

Chapter V

Enhancing Critical Thinking through an Intervention

Strategy

5.0 Introduction

The present study is an intervention study, focused on enhancing critical thinking in students using Psychology subject as a content matter. For the present intervention, the investigator had been allotted four Units that had to be taught within the regular schedule of the school. In the light of the objective – to enhance critical thinking using psychology subject, the investigator has endeavored to prepare lesson plans based on the units, incorporating various techniques and methods (as discussed in Chapter 1V).

The lesson plans for the units included for the intervention are Memory, Learning, Sensory attentional and perceptual process, and Motivation. In addition to the content to be taught, the investigator introduced the critical vocabulary separately in a lesson. Teaching –learning of critical vocabulary was a prerequisite for subsequent content-based lessons for enhancing critical thinking.

5.1 Layout of A Unit

Each unit will begin with an introduction, a briefing on the essence of the unit, and the topics and the sub-topics that it encompasses. Unit plan will present teaching-learning process, using methods and techniques for enhancing critical thinking.

A various topics falling under the concerned unit will be dealt separately and every topic will begin with a brief summery. The topics that had a scope ~~for~~

introducing critical thinking in the instructional process will have 'objectives', 'methods', and 'techniques' for inducting critical thinking under respective headings. Instructional process for teaching psychology subject on critical thinking paradigm will be described under the heading procedure and outcome. A detail description on the efforts to induct critical thinking in students will be put forward in a dialogue form under 'Group thinking task' and 'Individual thinking task'. Most of the Thinking tasks will be in form of a case study method wherein students will be asked to solve a case. A case will be formulated based on the subject content. While solving the problems in a case, students will be called to explore concepts, apply knowledge, analyze, assess etc. thereby students come to use the power of their minds to clarify, judge, and reason. The researcher would be using Socratic questioning technique to help students to discover the structures of their own thought, to arrive at judgments through their own reasoning, and to note claim, evidence, points of view etc.

On completion of a unit, the investigator will render her overall observation of the instructional process. The investigator would like to make it known that entire teaching-learning process as it was carried out for any unit is not given in toto as it would become lengthy and cumbersome. The instructional process that was governed through traditional method, namely the lecture method is not reported in detail. As the topics covered through lecture method would not be much different from the lecture method used by any other classroom instructors. Notwithstanding the investigator will explain the key process, especially critical thinking approach used in teaching the content.

Unit plan I

THINKING PRECISLY ABOUT THINKING

5.2 Introduction

"Thinking about thinking" was the opening lesson by which the investigator made a beginning into her research journey. Learning to think about one's thinking is the first step to critical thinking. It is grounded on the ability to think about thinking, to engage in what is called metacognition. Thinking about thinking is the art of thinking about one's thinking while one is thinking, reading, or listening. For example a critical thinker while thinking on particular data must make certain to distinguish what they have in the way of data. Whether the data they have are drawn from inferences or are drawn from implications or is it a point of view or based on evidence/fact or whether they are explicit or assumptions. It is the ability to distinguish between what is actually implied by a statement or situation from what may be inferred by them. Whether the inferences are drawn on assumptions or are they implied or are they based on evidence. A person should be able to distinguish a sheer unreasoned opinion from reasoned judgment. As a specific illustration: *to become responsible, a critically thinking student must practice identifying national bias in the news and in their texts and to broaden their perspective beyond that of uncritical nationalism.* This exercise enables one to make one's thinking more objective, more accurate and more precise. Hence it is an essential requirement of critical thinking.

In order to 'think about thinking' it is important to get acquainted with critical vocabulary. The analytical vocabulary in English language, the terms like 'assume', 'infer', 'bias', 'justify', 'evidence', and many others enables one to think precisely about thinking.

Dimension 'Thinking precisely about thinking' by itself is too enormous and profound to dwell completely upon it. The investigator has merely touched upon it so that students at the least get a glimpse of this important dimension of critical thinking. Hence the researcher has included in the intervention program but has restricted herself by teaching just a very few critical vocabulary and critical reading.

5.3 Topic: Critical Vocabulary

A. Objectives: The principle objectives behind introducing thinking about thinking are as follows-

- ◆ Students learn to use Critical Vocabulary: Learning to give evidence upon which the claims are based on; Draw Implications, Assumptions; Differentiate between Opinion and Facts.
- ◆ Critically Read : Look for writers' Assumption, Implications and Conclusions

B. Method: Lecture cum discussion and case study method.

C. Procedure and outcome

The researcher has attempted to instill the dimension 'thinking about thinking in students. In doing this researcher has not used content matter from Psychology syllabus.

The investigator's first day in the class was an introductory and ice-breaking session. The investigator introduced herself and her objectives of taking their psychology classes. The investigator informed the students that they would be asked to think on the content that they would be learning. That is they would be required to critically look into the content matter. The investigator explained what critical thinking is- "The term critical thinking does not mean thinking which is negative or fault finding, but thinking which evaluates, reasons, it is determining the authenticity, accuracy and worth of information or knowledge. In short it is about an intellectual freedom to arrive at one's decision, which is primarily ones own and one which is not based on hearsay, general opinion and dogmatism".

The investigator explained that in order for a person to gain expertness in the critical thinking skills, it becomes mandatory to acquaint oneself with its critical vocabulary". The researcher listed down all the analytical vocabulary that she was to teach, for instance 'opinion', 'fact', 'evidence', 'implication', 'assumption' and also mentioned that those were just a few drops in an ocean of critical thinking. Each critical vocabulary was separately dwelt with.

5.3.1. Facts, Opinion and Evidence

The very first analytical vocabulary that was taken up were 'fact, opinion and evidence'. The researcher differentiated between a fact and an opinion. Opinion was defined as a belief of a person/ a group/ a community, which may be rational that is based on reasons, evaluation, reasoned judgment and knowledge or may be irrational or unreasoned, based on hearsay or values inducted/percolated through family, education, religion, culture and so on. The particular values may or may not have relevance in the present context/ reality. Opinions are subjective and therefore subjected to dispute. On the other, a fact is what actually happened. It is verified by evidence/proof and is reality/contextual based. On explaining the critical terminology the investigator tried to assess student's comprehension under Group thinking task.

Group thinking TaskA.

The researcher listed down a few statements on the black board and the students were asked to pick our statement that were facts and statements that were opinions and supply reasons for the same. The statements read as follows:

- (1) Indians and Pakistanis are enemies.
- (2) India and Pakistan were at war in the year 1964 and 1971.
- (3) People enjoy picnics and parties.
- (4) Hong Kong has become a part of China recently.

- (5) People of Hong Kong are better off, now that they are united with China again.

A Few Responses of Students

Student: Statement no. 1 is an opinion for some may perceive Indians and Pakistanis to be at war because of our strained political relations.

Student: While others may not think Indians and Pakistanis are enemies as we do have cultural exchange programs. Celebrities from both the countries visit each other to participate and give performances.

Student: Statement no.2 is a fact, for India and Pakistan were at war in the year 1964 and 1971 and this is evident from the history of the world.

Student: Statement no. 3 is an opinion, for although generally people do enjoy picnics and parties nevertheless it may not hold true for all. And a person who makes such a statement is simply voicing his/her opinion.

Student: statement no. 4 is a fact for there are evidences to prove that Hong Kong has emerged with China recently- The world news for instance.

Student: Statement 5 is again an opinion for there is no evidence and there may never be a concrete evidence even in future that all people of Hong Kong are better off with the unification of their country with China.

Students' performance on and response to the task shows that were not only in the position to correctly identify the statement (2), (4) as facts and the statement no. (2), (3) & (5) as opinion but also justified their stand.

5.3.2. Fair and bias

'Fair' and 'Bias' were the next concepts that were taught. The term 'Fairness' was explained as treating either sides or all sides alike without preference to one's feeling or interest. Being impartial and unbiased and freedom from prejudice and 'Bias', as mental leaning or inclination.

The investigator explained that most of us are prone to being partial to/bias against an individual, community, nation, or a because of our needs, social conditioning, belief system and so on. But as a critical thinker and as an intellectual we need to acknowledge and be conscious of our inclination /disinclination and make efforts to look fairly at the issues that confront us. For example, as one reads a newspaper one definitely needs to keep in mind that as an intellectual and critical thinker he/she needs to resist being influenced by the emphasis or confidence with which assertions are made on one side or the other. They need to make efforts to recognize and resist appeals to their dearest prejudices and all kinds of cajolery. One needs to develop a habit to hold things as probable in all degrees and directions, without certainty and wait for evidence and weigh evidence.

The investigator went to show that 'Bias' could be further bifurcated into neutral and negative bias.

Neutral are because of one's point of view- one notices some attributes rather than others, emphasizes some points rather than others, and thinks in one direction rather than others. And negative biases are those that are reasoned/ illogical/ irrational. The investigator explained these concepts through illustrations, to drive home the point and the process is as follows.

Black board work

Fair and Bias

Examples

I want Ravi to be in charge of the elocution committee because I find him proficient in the language, articulate, witty, expressive and creative. (Neutral bias).

I also select Ravi as a head of the sports committee on the above mentioned attributes. (Negative bias).

I am a member of a 'ABC' organization because they work for animal welfare. (Neutral bias)

I have decided to employ Mrs. Shah because she is a member of the same organization as I. (Negative bias).

The investigator explained that no 1 and 3 could be considered bias although treated as a neutral bias because firstly, it is a subjective point of view and secondly one tends to notice some attributes rather than others, that is, thinks in one direction rather than others.

Researcher: "For instance in example no 1, I selected Ravi to be in charge of the elocution committee because of his proficiency in language and his articulation skills but I failed to consider his managerial skills and his competence to head the committee. Similarly in example no. 3 I have decided to become the member of an organization because it works for animal welfare without understanding its other philosophies and also may not have looked into other organizations working on similar lines".

"On the other hand examples 2 and 4 are treated as a negative bias because my selection of the concerned individuals to the post are governed by favoritism and inclination than by rationality and reason".

5.3.3. Implications

Next vocabulary that was taken up was 'Implication'. It was explained as a claim derived from other claims. Implication is a claim that is not directly stated but indirectly stated and that could be inferred (concluded) from the claim. Students' comprehension of the concept was assessed under the Group-thinking task.

Group-Thinking Task B

Under this task a few examples were jotted on the board and students had to draw implications from the given statements. The statements will be represented in the different columns.

Statement I

Implication
Example 1. 1. Mr. Jones: "Jack, please send me the message on Mr. Brown's E-mail. Jack: "Oh! Mr. Brown has E-mail!" What does Jack's statement imply?

(The investigator read out the statements from the blackboard using voice modulation to dramatize the conversation).

Researcher: What implications can you draw from Jack's reaction to Mr. Jones' request?

Students' Few Responses

Student: Jack's statement had implied that he was unaware of the fact that Mr. Brown E-mail.

Researcher: On basis what have you drawn your implication (*Calls for justification*)?

Student: Jack's exclamation "Oh" depicts surprise, which goes to reveal that he is unaware that Mr. Brown has e-mail (*student justifies his/her stand*).

Researcher: Good.

Those students who did not answer then had the chance to understand through classroom discussion.

Statement II.

Implication
Example 2. Vivekananda to his sister: " Thank you for getting my rug from Calcutta. How much duty did you pay? I insist on paying the duty". Q. What is being implied by the statement 'I insist on paying the duty'?

Students: Vivekananda does not know how much duty was paid for the rug.

Researcher: Does it imply that? According to you if the statement implies Vivekananda did not know how much duty was paid for the rug then why should he say 'I insist on'?

The researcher read that statement aloud, emphasizing on the word 'insist'.

Student: Vivekananda believes that his sister will not charge him the duty (*student redresses on analyzing the essence of the statement*).

Researcher: Good. How did you conclude that?

Student: Vivekananda did not merely ask for the cost of the rug but demanded that he paid for the rug.

Student: If Vivekananda is certain that his sister would charge him for the rug he would have simply asked the cost of the rug and not insist on paying (*student justifies his/her stand*).

Researcher: Well explained.

5.3.4. Assumption

'Assumption' was the next vocabulary under consideration. Knowing that students were acquainted with the terminology as it is being applied especially, in Mathematics, the investigator initiated students into explain what 'Assumption' meant. Students' responses are as follows:

Student: Assumption means to take something for granted.

Student: It means that one considers something to be correct/ truth.

Student: Things that is regarded as right without really knowing.

Researcher: You have done a good job explaining the meaning on your own, so I don't need to explain.

The investigator gave students an assignment whereby they could learn to recognize writer's assumption under Individual thinking task.

Individual Thinking Task ¶

The assignment was in form of a case study and students were asked to pick out assumptions. The task was to be performed individually, followed by discussion.

The problems in the exercise read as follows:

Pick out 'Assumptions' from the given statements and give reasons for your choice.

(1) **The manager to his team, "we shall have to postpone the meeting as we do not have enough data."**

- (a) The manager needs more data in order to proceed with the meeting.
- (b) The members are incompetent.
- (c) The manager would conduct the meeting some day latter.
- (d) The manger is disappointed with the cancellation of the meeting.

Students' Response

Student: The statements - 'a, b, c' are assumptions.

Researcher: why is the statement 'd' not an assumption? (Calls for analysis)

Student: Because it is no where specified in the statement.

Researcher: Good! Then why is statement 'b' treated as an assumption? (Calls for examination and analysis).

Student: It is due to members' incompetence that meeting was cancelled.

Researcher: Does the statement by itself indicate that members were incompetent?

Student: No, but if the members were competent enough the data would be made available.

