CHAPTER I

INTRODUCTION

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INTRODUCTION

Human beings are active, dynamic, and self-organising systems integrating body, mind, and spirit. They do not acquire idea but create it. Education is the process that facilitates human beings to attain wisdom and personal meaning. As the twenty-first century unfolds to the information highway that has changed the very life of human beings, we are at the verge of a new knowledge scenario that demands, pace and actions in all aspects of education.

Education is regarded as the potential instrument of social change that is thought desirable at a particular point of time. It is intended to bring about social upliftment, political awareness, and promotion of economic growth of the masses in general. Governments of different countries have therefore taken up the responsibility of universalising school education and widening the access to tertiary and technical education. It has been ensured not only in the constitution of most of the countries but also in the international charters of UNO and UNESCO.

“As the 21st century approaches education will become so varied in task and form that it covers all activities that enable
people from childhood to old age to acquire a living knowledge of
the world of other people and themselves” (Kumar, 1999).

All nations have to play equal and contributing role in
‘knowledge creation for the whole of the humanity’ and use it for
human welfare. “The new developments should be used as a
wake-up call for Indian education to restructure itself and get
prepared for playing a more determining role in the race for
knowledge supremacy” (Nair, 2005, p. 277).

The amount of scientific knowledge gathered over the last
couple of decades resulted in knowledge explosion, and can no
longer be disregarded. Science is no longer the concern of select
group of people in a society, it has become a part of every day’s
job of almost every body every where. Considering science from
the intellectual point of view, it is the most inexhaustible
storehouse of knowledge.

Science besides satisfying the intellectual curiosity of man
provides materials and media for intellectual exercise and has
disciplinary effect on the minds of individuals. It develops values
like interest, patience, perseverance, broad-mindedness, positive
outlook, respect for truth, respect for other persons, objective
nature, keenness, concentration of mind etc.
Teaching of science in this circumstance has great importance today than in the past; tremendous progress in science and technology, and interest in science is not that much reflected in the present day science curriculum and school practices. Surely, the faults lie with the curriculum transaction done in our schools, especially in science classrooms.

Science teachers have a crucial role in developing accurate understanding on nature and relationship of science, technology and society. Therefore, the science teacher needs to be familiar with both the products and processes of science in order to develop and impart thorough science understanding.

Present educational processes in our schools pay overriding importance to knowing accepted truths rather than developing capacities for effective and thoughtful actions. We are taught to value certainty rather than doubt, to give quick answers rather than inquire and to know which choice is correct rather than to reflect on alternatives.

The best of the curriculum and the perfect syllabus remain dead unless quickened into life by the right methods of teaching. The prevailing method of teaching science in our schools, depend much on lecture method, confining strictly to the prescribed
textbook, it is often oriented towards controlling rather than learning; rewarding individuals for performing for others rather than cultivating in them natural curiosity and impulse to learn. The aftermath of this kind of science teaching is that, the students neither will develop logical thinking nor will analyse scientific facts, and this way of teaching may only lead them to erroneous conclusions.

Today we are seeking to ground learning in a more authentic environment than that exists in the traditional classroom. Reflection is the search for general principles or rules based on evidence gathered largely from memory. It is the search for possible answers, new questions, and evidence that supports the possible answers.

Many believe that reflection is thinking about what one has done. Boud, Keogh, and Walker (1985) observed reflection as intellectual and affective actions in which individuals engage to explore their experiences in order to lead to new understandings and appreciations. It may take place in isolation or in association with others.

Today researchers have given reflective thinking a much wider meaning, it enables one to focus attention on to ones own
practices to improve the quality of teaching and learning – looking back and making sense of ones practice, learning from this and using this learning to affect his/her future action.

1.1 SETTING TO REFLECTIVE THINKING

Reflective thinking in educational practice can be traced back to the works of John Dewey, when he distinguished ‘routine action’ from ‘reflective action’. Education for him was a continuous reconstruction of living experience. Through reflective thinking, thoughts are made explicit, the quality of experience changes and it becomes reflective practice.

According to Dewey, reflection stems from doubt and perplexity that is felt in a directly experienced situation which then leads one to purposeful inquiry and problem resolution. Central to the process is the paradox that one cannot know without acting and one cannot act without knowing. The foundation of reflective thought is, therefore, to transform a situation in which there is experienced obscurity, doubt, conflict or disturbance of some sort, into a situation that is clear, coherent, settled and harmonious.

