EFFECT OF PQ4R STUDY STRATEGY ON SCHOLASTIC ACHIEVEMENT OF SECONDARY SCHOOL STUDENTS IN PUNJAB (PAKISTAN)

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FOUNDATION UNIVERSITY
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EFFECT OF PQ4R STUDY STRATEGY ON SCHOLASTIC ACHIEVEMENT OF SECONDARY SCHOOL STUDENTS IN PUNJAB (PAKISTAN)

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FOUNDATION UNIVERSITY ISLAMABAD, PAKISTAN
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IN THE NAME OF ALLAH THE MOST MERCIFUL THE MOST BENEFICIENT
DEDICATION

This dissertation is dedicated with depth of my heart and soul to khair u tabein Hazrat Khawaja Awais Qarni R.A. who, in the love of Prophet Muhammad (SAWW), sacrificed all his teeth in prime age.
AUTHOR’S DECLARATION

1. During the period of this registered study in which this dissertation was conducted, the author has not been registered for any other academic award or qualification.

2. The material included in this dissertation has not been submitted wholly or in part for any academic award or qualification other than that for which it is now submitted.

3. Except where otherwise acknowledged in the text, this dissertation represents the original research of the author.

Ruqia Bibi
FORWARDING SHEET

This thesis titled “Effect of PQ4R Study Strategy on Scholastic Achievement of Secondary School Students in Punjab (Pakistan)” submitted by Ruqia Bibi in partial fulfillment of the degree of Doctor of Philosophy in Education under my guidance and supervision is forwarded for further necessary action.

Lt. Col. (R) Dr. Manzoor Hussain Arif
Supervisor
Title of Dissertation: Effect of PQ4R Study Strategy on Scholastic Achievement of Secondary School Students in Punjab (Pakistan)

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Accepted by the Faculty of Education, Foundation UniversityIslamabad, in partial fulfillment of the requirements for the Degree of Doctor of Philosophy in Education.

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Date:
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Ruqia Bibi
ABSTRACT

Title: “Effect of PQ4R Study Strategy on Scholastic Achievement of Secondary School Students in Punjab”

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In teaching learning process, emphasis is laid mostly on teacher centered approach, whereas it is responsibility of learner to learn the material. Teacher’s job is to teach the students learning methods and strategies. Cognitive psychologists emphasize to use the cognitive and metacognitive strategies for learning. There is a variety of study strategies being used in the West, to understand, store, retrieve and use information. PQ4R study strategy is one of them. However, in Pakistan, no evidence could be found in the area of research regarding this study strategy. The present study was an attempt to investigate the effect of PQ4R study strategy on scholastic achievement of secondary school students in the subject of Pakistan Studies.

The accessible population of the study was 10th grade girls students studying in Govt. Girls Secondary Schools in District Rawalpindi. The sample school was selected out of 121 schools of District Rawalpindi through random sampling, and a sample of 104 girl students was randomly selected out of 390 girls students studying in the school. It was a pre-test post-test control group design of study which involved two variables. The independent variable was the PQ4R study strategy and the dependent
variable was the scholastic achievement of students. The main objectives of the study were to measure the scholastic achievement of students at secondary school level before the experiment, to expose the experimental group to PQ4R method of study, to teach the control group through traditional method without using PQ4R method, to measure the scholastic achievement of experimental group and control group after the treatment, to compare the scholastic achievement of experimental group and control group after the experiment and to compare the scholastic achievement of high achievers and low achievers of experimental group and the control group after the treatment.

The high achievers and low achievers were identified by using first and third quartiles. The data collected through pre-test and post-test were summarized through the use of measures of central tendency and variability. Significance difference between both the comparison groups in pre-test and post-test was analyzed by using $t$-test at 0.05 level of confidence. How the comparison groups were alike and unlike each other was analyzed through overlapping between the two.

The Study results indicated that PQ4R was any effective study strategy that improved the scholastic achievement of students. Both the high achievers and low achievers improved in their scholastic achievement, however, high achievers took more advantage than the low achievers. These results are in line with the results of some previously conducted research studies such as Salim (2010); Rahim, et al. (2010); Bagherpour, Abdollahzadeh and Valipour (2009); Rodil (2009); Lee (2004); Ping (2000); Katayama and Robinson (2000); King (1992) and Faryal (2005). Teachers are recommended to teach the students the use of PQ4R learning strategy while teaching the content, students are recommended to use this strategy while studying the material. Curriculum designers are suggested to use this strategy in designing the curriculum, and this is much neglected but rich area for future researchers.
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CHAPTER 1

INTRODUCTION

Education is a teaching learning process (Alam and Ali, 2008, p. 69). In the view of Hussain et al. (2003) “education is a process necessary for the creation of a sound mind in a sound body (Aristotle), a process of all those activities in the individual which enables him to control his environment and fulfill his possibilities” (p. 185). It is a means to develop the natural potentials of a person in the conformity with the demands of society. Ali (1993-94, p. 127) holds that the role of education is very important for national development and reconstruction of a country. Ryan (2004, p. 4) maintains that the process of education continuous from birth to death which is characterized by sequential development and change. Khalid (1996, p. 52) describes education as a productive activity and a real asset essential for the development and progress of a nation.

Rise and fall of nations depends on the quality and quantity of education because education is a power (Bux, 2005, p. 15). The end product of education is learning that includes both formal and informal learning. Informal learning occurs from entire universe and formal learning takes place in schools. Promoting intellectual development in schools is essential, so that all children can get opportunity to become rational human beings (Ryan, 2004, p. 8). This responsibility in schools lies on teachers to make their teaching effective by performing the complex activity of teaching in order to promote learning of the students.

Undoubtedly, teaching is a process of stimulating, directing, guiding and evaluating the learner (Masrur and Alam, 2000, p. 74). If learning situation is distasteful
to the students, then teachers are, probably, doing a disservice to students, to the content, and to themselves (Ullah, 2001, p. 88). Teaching emerges from the whole personality of the teacher. Methods and techniques of teaching come easy to those who seek themselves as a means to the expression of what is within (Masrur and Alam, 2000, p. 74).

According to Anyon (2001) “realistic expectations that education will make a substantial, positive difference in the lives of their students motivate teachers to higher level of performance” (p. 53). It is evident that high schools perform crucial role in modifying the student’s strengths and needs. The cornerstone of the school is the uniqueness of each child. By focusing on the individual child, the school runs the risk of preparing self-oriented, highly individualistic students. The teacher may have ability to perform the complex activity of teaching in the areas of the classroom environment, instruction, planning and preparation, and professional responsibilities (Ryan, 2000, p. 155).

Teaching is an interactive process that involves four aspects; learner, teacher, learning process and learning situation. The responsibility of teacher is to create the learning situation. The process of learning is the interaction between the learner and the teacher (Aggarwal, 1995, p. 434). Giovannelli (2003) holds that “teaching is full of problematic situation – classroom management, individual differences, relationship with colleagues and administrators, instructional issues, societal pressure, and moral dilemmas. The teacher should be technically competent, reflective and self-critical” (p. 295). The teacher must be capable to select the most suitable technique or strategy from his repertoire. Effective teaching strategies and the design of instruction concentrate
upon the requisite skills for teaching which successfully facilitates learning (Ullah, 2001, p. 88).

No dynamic teaching is possible without a dynamic teacher. So, effective teachers are known through their effective and qualitative teaching (Sultana, 2005, p. 111). Above discussion proved that teaching is an artistic and strategy based activity which will facilitate learning. The Holy Quran’s system of teaching is fundamentally based upon strategy, intellect and wisdom, gives the clues about multiple teaching strategies, i.e. in its 14th part, Sura An-Nahl, verse No. 125 states “(O beloved Prophet!) call to the way of your Rubb (sustainer) with wisdom and good advice and agree with them in a way that is the best”.

The Holy Prophet Hazrat Muhammad (Sallallah-o-Alaih-iWasallam) has also stressed upon the effective use of strategy and adequate planning. In this sense, Hazrat Ans (May Allah be pleased with him) reports his Holy Hadith (Sharh-u-Sunnah, Mishkaat: Bab-ul-Hazr wat Tanee, Hadith No. 2010):

“Do your work after well and thoughtful planning” (Ullah, 2001, p. 92).

Along with the effective teaching strategies, the skilled teacher must know the diverse characteristics of learners. He must understand the students as learners (Reddy, 2006, p. 42). It is required that students should take full part in the learning process, because they have to explore and question the experiences that they encounter in the classroom and beyond (Ground water Smith et al. 2003, p. 4). Now, education is supposed to be child centered, and the teaching learning process should be aimed at all round development of the child (Sultana, 2005, p. 112). However, there is no correct
way of teaching, no one specific set of skills, techniques and procedures that one masters and applies mechanically (Sher, 2002, p. 109).

Any discussion of teaching must involve a discussion of learning (Feden, 2003, p.13). Learning is defined as a process of bringing about relatively permanent changes in the behaviour (Mangal, 2005, p.175). Learning is a process of behavior modification, it is growth through experiences. It is improvement in efficiency of adjustment as a result of practice, insight, observation, imitation and conditioning. It is purposeful, intelligent and creative (Mahmud, 2004, p.69). Learning is an active, constructive and purposive process dependent on the mental activities of the student (Sher, 2002, p.110). Different types involve in learning, from simples to complex, and concrete to abstract, through which students learn.

To conclude, learning is the result of experience which brings permanent change in the behavior or knowledge of an individual. The role of students in their own learning is major concern of modern psychologists and educators. But different areas of theory and research all converge on one idea that responsibility and ability to learn rests within the student. No one can learn for some one else. Psychologists have tried to through light on the phenomenon of learning and developed various learning theories that are reasoned explanations for various phenomena in education. An understanding of learning theories is crucial to teachers (Parsons et al., 2001, p.204). According to Zhang and Watkin (2001) “there are three approaches to learning: surface, which involves a reproduction of what is taught to meet maximum requirements; deep, which involves a real understanding of what is learned; and achieving, which involves using such a strategy that would maximize one’s grade” (p. 241).
The behaviorists primarily believe on observable and measurable aspects of human behaviour. The major contributors of this approach of learning are Watson, Paulov, Skinner, Thorndike, Bandura and Tolman. They hold that changes in behaviour are result of stimulus response. Approaches of learning which contribute in understanding the process of learning are behavioural learning theories, social constructivist views of learning and cognitive theories of associations. Only the overt behaviours are to inform about what exists in the mind of an individual because the inner experiences are not observable and they cannot be studied scientifically. Classical conditioning, contiguity, stimulus generalization and discrimination, and operant conditioning are the four types of behaviouristic learning theories (Kazdin, 2000, p.35; Nayak, 2004, p.77; Kumar, 2006, p.5; Child, 1995, p.92; Parson 2001, p.240; Huitt, 2006, p.1 and Muhammad, 2004, p.74). They believe all learning occurs within these types.

On the other hand, social constructivist learning theory, renamed as Social Cognitive theory by Albert Bandura, gives importance to culture and context to understand the happening in the society, and the knowledge is constructed on the basis of this understanding. This theory is closely associated with the theories of Vygotsky, Bruner, and Bandura. Social learning theorists maintain that learning through observation and modeling proves to be an effective way of learning many things (Mangal, 2005, p.238; Azam, 2001, p.352; Feden, 2003, p.37; Kumar, 2006, p.13 and Parsons et al., 2001, p.233). Sher (2002) “older cognitive views emphasized the acquisition of knowledge whereas newer approaches (constructivism) stress its construction. The essence of constructivist theory is the idea that learners must
individually discover and transform complex information if they are to make it their own” (p. 45).

Whereas, in views of cognitive theorists, learning is the transformation of significant understanding. It is not simply acquire information from observable behavior and passive influence of environmental situations. Cognitive theory looks at the various aspects of socialization in the wider context of continuing changes in mental process such as thinking and intelligence (Woolfolk, 2004, p.236 and Azam 2001, p.352). According to cognitive approaches, learning is an active mental process to acquire, remember and use information. These theories believe that learning occurs in the result of active attempts of human mind’s to understand the world (Sher, 2002, p.115). According to Woolfolk (2004) “Cognitive psychologists assume that mental processes exist, they can be studied scientifically, and that humans are active participants in their own acts of cognition” (p. 236).

Learner’s previous knowledge is the most important element in learning process. It guides him to a great extent on what to pay attention to, perceive, learn, remember and forget. Propagators of cognitive learning theory are Piaget, gestalt psychologists, Kohlberg, Vygotsky and Bruner. To them, understanding, thinking, memory, cognitive structures and the cognitive processes are characteristics of cognitive theories (Child, 1995, p.99). To understand this phenomenon, the information processing theory involves encoding, retention, retrieval and other processing (Sher, 2002, p.115). The information processing is the work of cognitive psychologists that helps students to organize their learning, to relate new to old knowledge and to facilitate a deeper processing of material. All these processes of learning involve the process of thinking.
Giovannelli (2003) maintains that “teachers must be able to think for themselves and to understand those thought processes in order to teach their students how to think” (p. 294), because it is the individual who learns. Kumar (2006) posits:

It became clear that there was no one method of teaching that ensured successful learning. The researchers therefore turned their attention to the learners, attempting to answer the question, why is it that some learners succeed in learning regardless of the methods used to teach them? They offered guidance to students on how to make themselves better learners. (p. 4)

Through problem solving experiences, children should learn to think strategically while learning (Pape, 2004, p.188). Thinking is the process that transforms the representation of information into new and different ways for solving a problem or reaching a goal (Feldman, 1999, p. 257). According to Buggy (2008) “the way you deal with life depends on the way you think” (p. 33). Higher order thinking includes critical and creative thinking. Critical and creative thinking is needed to make sense of knowledge in any subject area (Fisher, 2008, p. 3). Mangal (2005) says “creative thinker explores new areas and makes new observations, new predictions and new inferences” (p. 362). Logical thinking and reasoning are the domains of critical thinking which involve classification, comparison, sequencing, cause-effect patterning, webbing, analogizing, forecasting, planning, hypothesizing and critiquing (Gelder, 2010, p. 1). Students must have the ability to use their thought processes in learning the information.

In the view of Kumar (2006) “the mechanisms that control ones own thinking and learning are called metacognition (p. 4). Metacognition is thinking about one’s own thinking that involves how effectively one processes information (Parsons et al., 2001, p.422). Faryal (2008) holds “metacognition is the knowledge concerning one’s own
cognitive processes and products. It includes the active monitoring and consequent regulation and orchestration of information processing activities” (p. 83). Too many students fail to think about their own thinking, they do not know what they know which means they cannot control their information processing or their cognitive capacities. The greatest challenge to teachers is to make students able to think and understand, instead of just memorizing; the teachers are concerned to train the students to think for themselves, that is, to use the knowledge they have in order to arrive at further knowledge (Hughes, and Hughes, 2003; Woolfolk, 2004, p.263 and Parsons et al., 2001, p.422). Woolfolk (2004) describes that “metacognition is awareness of people about their own cognitive machinery and how the machinery works. It literally means cognition about cognition or knowledge about knowledge and learning. This metacognitive knowledge is used to monitor and regulate cognitive processes such as reasoning, comprehension, problem solving, learning and so on” (p. 256).

Metacognition often takes the form of strategies (Kumar, 2006, p.4). These strategies help the students become self regulated learners. If students themselves do not pay attention, it means they did not learn (Szeto, 2010, p.3). Learners must have the ability to organize and regularize their learning on their own. Passive position of students and doing much of the cognitive work by the teacher may prevent them from asking or even thinking of questions (Woolfolk, 2004, p.444). Self regulated learning requires students to be aware of their own thinking processes and learning strategies (Taylor & Jenkins, 2000, p. 66). It is more helpful to make the students self regulated learners and engage them in enhancing their own capabilities. Bloom’s taxonomy suggests making the students able to learn and, also exploit their interest to improve
their capability level. Teachers must search for reading strategies to facilitate students learning (Nabeel & Liaquat, 2009, p.100). Academic competence is related with the information and implication of effective study skills. Intelligent learners at all grade levels may face difficulties in school because the lack of good study skills not because they lack capabilities (Gettinger et al., nd. p.2). Kiewra (2002) holds:

Students can learn how to learn when they are taught strategies in the context of subject matter. Instructors can teach the students how to learn by embedding strategy instruction within their content courses. Good strategy instructors must know two things (a) which strategies are effective and (b) how to teach them by embedding strategies instruction into content teaching. (p. 71)

A research study indicated that text comprehension strategy instruction guides learners learn the usage of text headings, subheadings, introductions and summaries which helped students perform significantly higher on texts (Oney, 2003, p.1978). Learning strategies are techniques, principles, or rules that will facilitate the acquisition, manipulation, integration, storage and retrieval of information across situations and settings. Several experts suggest that students should become efficient readers (Khattak and Khan, 2002, p.29) because reading is basic strategy for all academic areas, and good comprehenders are strategic readers (Simon, 2010, p.1). Reading is an intricate activity that involves perception and thought. It is the interactive procedure that needs the usage of prior information, and rebuilds the message the author desires to convey (Nabeel & Liaqat, 2009, p. 99; Jaleel, 1992, p.71). In the view of Nassaji (2003) “reading is a multivariate skill involving a complex combination and integration of variety of cognitive skills” (p. 261). This idea is supported by Senechal (2002) that “learning to read is a complex process that
involves a variety of skills and abilities (p. 445). Speed, comprehension, and recall are the three important components of reading. Comprehension and recall are specially interrelated (Fry 2003, p.14, 25). Regardless of whether the skill is related to identifying main ideas, determining meaning from the context or improving reading speed, the students should focus on reading skills which are most important for them (Khattak and Khan, 2002, p.29).

Research Studies demonstrate that surface approaches to learning are associated with poor academic results and its users are extrinsically motivated whereas the students who used higher order cognitive strategies were reported to be intrinsically motivated in learning. As a result, they out-performed in the given tasks (Kirby and Silvestri et al, 2008, p.85). Study skills improve the achievement level of students (Ormrod, 1998, p.362).

Most of the students at secondary school level fail to obtain good grades because teachers teach their students through traditional method. Students are unable to pick key concepts and cannot understand ideas in the text material. As a result, they fail to achieve the learning goal. A great number of learning strategies and skills are there for use. Cognitive and metacognitive strategies are proven strategies for deep understanding and learning. Some of the specific organizational skills, cognitive and metacognitive strategies are for example, note taking, skimming, organizing, elaborating, summarizing, retrieving relevant prior knowledge, monitoring comprehension, and some general reading strategies are KWL strategy, IDEAL, Testing, PRSR, READS, SQRQCA, SQ3R and SQ4R strategies.
The research studies conducted on some of the above specific study strategies like note taking, questioning, summarizing and elaborating etc. found positive effect of these skills and strategies on scholastic performance of students at primary or college level. But little research appears to have been conducted on the effectiveness of PQ4R strategy of learning at secondary school level students. The PQ4R study strategy encompasses almost all other study strategies in it, a new method being exercised in the West. The present study was an effort to examine the effect of PQ4R study strategy on students learning and achievement in Pakistan.

1.1 STATEMENT OF THE PROBLEM

The present study was therefore designed to investigate the effect of PQ4R study strategy on scholastic achievement of secondary school students in the subject of Pakistan Studies.

1.2 OBJECTIVES OF THE STUDY

The objectives of the study were:

1. To measure the scholastic achievement of students at secondary school level before the experiment.
2. To expose the experimental group to PQ4R method of study.
3. To teach the control group through traditional method without using PQ4R method.
4. To measure the scholastic achievement of experimental group and control group after the treatment.
5. To compare the scholastic achievement of experimental group and control group after the experiment.
6. To compare the scholastic achievement of high achievers and low achievers of experimental group and the control group after the treatment.

7. To give recommendations in the light of the results.

1.3 HYPOTHESES OF THE STUDY

Following were the research hypotheses of the study:

1. There is significant difference between mean scholastic achievement scores of experimental group and mean scholastic achievement scores of control group before the treatment.

2. There is significant difference between mean scholastic achievement scores of experimental group and mean scholastic achievement scores of control group after the treatment.

3. There is significant difference between mean scholastic achievement scores of high achievers in experimental group and high achievers in control group.

4. There is significant difference between mean scholastic achievement scores of low achievers in experimental group and mean scholastic achievement scores of low achievers in control group.

The above research hypotheses were tested through the following null hypotheses:

1. There is no significant difference between the mean scholastic achievement scores of experimental group and mean scholastic achievement scores of control group before the treatment.
2. There is no significant difference between mean scholastic achievement scores of experimental group and mean scholastic achievement scores of control group after the treatment.

3. There is no significant difference between mean scholastic achievement scores of high achievers in experimental group and mean scholastic achievement scores of high achievers in control group.

4. There is no significant difference between mean scholastic achievement scores of low achievers in experimental group and mean scholastic achievement scores of low achievers in control group.

1.4 DELIMITATIONS OF THE STUDY

The study was delimited to:

i) Govt. Girls High School Kahuta, District Rawalpindi.

ii) Urdu medium students of grade 10th.

iii) Punjab text book of Pakistan Studies for grade 10th.

iv) The PQ4R study strategy.

1.5 SIGNIFICANCE OF THE STUDY

Low achievement of students is constant problem in our system of education. There are many factors that may affect the achievement of students such as IQ level, learning styles, motivation, quality of teaching, family background, and personality factors etc. One of the most crucial factors is the lack of understanding and learner’s passivity in teaching learning process. Often students work very hard, but can remember very little. They are pouring upon the text books for days and nights but gain very little.
In the modern societies, teaching learning cannot be done passively. Aggarwal (1995) says “now the process is to be replaced to a great extent by a process in which the individual learner will take up the challenges through an inevitable intellectual revolution” (p. 434). Students must be the active learners rather than focusing all their energies and efforts on the task of presenting and attaining basic information.

Student’s approach to learning is highly individualistic with a wide range of variations. It is felt that study process could be more productive and fruitful if learners were taught specific strategies and techniques which will provoke thought process in the learners. Literature shows that cognitive and metacognitive learning strategies are the products of mental faculty that generate higher order thinking in students, which help them process knowledge in such a skillful, accurate and rigorous manner that it leads to the most reliable, logical, and trustworthy conclusions, upon which responsible decisions can be made (Evans, n.d., p.1). It is necessary to plan the strategies for use in order to connect previous and present knowledge for the improvement of scholastic performance of students to meet the goals. It cannot be assumed that learners are automatically able to know how to solve the problems, think and analyze critically, and regulate their learning. It is assumed that due to lack of application of particular study strategies, students may fail to acquire the higher level of achievement. Most of the teachers and the learners themselves want to learn about learning.

Powerful and sophisticated metacognitive learning strategies are taught off and on at high school or even college, so students have rarely practice with these powerful strategies. In contrast, students usually discover repetition and rote learning on their own, and lack deep transformation of knowledge and understanding.
Students must cognitively be engaged in teaching learning activity to learn the material. They are required to concentrate their heed to the relevant parts of the substance. For the enhancement of thinking to make the learning stronger, and process the information deeply, the learners invest their efforts for making connections, elaboration, translation, organization and reorganization. The more the practice and processing, the stronger and wider the learning. The need is that learners must be taught metacognitive strategies which would formalize the study process and thereby make it more efficient. This feeling led the researcher to the experiment of PQ4R study strategy.

Therefore, the present study will facilitate the learners in incorporating the above mental functions for the successful learning. Since the related literature reveals that the students can improve their scholastic performance with the use of PQ4R strategy, the result of this study will be beneficial for the students, teachers, parents, curriculum designers and for the common readers to evaluate their learning critically, discover their weaknesses and overcome them. Mere introduction to study strategies is not sufficient for the improvement of the academic achievement. A regular teacher must be fully equipped with study strategies to make the students learn effectively. In this way, the present study will be a milestone for regular teachers to enhance the students scholastic achievement.

Incompetence of reading the text material is the difficulty and a crucial problem of students and common reader. The present study will facilitate the common readers with effective study strategies to improve their reading competence. It is a common practice of Pakistan studies teachers and students to depend simply upon memorization or rote learning which is the basic cause of misconception and fragile knowledge in this
important subject at secondary school level. Due to rote learning, students cannot understand ideas and remain ignorant of the culture and ideological basis of Pakistan. Use of PQ4R study strategy may help students transfer the knowledge into their long term memory, and personalize it for further use and understanding. It is assumed that if PQ4R study strategy is applied on one subject, through practice students will become habitual to use this strategy on other subjects also.

The text books are designed in a way which mostly lead the learners towards rote memorization. To overcome this problem, if the curriculum developers, keeping in view the results of present study, develop and organize the text books material by incorporating PQ4R study strategy, it will lead the students to think deeply and to activate their mental faculties for deep understanding of the text material. The present study will provide a full digest of PQ4R study strategy for the use of students, teachers and common readers. This study will also facilitate the curriculum designers with guidance in how to use PQ4R study strategy in the text material, and how to make students study it by applying this method. In this way the present study will be both beneficial and helpful for the curriculum designers in making the text material understandable for the learners.

In this sense, the methods and results of this research will become real source in the exercise of improving the level of scholastic achievement of students at all academic levels.

1.6 RESEARCH METHODOLOGY

Methodology to conduct the present research study was as under:
1.6.1 Population

Population of the study comprised secondary school girl students studying in grade 10\textsuperscript{th} in the province of Punjab (Pakistan).

1.6.2 Sample

The sample of the study consisted of 104 10\textsuperscript{th} grade girls students studying in Govt. Girls High school Kahuta, District Rawalpindi comprising 52 each in the experimental group and control group. Tehsil kahuta of District Rawalpindi was selected through random sampling, and Govt. Girls High School Kahuta was selected through convenient sampling. Two sections of grade 10\textsuperscript{th} students were also selected through random sampling for the conduct of present study.

1.7 DESIGN OF THE STUDY

The present study was an experimental research. The pre-test post-test control group design was selected (as adopted by Bukhari, 1990, p.99; Best, 2003, p.190 and Gay, 2000, p.392.).

Two variables were involved in the present study, independent variable and dependent variable. The independent variable was the PQ4R study strategy and the dependent variable was the scholastic achievement of 10\textsuperscript{th} grade students in the experimental group.

1.8 INSTRUMENTS OF THE STUDY

Two instruments were used to conduct the present study:

i. The pre-test

ii. The post-test
1.8.1 Development of the pre-test

A 30-item multiple choice test (Appendix A) was developed in the light of cognitive domain of Bloom’s Taxonomy of educational objectives as stated by Feden (2003, p.19) and Shahid (2007, p.115). The test items were developed from the 1st chapter of Punjab Text book of Pakistan studies for class 10th, which the sample students had already studied. The chart of specification for the pre-test is given in chapter 3.

1.8.2 Validity of the pre-test

After preparation, the pre-test was shown to four female teachers teaching in the sample school and two male teachers teaching in Govt. Boys High School to evaluate it. These teachers, who had been teaching the subject of Pakistan studies for 14-20 years, found the pre-test valid and suitable to ascertain the learning achievement of 10th grade students in the above said subject.

1.8.3 Reliability of the pre-test

In order to test the reliability of the pre-test, the test was administered twice with an interval of ten days on 23 girls students studying in grade 10th. However, the students who participated in this test, were not the part of the sample of the study. The achievement scores of both the tests are given in appendix B.

To determine correlation between test and retest scores, Product Moment correlation coefficient was applied. The reliability of the pre-test was found to be 0.87, which, according to Garrett (2006, p.151) is appropriate for an achievement test.
1.9 ADMINISTRATION OF PRE-TEST

After the determination of validity and reliability, the pre-test was then administered on 108 girls students studying in class 10\textsuperscript{th}. On the basis of obtained similar scores, 104 students were matched in pairs comprising 52 students for each the experimental group and the control group. The list of achievement scores of 104 matched and four discarded students is given in appendix E.

1.10 DEVELOPMENT OF POST-TEST

The post-test was also 30 items multiple choice test which was developed according to the cognitive domain of Bloom’s Taxonomy of educational objectives as stated by Feden (2003, p.19). This test included the items from the second chapter of Punjab Text Book of Pakistan Studies for class 10\textsuperscript{th} which was the selected material taught during the experimental teaching to both the groups of the sample. The chart of specification for the post-test is given in chapter 3.

1.10.1 Validity of the Post-test

The test items were discussed with the subject teachers teaching in the sample school and in the boys school. After the exclusion of more than half of the items, the post-test was adjudged to be valid for administration to class 10\textsuperscript{th} in the subject of Pakistan Studies.

1.10.2 Reliability of the post-test

To determine the reliability of post-test, the test was administered two times with the interval of 10 days on 15 students studying in class 10\textsuperscript{th} who were not the part
of the sample students of the study. A list of achievement scores in both the tests is given in appendix D.

In order to determine the reliability of the post-test, Product Moment correlation coefficient was applied, which was found to be 0.91, highly appropriate for an achievement test (Garrett, 2006, p.151).

1.11 ADMINISTRATION OF THE POST-TEST

At the end of the experimental teaching, a 30 items post-test (Appendix C) was administered on both the experimental and control groups collectively at the same time.

1.11.1 Scoring of the post-test

The researcher herself collected, checked and marked the answer sheets of both the experimental and control groups. A list of achievement scores of experimental group and control group is given in appendix R, S.

1.12 ANALYSIS OF DATA

The data collected through the measuring instruments was analyzed and interpreted by using the appropriate statistical techniques as follows:

1. The answer sheets of subjects in both the pre-test and post-test were marked.

2. The obtained scores (ungrouped data) of subjects in the pre-test and post-test were converted into grouped data in the form of frequency distributions.

3. To compare the scholastic achievement of experimental group and control group, measures of central tendency (mean, median) and measures of
variability Q1, Q3, SD. Variability and overlapping were calculated on both the pre-test and post-test scores.

4. Significance of difference between both the comparison groups in pre-test scores and post test scores was determined through the use of t-test at 0.05 level of confidence.

5. To identify the high achievers and low achievers in both the comparison groups, students scoring above Q3 in the pretest were classified as high achievers and those below Q1 were classified as low achievers.

6. The scholastic achievement of high achievers in the experimental group and in the control group was compared after the treatment by using t-test to judge the effect of PQ4R study strategy.

7. The t-test was also used for the comparison of scholastic achievement of low achievers in the experimental and control groups after the treatment to determine the impact of PQ4R study strategy on this category of subjects.
CHAPTER 2

REVIEW OF RELATED LITERATURE

The present study was conducted to find out the effect of PQ4R study strategy on scholastic achievement of students at secondary school level. This chapter mainly deals with the characteristics, dimensions and implications of teaching and learning process, the usage of study strategies, and the research studies previously conducted on study skills/strategies.

2.1 TEACHING

Teaching is considered as an art and science and it is not simply to impart knowledge but to help students learn to acquire it (Sher, 2002, p. 109). Successful teaching needs both the science and the art of skillful experienced practice. As a science, a teacher may have research knowledge of research which can effectively be applied to teaching situations. But the teaching will still remain an art (Santrock, 2004, p. 7). According to Masrur and Alam (2000, p. 75), the art of teaching demands nothing more than the skillful arrangement of time, of the subject matter taught and the method of teaching. In the view of Bux (2005, p. 16), the quality and level of excellence in education depends on the quality and competence of teacher. Teaching offers a bright and rewarding career for those who can meet intellectual and social challenges of the job. However according to Nabeel and Liaqat (2009, p. 99) in our country, teachers use most commonly the traditional method of teaching. Students read the lesson without understanding. The purpose of teacher is to complete the course within short span of time. Santrock (2004, p.124) argues that students tend to learn passively, and memorize information by rote. Unluckily, some teachers believe that memorization is learning
(Woolfolk, 2004, p.295). As a result, according to Feden (2003, p.14), students learn superficially that is forgotten easily. At best, this fragile knowledge becomes an isolated bit of information that is virtually unusable when students go about trying to build new knowledge upon it or when they attempt to solve a novel problem by applying it. Arends (2007) explains:

> The task of teaching is simply too important and complex to be handled entirely by parents or through the informal structure. Modern society needs schools staffed with expert teachers to provide instruction. As experts and professionals, teachers are expected to use best practice to help students learn essential knowledge, skills and attitudes. (p. 7)

Teaching is a complex and challenging process, an interpersonal and interactive activity to facilitate learning. It is a connection between the students learning and teacher’s aim about what they should learn. The art of teaching is the emanation of scientific knowledge and personal skills that helps in decision making and problem solving.

### 2.1.1 Effective Teaching

Because of the complexity of teaching and individual variation among students, effective teaching is not like the one-size-that-fits-all. Teachers must have mastery of a variety of perspectives and strategies, and flexibility in their implementation Santrock (2004, p.8).

Aggarwal (1995) maintains that “the aim of teaching learning is not the acquisition of knowledge alone. It is the awakening of curiosity, the stimulation of creativity, the development of proper interest, attitudes and values and the building of essential skills for independent study” (p. 434). The job of teaching is affected by the personality of teacher.
According to Ryan (2004) “teacher’s personality is the most critical factor for effective teaching. If teachers have warmth, empathy, sensitivity, enthusiasm and humor, they are much more likely to be successful than if they lack these characteristics” (p. 151). As Bahman (2008, p.13) describes, empathetic teaching can have great benefits to both the teacher and children. Ryan (2004, p.151) is of the opinion that a competent teacher has theoretical knowledge about learning, teaching, and behaviors and attitudes of human being which foster learning, repertoire of teaching skills, personal practical knowledge, and knowledge of subject matter. Instructional and decision making strategies for planning the instruction, implementing and evaluating are the specialized characteristics of an effective teacher to make teaching effective.

2.1.2 Command on Subject Matter

Effective teachers have full hold on the subject matter. He must have thoughtful and flexible conceptual understanding about the subject matter which is inevitable to be an effective teacher. Knowledge of subject is not only knowing the facts, general concepts and terms but it includes information regarding organizing ideas, connection among ideas, way of thinking and arguing, patterns of change within a discipline, beliefs about discipline and ability to carry ideas from one discipline to another (Santrock, 2004, p.8).

Prospective teachers need to understand the content of the subject they teach. Three important components contribute the teacher’s content knowledge. First, teachers need understanding of the subject to analyze and convey its logic, possible uses and social biases. Second, the teacher must understand the school curriculum that pupils are expected to know. Third, an effective teacher must have pedagogical content knowledge because he has to present blending of content to the learners with diverse abilities and
interests to understand new topics and problems. The skilled teacher draws on the most powerful analogies, illustrations, explanations, examples, and demonstrations to represent and transform the subject so that the students can understand. Three types of knowledge: discipline content, curriculum content and pedagogical content are essential for effective teachers (Ryan, 2004, p.59).

Daily demands of teaching are multi-task which simultaneously require one to not only have planned well on the one hand but also to be flexible and able to think on one’s feet on the other. The ability and skill to enthuse and motivate students to cope with multitask, group oriented activities as well as individual activities are not merely desirable, they are essential attributes and skills (Rogers, 2006, p.130).

The teachers need practical techniques and skills to cope with the problems faced by students.

2.1.3 Effective Teaching Skills

A profound difference is there between knowing the things and doing them. No individual teacher can rely solely on knowledge of subject matter. All prospective teachers need to develop a repertoire of teaching skills to use in varying classroom situations (Ryan, 2004, p.165). In the views of Masrur and Alam, (2000, p.75), effective teaching skills include classroom management, direct instruction, amount of time spent on learning activities, appropriate questioning in facilitating mastery in academic content, emphasizing independent learning, improving higher order thinking skills, and grouping learners for individualized and small group instruction are the key factors of effective teaching and vivid indicators of an effective teacher. For effective teaching, some of essential skills are as follows:

The ability to
• Ask a variety of questions, each must based on different types of thought processes on the part of students.