Researcher: Does the statement say the lack of data was due to the members' incompetence? You seem to be making a personal assumption that does not follow from the statement.

Student: But...

Researcher: This is your assumption. The reasons for the lack of data could be many. Say, for instance the computer could be out of order; maybe the data was expected from some other place and had failed to arrive; the manager's decision to include some more data and so on.

With the above examples students seemed to have clear understanding of what assumptions are. The researcher then gave another task which is as follows:

**(II) "In case you cannot return from the office by 8 p.m., inform us."
parents tell the son.**

- (a). The son never informs about his late coming.
- (b). Unless specified, the son may not inform the parents.
- (c). The son has a poor sense of time.
- (d). The parents lack trust in the son.

Students' Response

Student: None of the statements is assumption.

Researcher: Why?

Student: The statement does not indicate any of the options.

Researcher: Specify the options.

Student: statements 'a, b, c, d' are not assumptions of the main statement.

Researcher: Read the statement 'b' again. The statement 'b' is definitely an assumption.

Student: No madam, it is not specified in the main statement (*student shows intellectual autonomy and courage to take his/her stand*).

Researcher: The statement reads 'unless specified, the son may not (the researcher emphasized on the words 'may not' by repeating) inform....' It is not mentioned will not.

The researcher further asked the students the difference between 'may ' and 'will'.

Student: 'may' indicates possibility and 'will' means certainty /surety.

Researcher: Yes. So, can we not consider the statement b to be an assumption?

Students: Yes we can (*students change their stand in light of evidence*).

With the above example, it is evident that students have understood and incorporated the art of critical reading that is the students are in the position to identify author's assumptions.

(III) Ali says, " the book 'Gone with the wind' is the one of the best books that I have read."

- (a) Ali has read plenty of books
- (b) Ali has read a very few books.
- (d) Ali has not come across many good books.
- (e) Ali enjoyed reading 'Gone with the wind'.

Students' Responses

Student: The statement 'e' is the only assumption of the main statement.

Researcher: why?

Student: The statements 'a, b & d' has not been indicated by the main statement while the statement 'e' has been. This is understood when Ali says that 'Gone with the wind is the best book that he has read.

Researcher: Good! Looks like you all are getting good at critical reading.

C. OBSERVATIONS

The Researcher has given exercises in what might be called 'trivial pursuit'. Wherein a student is presented with or led to discover critical vocabulary. Despite the researcher had not spent adequate time in training students in the art of critical reading due to time constraints and the necessity to complete the syllabus, it is evident from the above thinking tasks that the objectives have been accomplished. Another area that was not been considered for this intervention due to the time constraints was teaching 'thinking about one's thinking. It is the art of thinking about ones thinking while one is thinking in order to make one's thinking better: more clear, more accurate, more fair. It is to objectively track how one thinks and consciously evaluates ones own thinking.

Unit Plan II.

Memory

5.4 Introduction

The investigator embarked on the task of enhancing critical thinking using the Psychology syllabus for std. V111. The chapter on 'Memory' was the beginning of this venture. This chapter is taught in terms of mental process involved in storing and retrieving information. The Unit includes numerous sub-topics like Memory components, Memory systems, Measurement of retention, Forgetting, Theories of forgetting, Factors influencing memory, and Towards a better memory.

The chapter has much new terminology, which needed explaining. These terminology and new concepts were explained through lecture and discussion method. In the initial stage, the investigator was circumspect and did not want to rush into using high-flown instructional techniques. Being a new entrant in the school, the investigator had to gain confidence of the students. Hence she stuck to the traditional method of teaching in the initial phase. The serious and deliberate attempt to evoke critical thinking was on the topic 'Theories of forgetting' before which only stray efforts were made to evoke thinking in students.

5.5 Topic-Memory and memory components and memory system

A. Objectives- Students through analysis draw analogy, compare and contrast.

B. Method- Lecture method, Socratic Questioning method

C. Procedure and Outcome-

The investigator taught Memory and its components that included encoding, storage, and retrieval through lecture method. The Investigator's

lecture method was not any different from other educational instructors who used this method to explain their content.

5.5.1 Memory

Memory was explained in terms of mental processes involved in storing and retrieving information. It was taught in terms of processes that operate during the following periods: the time when learning takes place, the interval between learning and retention and the time when retention is measured. The investigator went on to emphasize better attention to the material, organization of information/learning material, and making the information/learning material meaningful were some of the steps to better retention. The investigator also narrated Hermann Ebbinghaus' experiments to measure memory.

5.5.2 Memory Components

Next the investigator introduced students to the components of memory namely Encoding, Storage and Retrieval. *Encoding* was referred to as the process by which one puts the information into storage/brain. It may be in the form of images, words and sensations like smell, touch and taste. The investigator referred the *Storage* as retention of information that is encoded. And *Retrieval* was referred to as processes related to recovering information from the storage.

5.5.3 Memory System

The investigator explained the two-memory systems: short-term (STM) and long-term memory (LTM) through lecture method.

The investigator explained that the STM has a limited capacity and hold information for a brief period. However, when information is rehearsed it goes to the LTM and information is retained for longer period. The investigator explained that the process of chunking, that is, several items of the information can be combined into one chunk. For example digits like 1 3 5 7 9 1 1 1 3 1 5 1 7 1 9

may be difficult to remember, but if one realizes that this string of digits is odd number then one has to remember one chunk of information.

The investigator explained that unlike in the STM, the information in the LTM is stored for longer period of time, even lifetime. And that organization of information in LTM is subjective. Based on their learning, students were made to think through an assignment, which is dealt under Group thinking task.

Group Thinking Task D

As soon as the investigator was ensured that students had understood the concepts she asked students to think of something that was akin to memory (Socratic questioning) in order to get students into drawing relationships between analogies.

The most spontaneous answer that came out from Students was computer as an analogy to memory. Next the students were asked to draw comparison between memory system and a computer through Socratic questioning. The task involved drawing comparing and contrasting between the two analogies.

A Few Sample Responses of Students

Student: the similarity between the computer and human memory is that both has three components like encoding, storage and retrieval.

Researcher: Good! Any other point?

Student: Just as human memory has two systems- LTM and STM, computer also has two types of memory –RAM and ROM.

Student: The contrasting aspects If stored information in the computer is lost, it is lost for ever while the information forgotten from the human memory could be retrieved.

Student: in order for the information has to be recalled by the human memory system, it has to be learned, rehearsed or has to be paid attention to while the information has to be just fed into the computer.

Student: Memory of the computer is made up of chips while the human memory is made up of cells and nerves.

Student: Information in the computer is fed through a keyboard while in the human memory it is through sensory experiences.

Researcher: Good!

E. Observation

The investigator made a small effort to stir students into thinking. The thinking task had been too simple for students, as they were familiar with the working of a computer but it served other purpose like getting students to talk and interact. Although the task was simple, students enjoyed it.

5.6 Topic- Measurement Of Retention

The four methods used for measuring memory namely (a) recall, (b) recognition, (c) savings and (d) reconstruction were taught through lecture method and was supplemented by demonstration. *This topic did not involve any critical thinking task for students.*

The investigator explained that in the 'Recall method', an individual is required to repeat what was learnt previously. Another method of assessing memory is the *Recognition* method. In this method subjects are required to recognize material learnt earlier from amongst other material not learnt before. *Saving or relearning* method as a measure of retention involves a comparison between the time taken or number of repetitions required to learn material once and then on latter occasions. The investigator explained that in the daily life one tends to remember books, stories and reports through *Reconstruction* method. What one remembers of a text is not always a copy of the to-be-remembered

material but the material is elaborated, simplified and changed in many ways at the time of input. The investigator demonstrated this phenomena (**Experiential Learning**) by asking a few students to read a sonnet from their text book, which goes as following

Sonnet

*"He told it all and then he became quiet.
When the sun rose he fell down.
Something black came out from his mouth.
His face became contorted.
The people jumped up and cried.
He was dead".*

The investigator asked students to recall the story.

Students' Responses

Student: Once there was a beggar he was telling something to the passerby and suddenly he fell down and died. A snake bit him. People declared him dead.

Student: One morning there was this old man who was telling stories about his youthful days. And suddenly he died. People saw poison coming out from his mouth. And said he has been poisoned so he died.

The investigator read the poem aloud and drew students' attention that the poem depicts neither a beggar nor an old man, nor does it say anything about a poison or the snake. Through students responses, the investigator was able to demonstrate constructive memory- a tendency to rebuild pictures of past by filling with new details. (***Experiential teaching enabled students to gain a first hand experiences on reconstructional method of retention.***)

5.7 Topic- Forgetting and the Theories of forgetting

A. Objectives-Students will learn to critically evaluate the theories of forgetting through analysis.

B. Methods-lecture cum discussion method, Socratic-questioning method.

C Technique- PMI

D. Procedure and outcome-

The topic on 'forgetting and theories of forgetting' was explained mainly through lecture method supplemented by illustrations. Each theory of forgetting was explained and on completion of each theory of forgetting a critical thinking task was given to the students whereby students had an opportunity to think for themselves on the content they had learnt.

The investigator explained the term retention as the positive aspects of memory indicating the amount of information remembered under specified conditions. Forgetting on the other hand refers to the negative aspect of memory and indicates the amount not recalled. The amount of forgetting is the difference between scores at the end of learning and after the lapse of a specified interval. The investigator also explained in detail with help of the black-board work, the Ebbinghaus retention curve, which showed that forgetting is most rapid immediately after learning and then proceeds at the slower rate as time passes.

Next the investigator moved on to explain the five theories of forgetting. Each theory was taken separately and based on a few theories of forgetting, the investigator framed thinking tasks. Here essence of all the five theories will be put together. The five theories of forgetting are - (1) Decay theory of forgetting (2) Interference theory of forgetting (3) Theory of cue dependent forgetting (4) theory of storage failure and (5) Motivated forgetting.

The essence of decay theory of forgetting is that forgetting occurs due to disuse of the material and also when the passage of time weakens the associative bond since memories are based on associations between ideas.

Interference theory of forgetting explains forgetting takes place because of the interfering activity, that is multiple activities on the part of the learner and the interaction of new experiences may provide sources of interference with what is being learnt. The investigator also explained the retroactive inhibition and proactive inhibition under the interference theory of forgetting. The theory of cue dependent forgetting puts forth the view that forgetting is caused by failure to retrieve information from storage due to inadequate memory cues. Theory of storage failure explains that the memory is lost if it does not reach the long-term store at all. And the theory of motivated forgetting states that an individual may be motivated to remember certain information and forget other information, especially memories that may cause pain or anxiety are likely to be forgotten.

Having been acquainted with the concepts, students were presented with the opportunity to think on the content. Instructional process based on critical thinking will be dealt under critical thinking approach.

5.7.1 CRITICAL THINKING APPROACH

Before initiating the critical thinking approach the researcher informed the students the essence of thinking in the classroom.

The researcher communicated to her students that they could no longer remain complacent with simply reading and rote memorizing the content taught. Henceforth it would become mandatory for them to think on what they studied.

The researcher explained that since psychology was science of human behavior, students would be called to conduct the role of a scientist and evaluate for themselves what they have studied i.e. to think critically on the content. The investigator explained what critical thinking is- "The term critical thinking does not mean thinking which is negative or fault finding, but thinking which evaluates, reasons, it is determining the authenticity, accuracy and worth of information or knowledge. In short it is an intellectual freedom to arrive at one's decision, which is primarily ones own and one which is not based on hearsay, general opinion

and dogmatism". With this note the investigator introduced one of the important dimension of critical thinking namely "Evaluation".

(1) Introduction to 'Evaluation' – dimension of critical thinking

The very first dimension of critical thinking that was introduced to students was 'Evaluation'. 'Evaluation' is an important dimension of critical thinking. To critically evaluate is to judge or determine the worth or quality of. Evaluation has logic and should be carefully distinguished from mere subjective preference. The importance of 'evaluation' was inducted in the students with help of lecture method & illustrations.

Researcher: " At one time or the other we are invariably called upon to take sides, choose or select amongst many option, be it an ideology, a theory or a group, an issue and so forth. In short we are called to exercise our independent thought. This is with an expectation it will be based on our independent evaluation, rested on reasons and analysis and not merely on hearsay and popular opinion. If not, it becomes a sheer mockery of our intellect and education". The investigator further explained, " if are to evaluate things in an objective and in a more rational manner, devoid of personal biases and prejudices we will have to make use of a technique called PMI". On this note the investigator introduced the technique PMI.

(2) Introduction to the technique PMI.

The researcher introduced the technique PMI as means to make objective evaluation, draw conclusion and pass judgment. The letter 'p' stands for plus or the good points. 'M' stands for minus or negative points and 'I' for interesting points. Before a person forms an opinion it is worthwhile to do PMI on the issue under consideration, to ensure that the person has a clear understanding of all the pro's and con's before a judgment or a conclusion is finally made. The researcher further explains the process to conduct PMI.

In order to do PMI one deliberately directs one's attention towards the plus points, then towards the minus points and finally towards the interesting points. This is done in a very deliberate and disciplined manner. People trained in PMI will be in position to make analysis more broadly and clearly.

5.7.2 Evaluation of Theories of Forgetting using PMI technique

For the students to indulge in the thinking process, using PMI technique the researcher made use of the subject content-Theories of forgetting.

Students had learnt the different theories of forgetting via lecture method and now they were required to evaluate the various theories -'the decay theory', 'theory of forgetting' and 'the cue dependent theory' of forgetting using PMI technique.

