CHAPTER 1

INTRODUCTION

Educators, researchers and psychologists in related areas have tried to identify individual differences in processing, retaining, and retrieval of the information. Many of the researchers employed a variety of measures to assess personality, attitude, ability and cognitive style (Cropley & Field, 1969; Cowell & Entwistle, 1971; Schmeck, 1983) to investigate these differences.

It enabled the researchers in the concerned area to understand how someone learns, attains novel information and holds earlier information which helps in attaining long-term learning objectives. Cognition is a wide field which considers keenly the study of the mind holistically. Neisser (1967) described that cognition studies the way people encode, structure, store, retrieve, use or otherwise process information and gain knowledge.

In other words, cognition refers to the activities of the mind or unobservable mental processes and these are usually seen as at least proximal causes of behavior (Ellis & Hunt, 1993). Sternberg, Robert and Jennifer (1998) proposed the construct of intelligence as a useful and unifying theme for the study of cognition.

American Psychological Association (1995) describes that individuals differ from each other in their capability to understand multifaceted ideas, to adjust successfully in their environment, learn through their experiences, indulge in diverse type of reasoning, and defeat obstructions by considering their thoughts. Even though these individual differences can be considerable, they are never completely being constant. Intellectual performance of any person may differ on dissimilar instances, in different fields, as evaluated by distinctive criteria. The concept of “intelligence” tries to explain, organize and systematize this multifaceted set of phenomenon.

The information-processing perspective exhibited that the systematic inquiry of cognitive process is the beginning of studying the cognitive basis of intelligence. The cognitive processes are directly associated with the intelligence that carry out characteristic transformations. These higher mental processes are essential for conducting IQ test tasks (Sternberg & Berg, 1986). In similar line, Snyderman &
Rothman (1987) revealed that they facilitate mental activities like reasoning and problem solving which are strongly related to intelligence. In turn, while investigating these processes, Schweizer & Moosbrugger (2004) revealed that working memory and attention are the significant mechanism of the cognitive basis.

1.1 ATTENTION

Attention is a complex and primary process in cognitive functions which plays significant role in fundamentally all features of perception, cognition and action. The term assigned as internal control mechanism which direct one’s sensory processes to the appropriate features of the myriads of physical energy bombardments and also to observe one’s reactions for providing unity of focus in all experiences and behaviours. It is this self directing control mechanism by which an individual selectively registers some stimuli and ignores others through efforts and creating concentrations. Right from the time of birth, attention reflected one’s larger metaphysical observation of the nature of objects and how one comes to know the world. Therefore it’s not surprising that interest in the area of attention laid foundation for the empirical research of attention in the following years (Sen, 1983).

With the establishment of psychological lab by Woundt at LeipZig in 1879 attention has been introduced as an important facet of mental activities. Pillsbury wrote (1908) that “The manifestations of the state of mind which we commonly call attention are protean. No part of individual is untouched by them. They extend to every part of the physical organism, and are amongst the most profound facts of mind. So numerous and varied are the manifestation of attention, that we find it defined by competent authorities as a state of muscular contraction and adaptation, as a pure mental activity, as an emotion of feeling, and as a change in the clearness of ideas”.

Experts have defined attention in different ways. Williams James, one of the first cognitive psychologists identifies the nature of attention thus: “it is the taking possession by the mind, in clear and vivid form, of one out of what seem several simultaneously possible objects or trains of thought. Focalization, concentration of consciousness are of its essence” (James, 1890). The immediate effects of attention as recognized by him are: (a) to perceive, (b) to conceive (c) to distinguish, (d) to remember, and (e) to shorten reaction time. An eminent neurophysiologist Hernandez-Peon (1966) defines attention “as the primary process underlying sensory perception,
memory and thinking, without which human life would be comparable to that of lower organisms.”

Titchner (1910) defined three stages in the development of attention: a) the primary, involuntary or passive attention referred by certain factors in an external event or any object present in the environment which forced the individual to attend, b) the secondary, voluntary or active attention involved in certain idea or perception which is detained in face of competitors or opposition, c) the derived primary attention based on this perception or idea makes capable to presume undisputed dominance over its opponent or challenger. Titchner argued that all three stages are the different manifestations of development of attentive consciousness. Initially attentive consciousness is simple, easy and effortless; later on it turns out to be difficult before being simplified once again.