• Plan learning activities and instruction.

• Diagnose students needs and learning difficulties.

• Vary the learning situation to keep the students involved.

• Recognize when learners are paying attention and to use this information to vary behavior, and possibly, the direction of the lesson.

• Use technological equipment, such as computers to enhance student learning.

• Assess students learning.

  Differentiate instruction on the basis of students interests, experiences, and academic abilities (Ryan, 2004, p.165)

### 2.1.4 Teaching Approaches

Research findings showed associations between different perspectives to teaching and different approaches to learning. Conversely, Bowden (2000) explains “in classes where teachers describe their approaches to teaching as having a focus on what they do and on transmitting knowledge, students are more likely to report that they adopt a surface approach to the learning of that subject” (p. 66). Findings of research studies show that most of the teachers use a mixture of teaching methods (Osborn, 2000, p.134). Creating and maintaining a positive, safe and healthy learning environment must be a top priority for teachers (Bahman et al., 2008, p.19). Any discussion of teaching must also involve a discussion of learning because teaching and learning are the two sides of a coin. Teaching cannot be effective if the learners do not learn effectively.
In determining the occurrence of learning, the work of student is more important than the work of teacher. Fry (1999) holds that “the teacher cannot do all the work if learning is to be the outcome” (p. 33). The teachers who describe their teaching as corresponding to a student focused approach tend to guide students adopt a deep approach to learning in that subject.

On the other hand, according to Bowden (2000):

Teachers who say they take a teacher focused approach to teaching are more likely to have students who say they take a surface approach to learning in the subject. Given the numerous studies that show correlations between students deeper approaches to learning and higher quality learning outcomes, these results demonstrate the importance of attempts to improve the quality of student learning by encouraging higher quality, conceptual changes / student-focused approaches to teaching. (p. 67)

The above statements remind us that students must engage with and take some responsibility for their learning. In the view of Ashman (1997) “if we choose to integrate information processing skills into teaching practice, a change would be required into teaching practice which would involve moving away from teacher centered, domain specific instruction toward student involvement in the teaching learning process” (p. 133).

The learner learns during the process of teaching. If there is no outcome or no change in learners' performance, the act of teaching is useless and mere the wastage of time. As the result of teaching, the learner’s learning is essential. The meaning and concept of learning is needed to understand. Teaching without the knowledge of learner will not be effective. The learner thus becomes the centre of the teaching learning process (Johri, 2007, p.28). The learner’s approaches to learning are therefore closely
related to their views or conceptions of learning. Learning is based on how the students conceptualize learning overall (Bowden, 2000, p.68).

2.2 LEARNING

Learning is one of the most important and an extremely difficult concept to define. The trend in recent years is to accept a definition of learning that refers to changes in observable behavior. Kimble (1961) defines learning as a relatively permanent change in behavioral potentiality which occurs in the result of reinforced practice. Looking at it more carefully, first, learning is indexed by the change in behavior, in other words, the result of learning must always be translated into observable behavior. After learning, learners are capable of doing something that they could not do before learning took place. Second, this behavior change is relatively permanent; that is, it is neither transitory nor fixed. Third, the change in behavior needs not occur immediately following the learning experience. Fourth, the experience must be reinforced; that is, only those responses that lead to reinforcement will be learned. Most of the learning theorists agree that the learning process can not be studied directly; instead, its nature can only be inferred from changes in behavior. Most learning theorists hold that learning is something that occurs as the result of certain experiences and brings changes in behavior (Hergenhahn, 2005, p.3). Experiences play a vital role in shaping the behavior of an individual. These changes in behavior brought about by experience are commonly known as learning. In this way, the term learning, broadly speaking, stands for all those changes and modifications in the behavior of the individual which he undergoes during his life time (Mangal, 2005, p. 170).

Learning is acquiring information; it is a permanent and enduring change in living beings instead of dictated by genetic predisposition, it is also a relative yet
everlasting change in behavior resulting from experience. But for the most part, learning brings change in behavior or it is capacity acquired through practice (Parsons, et.al. 2001, p.206). Reddy (2006) defines learning “as any relatively permanent change in behavior which occurs as a result of practice or experience” (p. 54). Three important elements include in these definitions:

1. Learning is a change in behavior, whether it is better or worse.
2. The change occurs due to experience or practice.
3. Change that occurred due to maturation, growth or injury cannot be called learning.

Mangal (2005, p. 171) narrates that the learning is a process and not a product. It involves all those experiences and training of an individual (right from birth) which help him to produce changes in his behavior. These changes do not necessarily bring about positive development. One has an equal chance to drift to the negative side of human personality. Instead of change in existing behavior or acquisition of new behavior, learning may also result in discontinuance of existing behaviour or acquisition of new behaviour. Learning is purposeful and goal oriented. It is a very comprehensive process which covers nearly all fields of human behavior. It is universal and continuous which involves new ways of doing things. On the basis of native response tendencies like instincts and reflexes, the change in behavior cannot be attributed to learning (Feldman, 1999, p. 184).

2.2.1 Types of Learning

Learning may be classified into a number of categories depending upon (a) the domain or specific area of behavior in which changes are introduced or (b) in term of the methods and techniques that are employed for the introduction of behavioral
changes. In the former criterion, learning can be classified as verbal learning, learning of motor skills, affective learning and cognitive learning. In term of latter criterion, learning may be characterized as trial and error learning, classical conditioning, shaping, learning through generalization, learning through discrimination, serial learning, associated learning, insightful learning and so on. Learning has been classified into the following types:

1. **Motor Learning**

   Motor learning refers to the acquisition of skills involving movement (Johri, 2007, p.142). Acquisition of various skills through such learning helps in acquiring speed and accuracy in the field of operation of these activities and creates a sort of confidence in the learner to perform with ease and satisfaction (Mangal, 2005, p.176).

2. **Verbal Learning**

   It involves facts, names, principles and generalizations (Kyriacou, 2005, p.22). This type of learning helps in acquisition of verbal behavior. Rote learning and rote memorization is also included in verbal learning. Signs, pictures, symbols, words, figures, sounds and voices are employed by the individual as essential instruments for engaging in the process of verbal learning (Mangal, 2005, p.175).

3. **Insightful Learning**

   In a typical insightful situation, a problem is posed, a period follows during which no apparent progress is made and then the solution comes suddenly (Johri, 2007, p. 144).

4. **Whole or Part Learning**

   In past, the part method was popular but later the whole method proved to be more effective. In part method, a longer topic is learnt in parts which makes the learning
mechanical and the learner goes from the root or basic point of the subject. Correlation is not established among the various points of discussion. In whole method of learning, stress is laid upon the totality of the viewpoint. The intelligent students prefer whole method whereas students of lower intelligence adopt part method to memorize a material through rote learning (Reddy, 2006, p.78). Teacher must judge from his experience where to use whole or part learning (Child, 1995, p.103).

5. **Serial Learning**

In the serial learning, material is presented in serial order. The items presented in the start of the list and at its end are easier to remember than those in the middle (Mangal, 2005, p.176). This method of learning is explained by Johri (2007, p. 148) that the subject will be required to learn the list by going through it in the same order.

6. **Paired-associate Learning**

In this kind of learning, a particular stimulus is associated with particular response. The subject must be able to give out the correct response on being given the stimulus concerned (Johri 2007, p. 148). Learning tasks are presented in such a manner that they may be learned by reason of their associations (Mangal, 2005, p.176).

7. **Latent Learning**

Latent learning in the view of Johri (2007) “occurs without reinforcement of particular responses and seems to involve changes in the way information is proposed” (p.144).

8. **Concept Learning**

According to Mangal (2005, p. 176), a concept in the form of a mental image denotes a generalized idea about things, persons or events. The formation of concepts on account of previous experience, training or cognitive processes is called concept
learning. Kyriacou (2005) explains that “the concept is a cognitive function. The mental processes involved in this learning include strategies for attending, thinking, memorizing, and dealing with novel problems” (p. 22).

9. **Problem Solving**

Johri (2007, p.145) maintains that in the hierarchical order of learning and acquisition of behavior, problem solving learning denotes a higher type of learning. Though this does not guarantee that a solution to the problem can be found, it reduces the problem to manageable proportions. Mangal (2005) maintains:

> This type of learning requires the use of the cognitive abilities like reasoning, thinking, the power of observation, discrimination, generalization, imagination, the ability to infer, draw conclusions and try out novel way and experimenting etc. An individual may be motivated to reach an unknown target, or to unfold the mystery of an unresolved problem. (p. 176)

It is this type of learning which has essentially enabled human beings to contribute significantly to the progress and improvement of society.

10. **Schematic vs Rote Learning**

Schematic learning, using organizations of past actions which become the seed bed for interpretation and development in future learning, is thought to be underrated in importance. In any new field, the schemata first formulated have a lasting consequence on future learning in that field. Therefore, according to Child (1995) “the first and most important task for any teacher is to discover and carefully define the elementary schemata required to enable the most productive assimilation and proceed from a familiar framework to unfamiliar knowledge” (p. 104). The schematic learning can be more efficient than rote learning, in which one builds systematically one’s previously
acquired knowledge. Rote learning in the absence of understanding precludes the logical acquisition of further meaningful knowledge.

11. **Active vs Passive learning and learning by discovery**

Constructivists hold that learning is a social and cultural activity, that knowledge is somewhat personal, and that learners construct meaning through interaction with others (Arends, 2007, p. 12). By supporting the above idea, Child (1995) states that “there are times when children want and need to sit back and listen; there are times when they need actively to be engaged in work. The process of learning by discovery involves (a) induction with a minimum of instruction; (b) ‘errorful’ learning employing trial – and – error strategies in which there is a high probability of errors and mistakes before an acceptable generalization is possible” (p. 104). In discovery learning, the students first discover and organize any new subject matter before its internalization in schematic form (Kyriacou, 2005) posits:

Meaningful learning has important implications for the notion of teaching for understanding, since it places emphasis on the type of changes in the pupil’s cognitive structure that take place during learning, and the consequent demonstration of learning that the learner can display. (p. 22)

The discussion of learning shows that it is a process by which one can acquire and retain attitudes, knowledge, understanding, skills and capabilities. If the teacher has knowledge about learning and specific goals to achieve, learning will become more effective and meaningful for learner. The knowledge of educational psychology and theoretical knowledge about learning process is needed to be learnt by a teacher. There are manifold learning theories, each one has its own views and characteristics to understand learning. Different schools of thought believe on different theories of learning according to their own needs, choices and circumstances. A teacher must have
knowledge about different theories of learning to understand the nature of classroom problems and to solve them effectively (Reddy, 2006, p. 57). Siemens (2006) states that “learning theories seek to provide insight into the act of learning” (p. 1). Feden (2003, p.34) holds that these theories must be based on rich information and well grounded scientific research. An understanding of learning theories is crucial to teachers (Parsons et al., 2001, p.204).

Here an attempt is made to review behavioral, cognitive and social learning theories.

2.3 THEORIES OF LEARNING

Psychologists have always been curious about how an individual learns a set of facts and figures, skills, habits, interest, attitudes and other similar things. Such questions have led them to the inquiry and investigations. As a result, a number of theories have come into existence. These theories mainly can be classified under two major heads: behaviorist theories and cognitive theories. Behaviorist theories belong to the school of behaviorism. They interpret learning in term of association between stimulus and response. Cognitive theories, on the other hand, belong to the school of cognitive psychology. Those theories emphasize the role of purpose, insight, understanding, reasoning, memory and other cognitive factors in the process of learning (Mangal, 2005, p.151). Another perspective on the process of learning positioned somewhere in between the behaviorist and cognitive explanation is neobehaviourist theory. The neobehaviourists hold that sometimes an intervening variable or something within the human beings may influence learning. They further believe that those personal subjective experiences or cognitive information processes are needed to fully explain how human learning occurs in social situations (Parsons et al., 2001, p.233).
Behaviorists believe learning as change in observable behavior rather than mental processes. Smith (1999) holds “what one learns is determined by the elements in the environment, not by the individual learner” (p. 1).

2.3.1 Behaviorist Approaches of Learning

Behaviorists maintain that learning is relatively permanent change in behavior brought which occurs in the result of practice or experience. The focus of the behavioral approach is on how environment impacts overt behavior. Huitt & Hummel (2006) says “it is assumed that the mind is a “black box” that we cannot see into. The only way we know what is going on in the mind, according to most behaviorists, is to look at overt behavior” (p. 1). In psychology the behaviorists use experimental procedures, to study behavior in connection with the environment. The important contributors of this approach are Watson, Pavlov, Skinner, Thorndike (connection), Bandura and Tolman (tending towards cognitivism). Smith (1999) states:

John B. Watson argued that the inner experiences that were the focus of psychology could not be properly studied as they were not observable. The result of his laboratory experimentation was the generation of the stimulus-response model. In this, the environment is seen as providing stimuli to which individuals develop responses. (p. 1)

Behaviourists believe on overt behavior rather than inner functions of mind. According to Kumar (2006) “human development should be based on observation of overt behavior rather than speculation about subconscious motives or latent cognitive processes” (p. 6).

In the views of behaviorists, learning is change in only the observable behavior. This notion has been explained by Kumar (2006) who maintains that behaviorism is primarily concerned with observable behavior. The theories of behaviour learning stress that changes in behavior are results of stimulus-response connections made by the
learner. Behaviorists believe that only those behaviors are worthy to study which can be observed directly; in this way, these are actions, rather than emotions or thoughts which lie inside the mind. Behaviorists take the position that learning yields overt, measurable change. At the core of the behaviorists perspective is the concept of learning via association. Association learning explains the efficacy of both classical and operant conditioning (Parson, 2001, p. 240).

For the modification of behavior, Nayak (2002, p.204) holds that behavior is modified through a process known as conditioning and change can be accelerated or inhabited by reinforcement. Kazdin (2000) says “Russian physiologist Ivan Pavlov turned his attention to studies of what has come to be called classical conditioning. Pavlov analyzed classical conditioning both at the behavioral level and neutral level” (p. 35).


2.3.1.1 Classical Conditioning

Nayak (2004) explains that “Pavlov, the founder of classical conditioning, thought that all learning, whether of elicited responses in animals or of highly conceptual behaviors in humans, was due to the mechanisms of classical conditioning” (p. 84).

Above idea is supported by Feldman (1999) that “in classical conditioning, an organism learns to respond to a neutral stimulus that normally does not bring about that response” (p. 185). The way one learns to form associations between stimuli and responses is called classical conditioning. Classical conditioning takes place when a
stimulus is responded through natural reflex. (www.google retrieved, Feb 10, 2010).

Shirley (2009) explains:

In the behaviorist approach, there are two sides of conditioning: classical conditioning and operant conditioning. Classical conditioning is simply about conditioning through a neutral stimulus. An example of this is the sound of bell in schools that encourages the automatic response of children to go to class. (p. 3)

Unconditioned stimulus (UCS) is that which brings about a response without having been learned. Unconditioned response (UCR) is one that is natural and needs no training. Conditioned stimulus (CS) a once-neutral stimulus that has been paired with an unconditioned stimulus to bring about a response formerly caused only by the unconditioned stimulus. Conditioned response (CR) is one that, after conditioning, follows a previously neutral stimulus (Feldman, 1999, p.188 and Nayak, 2004, p.85).

2.3.1.2 Classical Conditioning in Classroom

The behavior of students can be changed in a variety of ways. Classical conditioning is one of them; As Parsons, et al. (2001) hold:

Classical conditioning is sometimes referred to as stimulus-substitution learning, in that it represents a condition where, through contiguity and repetition in presentation of stimuli, a learner generalizes an existing stimulus-response connection to some new stimuli. The focus is on a pattern of learning where the catalyst for behavior change is what precedes a behavior. (p. 211)

The process of conditioning is not limited to only laboratory experiments. The every days’ learning at home or in the school consists of plenty of examples where the child learns through conditioning. The sympathetic treatment given by the teacher and his interesting and effective methodology can bring a desirable impact on the students through the process of conditioning (Reddy, 2006, p.118). Mangal (2005, p.191) says that a teacher with his defective method of teaching may condition a child to develop a
distaste and hatred toward him, the subject he teaches and even the school environment. On the other hand, affection, a loving attitude and sympathetic treatment given to the child may produce a desirable impact on him through the process of conditioning. This process not only helps in learning what is desirable but also helps in eliminating, avoiding or unlearning of undesirable habits, attitudes, superstitions, fears and phobias. A teacher can establish helpful associations and can help students avoid the pitfalls of detrimental associations if he carefully considers possible associations in advance. Planning for positive associations and preventing the detrimental associations are ways teachers can use classical conditioning in their classrooms (Parsons et al., 2001, p.217).

2.3.1.3 Contiguity

Contiguity is a theory that if two events are presented together repeatedly, they will become so associated, that when only one event is present, the missing event will be remembered. Learning via association or contiguous learning does not yield deliberate or adaptive behavior but we sometime learn things unintentionally. Still, contiguous learning, according to behaviorists, provides a powerful, general explanation of learning and highly useful in classroom (Parsons et.al., 2001, p. 210). Huitt and Hammel (2006) posits that “if the stimulus is no longer paired with the response, the association will be discontinued” (p. 2).

2.3.1.4 Stimulus Generalization and Discrimination

Stimulus generalization tends to give conditioned responses to stimuli which are similar in some way to the conditioned stimulus but have never been paired with the unconditioned stimulus. The greater the similarity of these stimuli to the original conditioned stimulus, the greater the amount of generalization (Johri, 2007, p. 141). In the view of Cunia (2005) “behaviors learned in one context or situation are transferred
to another similar context is generalization and behaviors rewarded or punished in one context or situation have a different contingency in another situation which is discrimination” (p. 2). Similarly, Mangal (2005) maintains:

Stimulus discrimination is the opposite of stimulus generalization. In this way, conditioning through the mechanism of stimulus discrimination one learns to react only to a single specific stimulus out of the multiplicity of stimuli and to distinguish and discriminate one from the others among a variety of stimuli present in our environment. (p. 190)

According to behaviorists, students, through the process of generalization and discrimination, learn different types of desired and undesired behaviors. As Child (1995, p.96) maintains, there are, of course, limits to stimulus generalization and it becomes necessary to draw distinctions between similar, but non-identical, stimuli, especially when the discrimination of response is a matter of adaptive survival.

2.3.1.5 Operant Conditioning

According to Huit (1997):

The major theorists for the development of operant conditioning are Edward Thorndike, John Watson and B.F. Skinner. They proposed that learning is the result of the application of consequences; that is, learners begin to connect certain responses with certain stimuli. This connection causes the probability of the response to change. (p. 1)

The most noted operant theorist is B.F. Skinner who in the view of Kazdin (2000) “introduced the concept of operant. An operant response is defined in terms of how the response alerts a specified feature of the environment” (p. 37). He believes according to Finchman (2003) that “the environment shapes an individual’s behavior by maintaining certain response and suppressing others. The most powerful shaping mechanism he believes is reinforcement. In operant conditioning, the key question is, what occurs after a response” (p. 24). Above notions are explained by Shirley (2009)
that “operant conditioning means reinforcing a particular behavior through punishment or reward” (p. 4).

According to operant conditioning, learning is the outcome or consequence of a behavior which makes that behavior possible to be repeated and thus more likely to be learned. In operant conditioning, voluntary behaviors are controlled by the manipulation of follow-up stimuli; also called R-S pattern learning (Parsons et al., 2001, p.218). Feldman (1999) maintains “reinforcement is the process by which a stimulus increases the probability of a preceding behavior being repeated, and any stimulus that increases the probability that a preceding behavior will occur again” (p. 194). According to Skinner, ‘behavior is shaped and maintained by its consequences. It is operated by the organism and maintained by its results. The occurrence of such behavior was named operant behavior and the process of learning, that plays a part in learning such behavior, was termed by him as operant conditioning (Mangal, 2005, p.192).

Reinforcement operates either negatively or positively.

2.3.1.5.1 Positive Reinforcement

Huit, et al. (1997) posit:

The term reinforcement always indicates a process that strengthens behavior; the word positive has two cues associated with it. First, a positive or pleasant stimulus is used in the process and second, the reinforcer is added after a response and increases the frequency of the response. (p. 6)

This type of reinforcement is used to increase the desirable behavior. Johri (2007) maintains that “a positive reinforcer is a stimulus or event which, when it is contingent on a response, increases the likelihood that the response will be made again” (p. 141). Positive reinforcement is rewards such as teacher praise. Kyriacou (2005) argues that “where such behavior is followed by reinforcement, it is more likely to
occur in the same situation on a future occasion” (p. 27). Above ideas are supported by Finchman (2003) that “positive reinforcement occurs when a pleasant stimulus follows a response. Money, status, recognition and praise can all act as positive reinforcers since they all increase the likelihood of the preceding response being emitted again” (p. 25).

2.3.1.5.2 Negative Reinforcement

Responses that are followed by the escape from or removal of an undesirable situation are likely to be repeated and constitute negative reinforcement (Parsons, et.al. 2001, p. 220). Nayak (2004) holds “negative reinforcement increases the probability of a response that removes or avoids an aversive condition” (p. 87). This type of reinforcement is further explained by Johri (2007) that “negative reinforcer is a stimulus or event which, when its cessation or termination is contingent on a response, increases the likelihood that the response will occur again” (p. 142). The concept of negative reinforcement, according to Mangal (2005, p.193), is that a negative reinforcer is a stimulus, of which removal or withdrawal increases the likelihood of a specific behavior.

Whether it is positive or negative reinforcement, none is better than other. In either case, positive or negative reinforcement, the goal is the same; to get a desirable behavior to increase in strength (Parsons et al., 2001, p.221). If positive reinforcement and negative reinforcement both fail to increase the desirable behavior, then comes the term punishment.

2.3.1.5.3 Punishment

The operant conditioning theory advocated the avoidance of punishment for unlearning the undesirable behavior and for shaping the desirable behavior. Punishment simply suppresses behavior and on the removal of its threat, the rate which the behavior
occurs returns to its original level (Mangal, 2005, p. 200). While positive and negative reinforcement serve to increase the strength of responses, punishment and omission have the opposite effect. Punishment includes an aversive stimulus following a response. The term ‘omission’ is used to describe the removal of unpleasant stimuli after the response (Finchman, 2003, p. 25). According to Feldman (1999) “punishment refers to unpleasant or painful stimuli that decreases the probability that a preceding behavior will occur again. It is typically considered in term of applying some aversive stimulus, or the removal of something positive” (p. 195). Punishment is effective only through its association resulting in a new response to the same stimuli (Mangal, 2005, p. 208).

2.3.1.5.4 Application of Operant Conditioning in Teaching

Smith (2005) narrates:

Behaviorism as worldview assumes that the learner is essentially passive, responding to environmental stimulus. The learner starts off as a clean slate and behavior is shaped through positive reinforcement or negative reinforcement. Both increase the probability that the antecedent behavior will happen again. The teacher’s function, according to behavior learning theory, is to make use of negative reinforcers to end unwanted behavior and positive reinforcers to strength wanted behavior. Reinforcers may also be used to teach new skills. Teachers are expected to use reinforcers and punishment to bring about a behavior change and facilitate learning (p. 1)

The behaviorists learning approach has a variety of educational implications for teachers. They must frequently use praise and reward to reinforce appropriate students’ behavior to shape it positively. Teacher may use quick corrective feedback and programmed learning package (Kyriacou, 2005, p. 28).

For the desired training or learning, the teacher should use rewards to increase the learning and, in return, the individual should act in such a way that he is rewarded
again. Therefore, the learning and training process and environment must be so designed as to create the minimum frustration and the maximum satisfaction in a learner. The human personality can be developed by the use of operant conditioning. According to Skinner, ‘we are what we have been rewarded for being’. Verbal praise, positive facial expressions of the teacher, a feeling of success, high scores, good grades, prizes and medals are all good motivators. Operant conditioning, thus, provides an external approach to motivation (Mangal, 2005, p.199).

Finchman (2003, p.30) proposed that Skinner was very critical of traditional teaching methods and believed teaching objectives needed to be specified in very precise, operant terms with constant reinforcement provided to learner. According to Kumar (2006) “in education advocates of behaviorism have effectively adopted the system of reward and punishment in their classrooms by rewarding desired behaviors and punishing inappropriate ones. Rewards vary but must be important for the learner” (p. 6). Teachers need to know what is reinforcing their students. Knowing the students is important. All reinforcers are not appropriate with all students. A teacher might use a variety of reinforcers including verbal praise, tokens, certificates, stickers, stamps, snacks, peer recognition, release from homework etc. (Parsons et.al., 2001, p.223).

In the light of behaviorists approaches of learning, it is concluded that learning brings change in observable behavior. Stimulus-response theories focus on environmental factors which reinforce learning. They reject the active mental process individuals use to learning skills (Nayak, 2002, p.204). Behaviorists hold that only observable behaviors are worthy to study rather than thoughts and inner working of brain. Key element of learning is the rewarded response (Kumar, 2006, p.5). According to skinner, if it is required that learning take place, the desired response must be
rewarded. Pavlov posits that all learning is due to S-R association, whereas Thorndike believes on trail and error mechanism. Watson also claims that observation of overt behavior is the base for learning rather than specialization of latent cognitive process. Such approaches, by focusing only on observable performance, dismiss the role of thinking that may be involved in learning.

Mangal (2005, p.231) states that all learning is purposeful and goal oriented. According to Tolman, understanding and map making rather than conditioning or building up S-R connection is the essence of learning. In the view of Feldman (1999, p.204), not all learning is due to apparent and classical conditioning. In fact, some kinds of learning must involve higher order processes in which people’s thought and memories and the way they process information account for their responses.

2.3.2 Cognitive approaches of Learning

Cognitive theorists tend to describe how brain processes and preserves new knowledge. They are concerned with minds as we learn. Kumar (2006) holds “they take the perspective that students actively process information and learning takes place through the efforts of the students as they organize, store and then find relationship between information, linking new to old knowledge, schema and scripts” (p.1). Theories of cognitive development seek to explain the quantitative and qualitative intellectual abilities that occur during development (Kodat, 2002, p. 3). In behaviorism, there was an excessive attention on single events, stimuli and overt behaviors. On the other hand, psychologists who were not happy with behaviorism, hold that perception or images must be approached as a pattern or a whole instead of as a sum of the component parts. Where behaviorists looked to the environment, cognitivists turned to the individual’s mental process. They were concerned with cognition-the act of process
of knowing (Smith, 1999, p. 2). Balota, et. al (2000) posit that “Cognitive psychologists rely most heavily on the experimental method” (p. 158). Cognitive Psychology represent the dominant approach in Psychology today (Huitt, 2003, p.1). Stimulus-response theories have to break down complex behavior into small stimulus-response units in order to explain how they are acquired. They take no account of the mental activity which may occur in individuals during learning. The need is to accept that internal mental processes, though difficult to monitor, do play an important part in the learning process (Finchman, 2003, p. 32). Cognitive Psychologists view learning in terms of the thought process, or cognition that underlie it (Feldman, 1999, p. 204). Cognitive psychology holds that mental processes exist, their study in scientific way is posible and that humans can participate actively in their own cognitive activities. They posit that learning is transformation of significant understanding which an individual already has. Woolfolk (2004) says “instead of being passively influenced by environmental events, people actively choose, practice, pay attention, ignore, reflect and make many other decisions as they pursue goals” (p. 236). A variety of learning situations are studied by cognitive psychologists, so there is no single cognitive theory or model of learning which can be representative of the entire area. An attempt is being made to cover the different views of cognitive learning theories.

2.3.2.1 Constructivist theory of Jerome Bruner

In the view of Woolfolk (2004) “constructivist perspectives are grounded in the research of Piaget, Vygotsky, the Gestalt psychologists, Bruner as well as the educational philosophy of John Dewey, to mention just a few intellectual roots” (p. 323). Kearsley (1999) posits that “Bruner’s constructivist theory of learning is based upon the study of cognition. A major theme in this theory is that “learning is an active
process in which learners construct new ideas or concepts based upon their current / past knowledge” (p. 4). Gardner (2001), p.6) narrates that, according to Bruner’s theory, due to effect of instruction, students can construct, elaborate on and transform the knowledge. Patsula, (1999) maintains:

The instructors should try and encourage students to construct hypotheses, make decision, and discover principles by themselves. The instructor’s task is to “translate information to be learned into a format appropriate to the learner’s current state of understanding and organize it in a spiral manner so that the students continually build upon what they have already learned”. He states that a theory of instruction should address the following aspects:

1. The most effective sequence in which to present material.
2. The way in which a body of knowledge can be structured so that it can be most readily grasped by the learner.

Bruner’s constructivist theory provides some principles to instruction for application.

1. **Readiness.** Instruction must be concerned with the experiences and context that make the students willing and able to learn.
2. **Spiral Organization.** Instruction might be structured so that it can be easily grasped by the student.
3. **Going beyond the information given.** Instruction should be designed to facilitate extrapolation and or fill in the gaps. (p.4)

Two major theories of cognitive development, Vygotsky’s and Piaget’s are discussed as under:
2.3.2.2 Vygotsky’s Theory of Learning and Development

Santrock (2004) holds “Vygotsky believed that children actively construct their knowledge. Cognitive skills have their origins in social relations and are embedded in a sociocultural backdrop” (p. 51).

Vygotsky very much believed that both what people know and how they think are shaped by the cultural and historical context in which they develop. Cognitive development takes place in a sociocultural context and it develops gradually out of the child’s social interactions. Certain tools of the mind exist in each culture such as language, problem solving tactics and memory strategies which are transferred to its members.

2.3.2.2.1 Zone of proximal development

Vygotsky presented a unique idea in his developmental theory. Zone of proximal development – the gap between the learner’s ability to perform a task independently and the ability to accomplish it with the help, encouragement and guidance of an instructor or a more skilled fellow. Skills within the zone are ripe for development and are the skills at which instruction should be aimed. Skills outside the zone are either well-mastered already or still too difficult (Sigelman, 1999, p.189).

While elaborating the zone of proximal development, Santrock (2006) says:

It is Vygotsky’s term for the range of tasks that are too difficult for a child to master alone but that can be learned with guidance and assistance of adults or more skilled children. Thus, the lower limit of the ZPD is the level of problem solving reached by the child working independently. The upper limit is the level of additional responsibility the child can accept with the assistance of an able instructor. (p. 237)

Feden (2003, p. 40) states, teachers often have to maintain a delicate balance between providing learning opportunities. Zone of proximal development is the area
between a child’s level of actual development and the level at which a child can potentially develop in collaboration with a more capable person. Vygotsky view of social interactions that push the child forward into his ZPD where new developmental processes are triggered and practiced until they are internalized and become part of the child’s repertoire of independent ability.

2.3.2.2 Scaffolding

It is the main feature of Vygotsky’s theory. According to Santrock (2006) “it involves changing the level of support over the course of teaching session, a more skilled person adjusts the amount of guidance to fit the child’s current performance level” (p. 238). In the views of Ashman et al. (1997)

One of the most common features of the cognitive and meta-cognitive programmes is the use of scaffolded instruction that provide support to learners to enable them achieve the objectives they would not have accomplished without that support. Scaffolding includes modeling, questioning and feedback depending on the task, the needs of the particular student, and their level of ability. (p. 137)

The use of language and shared experience is critical to successful use of scaffolding as an educational technique (Feden, 2003, p.44). To Vygotsky, learning and individual development are shaped through activity, social interaction and cultural tools. Woolfolk (2004) holds that “by participating in a broad range of activities with others, Vygotsky’s theory gives us both advantages in psychological and social ways where culture and cognition create each other” (p. 324).

2.3.2.3 Jean Piagets Theory of Cognitive Learning and Development

Piaget was an acknowledged international authority in the field of child psychology and cognitive development, who has contributed a great deal to the theory and practice of education (Mangal, 2005, p.91). Kyriacou (2005) found that:
The work of Piaget in studying the cognitive development of children has had a great impact on discussion of teaching and learning in schools. Piaget’s theory of cognitive development deals with the gradual refinement of the child’s cognitive structure through assimilation and accommodation. This refinement is governed by a combination of the child’s interaction with the environment. (p. 29)

2.3.2.3.1 Cognitive Process

Children employ schema when they actively construct their world. A schema is a concept or structure which exists in the mind of an individual for organization and interpretation of knowledge. Schemas can range from simple to complex (Santrock, 2004, p. 39). Driscoll (2000) states “Piaget believed that human beings possess mental structures that assimilate external events, and convert them to fit their mental structures. Mental structures accommodate themselves to new, unusual and constantly changing aspects of the external environment” (p. 1). The key to child’s cognitive development thus lies in his constant interaction with and adaptation to his physical and social environment. The task of such adaptation is carried out through the process of assimilation and accommodation (Mangal, 2005, p. 83). Piaget believed that all schemas and all understandings are created through two inborn intellectual functions called organization and adaptation. Through organization, a child combines existing schemas into new and more complex one whereas adaptation is the process that adjusts to the requirements of the environment. It occurs through two complementary processes of assimilation and accommodation (Sigelman, 1999, p. 172).

a) Assimilation

Hergenhahan (2005) explains that “the process of responding to the environment in accordance with one’s cognitive structure is called assimilation, which refers to a kind of matching between the cognitive structures and the physical environment” (p.
With assimilation, an object or an idea is understood in terms of the concepts or actions which the child already possesses (Johri, 2007, p. 239). If we always assimilate new experiences, our understanding would never promote and our knowledge be limited. So, Piaget believed that all new experiences are greeted with a mix of assimilation and accommodation (Sigelman, 1999, p. 172). In the view of Hergenhahn (2005):

If assimilation were the only cognitive process, there would be no intellectual growth because an organism would simply go on assimilating its experiences into its existing cognitive structure. However, a second, equally important process provides a mechanism for intellectual growth: accommodation, the process by which the cognitive structure is modified. (p. 297)

b) Accommodation

Santrock (2004) posits that “it is a mental process that occurs when a child adjusts to new information” (p. 39). The process of accommodation is further explained by Mangal (2005, p. 84) by saying that the child will have to change his old style of thinking and behaving to adapt or adjust to the new situation. One tries to accommodate or adjust to new ways of thinking and behaving in place of assimilation. Johri (2007, p. 239) says, with accommodation, concepts and actions are modified to fit the new situation. Such modification can be roughly equated with learning. We respond to the world according to our previous experience (assimilation), but each experience contains aspects unlike anything we had experienced before. These unique aspects of experience cause changes in our cognitive structures (accommodation). Hergenhahn (2005) says “accommodation, then, provides a major vehicle for intellectual development” (p. 297).
c) **Equilibration**

Piaget asserted that the process of assimilation or accommodation helps the organism to adjust or maintain a harmonious relationship between himself and his environment. This adjustment mechanism was called equilibration by Piaget. In fact, it is the need of seeking optimal adaptation or maintaining balance between himself and his environment that makes an individual feel uncomfortable and start reorganizing his cognitive structure for equipping himself with new ways of thinking and behaving (Mangal, 2005, p. 84). Santrock (2004) says that “Piaget proposed to explain how children shift from one stage of thought to the next. This shift occurs as children experience cognitive conflict or disequilibrium in trying to understand the world. Eventually, the child resolves the conflict and reaches a balance, or equilibrium, of thought” (p. 40). Bhattacharya and Han (2001) states:

> Piaget believed that cognitive development in children is contingent on four factors: biological maturation, experience with physical environment, experience with social environment and equilibration. Equilibration refers to the biological drive to produce on optimal state of equilibrium between peoples cognitive structure and their environment. It involves both assimilation and accommodation (p. 2)

> Teacher may create the state of disequilibrium in students so that they actively explore new knowledge to satisfy and balance their inner state of uncomfortibility.