The method used by the researcher is Socratic method. The researcher evoked thinking in students by means of asking questions, which deeply probes the meaning, logical strength of a claim, position, or line of reasoning. Thinking in students is geared through Group thinking task.

Group Thinking Task

In order to carry out evaluation of the theories using the PMI technique, students were required to scan the positive aspect first and then go to the negative aspect of the theories and lastly come to the interesting aspect of the theories. The classroom thinking process has been laid down below.

Researcher: (taking up the first theory- The decay theory of forgetting) let us evaluate the decay theory of forgetting. In order to do this let us proceed systematically, first scanning the positive aspect of the theory. What according to you are the plus points of this theory?

(Pause. The researcher is ready to jot down students' points on the black board).

Student: There is some fact in the theory, we do tend to forget things \ information that has not been utilized for a long time (*student reflects into his own experience*).

Student.2: Yes, we do forget most of the information that has not been utilized in the past. Yet we also have instances wherein we can remember our childhood experiences- nursery poems, names and faces of a few teachers who have taught us when we were little and many other childhood incidences (*student counter argues by supplying evidences*).

Researcher: Good! So you have given evidence against the theory.

Student: Then this is not a positive aspect of the theory, on the contrary it is the negative aspect of the theory (*student reflects*).

Researcher: Yes, so it is. Now look for more positive points about the theory?

Student: There cannot be any thing positive about this theory as we have proved it to be wrong (*student argues on her stand*).

Researcher: Nevertheless.....Can't we least say that the positive thing about this theory is that it helped in germinating seeds for further inquiry into, interest and further researches in forgetting?

Seeing students had nothing further to add on the researcher requested students to proceed to the negative aspect of the theory.

Researcher: Is there any other negative aspect of the theory that you would like to mention?

Students ponder over without replying.

Researcher: (hinting) what about research evidence for this theory?

Student: Yes, unlike other theories on forgetting there is no research evidence for this one (*student reflects*).

Researcher: At least no such evidence has been mentioned in your text and also in some other book that I have referred.

The researcher feeling that students didn't have any thing else to add on, asked students to proceed to the next theory of forgetting i.e. 'the cue dependent theory'.

Researcher: Now let us evaluate the other theory of forgetting (gets ready to jot down the points elicited by the students).

Student: The positive aspect of this theory is that it is research based (*student evaluates on basis of evidence*).

Student: The theory is applicable, if one learns to form cues in order to remember, one could remember a lot of information (*student evaluates on the basis of evidence*).

Researcher: Fine.

Student: The theory does explain phenomenon of forgetting (*student draws conclusion*).

When students had finished scanning the positive aspect they proceed to scan the negative aspect of the theory.

Student: The minus point of this theory is that all the experiments are conducted in the artificial condition that is in the laboratory condition.

Researcher: Very well said.

One of the students also came out with an interesting point - 'what if a person forgets the cue itself.'

E. Observation

Certainly, the above classroom process goes to indicate that students were successfully grappling the art of critical thinking.

Individual Thinking Task

In order to find out if students could critically evaluate on their own, the researcher provided them with an assignment, to be completed in the class within 30 -40 minutes. The assignment reads as -'*Comparing the 3 theories of forgetting (1) cue dependent theory (2) Interference theory and (3) Motivational theory, according to you which is the most relevant theory*'

(Outcome of the thinking task 1 will be presented under observation)

e. OBSERVATION

- ◆ Students previously not acquainted with critical thinking and the technique, found it a little hard to grapple with them at the same time displayed zeal to understand and learn.
- ◆ Dealing with the chapter on 'Memory' the researcher had endeavored to train students to critically evaluate; critical evaluation being one of the dimensions of critical thinking.
- ◆ At this initial stage it is difficult to say to what extent students or even how many students have perfectly mastered the technique PMI in order to critically evaluate. But the scores on assignment aiming to measure critical evaluation in students suggests that students have been able to comprehend the technique and thereby are in better position to critically evaluate for themselves.
- ◆ The Individual task 1 (assignment) was scored on the basis of students reasoning, clarity, relevance, fairness and completeness. Each standard was measured on a five point rating scale
The results of the students are in the table 1.

Table 1. Shows the result of the students on the Individual Thinking Task 1.

Student	Max marks (25)	Percentage
1	23	92
2	23	92
3	20	80
4	19	76
5	17	68
6	15	60
7	13	52
8	11	44
9	10	40
10	9	36
11	5	20
12	5	20

Students' result reveal that out of 12 students the average score of 3 students was 88%, the average score of 2 students was 72%, average score of students scores of 3 students was 45% and the average scores of 4 students was 22% respectively.

The researcher has presented below a few students' point of view on the (assignment) Individual thinking task 1. According to the researcher the particular answers have been well reasoned out, have clarity, relevance and completeness.

Students' Point Of View

The following are the answers of the students' who have scored 23 out of 25. The researcher has tried to represent the students' point of view as expressed, without any/much editing.

Student 1's point of view

According to me 'motivational' theory is the most relevant theory because if you have motivation you tend to remember, otherwise people tend to forget. Well I also say that cue theory & interference theories do help in remembering. For instance with the help of cue theory you learn to form cues and remember things better and easier but if you have the motivation remembering is possible at least upto 75%. At the least according to me 'Motivational ' theory is the most relevant theory.

Student 2's point of view

According to me the most relevant theory is the cue dependent theory. Although it is not possible for every one to remember every thing 100% as we are humans but this theory helps us to remembering things by forming cues, for example you are trying to remember a person whom you met at a party whose name and face you do not recall just then a friend describes the person's dress you realize that you are now able to recall the person. Thus the person's dress acted as a cue. Experiments on the motivational and interference theories are done in an artificial condition so I don't have much idea. Plus it is difficult to simulate whereas in cue dependent theory we observe that when we are trying to recall some events or information it is easier to recall when given some hint

Unit Plan III

LEARNING

5.8 Introduction

Instructional process of the chapter on 'Learning' is thought to be crucial, due to its relevancy for students. Hence the investigator had to contrive a teaching-learning process in a way that facilitated implanting an understanding of the theories in students. Instructional process had to be such that students would be able to understand their own behavior pattern, for learning influences habits as well as customs of a person also one's attitude and emotions as well as motor skills. Therefore, the entire stress of instructional process had to be on 'understanding' the concepts and theories, incorporated in the unit.

The unit covers various topics and sub-topics, which are as- Learning - meaning and definition and aspects of learning; Process of learning; Learning of skills - learning of motor skills, learning of concepts & problem solving; Types of learning-Classical, Instrumental conditioning and cognitive learning and Concepts used in Classical & Instrumental conditioning; Transfer of learning - Positive transfer of learning, Negative transfer of learning & Zero transfer of learning; Factors influencing learning- feed back, distribution of practice, whole & part learning, meaningfulness, interest & attitudes, and motivation.

5.9 Topic- **Learning-Meaning, definition, and process of learning**

A. Objectives- students will be able to define learning, note that learning is a continuous process and important process that affects all aspects of human behavior.

B. Method- the investigator used lecture cum discussion method.

C. Procedure and Outcome

The investigator used the traditional method - lecture method to teach the concept of learning. The investigator explained the importance of learning by stating that learning is one of the fundamental process that underline most of human behavior, be it emotional reaction, attitude, motor skills. In short all our activities are aftermath of our learning, be it desirable like respecting, being punctual, honest etc. or undesirable like being untidy, overbearing etc.

The investigator explained the 3 aspects of learning namely that learning is a process by which certain changes or modification in behavior occurs. These changes or modification are relatively permanent and changes or modification are due to practice or experience. Further the investigator goes to explain that certain behavior due to temporary conditions, say for example a person who has met with an accident begins to limp, or a drunk person starts to stagger, all these behaviors cannot be treated as having learnt. Similarly coughing, sneezing or child's ability to smile, crawl, babble etc. are changes in behavior that are associated with maturation of inherited structures and predisposition and hence do not constitute learning.

On the basis of aspects of learning the investigator helped students to develop the definition of learning as a process by which a relatively permanent change or modification in behavior occurs as a result of practice or experience.

5.1o Topic- Types of Learning

A. Objectives- Students learn to

- ◆ Analyze concepts through their own reflection.
- ◆ Analyze and evaluate theories of learning with the help of PMI technique.
- ◆ Learn to compare theories of learning using CAF technique.

B. Methods- Lecture cum discussion, using Socratic questioning method.

C. Procedure and outcome- the topic 'types of learning' provides a lot of scope for teaching new concepts like Classical conditioning, Instrumental conditioning

and cognitive learning. These concepts were taught through lecture cum discussion method. The researcher had put in lot of illustrations with day to day life examples to which the students could relate and thereby would comprehend the concepts. Students were further furnished with the opportunities to discuss their own experiences. Once the students had become acquainted with the concepts they were given the opportunity to critically think on concepts that had learnt. As it is difficult to present the entire teaching-learning process, only a few instances are mentioned.

5.10.1 Understanding Of Concepts

(i). **Classical Conditioning:** The investigator started off with an example- "suppose you got a bottle with an obnoxious smelling chemical, What would be your reaction?" To which students replied that they would hold their breath/close/cover their nose. Investigator, " So, your response to obnoxious smell would be to avoid the smell. Here the response of avoiding is associated with the stimulus smell. Hence it is an associative learning. Under associative learning the stimulus acts on the individual and the individual reacts automatically".

The researcher explained to the students that classical conditioning is a 'form of associative learning' A lot of things are learnt because of association formed between a stimulus and a response. For example a child who has burnt its fingers over a flame will learn that gas stove is hot and it burns and hence should not go near it. Similarly a stimulus which naturally arouses a response is presented together with one which does not naturally arouse this response. The two stimuli become associated together. For example stimuli 'food' arouses a response 'salivation' and in school and offices recess/lunch break gets associated with food and hence on hearing the recess bell it may cause one to salivate at the recess bell. In order to drive home the point the investigator explained in detail the Pavlov's experiment.

(ii) Instrumental Conditioning: The investigator explained that in instrumental conditioning the organism learns to make a response which is a means of achieving a goal. This was explained with an illustration. For example a child who has been denied a toy may have different options of getting its way and these options are spelt on the black board

- | |
|--|
| Child denied |
| Options |
| 1. Throw tantrums (scream), |
| 2. Bargain (if I do ...then will you) |
| 3. Emotional blackmail (you don't care...) |
| 4. Request |
| 5. Convince etc. |

From number of response the child may choose and make any of the response. Suppose a child throws a tantrum to have its way and if he gets a positive response than the child learns that throwing tantrums will get its way and will continue to do so whenever he wants his way. Even as an adult the person may continue to do so. But, if as a child, his parents do not give into his tantrum, the child may learn to respond differently. The investigator made it clear that unlike in the classical conditioning where the response to a stimulus is passive, that is the stimuli acts on the individual whereas in the instrumental conditioning the response is controlled by the individual and is active.

Simultaneously students were given an opening to narrate the manner in which their own social values attitudes and behavior was acquired. This was done with an intention to enable students to reflect on their own learning experiences. *Whenever students supplied clear and obvious examples, they*

engaged in analysis of concepts and in understanding its implications. Some of the discussions that took place are as follows:

“A child, who has been scolded for arriving late to school will avoid reaching late to school”. “A child who is forbidden to play with children of a particular community may grow up to be a racist”. “A child who has been often rewarded for being honest may end up valuing honesty”. These were some of the example of classical conditioning discussed in the class. Examples for instrumental conditioning discussed were – “A child’s initial honesty may be lead to punishment from his parents. Next, the child may resort to lying for which he gets away. As a consequence of this rewarding experience the child may learn to lie whenever he is hooked”.

“A student who has a doubt in the subject has an option of looking up in the text/ clarifying with a classmate/ clarifying with the concerned teacher. And if the student decides to clarify his doubts with the teacher and is ridiculed for that he will to avoid asking questions to any teachers”. These exercise provided students with a scope to *analyze relate the content with their own experience and to some extent called for application of knowledge.*

Next, when the investigator was ensured that students had comprehended the learning theories, they were called upon to critically think on the content. This will be dwelt under Critical Thinking Task.

5.10.2 Critical Thinking Task

The critical thinking tasks involved “Critical Evaluation” of these theories. The investigator attempted to evoke critical thinking by way of discussion method using PMI technique; scanning the positive and negative aspects of concerned theories. Since students were already familiar with PMI technique they could proceed, on their own with little help from the researcher. The particular task was intended to enable *students learn to analyze, judge and reason.* The process is presented under ‘Group thinking task’.

Group Thinking Task 4

A. Evaluation of classical conditioning theory using PMI

Classical conditioning was the first theory of learning that was evaluated by the students who began by scanning the positive aspects of the theory.

Student: It is the simplest way of learning

Researcher: What do you mean by simplest way of learning? (Calls for analysis)

Student: Any behavior could be taught by reinforcement, for example a dolphin can be trained to jump over a wire using 'food' as a reinforcement (student provides evidence in form of an example to support his statement).

Student: classical conditioning can be used for training small children to avoid dangerous things like hot iron.

Student: It can be used for teaching retarded people.

Researcher: very good, even I did not think of that.

After students had exhausted, their answers they moved on to scan the negative aspects.

Student: The minus point about this theory is that it is too mechanical.

Student: It does not help to learn problem solving, scientific learning and thinking.

Student: It suppresses judgment.

Student: It inculcates biases and prejudices.

Student: Learning through classical conditioning is like being brain washed, as there is no scope for thinking.

