chapter 4

Chapter-IV

DEVELOPMENT AND TRYOUT OF INSTRUCTIONAL STRATEGY

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4.1 Introduction

For the purpose of enhancing creative and critical thinking in the sampled teachers using their school subjects' investigator developed an instructional strategy. This instructional strategy comprised of various thinking tools and thinking strategies. These tools and strategies have to be incorporated while discussing the content with the sampled teachers. This particular chapter deals with the selected thinking tools and thinking strategies and various methods which have been utilized during the process of content transaction.

4.2 Instructional strategy

Topic 1: conduct of pre test

Objective: to calculate mean achievement

Procedure: investigator ensured the number of subjects and made necessary material that is number of copies, ruled and un ruled papers, twenty five boxes of matchstick each containing minimum twenty sticks, twenty five stars which are required for the practical perception of the problem in the test item included in the section of critical thinking and appropriate seating arrangement prior to this. Subjects were then asked to take their place with proper distance keeping in mind the ease and comfort for carrying out the test smoothly at the same time to avoid interaction and any chance of copy.

investigator then explained with illustration about the test what is it about, number of sections and number of test items in each of these sections, time required, and mode of answering each one. Test papers were than distributed to them and subjects were asked to look at the whole test in order to have clarity about the test items, legibility of the material, printing etc. any queries regarding test were welcomed by the investigator and solved according.

Subjects were then asked to start the test. Investigator invigilated himself till subjects have completed the test. Proper care was taken to avoid interaction among the subjects or any chance of copying through out the act.

At the said time limit, the investigator collected the test papers along with the answer sheets. Subjects were not allowed to take any points with them or any material with them out of the examination hall.

Reporting: this task last for one hour, subjects were comfortable at the end of this act.

Topic 2: to design lesson plan

Objective: to prepare a lesson plan in order to understand the lesson planning format and interaction pattern they are using in order to understand the classroom interaction pattern of the subjects which they are comfortable with more importantly following during their lessons.

Procedure: investigator supplied the required books, and other needed material along with necessary stationary to the subjects and they were asked to prepare a lesson plan in one subject of their own choice in order to achieve the said objective.

Following steps were followed to complete this act.

1. Selection of subject and topic.
2. Time limit for completing the task was decided through discussing with them and fixed for forty five minutes. Subjects were asked to start and to stop their job in the set time limit.
3. Designed lesson plans were collected by the investigator.

Reporting: subjects have completed this activity with peace and comfort in the set time limit.

Topic 3: concept and nature of thinking, introduction of creative and critical thinking

Concept and nature of thinking; Concept and nature of Creative thinking; Concept and nature of Critical thinking; Difference between creative and critical thinking

Objective: To introduce different perspectives that have been explained by various psychologist and investigators to explain the term thinking, creative and critical thinking.

Procedure: investigator asked the group to brainstorm on the topic what you mean by the term thinking and what one means when they say that they are thinking. The points are listed by the investigator on the black board and then discussed following Socratic discussion method in the classroom in order to refine the understanding of the group members.

Reporting: subjects were found passive during the initial stage and gradually become interactive at he end of the activity. This is a ice breaking session as the subjects were

gradually learning the terms of creative and critical thinking. Investigator presented various terminologies associated with creative and critical thinking and explained the importance of this in education.

Topic 4: concept and nature of creative thinking

Objectives:

- To introduce different perspectives that has been explained by various psychologist and researchers to explain the concept of creative thinking
- To explain nature and importance of creative thinking

Procedure: investigator asked the group to brainstorm and jot down their ideas on the term creative thinking and its importance. The points were then discussed one by one and depending upon the quality of answers investigator provided the feed back and necessary changes were carried out and importance dimensions of creative thinking were presented by the investigator. Key points that resulted out of discussion were listed by the investigator on the black board and then discussed one by one as this forms a basis of the next task. Socratic discussion method in the classroom is followed in order to refine the understanding of the group members.

Reporting: some teachers were found having proper understanding about the term creative thinking which was then shared with other members of the group. Those teachers who were passive during the initial stage gradually became interactive and came out their own explanation about creativity and its importance. Investigator shared his understanding about the key components of creative thinking and explained the importance of this in education.