Woolfolk (2004) describes:

> Piaget believed that cognitive development unfolds in a sequence of four stages. Each stage is age related. These stages have a sequence, all humans pass through these stages. Thinking at each stage builds on and incorporates previous stages as it becomes more organized and adaptive and less tied to concrete events. Piaget’s special concern was with logic and the construction of universal knowledge that cannot be learned directly from the environment. Such knowledge comes from reflecting on and coordinating our own cognitive or thoughts, not from maping external reality. (p. 324)
2.3.2.3.2 Developmental Stages

Child’s cognitive processes and the nature of the knowledge that he displays proceed in accordance with a fixed cumulative and chronological order of development through following four stages:

1. The Sensor motor Stage (birth to two years)

In this stage, infants construct an understanding of the world by coordinating their sensory experiences such as seeing and hearing with their motor actions – reaching and touching. By the end of this stage, they display far more complex sensorimotor patterns. Santrock (2004) maintains “the young infant does not differentiate between self and world and has no sense of object permanence. By the end of sensor motor period, the child can differentiate between the self and the world and is aware that objects continue to exist overtime” (p. 40).

2. The Preoperational Stage (2 to 7 years)

In this stage, the child begins to replace direct action in the form of sensory or motor exploration with symbols. The learning of the language provides him with a good tool for thinking Mangal (2005), p. 86). Santrock (2004) posits “it is egocentric and intuitive rather than logical” (p.40). The preoperational thinking stage has two subdivisions:

a. Preconceptual thinking (about 2 to 4 years). During this part of preoperational thinking, children begin rudimentary concept formation. They begin to classify things in certain classes because of their similarity but make number of mistakes of their concepts.

b. Intuitive thought (about 4 to 7 years) During this part of operational thinking, the child solves problems intuitively instead of in accordance with some logical rule. The most striking characteristic of the child’s thinking during this stage is his or her failure to develop conservation (Hergenhahn, 2005, p. 300). Children at this sub-stage, start to employ primitive reasoning. They lack rational thinking
and cannot perform operations that are reversible mental representations. (Santrock, 2004, p. 43).

3. **The Concrete Operational Stage (7 to 11 years)**

The child at this stage can decenter and juggle two diminutions at once. Reversibility now allows the child to mentally reverse the processes. Piaget maintained that operational abilities evolve in a predictable order as simple skills that appear early that are reorganized into increasingly complex skills (Sigelman, 1999, p.177). During this stage, the thought processes are directed to real events observed by the child. He can perform rather complex operations on problems as long as the problems are concrete and not abstract (Hergenhahn, 2005, p.301).

4. **The Formal Operations Stage (11 years or later and beyond)**

Ormrod (1999) holds “during this time, the child develops the ability to reason with abstract, hypothetical and contrary-to-fact information” (p. 3). At this stage, the intellectual development and functioning takes a very sophisticated shape as the child learns to deal with abstractions by logical thinking. He begins to construct relationship between concrete operations and between symbols. According to Piaget, he may discover the solutions of problems through scientific thinking (Mangal, 2005, p. 90).

2.3.2.3.3 **Teaching Strategies in the view of Piaget**

Kyriacou (2005) explains:

Piaget’s idea for effective teaching is the notion of cognitive matching; the need to pitch the learning experience at the right level for each child. The learning task needs to foster for the child can make useful link with what the child already knows, and extends this knowledge and understanding further. (p. 30)

For optimal learning to take place, information must be presented that can be assimilated into the present cognitive structure but at the same time be difficult enough
to necessitate a change in that structure. Piaget would favour a one-to-one relationship between teacher and pupil (Hergenham, 2005, p. 303). Following the ideas of Piaget in the areas of teaching and learning process, Santrock (2004, p. 44-48) provided teaching strategies according to the stages of cognitive development of children. Each stage has specific implications where the children are able to cope with the cognitive demands involved in specific curriculum topic. For working with preoperational thinkers, Piaget maintained that teacher may do following:

i. Have children manipulate groups of objects.

ii. To reduce egocentrism, involve children in social interactions.

iii. Ask children to make comparisons.

iv. Give children experience in understanding.

v. Have children draw scenes with perspective.

vi. Ask children to justify their answer when they draw conclusions.

For working with the concrete operational thinkers, the teachers must do as follows:

i. Encourage students to discover concepts and principles and reach the answer through their own thinking.

ii. Involve children in operational tasks.

iii. Plan activities for students to practice the concept of ascending and descending classification hierarchies.

iv. Include activities that require conservation.

v. Create activities in which children order and reverse order.

vi. Ask students to justify their answers when they solve problems.

vii. Encourage students to work in groups and exchange thoughts.

viii. Provide rich material in class to stimulate student’s questions.
ix. While teaching complex things, create props and visual aids.

x. Encourage students to manipulate and experiment in science and use concrete materials in mathematics.

For working with formal operational thinkers, the teacher:

i. May realize that many adolescents are not full-fledged formal operational thinkers. Thus, many of the teaching strategies for the education of concrete operational thinkers still apply to many young adolescents.

ii. Propose a problem and invite students to form hypotheses about how to solve it.

iii. Present a problem and suggest several ways it might be approached.

iv. Select a problem that is familiar to students and ask questions related to it.

v. Ask students to discuss their prior conclusions.

vi. Students may be involved in projects to be investigated by them.

vii. Encourage students to create hierarchical outline before writing a paper.

viii. Recognize that learners are more likely to use formal operational thinking in the area in which they have the most expertise and experience (Mangal, 2005, p. 95; Santrock, 2004, p. 49).

2.3.3 Social Cognitive Learning Theory

Social learning theory has been renamed as social cognitive theory by Albert Bandura in the mid 1980 because it had evolved to incorporate so many ideas from cognitive science. Social cognitive theory posits that much human behavior is learned by observing the behavior of others. It is in this social milieu that people acquire cognitive representations of behavior by observing models performed by others (Feden, 2003, p. 37). Proponents of social learning theory maintain that while the specific behaviors that result from social learning vary from culture to culture, the acquisition of
these behaviors appears to be consistently determined by the process of identification and imitation (Parsons, et.al. 2001, p. 233).

Observational learning rather than learning based on direct experiences is thus the base of social learning theory. The advocates of this theory emphasize that most of what we learn is acquired through simply watching and listening to other people. The persons whose behavior is observed and often imitated are known as models and observational learning is referred to as modeling. Observational learning can thus provide extra dimensions and opportunities for the learners in addition to their learning through self experience and direct involvement with environmental consequences. Social learning theory propagates that learning through observation and modeling proves to be an effective means of learning many things that have been observed, remembered, imitated and reinforced (Mangal, 2005, p.238).

2.3.3.1 How does learning take place

According to social learning theory, one learns through observation by incorporating and imitating the behaviors of others taken as models belonging to one’s social environment. Bandura (1986) explains that following steps are usually involved in this kind of learning:

1. Tend to and perceive the most critical aspects of another person’s behavior.
2. Remembering the behavior.
4. Motivation to learn and carry out the behavior.

Instead of learning occurring through trial and error, many important skills are learned through observational processes (Feldman, 1999, p.206; Mangal, 2005, p.238).
2.3.3.2 Role of Teacher

Bandura’s work is highly significant for classroom teachers. He examined how children learn through process of observing and imitating others (modeling). He concluded that students learn to imitate by being reinforced by teachers for specific act of imitation. There are four interrelated factors significant to the learning process: attention, retention, production process and motivation. For students (observers) to learn from the teacher (model), the teacher must get the students attention. Proximity or nearness to the teacher may help attract students. Despite proximity and identification with personal characteristics of the teacher, students may not learn via imitation unless there also is retention. Retention process ensures that the student can retain onto whatever is to be learned. Teacher may get students to rehearse or practice learning via imitation. Observational learning may depend on their production process. Despite the establishment of attention and retention, unless the students also able to actually do the task to be learned, they are unlikely to show what, if anything, they have learned. Thus, to be effective models, teachers must have several characteristics. They must attract the learners attention, provide for the retention of the learning, make sure that the learner has ability to learn through observation and they should practice and be provided some kind of incentive for learning (Parsons, et. al. 2001, p. 236 and Feden, 2003, p. 38).

2.3.4 Social Constructivism

In the view of Sher (2002, p. 115), constructivism is a much broader as well as comprehensive view of learning. This perspective is closely associated with developmental theories of Vygotsky, Bruner and Bandura social cognitive theory. Social constructivists hold that reality is constructed through human activity. It can not be explored and it does not exist unless it is socially invented. Kumar (2006) is of the
view that “knowledge is also a human product and is socially and culturally constructed. Individuals create meaning through interaction with each other and with environment they live in” (p. 15). According to Sher (2002) “learning is an active process of constructing rather than acquiring knowledge” (p. 115).

2.3.4.1 When Learning Occurs

According to social constructive perspective, learning occurs through social and environmental interaction. Kumar (2006) holds:

Social constructivists view learning as social process. It does not take place only within an individual nor is it a passive development of behaviours. Meaningful learning occurs when individuals are engaged in social activities and use cognitive tools. They produce products as well as impose meaning on it. Learning may not take place in isolation from environment. (p. 15)

While supporting the social learning method, Pressley (2003, p. 15) says that cooperative learning is a very flexible mechanism that can be included into a variety of content areas, used in kindergarten through college. It is very effective in improving academic achievement. Santrock (2004) says “Vygotsky claims that cognitive skills originate in social relations and culture and child’s development as inseparable from social and cultural activities” (p. 51). The idea of collaborative learning has been strengthened by Sigelman (1999, p. 189) that learning in collaboration with more knowledgeable companions drives development.

2.3.4.2 Role of Teachers

In the view of social constructivists, according to Kumar (2006) “teaching methods can include reciprocal teaching, peer collaboration, cognitive apprenticeships, problem based instruction and other methods that involve learning with others” (p. 16). Vygotsky’s views are nearest to the ideas of constructivists. To him, children are
involved in interactive activities in collaboration with a skilled peer or teacher. This act is called scaffolding. For the range of tasks, the zone of proximal development which has a lower limit and upper limit levels of tasks is followed. This term is for that piece of work for which children face difficulty mastering on it alone but with the guidance and assistance of a more skilled partner or instructor they can become master of it. Teacher uses the zone of proximal development, simply observes the students attention, smoothly provide support when needed, encourage the students and more skilled peers are used as teachers. Teachers ask questions and answer the queries and transform the classroom with vygotsky’s ideas. Teacher is only the observer and monitor of students who are engaged in their zone of proximal development (Santrock, 2006, p. 239).

Nayak and Rao (2004) states:

There are a variety of perspectives and emphases within cognitive psychology that are currently impacting educator’s thinking about how to improve the teaching learning process. The information processing approach focuses on the study of the structure and function of mental processing within specific context, environment or ecologic. (p. 98)

### 2.3.5 Information Processing Approach

This approach pays its attention particularly on memory which is for the storage and retrieval of information. This model focuses on how information is stored and processed in memory (Nayak, 2004, p. 99). According to the theories of Vygotsky and Piaget, the students are active learners who construct their knowledge through the active exploration of environment. In this sense, Svinicki (2005) argues that “using information processing theory to inform classroom practices is very similar to using “active learning” practices” (p. 4). This idea is supported here by Hetherington (1999) that “like Piaget’s theory of cognitive development, the information processing approach holds that children play an active role in their own development” (p. 2). The
information processing theory discusses how a person process information as he learns. All the models of information processing theory discuss how the human beings actively transform information from input to output (Feden, 2003, p. 45). Elaboration and rehearsal are those features of learning that are associated to information processing; however it focuses on understanding the ways through which the information is processed rather than how learning occurs. The basic information processing model has three components:

1. Sensory register (SR),
2. Short-term memory (STM) or working memory and
3. Long-term memory (LTM)

This model is cognitive processing model which is based on an explicit metaphor with a computer that supports to understand the information processing theory (Kumar, 2006, p. 1; Orey, 2001, p. 1).

1. **Sensory Register**

The sensory register contains receptors that briefly hold on to only that information that enters through our senses. The sensory register, according to gestalist principles, lets in only those things which we can see, hear, taste, smell or touch; all else fades away. Things that are attended to sensorally, recognized via feature analysis or anticipated associations, are held briefly before being passed on to the second port, the short term memory (Parsons, et al. 2001, p. 252). The corresponding process of attention and selective perception ensures that only particular stimulation is conveyed to the next structure, the short-term memory. The period over which the image is registered is very short before complete decay (a few hundred milliseconds) (Child, 1995, p. 126). Attentional processes have a good deal to do with which sensory stimuli
enter the sensory register in the first place and which are processed even further (Sigelman, 1999, p. 213). Woolfolk (2004) argues:

Sensory register is the initial processing that transforms the incoming stimuli into information so that sense of them can be made. The capacity of sensory memory is very large and can take in more information than can possibly be handled at once. But this vast amount of sensory information is fragile in duration. It lasts between one and three seconds. In these moments, there is a chance to select and organize information for further processing. Perception and attention are critical at this stage. (p. 240)

There are two major concepts for getting information into STM: First, paying attention to an interesting feature and second, activation of known pattern (Huitt, 2003, p. 3). It is absolutely critical that the learner attends to the information at this initial stage in order to transfer it to the next stage.

2. **Working or Short-term Memory**

Woolfolk (2004) maintains:

Working memory is the temporary storage of information that is being processed in any range of cognitive tasks. Working memory is the “workbench” of the memory system, the interface where new information is held temporarily and combined with knowledge from long term memory. It contains what some one is “thinking” about at the moment. For this reason, some psychologists consider it a “consciousness”. (p. 242)

The thinking process is activated in working memory where the world meets what is previously known. Stimuli are perceived and attended, and according to Orey (2001) “information is then actively processed, based on information stored in long term memory. It is limited to 5-9 items and it lasts only about 20 seconds. The rehearsal serves a maintenance function, and used to keep information in short term memory” (p.3). According to Field (2005, p. 88) working memory is limited in how much it can hold.
Chunking is another process to expand the capacity of short term memory. Through this process, individual bits of information are grouped into some type of large, more meaningful and process-able units. If short term memories are not used right away, they decay or are forgotten. If some other potentially memorable event occurs, existing short term memories may be displaced or interfered with unless short term memories are actively transferred to long term storage, (Parsons, et al. 2001, p. 254). Repetition or rote rehearsal is a technique that is used to “learn” something. Simply memorizing something does not lead to learning. There are evidences to remember something is to memorize. But all the material learned this way, a little can be remembered after six months or a year (Huitt, 2003, p. 4).

3. **Long Term Memory**

Long term memory is the last stage in the information processing model, which in view of Oney (2001) “is typically termed call memory. LTM is everything we know and know how to do” (p. 3). It has unlimited capacity and memories remain indefinitely (Parsons, et al. 2001, p. 254). The long term memory, with little or no decay and with little rehearsal if any, codes information according to meaning, pattern and other characteristics. It helps to remember a number of things on a relatively permanent basis (Mangal, 2005, p. 262). Working memory holds the information that is currently activated, long term memory holds the information that is well learned. Woolfolk (2004) maintains:

> Our access to information in working memory is immediate because we are thinking about the information at that very moment. But access to information in long term memory requires time and effort. Recently, some psychologists have suggested that there are not two separate memory stores (working and long term). Rather, working memory is the part of long term memory that works to process currently activated
information – so working memory is more about processing than storage. (p. 247)

Most of the cognitive psychologists categorize LTM as one type of memory out of declarative, and procedural memory. These two types of knowledge account for most of the knowledge which is learned during the work or in school Orey (2001, p. 3).

Declarative memory deals with factual information: names, faces, dates and the like. Procedural memory is for skills and habits. Feldman (1999) explains:

Information about things is stored in declarative memory; information regarding how to do things is stored in procedural memory. Declarative memory can be further subdivided into semantic and episodic memory. Semantic memory is for general knowledge and facts about the world as well as memory for the rules of logic that are used to deduce other facts. It is like mental almanac of facts. Episodic memory is for the biographical details of our individual lives. Semantic memory consists of associations between mental representations of various pieces of information. (p. 228)

When we think about a particular concept, our semantic memory activates the recall of related concepts, bringing them more readily to mind. Thinking about interlinked substance may help us in recollecting it.

2.3.5.1 Usage of Information Processing Ideas in the Classroom

In the school setting, unfortunately, the learner memorize large amount of information long enough to “spit it all back” on a test. But much of what has been memorized is either soon forgotten, or if it is retained somehow in long term memory, it is relatively disconnected from all other knowledge and therefore less likely to be retrieved when needed to perform higher level cognitive tasks (Feden, 2003, p. 49).

Information processing theory states that for learning new information, students may:

1. Pay attention on the new substance.
2. Make comparison between new information and previous knowledge which exists in long term memory and

3. Either incorporate new material to the previous information or create new mental categories to accommodate new material which can not be adjusted in any established mental category.

Svinicki (2005) argues:

Focusing attention on new material means using the senses to become aware of the material. A key step in learning is the movement of information from working memory to deep memory through encoding. Encoding depends upon attaching new information to knowledge that already exists in the brain. The more ways the new information is attached to existing information, the more readily it can be retrieved when needed. Students are often clumsy and slow at this process. Therefore, teacher may help the students to improve their ability to process information by giving students practice in using new information during lecture and in homework and making students solve the problems. (p. 4)

Some key principles to be employed in the classroom in the perspective of information processing theory are:

i. Gain the students attention

ii. Bring to mind relevant prior learning

iii. Point out important information

iv. Present information in organized manner

v. Show students how to categorize related information

vi. Create situations for learners to explain new knowledge

vii. Show students how to use coding when memorizing lists

viii. Provide for repetition of learning

ix. Create situations for overt learning of basic concepts and skills (Huitt, 2003, p. 6 and Svinicki, 2005, p. 4).
Information processing theory suggests that nothing moves to working memory unless attention is paid to it. Learners with the help of teacher can recognize and attend to the appropriate and relevant information that information is now in working memory. It is where the learner does the thinking, or cognitive work. Information is there long enough to permit to make decision about what to do with it (Feden, 2003, p. 48).

For the successful processing of information, Woolfolk (2004) suggests following principles for teachers:

a) Develop signals to attract the students attention

b) Help students separate essential from nonessential details and focus on the most important information

c) Help students make connections between new information and what they already know

d) Provide for repetition and review of information

e) Present material in a clear, organized way

f) Focus on meaning, not on memorization. (p. 256)

To sum up, “Behavior modeling” demonstrates how to perform the activities while “cognitive modeling” articulates the reasoning that learners should use while engaged in performing the activity (Jonassen, 1998, p. 12). The Behavioral theory helps in understanding the role of signals in setting the stage for behavior and the role of consequences and in encouraging or discouraging behavior. But the lives of human beings and learning is much more than behaviors. Language and higher order thinking need complete information processing that has been emphasized by cognitive models of the thinking. Today, a common theme has been an increased stress on the use of higher order thinking.
2.4 THE NEED FOR TEACHING UNDERSTANDING AND HIGHER ORDER THINKING SKILLS

Though important it is to learn and remember basic facts and skills, they must go beyond memorization to understanding and thinking. Understanding means transferring and using knowledge, skills and ideas appropriately. Which are complex thinking skills. Different aspects of thinking include transfer of learning, problem solving, metacognition and study skills. Nayak and Rao (2004) argue:

Critical thinking may be included as a focus of schooling. Because the movement to the information age has focused attention on good thinking as an important element of life success. Old standards of simply being able to score well, though still appropriate, cannot be the sole means by which the academic success of students be judged. (p. 108)

According to Kumar (2006, p.75), theories like social learning, constructivism, situated cognition and cognitive learning have common themes about the context and process of learning. Learning is most meaningful and is enhanced when students face a situation in which the concept is immediately applied. This type of learning involves problem solving and critical thinking in situated context. Gelder (2010, argues “when we talk about “higher order thinking skills”, we are concentrating on the top three levels of Bloom’s Taxonomy, that is analysis, synthesis and evaluation” (p. 1). Moon (2008, p.25) is of the view that it is clear that critical thinking is something to do with process of learning. He says that critical thinking would seem to be a gathering of various processes such as understanding, analysis, synthesis and evaluation, (such as those described by Bloom 1956) and termed tools of manipulation of knowledge.

Supporting learners in learning how to learn, understand and think is the main goal of education. According to Krishnamurti (2006) “all the thinking is between what is convenient, what is not convenient, what is beneficial, what is worthwhile-It is
always within that field” (p.117). Creative and critical thinking are higher order skills and are necessary for a balanced productive personality (Rusbult, 2001, p.1). Higher order thinking skills is a very common feature of outcomes based education reform (Wikipedia, 2010). Fisher (2008) says “creative and critical thinking is needed to make sense of knowledge in any subject area” (p. 3).

In the view of Horgenhahn (2005, p.281), learning that is based on understanding is the product of creative and critical thinking.

### 2.4.1 Creative Thinking

Creative thinking is absolutely an internal mental process and an important component of one’s cognitive behavior. It involves divergent thinking instead of the routine and fixed type of convergent thinking. Mangal (2005) holds that “creative thinking is not restricted by any pre-established rules. The creative thinker explores new areas and makes new observations, new predictions and new inferences” (p.362). According to Fisher (2008, p.4), a good thinker is someone who is always trying to find out new things.

Creativity is the ability to create original but appropriate and useful work. Creativity, talent and intelligence are related, they allow us to solve important problems. Creativity requires extensive knowledge, flexibility and the continued recognition of ideas (Woolfolk, 2004, p. 482). Creativity is the ability to produce something new that is also useful and valued by society. Creativity consists of a wide range of human experiences that most of us have at some time or other (Kaufman & Bair, 2006, p.1).

Creative thinking is an important kind of creativity. It is the process of generating ideas that are new, useful, productive and appropriate. Teacher can stimulate creative thinking by encouraging their students to think divergently by generating ideas
that are open-ended and multidirectional (Kim, 2006, p. 251-259). Advocates of critical thinking argue that alternative solutions are often not given, they must be produced or thought. Critical thinkers must also be creative thinkers and generate generating possible solutions so as to find the best solution. Rusbult (2001) argues that “the creative thinking is combining of divergent generation and convergent evaluation in a strategy of creative problem solving” (p. 1).

Divergent thinking depends partly on its opposite convergent thinking, which focuses on, logical reasoning about ideas that lead to specific right solutions. Convergent thinking has the strange effect of making student’s creative or divergent thinking possible (Sternberg, 2003, p.5; Runco, 2004, p. 47-62 and Cropely, 2006, p.291-404). Divergent thinking happens when teachers specially encourage students to use it, and in general convey to students that they value it. “Critical and creative thinkers are made, not born” (Feldman, 1999, p. 275). According to Fisher (2008, p.108), the thinking skills are not automatic, but they can be developed.

Whether in school or out, creative thinking flourishes when the creative activity contains its own internal reward. It is likely to be creative when the creator enjoys the creative activity itself, and does not worry about how others may think of the activity (Brophy, 2004, p. 4). Our own problems arise out of our own activity, and they seem worthwhile and real that arouse the curiosity of children (Hughes and Hughes, 2003, p.155). Claxton and Edwards et al., (2006) found:

The requirement of producing creative students can sometimes pose a challenge for teachers. Because not only are teachers supposed to evaluate student’s learning of particular ideas or skills, but they often have to do so within the restricted time limits of a semester or school year. In spite of these constraints, thought provoking activities can be encouraged in classrooms at least some of the time through application
of student centered strategies of instruction and through cooperative learning. (p. 57-61)

The education of a morally autonomous person requires the teaching of critical thinking because it helps to form intelligent judgments on public issues and thus contribute to the solution of problems. The aim is to develop in children the critical consciousness and intellectual virtues and dispositions such as to attend, concentrate, cooperate, organize, reason, imagine and enquire (Fisher, 2008, p.5).

2.4.2 Critical Thinking

According to Downs (2008) “critical thinking is skillful, responsible thinking that is conducive to good judgment because it is sensitive to context, relies on criteria, and is self correcting” (p. 60). At present, critical thinking is an important subject in education. All teachers take interest to teach critical thinking to their students. Gelder (2010) posits that “critical thinking involves logical thinking and reasoning such as comparison, classification, sequencing, cause/effect, patterning, webbing, analogies, deductive and inductive reasoning, forecasting, planning, hypothesizing and critiquing” (p. 1). The above view is supported by Huitt (1990, p. 1) that critical thinking involves analytical thinking for sake of evaluating read material. Mayer & Goodchild (1990, p.4) are also of the view that critical thinking is an active and systematic process to understand and evaluate the material. The concept of critical thinking is explained in stronger way by Scriven and Paul (1992) who argue that “critical thinking is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from or generated by, observation , experience, reflection, reasoning, or communication, as a guide to belief and action” (p. 1). Critical thinking, in view of Ennis (1992, p. 1), is a reasonable
thought process that concentrates on what is to believe and/or do. Lipman (1995) holds “that critical thinking is skillful, responsible thinking that facilitates good judgment because it relies upon criteria, is self-correcting, and is sensitive to context” (p. 146).

Crowl et al., (1997, p. 170) argue that critical thinking includes the thinker’s conscious process of monitoring and evaluating his or her own thinking. Hughes (2003, p. 165) states that recent investigations with children have shown that much of their thinking is carried on at subconscious level by mean of images. According to Huitt (1998) “it is necessary to include development of creative thinking and practice in using both sets of competencies to solve problems and make decisions in a wide variety of situations” (p. 5).

According to Moon (2008, p. 18), critical thinking is trying to understand a subject, thinking about it, appreciating, understanding the strengths and limitations of it and then developing a point of view on the subject. It is a deep thinking process which helps us to understand what may be right or wrong. It is analyzing our past experiences and help to resolve situations. Critical thinking is the questioning and assertion backed up with evidence. It involves not accepting everything as read but it is a process of asking why something is the way it is, working one’s way through the problems. It is to challenge an idea. It is being engaged in thinking in an evaluative way by considering the different perspectives and potentially adding value to reach a new level of knowledge-thence adding new and further questioning, finding answers and asking more question.

Nayak and Rao (2004) say that “as result of critical thinking, a previously held belief is confirmed or a new belief is established” (p. 112). Mangal (2005, p. 363) argues that the process of critical thinking is thoughtfulness which leads a person to new
events of knowledge and understanding. Huit (1998) explains critical thinking as “the disciplined mental activity of evaluating arguments or proposition and making judgments that can guide the development of beliefs and taking action” (p. 3). While supporting this idea, Moon (2008, p. 21) says that critical thinking is the ability to consider a variety of information derived from many different sources, to process this information in a creative and logical manner, challenging it, analyzing it and arriving at considered conclusions which can be defended and justified. Moon (2008, p. 54) again explains that critical thinking is more than a collection of skills and processes and there are many different skills and actions that may be involved in critical thinking.

Nayak and Rao (2004) explains that “critical thing is the ability to analyze facts, generate and organize ideas, defend opinions, make comparisons, draw inferences, evaluate arguments and solve problems” (p. 108). Kazdin (2000, p. 67) maintains that we need to reflect on how to solve problems that we experience in daily lifes. In the view of Mangal (2005) “critical thinking is essentially a directed thinking which pertains to reasoning and problem-solving procedures aimed at meeting specific goals” (p. 365).

2.4.3 Critical thinking and problem solving

In education, problem is question raised for inquiry, consideration, or solution. Thinking creatively and critically about how to increase the quality of life is active involvement in problem solving (Resbult, 2001, p.3) According to Kazdin (2000) “problem solving involves moving from a problem situation to a solution, overcoming obstacles along the way” (p. 67). In the view of Moon (2008) “problem solving and decision making are forms that can be broadly similar to critical thinking when there is no one fixed solution to be sought” (p. 30).
Critical thinking is a form of problem solving (Crowl, 1997, p. 171), and solving problem is one form of transfer of knowledge (Ormrod, 1998, p. 367). Hughes (2003) says that “much of our thinking is conscious, purposeful and logical. We grasp a problem, concentrate on it, collect evidence and draw conclusion. Problem solving is converting an actual current situation into a desired future situation” (p. 164). Resbult (2001) argues that “Problem solving methods are just strategies for effectively combining familiar thinking skills in order to achieve a goal and to solve a problem. Thinking skills and problem solving methods are closely related” (p. 4). In the view of Kazdin, (2000, p. 68), problem solving applies algorithms and heuristics in a problem space to solve it.

Feldman (1999, p. 265), posits that psychologists have found three major steps in solving a problem: preparation for the creation of solutions, production of solutions and evaluation of solutions that have been generated.

1. **Preparation: Understanding and Diagnosing Problem**

Woolfolk (2004) argues that “identifying the problem is critical first step. People often hurry through this important step and “leap” to naming the first problem that comes to mind. Experts in a field are more likely to spend time carefully considering the nature of the problem” (p. 285). Ormrod (1998, p. 334) and Feldman (1999, p.266) point out that problems differ from well defined to ill-defined. In a well-defined problem, the problem itself and the information required to solve it are available and obvious. Thus, judgments can be made for an appropriate solution. In an ill-defined problem, the specific nature of the problem is ambiguous and the information needed to solve it may be unclear. Solving each type of problem requires somewhat different kinds of psychological skills and knowledge. In the view of Azam (2001, p. 117), it is
wise to discover an appropriate guiding idea, inventing and testing hypotheses and incubating for the problem. Rational thinking is also a planned attack on the problem.

2. **Production: Generating Solutions**

   In the context of problem solving, Fisher (2008) says that “creativity is a process of becoming sensitive to problem, deficiencies, and identifying the difficulty, making guesses for formulating hypotheses about the deficiencies, testing and retesting these hypothesis; modifying them, searching for solutions and finally communicating the results” (p. 109). In the view of Feldman (1999, p. 268), the appropriate solution of a problem can be obtained through trial and error, means and ends analysis, sub goals and through insight.

   Woolfolk (2004) holds that “problem solvers often have to set and reach sub goals as they move towards the final solution” (p. 284). Kazdin (2000) is of the view that:

   People seeking to solve the problem can rely on either algorithms or heuristics. Algorithms are paths to a solution that, if followed, guarantee an accurate solution to the problem. A heuristic is an informal intuitive, speculative strategy, which sometimes works and sometimes does not. (p. 68)

   Fisher (2008, p. 125) says that the problems are solved, not by giving new information, but by arranging what we have always known. Woolfolk (2004) argues that “effective problem solving is based on an ample store of knowledge about the problem area” (p. 292).

3. **Judgment: Evaluating the Solutions**

   According to Feldman (1999, p.270), the final step in problem solving is judging the adequacy of a solution. If there is a clear solution, it will be the evidence of success. In the view of Nayak & Rao (2004) “evaluation, which might be considered equivalent
to critical thinking, focuses on making an assessment or judgment based on an analysis of a statement or proposition” (p. 110). Feldman (1999, p.268) again points out that cognitive approaches to problem solving suggest that thinking proceeds along fairly rational, logical lines as a person confronts a problem and considers various solutions. All steps involved in problem solving are the activities based on critical thinking. Without thinking critically, no problem can be solved accurately. According to Azam (2001, p.117), critical thinking proceeds from the data to a correct conclusion by a proper process of reasoning.

2.4.4 Critical Thinking and Reasoning

Kazdin (2000) holds:

Reasoning involves drawing conclusions from evidence. There are two main types of reasoning: Deductive and Inductive. Deductive reasoning is the process of reasoning from one or more general premises to reach a logically certain, specific conclusion. Inductive reasoning is the process of reasoning from specific facts or observations to reach a general conclusion that may explain the facts. (p.70)

Moon (2008, p. 44) states that critical thinking is working through for oneself a fresh problem; some processes that might be involved such as critically evaluating, making judgments, awareness of bias, commenting in a thoughtful way, emotions as well as reason and rationality. Skills in reasoning can be developed through a better understanding of what critical thinking entails.

Hughes and Hughes (2003, p.162) claim that as children’s interests widen, their range of subjects will also widen. As their ability to attend the ideas expressed in words develops and as their span of apprehension increases, the complexity of subjects about which they can reason will also increase. According to Mangal (2005, p.367), reasoning is step-wise thinking with a purpose or goal in mind. It is combining previous
experiences to solve a problem which cannot be solved by mere reproducing the earlier solutions. As Ruscio (2006, p.176) holds, reasoning is surely an outstanding ability and the failure to consider chance-related aspects of performance is a fundamental law in human reasoning. Feldman (1999, p.260) describes reasoning as a process by which information is used to draw conclusions and make decisions.

Mangal (2005, p. 367), narrates that reasoning essentially is a cognitive ability and is like thinking in many aspects. He says that it is not easy to clearly distinguish between thinking and reasoning as separate functions. Reasoning is said to be a productive and advanced stage in the complex process of thinking. Mangal (2005, p.368) again explains that reasoning may thus be termed as highly specialized thinking which helps an individual to explore mentally the cause and effect relationship of an event or solution of a problem by adopting some well organized systematic steps, based on previous experiences combined with present observation.

According to Azam (2001, p.91), reasoning is the stepwise or structured thinking, and complex learning necessitates reasoning. The thoughtful organization and logical arrangement of responses is essential in reasoning and complex learning. Mangal (2005, p. 368; Azam, 2001, p. 96 and Feldman, 1998, p. 260) support the above idea by explaining that correct thinking/ reasoning is purposive, sound, logical, clear and conclusive. Logical thinking is of two kinds inductive and deductive. Woolfolk (2004) holds that:

Learning is based on true understanding and inductive reasoning. The inductive reasoning is the using of specific examples to formulate a general principle. This approach requires intuitive thinking on the part of student. Thus, he believes that classroom learning should take place through inductive reasoning. (p. 280)
Mangal (2005, p. 368), supports the above idea by saying that induction is a way of proving a statement or generalizing a rule or principle. In inductive reasoning one can formulate generalized principles and conclusions on the basis of certain facts and specific examples.

Mangal (2005, p. 369) explains that deductive reasoning is the ability to draw logical conclusions from known statements or evidences. Feldman (1999, p. 261) and woolfolk (2004, p. 283) say that in deductive reasoning, the conclusion is derived through the use of general rules, whereas in inductive reasoning, a conclusion is inferred from specific examples. Azam (2001, p. 96) holds the same view, and says that in deductive thinking, the process of reasoning starts from a general proposition to lead to a specific conclusion.

To sum up, reasoning plays a significant role in learning and in adjustment of one’s environment. It is totally a complete cognitive activity and it also influences the total behavior and personality of a man. Both reasoning and problem solving are interlinked complex processes of thinking which help students learn with understanding. So, the students may be taught higher order thinking skills to solve problems on their own. Children are not born with the power to think critically, nor do they develop this ability naturally beyond survival – level thinking. Critical thinking is a learned ability that must be taught.