When students were through with their discussion, the researcher asked for their overall view on the theory. One or two had taken the opportunity to sum up whatever was discussed in the class.

B. Evaluation of instrumental conditioning theory using PMI

Next, the students had embarked on the task of evaluating Instrumental conditioning, the other learning theory. Students started by scanning the positive aspects of the theory.

Student: It allows person the freedom to make a response to a situation or a stimulus, therefore it is not a mechanical theory.

Student: It allows a person to think and react to the situation.

Student: It does not suppress judgment.

Student: It is applicable.

Next students go on to scan the negative aspects.

Student: It cannot be used for training animal.

Student: We cannot learn problem solving through instrumental conditioning.

D. Observation- From the above task it may be observed that students had been critically looking into the theories and evaluating them. It was encouraging to know that students had come up with a lot of illustration to support their statements. There have been instances where the investigator was surprised at students' understanding. For example when a student had mentioned that people with special needs (retarded) could be taught through classical conditioning. All this definitely goes to indicate that students had understood the theories in-depth. Moreover it has been proved that whenever a student is given an opportunity to reflect on the given concept, he/she holds as a better understanding and implication of the things learnt.

5.10.3 Introduction to CAF technique And Comparison of the Learning Theories Using CAF

The investigator next moved on to introduce students to the dimension of critical thinking that is Comparing and Contrasting analogies using the technique CAF (Considering All Factors). It was done with the help of demonstrations and explanation.

Researcher: Today I am going to make comparison between the two students, say Payal and Alka on all the aspects of their personality. Let us say I have compared them, as I will be doing it on the board'. The black board work was done as follows (shown on the next page):

Blackboard Work

Blackboard work

Eg.1 Comparison between Alka and Payal on the following attributes-

- Color of their hair
- Color of their eyes
- Color of their skin
- Height

Eg.2 Comparison between Alka and Pyal on following attributes

- Color of their hair
- Age
- Social back ground
- Color of skin
- Religion

The researcher asked students if they could find any fault with the way in which the comparisons were made from the given two examples (*Socratic questioning, calling for analysis*). On failing to detect flaws, the researcher aided students by way of an explanation. The researcher drew students' attention that in the first example the researcher was simply comparing Alka and Payal on a single aspect i.e. the physical aspect and had ignored rest of the aspects. In the example 2, the researcher has moved from one aspect to another haphazardly. Further, the researcher added that most of us were doing the same thing, whenever asked to draw comparison.

The researcher further went on to suggest that if one wants to make a comparison in a more critical way, it becomes very essential to lay down criteria on which the comparison would be made between the two analogies before actually proceeding. This was illustrated through an example of 'Javed Jaffery', an actor and a person who anchors a dance show. In order to remain fair and

select the best amongst the dancers, Javed Jaffery lays down the criteria on which the dancers are compared like grace, choreography and so on.

The researcher emphasizing the importance of laying down criteria to facilitate more comparison that is critical introduced CAF technique (Considering All Factors). The researcher explained that with the help of CAF the students could lay down all factors on which comparison would be drawn on. Doing CAF would ensure of, that students were neither harping on a single aspect nor were bouncing haphazardly from one aspect to another nor missing any factor. (That is critically analyzing the factors or criteria on which comparison is to be made).

In order that students practice CAF technique, the researcher asked students to compare chocolate ice cream to an ice-candy (orange flavored). Before they proceeded, students had to consider all factors on which comparison would be drawn on. And some of the factors \criteria that students come out with were- 'Ingredients', 'Quality', 'Cost', 'flavor', 'Shape' etc.

Individual Thinking Task 11

Students were given an home assignment: 'To Compare And Contrast The Two Learning Theories -The Classical Conditioning And Instrumental Conditioning, Using CAF'.

Observation- The assignment of the students show that out of 12 students only 4 students had cared to compare and contrast the two learning theories, based on the researcher's instruction of using the technique CAF. Hence the assignment was not considered. It could be noticed that the researcher had been unsuccessful in getting all students to work seriously on their assignment, thereafter the idea of giving home assignment had been dropped.

5.11. Topic- Important Concepts Used In Classical Conditioning and Operational Conditioning

A. Objectives- Students learn to explore new concepts based on their earlier learning, that is analyze, reflect and transfer previous learning to new situations.

B. Method-lecture cum discussion using Socratic questioning method.

C. Procedure and Outcome

The next sub-topic that was dealt was about the concepts used in Classical conditioning and Instrumental conditioning namely (1) stimulus generalization, (2) discrimination (3) extinction (4) spontaneous recovery. As one can see the topic has many new concepts that needs to be taught but the investigator took the task of explaining one concept and the rest was left for students to explore. This was done with the intention to render students the opportunity to analyze, reflect, draw inference and transfer their previous learning to new situation.

The investigator explained the concept Stimulus Generalization through illustration and its application in both classical conditioning and instrumental conditioning. Researcher defined Stimulus generalization as when a response to a conditioned stimulus is learnt and the same response is evoked by a 'similar' conditioned stimulus this is called stimulus generalization. "A child who learns to say 'auntie' to an elderly woman will end up calling all women as auntie other than his mother". "A boy who, almost drowned in water will avoid a boat ride", were given as examples to demonstrate stimulus generalization.

Stimulus Generalization was the only concept explained by the researcher. The remaining concepts were left to the students to explore own their and see how they were applied. The researcher used Socratic questioning method to evoke thought process in students. The instructional process for this can be seen under Group thinking task.

Group Thinking Task I

Researcher: I can see that you have understood the terminology 'stimulus generalization and its application in classical and instrumental conditioning. Now, I want you to explore the term Discrimination and also if you could show its application (*Socratic questioning, calling for analysis, seeing relationship, transferring old learning to a new situation*).

Student: when an organism is able to distinguish between two stimulus which may be different but of a similar nature (explores the term Discrimination through analyze, by relating it to the previous knowledge i.e. stimulus generalization).

Researcher: Splendid, can you give example for that (calls for analysis, reflection).

Student: In Pavlov's experiment the dog after a several trial learns to discriminate between the sound of a buzzer and a bell.

Researcher: Can you tell how the dog learns to discriminate between the buzzer and the bell (*calls for analysis and application*).

When students fail to give an appropriate answer, the researcher takes over the task of explaining. Over a period of trials the dog learns to salivate at the sound of a buzzer and not at the bell. The sound of a buzzer indicates advent of food while the sound of a bell does not bring in any reinforcement of food. In short Discrimination learning results from differential reinforcement of responses to different stimuli.

Researcher: Can you give an illustration to show how discrimination works in instrumental learning?

Student: When a student learns to discriminate between two teachers. A strict teacher (one who does not tolerate when students ask question) from an appreciative teacher (one who appreciates when students raise question). (*Student analyzes the concept*)

Researcher: Very good!

The researcher takes up the next concept 'Extinction' and only explains its meaning as 'termination/ oblivion/ to be lost' but refrains from explaining any further and giving example and instead asked students to do the same. (*Gives opportunity to students to reflect, relate to previous knowledge and analyze.*)

Student: In classical conditioning if the experimenter stops reinforcing the dog with food on the sound of a buzzer the dog may eventually stop responding to the bell after a few trials.

Student: In the Instrumental conditioning the rat will eventually stop pressing the lever in absence of food.

Researcher: Could you give another example that has no bearing to your textbook?

Student: Suppose a student has a habit of wishing a particular teacher on seeing her, will stop wishing if on the two or three subsequent days the teacher fails to respond to her wishing.

Student: A student who had previously asked a lot of questions in the class will ultimately stop asking if she finds that the teacher no longer is encouraging or positively responding to her.

Next concept that was taken up was 'Spontaneous recovery'; again the researcher took the task of explaining but left it up to the students to come up with an example.

Student: I shall extend example given by Radhika (about a student whose wishing response to her teacher had become extinct). Suppose the student does not see the particular teacher for a couple of days after the response (wishing the teacher) has become extinct. The same response (greeting) will surface on seeing the teacher after a long time. In short, the student again wishes her teacher (transfer insight in a new context: drawing relationship).

Student: After the responses of the dog in classical conditioning and rat in the instrumental conditioning become extinct, when returned again to their experimental situation after a lapse of few days both the animals will respond to their respective stimuli.

5.12 Topic Transfer Of Learning

A. Objectives- Students learn to explore new concepts based on their earlier learning, that is analyze, reflect and transfer previous learning to new situations.

B. Method-lecture cum discussion using Socratic questioning method.

C. Procedure and Outcome

Transfer of learning was a next concept the investigator had to deal with. The investigator explained transfer of learning as a process of applying or carrying over the knowledge, skills, habits, attitude or other responses from one learning situation in which they were initially acquired to another learning situation. It means that experience or performance on one task influences performance on some subsequent tasks. The investigator further explained that transfer of learning is important in the life of an individual. A person's ability to recognize objects, perceive relationships and conceptualize the experiences he/she encounters in his/her daily life are facilitated by transfer of learning. The investigator had to explain the 'kinds of transfer of learning' Students were explained 'positive transfer of learning' (a concept that falls under 'transfer of learning') as: when learning one task makes the learning of second easier. In this case, the performance on one task may facilitate to perform on second task by the researcher, who supplemented her illustrations with examples. If a woman knows to drive a car she will easily learn to drive a jeep and similarly if a student who knows to use water paints will easily learn oil painting.

The researcher next, provided students with an opportunity to explore terms like 'Negative transfer of learning' and 'Zero transfer of learning' which the students could successfully carry it out and this can be noticed from the following teaching-learning activities dwelt under Group thinking task.

Group Thinking Task 3

Researcher: Now that I have explained 'Positive transfer of learning', Could you suggest what 'Negative transfer of learning would mean? (Calls for analysis, relating to previous learning).

5.13 Topic Factors Influencing Learning

A. Objective- Students learn to explore, analyze and reflect on their personal experiences.

B. Method-Case Study method

C. Procedure and Outcome

'The factors influencing learning' is one of the topics under the unit learning. The researcher was confident that students would be able to handle the particular topic on their own, by way of self exploring and by relating to their own experience. The researcher decided not to teach students the particular topic but give students the opportunity to work on topic on their own with the help of an assignment provided under Group thinking task.

Group Thinking Task

The assignment was in form of a case study, which reads as: 'Each one of you are assigned to a teacher to prepare your self for an elocution competition. What would you want your teacher to do in order to facilitate you in your learning?'

A few responses of the students

Student- I would want my teacher to encourage, motivate and boost my confidence.

(The investigator jots down 'motivation' on the board)

Student- I want my teacher to give me feedback on my performance, so that I may become aware of my positive and negative points.

Researcher -(jotting down 'feedback' on the blackboard) yes, feedback is important to facilitate effective learning.

Student- I would appreciate if the teacher gave me the topic for the elocution to my interest and liking.

Researcher -(The investigator jots down 'interest and liking' on the black) board). Yes indeed if the learning tasks are to one's interest, then things become easy to learn.

Student- In case the task is long, I would appreciate if the teacher gave me a short break in between.

Researcher- Good! Here the student (X) is talking about 'distribution of practice'. The length of the practice session and distribution of rest periods affect the learning process to a great extent. Here again the duration of the rest period is very crucial. The rest period should neither be too long, too short or very frequent. If the rest period were extended for long, then forgetting would result. And if it is too short and frequent it would tend to break up the task into small and meaningless parts.

On finding, that students had nothing more to add, the investigator went to explain the remaining factors namely whole and part learning and meaningfulness.

Researcher- you have all given certain factors, which contribute to efficient learning and acquisition of skill. Yet certain others have been missed out and they are Whole and part learning, and meaningfulness of the material. The investigator explained the whole and part learning as "If the learning task is short than one is in the position to learn and memorize the material as a whole. But in case of a long material one would easily learn if the task is broken into parts. For example, if one has to learn a poem which is of five paragraphs than one needs to first learn in parts and then as a whole". 'Meaningfulness' was illustrated, as, "if the material to be learnt is meaningful and relevant, the rate of learning becomes rapid. It much easier to learn paragraph than fragmented list of words and similarly it would be easier to a list of meaningful words than a list of nonsense syllabus".

D. Observation-The researcher experienced that students not only enjoyed doing the task but also proved capable in exploring almost all the factors that influenced learning, by reflecting on their own experiences.

At the end of the unit, the investigator gave an assignment in form of a case based on the content 'theories of learning'. This assignment was to assess students' critical Thinking and is dwelt under Individual thinking task.

Individual Thinking Task

The particular exercise is designed to train students to think independently, analyze, reason, make hypothesis and reflect on the content (conditioning) they already have acquired. In addition to assess their thinking ability. The case reads as-

'James believes that all light eye people cannot be trusted. What conditioning has taken place and how could it have taken place? Explain.

Students' point of view

The investigator has reported students' answers without much/any editing on the next page.

E. Observation: It has been found that most of the students had shown clarity and relevance in reasoning, they were able to provided hypothesis and explain adequately. It had been observed that many students did not individually work on the assignment but worked as a group. This was evident when students' assignments were checked. It had been observed that most the answers were, not only falling on the same line but also their style of writing, illustrations and language used were quite the same. In spite of that the researcher feels that a few good assignments needs to be displayed and a few of them are as follows:
(The investigator has presented students' answers without much/any editing).

Student 1.

It could be the case of both Classical Conditioning and Operant Conditioning.

Classical Conditioning: James could have been brainwashed from childhood that he should not believe lighted eyes people and this got fixed into his mind and hence he does not trust light eyes persons.