Reflective thinking demands attention on both the terms ‘reflection’ and ‘thinking’. Reflection occurs naturally in all
humans; making continual comparisons to the present situations from previous, perhaps similar, to moment decisions. Thinking is a mental activity that helps to resolve doubt about what to do and what to believe. Thinking about what to do is decision making, and thinking about what to believe is part of learning.

We act daily based upon our life experiences, the purpose of reflection is to uncover to ourselves habits, blockages, ways of responding, internal dialogue, mental constructs that we take advantage of for our moment to moment decisions. Learners are able to look outwardly and introspectively, develop abilities to understand implications of decisions and actions, acquire more immediate insight into personal learning process and determine effectiveness based on comparison with previous experience or impact.

Reflective thinking strategy of teaching, do not seek to explore the superficial or the obvious; do not strive for the facile land of opinion, judgment, or passion. It seek the deeper road challenging learners, to hypothesise, question, analyse, synthesise, test and validate their ideas and, to engage their instincts in intellectual risk-taking that result in real and fruitful learning.
1.2 REFLECTION – FOR A PURPOSEFUL LEARNING

Reflection is an active process of witnessing one’s own experience in order to explore it in greater depth; this can be done in the midst of an activity or as an activity itself. By developing the ability to explore and be curious about our own experiences and actions, we suddenly open up the possibilities of purposeful learning. It is the process of one’s purposeful and conscious activity to monitor, analyse and evaluate one’s own learning in terms of learning goals.

In reflective thinking strategy of teaching, education is nothing but learning to LOVE - learning to Listen; learning to Observe; learning to Visualise; and learning to Evaluate; - one’s own learning in terms of learning objectives.

Reflective thinking involves retrospection as well as anticipation. According to Dewey (1933), “the closer the process of reflection moves towards a resolution of the problem, the more critical it becomes to examine the past events and experience” (p.64).

In other words, reflective thinking strategy is an attempt to make our students actively participate, and give their own opinion by way of thought process. This is not an easy task but it
is a goal that most teachers would like to emulate and there are many means for motivating students to actively engage in classroom activities by the practice of reflection.

1.3 NEED AND SIGNIFICANCE OF THE STUDY

The efficacy and strength of a country largely depend upon the quality of its educational system. The readily available educational system in our country when compared to standards maintained by many other nations seems to be deteriorating day by day. A passive type of teaching-learning takes place in our schools. The existing educational system has reached its limits given the time constraint, the nature of curriculum and the crowded classes. Since learning and teaching take place in a complex system, introducing technology to this system can result in ripples of change that reaches far into the corners of the system.

In this world of innovations and information-explosion, education too has to change accordingly for its praiseworthy existence. Educational management and the teachers have the key responsibility of designing the learning system and environment, by expanding and redefining educational activities for new questions, possible answers, and evidences that support
the possible answers. Here emerges the need for finding out new ways and means to make our schooling lively and to ensure active participation of students in the teaching learning process to equip them for the ever-changing knowledge scenario.

These days the prime motto of education has swing from ‘information transfer’ to ‘human resource development’; all teachers and students are faced with new challenges - teachers are expected to prepare for greater professionalism and students to prepare for a life in a competitive globalised world order. Nair, 2005, rightly observes that:

The emerging new education is one which is developed around the core belief that teacher performance has the power to make a profound influence on their students’ lives. This amount to saying that it is the quality of teaching which a student gets during his schooling has a determining role on his behaviour as a human being. (p. 274)

Science and technology are commonly signified today as channels of wide spread destruction, annihilation, and extermination of human race. Even technology applied to education very often does not indicate a positive trend. The
nature of educational technology seems rather rigid, adopting a very formal approach and serving a limited purpose. Here emerges the need of finding out new ways and means to make our schooling lively and our students’ active in the classrooms.

Science classes expect good teaching learning materials for its better transaction. The reflections and radical efforts of the investigator in finding out an alternate and easy way of practice in our science classes culminated in the present study. This study is a passionate effort to make it evident that reflective practice in education is highly relevant and appreciable in our classrooms.

The present study intended to develop practices on classroom reflections. Reflection can occur before, during or after a lesson. Reflection on what has been learnt from experiences can be used to enlighten current planning. According to Schön (1983) reflection during the lesson is called ‘reflection in action’ and reflection after the lesson is called ‘reflection on action’. The former occurs during our interaction with learning experiences and situations and the latter occurs after the event when we look back on what has happened.