Moon (2008, p. 25), is of the opinion that critical thinking is a process in which we generate knowledge, and gather various processes such as understanding, analysis, synthesis and evaluation (as described by Bloom 1956).
2.4.5 Critical Thinking and Bloom’s Taxonomy of the Cognitive Domain

According to Arends (2007, p.112), Benjamin Bloom categorized the level of complexity of learning into three broad domains including cognitive, effective, and psychomotors known as Taxonomies of educational objectives. These are devices that classify and show relationships among things. In the view of Gelder (2010) “these domains and levels are still useful today to develop the critical thinking skills of students” (p. 1).

The cognitive domain of the objectives is of the most concern to many educators because it deals with various cognitive processes that may be included in instructional objectives. These objectives have been arranged in hierarchical order on the basis of complexity of the task from simple to complex behavior such as knowledge, comprehension, application, analysis, synthesis and evaluation. The higher level of the taxonomy depends on the lower level. The synthesis and evaluation both depend on analysis, analysis depend on application, and application depends on comprehension. The taxonomy facilitate transfer from simple to more complex thinking (Pankajam, 2005, p.195; Parsons, et al. 2001, p.396-99; Moon, 2008, p.36; Nayak & Rao, 2004, p.110; Huit, 1998, p.2; Arends, 2007, p.114; Azam,2001, p.111; Feden, 2003, p.120 and Jonassen, et.al., 1999, p.83).

2.4.6 Transfer of Learning

Sanacore (2000, p.2) argues that transfer is psychological concept that one aspect of learning affects a later aspect. The mastery of learning skills makes the students able to transfer of knowledge. As Reddy (2006, p. 66) states, learning is transferable. Transfer takes place from one field of study to another and from the
classroom situation to life situation. This transfer is essential as it leads to economy in learning.

According to Sanacore (2000, p. 2), the first object of any act of learning over and beyond the pleasure it may give, is that it should serve us in the future. He suggests two ways in which learning may serve us in the future. The first concerns its specific applicability to tasks or skills, while the second relates to its associations with principles and concepts. Although Bruner emphasizes the importance of the latter approach, both suggestions have merit for reading and study strategies. Child (1995, p.144), also holds that where there are common factors in the context or in the procedures adopted in carrying out two tasks, transfer is possible. Sanacore (2000, p.2) again explains that anything which can be learned may be transferred. According to Ormrod (1998, p.331), if we want our students to use the things they learn at school in real-world situations later on, we should teach classroom subject matter within the context of such situations. We may have the students practice their knowledge and skills in so many different contexts.

Thinking is cognitive activity and cognition according to Pasricha (2007, p.31) is defined as knowing or thought processes. The result of the processes of cognition is belief. Belief can be defined as a cognitive evaluation of something. In this context, Ormrod (1998, p.309) holds that people’s knowledge and beliefs about their own learning processes and capabilities are metacognition.

2.5 METACOGNITION

According to Parsons, et al., (2001, p.422), metacognition is thoughtfulness. It is thinking about ones own thinking and about how we process information effectively. Metacognition (literally overseeing cognition) refers to our ability to understand and
manipulate our own cognitive processes. It involves awareness about our thinking and purposely making changes in how we think. By supporting this statement, Ormrod (1998) argues that “when we talk about student’s knowledge and beliefs regarding their own cognitive processes and their attempts to regulate their cognitive processes to maximize learning and memory, we are talking about metacognition” (p. 348). In the view of Orey (2001) “there are mechanisms that control thinking and learning. These control processes are called metacognition” (p. 4). Child (1995, p. 136), holds students ought to have greater awareness of their thinking strategies. Individual students, by understanding the processes of study, their own characteristics, work conditions and subject contexts, are thought to have a better chance of improving the effectiveness of study sessions. This concept of self-consciously examining own mental processes, becoming aware about problems and adjusting accordingly to improve learning effectiveness is known as metacognition.

It is common practice that students rely on rote memorization rather than understanding and practicing thoughtfulness. According to Santrock (2004) “students who approach learning with a surface style fail to tie what they are learning into a larger conceptual framework” (p.124). Woolfolk (2004, p. 264) holds, rote memorization creates inert knowledge. Persons, et al., (2001, p.422) argue that too many students, in fact, fail to think about their thinking. We do not think about how we think or what we know about what is known which means we cannot control our information processing or use our cognitive capacities. According to Woolfolk (2004), “the greatest challenge teachers face is to help students think and understand not just memorize” (p. 263). Hergenhahn (2005, p.251) argues, when one acts on memorized facts or rules without understanding them, one can often make stupid mistakes. Bowden (2000, p.61)
maintains that students are criticized for their tendency to memorize information, often by swatting just prior to examinations and to forget it promptly afterwards.

According to Santrock (2004) “deep learners are more likely to actively construct what they learn and give meaning to what they need to remember. Thus, deep learners take constructivist approach to learning” (p. 124). In the light of arguments given above, it is concluded that students need to learn strategies of deep understanding for self regulation.

2.5.1 Self Regulation and Learning

According to Ashman (1997, p.149), there has been a strong and consistent emphasis in the cognitive and metacognitive strategy literature on the use of self – regulation procedures. Self-regulation is one aspect of metacognition.

According to Kumar (2006) “self-directed learning is the process in which individuals take on the responsibility for their own learning process by diagnosing their personal learning needs, setting goals, identifying resources, implementing strategies and evaluating the outcomes” (p. 30). He states that students can be described as self-regulated to the level that they are metacognitivly, motivationally and behaviourally take active participation in their learning processes. In the view of Osborn et al., (2000, p.133), pupils should have some classroom autonomy. Within the context of a clear organizational structure to increase motivation, allow for a more worthwhile learning experience to enable pupils to become independent learners in the future.

In the view of Parsons et al. (2001, p.423), most of our students should have the ability to think about their own thinking and the significant process that influence their learning. Reddy (2006, p.66) maintains that no learning can take place where there is no self activity. He quoted that “no one can teach you but you may learn, your teacher can
direct your learning, can show you how materials are derived or related and stimulate you to study. Whether or not you learn and what you learn depends upon what you yourself do, for learning is an activity”. Taylor and Jenkins (2000) argue that “students must become able to organize and regulate their own learning to learn independently, and to overcome difficulties in the learning process. This requires them to be aware of their own thinking” (p. 66).

According to Orey (2001, p. 4), metacognition is the form of strategies that can help students become self regulated learners. Kumar (2006) explains that “self regulation is not a fixed characteristic of learners. Employing appropriate strategies can help learners to develop self-regulation and volition to learn” (p. 22). Crowl, et al., (1997, p. 93) argue that learners may be taught the usage of metacognitive strategies to improve their learning. Parsons et al., (2001, p.425) hold similar notion that if the appropriate strategies are employed, teacher can make learners better users of their metacognitive skills. Ormrod (1998) supports the above idea by saying that “the more students know about effective learning strategies, the greater their metacognitive awareness and the higher their classroom achievement is likely to be” (p. 349). Parsons et al., (2001, p.422-425), argue that metacognition relies on a fair amount of abstract thinking and the skills engaged are often highly representational and internalized. Kumar (2006) maintains that “metacognitive strategies indicate an ‘executive’ function that involve planning for learning, thinking about the learning process as it is taking place, monitoring and evaluating learning” (p. 4). The metacognitive strategies or study skills are the tools to use mainly in reading. According to Hartley (2001, p. 26), reading development is closely associated with skills. Johri (2007, p. 282), argues that the child who cannot read well cannot succeed in mastering geography, history, science, or any
other school subjects that require reading. Simon (2010, p. 1) holds that reading is basic in all academic disciplines.

There is no understanding in reading without thinking. As Burns, et al. (1988) argue that “reading is a thinking process” (p. 10). Hay, et al. (2005, p. 24) holds similar point that reading needs thought, practice and an active approach. Johri (2007, p. 284) maintains that for its highest level, reading requires both thinking and learning. The reader takes what is on the printed page and uses his store of ideas to accept or reject and he himself is changed in the process. According to Burns, et al. (1988, p. 10), in order to comprehend a reading selection thoroughly, a person must be able to read critically and creatively to understand the figurative language, determine the author’s purpose, evaluate the ideas presented, and apply the ideas to actual situations. In the view of Hayat (2009, p. 17), academic reading affords opportunities for critical engagement with academic text.

Thomas and Pattison (2008, p. 100) maintain that these skills endow children with an implicit understanding of what literacy is and how it is used. Understanding of reading material can be acquired through study skills/strategies. According to Tyagi (2006, p. 59), skills and strategies in reading are means to an end; the end is fuller comprehension. A strategy is a general approach to a recurrent problem because reading requires the reader to deal continually with complex information.

Ormrod (1998, p. 350) argues that often teachers teach content without teaching students how to learn that content. The students may have difficulty mastering the content that teachers teach, as a result they do not learn successfully. They may not know why they fail nor may they know how to improve their chances of success. According to Leppanen et al. (2004, p.72), children who encounter problems while
learning to read, read less and without practice they fall behind in reading skills development. In the view of Ali (1993-94, p.128), there is a great need to find research based techniques and strategies to solve the problem of reading.

Harley (2001, p. 336) argues that one can improve his reading ability and the level of comprehension of text by providing himself with a framework of study methods. According to Ormrod (1998, p. 350), the teacher can better help students become successful learners if, when teaching specific academic content, teach them how to study that content, and help students develop and use effective learning and study strategies. Because, according to Kiewra (2002) “if you give a man a fish, you feed him for a day, but if you teach him how to fish, you feed him for a life time” (p.78). Lepanens et al., (2004, p. 77) indicate that metacognitive strategies like the ability to assess and monitor one’s own learning progress in a specific task may be associated with reading strategies.

### 2.6 SOME MAIN STUDY SKILLS/ STRATEGIES

A study strategy consists of specifically selected study skills that have the greatest potential for learning the material assigned. According to Woolfolk (2004) “using good learning strategies helps students learn and that these strategies can be taught” (p. 295). Sobkowiaka (2001) holds similar point that “success in reading comprehension is not an inborn capacity and it can be learnt” (p. 5). According to Hussain et al. (1992) “one of the great fact of Indian education system has been the lack of training in effective methods of study” (p. 190). Kiewra (2002) states that “teachers can teach students how to learn by embedding strategy instruction who must know two things:
a. Which strategies are effective and
b. How to teach them by embedding strategy instruction into context of teaching” (p. 71).

In this sense Pressley and Woloshyn (1995) suggest that strategy instruction should:

i. “Introduce the strategy by modeling it and describing it.

ii. Sell the strategy by telling why it works.

iii. Generalize the strategy by telling where else it is useful and

iv. Perfect the strategy by providing practice opportunities” (p. 72).

Whatever strategies should be used, the matter is that, according to Woolfolk (2004) “students must be cognitively engaged in order to learn, regulate and monitor their own learning, think and process information deeply, and monitor their understanding” (p. 296). Parsons et al., (2001, p, 425) hold that there are a number of specific metacognitive learning strategies that a teacher can teach to students. Many study skills could be discussed under this heading.

2.6.1 Organizational Skills

Burns et al., (1988, p. 373) states that students need to organize the ideas they encounter in their reading but too often teachers give little attention to organizational skills, such as identification of important information, note taking, and summarizing etc.

2.6.1.1 Identifying Important Information

According to Woolfolk (2004) “learning begins with focusing attention and deciding what is important” (p. 296). Ormrod (1998, p. 351) suggests that students must be selective in studying course content. The things they choose to study inevitably affect their learning and school achievement. Hay et al. (2005, p.31) argue that students
need to be selective in their note taking. Teachers can facilitate their students academic success by letting them know what things are most important for them to learn.

2.6.1.2 Taking notes

Woolfolk (2004) holds that “effective use of underlining and note-taking depends on an understanding of the text or lecture and connections and relationships among ideas” (p. 298). Mapping and graphics are helpful to depict relationship among concepts. Butcher (2002, p.43) states that it is important to write down the material covered because forgetting begins almost immediately. To guard against the relentlessness of forgetting, students must write down much of the information presented in class. When students review the notes, more likely they will master the material. According to Hay et al., (2005, p.29), for learning efficiently, students must read systematically and make notes in their own words. To be sure to really understand something and remember it, a student must be sure that he can explain it in his own words. ‘When in doubt, write it out’. In the view of Boud (1999, p. 95), effective note taking is a boon to students because it can help them to pay attention to what they are reading or listening to and it can aid their understanding of material. Kiewra (2002) maintains that “higher quantities of note taking are associated with higher achievement. Students have about 50% chance of recalling noted information on a test but only about a 15% chance of recalling non-noted information” (p. 72). Butcher (2002, p. 40) states that good notes are absolutely essential to college success.

Ormrod (1998, p. 52) again explains that note taking is associated with more successful classroom learning. It performs two very important functions, that is, encoding and external storage.
(1) **Encoding**: The process of taking notes, writing down things that have been read or heard helps students encode information in their long-term memories. Students who are actively engaged in taking notes are less likely to let their minds wander from what they are reading or listening to in class.

(2) **External Storage**: Even when we effectively keep information in long term memory, we can’t always find it again. Notes provide an additional source of storing information external to the memory system. Memory is often unreliable, notebooks are fairly dependable.

### 2.6.1.3 Retrieving relevant prior knowledge

Woolfolk (2004) argues:

> When we need to use information from long-term memory, we search for it, apply our schemas and draw on already existing knowledge to construct an understanding. Long-term memory is as a huge shelf full of tools (skills, procedures) and supplies (knowledge, schemas) ready to be brought to the workbench of working memory to accomplish a task. When a particular proportion is active, other closely associated knowledge can be activated as well. So, retrieval from long-term memory is partly through the spreading of activation from one bit of knowledge to related ideas in the network. (p. 254)

In the view of Ormrod (1998) “students can only engage in meaningful learning when they have previous knowledge to which new information can be related” (p.353). To make multiple connections between new material and their existing knowledge base, students must retrieve the information they already have as they study the new material. Gill (1990) posits “knower is evolutionarily endowed with the capacity of intelligence of making cognitive judgments about what is connected to what and what follows from what” (p. 91).
2.6.1.4 Organizing

Ferrett (2000) posits “once students record notes, they first organize their notes in outline form” (p. 73). Kiwera (2000) states that “the purpose of outlining is to readily see how information is organized into topics, categories, and associated details” (p. 74). After effective note taking, students find ways how they can set about making them more systematic and organized (Boud, 1999, p. 95). According to Ormrod (1998) “organized information is stored and retrieved more easily than unorganized information. One useful way of organizing information is outlining the material, a strategy that may be especially helpful to low achieving students” (p. 354). Concept mapping is also a useful strategy for organizing the information.

2.6.1.5 Elaborating

According to Ormord (1998, p.350), elaboration is speculating about possible reasons why people did the things they did, thinking about how an event has connection for current events. Elaborating involves drawing inferences, explaining and integrating material more effectively. Teachers can teach elaboration through modeling, giving students questions about their prior knowledge, differences, similarities, strengths, weaknesses, and conclusions related to the topic.

2.6.1.6 Summarizing

Summarizing the material being studied is another study strategy (Ormoro, 1998, p.357). According to Burns et al., (1988, p. 378), in summary, students restate what the other has said in a more concise way. When making summaries, trivial and redundant material should be deleted. Ormrod (1998) states that “summarizing usually entails at least three processes.
i. Separating important from unimportant information.

ii. Considering details into more general ideas.

iii. Identifying important relationship among those general ideas” (p. 397).

2.6.1.7 Monitoring Comprehension

According to Kazdin (2000, p.32), the use of self monitoring practice enhances the achievement. Kiewra (2002) is of the opinion that “most students do not adequately monitor their understanding before exams and are, therefore, unaware that they do not know all they need to know” (p. 77). Ormrod (1998, p.358) argues that when students do not monitor their own comprehension, they are unaware about their knowledge. Hay et al., (2005, p.30) state that you can waste a lot of time unless you think carefully about your reading and purpose of it. Ormrod (1998) further describes that “to be successful learners, and more specifically, to know what they know, students should monitor their comprehension both while reading and after they study. A teacher can promote better comprehension monitoring skills in students by teaching them self-questioning, and formulating and asking themselves questions” (p.358).

The above learning strategies support students focusing attention, making efforts for elaborating, organizing, connecting and summarizing. Thus they can process information deeply and monitor their understanding. A few well known reading strategies that support metacognitive process are reviewed below:

2.6.2 KWL Study Strategy

Woolfolk (2004) maintains:

Many teachers use a strategy called KWL to guide reading and inquiry in general. This general frame can be used at most grade levels. The steps are:
i. K: What do I know about this subject?

ii. W: what do I want to know?

iii. L: At the end of reading or inquiry, what have I learned. (p. 299)

According to Parsons et al. (2001, p.428), KWL is a strategy enabling students to know what they know, what they desire to learn, and what they do to learn. This metacognitive strategy starts with students discussion of what they know by listing of the information. Burns, et al. (1988, p.409) says that in this step, students may be asked to think of categories of information that they think may be found in the material they are going to read.

Then, learners are encouraged to make predictions about what they want to learn. The teacher may point out disagreements in the things that the students think they already know and may call attention to gaps in their knowledge. Having read the content information, students are guided to recall the information they learned (Parsons et al. 2001, p.428). If the reading did not answer all of their personal questions, students can be directed to other sources for the answers (Burns, et al., 1988, p.409).

2.6.3 Ideal

Parsons et al. (2001, p.428) explain that IDEAL is the acronym for the strategies, which are important for effective and efficient thinking and problem solving. IDEAL stands for:

I    Identifying
D    Defining
E    Exploring
A    Anticipating
L    Looking back
I. Identification of problem

According to Woolfolk (2004) “the first step, identifying that a problem exists and treating the problem as an opportunity begins the process” (p. 285). In the view of Parsons et al. (2001, p.429), effective problem solving should begin with careful anticipation of potential difficulties.

II. Definition of Problem

Identifying the problem is not enough. After identification, problem definition is a significant step. Through this step, the efficient learner examines goals (Parsons et al. 2001, p.429). Problem solving requires the activation of right schema (Woolfolk, 2001, p.285).

III. Exploring solution

According to Woolfolk (2004, p.288), if there is no right schema, there are two general procedures to solve a problem, that is algorithms, and heuristics. But, activating right schema is the efficient way to solve problem.

IV. Anticipating, acting

Woolfolk (2004) explains that “after representing the problem and exploring possible solutions, the next step is to select a solution and anticipate the consequences” (p. 289). Learners act on their solution options (Parsons et al., 2001, p. 429).

V. Looking Back

The last strategy in IDEAL is a critical step to monitor the outcomes of learner’s choices. In this step, students look and note which actions lead to successful resolution and which do not (Parsons et al 2001, p.429). According to Woolfolk (2004) “after you choose a solution strategy and implement it, evaluate the results by checking for evidence that confirms or contradicts your solution” (p.289).
2.6.4 PRSR Strategy


PRSR stands for preview, read, self-test, and review. Text organization, paraphrasing, and self-evaluation are stressed.

1. **Preview:** Read the title and introduction, heading and subheading to determine the main ideas covered in the text. Examine the illustrations for additional information. Look at the words in italics or bold print. Read the summary and then skim any review questions at the end of the chapter.

2. **Read:** Form the headings into questions and then read with the goal of answering those questions. Identify important points by underlining or taking notes. Think aloud to work through the meaning of the text.

3. **Self-Test:** Monitor understanding by answering self-made questions as well as review and discuss questions at the end of the chapter without referring to the text. Use summaries to organize important information. Try explaining key ideas and concepts to another person.

4. **Review:** Check answers to review questions against the text. Reconsider information that was forgotten or misunderstood. Repeat the self-test and review stages until the material is mastered. Then review periodically to keep the information in the long term memory. (strategy. 8)

2.6.5 READS Strategy

Woolfolk (2004) explains “READS stands for:

1. **R:** Review headings and subheadings

2. **E:** Examine bold face words
3. A: Ask, what do I expect to learn?

4. D: Do it and read

5. S: Summarize in your own words” (p. 299).

### 2.6.6 SQRQCQ Strategy

This method seems simple enough to utilize with good results which is developed especially for use in mathematics. SQRQCQ stand for Survey, Question, Read, Question, Compute, and Question. This approach may be beneficial because youngsters frequently have great difficulty reading statement of problems in mathematics textbooks. Its description is as under:

i. **Survey:** Read through the problem quickly to gain an idea of its general nature.

ii. **Question:** Ask yourself about what is asked in the problem.

iii. **Read:** Read the problem carefully, paying attention to specific details and relationship.

iv. **Question:** Make a decision about the mathematical operations to be carried out and, in some cases, the series in which they are to be performed.

v. **Compute:** Do the computations decided upon in the preceding step.

vi. **Question:** Decide whether or not the answer seems to be correct, asking, “Is this a reasonable answer? Has the computation been accurately performed?

The teacher should have the whole class practice the SQRQCQ method before he or she expects student to use it independently. The teaching of the method takes little extra time, since it is a good way to manage mathematics instruction (Burns, 1988, p. 352).
2.6.7 SQ3R Strategy

The SQ3R reading method is a structured strategy to reading that can be very helpful for learning (Hay, 2005, p.29). Trabasoo and Bouchard (2003) “SQ3R is a text pre-reading developed in 1941 for World War II military personal undergoing accelerated courses. It is considered a “test previewing: comprehension strategy instruction in that it guides readers to look for the meaning before reading the text” (p. 1978). According to Burns et al., (1988, p.350) probably it is the best-known study method.

The five steps of SQ3R strategy are:

1) **Survey:** Survey is the scanning of material to have a picture of the whole material covered by the book or article.

2) **Question:** This step is to ask questions about the text and to turn headings or subheadings into questions, then to answer them.

3) **Read:** Read the text thoroughly in the light of the questions posed during the question step, and then make notes in your own words.

4) **Recall:** Close your book and try to remember the information that has been read. Try to write the information in your own words which you remember. Testing your recall is the only way to know how successful your learning has been.

5) **Review:** In this last step, look back to your notes to make sure you do not forget and to see how what you have learned relates to the course as a whole, your other reading and what you are still required to do (Hay, 2005, p. 29; Feldt & Robert, 1999, p. 103; Huber, 2004, p. 1). If reading assignments are consistently
presented through the SQ3R method the procedure may become part of the child’s skills.

2.7 THE PQ4R STUDY STRATEGY

The PQ4R strategy of learning is based on the SQ3R approach (Sanacore, 2000, p.3). Sheffield, et al. (2005) hold that Francis Robinson developed the SQ3R method of self regulated reading (p. 10). This strategy is best-suited for text book reading (Huber, 2004, p.2). Nord (1985, p.4903) is of the opinion that it is the most commonly taught and higher level study skill technique. Hamblin (1986, p. 44) states that the old principle of gestalt psychology is embodied in it which stresses the need to get a grasp of the nature of the whole before attempting to master specific parts of that whole.

The PQ4R strategy is based on SQ3R with a fourth R added for the “reflect” step. Thus it becomes a six step approach. According to Harley (2001, p.336), one of the best known methods for studying is called PQ4R method. Sanacore (2000, p.3) states that the PQ4R strategy should be effective in improving the reading of material when the student’s purpose is thorough understanding of the content. Harley (2001, p.336) maintains that the PQ4R method emphasizes identifying the key points of what you are reading. It enables learners to process the material more deeply and think about its implications.

According to Mangal (2005, p. 269), in PQ4R technique the learners are taught to adopt a systematic approach to learning the desired material involving sequenced steps. Burns, et al. (1988, p. 351) hold that this strategy helps the students remember content material better than simply reading the material. Woolfolk (2004) explains the effectiveness of this strategy in these words:
First, following the steps makes students more aware of the organization of a given chapter. Next, these steps require students to study the chapter in sections instead of trying to learn all the information at once. This makes use of distributed practice. Creating and answering questions about the material forces students to process the information more deeply and with greater elaboration. (p. 300)

In the view of Sanacore (2000, p. 3), PQ4R method should help the student comprehend better, concentrate better, and retain better. It is appropriate for most subject areas in which reading informational textbook chapter are stressed. Reynolds (1996, p. 215) states that if you are learning a new skill, preparing for a test or mastering body of information, you will have to read thoroughly and carefully, noting the connections between idea and organization of the content. For this purpose, PQ4R strategy can actually save time and make a student more efficient reader, and because of reading actively, it is easier to concentrate and retain new information.

Harley (2001, p. 336) maintains that PQ4R technique maximizes memory retention. Elaborative processing of material is highly beneficial. The method can be applied either to whole book or to just one chapter in a book. Peirce (2003) holds that “students who learn study strategies in one course need to apply them in other contexts than where they first learn it” (p. 3). Ormord (1998, p.331) argues that when a student acquires effective learning strategies, rather than rote learning, those strategies often transfer positively to learning in a very different situation.

The PQ4R strategy has six steps, systematically combines a whole series of important study strategies, a plan of attack for studying a chapter or dealing with a textbook assignment.

The PQ4R study strategy goes like this:

1. P = Preview
Step 1: Preview

A preview is a rapid survey that helps setup mental compartment in which students fit the material. It involves taking several minutes to look through an entire chapter before beginning to read it (Butcher, 2002, p.97). In the view of Sobkowiaka (2001):

Preview refers to gathering the information necessary to define goals and concentrate on the text. At this stage, the reader reads the title and thinks of the topic it may suggest. To get more information, the reader reads boldface headings and any graphics should be noticed and paid attention to, as they build a framework into which details will be fitted during intensive reading. (p.3)

Preview is the quick survey of the material. Seiman (2010) explains that: To preview the reading material, students need to quickly overview the text and understand the main points and how this information is structured. The learner will skim the text book chapter to see the overall structure, decide which reading method will be best based upon headings and view the larger image of the chapter to understand the reading. (p.10)

Huber (2004, p.102) states that the preview asks the students to survey the material they are going to read. This activity may involve anything from identification of text structure and headings of the substance to previewing illustrations. Mangal (2005, p.269) says that previewing is quickly getting an idea of the material that is going to be remembered. Bibi (1994, p. 26) holds that the preview consists of quick and
efficient survey of the text content and its organization. It involves title, table of content, headings, subheadings, diagrams, maps, graphs and pictures etc.

**How to Preview the selection**

Wong (1994) suggests that “when you first open the book to a new chapter, do not dive right in and begin reading from the beginning of the chapter straight to the end. Instead, learn to use the process of surveying” (p. 100). Squires (2003, p.103) also posits not to just start reading automatically at page one and plough through the whole text. Instead, first skim through the table of contents, section headings, summaries and the beginnings and ends of the chapter. This will give you a mental framework within which you can house the detailed information.

Hay (2005, p. 27) narrates that “to take full control of any reading task that involves searching for information, you need to gain a general overview of the book or chapter you are consulting.” Reynolds (1996, p.215) suggests to be as specific as possible about one’s expectations because when you know what you are looking for, you are more likely to find it. When you have decided on your purpose, make a high speed survey of your reading selection. Durwin (n.d.) argues that “students should read chapter outlines, scan the chapter for general topics and identify major section within the reading assignment” (p. 1).

Hay (2005, p. 28) describes that before reading the text book or article in detail, follow these:

I. Glance at the title of the book, chapter of article and think about what it means.

   The title usually gives you an idea of what the book’s contents will be about.

II. Scan the contents page of book or chapter before you begin reading. It will give you what it covers.
III. While previewing an article or book chapter, skim the pages, looking for subheadings that indicate content.

IV. Check the beginning and the end of any chapter for an abstract or summary.

V. Look at illustrations, diagrams and graphs and read their captions to get further clues to content.

VI. If you are previewing a chapter, read the first sentence of each paragraph.

Hay (2005, p. 28) further explains that the quick survey is an essential first step. You should never embark on careful reading until you have looked ahead and decided what you need to do. Bavair (n.d) illustrates the preview step of PQ4R strategy by saying that “take a look at the material: skim the chapter headings, the boldface words and read the outline summary” (p.1).

Reynolds (1996, p. 216) describes that if your goal is mastery of the reading selection, the survey will prepare you to absorb what you read and help you devise an effective working strategy. Ryan (n.d, p.1) says, for previewing the material, read headings and subheadings as well as the associated pictures and graphs to have a best understanding of what you will read. Reynolds (1996, p. 216) also suggests that while previewing, read the first and last paragraphs, along with any study aids: headings, subheadings, summary, charts, diagrams and review questions. Burton (2007, p. 1) also suggests to look at the structure of the text and identify the aspects which may help with reading.

Burns et al., (1988) explain that “in survey step, as you approach reading assignment, notice chapter title and main headings, read introductory and summary paragraphs and inspect any visual aids such as maps, graphs or illustrations. This initial
survey provides a framework for organizing the facts you later derive from the reading” (p. 350).

There are some common features illustrated in related literature by the experts for how to preview a chapter, book or any other material.

**Title:**

The title gives a reader in a few words the shortest possible summary of the whole chapter. Without reading a line of text, you can learn in general way, what the material is about (Butcher, 2002, p. 97). The topic for the chapter is stated in the title (Wong, 1994, p. 101)

**Introduction**

The introduction is a key to understand the contents of the chapter. It highlights the main ideas and may give organizational clues about the relationship of ideas (Wong 1994, p. 101).

**Chapter Objectives**

The chapter objectives state the goal of the chapter, what the author intends to achieve from your reading. Read the objectives carefully and thoroughly (Wong, 1994, p. 101).

**Chapter Headings**

The learner may look for the headings, subheadings, key sentences and relationship among these headings. Page through the chapter and look at different levels of headings (Butcher, 2002, p. 97). The headings and subheadings appear in a larger or an italic print. Glance over the headings and subheadings to understand the structure of the chapter (Wong, 1994, p. 101).
Boldface Words

Look briefly at words marked in boldface and italics and in colour. Such words are important terms which help get an idea (Butcher, 2002, p. 97).

Picture and Charts

Pictures, charts and boxed material are helpful to understand the chapter at a glance. To get a general idea about contents and relationship to the topic, look enough to these visual aids (Wong, 1994, p. 101; Butcher, 2002, p. 97).

Chapter Study Questions

The questions found at the end of the chapter help to review the information the author feels is important to learn. While beginning the reading process, there is some foresight on the key points to learn in the chapter (Wong, 1994, p. 101).

Chapter Summary

If there is chapter summary, it should be read carefully because it highlights the main idea of the chapter (Wong, 1994, p. 101). Eliot (n.d) posits that “summary is provided to help understand the most important points in the chapter” (p. 2). If there is no summary, read the first and last sentence of every paragraph (Reynolds, 1996, p. 216).

Before reading ask, yourself some questions about preview:

- What previous knowledge I have about the chapter?
- What information can I find from the chapter?
- What should I look for when reading carefully?
- What information am I looking for?
Then the student should find out the main idea, the association between the title and the main headings and the connection between headings and subheadings of the chapter.

This is the way, through which the main idea of the chapter can be extracted. Previewing is a good idea and it should be the part of reading instruction (Langan, 1998, p. 88).

**STEP 2: Question**

According to Sobkowiaka (2001) the second step, “question, helps the reader focus on the reading passage and get involved in the work. Form as many questions concerning the text as possible” (p. 3).

The process of question and answer lies at the heart of explaining and understanding (Squires, 2003, p. 110). The question process is a central feature of most classrooms (Ryan, 2004, p. 171). In the view of Duffy & Roehler (1983) “all the steps are important but question step is the real key to success” (p. 311). Questions allow learners the chance for planning or identification of the important information to be obtained from the reading. (Durwin, n.d. p. 1 and Roger, 2006, p. 116) state that questioning activity engages students in thinking. Questions, where possible, should also link back to what students already know to extend their natural curiosity. According to Feden (2003, p.118), questions challenge students to think at higher level. Bovair (n.d.) explains that:

One study showed that subjects who study a passage without questions recall about thirty percent of it, with questions provided by the experimenter, they recall sixty percent, and if they make up their own questions then they recall seventy five percent. So this simple technique can double the amount you can remember. (p. 1)
Ryan (2004, p.172) is of the opinion that there is relationship between questioning strategies and student achievement. Questions from students mean they are thinking critically about what you are saying. Squires (2003, p.110) argues that questions and responses will make you think harder, and perhaps lead to a wider discussion in the group.

According to Simon (2010) “during the question phase of PQ4R reading strategy, students build questions based on the surveying they did previously. These questions are provided with the intention that they will be answered later on in the reading” (p. 10). In the view of Artis (2008) “by knowing what the textbook chapters are about, students can be provided questions to promote critical thinking skills” (p. 10). According to Burton (2007, p.1), questioning step of PQ4R strategy encourages the learners to formulate some questions to provide answers from the information in the text. These can be factual but should also include critical and evaluative questions.

How to Develop Questions

- Reynolds (1996, p. 216) suggests to write down any questions that occurred during the survey step. Make up questions from headings, charts, summary and other information as well. All the “Reading Thoughtfully” encourages the students to ask questions as preparation for reading.

- Rowntree (1988, p. 85) states that headings are always likely to bring questions in mind.

- Langan (1998, p. 340) and Wong (1994, p. 103) advise to turn headings into basic or specific questions, and then locate its answer to get the heart of the matter. Basic questions start with words such as what, why or how. Specific questions start with the words when, where or who.
• According to Eliot (n.d.) “turn the headings within chapter into questions. Using the author’s heads has an added benefit. It gives insight in the organization of the subject matter and the relationships among ideas” (p. 2).

• Headings and subheadings can be turned into questions by using previous knowledge and experience. These questions may be answered during the reading. Questions that arise during the survey step are needed to be recorded as well. Then these predicted questions should be compared to those given at the last page of the chapter.

• Make a margin on the left of note book to write questions. During this step, don’t write answers.

Writing student’s own study questions has several advantages:

- The questions give students a purpose of reading. Natural curiosity leads to read so that answers can be provided.
- Curiosity can help to concentrate on reading.
- Increased concentration helps to gain increased comprehension.
- Questions help students prepare for future test (Wong, 1994, p. 103).
- Phrasing questions about the substance can make the learning an active process.
- Generally, questions about material in books promote retention.
- Questions help students perceive the underlying structure of chapters (Eliot, n.d. p. 2).
- Ask students to read a selected passage and give them a question to focus their reading (Cottrell, 2001, p. 276).
Step 3 & 4: Read and Reflect

This is the heart of reading process (Rynolds, 1996, p. 216). The reading process is also a thinking process (Wong, 1994, p. 103). Eliot (n.d.) explains that “once you have phrased questions, in the PQ4R method, read the material that you can answer the questions” (p. 2). If you want to read in an active way, you must be prepared to question as you read. Your aim is to gain the best insight into a book’s content in the shortest possible time (Barness, 1992, p. 60). According to Hay (2005, p. 25), to be an efficient reader you need to know what is the purpose of your reading and what are you looking for. Ali (1993-94, p. 135) maintains that the reader should think, predict, question, evaluate, define and redefine when engaged in reading activity. Kathryn (1990) says “critical reading should be central to any discussion of thinking skills because the reading of textbooks plays such a prominent role in the content fields” (p. 2).