Operant Conditioning: It could have happen if James has had a bad an experience with a lighted eyed person and due to this, it got fixed in James' mind that light eyes people could not be trusted.

Student 2.

Definitely, James' attitude is acquired through conditioning. A mixture of both Classical and Operant conditioning could have taken place. First, it is general beliefs that light eyes people are cunning. Villains in the movies, novels usually have light eyes and James' family and friends and relatives may believe this. Therefore, James might have been influenced Anil's thinking plus if he has had bitter experiences with a light eye person. Anil might have generalized his notion about light eyes person. Thus, we can say that it could be due to both classical and operant.

Student 3.

Classical Conditioning - The subject James could have been brain washed about a myth that light eye people cannot be trusted. This may be due to his interaction with his family, friends and society that could have led him into thinking that light eyes people cannot be trusted.

Instrumental /Operant Conditioning -James' conclusion that light eyes people cannot be trusted could have been decided on the his bad experiences.

General Observation

In spite of the fact that the particular unit had a lot many unfamiliar concepts, students could relate to them easily. Students could independently think on the given content and provide appropriate illustrations. Despite the researcher had not taught all the new concepts in the unit, the students could rightly explore them on their own at the given opportunity to think about what they learnt. This goes to indicate that a teacher should no longer think that a student could only learn and comprehend when a teacher gives it to them. All that is required is that is required of a teacher is to render students with an opportunities to explore.

The teaching-learning process was found very interactive. Students were participatory. Consequently, the level of interest in the students as well as the researcher was high. Some of the usual complaints that we hear from teacher are "Most students are not motivated; they do not want to study; they do not use what they have learned" and so on. This is because most of the time, teachers are talking and actively engaged, while students are listening passively. Most teacher utterance are statements, not questions. The critical thinking education paradigm is a transition from didactic to teaching thinking which has meaning to students and can become intelligible to students when students tell something important and when students make sense of what they know.

Unit plan 4

Sensory Attentional And Perceptual Process

5.14 Introduction

The present chapter deals in perception and attention. The chapter offers scope to students to learn new concepts experientially that is students learn through actual observation and draw practical understanding of the concerned concepts. The topics covered under this chapter are *Sensory process, Difference between Sensation and perception Principle of perception, Perceptual constancy, illusion in perception, illusion in perception Of motion, Factors affecting attention, and Span of attention.*

The instructional process for each topic is presented under the headings- topic, instructional methods, techniques, procedure and outcome. As it is not possible to lay down the entire teaching –learning process for the entire unit, only teaching-learning process of a few sub-topics are presented here.

5.15 Topic - Sensation and Perception

A. Objectives -students will be able to note the difference between sensation and perception; will be able to figure out the principles of perception; will be able understand perceptual constancy; will be able to note factors influencing perception. Students will learn to think dialectical on the content factors influencing perception.

B. Methods- the investigator uses lecture cum discussion, Socratic questioning and experiential learning for inculcating understanding in students. * Experiential learning is a process by which the investigator

explains concepts through diagrammatic presentation and demonstrations, and the students learn to conceptualize through these presentation.

C. Technique- OPV (Other point of view)

D. Critical thinking task- on completion of the unit the investigator gave students a task that enabled them to think on the content. The task was in form of case studies developed by the investigator.

E. Procedure and Outcome

5.15.1 Meaning of Sensation and Perception

The investigator began the unit with the explanation of the term sensation, perception and explaining students the difference between sensation and perception. The term sensation was explained as, that a primarily a physiological process involving senses organs, receptors, nerves, and finally the central nervous system. And perception as a process of organizing and interpretation of information received by sense organs. This was further illustrated with a few examples. The sensory inputs come into awareness as patterns of stimuli but what is perceived is not just white, black, or a variation in the brightness or the sounds but are objects like tables, trees, one hears a sound of foot steps or a spoken word. One may perceive the cold sensation on the skin as ice. A frown on one's face as anger and so on. The differences between sensation and perception was differentiated as, the sensation is said to be the primary response of the sense organ while perception is the meaningful interpretation of the stimulus.

5.15.2 Principles of Perception

The investigator explained to students that a person's ability to recognize an object, name it or gives its appropriate properties and functions are the result of learning. But apart from learning all human beings have a basic tendency to organize the incoming stimuli and to perceive objects in an organized form. The investigator explained the main principles involved in organization of perception namely 'figure and ground relationship', 'contour' and grouping.

5.15.3 Experiential teaching-learning process, using Socratic method

The investigator used diagrammatic presentation and Socratic questioning technique to teach 'principles of perception'. Alternative to explaining concepts through lecture method, the researcher had attempted to teach the topic using diagrammatic presentation. This was done with an intention that students would be able to develop the understanding of the concepts on their own (*students will be able to see relations in what is being demonstrated and draw inferences*).

It was especially possible to demonstrate some of the major aspects like similarity, proximity (nearness), closure, symmetry & continuity due to which perceptual grouping takes place.

The researcher gave a diagrammatic presentation of the various phenomenon on the board. In lieu of explaining what 'similarity' means in grouping, the researcher drew a basket of four apples and three pineapples and asked the children to tell what they saw. The unanimous answer the researcher got was 'basket of apples and pineapples'. The researcher jotted down the students' answer on the board.

Next the researcher chalked out 2 list on the board. One list of stationary items like pen, rubber, notebook so forth and other list of furniture like chair, table, sofa set, cupboard and so forth. And once again inquired from the students what was written on the board and reply received was a list of stationary items and furniture items.

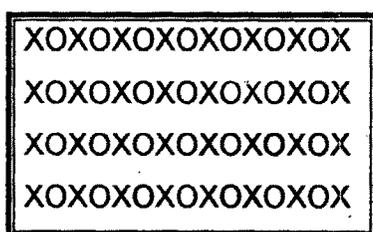
<i>Black board</i>	
<i><u>List 1</u></i>	<i><u>List 2</u></i>
<i>Pen</i>	<i>chair</i>
<i>Rubber</i>	<i>table</i>
<i>note book</i>	<i>sofa set</i>

the researcher jotted down students' answer on the black board.

The researcher explained and drew students' attention to the fact, that instead of them mentioning 4 apples and 3 pineapples they have mentioned it as a basket of apples and pineapples in the first example. And instead of mentioning individual items from the 2 lists they had mentioned what the lists are. Thus the students had demonstrated that items or stimuli which were similar in space or time tend to be perceived as belonging together or forming an organized group.

In the similar fashion the concept of proximity was demonstrated. In order to explain the particular phenomenon, the researcher gave two taps in a rapid succession on the top of a table and then waits for a short period of interval and taps twice again. This process continued three times at the end of which the researcher inquired from the students how many taps they had heard and the unanimous answer was '3 taps'. The researcher repeated the process but this time number of taps were counted. Thus the researcher was able to put forward the principle of grouping i.e. 'proximity'.

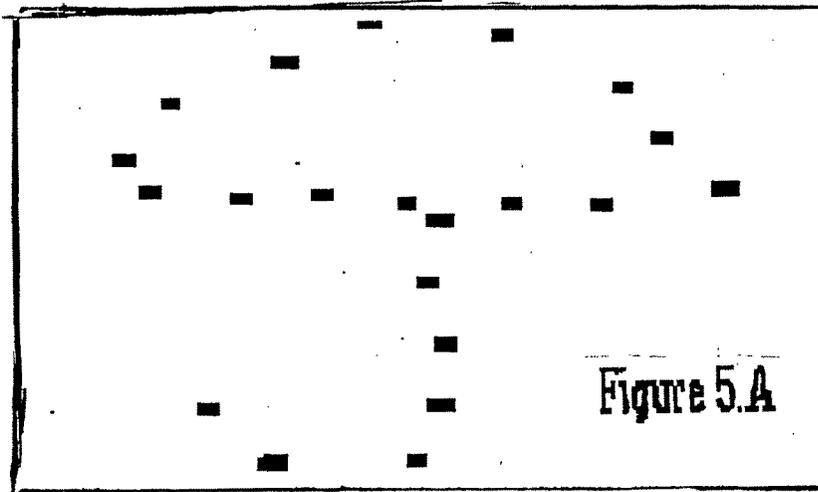
2. The researcher also provided another illustration, drawing on the board alternate lines of 'x and o'.



and asked students to tell what they saw and the reply was 'rows of x and o'. The researcher went on to explain that we are generally in the habit of reading horizontally, yet they were reading vertically, this is due to the fact that stimuli which were close together in space or time tend to be perceived

as belonging together. Further the above example also demonstrated grouping due to similarity.

Next the researcher drew a figure on the black board



On seeing the figure the students exclaimed that it was an umbrella. To which researcher argued (laughingly) all that she had drawn were fragmented dots, yet they had perceived the stimuli as a whole figure despite, it did not constitute a complete object. This was due to the principle of 'closure' and further explains the meaning of closure as an ability to see a whole object when the stimuli itself does not constitute a complete object.

The researcher further wanted to explain that principle of closure did not merely confine to visual perception only. To do this the investigator wanted to find out what the students' thought on how rumors spread. Finding students were not in the capacity of replying, the researcher took in the task to explain through practical illustration.

The researcher chalked down a conversation on the board, which reads as

Black board
Father : " You shall
not" Son : " It was a
mistake"

And invited the students to interpret the matter on the board in their own words. Following were the interpretations-

Student 1: 'The son had disobeyed the father and as a result is not allowed to play, so the son apologizes for his mistakes.'

Student 2: 'The son did not get good marks in the examination so his father has forbidden him to watch TV'

(many more of such examples were given on a similar lines).

The researcher pointed out that the different interpretations derived were fabrication of students' own imagination. The conversation as it was put up on the board between father and son had no direct or indirect bearing to what the students had interpreted. There was no mention of 'disobeying the father'; not getting good marks; not being allowed to play or watch TV', in the conversation. Nevertheless it is found that people have tendency to fill in the gaps in order to gain wholeness/ completeness in the data. Thus the researcher was able to cogently demonstrate the principle of closure.

5.15.4 Factors Influencing Perception

The next sub-topic under consideration was 'Factors Influencing Perception'.

The researcher was able to put across to her students that (i) A stimulus has different meaning for different people. The same event may be perceived differently by different people. (ii) People differ in their perception because of the past experience, social and culture conditioning. (iii) Motivation and

emotions also influence individual's perception. (iv) The same event may be perceived differently by the same individual over a period of time.

The researcher explained this through the following illustration: Person A and person B happen to pass by a river. Person A is delighted seeing the river and jumps into the river for a swim. While person B who had nearly drowned in the water as a child may shudder at the sight of the river. The researcher explains that the same stimulus 'river' has a different meaning for the two individuals. The researcher dwells further into the same example. Now, the Person A, who is enjoying the water notices a signboard saying, 'Beware! River is dangerous' and suddenly a shiver runs down through his spine. Person A no longer wants to remain in the water. The researcher explained that the same stimulus had been a different experience (one of delight and latter that of a fear) for the same individual over a period of time as the experience changed.

Dealing with the particular topic, the researcher took the opportunity to introduce "dialectical thinking", a dimension of critical thinking using the technique 'OPV' (other point of view).

5.15.5 Dialectical Thinking – Dimension of Critical Thinking

Dialectical thinking refers to dialogical thinking conducted in order to test the strengths and weakness of opposing points of view. Students need to develop dialectical reasoning skills so that their thinking not only moves comfortably between divergent points of view or lines of thought, but also makes some assessment in light of relative strengths and weaknesses of the evidence or reasoning presented. Dialectical thinking can be practiced whenever two conflicting points of view, argument or conclusions are under discussion. The dialectical thinking is not only intended to increase cognitive dimension of critical thinking but is suppose to also increase the affective dimension of critical thinking like intellectual empathy.

5.15.6 Introduction To OPV Technique

In order to understand opposite point of view, one needs to imaginatively put one's self in the place of another to genuinely understand another's points of view and his or hers reasoning. This is done through the technique of OPV. The researcher explains the technique OPV to students.

Researcher: "You shall be taught the a new technique OPV. The letter OPV stands for 'other point of view'. In using OPV the thinker (person who is called to make a decision, take sides, form opinion is asked to generate specific views of other people as if, it were their own. To generate specific views of other people it is important for one to put ones self in other's shoes to think and feel like them and to look at the world from that position. This is conducted to facilitate the concerned thinker to test the strengths and weakness of opposing points of view thereby by arriving at a conclusion which is likely to be fair as the thinker endeavors to treat both sides alike without reference to one's own feeling and interest".

Group Thinking Task

The researcher in order to make things indelible for students gives them an exercise on OPV, using Socratic questioning.

The issue place before them was 'should tuition classes be banned' (the particular issue is not within the purview of Psychology syllabus). Students were asked to list points in favor of the topic as well as against it. The elicited from the students were jotted on the board. Some of these are as –

Blackboard

<u>Points in favor of tuition classes</u>	<u>Points not in favor of tuition classes</u>
<p><i>Provides individual attention, which is not possible in a regular class due to its huge strength.</i></p> <p><i>Provides better coaching and practice due to the supplementary material that is provided.</i></p> <p><i>Provides opportunity to clarify doubts which is not always possible in the regular school hours.</i></p> <p><i>Etc.</i></p>	<p><i>Fosters dependency on others in students.</i></p> <p><i>A student has a tendency to become complacent with ready made tuition material and may avoid library work and self-study.</i></p> <p><i>A student attending a tuition class may become disinterested in the regular classroom instruction and prove nuisance to others.</i></p> <p><i>In ability to avail time for extra reading and recreation. Etc.</i></p>

Next the researcher asked a few students individually to give their individual opinion on the subject. The main objective behind this task was to develop and encourage dialectical thinking in students and intellectual empathy in students.