Topic 5: concept and nature of critical thinking

Objectives:

- To introduce different perspectives that has been explained by various psychologist and researchers to explain the concept of critical thinking
- To explain nature and importance of critical thinking

Procedure: investigator asked the group to brainstorm and jot down their ideas on the theme critical thinking and its importance. The points were then discussed one by one and depending upon the quality of answers investigator provided the feed back and necessary changes were carried out. Following lecture cum discussion investigator also presented his ideas on the said topic. Key points that resulted out of discussion were listed by the investigator on the black board and then discussed one by one as this forms a basis of the next task. Socratic discussion method in the classroom is followed in order to refine the understanding of the group members.

Reporting: some teachers were found having poor and unclear understanding about the term critical thinking which was then empowered with the help of other members of the group. Those teachers who were passive during the initial stage gradually became interactive and came out with their own explanation about critical thinking and its importance. Investigator shared his understanding about the key components of critical thinking and explained its importance in developing democratic environment.

4.2.1 Thinking tools

Topic 6: introduction to thinking tools

Objectives:

- To introduce different thinking tools given by Edward de Bono
- To explain nature and importance of thinking tool

Procedure: keeping in mind the difficulty level and objectives of thinking tools given by de Bono investigator selected thinking tool in the first step. These tools of thinking are then practised in depth through various brainstorming activities in order to make them clear and friendly. Investigator presented these tools one by one following these steps. Each of these thinking tools is explained with objectives, procedure to be followed with brief description, illustrations, supportive activities for practice and then discussion on the developed list. Following lecture cum discussion method and through discussion investigator presented tools one by one. Key points that resulted out of discussion were listed by the investigator on the black board and then discussed one by one as this is the most important task of the study.

A tool is a device or an instrument, which aid and direct our attention in particular direction. Practicing these tools of thinking we can explore the possibilities that inturn facilitate our thinking more creatively and critically. The major thinking tools that were embodied in the present study have been adopted from Edward deBono's CoRT lessons as Edward deBono is considered to be the leading authority all over the world on the direct teaching of thinking as a skill. His thinking lessons and in particular CoRT thinking lessons have been in use for many years and in many countries like Venezuela, Singapore, Australia, New Zealand, Canada and many more.

Following thinking tools were widely used in order to teach to think in a better way.

Other Peoples' View (OPV), Plus Minus Interesting (PMI), Considering All Factors (CAF), Consequences & Sequel (C & S), Aims Goals Objectives (AGO), North South East West (NSEW). Out of these thinking tools of thinking, investigator had embodied P.M.I., C.A.F., A.P.C. and C & S. in the present study. Each of these thinking tools is explained with objectives, procedure to be followed with brief description, illustration, supportive activities for practice and major points that were emerged while these tools were practised with the sampled teachers.

Topic 7: introduction to thinking tool P.M.I.

P.M.I. (Plus Minus Interesting)

(1) Description about P.M.I.

This is a scanning tool. This is a very powerful and so simple tool that does not require much effort. The letters are chosen to give a nice pronounceable abbreviation so that we can communicate with ease just by saying to, "do a PMI on ....."

P - stands for Plus or the good points.

M - stands for Minus or the bad points.

I - stand for the Interesting points.

PMI is an attention directing tool. In doing PMI you are deliberately directing your attention first toward the Plus points, then towards the Minus points and finally toward the Interesting points.

PMI sets the mood of objectivity and scanning. At the end of the exercise our ideas completely reversed or over liking or disliking about the decision changes.

(2) Illustration

Suppose you are asked to do a PMI on the suggestion that all cars should be painted yellow your list may result following points:

Plus Points

- Easier to see on the roads
- Easier to see at night or in bad light
- No problem regarding decision which color to be selected
- No waiting to get the color you wanted
- Easier for the manufacturing companies
- The dealer would need less stock
- In minor collisions the paint rubbed off on to your car is the same

Minus Points

- Boring
- Difficult to recognize your car
- Very difficult to find your car in the parking lot
- Easier to steal cars
- The abundance of yellow might tire the eyes
- Car chases would be difficult for the police
- Accident witness would have a harder time
- Restriction on your freedom to choose
- Some paint companies might go out of business

Interesting Points

- Interesting to see if different shades of yellow arose
- Interesting to see if people appreciated the safety factor
- Interesting to see whether attitudes towards cars changed
- Interesting to see if this were enforced
- Interesting to see who would support the suggestion

Carrying out the process is quite easy. What is not easy is to direct attention deliberately in one direction after another when your prejudices have already decided for you what you should feel about an idea. It is this "will" to look in a direction that is so important. Once this is achieved then the natural challenge to intelligence is to find as many P or M or I points as you can. So there is a switch. Instead of intelligence being used to support a particular prejudice it is now used to explore the subject matter.