In similar viewpoint of Titchner (1910), Gaddes (1994) indicated that there are two main stages in the development of attention i.e. passive and active. Passive attention is easy and involuntary which is engrossed by various factors that are prominent in their environment, for example a bright flash, a strong smell, or a sudden loud noise. On the other side, active attention refers to the intentional and effortful process that is channelized by internal events such as alertness, concentration, interest and needs like curiosity and hunger.

Three components of attention have been introduced by Posner and Boise (1971) and these are: 1.) alertness, 2.) selection, and 3.) processing capacity. Alertness has been mostly recognized in the vigilance and vigilance-like performance. The foreperiod of a reaction time task during which the subject allows himself to attend the stimulus also requires alertness on his part. Selectivity means selection of information from one basis while ignoring other. The third component is the processing capacity directed by the limited capacity of an individual introduced by Broadbent (1958a).

Due to the limited information capacity of the cognitive mechanism, Broadbent (1958) argued that a filtering processor is required if it is not to be filled to capacity. This limited capacity mechanism deals with but one channel of information at a time. The organism chooses information from various sources on the basis of the physical characteristics of the information which are impinging on his sense organs. On the basis of requirement, he switches attention among various input sources. He defined attention
as the bottleneck that needs to be passed on the way to consciousness. Further, Broadbent (1958) describe three systems of this filter model and these are: A short-term store (S-System), a selective filter and a limited capacity channel (P-System). S-System capacity is not fixed and in this system many information entered in parallel filter. After that the selective filter permits information from one preferred channel to enter into the P-system. This channel can be described by any physical characteristics which hold more detailed analyses on an accepted channel. When the P-system cleared the information processing from one channel, the filter permits a new message to enter into this system.

Modern cognitive psychology described that only brain has a limited amount of resources to process. To understand the bombardment of information, the process of concentrating on relevant stimuli is very difficult in an environment where unlimited and immeasurable amounts of sensory stimulus are continuously presented (Ashcraft, 2005; Goldstein, 2007). Further, they concluded that attention serves as a mechanism which filters out all of the sensory information and focus on relevant elements so that it can be processed quickly and efficiently. Suthers (1996) also considered attention as the “limitations in our perceptual processing and response generation: to attend to one this is to not attend to others”.

Posner and Snyder (1975a) define two processes of attention i.e. automatic activation processes and the processes under present conscious control. The researchers demonstrated three operational indicants for automatic activation process. For example, a) they have been assumed to occur without intention, b) without any conscious awareness and c) without producing interference with other ongoing mental activity. Many experimental findings revealed that human beings are unable to ignore the undesirable information in the sense and later they are processed automatically and make contacts at the semantic level systems. Posner and Snyder (1975a) have pointed out that the interaction of conscious attention with automatic activation processes determines the output. The conscious attending system and automatic activation process are distinguished in the sense that the former have limited capacity effects. Therefore, the assurance of the conscious attending process to any action accordingly lessens its accessibility to execute any other operation. Many cognitive tasks have been resulted from the combination of automatic activation process and conscious strategies.
The attending response is a difficult phenomenon which includes both facilitators and inhibitory factors. Travers (1970) suggested that attention is engaged in the modification in the sensory system (the attending or orienting response) for the reception of particular stimulus information. Attention also restrains the reception of definite set of information in order to encourage responses of other certain information. Environmental factors also play important part in determining inhibition or facilitation in the reception of the stimulus.

Developmentally, attention is considered as modification between information pick-up and utility of that information with greater specificity. Attention modifies with development and those modifications include more than a) an improved capacity to attend and b) shift from unintentional to intentional attending (Gibson and Radar 1979). They focused on the point that alertness to environmental circumstances does not seem to change with development but after sometimes curiosity remains strong all through. But developmentally, the child gradually develops association between which kind of information his perceptual processes are occupied with and its utility for performance in the service of his needs. His flexibility enhances if more options are accessible to him. He gets prepared for an action and eagerness for performance.

Rosenthal and Allen (1978) suggested that attention can be divided into two factors. One is an intensive factor which is known as alertness. Second is a selective factor which means to choose definite stimulus for upcoming processing. In his review, Posner and Boise (1971) pointed out that stimulus might be used to enhance attentiveness for processing of all external information and to improve quality of selection of specific stimuli or at the same time implementing both.