Students' Point Of View

Student 1. : *I feel that tuition classes are very important for a student to do well in exams because the tuition class caters to the individual need of the student. A student has a better understanding of the subject as their doubts are cleared there and then.*

Student 2. : *I believe that tuition classes should not be encouraged because they made a student lazy. A student fails to take any initiative to learn own his/her own. Tuition classes are very expensive too.*

Researcher (addressing to both the students): *I appreciate the way in which you have supported your stand i.e. by reasoning it out. Nevertheless, you have missed out the merits of opposing points of view and at the same time you have failed to mention the shortcomings of your point of view. This gives*

an impression that you have formed an opinion without really evaluating the issue in its proper perspective. It is therefore likely to be deemed biased.

The researcher demonstrates one of the ways in which it could be done.

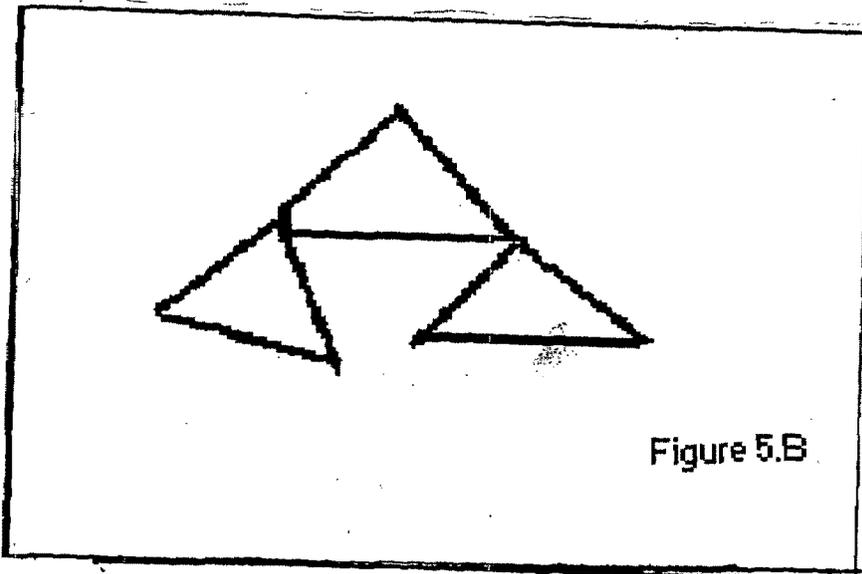
Researcher: If I were of the opinion that tuition classes should not be banned, I would express my opinion in the following manner:

I believe that tuition classes should not be banned because..... But at the same time I do see the demerits \ evils of tuition classes, likeAt the same time I am able to acknowledge benefits of banning tuition classes. But overall I strongly feel that tuition classes should not be banned because
(The researcher attempts to implant critical writing in students).

Motivations, emotions, learning, past experience were explained as an important factor influencing perception. While explaining motivation is an important factor in influencing attention the researcher had mentioned that suppose an abstract painting was shown each person would perceive it differently according to ones' own need/motivation.

On hearing to this a student looked very skeptically at the researcher and asked how was that possible. Two other students jointed in her support (*the students exhibited intellectual courage by raising such a question, which is an affective dimension of cognitive thinking*) and requested for evidence. The request for evidence can be attributed to a good critical thinking, unlike critical thinkers who treat their conclusion as some thing given. From this incident it might be inferred that students might be imbibing other dimensions of critical thinking like intellectual courage and insisting on evidence.

In order to confirm the researcher drew an ambiguous figure on the black board and asked a few students to mention what they perceived the figure to be.



Student 1.: I see it as pizzas. Student 2.: I see it as symbol of family planning.
(The class has a hearty laugh).

Student 3.: I see it as cones.

Student 4.: I think it is a kite

Researcher: Each of you has perceived the same drawing differently. With this demonstration I think I have made my point clear that motivation plays important role in perception.

The investigator also explained how learning and past experience with stimuli influence perception. For example a gun may be perceived differently by a person whose son has been killed in firing incident during violence and a man who is interested in hunting. For the hunter, a gun is an object that evokes excitement, adventure and pleasure and for the other person a gun could be associated with sorrow and pain.

5.15.7 Perceptual constancy

Perceptual constancy was another sub-topic that was covered under perception. This included shape constancy, size constancy and perception of

color, perception of color, illusions in perception and factors influencing perception. To facilitate learning the investigator used a lot of illustrations. The illustrations promoted experiential learning.

The investigator demonstrated that despite changing environmental conditions an individual's awareness of the world around him/her remains stable and unchanging. Stability of perception helps one to adapt to one's environment. Things tend to remain constant in size, shape, brightness and color under different viewing conditions. This was displayed through various examples like students were asked to view a particular color in different light condition- under bright sunlight, under a shadow etc. A constant shape like a square window was examined from various angles. To illustrate illusions in perception of distance or length the investigator demonstrated Muller- Lyer illusion, demonstrated how a vertical lines appear to be longer than the horizontal lines though they are of equal length.

Illusion in perception of motion was explained through the principle operating in a movie camera and phi-phenomenon that is observed in the case of many advertisements with neon lights.

F. Observation-

(1). Experiential learning is akin to learning by doing and therefore requires student participation. Students learn through actual experience and observation of the given phenomena. As a consequence a lot of understanding goes into learning of the concepts. Students enjoyed the instructional process, this could be inferred from their participation in the teaching-learning process.

(2). It had also been observed that students had that students had also acquiring affective dimension critical thinking namely intellectual courage and insisting on evidence. But this could be attributed to the open and friendly classroom climate, where students could be free to hold intellectual

discussion, a permissible classroom climate, which the investigator had always tried to maintain.

(3). The researcher could not spend more time dwelling on the technique OPV, as much as she would have liked to due to the constrains of time and the need to complete the syllabus. The researcher felt that she could not do much justice in training students to think dialectically.

5.16 Topic- Attention

A. Objectives- Students understand attention and various characteristics of attention.

B. Method- Lecture cum discussion, Experiential learning, and case study method.

C. Procedure and Outcome–

Attention was the next topic under consideration. It included many sub-topics like characteristics of attention, factors influencing attention, span of attention, and distraction of attention.

5.16.1 Characteristics of Attention

The investigator began with a question. She asked student at that given time what were the things they were aware of, to which most students replied that they were aware of what the investigator was doing and saying. The investigator next asked students to look at the fan and asked them what they were perceiving and again to which the students replied they saw the fan rotating, and could hear its sound. Next the investigator asked students to out of the window and asked what they perceived and to which the students replied that could hear swinging of the tress, sound of the wind blowing. The investigator explained to students that even while they were concentrating on what the investigator was saying earlier, all other auditory stimuli that had mentioned were present. Yet, they did not notice them until asked to do so because at a given time one pays attention to a few stimuli while ignoring the

other. Thus the investigator explained that the concentration of awareness on certain objects and events or stimuli while ignoring others in the environment is referred to as attention.

The investigator described the characteristics of attention namely 'attention is selective in nature', 'There is center and margin of awareness', and 'attention shifts constantly'. Another aspect of attention is 'factors affecting attention'. The investigator did not feel the need to explain these factors and provided students with an opportunity to reflect through their own experience under Group thinking task.

Group Thinking Task

Exercise in form of a case study was presented to students, which reads as-

'You are to launch a new product in the market. How would you advertise in order to allure potential customers to your product?

(The question calls for analysis and reflections of students' own experience.

Students' point of view

Student 1.: I would like to see that my advertisement is colorful.

Student 2.: I would use beautiful models to promote my products.

Researcher: when you say beautiful models, who are your targeted customers? (*Socratic questioning. Call for analysis*).

Student 2.: People who are rich especially women and teenagers.

Researcher: Suppose your target customers were rich businessmen then what? (*Calls for analysis*).

Student 3.: My models would be dressed in suits and would be with briefcases.

Researcher smiles.

Student 4.: I would repeatedly flash my advertisement so that people began to take notice of my product (*provides reasons*).

Researcher: (Seeing that students had nothing left to add on) Yes indeed, all the factors that got mentioned in the class do draw attention. Besides these there are other factors like 'intensity', 'movement', 'size' and 'contrast' which also effect attention.

The investigator explained intensity as a degree or strength of stimulus in gaining attention that is a bright light, loud tone, bold letters etc. Size was explained as physical dimensions of the stimuli that influence attention. The investigator explained that other qualities being equal, a moving objects usually gets more attention than a stationary one and hence movement influences attention. These factors were explained with illustration.

Interest, attitudes and prejudice, fatigue and preparatory set were some another internal factors that influence attention that were explained by the investigator, using illustrations.

The next concepts that were taken up were 'span of attention' and 'distraction of attention'. The span of attention was explained as the amount of information an observer can grasp from a complex stimulus at a single, momentary exposure and total number that we can attend to in this manner is limited. To drive home the point, the investigator asked a few students to go out of the class and come back within one minute and report on number of things they had observed. The investigator jotted down the same on the black board and it had been observed that average number of things attended by the students were 7. The investigator also explained Hamilton's experiment on the span of attention using tachistoscope.

'Distraction of attention' was the last sub-topic under attention. The topic was explained with a number of illustrations from day to day examples like music, which could impede/distract an ongoing task like reading, studying, calculation, on other hand it could increase an activity as it keeps up with the tempo of activity like cleaning, washing etc. The investigator also

mentioned various experimental studies conducted in industries/factories to understand the impact of distraction of attention and the level workers' efficacy. The investigator also mentioned distraction is not always dependent on the external stimuli but it may also occur because of various internal factors like anxiety and preoccupation.

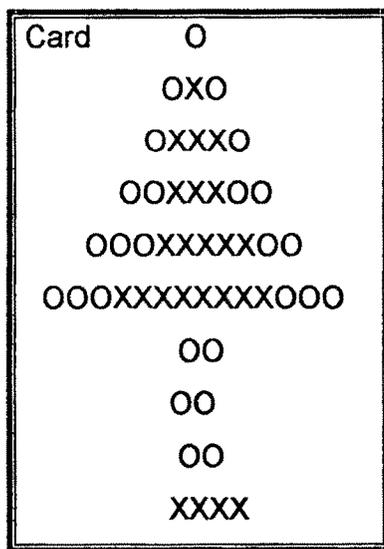
At the end of completing the entire unit 'Sensory Attentional and Perceptual process' critical thinking task was presented on the content.

5.16.2 Critical Thinking Task

At the end unit 'Sensory Attentional and Perceptual process' a few problems in form of case studies, based on the content, were given to measure students' concept clarity, ability to analyze, reason and knowledge application. Students were asked to individually carry out the exercise. This was followed by a group classroom discussion. The assignment is discussed under Individual thinking task.

Individual Thinking Task ①

Q1. Payal had prepared a card on a typewriter. Alphabet 'X' and 'O' was used for creating a form of a tree (researcher draws the figure on the board). What law of grouping is being used –(a) Similarity (b) Symmetry (c) Proximity? Give reason for your choice (question calls for application & reason).



Observation- From the discussion that followed, the researcher observed that 100 per cent of students had given correct answer that is 'Symmetry' but only 80 per cent of the students were able to provide satisfactory explanation for their choice.

Q2. Ritu heard strange sounds and experienced sinking feeling due to medication. What was Ritu experiencing- (a) Hallucination (b) Illusion? (Understanding of the concept).

Observation- 99 per cent gave correct answer 'hallucination', but only 80 per cent could give satisfactory explanation.

Q3. Anosh, who did not care for classical music began to take interest in the same during his visit to his uncle's place who, was a connoisseur of classical music. Anosh's fondness for classical music grew as a result of (a) Novelty (b) Repetition (c) Learning (application of knowledge and reasoning).

Observation- 100 percent of the students gave correct answer that is 'repetition' and they were able to provide satisfactory explanation for the same. The researcher further wanted to know why students did not think that

the answer could have been novelty (Socratic questioning, asking for analysis and reasoning).

Student : It could not have been novelty because the statement says 'Anosh did not care for classical music', indicating that Anosh had already been exposed to classical music (student was critically reading).

Researcher: Very good.

Q4. While reading a book I suddenly noticed the time and remembered I had to go to the laundry. This break in attention is due to (a) The shift in attention (b) The distracter -my wrist watch (Analysis and application).

Observation- Except for 2 or 3, almost all students said break in attention was due to shift in attention because it is not possible to keep attention fixed on the same thing for a long time. Attention tends to shift from one stimulus to another.

The researcher wanted to find out as why the particular student had felt the break in attention was due to a distracter. The researcher asked the particular student for an explanation.

Student: The statement says that while I was reading I suddenly noticed the time. It could possible that the wrist watch had an alarm..... (Unable to complete the sentence due to interruption from other students.

Student 2.: The statement mentions nothing about the alarm watch. Student 1 has made a few assumptions of his own (student has demonstrated critical reading ability).

Student 1.: (protesting) but there could be a possibility that the watch had an alarm.

Researcher: Yes there could be a possibility but this particular statement as it is framed does not spell out what you are assuming to be.

Student 1.: (acknowledging) Yes madam. (Changes opinion in the light of evidence thereby shows intellectual humility; depicting affective dimension of critical thinking.)

Q5. Sachit has only a week to appear for his finals. In order to get him to attend to his task, which is a better way to boost him (a) Motivate him through pep talk (b) Intensify his interest in the subject? (Seeking a point of view and reasons).