The study is an innovative endeavour, which attempts to fuse the different forms of reflections to structure continuous
cycles of reflection-and-action, for creating a simple but meaningful and authentic teaching-learning practice suitable for our secondary schools. This reflective thinking strategy of teaching expects to enhance an active and purposeful learning situation for better achievements.

1.4 STATEMENT OF THE PROBLEM

The present study aims to experiment the reflective thinking strategy of teaching, and measures its impact on certain cognitive and affective variables among secondary school students. Therefore, the topic selected by the investigator for the purpose is entitled as \textit{“EFFECTIVENESS OF REFLECTIVE THINKING STRATEGY OF TEACHING ON CERTAIN COGNITIVE AND AFFECTIVE VARIABLES AMONG SECONDARY SCHOOL STUDENTS”}.

1.5 DEFINITION OF KEY TERMS

Effectiveness

It is the use of plan for instruction or presentation, which causes a desired change in the learners’ behaviour (Good, 2006). In the present study, effectiveness means significant difference in the performance of students in terms of certain cognitive and affective variables.
Reflective thinking strategy of teaching

Reflective thinking strategy of teaching in this study means a purposeful and conscious activity to make one listen, observe, visualise and evaluate one's own learning in terms of learning goals by maintaining motivation and building deep understanding through interaction with peers and teachers. It aims at creating new perspectives in learning that leads to improved teaching-learning process and performance.

Cognitive Variable

‘Cognitive variable’ designates intellectual traits or characteristics that relate to knowledge acquired by reasoning and perception. Achievement and metacognitive awareness are the two cognitive variables selected for the present study.

Affective Variable

‘Affective variable’ denotes psychosomatic traits or characteristics that relate to emotion produced by insight and way of thinking. Innovative attitude and fear of success are the two affective variables selected for the present study.

Secondary School Students

Secondary school students are students studying in VIII, IX and X standards of high schools.
1.6 OBJECTIVES OF THE STUDY

The present study aimed to achieve the following objectives.

I. To prepare ‘lesson transcripts’ based on reflective thinking strategy of teaching – chemistry – at secondary school level.

II. To prepare ‘reflective thinking tool’ to support the reflective thinking strategy of teaching – chemistry – at secondary school level.

III. To find out the effectiveness of reflective thinking strategy of teaching on certain cognitive variables among secondary school students.

1. To compare the effectiveness of reflective thinking strategy of teaching with that of conventional method of direct instruction in terms of ‘achievement in chemistry’ among secondary school students.

2. To compare the effectiveness of reflective thinking strategy of teaching with that of conventional method of direct instruction in terms of ‘metacognitive awareness’ among secondary school students.

IV. To find out the effectiveness of reflective thinking strategy of teaching on certain affective variables among secondary school students.
1. To compare the effectiveness of reflective thinking strategy of teaching with that of conventional method of direct instruction in terms of ‘innovative attitude’ among secondary school students.

2. To compare the effectiveness of reflective thinking strategy of teaching with that of conventional method of direct instruction in terms of ‘fear of success’ among secondary school students.

V. To verify whether the reflective thinking strategy of teaching is equally effective on the performance of secondary school students with different levels of creativity.

1.7 HYPOTHESES OF THE STUDY

The hypotheses formulated for the present study are:

1. Achievement in cognitive variables among secondary school students taught through reflective thinking strategy of teaching is higher than that of students taught through conventional method of direct instruction.

2. Achievement in affective variables among secondary school students taught through reflective thinking strategy of teaching is higher than that of students taught through conventional method of direct instruction.
3. Reflective thinking strategy of teaching is equally effective on the performance of pupils with different levels of creativity.

1.8 METHODOLOGY IN BRIEF

The present study aims to test the effectiveness of reflective thinking strategy of teaching over conventional method of direct instruction in secondary schools of Kerala, with special emphasis on certain cognitive and affective variables at secondary school level.

To realise the objectives of the study, experimental method with a non-equivalent pre test – post test design is employed.

For the collection of data, the present study makes use of six intact classroom groups, one experimental and one control group each from three schools by random procedures, in order to get an adequate sample.

Following tools are employed for the study: (1) Lesson transcripts on chemistry of standard VIII following reflective thinking strategy of teaching and conventional method of direct instruction; (2) Reflective thinking tool; (3) Achievement test in chemistry; (4) Metacognitive awareness inventory; (5) Test on
innovative attitude; (6) Test on fear of success; and (7) Test on creativity.