In the view of Boud (1999, p. 105), one of the basic skills of learning is the ability to read. According to Ali (1993-94, p. 135), the readers should have ability to understand the lexical meaning, the phrasal meaning, the functional relationship, and the structure of discourse. Boud (1999, p. 105) explains that most people when they read are aware neither of how they read, nor of the cognitive and effective processes which underlie their behavior. Even if they try to develop awareness, enormous difficulties are experienced in observing their reading-for-learning process. One outstanding experience is that they are unable to remember themselves reading. Only by guiding learners back into contact with their own process can they become aware of the existing state of their skills and bring these under review. Johri (2007, p. 287) holds that we must teach the child to understand what he reads and integrate what he reads with what he already knows.
During reading step, students may read the selection thoroughly as many times as necessary for maximum comprehension, retention and to get good initial sense of the chapter. Then focus upon main points of selection, headings, subheadings and unfamiliar terms to comprehend the selection. After students have gotten an overall impression of the chapter by reading everything once, they go back to reread everything once, they go back to reread parts that they did not at first understand (Reynolds, 1996, p. 216).

According to Wong (1994, p. 103), the read step of PQ4R encourages to read carefully. Read paragraph by paragraph of textbook to concentrate and comprehend one section of information at a time. Careful reading saves from rereading. After reading one paragraph, stop and think about what has been just read and ask yourself questions like:

What did the author just say? What is the main idea of the paragraph? What details are important to know?

This process of reading a paragraph, stopping, asking questions and thinking about the information helps in several ways:

- The mind stays focused on the information. Reading too quickly or carelessly puts the mind into “automatic pilot” where a little or no information can be registered in memory.
- The accuracy and higher level concentration can be attained that result better comprehension.
- The memory can have time to process new information. The learner also has time to think about information and understand it with greater accuracy.
According to Johri (2007, p.286), although the skillful reader can read rapidly, his most important characteristic is his marvelous ability to adjust his pace to the difficulty of the material and to his purpose in reading it. His comprehension remains big for all materials, but his rate fluctuates. He reads slowly when encounters difficult materials, when he finds it necessary to consider implications, or when he wants to remember a number of facts.

Butcher (2002, p. 100) argues to read the chapter straight through. In this first reading, not to be worried about understanding everything, just get a good initial sense of the chapter. Hay (2005, p. 25) explains that the reader cannot read everything in the same way, he must match the method of reading with the purpose of reading. Eliot (n.d, p. 2) says looking for answers of questions posed make sense of purpose that will help focus on the key points of the subject matter. According to Cottrell (2001,p. 276), students must focus their attention for key information. Parsons et al. (2001, p. 429) suggest to read using questions as guides. Pay attention to introductory paragraphs, reread difficult passages and look up unfamiliar terms. Then, according to Butcher (2002, p. 100), after getting an overall impression of the chapter, you can go back to reread parts that you did not first understand.

Making the Main points

Khattak and Khan (2002, p. 31) maintain that the first step and perhaps a central part of the programme is reading paragraph for the main idea. Rynolds (1996, p. 217) suggests to read thoughtfully, referring to the dictionary when necessary, check your understanding of the passage. Then decide upon the selection’s main point (often subheadings will help you to find it). Look up any unfamiliar terms and references to make sure you comprehend what you have read. Then use “one of the best of eye, a
pencil or marker, to mark up the reading material thoroughly at least once to make sure you understand it before you get out your pencil or marker: lines, stars, and question marks in the wrong places can be distracting. Students very much need to learn to read actively, critically and analytically (Rynolds, 1996, p. 217).

Look for and mark off what looks to be important ideas of details. In particular, mark off with following:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Set off a definition by underlining it.</td>
</tr>
<tr>
<td>Ex.</td>
<td>Set off examples by writing Ex in the margin of the page. Do not underline examples.</td>
</tr>
<tr>
<td>1,2,3</td>
<td>To mark enumeration items in a list, use numbers.</td>
</tr>
<tr>
<td>*Imp</td>
<td>For setting important ideas use a star or imp.</td>
</tr>
<tr>
<td>✓</td>
<td>Use a check for marking off items that may be important.</td>
</tr>
<tr>
<td>?</td>
<td>For the material that you can not understand and may need to reread later, use a question mark.</td>
</tr>
</tbody>
</table>

The purpose of marking is to set off points so that the student can easily return to them later when he will take study notes or answers of the posed questions. Butcher, (2002) holds that “marking should be a selective process, mark only the most important points: definitions, key examples, enumerations, and what seem to be other important ideas. Setting off too much material is no better than setting off too little” (p. 100).

According to Simon (2010, p.10), reading step of this method is the most important part. In the view of Sobkowiaka (2001) “read implies filling the earlier-built
mental framework with detailed information. If possible, some additional questions regarding the text should be made up” (p. 3). Durwin (n.d.) says:

While reading, students should attempt to answer the questions developed from the outline or section heading or questions provided in the chapter by the author. Students should not skip over tables, figures or other important visuals because these often support the main ideas in the narrative of the text. (p. 1)

Reflection is necessary and a vital strategy to be used during reading process. Eliot (n.d.) maintains that “reading without reflecting is like eating without digesting (p. 2). Reflection is thinking about the substance just read. Think of the previous examples from one’s own life, and relating the new information to things already in knowledge (Bavair, n.d., p.1).

During reading the reader must take breaks from the reading material in order to relate information to previous knowledge (Durvin, n.d., p.1). In this sense O’Reilly (2010) argues that “Learner’s background knowledge is important in determining how well readers can comprehend, learn and utilize new information. Student’s prior knowledge plays a vital role in learning” (p. 1). Sobkowiaka (2001) supports the argument that “while the reader reads the text, he should ponder on it, look for its reflection in reality, his own experience and background knowledge. Thus, the main aim of reflecting on the text is to understand it” (p. 4). Parsons et al., (2001, p. 429) is also of the opinion to think about what has been read, relate ideas to what you already know.

In the view of Reynolds (1996, p. 217), during reading, look for connections between the reading selection and your own experience such as:

Is the information related to what you already know? Will it be helpful to you academically, professionally, or personally? Make sure you have not missed any practical details. Check your understanding of any abstract
ideas you have read. It will help to comprehend and retain what you have read; it also develops the insightful outlook that is the hallmark of every truly educated person. This strategy is a vital part of the critical reading process.

Reddy (2006, p. 66) argues that true human learning should aim at the higher level of thinking i.e. creative and critical thinking. Thus reflection involves higher level of thinking. When a learner, according to Klein (n.d. p. 3), reads in short bits, stops when he needs to think about what he has been reading, and asks him/herself questions about what he has read, he is passing through the higher level thinking process.

Mangal (2005, p. 270) and Eliot (n.d. p. 2) posit that while reflecting, the information given in selected material is organized and made meaningful. If students want to remember the information, they need to think about it and put it in heads in their own words, instead of sitting back passively and absorbing it.

Cottrell (2001, p. 277) suggests to give students time to reflect upon their own reading. Moon (2008, p.25) says that thinking critically about one’s own actions or ideas might involve gathering of various processes such as understanding, analysis, synthesis, evaluation and so on, such as those described by Bloom (1956), and termed tools of manipulation of knowledge. Eliot (n.d.) explains that “you learn more effectively when you reflect on what you are learning. Reflecting means relating it to things you already know about. This process makes the material meaningful and remember, and you are able to apply the information to your own life” (p. 3).

Thus reflection is thinking process that involves:

- **Linking new information to the old**

According to Mangal (2005, p.270) and Eliot (n.d. p.3), we mostly expand our knowledge base by relating new information to the things we already know. Ghani
(1991, p. 14) holds that we travel from familiar to unfamiliar, that is, we try to establish an association between the known and unknown. In the views of Thomas and Pattison (2008, p. 100), in order to actively derive meaning from print, the reader needs to be able to relate what is read to other experiences and knowledge.

Arends (2007) is of the view that “meaning can emerge from new materials only if they tie it into existing cognitive structures of prior learning” (p. 259). Harley (2007, p. 52) posits that student’s prior knowledge affects their learning more than anything else. Consequently, a constant reference in the literature on teaching is to find out what the students already know, and start from there. Thomas and Pattison (2008, p. 100) explain that reading does not exist as a skill in isolation though this is how it is often treated in school; it is connected to language, to life, to culture and experiences. O’Reilly (2010) explains that “knowledge is the foundation with which new information is learned. Learner’s existing knowledge has a large impact on knowledge acquisition” (p. 10).

Sanacore (2000, p. 2) states that students will learn how to transfer learning if they relate their learning experiences to their interests and experiences. So, activate the student’s previous knowledge of the content, and facilitate the application of this knowledge to the present reading assignment. Thus, ‘what one already knows will affect most readily what one can come to know’. According to Eliot (n.d. p.3), we better learn information if we reflect on it.

▶ Relating new information to events in our personal lives

Eliot (n.d. p.3) maintains that we can reflect on information by relating the new information to our personal lives. According to Trabasso and Bouchard (2003):
Prior knowledge is to assist reader in bringing to mind their own knowledge that is relevant to understanding the text. A teacher can activate prior knowledge by asking students to think about topics relevant to the passage, by teaching the requisite relevant knowledge, by using prereading activity on related but better-known topics, by having the readers predict what will happen in the text based on personal experience, by having readers make associations during reading, and by previewing the story or text. (p.1979)

Johri (2007, p. 284) holds that the past experiences and present needs of the reader govern what meanings he receives. Barnes (1992, p.53) explains that relate the things you already know and relate them you have been reading to your own life. If you don’t do so, your reading will take several repetitions. Through reflection, the material can be embedded so firmly in the memory that it can be retained on the basis of review.

- **Relate new information to old rules**

Sometimes to reflect on information means to apply rules (Eliot, n.d. p.3). In the view of Peirce (2003) “connect the reading to a past lecture or to prior knowledge and apply the chapter content to a scenario or a case” (p. 8). According to Harley (2001, p.336), prior knowledge provides a framework for understanding new material and activate appropriate concepts more easily. It also helps us to decide what is important and relevant in material and what is less so. Johri (2007, p. 285) says, the person who has little experience or knowledge of his own, will gain little from reading.

- **Compare and contrast the facts**

Harley (2001, p. 337) states that learner should reflect on the material while reading it. He may try to think about examples and try to relate them to prior knowledge. Durwin (n.d.) holds the same view and says “create examples beyond those provided in the text. Compare how does this relate to other information in the text” (p.1). Peirce (2003, p. 8) suggests to compare and contrast the selected material with
another reading. Critique and evaluate the reading. Johri (2007, p. 284) believes that the reader must challenge what he reads on the basis of his previous knowledge, and he must re-examine his present ideas in the light of what he reads. Because mere understanding of the printed work without challenge or integration is at best a low level of reading.

- **Use Mnemonic Devices**

  Ghani (1999, p. 10) is of the view that through the use of mnemonics, one can remember and fix the information permanently in his mind. According to Mangal (2005, p. 270) and Eliot (n.d. p. 3), mnemonic devices refer to remember any information but we usually use chunks of information by combining them into phrases.

- **Correlating the information with other similar facts, concepts and principles**

  According to Mangal (2005, p. 270), correlating the information with other similar facts, concepts and principles is a process performed during the reflection step. Kiewra (2002) is also of the view that “students must relate or connect the material to be learned” (p. 76). Arends (2007) posits that “prior knowledge definitely filters new information and thereby determines how well new information will be integrated and retained by a learner” (p. 262). In this sense Eliot (n.d.) holds that:

  > There are thus many ways to reflect upon the selected material for study. Broadly speaking, when we reflect on material, we relate things. This may mean relating it to personal experiences, categorization or classification of information, making associations and using mnemonic devices such as acronyms and mediation. (p. 3)

At the end, students must ask themselves questions like this:

- Do I know exactly what I am looking for?
- Have I considered what questions I will have to answer?
• Have I determined what information do I require?

If a student finds any answer in ‘no’ then he must repeat the process and reread the text (Barnes, 1992, p. 53).

In the light of above mentioned arguments, it is concluded that reflection step of PQ4R study strategy helps to retrieve information previously stored in long term memory, rejects or accepts new information, reconstruct it, then register it again in long term memory for further use.

**STEP 5: Recite**

In the view of Huber (2004) “definition of “recite” is not literal, but rather means that students should periodically stop to reflect on what they have read, to interact with the text and to answer their self-generated questions” (p. 108). Sobkowiaka (2001) says “recite and review correspond to the ones from SQ3R strategy” (p. 5).

A leading cognitive psychology text recommends this method, in this concern Kiewra (2002) posits “the PQ4R method of learning text material. One of the four R’s is “recite”, which involves repeating information” (p. 75). Recitation is, in fact, a surefire way of mastering the material to be learnt (Butcher, 2002, p. 105). In this step, students check their understanding by restating what they learned from the selection (Reynolds, 1996, p. 218). The information provided in the material is remembered through recitation and recall both orally and in writing (Mangal, 2005, p. 270). Students may recite material as follows:

a. **Answering Questions:** After finishing a section, try to recall the information that was in it. The reader should stop and make effort to answer his questions from memory, if he is unable to do this, reread the difficult material and the parts relevant to the questions he could not answer. Relate information to
headings and recall main points (Harley, 2001, p. 336; Sobkowiaka, 2001, p. 3; Parsons, et.al., 2001, p. 429). According to Eliot (n.d. p.4), Ryan (n.d. p.1) and Wong (1994, p. 104), after reading a section, recite each answer aloud to yourself or to someone else. Reynolds (1996, p. 218) explains this strategy that for recitation, cover the answer to the questions you wrote in previous step and see if you can recall the answers. In the view of Butcher (2002, p. 105), recite the material to yourself. Eliot (n.d. p. 4) explains that reciting the answers aloud is helpful for remembering them in different ways. Repetition fosters retention. We produce the concepts and ideas, associate them with spoken words and gestures. Thomas and Pattison (2008, p. 107) hold that reading aloud introduces the idea of stories, what they are and how they relate to real life in different ways. It helps children to map their own experience onto written words so that what they are hearing make sense to and hold meaning for them. It also introduces a feel for the flow of words, helping children to anticipate what may be coming next.

b. **Key Words:** Butcher (2002, p. 105) suggests to use key words in the margins of notes. Then, turn each key word or phrase into a question and go over the material until you are able to answer the questions without looking at the page. You will find out immediately whether or not you know the material. Go back and reread the items, if necessary. Next, look at definitions and examples. After finishing a section, go back and review previous sections and make sure you can recite all the material.

c. **Tell Story:** Encourage the learners to talk about the text e.g. without looking at the print, in pairs or small groups, explain different parts of the text to each
other. If this is difficult, reread the appropriate parts. Telling something to some
one else is a good way of finding out if it has been fully understood. Some
learners need to activate their auditory memory by talking about what they have
read (Burton, 2007, p. 2). Kiewra (2002) maintains that “make reciting and
repeating information aloud so that you both hear it and “get the physical
sensation in your throat, tongue and lips” (p. 75). Discuss the text and create
mind maps or posters with the key points which can activate visual memory and
highlight any gaps in recall of the text (Burton, 2007, p. 2).

d. **Summarizing**: Another possibility is to write a summary of what you have read;
then compare your version with summaries written by other members of the
class or study group (Reynolds, 1996, p. 218). According to Orey (2001)
strategic readers might stop and summarize what they have just read in order to
ensure comprehension” (p. 4). Bavair (n.d.) supports the idea that “one form of
recitation is to try to write ideas in your own words, using your own
organization. Then try to explain the ideas to somebody else” (p. 1).

e. **Using Auditory Channels**: Wong (1994, p. 104) narrates that reciting is one of
the memory principles and valuable for the reasons that it requires you to
explain the information clearly. Reciting provides with important feed back. It
leads to active learning which increases the level and length of concentration. It
also activates the auditory channels of the brain. The more senses you can use in
the learning process, the stronger the paths will be to your memory. Reciting in
your own words helps you avoid rote memorization. After recitation, you have
fresh ideas in memory that later can be connected to the new information while
reading the next paragraph.
Reddy (2006, p. 93) throws light on this step by saying that materials learnt through recitation were much better remembered than when material were learned through reading alone. It reduces the time needed for learning and increases the persistence of learning. According to Shahid (2000, p. 173), psychologists are of the opinion that recitation is helpful in the process of retention. Self recitation is much more efficient way of retaining learnt material. In the view of Reddy (2006, p. 93), the conscious use of recall during the process demands that the act of reading be effortful. It prevents the reader from letting his eyes dance lightly along from word to word while he focuses his thoughts. The learner sets specific goals and makes an immediate evaluation of his progress toward them. Recitation gives the learner chance to check immediately on the accuracy of his learning. Correct information is confirmed and incorrect is rejected. It is a muscular activity as the learner tries to repeat the material in his own words, he tends to use at least his muscles in the process.

f. **Use all the Senses:** Klein (n.d. p. 4) suggests using all the senses while reciting the material, see, say, hear and then write or draw, and select the important parts.

According to Rowntree (1988, p. 91), at least half the PQ4R time may be spent on reflecting and reciting the material. Because the ideas in the text are important, the time is not wasted. You will lose understanding unless you follow through reflecting, reciting and reviewing.

**STEP 6: Review**

Since most forgetting takes place within 24 hours, students will have to review the reading selection to retain what they have read (Reynolds, 1996, p. 218; Klein, n.d.)
p.5). Ghani (1999, p. 9) maintains that unless perpetually repeated, we usually tend to forget most of the information stored in our memory. According to Sobkowiaka (2001) “review factor is very similar to recite one, but the ‘review’ is applied after the whole text has been read, and the ‘recite’ is employed after each small section of the text” (p. 3).

Fisher (2008, p. 146) explains that review is an important element in the process, as it aims to develop metacognitive awareness of the process, the content and the response of the individual. It aims to help children identify what they have learnt from the experience, where they and others achieved success, and ways in which they or the group could improve in the future. The review can take place during or after the discussion. It can be undertaken as part of whole group or paired discussion, in response to an evaluation sheet of key questions or through individuals doing a ‘think write’ in their notebooks. Reddy (2006, p. 100) holds that careful review is a valuable aid to memory, particularly when it is begun soon after the initial learning. According to Child (1995, p. 140), the review is important because memories begin to fade with the passage of time unless we actively recall them periodically. It is a useful idea to set aside some time both during or after the learning session for actively recalling or committing to paper the work covered. Reddy (2006, p. 101) supports the idea that the first review should take place soon after learning, in order to avoid the great loss that takes place during the initial period of rapid forgetting. An hour or two each week should be identified for the review of all the course notes for the semester or the year. Wong (1994, p. 105) narrates that review is a vital step for the reason that:

- The process of memory involves putting information into long-term memory and being able to retrieve it from this memory storage when needed.
• Frequent ongoing review keeps information fresh in the memory. The student has less need to cram or feel unprepared for tests.
• New knowledge can be easily connected to the information in the memory.
• An immediate review of information summarizes the learned material. It provides the learner a big picture supported by important details.

**How to Review:**

Durwin (n.d) posits that “review actually requires the student to mentally, rather than physically, think through the chapter contents in order to monitor how much of the material has been learned” (p. 2). Reddy (2006, p. 101) advocates to teach the child to review independently. According to Child (1995, p. 140), we should spend at least half the study time trying to recall and recite the work we are learning because often the time is totally taken up in reading, without necessarily absorbing the work. In the view of Reddy (2006, p. 101), we must also review lesson before we begin a new unit, and schedule a regular portion of study time for it in the classroom. Reynolds (1996, p. 218) maintains that a short, easy selection may require only five minutes of review every day; a long or difficult selection may require extensive reading and review.

Cottrell (1999, p. 115) suggests how to understand what has been read. What is the basic argument of the idea? Does the text answer the questions posed? How does new knowledge relate to your previous knowledge? Does it confirm or challenge your view? What else do you need to find out? Keeping the above questions in mind, organize information, restudy difficult material and remember linkages (Parsons, et.al., 2001, p. 429). Bavair (n.d.) says “try to recall the material and set yourself. Study partners can help here. Making up a quiz as part of recitation and then taking it as review is a good way to study” (p. 1). Make sure your review strategies are appropriate
to the length and difficulty of the reading selection (Reynolds, 1996, p. 218). In the view of Harley (2001, p.337), after finishing read, reflect and recite, go through the material mentally, recalling the main points. Again answer the questions you posed. A few minutes after you have finished this process, flick through the material once more. If possible, repeat this an hour or so later.

Mangal (2005, p.270) says that learner asks himself questions related to the information given in the material and in case he is unable to provide satisfactory answer, he reads the material again, recites and remembers it more carefully and then again evaluates his learning. According to Eliot (n.d.):

To effectively review material, you need to establish goals and plan ahead to meet them. Learning takes time. We forget most of what we learn. Thus we remember best when we repeat or review what we have learned. Once you have determined the amount of study time, try to space or distribute it fairly evenly. Distributed learning is efficient than cramming. (p. 5)

Reddy (2006, p.101) maintains that although no new materials are presented, during a review the child learns many things for the first time, since he will seldom have learned all that is available during the previous exposure. New applications and understandings will be developed during the review.

Following valuable activities were suggested for immediate and ongoing review:

- Reread the entire selection
- Answer the questions predicted during the question step
- Answer those questions given at the end of the chapter
- List the key points from the text, orally or in writing, as appropriate
- Repeat the survey step by reading only selected parts of the selection
• Personalize the information by asking yourself additional questions: Why is this important to learn?

• Try explaining what you have read to a friend

• Write a summary

• Without looking, recite your summary from memory

• Make mind map or outline

• Create additional study tools such as vocabulary, flash cards etc and study them

• Redo the review questions at the end

• Individually read the text again to monitor your own confidence and to identify any aspects which need further development. This will act as formative assessment (Reynolds, 1996, p.219; Wong, 1994, p.105 and Burton, 2007, p. 2).

2.7 RESEARCH STUDIES ON STUDY SKILLS

Since the early 1990s, there has been a dramatic change in the approach to skills development within the education. Skills development is now high on agenda for universities, colleges and schools to improve individual’s own learning and performance (Cottrell, 2001, p. 3). A number of research studies have found the relationship between several types of study skills and strategies, and learning outcomes. Some evidences from research studies conducted on study strategies are reviewed below, and presented in chronological order:

A research study was conducted by Schumaker and Deshler, et al. (1982) to use the multipass, a learning strategy for improving the reading comprehension. It was an experimental study. The participants were eight students studying in grade seven, 5 males and three females. They were taken from learning disabled programme but their
IQ level was in normal range i.e 80 or above, their age range was 14 to 18 years. Ten instructional steps were involved to teach three multipass sub strategies: survey, size-up, and sort-out. The steps involved in sub strategies were almost similar to the steps in the PQ4R and SQ3R strategies. Results were analyzed by using the percentage formula, which showed that all the students mastered the multipass strategies through training and then successfully generalized them to text materials. Student’s grades were improved dramatically on tests after the training of the strategies. These results indicate that a specific instructional methodology can be effectively used for teaching the complex strategies of learning even to learning disabled adolescents.

Another research study was carried out by Rinehart, Stahl and Erickson (1986) to find out the effect of summarization training on reading and studying. The sample of the study was 70 6th grade students in two elementary schools located in northern central West Virginia. The pretest means for the comprehension subtest for both the comparison groups (control and experimental) were equivalent to the 58th and 63rd percentile respectively. The difference between both the groups in this measure was non-significant at .05 level. The summarization training was extended to each of the two classes by their respective classroom teachers. The treatment was on five consecutive days on 21 paragraphs adapted from reading skills book, for the period of 45 to 50 minutes per day. Four operations of summarization: Identifying main ideas, deleting trivial facts, deleting superfluous information, and making relation between main and supporting information were taught. Results were analyzed by using one-way analysis of covariance (ANCOVA). The training of summarization was significantly effective for the recall of major information in a study task but had not a significant affect on recall of minor information.
A research study was conducted by Zeller and well (1990) to investigate adequacy of preparation in study skills. Four study skills were involved: 1. Test taking 2. Text reading 3. Note taking 4. Review of tests. This study used pretest posttest control group design, and did not use random assignment. The comparison groups were nonequivalent. The performance of 241 students was examined. The grade point average (GPA) was calculated 18 students participated from 8-14 hours, 22 participated 4-7 hours and 29 students participated from one to three hours during the semesters.

The main finding of the study was that those students who used the study skills lab for four or more hours improved their test scores whereas students who participated SSL for three or fewer hours did not improve.

McCormic and Cooper’s (1991) carried out a research study on the effect of SQ3R strategy on learning of the disabled. They found that SQ3R strategy as a whole did not have noticeable effect on student’s mastery of the text. On the other hand, Sakta (1991) claimed that the SQRC method, or State Question Read Conclude was partially derived from SQ3R strategy which, according to her, is an effective strategy for promoting the reading and thinking skills.

King (1992) conducted an experimental research to compare the summarizing, self questioning, and note taking-review as methods of learning from lecturing. The sample of the study was 56 college students in remedial reading sections of study skills course, comprising 19 students for self-questioning, 19 for summarizing and 18 for note taking review. Before the treatment, scholastic aptitude test, and Nelson Denny reading test were taken from all the groups. Mean age of participants was 19.09 years. Each of the three classes met three times per week for 50 minutes for training, practice and
testing components of study, and all three classes were taught by the same instructor. Videotaped lectures were used as material. Results showed that in the use of study strategies, no significant differences could be found among conditions on typical strategy use. Students in questioning condition used the study strategy of rewriting their lecture notes more frequently than did the summarizing students. The results revealed that both guided self-questioning and summarizing are effective strategies for learning from lectures. Students who were trained to generate their own thought provoking questions, and those who were trained to write summaries, performed better at immediate posttest than of those students who simply took notes and reviewed their notes.

Another research study was conducted by Somuncuoglu and Yildirim (1999) to explore the relationship between goal orientation and use of strategies for learning. The sample of the study was 189 undergraduate students in a course of educational psychology who filled in a questionnaire on goal orientation and strategies for learning. The students often used metacognitive strategies such as adapting their study to the course and the style of instructor, compensating for their missing notes, skimming material before reading it, self-questioning, thinking critically about the topic, and setting their own learning goals for self directed study. Finally, framing questions to guide their reading was the least used metacognitive strategy. Overall, students used deep cognitive strategies.

The results of questionnaire were analyzed through statistics like percentages and means and inferential statistics. The results indicated that there was a significant but low negative correlation between mastery orientation and use of surface cognitive and
metacognitive strategy. Though Ego-social orientation was positively correlated with
cognitive strategies, yet this orientation was not correlated with deep metacognitive
strategies. Work avoidance was also positively correlated with surface cognitive
strategies, and negatively correlated with use of both deep cognitive and metacognitive
strategy.

Jitendra, Kay and Ping (2000) examined the effect of a main idea strategy and
self-monitoring instructional procedure to improving comprehension of text material
with high incidence disabilities students. The sample consisted of 33 middle school
students who were randomly selected as experimental and control groups. Students in
experimental group were given training for the identification and generation of main
idea statements and a self-monitoring procedure. Results were analyzed by using
ANOVA with repeated measures. Significant main effects were found. Scores for the
experimental group were higher than those for the control group and pretest scores were
lower than posttest as well as and delayed posttest scores. The experimental group
obtained increased posttest scores that were significantly different from the pretest
scores on the other hand, scores for the control group decreased from pretest to posttest
but increased on the delayed posttest. These differences among tests were significant
only between posttest and delayed posttest for the control group.

Another research study was carried out by Katayama and Robinson (2000) who
involved students “Partially” in Note-Taking and using Graphic Organizers. The sample
consisted of 117 (65 females and 52 males) students from two undergraduate education
courses. The material of the study included one chapter. The text covered the topic
“Sleep disorder”. A 30-item, multiple choice test measured the students factual
knowledge of information clearly stated in the text. The six sets of study notes involved complete outlines, partial outlines, skeletal outlines, complete Gos, partial Gos, and skeletal Gos. The students were randomly assigned to six conditions and were given 40 minutes to read the material and perform the assigned activities. Factorial analysis of variance were performed on factual and application test scores. The main effect of study notes for factual notes was not significant. Type of study notes did not affect the student’s scores. The main effect of amount of information and the study notes and amount of information interaction was also not significant. The students who studied Gos strategy did better than those students who studied outlines.

A research was carried out by Lee (2004) to examine the effect of note taking instruction on 3rd grade students learning of science and note taking. Participants in this study were 93 3rd grade students in the natural science classes offered in a rural elementary school of southern Taiwan. Three classes were assigned to a strategic note taking method condition, and a control condition, with a sample of 30, 34, and 29 respectively. It was an experimental study which studied six experimental conditions. 2x3 MANCOVA was used for analysis. There was no significant difference between the groups. In exploring equivalence of prior knowledge of the three groups, the test for homogeneity of dispersion matrices was not significant. Students with different previous achievement scores performed differently. All the differences favoured students with higher previous achievement in sciences. The experimental group exposed to strategic note taking method which outdid the control group on the task. Strategic instruction groups, and partial strategic instruction group did significantly better than the control group.
A research study was conducted by Bibi (2007) on the investigation of macro processing and micro processing in reading comprehension on government secondary school students. The researcher investigated the ability to read the passage and find the answers of given questions. The percentage formula was used to analyze the results. It was concluded that most of the students lacked the ability to read the passage and find out the required information.

A research was carried out by Faryal (2008) to explore the ways for the enhancement of reading comprehension ability of learners through metacognitive strategies. The sample consisted of the research was 130 students, out of which 65 students participated in metacognitive instruction while the remaining 65 students did not do so. The study was pre-test – post-test experimental design. Two instruments, on 20 items multiple choice test of vocabulary was used to assess the students in pre-test and post-test. The second test was the reading comprehension test and used in the pre-test and post-test stages of the study. Mean and standard deviations were applied to summarize the data. The experimental group showed significantly better performance than the control group. Metacognitive learning strategies such as inferring meanings, using background knowledge, distinguishing, guessing, and evaluating etc. helped students to better comprehend and apply these strategies on different reading tasks.

Kirby, et al. (2008) examined the effect of learning strategies of postsecondary students with and without dyslexia. Sample consisted of 102 students comprising 36 students with dyslexia and 66 students without dyslexia. To assess the reading rate and comprehension, the Nelson Denny Test was used. The SPQ-R consisting of two scales to measure the deep approach and to measure the surface approach of learning was
used. The LASSI second edition was used to measure student’s use of learning strategies. To explore the difference between students with dyslexia and without dyslexia, the two tailed $t$ test was applied. A multivariate analysis of variance (MANOVA) was used to compare two groups on 10 scales of the LASSI -2, and the surface and deep approach scales of SPQ-R. The results indicated overall group differences. Students with dyslexia obtained low scores in the selection of main idea and test taking strategies. However, they frequently used time management principles and study aids than the students without dyslexia. The $t$ test showed a significant difference in the use of deep approach by the students with dyslexia and those without dyslexia. The groups showed no significant difference on the surface approach scales.

Bagherpour, Abdollahzadeh and Valipour (2009) carried out a research to examine the effects of instructing the cognitive and metacognitive strategies on remembering and comprehension of students. It was an experimental study. Pretest and posttest control group design was used in this experiment. No significant difference was found between two groups in pretest. The results were analyzed on the basis of one tailed ANOVA. Positive effect of cognitive and metacognitive strategies on remembering and comprehending the text material was found. The mean difference between experimental and control group shows a positive effect of learning strategies on increasing the retention scores and scientific comprehension. In the pretest 1 and posttest 2, easy scientific comprehension in both the groups were equal. This score was not significant. On the whole, learning strategies education caused increase in retention and scientific comprehension.
Rodi (2009) investigated the improvement of the reading comprehension of 10th year students of MAN Mojokerto using PQ4R strategy. Sample of the study consisted of 42 10th year students of MAN Mojokerto, East Jawa. The study consisted of two cycles. The data was collected through observation sheets for the information regarding student’s and teacher’s activities during the usage of PQ4R strategy, field notes and test were taken to identify whether the students made progress in reading comprehension. The results showed that the implementation of PQ4R strategy improves the reading comprehension of students.

A research study was carried out by Rahim et al. (2010) to explore the usage of metacognitive and cognitive strategies for 3rd semester students majoring the English in reading of an English text. The researchers also investigated the difference in the metacognitive reading strategies adopted by students across demographic factor that was former type of school attended.

The result of the study showed no significant difference between metacognitive strategies with demographic factor, and no association was found between cognitive strategies and the demographic factor.

A research study was conducted by Salim (2010) to find out the impact of the usage of KWL strategy on grade 10 female students’ reading comprehension of religious concepts in Ma’an city. It was experimental study. Pre-test post test instrument was administered to collect the data from a sample of 80 students. One class was the experimental group, to whom KWL strategy was applied; and the other was the control group with whom the traditional teaching method of reading was applied. Both of the methods of reading instruction were compared through averages and standard
deviations. ANCOVA was then used to see the impact of each strategy: the KWL and the traditional strategies. The analysis showed statistically significant differences between two groups in favour of experimental group.

The above research studies represent a sample of research work carried out on study strategies. This work indicates that researchers have been trying to investigate the effectiveness of study strategies and skills in relation to the academic performance of the students at different educational levels and across the grades and subjects. Most of the studies revealed a consistant relationship between study strategies and academic performance of students. A great deal has been written about the effectiveness of study strategies which may increase the learning as well as scholastic performance of students at all levels.
CHAPTER 3

METHOD AND PROCEDURE

This chapter presents the method and procedure used to conduct the experimental study. The purpose of this study was to explore the effect of PQ4R study strategy on scholastic achievement of secondary school students. This research study was carried out under following headings:

3.1 POPULATION

The target population of the study to which the results of the study could ideally be generalized consisted of 10005 10th grade girl students studying in all the rural and urban Govt. Girls secondary schools of District Rawalpindi under the administration of the Punjab government in Pakistan, as it stood at the time of this study. The accessible population of this study to whom the results of this study may practically be generalized were 713 girl students studying in 10th grade of seven girls high schools in Tehsil Kahuta as it stood at the time of the study. Tehsil Kahuta is one of seven Tehsils of the district which was randomly chosen. The following table indicates the number of schools in district as located in each Tehsil and number of students studying there in.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of Tehsils</th>
<th>No.of G.G H/Higher Secondary Schools</th>
<th>No. of Students Studying in 10th class</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gujar Khan</td>
<td>29</td>
<td>2135</td>
</tr>
<tr>
<td>2</td>
<td>Kahuta</td>
<td>07</td>
<td>713</td>
</tr>
<tr>
<td>3</td>
<td>Kaller</td>
<td>13</td>
<td>791</td>
</tr>
<tr>
<td>4</td>
<td>Kotli Sattian</td>
<td>08</td>
<td>273</td>
</tr>
<tr>
<td>5</td>
<td>Murree</td>
<td>07</td>
<td>320</td>
</tr>
<tr>
<td>6</td>
<td>Rawalpindi</td>
<td>53</td>
<td>5424</td>
</tr>
<tr>
<td>7</td>
<td>Taxila</td>
<td>04</td>
<td>349</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>121</td>
<td>10005</td>
</tr>
</tbody>
</table>
The table below shows the number of Govt. Girls High Schools in Tehsil Kahuta and the number of students studying in 10th class in each school of this Tehsil.