Observation- There was no unanimous answer to this. Students' opinion was divided on the issue leading to a good and hot discussion between the two groups.

Student (in favor of intensifying interest) : If Sachit is absolutely disinterested in the subject no amount of pep talk is going to lead him to work for the examination.

Student (in favor of motivating): Most of the time students are not interested in the subject yet they perform well in order to get through the examination. I feel it is better to motivate the person.

Student (in favor of motivating) I appear for an examination whether I like the subject or not. I would want to be motivated by pep talk (student relates to her own experience).

E. Overall Observation

An overall observation can be made from the above assignment is that, students enjoyed the assignment as it evolved a lot of thinking.

Almost all students actively participated in the group discussion.

Students were using critical reading ability, taught in the previous session.

Students demonstrated their ability to think independently, question insistence on evidence and change opinion in light of evidence. Many students had difficulty in reasoning out, nevertheless, it can be hoped that the group discussion might have helped them in that direction.

Unit V

MOTIVATIONAL AND EMOTIONAL ASPECTS OF BEHAVIOR

5.17 Introduction

The unit 'Motivational and emotional aspects of behavior' concerns with the process which explains 'why' of our behavior. The unit has many topics and sub-topics. Some of the crucial topics revolve around explaining motivation, types of conflicts, measurement of motivation, emotions, general characteristics of emotions, viewpoints of emotions and types of emotions. Instructional process for these topics under the unit will be covered. Each topic will have objectives, methods and techniques for enhancing critical thinking. Procedure and outcome of the instructional process will be noted. The attempts to develop critical thinking will be dwelt in detail under 'Thinking tasks'.

5.18 Topic- Motivation

A. Objectives- To enable students to analyze, make hypothesis, and reflect on Maslow's hierarchy of needs.

B. Method- the researcher used Socratic questioning and Case study method to develop students' critical thinking abilities. Using Socratic questioning the researcher probes the meaning, justification, lines of reasoning and many other students' critical ability and students' understanding of the concepts.

C. Procedure and Outcome-The investigator taught the particular topic and the sub-topics through lecture, illustration and discussion method. The investigator acquainted students with 'Motivational process', which she defined as "some kind of internal forces which arouses or initiates action on the part of the organism. In addition it also regulates and sustains all our action in order to fulfil desires of objectives. In other words, motivation is that force which initiates behavior,

directs it and accounts for its termination". The researcher explained the phenomenon with an example. "Suppose you are hungry and you decide to make a sandwich for your self and after having the sandwich you feel satiated and decide to make no more sandwiches. Here the 'hunger' is a driving force that initiates behavior 'sandwich preparation' and once the hunger is satiated it terminates the behavior 'sandwich preparation". In explaining this, the researcher not only defined motivation but also explained the motivational cycle.

The investigator explained various concepts like 'Instincts', 'Species Specific Behavior', 'Imprinting' and 'Need' in order to help students understand that motivation is a complex process which was partly innate and partly learnt. 'Instincts' was explained as a predetermined action by which the organism is able to preserve its existence and propagate its species. Species specific behavior was described as behavior of animals. Imprinting was explained as a learnt behavior that appear only when the organism is exposed to the appropriate stimulation at appropriate time. This concept was made clear through exemplification of a child reared by wolf who ends up walking and making sounds like a wolf at the age when the child is geared to crawl and make sounds. 'Need' was explained as a generalized condition of desire or want which results in individual identifying particular goals and directing his activities towards its fulfillment.

Under the topic Needs, Maslow's hierarchy of needs was explained and also the concepts that fall under its purview like physiological needs, safety needs, affiliation, self esteem, and self actualization. The researcher in order to ensure that students had grasped the concepts asked students to explain these concepts. Having been assured, the investigator called students to analyze, reflect on Maslow's hierarchy of need and make reasonable hypotheses under Group thinking task. In short students were *called to critically examine what they had learned.*

Group Thinking Task 9

A case was presented on the board accompanied with a problem and students were required to discuss. The case reads as:

Ali has joined an advertising agency. He is very hard working as a result he is appreciated both by his superiors as well as subordinates. In your opinion Ali's motivation to work hard stems from which need in Maslow's hierarchy of needs?

Students Point of View

Student: Ali's need could be physiological, in order to procure food and shelter for his family and him he may be driven to work hard. (*The student reflects on the content, analyzes and hypothesizes*).

Student: Ali may be seeking affiliation from his subordinates and superiors and therefore works hard to gain appreciation.

Student: Ali's hard work could be the result of his achievement need that is the need to succeed. (*The student reflects on the content, analyzes and hypothesizes*).

When students had nothing further to contribute, the researcher insinuates at the need to self-actualize.

Student: Ali's hard work could be the result of his need to self-actualize. His need to work hard could be to realize his own potentials.

The main aim of this assignment was not only to know Maslow's pyramid of need hierarchy but also to enable students to understand that a behavior was a complex phenomenon and that a single behavior could be motivated by different needs.

D. Observation- From students supplied hypothesis it may be observed that students were in position to examine the nature of Maslow's hierarchy of need that is analyze and reflect on the content. Students' hypotheses show an

understanding that a single behavior could be the outcome of different motivations. The students' hypothesis has relevance bearing to the concept indicative that they had a deep understanding of the learning material.

5.19. Topic Conflict and Types of Conflicts

A. Objectives- enable students to explore concepts like conflict and types of conflicting situations – Approach- approach; Approach-avoidance and Avoidance-avoidance. To enable students to understand and appreciate given concepts that is to analyze words/phrases and the feeling that accompany these concepts.

B. Method- the investigator used lecture cum discussion method and Socratic questioning method to probe the meaning, justification, and lines of reasoning in order to find out the level of students' understanding of the concepts.

C. Procedure-The investigator used lecture method accompanied by illustrations to explain conflicts and conflicting situation. Conflict and conflicting situation was explained as when a person is encountered by a several needs occurring at a given moment, that is when two needs or wishes arise simultaneously within the person and demand their satisfaction. Under such circumstance one may be faced with a conflict. Human beings often encounter such situations and try to sort them out, however, sometimes they become incapable of solving such conflicts as a consequence they face tension and become inefficient in handling motives.

'Types of conflict' was next important topic that was dealt with. The students were called upon to explore the term types of conflicting situations. The investigator felt that if students had understood conflicts they would be in a position to explore various concepts like Approach- approach conflict, Avoidance-avoidance conflict and Approach-avoidance conflict. This was with an intention that students should explore and explain rather than repeat teacher given concepts. Further when students analyze, and reflect they give meaning to what

they learn and make it intelligible. The instructional process for the particular topic is made evident from the Group-thinking task.

Group Thinking Task 2.

Researcher: what do you understand by conflict?

Student: Conflict means to fight.

Researcher: Can any thing more be added to it?

Student: Conflict means when a person has to choose between two different objects, persons, situations and the person may not be able to make a choice.

Researcher: Very good. Rightly said.

With this the researcher introduced students to 3 types of conflict (I) Approach - Approach (II) Approach -Avoidance and (III) Avoidance -Avoidance. And once again left it up to students to explore the concepts which is demonstrated under Group thinking task.

Group Thinking Task 2.

Analysis of 'Conflicting situation' using Socratic questioning method

Researcher: Payal has rightly said that conflict occurs when a person has to make a choice between two objects, situation or a person, so this would make it easy for you to guess what Approach- Approach conflict could mean.

Students ponder over without saying anything.

Researcher: (emphasizing) choice between two goals, What kinds of goals are they? (*Probing, calls for analysis and reflection*)

Students: Both goals are desirable.

Researcher: Good, both the goals are attractive but at a given time, a person can choose only one and sacrifice other goal. This is approach-approach conflict. Can you give me an example for this?

Student: A person can go either for a movie or for a picnic. Here the person has to choose between the two desirable goals.

Researcher: Is it really a conflicting situation? In any case the person is going to enjoy, either way. Conflicting situation is usually painful for the person who has to choose since both the goals are attractive and choosing any one would spell deprivation.

Student: I came to India after passing my 11(eleventh) std. from Kuwait. I had two choices in front of me. I could take admission either in Navrachana School or in Convent of Jesus and Mary school. If I took admission in Navrachana, the school I loved to study in, I had to repeat a year. This was because the subjects I had passed out in std. 11 in Kuwait were not being offered at Navrachana. On the other hand I could save a year by joining Convent school. The choice had been a conflicting one for me (student relates to her own experience).

Researcher: I am sure it must have been very hard making that choice.

Student: Madam, I too had a similar experience. I wanted to take Arts stream but then my marks in science subjects were very good. A lot of people had advised me to join science stream and I was so confused deciding, whether I should choose Arts or Science.

Researcher: Now that you have finally chosen to be in Arts, do you have any regrets?

Student: No madam.

A few other students had shared their experiences on a similar line. At the end of which students understood what 'conflict' meant. It did not merely mean choosing between two goals but in order to choose one they had to sacrifice another and this could be a painful experience.

Students were not only able to grapple the real essence of the word 'conflict' by reflecting on their experiences but also learnt to enter sympathetically and analytically into the perspective of others (empathy).

The next concept that students were asked to explore was 'Avoidance-Avoidance.

Student: Avoidance -Avoidance could mean that a person might have to choose between the two undesirable goals (*Reflects on the knowledge already known to them and transfers known knowledge in a new content through analyzing*).

Researcher: Good. Can you give an example?

Student: A person who does not want to die is forced to choose his own death. He could die either by shooting himself with a gun or hanging himself.

Researcher: (laughing) The example you gave is right though morbid.

Student: An unwilling 10-std. science student has to make a choice between dissecting a frog or a lizard.

Researcher: What do you understand by Approach -Avoidance conflict?

Student: When a person wants to approach a goal and at the same time wants to avoid it.

Researcher: How many goals are there for a person to select? (Ensuring if the student has really understood)

Student: There are two goals.

Researcher: That means the person has a liberty to select a goal that he desires and reject a goal he undesired. Then where does the conflict occur? (*Calls for analysis*)

Student: Does it mean there is a single goal?

Student: It means there is a single goal and the goal is both a desirable and an undesirable.

Researcher: True.

Student: What example can you give for this? (*Asks questions to seek evidence-an important dimension of critical thinking*).

When students fail to provide example the researcher intervenes.

The researcher exemplifies by stating that a person who is thrilled at the prospects of studying in U.S.A may be equally unhappy leaving his family, relatives and friends behind.

Similarly a person who wants to go in for medicine but hates sight of blood.

C. Observation- the Socratic questioning method had definitely charged students into thinking and the method facilitated students to explore and figure out various conflicting situations, which is evident from the above 'group thinking task'. When students engage in exploratory tasks, the concepts do not simply become bunch of words but instead has a meaning that makes it intelligible. When students examine concepts in context to their own experience they get not only involved in cognitive dimension of critical thinking but also affective dimension. Here students have learned not only to analyze content in relation to their experience but also learnt to get in touch with their own feelings as well as the feelings of others (*empathy*).

5.20. Topic- Frustration and Measurement of Motivation and Reinforcement

A. Objectives- Enable students to think independently, analyze and reflect and
B. evaluate the effectiveness of intrinsic motivation and extrinsic motivation.

B. Method- Lecture cum discussion method and Case Study method.

C. Technique- CAF (Consider All Factors).

D. Procedure- 'Frustration' and 'Motivation' were another topic under the unit 'Motivational and emotional aspects of behavior'. The topics were dealt with the help of illustrations and discussions. The investigator explained the term frustration as a behavior expressed through fear and anger, that results from conflict of motivation or delay or even complete failure in reaching a goal.

Under the same unit the investigator touched upon measurement of motivation. The investigator explained like other psychological processes motives can not be seen directly but can be inferred from behavior. The investigator described the five methods of measuring motivation, namely Consumatory behavior, Deprivation, Performance, Learning and Personality test through lecture method. Another concept that the investigator took up was the importance of reinforcement and incentives. The investigator explained the different types of reinforcement programs that were planned and administered on students, industrial workers and patients so as to motivate them towards the determined

goal. Example the grades, scholarships given to the good students or the bonus, increment, overtime given to the workers for their performance. During the process the investigator explained the concepts- external motivation (extrinsic motivation), that is achieved by merits, grades, rewards, money etc. and self-motivation (intrinsic motivation) that is working for the for the sake of doing or for the love of work. At the end of which an exercise was provided to the students for discussion. The exercise was in form of Individual thinking task.

Individual Thinking Task

In order to facilitate thinking in students, on the content 'types of reinforcement, an assignment was given. The exercise called for independent thinking in students, analysis, to reflect on the content and evaluation. The assignment reads as:

Ambit Singh suffers from obesity. In order to help him overcome his obesity two methods have been suggested (1) To reward him with Rs. 200, for every two kgs. he loses. (2) To convince him of health hazards due to overweight and the benefit of exercise.

Q1. In what way are the two motivating techniques different?

Q2. According to you which would be the better means of motivating Ambit?

The researcher made sure that students had first written their answers on a sheet of paper and only then moved on to discussion. The discussion went on as follows: -

Students' Point of View

Under this section the investigator will present some students' answers which are as follows-

Student: Answering to the first question, the two techniques of motivating are different. To reward Amit with Rs. 200 is to externally motivate him and to

convince him to of reducing weight is to self-motivate him (application of knowledge).

Student: The former technique is extrinsic motivating and the later technique is intrinsic motivating.

Researcher: Any other difference you can think of?

Researcher: Looks like there is a unanimous agreement on this one. However, but none of you have answered it critically that is using CAF. Considering which criteria will you select to make the comparison?