In the present study, the effects of reflective thinking strategy of teaching and conventional method of direct instruction are measured by means of the scores of students in two categories of variables cognitive and affective. Therefore, the reflective thinking strategy of teaching and conventional method of direct instruction is referred to as the independent variables. The dependent variables are under two heads - cognitive and affective; students’ achievement in chemistry and metacognitive awareness are considered under cognitive variable, and innovative attitude and fear of success are considered under the head affective variable.

A pre test is administered to all the groups of students as a measure of the dependent variables. Two units of chemistry at standard VIII are introduced to the experimental and control groups respectively using the reflective thinking strategy of teaching and conventional method of direct instruction. After the instruction, both experimental and control groups are subjected to the post test to measure the same dependent variables. The difference between the mean pre test scores and post test scores are found for each group and the significance of the difference of
the means is checked with the help of appropriate statistical procedures.

1.9 SCOPE OF THE STUDY

The study conducted intended to evolve a new instructional strategy to teach science. The study proves the effectiveness of a new, efficient, and simple strategy of teaching, the reflective thinking strategy of teaching over conventional method of direct instruction on certain cognitive and affective variables.

This study is a step to prove usefulness of reflective thinking practices in our schools. Practicing of reflective thinking in school works would help in pupils’ development; reflecting on ones own learning practices would help them in future to learn experiences in life – by listening; observing; visualising; and evaluating life experiences.

In the midst of the new generation students, teachers feel challenged and are forced to device new ways to make students active in the classrooms. Reflective thinking strategy of teaching is an answer to the problem faced by the present day teachers, because this strategy offers teachers ways to make students active in the learning process.
Reflective thinking strategy of teaching helps pupils to understand their own thought processes and the ways through which each one learn. This strategy helps students understand that learning is learning to learn; thus the reflective thinking strategy of teaching helps in improving their learning and in enhancing their performance.

The findings of the study would assist teachers to make students understand the process of learning and help students learn how to learn. The study is likely to help teachers adopt proper curriculum transaction at secondary level.

The findings of the study would be of great help for administrators in reorganising the prevailing practices in the process of instruction at the secondary level. It would prove useful for curriculum planners on selection of appropriate strategies and content at some point in curriculum revisions. The study focused much on the classroom teaching and it would be of great help to those who are in search of reflective classroom practices.

The study will be useful for all those who are interested in thought processes in the field of education – curriculum planners, administrators, researchers, teachers and students.
1.10 LIMITATIONS OF THE STUDY

Even though necessary steps were taken to make the study precise and objective as possible, certain shortcomings might have crept into the study. Considering the constraints the study has to be limited to the following:

- The investigator has to confine the selection of cognitive variables to achievement and metacognitive awareness, and affective variables to fear of success and innovative attitude, to make the study feasible in the limited time.

- The study was limited to VIII standard students of three high schools of Kerala due to practical difficulties.

- The study was limited to two units in chemistry, of standard VIII because of time constraints.

- In the present school situation, it is practically impossible to upset class schedule to gather subjects for obtaining large sample so the treatment was employed to a sample of only 260 students.

- To reorganise classes in order to employ randomisation procedures for getting equivalent experimental and control groups is difficult in our schools, therefore non-equivalent pre test – post test group design was selected for the study.
Despite of the aforesaid limitations all possible efforts had been made by the investigator to make the study a reliable one.

1.11 ORGANISATION OF THE REPORT

The study culminated in the presentation of a consolidated research report consisting of six chapters. They are:

**Chapter I:** Highlighting the significance of reflective thinking strategy of teaching, presents the reason for selecting the present problem, definition of key terms, statement of the problem, objectives of the study and a brief discussion on the scope and limitations of the study.

**Chapter II:** Pours light on reflective thinking practices and the learning theories that support it. The chapter also provides an overview of achievement, metacognition, innovative attitude, fear of success and creativity.

**Chapter III:** Reviews related literature with stress to studies having more proximity with the present one. It provides the researcher an opportunity to justify this endeavor.

**Chapter IV:** Organises details of the design of the study stating the variables, objectives, hypothesis and procedures followed.
**Chapter V:** Details the analysis of the data collected with suitable statistical techniques. The interpretation of the results is also given in this chapter.

**Chapter VI:** Presents summary of the study, its findings in brief, and suggestions as to how best these findings are to be used and offers suggestion for future research.

Bibliography and Appendices are given at the end of the report.