Table 3.2 Schoolwise Breakdown of accessible population in Tehsil Kahuta

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of schools</th>
<th>No. of students Studying in class 10th.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>G.G.H.S. Balria</td>
<td>78</td>
</tr>
<tr>
<td>2</td>
<td>G.G.H.S.Beor</td>
<td>52</td>
</tr>
<tr>
<td>3</td>
<td>G.G.H.S.Kahuta</td>
<td>390</td>
</tr>
<tr>
<td>4</td>
<td>G.G.H.S.Matore</td>
<td>64</td>
</tr>
<tr>
<td>5</td>
<td>G.G.H.S.Nara</td>
<td>53</td>
</tr>
<tr>
<td>6</td>
<td>G.G.H.S.Narar Moreen</td>
<td>57</td>
</tr>
<tr>
<td>7</td>
<td>G.G.H.S.Punjar</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>713</strong></td>
</tr>
</tbody>
</table>

3.2 SAMPLE AND SAMPLING PROCEDURE

The sample of the study consisted of 104 10th grade girl students studying in Govt. Girls High School Kahuta, comprising 52 each in the experimental group and control group.

Govt. Girls high school Kahuta was selected through convenient sampling. The sample was derived through random sampling by adapting following procedure: There were six sections of class 10th in Govt girls High School Kahuta, Distt. Rawalpindi: Section A, B, C, D, Computer Science section, and Biology section. The strength of students in each section was about 60 – 65. Two sections were needed to conduct the experiment. Computer science section and B section were selected randomly. 121 students were studying in the selected sections comprising 61 students in B section and 60 students in computer science section of class 10th. Out of 121 students, at the day of pre-test, 108 students were present who participated in the pretest. By following the
method given by Gay, (2000, p.384), the pairs were matched on the basis of their obtained similar scores in the pre-test. After matched pairs were identified, one member of the pair was randomly assigned to group A, and the other member to group B. One of these groups was randomly assigned to the experimental while the other was assigned to control group. In this way, 104 students could be selected as a sample comprising 52 students for experimental group and 52 students for control group while four students were discarded due to unavailability of their matching pair. Almost all the students belonged to lower middle and low socio economic status with similar background. The chronological age of the sample students ranged between 15-17 years.

3.3 MEASURING INSTRUMENTS

Two instruments were used for conducting the study:

1. The pre-test
2. The post-test.

3.3.1 Development of the Pre-test

On the basis of cognitive domain of Bloom’s Taxonomy of educational objectives stated by Feden (2003, p.119) and Shahid (2007, p.115), a pre-test was developed on the 1st chapter of the Punjab Textbook of Pakistan Studies for class 10th. Titled “The Ideological Basis of Pakistan” to assess the reading comprehension of students. Students had already studied this chapter. The pre-test consisted of 30 multiple-choice items (Appendix A) which covered all sections of the chapter and all levels of the cognitive domain in the light of Bloom’s Taxonomy. For that purpose, chart of specification was prepared as given ahead:
Table 3.3 Chart of Specification for the Pre-test

Chapter : Ideological Basis of Pakistan.

<table>
<thead>
<tr>
<th>S. No</th>
<th>The Contents</th>
<th>Knowledge</th>
<th>Comprehension</th>
<th>Application</th>
<th>Analysis</th>
<th>Synthesis</th>
<th>Evaluation</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ideological Basis of Pakistan</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Ideology of Pakistan and Quaid-e-Azam</td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>02</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Ideology of Pakistan and Allama Iqbal</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>01</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Foundation of Islamic society in India. Spread of Islam</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Muslim Rule in India</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td>02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Downfall of Muslims in India</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Components of the ideology of Pakistan</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Islamic Concept of Sovereignty.</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td>03</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td><strong>04</strong></td>
<td><strong>07</strong></td>
<td><strong>03</strong></td>
<td><strong>10</strong></td>
<td><strong>04</strong></td>
<td><strong>02</strong></td>
<td><strong>30</strong></td>
</tr>
</tbody>
</table>

3.3.2 Validity of the Pre-test

After preparation of the pre-test, its content validity was established by showing it to the subject teachers of the sample school who found it appropriate for the purpose of ascertaining the learning achievement of the students. It was discussed with the four female teachers of the sample school and two male teachers of another school who had been teaching Pakistan Studies for 14-20 years. These teachers and research experts found the pretest suitable. Though Urdu version of the test was used in the study, English translation of the pre-test is given at appendix A with correct answers circled in it.
3.3.3 Reliability of the Pre-test

In order to test the reliability of the pre-test, it was administered to 23 girl students of 10th class. For this purpose, a meeting with school headmistress and concerning class teachers was held to invite those students for conduct of test, who had been appeared in final examination and were waiting for practical component. 23 students could be available for the purpose. Once those students came in the school, the test was administered on them. After ten days, they had to come for their practical examination, so, the same test was administered on same group of students after the interval of 10 days. A list of achievement scores in both situations was prepared (Appendix B).

To determine the correlation of test and retest, Product Moment correlation coefficient was applied. The reliability of the pretest was found to be .87 which is appropriate for an achievement test (Garrett, 2006, p.151).

3.3.4 Development of the Post-test

The Post-test was developed from the second chapter of Pakistan Studies Text Book for class 10th that is “The establishment of Pakistan” which was the material, taught during the experiment to measure the scholastic achievement of students in both the experimental and control groups. It was also multiple choice test. Questions from all the headings, subheadings and main points were included in the table of specification under cognitive domain of Bloom’s Taxonomy. The table of specification is given below:
Table 3.4 Chart of specification for the Post-test

Title: Establishment of Pakistan Chapter 2

<table>
<thead>
<tr>
<th>S. No</th>
<th>Contents</th>
<th>Knowledge</th>
<th>Comprehension</th>
<th>Application</th>
<th>Analysis</th>
<th>Synthesis</th>
<th>Evaluation</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Establishment of Pakistan</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>01</td>
</tr>
<tr>
<td>2.</td>
<td>Evolution of two Nation Theory</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>3.</td>
<td>Shah Wali Ullah</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Faraizi Movement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Aligarh Movement</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td></td>
<td>06</td>
</tr>
<tr>
<td>6.</td>
<td>Simla Deputation, Lakhnau Pact1916 and Muslim League1906</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>02</td>
</tr>
<tr>
<td>7.</td>
<td>Khilafat, non Cooperation and Higrat Movements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>01</td>
</tr>
<tr>
<td>8.</td>
<td>Nehru Report, 14points of Quaid-e-Azam</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>03</td>
</tr>
<tr>
<td>9.</td>
<td>Allahabad Address, Act1935, Provincial Autonomy</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>04</td>
</tr>
<tr>
<td>10.</td>
<td>Lahore Resolution, Crips Mission, Cabinet Mission Plan.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>03</td>
</tr>
<tr>
<td>11.</td>
<td>Yaum-Rast Iqdum, Interim Govt. 3June Plan, Indian Independence Bill 1947, Red Cliffe Award</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>03</td>
</tr>
<tr>
<td>12.</td>
<td>Role of Provinces in Establishment of Pakistan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>01</td>
</tr>
<tr>
<td>13.</td>
<td>Quaid-e-Azam as The Governor General Of Pakistan.</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td>03</td>
</tr>
<tr>
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<td><strong>TOTAL</strong></td>
<td>04</td>
<td>07</td>
<td>03</td>
<td>10</td>
<td>03</td>
<td>03</td>
<td>30</td>
</tr>
</tbody>
</table>

3.3.5 **Validity of the Post-test**

The selected items were reviewed and discussed with the subject teachers from different schools male and female and by research experts. More than half of the items were excluded in the light of suggestions of experts as the prepared items were almost double in number than the questions administered finally. The test was adjudged as being valid for the subject and class.

3.3.6 **Reliability of the Post-test**

To determine the reliability of instrument, 30 items test was administered (Appendix C). The test and retest method was applied on 15 students of class 10th.
studying in Oxford Public Model School, Kahuta. These students were not included in the experiment. The same test was administered again after the interval of 10 days of test 1. The list of scores of test and retest is given at Appendix D.

Product Moment correlation coefficient was calculated to determine the reliability of the posttest that was found to be 0.91 which is highly appropriate for an achievement test (Garrett, 2006, p.151).

3.4 DESIGN OF THE STUDY

It was an experimental study. The pretest posttest control group design was selected (adopted from Best, 2008, p.177, Gay, 2000, p.392, and Alam, 1990, p. 99). The design is represented as:

\[
\begin{align*}
  R & \quad O_1 & \quad X & \quad O_2 \\
  R & \quad O_3 & \quad C & \quad O_4 \\
  O_1 & \quad O_3 & = & \text{Pretest} \\
  O_2 & \quad O_4 & = & \text{Posttest}
\end{align*}
\]

Where:

- **R** = Random assignment of subjects to groups.
- **X** = Exposure of a group to an experimental (treatment) variable.
- **C** = Exposure of a group to the control condition.

\[
\begin{align*}
  O_1 & \quad O_3 & = & \text{Pretest} \\
  O_2 & \quad O_4 & = & \text{Posttest}
\end{align*}
\]

In this design, pretest is administered before the application of treatment and posttest at the end of treatment. Significance difference between mean scores may be determined by using standard deviation and \( t \)-test.
This design was selected because it could minimize the threats to the experimental validity whereas equivalence of the experimental and control group was provided by random assignment and paired matching of subjects to both experimental and control groups.

3.5 PROCEDURE

Following procedure was adopted for the conduct of the study:

3.5.1 Administration of the Pre-test

After establishment of the validity and reliability of the pretest, it was administered on 108 students: 51 of computer science section and 57 of B section who were present on the test day. The researcher herself marked the papers and matched the students on the basis of their obtained similar scores. A sample of 104 students could be matched comprising 52 students in each group. One group was randomly assigned to experimental group and the other as control group. Four students did not have a suitable match, so, they were discarded from the study. The list of achievement scores in pretest of 104 matched and four excluded students is given at Appendix E.

Both the groups, experimental group and control group, were provided separate classrooms equipped with almost equal provisions i.e. blackboard, and furniture etc. The ventilation system and outdoor atmosphere was also the same and equal in all aspects. Classrooms were also randomly assigned to the experimental group and the control group.

There were two teachers to teach the sample students, one was the researcher, herself and the second was a regular social studies teacher. The researcher herself taught the experimental group because no other teacher was competent in PQ4R study skills,
nor was ready to learn these skills. Experimenter herself studied and learnt these skills, who has a rich experience of teaching Pakistan Studies. A teacher with similar experience and qualification was identified to teach control group. Experimental group was taught through PQ4R study strategy whereas control group was taught through traditional method by the teacher who had no knowledge about this study strategy. She taught this group of students by reading the paragraph by herself, explained it before the students, and then let them memorize it by heart.

Students were needed to be prepared for learning new skills because psychologists laid great stress on motivation for learning. The child must be made ready to learn. His interest, attitude, and mental preparation is essential for the smooth sailing in the teaching learning process. Motivation plays a vital role in learning. The learners have to be self-motivated, otherwise they would not embark on their projects at all. The researcher motivated the experimental group by explaining the effectiveness of PQ4R study skills. All the students were inspired, motivated and happily ready to learn these skills to improve their academic performance.

3.6 TRAINING COMPONENT

Before the conduct of experiment, the experimental group was exposed to the training of how to apply PQ4R strategy on the reading material. Punjab text book of social studies for class 7th was selected for training, so that students of 10th class could easily understand this technique by applying it on easier material.

The students in experimental group were provided social studies text books for class 7th to save the students from financial load. The second chapter of the Punjab text book titled “Islamic society” was selected for training. Students took interest in learning this strategy. Authoritative style of teaching was adopted throughout the training period.
so that students did not feel any hesitation in learning these skills and in asking questions about these. The experimenter herself demonstrated before students how to apply each of six steps of PQ4R strategy in reading the text. The training was started with the first step of PQ4R strategy that was:

1. **Preview:**

   Students were explained that preview was just like a glance on the whole forest before counting trees in the forest. For example, they were asked to look outside the window in the class within one minute then sit on the seats and tell:

   i. What is there outside the window?

   ii. What kind of trees were there outside the window?

   iii. Were trees short or long?

   iv. Were there any flowers with the plants?

   v. If yes, what was the color of flowers?

   After completing this activity, the students were told that in a quick survey of a chapter before reading it, we will have to look at a glance what this chapter is about and what are the headings in it. They were directed to do the following things:

   1) Read the headings of the chapter, without reading the details, to guess what this chapter is about.

   2) Read the headings and sub headings at a look to judge the association between the title and headings and subheadings of the chapter.

   3) Briefly look at boldfaced words and sentences because they are very important key terms.
4) Read only 1st sentence of the paragraphs under the headings and subheadings, close the books and raise hands to answer the questions asked by the researcher. (Activity 1 and 2: Appendix F).

2. Question

It was explained to the class that questions are helpful to promote the learning process, to evaluate the reading material critically and to keep the reader alert. It was confirmed that students have a set of questions in mind after previewing the chapter according to activity No. 2 of the preview step.

Students were asked to open their books at page 7 and turn the headings, subheadings and key terms of the chapter into questions. The researcher corrected and modified some of questions formulated by the students. (Appendix G)

3 & 4. Read and Reflect

Importance of reading step was described before students that it is the centre of PQ4R series. Then, they were instructed to read the answers of questions that were generated during question step. Students were led to concentrate on main points, headings, subheadings and key terms and read the things once. If any thing was difficult to understand at first reading, reread only those parts of selection by breaking it into parts. Take pause after reading a little part and think over it. While thinking, relate the information with your previous knowledge or with your life experiences. This activity will help them for a strong grip over the material. They were convinced that no knowledge could be durably retrieved without reflection. Reflection process can be adopted during and after reading as well. Students were guided to take following steps while reading and reflecting:
• Whatever you have learnt in chapter, evaluate your performance by yourself.
• Break the material into little parts and read. Stop and think when needed.
• Read a few sentences, then stop, concentrate over your reading without opening the book.
• Examine yourself through thinking.
• Read easy parts first and later, the difficult one.
• Read easy material quickly but slow down on difficult parts of the material, for example, last part of page 12 of social studies book.
• Ask yourself questions about what you have learnt.
• Relate new information with your previous knowledge.
• Relate new information with your personal life, for instance, from page 8 to 12, different aspects of life, their relation with Islam and existence of these qualities in your personality.

If they will not relate previous information with new information or with their personal life, this information shall no longer remain with them.

During reading, mark the material with following signs: (Appendix H)

❖ Underline (-------) the definitions,

❖ Put EX to give or read examples (i.e, last sentence on page 9)

❖ Give numbers 1,2,3,(i.e page 7 of the book)

❖ Put * or imp on important information (i.e Paragraph 2,3and 4)

❖ Put a vertical line on information in more than one line. (i.e 2nd and 3rd paragraph on page 7).

❖ Put a check mark on information that can be important.
 Put question mark (?) on information that they can't be understood.

 Search or ask teacher the meaning of difficult words and think over them.

 Read difficult information aloud, write it down and follow the signs they just put on selection.

If they find any part difficult and cannot answer any of question, reread the relevant part slowly and highlight the important parts with colors, then look and think over it. As 2nd paragraph on page 11, color the name of various countries, conquered areas and conquerors.

Use W for questioning words: what, where, why, when, who etc. and find the answers of these questions also.

Students were told that if any one or more questions of the activity received answer in “no”, then repeat the read and reflect process. If all questions were answered in “yes”, then step forward towards the next step.

5. Recite

After preview, question, read and reflect steps, the students were immediately moved towards “recite” step. In this step, they closed their books and recited the learned material immediately. In this way, each student assessed her own performance individually to see how much material was in her mind. They used key words and phrases for recitation, related previous knowledge (by telling in the class) with present situation, consolidated the information and wrote a summary of the selection individually with the help of main idea, main points, recall words, main phrases and answers of questions they generated during the question step. They used all their senses i.e. seeing, saying, hearing, then they wrote for reciting the material. Classroom activities No.1 and 2 as described by Reynold (1996, p.218) and Rowntree (1988, p.91)
were performed (Appendix I). About half of the time was spent on recitation for better understanding of the selection.

6. **Review**

In review step, students were convinced to assume that they might have missed some important information. So, it was necessary to search for that information. Keeping this assumption in mind, they were immediately moved to review the selection. They quickly repeated the preview, question, read and reflect and recite steps and:

- Answered the questions generated in the question step.
- Shared their information with their classmates about the text they had just read.
- Explained the key words, recalled words and phrases as a story.
- Made mind maps and outlines.
- Made flash cards about the selection to learn the selected material.
- Took active part in classroom activity for the review and repeated all steps of PQ4R strategy (Appendix J).

This activity took five minutes. At the end, students were orally asked following questions:

- What steps did they follow?
- How did they feel about PQ4R series of study strategy?
- Which step was more helpful in learning the material?
- What difficulty did they face in applying PQ4R strategy?

The students quite happily named the PQ4R series and told that all steps were most helpful in reading the text. They told that at first they felt a little difficulty in
relating the reading material to previous knowledge or personal experience but with the passage of time they got experienced during class activities and became experts in read and reflect step.

3.6.1 Duration of Training Component

Ten days were spent to complete the training of applying PQ4R study skills on 2nd chapter of social studies for class 7th. One period of 45 minutes a day was utilized to train the experimental group. To control the extraneous variable of time, 5th period from 11:15 am to 12 noon was fixed for teaching both the groups. The experimental group received training while the control group revised the first chapter of Pakistan Studies for class 10th that was not included for the study. Teaching component of both the groups was started simultaneously.

3.6.2 Assessment of Student’s Ability in Using PQ4R Study Strategy

After completing the training, following steps were taken:

3.6.2.1 Development of Test

To evaluate the ability of students in the experimental group for using PQ4R study strategy, a question paper was developed on the basis of each step of these skills. Chapter 10 (Civic Life in Pakistan) of social studies book for class 7th in urdu medium was selected to check the students performance. That chapter was selected for test as a new material to measure the ability of students in experimental group to apply PQ4R study strategy on new material independently. This chapter was not taught to the group. They studied it on their own as a new material so that their ability to learn the lesson independently could be assessed. The number of prepared test items was double than the number of items actually included in the test.
The test items were reviewed by the teachers of social studies for class 7th and by the research experts. Some of the items were excluded in the light of suggestions given by the experts. Finally, 15 multiple choice items test was designed and administered to the experimental group. Each item carried two marks. Urdu version of question paper (appendix K) was used because students were studying in Urdu medium school. All the correct answers are circled in the appendix.

3.6.2.2 Analysis of Test Scores

The test was marked by the researcher. Mean and SD scores were calculated to find out the performance level of the experimental group in using PQ4R study method.

The average score on the test was 25.4 out of the maximum score of 30 with standard deviation score being 3.36.

Fifty students out of 52 of experimental group were present on test day. A list of achievement scores in ability test (Appendix L) was prepared. High scores in the test indicated sound performance of the students in applying PQ4R study strategy on the new material. They were thus prepared for the experiment.

3.7 THE EXPERIMENT

The experimenter herself taught the experimental group. A teacher with same experience, qualification, age and gender was selected to teach the control group through the traditional method.

It was beginning of academic year for class 10th when experiment was started. One period of 45 minutes was allotted to each of the groups from 11:15 a.m to 12:00 noon from Monday to Saturday. Both the groups were taught for four weeks.

The second chapter of Pakistan Studies text book of Punjab Text book board Lahore for class 10th was chosen for teaching according to the scheme of syllabus
prepared by the school. Students brought their books, lead pencils and notebooks with them. The experimenter arranged A.V.Aids (charts and maps) to use during teaching. Separate attendance sheets were prepared for both the groups to take their attendance for reducing absenteeism that might affect the scholastic achievement of sample students.

3.7.1 Teaching of Experimental Group

Seating arrangement was the same as in the training session. As the first chapter was already studied by the students before the experiment, it was not included in experimental teaching. First chapter was used for pre-testing. Period of 45 minutes was divided into six PQ4R steps.

1. **Preview Activity**

Within five minutes, students previewed the chapter that contained about 30 headings and subheadings. Then they closed their books. The experimenter drew a diagram on the blackboard and asked the students what was the title of the chapter, they correctly answered which was written in the centre of the diagram. Then the students dictated the headings and subheadings one by one by raising their hands without looking at the text book and teacher wrote these on black board (Appendix M).

They also noted down key words and phrases. In this way, all 30 headings and subheadings were put into the diagram before the students. Students also sketched the same diagram with all headings and subheadings in their notebooks.

The next step was converting these headings, subheadings and keywords into questions.
2. **Question Activity**

Students were directed to turn all the headings, subheadings, key words and phrases into as many questions as they could with the help of W questioning words i.e. what, why, when, where and how to make depth questions. The researcher presented an example of turning above noted points into basic questions on blackboard (Langan, 1998, p.340) activity (Appendix N).

She used charts containing the photographs of great leaders who struggled to bring Pakistan into existence, map of the world and map of Pakistan, so that deep questions could be raised in students minds by looking at these charts.

**Self Assessment Questions:**

Before the reading of the text, students assured themselves that they had a set of questions in their minds to be answered. Questions were like:

a. What do I already know about existence of Pakistan? (This question could suck the previous knowledge of the student).

b. Will information in the chapter “Existence of Pakistan” be helpful for me? (Student could anticipate about the information in the chapter).

c. Why did the writer give this topic to the chapter? (Student could concentrate and think about the topic that helped in generating more specific questions).

While answering these questions, students generated more questions, especially thought questions by concentrating on subheadings and key words. At the end of the chapter, a set of questions was given, students noted them also. Hear (1977), Langan, (1998) and Rowntree (1988) are of the opinion that headings are always likely to bring questions in mind. Students changed all the headings, subheadings and keywords of whole chapter into questions before the start of reading step. Each student was allowed
to speak her question aloud in the class and the experimenter corrected it when it was necessary. Because of this collective activity, weaker students learned more about how to change headings and key words into basic and deep questions. Much time was saved through group activity.

3. & 4. Read and Reflect activity

Students were already trained and they knew that the step of read and reflect is the heart of PQ4R series. Importance of this step was reminded.

The chapter was broken into sections that could be studied in one session easily. Generated questions about the section to be taught in a session were concentrated upon to have their answers from the selected material. Read and reflect was an individual activity. All the students read the selected parts once, keeping the posed questions in mind. Then they reread the parts which they could not understand in first reading. They were guided to break the material in parts, read the material one by one with pauses and mark it with reading signs i.e. ex., imp., and ? etc. activity 1 (Appendix O). As it was an individual activity, the teacher kept on observing the students while performing the task. They asked meanings of difficult words from the teacher. They also narrated their previous knowledge. When all the students were sure of comprehending the material thoroughly, they performed related activities. Students, who performed the activities successfully, looked for answers of questions posed during the question step and for the deep questions generated during read and reflect process. The students who had some difficulty in understanding the selection fully, repeated the previous steps, and they:

Started with something general

They took a general overview of the context, concentrated on more basic text and asked meanings of difficult words and terms from the experimenter.
**Monitored their own comprehension**

They broke the material into small bits, read it and stopped; thought over it to sum up how much they knew about it (i.e., Tehreek e Aligarh and Sir Syed Ahmed Khan), involved their auditory (by using charts) and motor memory (by writing key words and main points) and uttered the words aloud and jotted them down.

**Guided their reading**

Students set the basic questions (i.e. why is it called Tehreek e Hijrat?) in mind before reading, and adopted such depth questions as why, when and where they migrated? during reading process and became clear about the questions and information.

**Re-read difficult passages**

They repeated the difficult parts (14 points of Quaid e Azam) of the text slowly and repeatedly by following the reading symbols, highlighted the information with different colours which they could not understand. They asked depth questions for specific information, related new information with their previous knowledge and shared the information in class with classmates and with teacher. This strategy was adopted by Reynold, (1996, p.216); Friedman et al. (1980, p.247) and Barnes, (1995, p.53). Students daily wrote the answers of questions generated during the session in the class. On completing question and answer process, students moved to the next step of PQ4R series.

5. **Recite activity**

In this step, students closed their books and recited the material. They recalled the information with the help of recall words and phrases to crystallize the information in their minds. In this step, they consolidated the text material and wrote a summary.
To check the understanding of students, activities for recitation were performed (Appendix P). Those activities were adopted by Reynolds (1996, p. 218); Rowntree, (1998, p. 91) and Friedman, (1980, p. 242).

More than half of 45 minutes were spent on read, reflect and recite steps.

6. **Review activity**

As soon as the recite step ended, students were guided to review the selection to save them from forgetting the information because most of the learnt material vanishes within 12-24 hours. They were involved in review activities. In activity 1, they answered the questions asked by the researcher verbally. Then they repeated previous steps quickly, that is, preview, question, read, reflect and recite. In preview step, they generally looked at headings, subheadings and boldfaced words. The question step was to remind whether they could answer all posed questions or did there arise any new question? In next step of read and reflect, they reread only important points of the selected material. Then they reflected upon their reading, told themselves the main idea and thought whether they had a strong grip on selection. In the recite step, students recalled the key words, phrases and concentrated over their understanding about the learnt material from the selection. Then they performed activity No.2. In this activity, teacher asked oral questions from the students one by one (Appendix Q).

In review step, students were taught to work on assumption that they may have missed some important information from the selection. Keeping this point in mind, they completed this step.

**3.7.2 Teaching of Control Group**

Control group was taught through the traditional method. The teacher read the paragraphs of the chapter and explained them where it was necessary. Then she allowed
the students to memorize the paragraphs and learn the answers of questions given at the end of the chapter through rote memorization. Monthly scheme of studies and weekly lesson plans were used for teaching by their teacher.

3.8 ADMINISTRATION OF THE POST-TEST

Both the groups completed the selected chapter at the same time according to the time table set before the experiment. At the end of treatment, 30 items post-test (given in appendix C) was administered on the students of both the experimental and the control groups simultaneously. The groups were combined in the examination Hall and the same post-test was administered on them. Time for the test was one hour. The researcher and another teacher supervised the students during the test.

3.8.1 Scoring of the Post-test

The answer sheets of post-test of experimental and control groups were mixed, checked and marked by the experimenter. A list of achievement scores of the experimental group and control group was prepared (Appendix R, S).

3.9 ANALYSIS OF DATA

The appropriate statistical techniques were used to analyze the data collected through the measuring instruments. The following procedure was followed for the analysis and interpretation of data:

1. The answer sheets of the subjects were scored, both on the pre-test and post-test.
2. For analysis, the ungrouped scores obtained in the pretest and the post-test were organized into grouped data through frequency distributions.
3. Measures of central tendency (Mean, median) and measures of variability (Q1, Q3, SD, V) were calculated in order to compare the experimental group and control group on these measures, both on the pre-test and post-test scores.

The formulas for (a) the mean (b) median and (c) standard deviation is as under:

Mean

\[
\bar{X} = \frac{\sum X}{N}
\]  

(Gay, 2000, p. 454)

Where

\[
\bar{X} = \text{symbol of mean}
\]

\[
\sum X = \text{sum of scores}
\]

\[
N = \text{divided by number of participants}
\]

Median

\[
Mdn = L + \frac{\left(\frac{N}{2} - F\right)i}{fm}
\]  

(Garett, 2000, p. 32)

Where

\[
L = \text{Exact lower limit of the class interval upon which the median lies.}
\]

\[
N/2 = \text{One half of the total number of scores.}
\]

\[
F = \text{Sum of the scores on all intervals below L.}
\]

\[
fm = \text{Frequency (number of scores) within the interval upon which the median falls.}
\]

\[
i = \text{Length of class interval.}
\]
The formulas of $Q_1$ and $Q_3$ are:

$$Q_1 = L + \frac{(25\%N - fc)i}{fi}$$

$$Q_3 = L + \frac{(75\%N - fc)i}{fi}$$

(Garrett, 2006, p.19)

Where

$L$ = The exact lower limit of the interval in which the quartile falls.

$i$ = The length of the interval

$fc = $ Cumulative $f$ up to the interval containing the quartile.

$fi = $ The $f$ on the interval containing the quartile.

**Standard Deviation**

$$SD = \sqrt{\frac{\Sigma X^2 - \left(\frac{\Sigma X}{N}\right)^2}{N-1}}$$

(Gay, 2000, p.455)

Where

$SD = $ stands for standard deviation. It is the square root of the sum of square divided by $N-1$

$\Sigma X = $ sum of scores

$N = $ number of squares of scores

$\Sigma X^2 = $ sum of squares of scores

$N-1 = $ one participant less than total number of participants.

$$V = \frac{100 \times SD}{\text{Garrette, 2006, p.41}}$$

Mean
4. Significance of difference between pre-test scores of experimental and control groups, and post-test scores of both the comparison groups was determined through \( t \)-test at .05 level of confidence.

The formula of \( t \)-test for independent sample is as under:

\[
t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{SD_1^2}{n_1} + \frac{SD_2^2}{n_2}}}
\]  

(Gay, 2000, p. 485)

Where

\( \bar{X}_1 - \bar{X} \) = The difference between mean of group 1 and mean of group 2

SD1 = Standard deviation of group 1

SD2 = Standard deviation of group 2

\( n_s \) = Number of participants in each group

In order to find out the probabilities associated with \( t \) value at given level, the formula of degree of freedom was used as under:

\[
n_1 + n_2 - 2
\]

Where

\( n_1 \) = Number of participants in group 1.

\( n_2 \) = Number of participants in group 2.

5. For the identification of high achievers and low achievers in the experimental group and in the control group, the frequencies of both the groups were distributed on the basis of scores obtained in the pre-test.

6. On the basis of scores obtained in the pre-test, high achievers in the experimental group and in the control group were identified by applying the
measures of variability: \((Q_1 \& Q_3)\). The students scoring above than \(Q_3\) (14.5) were classified as high achievers and those scoring below \(Q_1\) (5.88) were identified as low achievers.

7. In order to compare the scholastic achievement of high achievers of the experimental group and high achievers in the control group to judge the effect of the treatment, \(t\)-test was applied.

8. The same procedure was adopted for comparing the scholastic achievement of low achievers in both the comparison groups.

9. In order to find out the significance difference between the mean scholastic achievement scores of experimental group and mean scholastic achievement scores of control group after the treatment, the \(t\) test was applied.

10. To compare the individual scholastic achievement of the experimental group students with the individual control group students in term of overlapping (Garret, 2006, p.44), median of the experimental group was used to find out percentage of students of control group who did better than average performance of experimental group.
This chapter deals with analysis of data. For the present study, an experiment was conducted on female students studying in 10\textsuperscript{th} grade to explore the effect of PQ4R study strategy on their scholastic achievement. The design of study was pretest- posttest control group, a variation of true group experimental design that controls for maximum number of sources of internal and external validity (Gay, 1990, p. 285).
Table 4.1

Frequency distribution of pre-test scholastic achievement scores of the experimental group and the control group.

<table>
<thead>
<tr>
<th>Class Intervals</th>
<th>Experimental Group Frequencies</th>
<th>Control Group Frequencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-24</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>15-19</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>10-14</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>5-9</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>0-4</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>N=52</td>
<td></td>
<td>N=52</td>
</tr>
</tbody>
</table>

Entries in the above table show that the frequency distribution of pre-test scholastic achievement scores of both the comparison groups were almost equal due to paired matching. The average pre-test score in terms of mean and median is also equal. The above frequency distributions are represented below in the graphic form.

![Graphic representation of frequency distribution](image)

Figure 1
Table 4.2

Significance of difference between mean scholastic achievement scores of the experimental group and the control group before the treatment.

<table>
<thead>
<tr>
<th>Groups</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>SE_D</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>52</td>
<td>10.44</td>
<td>5.60</td>
<td></td>
<td>1.102</td>
<td>0.0000</td>
</tr>
<tr>
<td>Control</td>
<td>52</td>
<td>10.44</td>
<td>5.63</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\[ df = 102 \quad t_{0.05} = 1.98 \]

Entries in the above table show that mean scholastic achievement scores of both the groups and the spread of individual scores from the respective mean scores was almost the same. Therefore, the t value is zero. It implies the both the groups were equal in their academic performance in the subject of Pakistan studies before the experiment. Thus experimental group and control group fulfilled the requirement of the selected research design that the group should be equated on the dependent variable.
Table 4.3

Frequency distribution of post-test scholastic achievement scores of the experimental group and the control group.

<table>
<thead>
<tr>
<th>Class Intervals</th>
<th>Experimental Group Frequencies</th>
<th>Control Group Frequencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-34</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>25-29</td>
<td>19</td>
<td>5</td>
</tr>
<tr>
<td>20-24</td>
<td>16</td>
<td>13</td>
</tr>
<tr>
<td>15-19</td>
<td>11</td>
<td>21</td>
</tr>
<tr>
<td>10-14</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>N=50</td>
<td>Mean = 22.44</td>
<td>17.92</td>
</tr>
<tr>
<td></td>
<td>Median = 22.93</td>
<td>17.71</td>
</tr>
</tbody>
</table>

Entries in the above table indicate that frequency distribution of experimental group and control group in each class interval differs widely, especially in the intervals of 10-14, 15-19 and 25-29. 100 percent of control group and 98% of the experimental group scored between 10 and 29. The following graph represents the above frequency distributions.

Figure 2
Table 4.4
Comparison of experimental group and control group on posttest measures of central tendency and variability

<table>
<thead>
<tr>
<th>Groups</th>
<th>Mean</th>
<th>Median</th>
<th>Q1</th>
<th>Q3</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>22.44</td>
<td>22.93</td>
<td>18.8</td>
<td>26.47</td>
<td>4.42</td>
</tr>
<tr>
<td>Control</td>
<td>17.92</td>
<td>17.71</td>
<td>14.6</td>
<td>21.5</td>
<td>4.59</td>
</tr>
</tbody>
</table>

As the above table shows that difference between posttest achievement of average student of the experimental group and control group is 4.52 points in favour of experimental group. The difference between median experimental student and median control student on posttest scholastic achievement is also 5.22 points in favour of experimental group. Middle 2/3\textsuperscript{rd} of experimental group scored between 18 and 27 points whereas middle 2/3\textsuperscript{rd} of the control group scored between 13 and 23. From the quartiles, it is evident that middle 50% the experimental group scored between 19 and 27 but middle 50% of the control group between 15 and 22. The spread of scores of both the groups around their mean is almost equal however the experimental group appears to show higher scholastic achievement, on the average, after the treatment.
Table 4.5

Comparison of experimental and control groups on their relative variability on post-test scores.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Mean</th>
<th>SD</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>22.44</td>
<td>4.42</td>
<td>19.69</td>
</tr>
<tr>
<td>Control</td>
<td>17.92</td>
<td>4.59</td>
<td>25.61</td>
</tr>
</tbody>
</table>

As the above table No.5 shows, not only did the experimental group do better in average posttest performance, there is also less individual variation in the experimental group than the control group because the coefficient of variability for the experimental group was 19.69 whereas it was 25.61 in the control group. Therefore, the experimental group was about 77 percent as variable as the control group.
Table 4.6

Comparison of the experimental group and the control group on posttest scholastic achievement in terms of their overlapping.

<table>
<thead>
<tr>
<th>Class Intervals</th>
<th>Experimental Group Frequencies</th>
<th>Control Group Frequencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-34</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>25-29</td>
<td>19</td>
<td>5</td>
</tr>
<tr>
<td>20-24</td>
<td>16</td>
<td>13</td>
</tr>
<tr>
<td>15-19</td>
<td>11</td>
<td>21</td>
</tr>
<tr>
<td>10-14</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>N=50</td>
<td></td>
<td>N=51</td>
</tr>
<tr>
<td>Mean = 22.44</td>
<td></td>
<td>17.92</td>
</tr>
<tr>
<td>Median = 22.93</td>
<td></td>
<td>17.71</td>
</tr>
</tbody>
</table>

From the above table of frequency distributions, when the percentage of control group students who exceeded the median score of the experimental group (22.93 points) was calculated, only 20% students of the control group could be found to do better than the median student of the experimental group. It means that though experimental group did better, it does not mean that every individual student in the experimental was better than every individual student of the control group. 20 percent students of the control group surpassed the median score of the experimental group. Yet the percentage of the control group students achieving higher than median experimental group was lesser than that of experimental group, being 50 percent.
Table 4.7

Significance of difference between mean scholastic achievement score of the experimental group and mean scholastic achievement score of control group after the treatment.

