DEEPAK VERLEKAR	227	32	16.0

- Students got to know their performance immediately after the test

Problems Faced:

None

Department of Computer Science

Teaching-Learning-Evaluation Methodology

By : Mr. GajananNial

Title :SWAYAM Courses as CA-3 for Operating Systems and Networks (M.Sc. IT Part I)

Introduction : For the subject Operating Systems & Networks in M.Sc. IT Semester I, NPTEL courses related to Operating Systems and Networks were allotted to students to study and complete two weeks of assignments uploaded by the respective NPTEL courses.

Objectives of the method :

- Students got to revise the undergraduate level concepts by going through the online courses
- Exposure to teaching and learning practices of the IIT/IISc professors
- Exposure to self learning through MOOCs

Problem / Topic that was given to students :

- Six different NPTEL courses related to Operating Systems and Computer Networks, conducted for the session July-Oct 2019 by SWAYAM portals were chosen to be assigned to students

Procedure

- Each student was assigned two weeks from one of the course to study from the portal and answer the assignment on the site related to those two week's portion
- No two students were assigned the same weeks two maintain uniqueness of topics and their evaluation
- Marks scored out of two weeks of assignments from the respective courses was considered as CA-3 mars out of 20

In-Class Activity:

- Allocation of courses to students through lot
- Registration by students in the lab
- Submission of marks obtained

Out-class Activity:

- Watching the video lectures from SWAYAM portal
- Assignment Submission

Outcomes

Sr. No.	Roll No.	Name	NPTEL Course	Assignment Weeks	Due date	Out of 20
1	SP19 2203	D' SOUZA WALWYN DYLAN XAVIER	Introduction to Wireless and Cellular Communication	8 & 9	Oct 3	10
2	SP19 2204	FERNANDES VALDO FELIX	Internet of Things	3 & 4	Aug 29	16
3	SP19 2205	MANGIRISH TULSHIDAS NAIK	Operating System Fundamentals	7 & 8	Sep 26	17
4	SP19 2206	KAMAT BAMBOLKER SABURI RADHAKRISHNA	Ethical Hacking	1 & 2	Aug 22	12.6
5	SP19 2207	SHAIKH MUZAFFAR	Introduction to OS	5 & 6	Sep 12	9
6	SP19 2208	CHATIM AKSHAY RATNAKANT	Operating System Fundamentals	11 & 12 10& 11		16
7	SP19 2209	DHARGALKAR PUNDALIK ALIAS AKSHAY	Demystifying Networking	3 & 4	Aug 29	13

Sr. No.	Roll No.	Name	NPTEL Course	Assignment Weeks	Due date	Out of 20
		DEEPAK				
8	SP19 2210	FERNANDES GARRY ROQUE	Ethical Hacking	5 & 6	Sep 12	9.3
9	SP19 2211	PATIL KAJAL MANOHAR	Ethical Hacking	3 & 4	Aug 29	13
10	SP19 2214	BHAGAT UNNATTI UMESH	Operating System Fundamentals	9 & 10		12
11	SP19 2215	BHAGAT SATVIK RAVINDRA	Demystifying Networking	1 & 2	Aug 22	9.5
12	SP19 2216	GOMINDES SWELLA GLENNA	Operating System Fundamentals	5 & 6	Sep 12	9.5
13	SP19 2218	PEREIRA RUFINA	Introduction to OS	7 & 8	Sep 26	12
14	SP19 2221	NAIK VEDANK SUBHASH	Introduction to OS	3 & 4	Aug 29	15
15	SP19 2223	PEREIRA PRESSY	Operating System Fundamentals	1 & 2	Aug 22	17.2
16	SP19 2224	KANKONKAR RAKSHADHA KASHINATH	Introduction to Wireless and Cellular Communication	1 & 2	Aug 22	10.8
17	SP19 2225	SALDANHA JOHNAS ELIO…	Introduction to OS	1 & 2	Aug 22	10
18	SP19 2226	TEREZA MONTEIRO	Introduction to Wireless and Cellular Communication	3 & 4	Aug 29	11
19	SP19 2227	SACHIN VERLEKAR	Operating System Fundamentals	3 & 4	Aug 29	15.2
20	SP19 2228	GEETALI AEER	Internet of Things	1 & 2	Aug 22	20

Problems Faced:

None