At the end of the exploration emotions and feelings can be used to make a decision bout the matter. The difference is that the emotions are now applied after the exploration instead of being applied before which is preventing exploration.

(3) Supportive activities for Practice using P.M.I.

1. Should every child adopt a senior citizen to look after?
2. Should everyone be allowed to indicate where they would like their taxes spent?
3. Should cars be banned from city centers?
4. Should students be allowed to write their examination with books?
5. Should students have to use bicycles compulsory till their school education?

(4) **Major points that were emerged when investigator practised this tool with teachers:**

Out of these items investigator has practised item no.4 with the group of subjects and following major points were emerged:

- **Should students be allowed to write their examination with books?**

Plus Points

- Students can pass examination easily
- Slow learners can also clear the examination comfortably
- Chances of copying or steeling in the examination will be abolished
- Students will read more number of books
- Book publishers will have handsome business
- Fear for examination will remove
- Students will read books regularly
- Student's attitude for examination will become positive
- Student's dependence on guide or digest or material of that kind will decrease
- Excess stress on rote learning, memory will decrease
- Teachers will have to refer more authors

Minus Points

- Students may not remember what they are reading
- Opportunity for development of speaking will decrease
- Student's original answers can not be justified
- It will be very difficult to draw question papers
- Teacher will have to read more books

- More budget to be spent for books
- Students may not care for their examination
- Managing class rooms will be a big problem
- Students writing activities on their own will decrease as a result they can not think independently

Interesting Points

- It is interesting to study how students, parents and teachers will react to this
- It is very interesting to study the short term, middle term and long terms consequences of this practice
- It is interesting to see who will support this idea
- It is interesting if it attract more number of students in the library

Topic 8: introduction to thinking tool C.A.F.

C.A.F. (Considering All Factors)

(1) Description about the tool C.A.F.

This tool helps us in exploring the possible factors related to the given issue or condition. It helps us in considering all the factors that influence the given condition. Thus, doing CAF means considering all the factors that are to be considered in a given situation without attempting to evaluate these factors.

(2) Illustration

For example doing a CAF on buying a secondhand car might result in the following items.

- Price

- Previous history
- Previous owners
- Present owner
- Likelihood of Mileage
- Resale value
- Comparison of price with official listing
- Condition of the car
- Fuel consumption
- Oil consumption
- Condition of the tires and other accessories
- Cost of spares
- Nearness of service stations and so on.

This is neither a complete list, nor the items are in order of priority. Some of them might overlap. In the process of listing if you think anything is to get individual attention it is worth listing it separately.

(3) Supportive activities for Practice using CAF

Do a CAF and list all the factors that should be considered when thinking about the following:

1. Choosing a career
2. Writing a detective story
3. Buying a house
4. Buying a gift for your friend
5. Selecting a newspaper
6. Preparing a question paper for examination

7. Planning a lesson

Out of these items investigator has practised item no.7 with the group of subjects and following major points were emerged:

(4) Major points that were emerged when investigator practised this tool with teachers:

CAF for planning a planning a lesson

- Age level of students
- Available time limit
- Interesting points to be included for the discussion
- Selection of language
- Teaching aid (TLM)
- Mode of presentation
- Selection of content
- List of activities that is to be carried out
- Seating arrangement
- Evaluation strategy
- List of major questions to be discussed
- Appropriate mode of evaluating learning outcome
- Assignment

Topic 9: introduction to thinking tool A.P.C.

A.P.C. (Alternatives Possibilities Choices)

(1) Description about the tool A.P.C.

The natural tendency of mind is toward certainty, security and arrogance. The mind wants to recognize and identify with certainty as soon as possible. The natural tendency of thinking is to support a view arrived at by some or other means. As the deliberate search for alternatives counteracts this natural tendency of mind it is therefore challenging to search for the alternatives in the natural and familiar course of action. Generating alternatives is always facilitates us in the time of crises or in any abnormal conditions. Therefore, this is an extremely important part of the skill of thinking to counteract this natural tendency of mind and to look for alternatives or generating possibilities.