<table>
<thead>
<tr>
<th>Groups</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>SE</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>50</td>
<td>22.44</td>
<td>4.42</td>
<td>0.897</td>
<td>5.0362</td>
<td>&lt; .001</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.897</td>
<td>5.0362</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Control</td>
<td>51</td>
<td>17.92</td>
<td>4.59</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From the entries in the above table, it is clear that observed difference of 4.52 points in the mean scholastic achievement of the experimental and control groups was significant at not only 0.05 level but also at .001 level. The null hypothesis of the study is therefore, rejected. It is inferred that the experimental group showed better scholastic performance than the control group after the experiment.
Table 4.8
Frequency distribution of post-test scholastic achievement scores of high achievers in the experimental group and the control group.

<table>
<thead>
<tr>
<th>Class Intervals</th>
<th>Experimental Group Frequencies</th>
<th>Control Group Frequencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-34</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>25-29</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>20-24</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>15-19</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>10-14</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

N=11
Mean = 26.09
Median = 28.44

N=12
Mean = 22.08
Median = 22.35

Frequency distribution in the above table indicates that all the high achievers in the experimental group scored between 20 and 29 points whereas 83 percent high achievers in the control group could score equally well. The above frequency distributions are represented graphically below:

Figure 3
Table 4.9

Significance of difference between mean posttest scholastic achievement score of high achievers in the experimental group and mean scholastic achievement score of high achievers in the control group.

<table>
<thead>
<tr>
<th>Groups</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>SE_D</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>11</td>
<td>26.09</td>
<td>2.70</td>
<td></td>
<td>1.644</td>
<td>2.4374</td>
</tr>
<tr>
<td>Control</td>
<td>12</td>
<td>22.08</td>
<td>4.80</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\[ df = 21 \]

Statistically calculated values shown in the above table indicate that mean difference in the scholastic achievement of high achievers in both groups is 4.01 points in the favour of experimental group. The obtained difference was found to be significant even at 0.05 level of significance. The null hypothesis No.3 is therefore, rejected.
Table 4.10
Frequency distribution of post-test scholastic achievement scores of low achievers in the
experimental group and the control group.

<table>
<thead>
<tr>
<th>Class Intervals</th>
<th>Experimental Group Frequencies</th>
<th>Control Group Frequencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-34</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>25-29</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>20-24</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>15-19</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>10-14</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>

N=10  N=11
Mean = 18.30  16.27
Median =17.62  16.00

Frequencies of low achievers in the experimental group and low achievers in the control
group are given in the above table which show that all the low achievers in the experimental
group and 50% low achievers in the control group scored between 15 and 29 points. The
remaining low achievers in the control group mostly scored less marks. The frequency
distributions in the above table are represented in the graphic form below:

![Figure 4](image-url)
Table 4.11

Significance of difference between mean posttest scholastic achievement score of low achievers in the experimental group and mean scholastic achievement score of low achievers in the control group.

<table>
<thead>
<tr>
<th>Groups</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>SE_D</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>10</td>
<td>18.30</td>
<td>1.25</td>
<td>1.440</td>
<td>1.4081</td>
<td>&gt;.05</td>
</tr>
<tr>
<td>Control</td>
<td>11</td>
<td>16.27</td>
<td>4.38</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Entries in the above table show that obtained difference of 2.03 points in mean posttest achievement of low achievers is not significant at 0.05 level of significance. The null hypothesis No.4 is therefore, retained. It is inferred that though the low achievers of the experimental group appeared to do better in their average scholastic achievement, there was, as a matter of fact, no real difference in the scholastic performance of low achievers in the control group and experimental group.
CHAPTER 5
SUMMARY, FINDINGS, CONCLUSIONS, DISCUSSION
AND RECOMMENDATIONS

5.1 SUMMARY

The topic of this study was to explore effect of PQ4R study strategy on scholastic achievement of secondary school students in Punjab. The objectives of the study were:

1. To measure the scholastic achievement of students at secondary school level before the experiment.
2. To expose the experimental group to PQ4R method of study.
3. To teach the control group through traditional method without using PQ4R method.
4. To measure the scholastic achievement of experimental group and control group after the experiment.
5. To compare the scholastic achievement of experimental group and control group after the experiment.
6. To compare the scholastic achievement of high achievers and low achievers of experimental group and control group after the treatment.
7. To give recommendations in the light of the results.

In order to achieve the above mentioned objectives, research hypotheses and null hypotheses were formulated and tested. Population of the present study comprised 10th grade girls students studying in rural and urban Govt. Girls secondary schools of
District Rawalpindi under the administration of Punjab government in Pakistan. The sample size was 104 students selected through random sampling procedure from the population. Two groups of students were formulated and equalized on the basis of their pretest scores, and randomly assigned to the experimental group and control group by matching them. Data were collected through pretest and posttest. Measures of central tendency (mean and median), measures of variability (Q1, Q3, SD, V) and t-test was applied to test the null hypotheses of the study. The level of significance was preset as .05.

5.2 FINDINGS

The findings of the present study are as follows:

1. Frequency distribution of pretest scholastic achievement scores of both the comparison groups were almost equal (Table 1).

2. Mean scholastic achievement scores of both the groups were 10.44, and the spread of individual scores of experimental group and control group was 5.60, and 5.63 respectively. There was thus no significant difference between the scholastic achievement scores of both the groups before the treatment (Table 2).

3. Frequency distribution of post-test scholastic achievement scores of the experimental group and the control group in each class interval differed widely (Table 3).

4. The obtained difference between post-test achievement of average student of the experimental group and control group is 4.52 points in favour of experimental group. The median difference between experimental student and control student
on post-test scholastic achievement is 5.22 points in favour of experimental group. Middle 2/3\textsuperscript{rd} of experimental group scored between 18.02 and 26.68 points whereas middle 2/3\textsuperscript{rd} of the control group scored between 13.33 and 22.51. Middle 50\% of the experimental group scored between 18.8 and 26.47. Middle 50\% of the control group scored between 14.6 and 21.5. The experimental group appeared to do better in the average post-test achievement score (Table 4).

5. The coefficient of variability for the experimental group was 19.69 whereas it is 25.61 in the control group. The experimental group was about 77\% as variable as the control group. The experimental group did better in its average post-test performance and there was less individual variation on the post-test in the experimental group than the control group (Table 5).

6. The control group students who exceeded the median score (22.93) of the experimental group. Only 20\% students of the control group did better on post-test scholastic achievement than the median student of the experimental group (Table 6).

7. The observed difference of 4.52 points in the mean scholastic achievement of the experimental and control group was not only significant at 0.05 level but even at .001 level of significance (Table 7).

8. Post-test scholastic achievement scores of high achievers in the experimental group were found to be between 20 and 29 points, whereas 83 percent students in the control group could score equally well (Table 8).

9. Mean difference in the posttest scholastic achievement of high achievers in the experimental group and in the control group is 4.01 points in the favour of
experimental group. The obtained difference was significant at 0.05 level of significance (Table 9).

10. The low achievers of the experimental group and 50% low achievers of the control group scored between 15 and 29 points, the remaining low achievers in the control group scored below 15 points (Table 10).

11. The obtained difference of 2.03 points in the mean post-test achievement of low achievers was not found significant at 0.05 level of significance (Table 11).

5.3 CONCLUSIONS

Following conclusions were drawn from the above findings of the study:-

1. The scholastic achievement of group of students taught through PQ4R study strategy and the group taught through traditional method was the same before the treatment. However the scholastic achievement of the group taught through PQ4R study strategy and of the group taught through traditional method differed widely after their exposure of PQ4R method and the traditional method of teaching respectively. Thus both the comparison groups equal in scholastic achievement, really differed after the treatment.

2. The average scholastic achievement of high achievers in the group taught through PQ4R study strategy was superior than the high achievers in the group taught through traditional method.

3. Although the low achievers of the group taught through PQ4R study strategy did somewhat better than the low achievers of the group taught through traditional method, the low achievers of both the comparison groups did not really differ in their scholastic achievement after the experiment.
4. Twenty percent students of the group taught through traditional method outperformed in their scholastic achievement than the average student of the group taught through PQ4R study strategy. This means that only one fifth of students taught through traditional method could achieve better than average student of group taught through PQ4R strategy. Four fifth of them, however lagged behind average scholastic achievement of the experimental group.

5.4 DISCUSSION

The present study investigated the effect of PQ4R study strategy on scholastic achievement of 10th grade students in the subject of Pakistan studies. The results and limitations of the study are discussed in this section.

Although both the comparison groups were equal in their scholastic achievement before the treatment, the real difference was found after the application of PQ4R study strategy. The experimental group outdid the control group in the scholastic achievement in post-test. This difference may be attributed to PQ4R study strategy which was applied by the experimental group during the treatment period. These results confirm the results of previous study conducted by Bagherpour, et al. (2009) who found no significant difference between the academic achievement of experimental group and control group in pretest while exploring the effect of cognitive and metacognitive strategies on reviewing comprehending and remembering the material.

The findings of the present study substantiate the previous researches conducted to investigate the effect of study skills and strategies. For example, Jitendra (2000) found that due to use of review and comprehension strategies and self monitoring
procedure, the experimental group performed much better than the control group on enhancing the main idea comprehension. As stated by Jitendra (2000), the findings of his study were also supported by Chan, (1991); Graves, (1983); Graves and Levin, (1989); Jitendra et al., (1998) and Malon & Mastropieri , (1992) cited in Jitendra,(2000). Salim (2010) examined the impact of KWL study strategy on reading comprehension, and found positive impact on the academic achievement of those students who used it. The results of the present study are consistent with this study and with the study conducted by Jitendra, (2000).

Shepley and Victor (1996), Payre and Manning (1992) used a series of metacognitive strategies to enhance the reading comprehension scores. They found that the students instructed in metacognitive strategies scored significantly better than the students who were not taught through these strategies. Their results are supported by the present study. Similarly, Chang et al. (2006) found that students improved their reading comprehension scores which were strongly correlated with the use of metacognitive strategies. Their results are also in consonance with the results of present study. Morill and Cynthia (1995) also supported the idea by concluding that intertwining of higher order thinking and metacognitive skills was the cornerstone for the improvement of reading comprehension. The present study results also support this point because PQ4R strategy was a combination of higher order thinking and metacognitive skills. On the contrary, however, Taylor and Frye (1992) cited in Victor (1996) investigated the effect of strategies of reciprocal teaching and summarization by using social studies text on fifth grade students who found no difference between the reading comprehension scores of the control group and the experimental group.
Analysis of present study in term of individual differences revealed that the experimental group had less individual variation as compared to the control group on posttest academic achievement. Scholastic achievement scores of high achievers in experimental group and of the control group showed that high achievers in experimental group did better than the high achievers in the control group although high achievers of both the comparison groups were quite equal before the treatment was given. But after the exposure of PQ4R study strategy, a clear difference was found between the high achievers of both the groups in their scholastic achievement in favour of experimental group. The use of PQ4R study strategy had more positive effect on the scholastic achievement of high achievers of the experimental group. Though high achievers in the control group taught through the traditional method of study improved in their performance as compared to their performance on pré-test, it could not help them gain as much as the high achievers in experimental group. It means that study strategy was fundamental to academic competence which enabled students to take full advantage of learning opportunities.

On the other hand, though the low achievers in experimental group did better in their post-test average scholastic achievement than the low achievers in the control group but as a matter of fact, no real difference was found between the scholastic achievements of low achievers in both the comparison groups. The average scholastic performance of low achievers in experimental group is the evidence that these students improved their academic performance through the use of PQ4R study strategy but could not show clearly superior achievement than their counterparts in the control group. The reason may be that they did not have an executive level of thinking in which they could plan and evaluate their study which may be disorganized.
Students with low academic background often refer to assume a passive role in learning and rely on others. As Akhtar (2009) found that low achievers proved to be field dependent. Literature showed that many cognitive and behavioral characteristics reflect this passivity in learning, such as low achieving students do not often tend to monitor their own understanding of content and show little evidence to look back or to employ strategies for the remedy of their comprehension problems, and also rely on rote memorization. Low achievers in control group through rote memorization may have improved their performance to some extent but low achievers in experimental group could not have the opportunity to use their habit of rote learning. The other reason is that low achievers in experimental group might have learning problems in situations where studying is purposeful and individual activity which requires conscious efforts on their part. Even when learning is fostered through social communication process, the behaviours of individual study still play a critical role in scholastic competence. Another possible reason of this finding may be the weak knowledge background of the low achievers which might have hindered in understanding the text because while studying through PQ4R strategy, the reader must ponder on the text, and elaborate the learning material, his own experience and background knowledge, and without sufficient background knowledge, the students fail to retrieve the relevant information. Though the low achievers of experimental group through the use of PQ4R study strategy improved their scholastic achievement scores as compared to those of control group but the difference of average performance could not reach the level of significance at 0.05 level. Another possible reason might be that they were slow learners, had the duration of experiment been extended, the low achievers of experimental group could show better academic performance than those of control
group. Other factors which might have influenced the learning process are the learning styles of the students. Had the learning styles of the students in experimental group identified before the conduct of the study, and had the students been divided into groups within the class according to their learning styles, and then treated accordingly, the results might have been different and more accurate.

It is fact that there are as many individual differences as are the number of students in a class. Some children will need specific instruction in specific strategies and skills. The patterns and rates of learning of children differ so greatly that it is highly unlikely that all the class would have the same needs at the same time. So in this study as a matter of fact, it is assumed that some children, such as low achievers in this study might suffer from the same kind of instruction that others such as high achievers might profit from. This part of research confirms the findings of previous research conducted by Lee (2004) who found that students with different levels of previous achievement performed differently and all differences were in favour of those students who had higher previous academic achievement. In the present study, the high achievers as well as low achievers of the experimental group improved their performance but low achievers could not perform significantly. Reason may be that their prior knowledge might have affected their present performance. It is also important that although the high achievers in the experimental group improved significantly better than the high achieves in the control group, as a matter of fact when improvement of high achievers in experimental group is compared to the improvement of low achievers in the experimental group on the basis of their pretest performance, the low achievers improved more than the high achievers in experimental group. For example, low achievers in the experimental group who scored 2 marks out of 30 in pre-test improved
so much that they scored 15 to 17 marks in the post-test. Whereas, high achievers in the experimental group who scored 16 marks in pre-test, improved only this much that they scored 26 to 28 marks, and those high achievers in the same group who scored 18 marks in pre-test, scored 20 to 25 marks in post-test. Some of high achievers gained 4 to 6 marks in posttest than in the pre-test. It means that though low achievers in the experimental group, could not reach the level of significance, they improved more than high achievers in the sense that they gained more marks as compared to their marks in the pre-test. This can be attributed to PQ4R study strategy through which low achievers in the experimental group got more benefit than high achievers of the experimental group.

Related literature shows that the results of application of study strategies, such as SQ3R method have been mixed. As cited in Schurmaker (1982), some of the studies (Graham, 1977) of application of SQ3R have reported improved reading rate and comprehension after using the technique. Others have failed to do so (Mcormic and Coopers, 1991; Wooster, 1953). He further explains that in one study (Wooster, 1953) improved notes were reported. In two studies, comparing the use of SQ3R technique to other reading techniques were shown to be as good as or superior to the SQ3R technique (Niple, 1968, Willmore, 1968; Sakta, 1991). On the other hand, results of some other studies indicated that the SQ3R technique appeared to be especially useful with students needing overall reading improvement. Schumaker (1982) referred two more investigations by Donold, (1967), Garty, (1975) about the effectiveness of the SQ3R method with seventh grade students, which yielded negative results. In both studies, no statistical different results were found between a group using the SQ3R method and one not using it. These contradictory results are in line with present study
where some students took benefit significantly from PQ4R study strategy while others could not improve their scholastic performance to the level of significance. (Table 11).

It is noticeable that while other research studies showed the overall results of the learning strategies, either positive or negative, but the present study revealed this contradiction within one group of students consisting of low achievers and high achievers. In other studies, the contradictory results reported on the use of SQ3R or similar methods may be the product of different populations, different teaching methodologies or different interpretation of strategies. But, the present study was carried out while controlling all such conditions which might affect the experiment and same methodology of treatment was used. Although the achievement level of students in experimental group in this study was differing, it is fact that all the students whether they were high achievers, low achievers or medium students, improved greatly. This development may be attributed to some other factors along with PQ4R study strategy. It might be related to the novelty of instructor. Students often get inspired by the new teacher, who soon becomes their favourite. They like to learn the subject of new teacher and do the homework assigned by him/her. Moreover, new learning strategy may also be motivating for them because before the experiment, the experimenter clearly explained the benefit of use of the PQ4R study strategy which would accelerate their scores in the final examination. Another factor for this progress may be the training component of PQ4R strategy which was given before the experiment on easy material, a chapter of seventh grade social studies text book. Students got training willingly, and when ability test was analyzed, they dramatically scored high. Once they saw their improvement, they became enthusiastic learners. After they had learned the strategy, their scores improved markedly. All the students expressed satisfaction with learning
the strategy during the training and showed ability to generalize it. This positive effect of training component was consistent with other previous researches (Rodil, 2009; Schumaker, 1982).

The students in the control group on whom traditional method of teaching was applied, also did better than their performance in the pre-test. Almost all the students strived for the excellence. As a result they improved, but on the whole, their performance was not equal or better than the performance of students in the experimental group. Although the experimental group as a whole was superior to the control group in their scholastic achievement, every student of the experimental group did not do better than every student of control group. Because when the difference was calculated individually in the term of overlapping, it was revealed that 20% students of control group showed better performance than the average student of experimental group, and 80% students of this group still lagged behind the experimental group students. Whereas, before the treatment, the medians of both the comparison groups were exactly the same (09.5). 50% students of control group and 50% students of experimental group performed above average before the experiment but after the experiment it was found that the students of control group who were 50% above average student of the experimental group were reduced to 20%. It means the performance of control group after the experiment went down by 30% as compared to experimental group. The average performance of both the comparison groups before the experiment was 9.5 points. It means that 50% students in both the groups scored higher than the score of 9.5 but after the treatment the overall performance of the experimental group improved so much that only 20% students of the control group could do better in academic achievement than the median student of the experimental group.
The performance of 20% students of control group who overlapped with the students of experimental group may be attributed to their practice of rote memorization and rehearsal on the material. Their memory might be strong, for that reason they might have memorized the information. Possibly, they might have good performers who could not perform well only in pre-test due to their illness, carelessness or for any other reason and during the treatment period they may have recovered. Ultimately, in the post-test they performed as usual. The researcher, after the experiment, realized that only the pre-test should not have been used as the sole criterion for equalizing the groups. Previous scholastic performance in at least two examinations should have been taken into account along with the pre-test.

Findings of Bol and Hacker (2001) on effects of practice test and traditional review on performance and calibration revealed that low achieving students became overconfident, so they did not do well to be good performers. So, in this study, low achievers, being over confident during the training for the use of PQ4R strategy, thus gaining high scores in the ability test could not arrive at the highest level of achievement.

In the present study, no standardized test was used on sample students in experimental group to assess the effectiveness of PQ4R study strategy. Possibly, the use of standardized test may have produced more reliable results in the study.

PQ4R learning strategy is a technique to process information accurately and effectively. It can be assumed that there may be different information processing mechanisms included in learning due to different prior knowledge and different concepts about the material being studied by the students. Six-step PQ4R strategy
requires the involvement of students’ personal thoughts during the application of this strategy. Variation in the results in this study might be due to individual differences in thinking skills, reflection, and processing the information on the part of students in the experimental group.

In the present study, the sample students of experimental group faced some difficulties during some specific steps. In generating questions, students took much time in developing questions from the key words or phrases, whereas turning the headings and subheadings into questions was comparatively easy. Previews and reviews both were activities of collecting total image of the text. A reader previews the material before starting to read it. Whereas, in the review, reader recollects the total image of the text after reading. Before reading, the reader assumes or depends on little knowledge about the text but after reading in review steps, the reader has substantial knowledge in the mind. Preview was a difficult step for some of the students because they were used to learn the material through rote memorization, and had no idea to think, assume or assess the material before reading. Reflection during reading is a critical step in personalizing and internalizing the knowledge that depends on making relations among things, events or information that varies from person to person.

The present study found the effect of PQ4R strategy wholistically and in its totality on the scholastic achievement of the students. It is possible that some steps of the PQ4R strategy might have overlapped other steps of the strategy. Students might have outperformed in one step but they might have lacked the perfection in other steps. Had the performance of the students been assessed in all the steps of PQ4R strategy one by one, the analysis of the results would have revealed deeper results in the sense that
which students used which step of the PQ4R strategy more effectively than the other one. It was observed during the treatment period that PQ4R study strategy was a time consuming strategy. All the six steps of the strategy were difficult to apply on the new material in one short period of 30-45 minutes. Inadequacy of time might have broken continuity in the steps of PQ4R study strategy. Other variables might have interrupted in the learning process. However, dividing the material in suitable parts can overcome this difficulty. For instance, previewing the whole material at once, followed by generating questions, applying read, reflect, and finally reciting and reviewing the whole material is the proper way to use the strategy.

After reviewing the related research, it was revealed that PQ4R study strategy is a mother strategy which embraces almost all other cognitive and metacognitive learning strategies that seem to the part of PQ4R method of study.

5.5 RECOMMENDATIONS

Following recommendations are drawn from the conclusions and discussion on the study.

The main conclusions of the present study are that although the scholastic achievement of both the comparison groups was equal before the experiment, yet a great difference was found in their scholastic achievement after the treatment was given. The group taught through PQ4R study strategy performed much better than the group taught through traditional method. Secondly, high achievers in the experimental group who were taught through PQ4R study strategy performed better than the high achievers in the control group who were taught through traditional method of teaching. Thirdly, low achievers who were taught through PQ4R study strategy, improved their
academic performance, though they could not touch the level of significance as 0.05 level. They improved their scholastic achievement more than the low achievers in control group, in the light of their scores on the pre-test. Fourthly, scholastic achievement of low achievers in control group was 50% above the average scores in the pre-test that was reduced by 30 percent and lowered to 20% in the post-test. Keeping in view the above conclusions, it is obvious that PQ4R study strategy is an effective strategy that helps students improve their academic performance and reach at the highest level of learning.

In the light of the evidence that PQ4R is an effective study strategy, the recommendations are given in following ways: first for teachers, second for students and third for curriculum designers. At the end the dimensions for future research are recommended.

5.5.1 Recommendations for Teachers

Teaching and learning is not an individualistic but a cooperative process. Psychologists who deal with educational problems are concerned with what, when, and how to teach. The teacher should have the knowledge of educational psychology because it is concerned with understanding the learner, the learning situation and learning process. It will give the teacher larger awareness of the nature, abilities and needs of the students, of the process involved in his work and his own capacities and limitations.

Teaching skills are not sufficient. The teacher must understand the students as learners from the psychological point of view. He must try to recognize those characteristics that are significant in helping each student learn more effectively. He
must also know that growing up is more than growing bigger, and the process of growth and development, as well as the knowledge of individual differences is essential. In the present study, students who studied with the help of PQ4R study strategy performed better than those students who did not use any study strategy, but in the same class and same teaching method at same time, some students performed better than the others. It means that there may some other factors that influenced the learning outcomes. There were individual differences among learners which produced different results within the same group of students. So, it is recommended that:

1. The teachers may find those characteristics of personality that may affect the learning of students such as IQ level, learning styles, and background knowledge of learners that play a significant role in learning the text which may be taken into account in planning the relevant learning programme.

2. It is a common practice in most of the schools that teachers transmit the knowledge without activating students’ energy of learning. Whereas learning takes place when the learner becomes active and indulges himself in the learning process. The first and foremost job of the teacher is to ensure that students learn. Moreover, to be effective, teachers have themselves to be good learners equipped with cognitive and metacognitive strategies to diagnose misunderstanding perceptively and reinforce success enthusiastically. For this purpose, the PQ4R study strategy is recommended to be included in teacher training courses as compulsory component. So that, every teacher may essentially learn this strategy to make the learners able to understand the material.
3. The teaching learning process is recommended to be learner centered.

4. The results of the present study and findings of previous research studies revealed that learning strategies can improve the academic performance of students. Therefore, it is recommended that the students may essentially be taught learning strategies for their successful learning.

5. The learning strategies may not be taught in isolation because research findings in this field show that when skills are taught in isolation, they do little more as compared to prepare learners for tests of isolated skills. The cognitive and metacognitive strategies should be taught along with the content to ensure that students can clearly think and understand the relationship between strategic knowledge and content knowledge.

6. The teachers are required to think the academic content from students’ perspective and provide learning experiences that allow content knowledge to be discovered.

7. Cognitive and metacognitive study strategies offer procedures through which students can become more thoughtful and more rational. They are more aware of their learning styles, task demands, appropriate strategies to complete the task and relevance of using their background knowledge to facilitate learning. It is needed for teachers to recognize the role of thinking in shaping human feelings and behaviour, in developing those attitudes and dispositions which will enhance learning along with moral, social, and emotional education.
8. The teacher may provide framework for developing critical thinking, creativity and imagination in a wide variety of contexts, both the general universal elements of reasoning and those which are content specific.

9. Through statistical analysis between low achievers in the experimental group and in the control group, it was concluded that though low achievers in experimental group improved their scholastic achievement than their achievement in the pre-test due to the use of PQ4R study strategy, yet their scholastic achievement was not significantly different. It means that these students were adequately trained and required to use higher order thinking skills such as analysis, synthesis and evaluation in the content area, that caused the students lagging in problem solving and thinking skills. Whereas, higher order thinking cannot be divorced from content because it is an effective tool for attacking real issues. It is urgently needed to teach higher order thinking skills at all grade levels of education without relying on special courses and texts for the purpose.

10. All teachers are required to create an atmosphere where learners may be motivated to study deep questions, involve in divergent thinking and look for associations among ideas and struggle to solve the real issues in their lives.

11. The responsibility for generating, applying, and monitoring the strategy must be transferred from teaching to students.

12. In the tests, teachers are required to develop question papers which follow the steps involved in PQ4R study strategy to promote understanding and to ensure learning.
13. It is needed that teacher may offer procedures through which students can become more thoughtful, can understand not only the features of learning strategies but also the procedural and conditional knowledge.

14. Low achievers in the class may be identified, classified and divided into groups. These groups or individual students may be provided scaffolding with teacher or more competent peers by assigning those tasks that demand metacognitive functioning.

15. Individual attention and guidance be provided to low achievers until they can use PQ4R strategy independently.

16. The teacher should be flexible during teaching the study strategy. PQ4R study strategy tends to be an effective and embracing strategy of learning because different features of many other strategies are included in this study strategy.

17. It is recommended in the light of conclusions of this research study that while taking into account other factors such as IQ level, learning styles, previous knowledge of learners, PQ4R strategy may be adopted in teaching the content and its steps be explained clearly through modeling before the students and practicing it in groups or individually with teacher assistance.

18. Some students need more instruction and more struggle in one step of PQ4R strategy than the other. This diversity of requirement needs to be met accordingly.
19. Motivation, practice and reinforcement provided by the teacher will encourage the learners in using the PQ4R study strategy which will enhance their learning.

20. Although the individual results in studying through PQ4R strategy may vary, the exposure of the strategy is essential for all the students, and it must become part of their strategy arsenal for use in appropriate situations.

5.5.2 Recommendations for Students

The conclusions of the present study showed that students who employed PQ4R study strategy improved their academic performance as compared to their performance in pre-test whether they were high achievers or average students. It means that the students must participate actively in the teaching learning and problem solving process. Students need to be skilled learners to become aware of their learning process while completing the assigned tasks. They must select and use study strategies which activate their relevant prior knowledge and make associations and comparisons with prior knowledge to make learning more meaningful. Skillful readers can generate more information by elaborating it than the readers who are less skilled. Skillful learners are more strategic because they are experts of reading strategies. They become able to monitor their comprehension and use active reading strategies like previewing, predicting, making inferences, drawing from background knowledge and summarizing. Therefore:

1. PQ4R study strategy is recommended for students at all levels to learn how to use it in their studies for successful learning. It is a tested strategy to make the students thoughtful, skilled and practical. This strategy enables the students use
their metacognitive faculty of mind and promote their thinking which is helpful in enhancing the learning and retaining it in their long term memory.

2. All the students, specially low achievers, should be aware about which part of the strategy can be used, how, and when for effective learning. The successful application of the PQ4R study strategy will instill confidence and feelings of self efficacy in the students. Learning does not require rote memorization of material. Students are needed to develop the ability to use cognitive and metacognitive strategies that will help them in retaining the material they read, taking tests effectively and locate and organize information properly.

3. It is necessary to spend time, for learning strategies and methods to acquire, understand and evaluate the information instead of spending time in learning more information. This process needs critical thinking. Students who think critically are likely to generate appropriate questions, collect relevant knowledge, present logical reasons and conclude reliable and trustworthy conclusions for a problem. Therefore, students should develop higher order thinking skills by using PQ4R strategy in their study.

4. PQ4R study strategy is recommended to be used during learning the content. The strategy may be applied on the text material instead of practicing it in isolation.

5. Students should avoid being passive learners, and they may involve themselves actively in learning in one subject area and than transfer it to the other subjects. This transfer and generalization will make the students more skillful and more competent learners.
6. For the activation of learners’ cognitive schemata, PQ4R strategy is of paramount importance as it conditions the improvement in scholastic achievement of students.

7. PQ4R strategy is recommended for all types of students whether they are high achievers, low achievers or average students at any grade level.

5.5.3 Recommendations for Curriculum Designers

The purpose of education is to produce learned and reasonable members in the society and increase the literacy rate. But all the efforts are going almost wasted. Poor academic standard below board results, truancy of students from school, low literacy rate, uneducated and uncivilized society, increase in the crimes, and growing involvement of youth in undesirable activities indicate that there is something wrong in education. To tackle with above problems and issues, the responsibility lies on teachers, curriculum designers and students. Curriculum is the plot on which teachers and students try to play their role. But it seems that students find the curriculum difficult to understand. One of the reasons of this scenario may be the lack of understanding the text material, and relying on rote memorization on the part of students. The present study was an attempt to overcome this deficit through the use of PQ4R study strategy, which in the light of the findings of present study and related previous research studies is an effective strategy that will help students personalize and internalize the knowledge and generalize to different situations. Therefore the curriculum designers may take into account that:

1. The text books material should be developed in such a way that student automatically follow the steps of PQ4R study strategy.
2. It is observed that at the end of each lesson of the text books, there is an exercise of questions given to search answers from the text material. The questions are recommended to be developed according to six steps involved in the PQ4R study strategy that is: preview, question, read, reflect, recite and review.

3. The exercises should cover all the six steps of the strategy that will ensure learning and promote understanding of the learners. Once the understanding occurs, the students will be motivated to learn more information that will be stored in their long term memory, which ultimately, will affect the scholastic achievement of students.

4. Examination boards should set the question papers to check the understanding of the students in relevant subject rather than developing such questions that require reproduction of crammed material.

5.5.4 Future Directions for Further Research

Although, the present study found that PQ4R study strategy appears to enhance the learning and academic achievement of students in the subject of Pakistan Studies, this topic never be ended to explore new dimensions. Recommendations for future researchers are presented as follow:

1. Similar studies be replicated to confirm the findings of the present study, as well as the study be carried out with diverse populations to generalize the results.
2. The present study was carried out on the subject of Pakistan studies, however, it may not confined to this subject only. The effect of PQ4R study strategy may be investigated in other disciplines of sciences, humanities and arts with the diverse of sample size, gender and grade levels.

3. To explore the impact of PQ4R study strategy, the sample be selected on the basis of student’s previous results along with their pre-test in experimental studies.

4. Low achievers may be provided extra instruction, demonstration and scaffolding by the instructors before allowing them to practice the PQ4R strategy collectively and individually.

5. The present study was conducted on one chapter of Pakistan studies text book for the period of one month. The text material and period of study be extended in further studies.

6. The standardized tests instead of teacher made tests be applied to investigate the effect of PQ4R study strategy and to confirm the findings of present study.

7. Contradictions among the results of previous research studies regarding the effectiveness of PQ4R study strategies may be further investigated.

8. For deeper analysis, each step of PQ4R study strategy may be investigated individually and results be interpreted separately.

9. It is strongly needed to explore into the reasons through which low achievers in the experimental group could not perform significantly better.
10. Test items be increased to provide high achievers the space to improve their academic achievement level to their extent.

11. This study be carried out on girl students in the private sector schools. The comparison of effects of PQ4R strategy may be made between urban and rural school settings and between boys and girls.

12. In further studies, in order to provide a model for professional development of teachers in Pakistan, the teachers may be exposed to PQ4R study strategy so that they can teach their students how to study effectively.
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THE PRE-TEST

Paper: Pakistan Studies                   Name: ________________
Max Marks: 30                           Father name: ___________
Time: 01 hour                           Class: _________________

For each question four possible answers have been given, tick the correct answer. Each question carry one mark.