Students: Criteria would be 'types of reinforcement'.

Student: External reinforcement and internal reinforcement.

Researcher: What other criteria? (When students fail, the researcher insinuates by saying 'effectiveness')

Student: Yes of course effectiveness. The effectiveness of external motivating technique and self motivates technique.

Student: The external motivating would be effective only as long as a person gets some kind of external reward for it while self-motivating would be more effective and the person may continue to motivate himself in absence of any reward (*students make analysis and evaluate*).

Researcher: Good.

Student: Self-motivating is more effective than the external motivating.

Student: (Answering to the question 2.) The second technique that is motivating Amit through self-motivating is better because Amit would work on his obesity in absence of any external reward (*thinks independently, and justify their stand*).

Student: Intrinsic motivating is better than extrinsic motivation because here Amit is convinced of the importance of good health and therefore he will exercise for the love of good health.

Student: Even I feel that intrinsic motivating is a better technique as it has lasting impact.

Researcher: Any one with a different point of view?

It was observed that almost all students were of the same opinion.

Researcher: Whenever you convey your view point please begin with 'I feel, or 'I think', or 'in my opinion' otherwise a listener gets a feeling you are making a universal statement and whatever one believes or thinks is just one's own view point. (*Inducing critical ability, to present one's point of view*).

For instance I hold a different point of view. I feel that Amit should be initially offered Rs. 200 for every 2kgs he knocks off. This just to get him started off with exercising. And with the passage to convince him of the benefits that follow weight reduction so that Amit is not hooked on to the extrinsic rewards. (*The researcher intends to train students in critical writing and critical speaking*).

E. Observation-The assignment had two components on which the students were called to think. Firstly students were asked to compare between the two types of reinforcement and secondly to evaluate the two.

Although the students were acquainted with the technique CAF which could be used while making comparison, it can be observed that students' had not used the CAF technique on their own without being hinted. This had been disappointed for the investigator who expected students to be in position to do the same. The second task initiated students to develop their own perspective on which was the best way of motivating according to them, after evaluating both the reinforcement techniques. Students' perspectives were based on reasoning, which had bearing to the task on hand. In other words reasoning had consistency and relevance. The above exercise also shows that students had acquired affective dimension of critical thinking namely **Intellectual autonomy**. Under this task, the investigator also took the opportunity to train students in critical writing and critical speaking.

5.21 Topic - Emotions and general characteristic of motivation

A. Objectives- To enable students to explore bodily changes in emotions by reflecting on their own experiences and observation.

B. Method- lecture cum discussion method and Case study method.

C. Procedure and Outcome -The next topic that falls under the unit 'Motivational and emotional aspects of behavior' was 'Emotions' which was explained through lecture cum discussion method. The researcher explained emotion as a stirred up state of the organism, which initiates and directs behavior. The investigator was explained general characteristics of emotions like emotional experience may either help or disrupt adaptive functions; emotional experiences vary from one individual to another and from one situation to another; bodily changes, facial expression or gesture changes takes place when the person is in an emotional state etc.

The investigator initiated a 'Group thinking task' in order that students on their own explain 'general characteristics of emotions'. The investigator was certain that students would be able to do so with help of a case study.

Group Thinking Task

The investigator presented a case study which reads as- 'Sachet has prepared a class assignment, just to find it destroyed by his sister. What would be Sachet's physical reactions?'

The researcher formulated the case so that students ponder over and explore on their own general characteristics of emotions (*empathizes, reflect on their experiences, analyze*).

Researcher: Lets begin by describing Sachet's facial expression.

Student: His face would become red with anger.

Student: His eyes would widen and may turn red.

Researcher: What about his facial muscles?

Student: they tighten.

Student: His mouth becomes.

Researcher: What about his voice?

Student: His voice becomes harsh.

Student: His voice may be come shaky and loud.

Researcher: What if Sachet was frightened?

Student: His voice would be soft, low and shaky.

Researcher: Now lets move on to bodily changes.

When students are unable to reply, the researcher insinuates by asking them about his heartbeat and blood pressure?

Student: Heartbeat is faster.

Student: blood pressure increases.

Student: rate of respiration increases.

Researcher: What about his energy level?

Student: He becomes energized and may hit his sister.

Researcher: Fine.

The researcher mentions about the changes in the electrical properties of the skin, which is measured by means of Galvanometer.

D. Observation- it may be observed thate students understood the general characteristics of emotions with a little guidance from the researcher.

5.22 Topic Viewpoints Of Emotions

A. Objectives- enable students to compare, analyze, apply knowledge, reason and conceptualize on the content.

B. Method- Lecture cum discussion, Socratic questioning and case study method.

C. Procedure and Outcome-The researcher explained the various Viewpoints on emotions by James-Lange, Cannon-Bard and Schachter-Singer with help of illustrations. As it is impossible to present herein the entire teaching-learning process for all viewpoints of different scientists, hence instructional process for Sachachter-Singers' viewpoint will only be discussed under group thinking task.

Group Thinking Task

The researcher asked students to imagine themselves to be on a roller coaster and narrate physiological changes that were likely to experience during their

emotional state. The investigator divides the board into two parts by drawing a perpendicular line. The investigator jots down students' replies on one side.

Subsequently, the investigator asked students to visualize themselves on a fast moving train whose breaks had failed. Students were asked to describe physiological changes that would accompany their emotional state. The researcher again takes down students' answers on the other side of the board. At the end of which the investigator asked students to interpret emotional experience in both the situations. (Students' replies are presented below under student's reaction)

Students' Reactions

Black Board

<p>Roller coaster experience</p> <ul style="list-style-type: none">• Dilation of pupil• Increase in heart beat• Increase in blood pressure• Scream <p>Emotional experience- thrill</p>	<p>Train Experience</p> <ul style="list-style-type: none">• Scream• Perspiration• Dilation of pupil• Increase in blood pressure <p>Emotional experience – Fear</p>
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The investigator illustrated to students that in both the situations physiological changes in the body are same. Nevertheless, students had suggested two different emotional experiences. The investigator sought explanation from students for this. On finding students were unable to do so, the investigator took task of explaining through another example.

Researcher: Suppose one of you was yawning in the class and I am distracted. My reactions to the student would be that, I would stop lecturing, stare at the concerned student (the investigator dramatizes), my pupils dilate. What is my emotional status?

Student: You are angry.

Researcher: Yes.

Researcher: However, if one of you was coughing and I am distracted. My reaction to the student is that I stop lecturing, stare at the student (the investigator dramatizes again). Am I angry?

Student: No you are not.

Researcher: Yes you are right.

Researcher: In both the above situations I was distracted and my reactions in both the situations were almost the same, yet, in the first situation I was angry and in the second situation even if I was distracted, I wasn't angry. What could be the possible explanation for this? (*Calls for analysis*).

Student: Because if a student is yawning in the classroom it means that he is not interested in what is teaching/saying.

Researcher: Yes, in the first situation where a student is yawning I *'interpret'* yawning as boredom disinterested in my teaching while in the second situation where a student is coughing I do not *interpret* at disinterest in my subject.

Researcher: Even when the physiological changes in the body are same, it is the *interpretation or evaluation of the situation* (cognitive process) that determines emotion experience.

With the above mentioned illustrations the investigator explained to students that according to Schachter-Singer's point of view the emotions one experiences depends on how one evaluates or appraises the external situation. In short, evaluation of the stimuli precedes emotional experience. In case of James-Lang's point of view, physiological changes precede experience of emotion while Cannon and Bard emphasized that both the experience of emotion and physiological changes occur at the same time as a result of nervous activity in the thalamus and the hypothalamus.

Once the students were familiar with different viewpoints, a class room assignment is given to students under Individual thinking task. This was done in order to enable students to critically think on the learnt content.

Individual Thinking Task

The individual thinking task was in form of a case. The case requires that students reflect on what they have studied, analyze show application of their knowledge and justify.

The case reads as follows: Anise is absolutely engrossed in writing, suddenly feels a tap on her shoulder. She lets out a scream and at the same time, her pen slips of her hand, her heart beat and respiration increases. Anise turns back to find out her mother standing with a glass of milk. Anise exclaims "Mother you startled me!"

Q. According to you whose theory is more applicable James-Lang or Schachter-Singer's? Give reason for your stand.

After it was ensured that all students had their answers written on a sheet of paper it was made open to discussion.

Students' Point Of View

The unanimous answer was Schachter-Singer to which a few students were asked to reason out and process be as follows:

Student: It is Schachter- Singer's theory because their theory states events causes physical arousal and the interpretation of the event leads to experience of emotions. (*Student justifies her/his stand*).

Researcher: True that was Schachter-Singer's theory states. Now read the case again. (*Students read the case aloud*).

Researcher: According to the case Anise does experience physiological arousal. What are the different excitements demonstrated by her?

Student: Anise lets out a scream, her heart beat and respiration increases.

Researcher: Fine. What happens next?

Student: Anise is frightened.

Researcher: Is that an emotional experience (probing)?

Student: Yes it is an emotional experience.

Researcher: very true. Now is there an evaluation of stimuli

Student: yes. Anise turns to find his mother standing.

Researcher: Right, so why should his mother frighten him?

Researcher: Here physiological changes in the body (screaming, increase in the heartbeat and respiration) has preceded experience of emotion (fright). It was the emotion (fear) that had preceded the interpretation of event- his mother standing. According to Schacter-Singer's view point It is the interpretation of the event that precedes emotional experience.

Student: No madam, Its James -Lange's theory.

Researcher: why?

Student: Because James-Lange theory states that physiological changes are followed by emotional experience. That is a person a person experiences emotions due to her physiological changes. In this case Anise is frightened because her heart beat and respiration has increased plus she lets out a scream. *(Student compares and contrasts between the James-Lange point of views and Schacter-Singer's point of views, analysis, justifies and changes opinion in light of understanding, Showing intellectual humility).*

D. Observation- Although the above teaching-learning process suggests that students did not understand the essence of the theories nevertheless With the help of Socratic Questioning method the researcher was successful in getting students into the process of *reflecting, analyzing, reasoning, and justifying (dimensions of critical thinking)*. Thereby helping them to arrive at an understanding of the theories in their own right.

Educators who do not care for critical teaching would most often find themselves complaisant if students were able to recall different theories. Just because a student is able to produce what he/she has rote memorized does not ensure understanding or his/her ability to conceptualize. This has been made evident from the above instructional process (Individual thinking task). The essence of education is realized when education brings the learner to a personal association with knowledge. One of the main imperative intentions of education

is said to be fulfilled only when students are able to create their own understanding or become a source of information.

5.23 Topic Some of the Important Emotions

A. Objectives: Enable students to appreciate emotions like fear, anger, love and a few others.

B. Method – lecture cum discussion method.

C. Procedure and Outcome -Some of the important emotions' which included emotions like 'Fear', 'Anger & Aggression' and 'Love was the last topic under this chapter and the investigator covered the chapter through lecture cum discussion method.

The investigator made distinction between two closely related emotions namely fear and anxiety via examples. The investigator also introduced concept like phobias. The investigator made also distinction between anger and aggression, introduced concept of displacement as a reaction instead of placing or directing anger on the original stimulus being displaced on the relevant stimuli. Love and affection was explained as an emotion associated with pleasant and a pleasurable experience. The investigator also explained H.F. Harlow's experiment on monkeys to demonstrate that love was innate and is present in young infants. In order to show the significance of love the investigator narrated about the experiment conducted in Russia with orphaned neonatal. In spite of the fact that the babies were provided with food and shelter, most of them had died in absence of touch and love. Hence the investigator was able to communicate to students the far-reaching effect of love. The investigator also explained the role of learning and maturation on emotional behavior. How certain emotional expression change as a consequence of maturation and learning.

Towards the completion of the chapter the researcher asked students what they thought of emotions like 'fear', 'anger' and 'aggression'. To which most of the students felt that these emotions were absolutely undesirable and that they

were negative. The researcher explained to students that these emotions were absolutely necessary for one's survival. In absence of these emotions like fear, we, on the sight of outbreak of fire we would not have run to save our lives. And if had not been for the passionate anger of our leaders like Tilak, Bose, Gandhi and others we perhaps would not have got our independence. With this the investigator concluded that none of the emotions were negative because to an extent they contribute to the safety and survival of organism.

D. Overall Observation

Critical thinking as a model of teaching-learning when applied to instruction, creates a climate where students are allowed to build a personal association with knowledge through their own analysis, synthesis and assessment and arrive at their own understanding of knowledge. This is so because they are asked to think about what they learn. Critical thinking as a model of instruction allows a student to question the validity as well as understand the information. It enables his/her to establish a point of view upon which to analyze information received. It also encourages him/her to develop and utilize hi/her own thought process in given situation and figure things out for themselves (*Intellectual autonomy-the affective dimension of critical thinking*).

From the four months of classroom interaction, the investigator could observe that students were generally motivated to learn, there was always a general excitement among the students especially working on the thinking tasks. As the classroom processes were stimulating the students were usually alert and interested in the subject matter. A lot of students had voiced that they found the lessons interesting. It was a wonderful to see students relate to concepts under consideration. A sense of achievement in students could be noticed when they could on their own explore meaning of concepts on 'Learning' and 'Sensory attentional and perception process'.

Prior to the intervention, the investigator had always felt that education based on thinking is crucial but after the intervention program her convictions have become all the more staunch. After the intervention it has been realized that Critical thinking as a model for instructional process should not be considered a distant dream but a reality for all educational instructors in all subjects and at all grades.