Because of this natural tendency of mind we need to practice consciously this APC tool in order to generate the alternatives or look for possibilities or choices. As with the P.M.I. we have to provide ourselves a concrete instruction which we can then use with ourselves and with others whenever it seems that a search for alternatives is required. The tool is A.P.C. (A is for alternatives; P is for possibilities; C is for choices)

The main point is that we should not be reluctant to look for alternatives because we cannot conceive of anything better than what we have. The secondary point is that we should not be afraid to look for alternatives for fear of the extra hassle they might cause.

Without the willingness to look for alternatives we remain trapped in the past and in what we have always done before. If you generate alternatives you can always reject them if thy do not seem superior to the existing way of doing things. But if you never generate alternatives you never have a choice.

Generating alternatives opens up possibilities. Possibility system has been the driving force in the success of the Science and Technology. Since the nature of the mind seeks certainty and not the alternatives we need this powerful tool that deliberately signals the need to look for alternatives.

(2) Illustration

A young man is seen pouring cans of beer into the gas tank of his car at a gasoline station. Do an APC on this. What possible explanations might there be for this behavior? Some starting alternatives are given below.

- It was not his car
- He was drunk
- It was an advertising stunt for the beer
- He may be a mad man
- It was gasoline but the pump was out of action so he used cans and so on.....

(3) Supportive activities for Practice using APC

1. A person who is usually punctual starts to be late. What are some alternative explanations?
2. There is a sudden rise in the stock market. Give some possible explanations.
3. A new antique shop opens up across the street form your antique shop. What alternative action could you consider?
4. You want your students to discourage from smoking. What alternative approaches might there be?
5. Give some alternative approaches to encourage your students to be in time in class?

6. What are the alternatives to save electricity?
7. What are the choices to reduce petrol consumption?
8. A regular student starts coming late in the school. Write some of the possibilities for this.

Out of these items investigator has practised item no.8 with the group of subjects and following major points were emerged:

(4) Major points that were emerged when investigator practised this tool with teachers:

APC for the possibilities for a regular student start coming late in the school

- Fear
- His residence might have been change
- He might be spending some time on the way
- Some one may harass him in between
- Family problem
- Bad habit
- Playing with friend on the way
- May not be interested in the school assemble
- He may want to draw attention of others
- Some responsibility at home
- Change in the home or school environment
- Helping parents in the earning of livelihood

Topic 10: introduction to thinking tool C & S

C & S (Consequences and Sequel)

(1) Description about the tool C & S

Thinking is almost always short-term because the attraction or repulsion of a course of action is immediate. We are interested in what happens next: the future can look after itself. The C & S thinking task is an instruction to deliberately consider the consequences of an action or decision. Four time zones are very important to consider in this line: immediate consequences up to 1 year; short-term from 1 to 5 years; medium-term from 5 to 20 years; long-term over 20 years. These time frames are arbitrary and can be varied. They can also be specified to suit the need and demand of the situation.

In doing C & S there is the usual deliberate attempt to focus on the frame of the moment. Just as in the PMI the thinker focuses on the Plus, Minus and Interesting aspects in turn, so in the C & S the different time zones are focused upon in turn. The exercise is surprisingly difficult, partly because it is unnatural. The difficulty also arises from our reluctance to assign time zone. We can appreciate that a consequence may happen "sometime" but be very hazy as to when that might be. The C & S is a usable tool for getting rid of that haziness.

(2) Illustration

C & S on a major breakthrough in solar energy technology could have the following consequences and sequel

Immediate (up to 1 year)

- rapid change in stock market prices of companies involved
- a great deal of talk an speculation
- slight fall in oil prices
- new designs for buildings show provision for solar energy panels

Short term (1 to 5 years)

- further fall in oil prices
- much less development than expected
- property prices in desert cities start to rise

Medium term (5 to 20 years)

- some projects are operating and others have failed
- better appreciation of those areas where solar energy is most useful
- two further steps in the technology
- oil prices are now beginning to rise again
- hydrogen is being tried as fuel for cars

Long term (over 20 years)

- sharp division of energy uses according to pricing and convenience
- solar energy beginning to have major use except with transportation systems
- price of oil rising faster for transportation and machinery

When doing a C & S the time frames will vary according to the subject matter. For example with a new clothing fashion: immediate might be up to one month; short term up to three months; medium term three months to six months and long term over six months. You need to specify the time frames in advance.