Q. 1 Who played role for spreading Islam in the sub-continent?
   i) Muslim Sufis and Scholars   ii) Muslim historians
   iii) Political leaders        iv) Social workers

Q. 2 Who laid the foundation of Islamic Government in India?
   i) Shahab-ud-Din Ghouri        ii) Muhammad Bin Qasim
   iii) Qutb-ud-Din Aibak        iv) Mehmood Ghaznavi

Q. 3 Who encouraged Hinduism in India?
   i) Aurang Zeb Alam Gir        ii) Shah Jahan
   iii) Mughal King Akbar        iv) Zaheer-ud-Din Babar

Q. 4 What is theory?
   i) Progressivism              ii) The amalgamation of general concepts
   iii) Censuses force           iv) All aspects of life

Q. 5 After whose death the Muslims fell the prey of deterioration?
   i) Shahab-ud-Din Ghauri        ii) Qutb-ud-Din Aibak
   iii) Tipu Sultan              iv) Aurang Zeb Alam Gir

Q. 6 How should Muslims spend their lives in an independent country as Quaid—Azam said? According to:
   i) their religion and culture   ii) Progressivisms
   iii) The customs of India      iv) their own thinking

Q. 7 Which revolution came in the 17th and 18th century?
   i) Political                   ii) Economic
   iii) Educational               iv) Rational
Q.8 For what cause the British came to India?

i) Tourism  
ii) Trade  
iii) War  
iv) Rule

Q.9 What is meant by Jihad in Islam?

i) To leave the house in the way of Allah  
ii) To defend the country  
iii) For the sublimity of uprightness, the sacrifice of life and wealth  
iv) To fight for self principles

Q.10 What is the logic of Zakat (the Islamic tax)?

i) To show self preference  
ii) To please the people  
iii) Circulation of wealth  
iv) Collection of money

Q.11 Who is the spring of power in Islamic sovereignty?

i) Public  
ii) Government  
iii) Allah  
iv) Wealth

Q.12 What source did Allama Iqbal use for awakening the Muslims?

i) Philosophy  
ii) Advice  
iii) Poetry  
iv) Power

Q.13 From what things does the prayer prevent?

i) Over sleeping  
ii) Over eating  
iii) Shamelessness and evil deeds  
iv) Talktivity

Q.14 Which system is responsible to enforce the justice?

i) Judicial  
ii) Legal  
iii) Political  
iv) Local institutions

Q.15 Which incident took place in the 19th Century in the sub-continent?

i) Occupation of the British upon the sub-continent.  
ii) Evolution of ideology of Pakistan  
iii) Elections in sub-continent  
iv) Existence of Pakistan
Q.16 In what aspects are the Muslims and the Hindus different nations?
   i) Religion and civilization   ii) Government and Politics
   iii) Territory and climate   iv) Education and festivals

Q.17 By whose arrival did Islam become political power?
   i) Tipu Sultan   ii) Sultan Mehmood Ghaznavi
   iii) Muhammad Bin Qasim   iv) Quaid--Azam

Q.18 What characteristics had the Khilji Regime?
   i) Injustice and cruelty   ii) Murder and Devastation
   iii) Equality and justice   iv) The spreading of knowledge

Q.19 Which weakness of the Muslims did the British Cash?
   i) Fall of health   ii) Sluggishness and Luxury
   iii) Transgression   iv) Injustice

Q.20 Which are the elements of Pakistan Ideology?
   i) Territory, food and living
   ii) Morality, Philosophy, Language and Civilization
   iii) Dogmas, tradition, law and justice
   iv) Country, state, Government and Caliphate

Q.21 What are the ingredients of faith?
   i) Guidance, moral and knowledge
   ii) Knowledge, logic and wisdom
   iii) Oneness of Allah, Prophet-hood, resurrection, Angels and Heavenly Books
   iv) Richness, fame and state

Q.22 What is the reason of declaring usury unlawful?
   i) It benefits the rich   ii) Increase in spend thrift-ness
   iii) Deterioration of the poor   iv) Increase the dearness

Q.23 Who is the spring of law in Islam?
   i) Islamic institutions   ii) The ruler of age
   iii) Scholars   iv) Almighty Allah
Q.24 What motives should be considered necessary in understanding the existence of Pakistan?
   i) Ideology of Pakistan   ii) The deceptions of the British
   iii) Indian rules   iv) Indian Politics

Q.25 What is the reason of the occurring the religions, political, economic and social changes in the sub-continents?
   i) Strong political system   ii) The arrival of the British
   iii) The arrival of Islam   iv) Knowledge and Literature

Q.26 How does the Islamic system has accordance with democracy?
   i) Politics   ii) Inter-consultation
   iii) Economics   iv) Social

Q.27 What is the necessary demand for having belief in Prophet-hood?
   i) Belief in oneness of Allah   ii) To perform Hajj
   iii) Belief in Prophets   iv) Belief in Angels

Q.28 Why was Allama Iqbal against the Hindu Muslim Unity?
   i) Their customs were different
   ii) Hindus were habitual of drinking and gambling
   iii) Hindus having prejudice with the Muslims
   iv) The Muslims were dominated by Hindus

Q.29 What is the result of giving up of justice?
   i) Government gets power   ii) Democracy develops
   iii) People remain unpunished   iv) Society deteriorated

Q.30 What lesson does Haja-tul-Widah give us?
   i) To travel foreign countries   ii) Unity and brotherhood
   iii) Clean trade   iv) Hatered against non-Muslims
### ACHIEVEMENT SCORES IN RELIABILITY TESTING OF PRETEST

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THE POST-TEST

Paper: Pakistan Studies  
Max Marks: 30  
Time: 01 hour  

Name: ____________________  
Father name: ________________  
Class: _____________________

Note: 30 Questions are given to answer all the questions is compulsory, each question carry 1 mark.

For each statement, there are four possible choices, mark (√) on the right choice.

Q.1 When did the Muslim rule start in the South Asia sub-continent?
   i) 1707  ii) 712  iii) 1857  iv) 1799

Q.2 When Sir Syed Ahmed Khan was born?
   i) 17 Oct 1815  ii) 17 Oct 1816  iii) 17 Oct 1817  iv) 17 Oct 1819

Q.3 When did Muhammad Ali Jinnah get the title of “Quaid-e-Azam”?
   i) 1936  ii) 1937  iii) 1938  iv) 1939

Q.4 When did the Quaid-e-Azam hold the first Educational Conference?
   i) 1945  ii) 1946  iii) 1947  iv) 1948

Q.5 What is the aim of obligatory movement?
   i) To call and advice the Muslim to fulfill their duties.
   ii) To urge sentiments of Jehad in Muslim.
   iii) To raise hats against the English
   iv) To stimulate people for the Pakistan movement.

Q.6 On which status Sir Syed Ahmed Khan started meetings in the Court?
   i) As an advocate  ii) Asstt. Secretary
   iii) Secretary  iv) Judge

Q.7 From where, the educated mass produced in 20th Century?
   i) Colleges of Hindustan  ii) Aligarh University
   ii) Muradabad School  iv) Ghazi pur
Q.8 What was the purpose of Nehro Report, presented in 1928?

i) Separate Education

ii) To reject the principle of separate Education

iii) To establish Unity among Muslims & Hindus

iv) To accept Muslims rights

Q.9 Why did the Muslim celebrate Liberation day in 1939?

i) Sub-continent go Independent

ii) Muslims got service/employments

iii) Law was established in sub-continent

iv) Congress Minister SWP got ended.

Q.10 What was announced in the 3rd June Plan?

i) Provinces will be divided

ii) Provinces will not be divided

iii) District will be divided

iv) District will not be divided

Q.11 On which statement Allama Iqbal stressed in his address of Ala-abad?

i) To laid foundation/to establish a political party

ii) On the creation of separate homeland

iii) On jehad

iv) On the unity of Muslim

Q.12 Which constitution will be enforced in India according to Crip’s, announcement/declaration?

i) Which is according to the Islam

ii) Which is according to the democracy

iii) Which is according to the believe of people in India

iv) Which is according to the opinion of all the political parties in India

Q.13 How many Muslim member will be there in the management council of Vice Roy according to ford view?

i) Less than the strength of Hindus

ii) More than the strength of Hindus

iii) Equal to the strength of Hindus

iv) Half to the strength of Hindus
Q.14 Who was the president of Management Committee, founded by the Quaid-e-Azam after the creation of Pakistan?

i) I.I. Chundrigarh  ii) Ch. Muhammad Ali  
iii) Ch. Rehmat Ali  iv) Ghazanfar Ali

Q.15 What were the circumstances for the sub-continent, when Shah Wali Allah Started his movement?

i) Hope was there  ii) disappointment was there
iii) The light of education was spread every where  iv) Ignorance was the every where

Q.16 After which incident the darkest era of the Muslim history was started in sub-continent?

i) After the failure the war of independence  ii) With the entrance of the English
iii) After the Palasi war  iv) After the death of Shah Wali Allah

Q.17 What is necessary for the progress of the Muslims according to Sir Syed Ahmed Khan?

i) Men Power  ii) Economic progress
iii) Education  iv) Modern Tech.

Q.18 When did the opposition movement start?

i) After Nehro Report  ii) After 14 points of Quaid-e-Azam
iii) After the migration movement  iv) After the first world war

Q.19 To whom Turkish favoured in the First world war in 1914?

i) Against German with English  ii) Against English with Germans
iii) Against Hindus with Sikh’s  iv) Against Sikhs with Hindus

Q.20 How much strength will be given to Muslim presentation in the 14 points of Quaid-e-Azam?

i) At least 1/3rd  ii) At least 1/4th
iii) At least 2/4th  iv) At least 2/3rd
Q.21 Who got clear majority in the election of 1937?

i) Muslim League and Jamiat Ulma-i-Islam
ii) Muslim league
iii) Congress
iv) Jamiat Ulma-i-Islam

Q.22 What were the authority/designation of the members, who were selected for the division of Punjab Province?

i) Judges of Supreme Court
ii) Members of Assembly
iii) Teaches of university
iv) Judges of High Court

Q.23 Which province of Pakistan is biggest according to area and smallest according to population?

i) Baluchistan
ii) Sindh
iii) Sarhad
iv) Punjab

Q.24 How many seats Muslim League won out of 86 in the election of 1945-46?

i) 74
ii) 75
iii) 77
iv) 79

Q.25 How many objectives were of Cabinet Mission sent by the British Govt?

i) One
ii) Two
iii) Three
iv) Four

Q.26 On which status, the Muslims will be given Govt. job according to the 14 points of the Quaid-e-Azam?

i) According to their cast
ii) According to their wish
iii) According to their merit & proportion
iv) According to the legislation

Q.27 What scarcity did the Muslims feels badly, during the Shimila (delegation)?

i) A leader
ii) An organized party
iii) A movement
iv) An Ideology

Q.28 What was one objective of Aligarh Movement of Sir Syed Ahmed Khan?

i) To stimulate the Muslims against the English
ii) To create unity in Muslims and Hindus
iii) To create confidence in Govt. and Muslims
iv) To avoid the Muslim to learn/to get education
Q.29 When did the Muslims were considered as a separate Nation?

i) In Shimla delegation ii) In opposition movement

iii) In migration movement iv) In Lakhnow pact

Q.30 From which rivers Pakistan was deprived in the result of red Cliff's division?

i) Sutlaj, Jehlum and Punjab ii) Sutlaj, Biyas and Ravi

iii) Ravi Sindh and Sutlaj iv) Jehlum, Biyas and Sindh
### Appendix D

**ACHIEVEMENT SCORES IN RELIABILITY TESTS OF THE POSTTEST**

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### Appendix E

**ACHIEVEMENT SCORES OF SAMPLE STUDENTS IN PRE-TEST AND THEIR MATCHING.**

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UNMATCHED STUDENTS

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Students! After completing preview step, close your books and answer the questions asked by the teacher. Raise your hands to give an answer.

Teacher: What this chapter is about?

Student: This chapter is about “Islamic Society.”

Teacher: What was the condition of Arab Society before Islam? (This question can be answered by looking the link between title and main heading of the chapter.)

Student: The condition of Arab Society was worst before Islam.

Teacher: Which aspects of life have been discussed in this chapter? (This question can be answered by looking at the subheadings of the chapter.)

Students: Religious, social, political and economic aspects of life have been discussed in this chapter.

Teacher: Which aspects of life were influenced after the arising of Islam? (Answer of this question can be found by viewing the subheadings of the chapter.)

Students: Religious, social, political and economic aspects of life were influenced after arising of Islam.

Teacher: What elements proved to be helpful during the diffusion of Islam? (This question can be answered by reading key words on page 12 of the book).

Student 1: Simplicity, basic principles of Islam, love, tolerance, endurance, equality and justice have appealed the people and they embraced Islam.

Student 2: The preaching of Islam by Muslims traders, preachers and conquerors are also the elements which helped in spreading Islam.

Student 3: The superior character of Muslims, excellent behavior and honesty are elements which appealed the non-believers and they accepted Islam.

Teacher: Which wars are called “Saleebi” wars? (Answer of this question can be found by reading the first sentence of the paragraph given under the heading “Saleebi Jangen”)

Students: The wars fought by the christions against Muslims are called “Saleebi wars.”
QUESTION ACTIVITY DURING TRAINING

Students were involved in turning the headings, subheading and key terms into questions. Teacher asked the students to open page 7 of chapter two titled “Islamic society” and turn the headings and subheadings in this chapter into questions and write them in your note books then raise hands to read the questions they formulated. The teacher corrected and modified some questions generated by students.

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<tr>
<th>Headings/Subheadings/Key words</th>
<th>Generated Questions</th>
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<td>What was the condition of Arab society before Islam?</td>
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<td>Before Islam Arab’s:</td>
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<td>i. Religious life.</td>
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<td>i. Social life</td>
<td>What did Arabs preach before Islam?</td>
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<td>iii. Political life</td>
<td>What was the living style of people of Arabia before Islam?</td>
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<tr>
<td>iv. Economic life</td>
<td>How did people of Arab earn their living before Islam?</td>
</tr>
<tr>
<td>Depth questions were formulated with the help of following key words/phrases.</td>
<td></td>
</tr>
<tr>
<td>Idol worshiping, wine, usury, Ignorance,</td>
<td></td>
</tr>
<tr>
<td>Cruelty, chiefs of tribes, rule of power and fights.</td>
<td>What were the ways to change the worst condition of Arabs?</td>
</tr>
<tr>
<td>Appearing of Islam (page 8-11)</td>
<td>What is the reason of turning the worst conditions into excellent civilization?</td>
</tr>
<tr>
<td>Arab’s:</td>
<td></td>
</tr>
<tr>
<td>Religious Life</td>
<td>What were the effects of Islam upon religious life of Arabs?</td>
</tr>
<tr>
<td>Social Life</td>
<td>Which social changes occurred in Arab society after Islam?</td>
</tr>
<tr>
<td>Political Life</td>
<td>Which conditions were made compulsory to rule the society?</td>
</tr>
<tr>
<td>----------------</td>
<td>----------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>How was politics reshaped when Islam came?</td>
</tr>
<tr>
<td>Economic Life</td>
<td>Describe the basis laid to bring changes in economics of Arab?</td>
</tr>
<tr>
<td></td>
<td>Which steps were taken to finish poverty?</td>
</tr>
<tr>
<td></td>
<td>Why Federal Accountability institution was established?</td>
</tr>
<tr>
<td></td>
<td>Which matters Federal Accountability institution deals?</td>
</tr>
<tr>
<td>The Diffusion of Islam (page 11)</td>
<td>(questions were made after reading 1st sentence of paragraph and key words)</td>
</tr>
<tr>
<td></td>
<td>How Holly Prophet (PBUH) spread message of Islam?</td>
</tr>
<tr>
<td></td>
<td>To which territories was Islam spread during the rule of great caliphs of Islam?</td>
</tr>
<tr>
<td></td>
<td>Why people happily embraced Islam?</td>
</tr>
<tr>
<td></td>
<td>Who laid the boundaries of Islamic country?</td>
</tr>
<tr>
<td></td>
<td>Which principles of Islam appealed the people?</td>
</tr>
<tr>
<td>BOLD FACED WORDS (page 12)</td>
<td>Narrate three factors that helped in diffusion of Islam?</td>
</tr>
<tr>
<td>SALEEBI WARS</td>
<td>Why these wars are called Saleebi wars?</td>
</tr>
<tr>
<td></td>
<td>During which period Saleebi wars were fought?</td>
</tr>
<tr>
<td></td>
<td>Describe the great work of Amad-ud-Din Zangi, Noor-ud-Din Zangi and Sultan Sla-ud-Din Ayoubi?</td>
</tr>
<tr>
<td></td>
<td>Evaluate the reasons of Saleebi wars?</td>
</tr>
<tr>
<td></td>
<td>Explain the results of Saleebi wars?</td>
</tr>
</tbody>
</table>
READ AND REFLECT ACTIVITY DURING TRAINING

Students were involved in activity to use reading signs for reading the selected material.

Activity:
There are some important information in the chapter, let us mark them with reading signs.

Underline where there is a definition i.e page 7. period of ignorance page 8.
Nazria –e – Toheed page 9, Hijrat –e –Madina, Hajjatul Widah. Page 10,

EX If you noted, or want to give any example, write EX in the margin i.e. last line on page 9, Example of a women has been given.

1 2 3. Last paragraph at page 10, put 1, 2 and 3 on Awwal, Dom and Som.

Imp. There are some important information in the material, mark them with a star or imp.
To find the answers you generated during the question step.

Put a vertical line where important information are in more than one line.i.e first and second paragraph on page 8 under the heading Rising of Islam, p.9 last paragraph, p.11 last paragraph, p.12 third paragraph, and last paragraph of p.13.

Tick Tick mark sign may be put on information that can be important. i.e. page 10 2nd paragraph
Mark of Federal accountability cell.

? Put this mark on the material that you can not understand during first reading.
(Different students put question mark on different places of the material).

Activity
Students put question mark on difficult words also and asked their meanings from teacher.

Activity
Then they performed an activity to have a strong grip on the material. They were asked to answer the questions in “Yes”or No. If any answer was “no” then reread the material with reflection. If all the answers are Yes then step forward for next skill.

Questions:
Do I know:
1) What was the condition of Islamic society before Islam?
2) Which difficulties did Holy Prophet (PBUH) faced after appearing of Islam?
3) What were the effects of Islam upon Arab society?
4) Which steps had been taken to spread Islam?
5) What were the Saleebi wars?
6) What were the results of Saleebi wars?
**RECITATION ACTIVITY DURING TRAINING**

Chapter: Islamic Society

Selection: Religious, social, political and economic condition of Arabs before Islam.

Time Allowed: 15 minutes

Recite the chapter with the help of key words and phrases.

Key Words noted down during previous steps.

<table>
<thead>
<tr>
<th>Topics</th>
<th>Conditions of Arabs before Islam</th>
<th>Conditions of Arabs after Islam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Religious Condition</td>
<td>Idol preaching, demigods, superstitious, human killing and wine.</td>
<td>Toheed, Unitarianism, Almighty Allah, house of Allah and fundamentals of Islam</td>
</tr>
<tr>
<td>Social Life</td>
<td>Lack of code of conduct, disputes, enmities, Murders, racial pride.</td>
<td>Madina migration, mosque, brotherhood, endurance, tolerance, Ansaars, equality, simplicity, women status and justice</td>
</tr>
<tr>
<td>Political life</td>
<td>Tribes, chiefs, disputes between tribes, cruelty, rule of power, no government.</td>
<td>Allah Almighty, Islamic rules, consultative council, Caliphs of Islam, Zakat, freedom, democracy and justice</td>
</tr>
<tr>
<td>Economic condition</td>
<td>Cultivation, trade, usury, interest on loan, Increasing poverty.</td>
<td>Fair business, end of interest, Baitiul Maal, Zakat, ushr, tax from non believers.</td>
</tr>
</tbody>
</table>

Activity:

Students! Close your books cover the answers. You have just previewed, questioned, rea read and reflected the selected material.

Write down:
- Main idea,
- Main points,
- Recall words
- Main phrases
- Answers of questions posed
- Turn each recall word into question and write their answers.
After you have written, raise your hands to answer the questions one by one.

1. What is the main idea of the chapter?
2. What main points did you note?
3. What key words did you write down?
4. Which key words did your friend write but you missed?
5. Which point did you found helpful but your classmate missed them?

All of the students were excited to answer above questions. They were guided to use their senses for strong grip over selected material:

SEE: look on the words and phrases and use your visual memory, then answer the questions asked by the teacher.

Question: Can you visualize the idols that were put in Holy Kaba?

Students: Yes we can.

Question: What are the idols made of and what are they look like?

Students: They are made of stones and wood, little and big, of different colors but very ugly to look at.

Question: Can you visualize tribes quarreling each other?

Students: I can see different people fighting with swords, sitting on horses, killing each other dead bodies lying on ground and blood spread all around.
Students: we can see peace and calm everywhere in the presence of Holy prophet (PBUH), all are in happy mood, ready to help others.

Question: What political differences can you see, before Islam and after Islam?

Students: (one by one)

Before Islam, we see no government, no rule, tribes fighting, rule of power, inhumanity, cruelty and injustice everywhere.
After Islam, we can see rule of law, democracy, people sharing their belongings each other, sacrifice and brotherhood everywhere.

SAY AND HEAR: Students read aloud, heard their words and used auditory memory. In this activity teacher allowed the class to read difficult paragraph aloud and write by using auditory and motor memory. (Different students selected different paragraphs for this activity).

WRITE OR DRAW: Students used motor memory by jotting down the key words and phrases without looking back to the text. (teacher had been observing the students using their senses, by walking in the class).
SELECT: students selected the key words, phrases and recall words to write a summary of the selected text.

Activity:

Students repeated the answers of questions generated during read and reflect steps. Each student individually wrote a summary on the topic “Islamic Society” with the help of key words and phrases jotted down during previous steps and then compared it with her classmates.
Appendix J

REVIEW ACTIVITY DURING TRAINING

Chapter: Islamic Society

Selection: Religious, social, political and economic condition of Arabs before Islam.

Time Allowed: 5 minutes

Answer following questions before reviewing the selection.

1. Have you thoroughly studied the chapter by using PQ4R skills.
2. Which step did you find more helpful?
3. Do you want to repeat any of PQ4R steps?
4. If yes, which step do you want to repeat?
   (one of the students showed difficulty in reflecting the information).

Activity:
Open your books, second last paragraph at page 9 and break it in little bits, read one sentence and stop to think deeply over every bit. Try to relate information with your own life, with your surroundings or with your previous knowledge and answer following questions.

1. Does this paragraph relate with any event of your life?
   Students: yes, there are many events full of false pomp and show, extravagant and superstitious at weddings, anniversaries and even on death.
   (students related several examples with the information in selected paragraph).
2. Have you now completed chapter 2 of social studies for class 7th?
3. Can you apply the systematic series of PQ4R skills by your own?
4. How did you feel the transition of one step to the next?

Home work:
Apply PQ4R skills on a new material of your own choice.
ABILITY TEST FOR THE USE OF PQ4R STRATEGY

Q.1 What is the name of the chapter which you have studied by your self
With the help of PQ4R skills


Q.2 On how many departments, the Local Govt. is formed

i) Two   ii) Three   iii) Four

Q.3 Which department is established to provide the urban facilities in the cantonments

i) Union council   ii) Tehsil Council
 iii) Cantonment Board

Q.4 What is the relation of the Questions, which raised in your mind, after reading the headings and sub-headings of this chapter?

i) With the Muslim citizens   ii) Department of the local Govt.
 iii) Medical aids

Q.5 Sub-headings Health and Hygiene provide the information about:

i) The Local Govt.   ii) Drugs Business
 iii) Healthy environment

Q.6 What is the objective/aim of establishing the departments of the local Govt.

i) To solve the problems of citizens in providing the basic necessities.
 ii) To mend the system of export and imports
 iii) To strengthen the presidential system

Q.7 What is the number of seats preserved for the women in the tehsil council?

i) 5%   ii) 10%   iii) 33%

Q.8 Who elected the District Nazim?

i) Govt. Officers   ii) Members of union council (present in the District)
 iii) Naib Nazim of the District
Q.9 Why this chapter is marked during the study?
   i) For an important information  
   ii) For example  
   iii) To write the information in order wise

Q.10 What is necessary to keep yourself healthy?
   i) Daily visit the Doctor  
   ii) To keep the body, dress and place clean  
   iii) To eat frequently

Q.11 Who’s responsibility is to keep the park clean, near your house?
   i) Local Govt.  
   ii) Management of the Park  
   iii) Of all of us

Q.12 What problems are caused due to use of drugs?
   i) Fatal diseases and problems  
   ii) Pollution  
   iii) Hygienic problems

Q.13 What so ever you learnt from this chapter is related to:
   i) The cycle of life  
   ii) Independent local Govt. in Pakistan  
   iii) Ways of living

Q.14 What may be the key words, for writing the summary of this chapter
   i) Police station, jail (cell) schools, Hospitals, Govt’s Offices  
   ii) Business, Industry, Agriculture, Construction, Resources  
   iii) Local Govt. Nazim, Civil defence, Army Cantt. Hygienic drugs

Q.15 When did the independent Local Govt. start working?
   i) 14th August 2000  
   ii) 14th August 2001  
   iii) 14th August 2002
## ACHIEVEMENT SCORES IN ABILITY TEST

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of students</th>
<th>Scores</th>
<th>S.No.</th>
<th>Name of students</th>
<th>Scores</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Shehla Yaseen</td>
<td>26</td>
<td>26</td>
<td>Komal Shafiq</td>
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<tr>
<td>2</td>
<td>Sunny Raza</td>
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<td>27</td>
<td>Naïma Rani</td>
<td>24</td>
</tr>
<tr>
<td>3</td>
<td>Maria Perveen</td>
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<td>28</td>
<td>Abida Kausar</td>
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</tr>
<tr>
<td>4</td>
<td>Saba Fayaz</td>
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<td>Noreen Akhtar</td>
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<tr>
<td>5</td>
<td>Sonia Naz</td>
<td>20</td>
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<td>Mah Jaben Azram</td>
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</tr>
<tr>
<td>6</td>
<td>Sana Naz</td>
<td>24</td>
<td>31</td>
<td>Laraib Fida</td>
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<tr>
<td>7</td>
<td>Maryam Nisa</td>
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<td>Amina Nazar</td>
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<td>8</td>
<td>Samina Kausar</td>
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<td>Saima Manzoor</td>
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<td>9</td>
<td>Amreen Pervaiz</td>
<td>20</td>
<td>34</td>
<td>Sadaf Kiyani</td>
<td>30</td>
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<tr>
<td>10</td>
<td>Maryam Ghazanfar</td>
<td>20</td>
<td>35</td>
<td>Sobia Nawaz</td>
<td>26</td>
</tr>
<tr>
<td>11</td>
<td>Anila Bibi</td>
<td>30</td>
<td>36</td>
<td>Anam Shehzadi</td>
<td>30</td>
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<tr>
<td>12</td>
<td>Sobia Bibi</td>
<td>20</td>
<td>37</td>
<td>Anam Batool</td>
<td>22</td>
</tr>
<tr>
<td>13</td>
<td>Tehmina Shaheen</td>
<td>26</td>
<td>38</td>
<td>Qudsia Azeem</td>
<td>28</td>
</tr>
<tr>
<td>14</td>
<td>Shabnam Firdaus</td>
<td>24</td>
<td>39</td>
<td>Iqra Bibi</td>
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</tr>
<tr>
<td>15</td>
<td>Rafia Azhar</td>
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<td>40</td>
<td>Irsa Saleem</td>
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<tr>
<td>16</td>
<td>Saba Faiz</td>
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<td>41</td>
<td>Bushra Zahid</td>
<td>28</td>
</tr>
<tr>
<td>17</td>
<td>Sadia Riyaz</td>
<td>20</td>
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<td>Sonia Nisar</td>
<td>26</td>
</tr>
<tr>
<td>18</td>
<td>Shamaila Tariq</td>
<td>26</td>
<td>43</td>
<td>Sonia Sarfraz</td>
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<tr>
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<td>Aisha Saleem</td>
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<td>Sammia Rasheed</td>
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<tr>
<td>20</td>
<td>Mehmoona Khatoon</td>
<td>28</td>
<td>45</td>
<td>Madiha Bibi</td>
<td>30</td>
</tr>
<tr>
<td>21</td>
<td>Sidra tul Muntaha</td>
<td>30</td>
<td>46</td>
<td>Shehla Naz</td>
<td>24</td>
</tr>
<tr>
<td>22</td>
<td>Jawairia Azhar</td>
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<td>Asra Rafi</td>
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<td>23</td>
<td>Muniba Shabbir</td>
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<td>Hina Ashiq</td>
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<td>Samina Ashraf</td>
<td>24</td>
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<td>Rozina Pervaiz</td>
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</tr>
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<td>25</td>
<td>Shafaq Iqbal</td>
<td>24</td>
<td>50</td>
<td>Anial Iftikhar</td>
<td>28</td>
</tr>
</tbody>
</table>

**Sum of Scores 1272**
CONTENTS
PREVIEW ACTIVITY DURING EXPERIMENTAL TEACHING

Establishment of Pakistan

- Fazal Movement
- Shah Wali Allah
- Shimla Deputation
- Ali Garh Movement & Sir Syed Ahmed Khan
- Lucknow Pact 1916
- Muslim League 1906
- Non-cooperation Movement
- Khilafat Movement 1919
- Nehru Report 1928
- Hijrat Movement
- Allama Iqbal's Allahabad Address 1939
- 14 Points of Quaid-e-Azam

Evolution of Two Nations Theory

- The Dawn of Independence
- Redcliff Award
- Independent Law of Hind
- 3rd June Plan
- Executive Govt.
- Direct Action Day
- Cabinet Mission Plan 1946
- Shimla Conference & Elections
- Cripps Mission 1942
- The Lahore Resolution 1940
## QUESTION ACTIVITY DURING THE EXPERIMENTAL TEACHING

Following headings and sub headings have been taken from chapter 2 of Pakistan Studies text book for class 10th. Change each into meaningful basic question by using W questioning words like what, why, who, which, when and key words, charts and maps for depth questions.

Activity:
(one session)

<table>
<thead>
<tr>
<th>HEADINGS/SUBHEADINGS/KEY WORDS.</th>
<th>QUESTIONS</th>
</tr>
</thead>
</table>
| EXISTANCE OF PAKISTAN (heading)               | a. How Muslim Rulers began their rule in South Asia?  
   | b. Why British entered the Sub-Continent?       
   | c. Who were the great leaders fought to stop British to enter Sub-continent?                                                                                                                                       
   | d. What happened in 1831 with Muslim leaders and scholars?                                                                                                                                                        |
| Development of Two Nation Theories (subheading)| e. What is two nation theory?  
   | f. Who proceeded two nation theory?              
   | g. What struggles were made before two nation theory?                                                                                                                                                          |
| Shah Wali Allah (sub heading)                 | a. Who was shah wali Allah?  
   | b. What were his struggles for the cause of Islam?                                                                                                                                                             |
| • Fatah-ul-Rehman fi Tarjama-tul-Quran.       | a. Why he wrote Fatah-ul-Rehman fi Tarjama-tul-Quran?                                                                                                                                                       |
| • Al Musawa Al Musaffa (key words)            | b. Which is his book on translation of Hadith?                                                                                                                                                              |
| Faraizi Tehreek (subheading)                  | c. Who was founder of Faraizi Tehreek?  
   | d. What was the cause of this Tehreek?       
   | e. What were the results of this Movement?     |
Appendix O

READ AND REFLECT ACTIVITY DURING THE EXPERIMENTAL TEACHING

Activity 1

Students! Open your Pakistan studies text books, page 15-16. Be selective, read and mark the most important points, definitions, examples, and enumerations in the selected text page 15-16, from heading Two Nation Theories to Faraizi Tehreek.
Put following reading signs on relevant places of the text:

1. _____ 2. Ex 3. 1,2,3. 4. Imp. or draw a star 5. / 6. Tick mark 7. ?

Activity 2

After reading the above selected headings, answer following questions by putting yes or no in the boxes.
Do you:

1. Understand most about Two Nation Theories and Faraizi Tehreek? ☐
2. Know how much you understand about above two headings? ☐
3. Understand uninteresting material? ☐
4. Actively monitor your understanding? ☐
5. Know how to improve your comprehension? ☐
6. Relate the things you already know? ☐
7. Relate the things with your personal life ☐
8. Have experience of reading material like this? ☐

If you answered all the questions in yes then forward a step and note down following questions in your books, again answer them in yes or no in the boxes given against each question.

Can you:

1. Explain the meaning of theory? ☐
2. Tell when two nation theory started? ☐
3. Justify the saying of Sir Syed Ahmed Khan about two nation theory? ☐
4. Describe the process of development of two nation theories? ☐
5. Explain the great work of Shah Wali Allah for the cause of Islam? □

6. Describe the objectives of Faraizi Tehreek? □

7. Tell the results of Faraizi Tehreek? □

Activity 4

How many yes and how many “no” are there in your note books at the end of activity No3. Those students who have all yes, search the answers of questions posed during the question step but the students who have one or more “no”, repeat the preview, question, read and reflect processes, take help of your classmates and teacher.
Appendix P

RECITATION ACTIVITY DURING THE EXPERIMENTAL TEACHING

Students! after you have completed read and reflect process, recite the material you have just read with the help of key words, phrases, recall words and main points that you noted down.

Activity

Close your books and dictate to the teacher all the key words, phrases and recall words in accordance with their headings who will write them on black board in the class. Note down the words in your notebooks that anyone of you has missed and make colorful flash cards of all the words written on the black board.

<table>
<thead>
<tr>
<th>Headings</th>
<th>Key Words/Phrases/Recall Words/Main Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existence of Pakistan</td>
<td>712, death of Aurang Zeb Alamgir, trading company, Tipu Sultan, movement of Mujahidin, Syed, Balakot.</td>
</tr>
<tr>
<td>Development of Two Nation Theories</td>
<td>Two Nations, Jhon Bright, Allama Iqbal, Sir Syed Ahmed Khan, No obsorption, 1879, Jamal-ud-Din, 1890 Haleem,</td>
</tr>
<tr>
<td></td>
<td>1913, Murtaza, 1928, thanvi</td>
</tr>
<tr>
<td>Shah Wali Allah</td>
<td>Renewer, letter, Jahad, Fatah-ur-Rehman, Musawa, Musaffa, Raheemia.</td>
</tr>
<tr>
<td>Faraizi Movement</td>
<td>Faraizi, Bangal, peasant’s problems, denying Hindu’s orders.</td>
</tr>
</tbody>
</table>

Activity

Cover the answers you wrote in previous step and answer the following questions.

Can you:

1. Recall the answers you just wrote? [ ]
2. Write the summary of the selection from Existence of Pakistan? [ ]
3. Compare the summary with the writing of your classmate sitting nearest to you?

4. Assess whose summary is better?

5. Recall all the key words and main points of the selection?

Activity
From the selection you have just previewed, questioned, read and reflected write down in your note books:

- The main idea of the selection
- Main points of the selection
- Recall words of the selection
- Main phrases of the selection.

Activity 3
Turn following key words, phrases and recall words into questions and answer them without looking at the selected material.

- 712
- Trading company
- Theory
- Two nations
- Fatah-ur-Rehman
- Problems of peasants
- Tipu Sultan

Activity
Use all your senses and involve your memories in following way:

SEE the printed words, charts, flash cards, pictures and black board and involve your visual memory.

SAY the selected material and involve your motor memory.

HEAR. Say aloud the difficult material and involve your motor and auditory memory simultaneously.

Make two columns, write the important events, personalities or information in one column and their year in second column, then match by saying them aloud.

WRITE/DRAW Jot down key words and phrases that you noted down in previous activities and draw a sketch by involving your motor memory.

SELECT important points and write them by involving your motor memory.
Try to use your motor memory as much as you can to embed the information into your long term memory.
Appendix Q

REVIEW ACTIVITY DURING THE EXPERIMENTAL TEACHING

Time allowed five minutes.

Activity 1
Take two minutes and verbally answer the questions asked by the teacher before starting the review step.

- Have you completed the tasks planned for review step?
- If you have not completed, why not?
- What did you plan to do with the chapter “Existence of Pakistan”?
- Do you need to do more with the selected material? If yes, then what?
- Is that the end of your work with the selection?

Activity 2
Close the books and do as directed by the teacher.
- Quickly find the main points of the selection.
- Answer the questions you have generated from the selection.
- Explain your friend the efforts made by great leaders for achievement of Pakistan and the base of these efforts.
- Make mind map and outline of page 15-16 of your book and write a summary of selected material having 150-200 words.
- Revise key words and phrases from the headings development of two nation theory, Shah Wali Allah and Faraizi Tehreek and write them on flash cards to study them.

Raise your hands to answer the questions asked by the teacher.
- What steps did you follow?
- How did you feel each step?
- Did you counter any difficulty?
- Which step did you feel more helpful?

Home work:
- Practice PQ4R series of study skills with a new material.
## ACHIEVEMENT SCORES OF EXPERIMENTAL GROUP IN THE POSTTEST

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of Students</th>
<th>Scores</th>
</tr>
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