It should be noted that with the C & S there can be no certainty on any of the points: all thinking about the future is speculative and is based on "may be" and "could be" even though these may have different degrees of likelihood.

(3) Supportive activities for Practice using C & S

Do a C & S on each of the following situations. Set your own timings in each case for "immediate", "short term", "medium term" and "long term" consequences.

1. All school examinations were abolished.
2. Petrol becomes extremely expensive.
3. Life was discovered somewhere in the space.
4. Marriages only lasted five years.

(4) Major points that were emerged when investigator practised this tool with teachers:

C & S on if Petrol becomes extremely expensive

Immediate (up to 1 year)

- Only rich people can use petrol
- People may go for strike against Price hike
- Commutation with Petrol vehicle will suddenly decrease
- Price of Petrol vehicles start decreasing
- Oil companies will have less business
- Purchase of Petrol vehicles will be very less
- Alternative for other fuel will start immediately
- People will start using bicycle and cycle for small travel and transport
- People may go for stock of Petrol

Short term (1 to 5 years)

- Price of vehicles with Petrol engines will again decrease
- Manufacturing and purchase of Petrol vehicles will decrease
- People will prefer vehicles other than Petrol
- More company start manufacturing vehicles will engines other than Petrol
- Pollution will decrease

Medium term (5 to 20 years)

- Vehicles with Petrol will start disappearing from the market
- Some company will stop manufacturing Petrol engine
- People will start using cycles
- More business for cycle manufacturing companies
- Petrol pump start disappearing
- Price of Petrol may start reducing as a result of lower demand
- Use of Petrol vehicles may start as a result of low demand

Long term (over 20 years)

- Petrol pumps will disappear completely
- Petrol car and other vehicles will be out of the market
- Improvement in health
- Price of petrol may reduce further and may become cheaper compare to other fuels
- Many alternative fuels of Petrol are invented

The points were discussed with all the group members in order to clarify any doubt or query regarding it. Investigator followed brainstorming approach to conduct all these practice. Some points of contradiction were emerged during the process which were settled out while discussion. Rules of brainstorming and democratic discussion were followed throughout the sessions.

4.2.2 Thinking strategies

Thinking independently (S1)

Refining generalization and avoiding oversimplifications (S2)

Comparing situation and transferring insight to new context (S3)

Clarifying issue/ fact/ belief/ opinion etc. (S4)

Discriminating relevant from irrelevant facts (S5)

Topic 11: thinking independently (S1)

Thinking for oneself is of prime importance. Most of our beliefs are acquired at an early stage. Critical thinkers do not passively accept the beliefs of others; rather they analyze issues themselves, reject unjustified sources and recognized the contributions of justified authorities. Independent thinking strives to incorporate all known relevant knowledge and insight into their thought. They strive to determine for themselves relevance of the given information, when to apply a concept or when to make use of a skill.

Students should be encouraged to discover information and use their knowledge, skills and insights to think for themselves. Rather than simply giving ideas in the texts, let students brainstorm ideas and argue among themselves about problems and

solutions. Students could develop their own categories instead of being provided with them. Instead of following the procedure given in the text let them decide on their own {categories/ heading,}, which help them in discriminating fact, opinion, belief etc in enriching their understanding.

Following type of questions help students to develop their independent thinking skill

- What does this content indicate?
- Why does the text tell you about this?
- Why do the authors think this (concept, skill, procedure, step) is worth knowing?
- Why does the text tell you to do this?
- What would happen if you didn't?
- Which words are not familiar with you?
- How this concept or principle is useful to you?
- **Assignment**: when giving written assignments, those assignments should provide many opportunities for the students to exercise independent judgment: in gathering and assembling information, in analyzing and synthesizing it and in formulating and evaluating conclusions. Have students discuss how to organize their points in essays.

Topic 12: Refining generalization and avoiding oversimplifications (S2)

Oversimplification results in to misunderstanding of problem and experiences. Thinking helps us to recognize complex, intricate, ambiguous or subtle situation and make it simple, elementary, clear and obvious.

For example, it is typically an oversimplification as to view people or groups as all are good or bad, actions as always right or always wrong, one contributing factor as the cause etc. Thus, there is a need to learn how to make a distinction between useful simplifications and to filter misleading oversimplification.

Appropriate use of qualifiers such as highly likely, probably, not very likely, often, some times, occasionally, seldom, I doubt, I suspect, most, many often, very often, etc helps us to make ourselves not only clear but precise and exact. A good thinker scrutinizes generalizations through appropriate qualifiers. During classroom interaction we need to engage our students to pay their attention to these qualifiers and use them in their conversation.

Role of teacher could be:

- Help students clarify their thoughts by rephrasing or asking questions
- Pose thought-provoking questions
- Help them in focused discussion
- Encourage students to explain things to each other
- Ensure that students do justice to each view, that no views are cut off, ignored or unfairly dismissed

Topic 13: Comparing analogous situations: transferring insight to new contexts (S3)

Power of idea is limited by our capacity to see its applications. Our ability to use ideas mindfully enhances our ability to transfer ideas more productively. Practicing ideas and insights by appropriately applying them to new situations facilitates us to organize materials and experiences in different ways, to compare and contrast

alternative labels, to integrate their understanding of different situations and to find fruitful ways to conceptualize novel situations. Each new application of an idea enriches understanding of both the idea applied and the situation to which it is applied.

Focusing more on basic concepts than on artificial organization of material, encourages students to apply what they have just learned to different but analogous contexts. It provides for more than one way to organize material. Using similar information form different situations makes explanations clear. When students master a new skill, or discover an insight, they can be encouraged to use it to analyze other situations. Combine the strategy with independent thinking by asking students to name or find analogous situations.

Students should be encouraged to find analogies between historical events or beliefs and present day actions and claims. Such parallel situations can be compared and insights in to each applied to the other.

When students have learned a scientific law, concept or principle they can enrich their grasp of it by applying it to situations not mentioned in the text. By exploring students understanding of such situations, teachers can discover misunderstandings.

Topic 14: Clarifying issue/ fact/ belief/ claim etc (S4).

The more clearly and accurately an issue or statement is formulated, the easier and more helpful the discussion of its verification. Given a clear statement of an issue, and prior to evaluating solutions it is important to recognize what is required to settle it and before we agree or disagree with a claim, we must understand it clearly. It makes no sense to say "I don't know what you are claiming, but I deny it, whatever it is".

Practicing this helps in distinguishing facts from interpretations, opinions, judgments, or theories. When discussing an issue, teacher can ask students first, "is the issue clear? What do you need to know to settle it? What would someone who disagree with you say?" students should be encouraged to continually reformulate the issue in the light of new information.

To encourage students to distinguish fact from interpretation, for example, the teacher could use questions like the following: Does this description stick to the facts, or is reasoning or response included? Is this something that can be directly seen, or would you have to interpret? What you saw to arrive at this statement? Is this how anyone would describe the situation, or would someone else see it differently? What alternative descriptions or explanations are there?

When a claim is unclear, the teacher can engage the class to discuss questions like:

How can we know whether or not this is true? What would it be like for this claim to be true or false? Do we clearly understand the difference? What evidence would count for it? Against it? Are any concepts unclear? What does this claim assume? What does it imply? Is there a more accurate way to word it? Can it be rephrased? Do the different ways of putting it say the same thing? Why would someone agree with this claim? Disagree?

Reporting: some teachers were found very receptive and able to grasp very quickly. Some are poor and slow to understand the presented thinking tools and thinking strategies; however, through second or third illustration all of them were satisfied with explanation and have reasonably good understanding about each tool and strategy and how to use them. Investigator ensured their understanding through questioning.

4.3 Designing of lesson plans

After completing this task of introduction of different thinking tools, strategies, methods and approaches investigator demonstrated two lesson plans in the subjects, Mathematics and Science and Technology of Std. VII integrating these thinking tools and strategies, methods and approaches which were applicable related to the content. The sampled teachers then after were instructed to design lesson plans in their concerned subjects. This was followed by in depth discussion taking two lesson plans and any modifications suggested by other group members were also incorporated in the developed lesson plan. Lesson plans are enclosed in **Appendix-VI.**

This activity was to ensure whether the teachers were able to link different strategies, methods, approaches to the school subjects which is even may help them to develop creative and critical thinking among them so that they can transact it in their classrooms also as and when needed.