A number of researchers have advocated physiological aspects to study attention. Hernandez-peon (1961) defined the role of reticular system in attention. According to him, reticular system acts as an integrating mechanism regulating the activities of a sensory amplifying system located in the particular sensory receiving areas of the cortex and a filtering system operating at the brainstem and spinal cord levels. He recommended that through the action of the reticular system “a filtering system is directly associated to those mechanisms that selects the information to be amplified at higher levels of the brain”.

Tecce (1970) in his review defined that attention often leads to an increase in the evoked potential and inattention leads to a reduction in evoked potential. For instance, psychomotor tasks under a high evoked potential are more effectively done when attended to. In similar line, Wilkinson (1967) also found changes in the EEG during RT experiments which include attention implications. Under the condition of focused attention contingent negative variation (CNV) resulted high.

In their review, Pribram and Mcguinness (1975) worked on neuropsychological and psycho-physiological aspects of attention. They have reported three separate, but interacting, neural system i.e. (A) Controls arousal which is considered as phasic physiological responses to input. (B) Controls activation which refers to tonic physiological readiness to respond. (C) and the last system is demanding effort that manages arousal and activation.

**Determiners of Attention**

a) **Stimulus variables**

External determiners and stimulus variables are determined by an object size, colour, intensity, motion, etc. A) In the study of eye movements, Brandt (1945) and Rudolph (1947) reported that in verbal reports and memory tests attention value increases 40-60% with an increase in size. B) Stimulus Position is another important variable. For example, display from upper left hand side would be more effective than lower right hand quarter and full page advertisement, be it in a pocket size magazine or a newspaper, it would be equally effective C) The factor of isolation also plays important role in enhancing attention. In their study, Bhatnagar and Sen (1973a, b) described the principle of isolation by using verbal material in order to modify the nature of classical bow shape curve for errors in both serial learning and free learning situations. An effort was made to increase the attentional capacity of the items at distinct chronological order viz., the second, the eighth, and the fourteenth positions of three dissimilar lists of 15 NSS each. The isolation was attained by introducing color in the background of an item in its relevant position in the list. This was operated by representing the item related to a specific list on a red background which is covering the hole of the window of the memory drum; other features of the items like shape, size, and location remained constant. Findings revealed that the isolation was found most effective in the middle.
region of the list in conditions of reductions in errors and order of retrieval in the free learning situations (Bhatnagar and Sen 1973b).

b) Organismic variables

Internal determiners or organismic variables are determined by familiarity, emotional appeal, interest, and mental set, degree of wakefulness or level of arousal, expectancy and motivation of the attending person. Dodwell (1964) described a good example of subjective variables and he revealed that the subjects are more curious to listens only the “good” words such as truth, flower and bible in comparison to “bad” words in the list of stimulus. In the same way, other factors such as interest, sex, prestige, curiosity, desire for security are some other instances of subjective variables.

c) Environmental or Situational variables

Environmental or Situational variables are like the type of background noise, the nature of incentive-punishment or reward, knowledge of results etc. To understand the relationship of reward and punishment with attention, Travers (1970) reported that object related to rewards are more prone to be attended rather than an object which is not related with reward.

Selective Attention v/s Divided Attention

Selective Attention

The term selective attention is innately associated with limited capacity (Shiffrin, 1976). Selective attention indicated the control of information processing so that limited capacity channel is not overburdened and the individual’s competency for the derived stimulus is protected (Schneider & Shiffrin, 1977).

Selective attention facilitates an individual to select particular information while rejecting the rest. Thus, selective attention acts as a process in which some part of the information has been registered in the sensory systems and to sort out the rest. Selective attention is considered as the procedure of actively focusing on one facet of the environment while disregarding others (Posner, 2004; Ashcraft, 2005; Goldstein, 2007).

Kahneman (1973) has emphasized many options of selective attention, like circumstances needing the participants to choose input of stimulus from a specific
source; objective of a specific type; a particular attribute of objects; outputs or responses in a specific category.

The concept of selective attention has been identified with the cocktail party problem put forward by Cherry (1953). Cherry, in a cocktail party situation observed that an individual is engaged in conversation. There is apparently a lot of dissimilar conversation going all around. The individual listens to a particular conversation to which he is consciously attending, and also attended some other conversations that may be related to him, though he was not deliberately attending to other conversations.

In this cocktail party phenomena, Cherry (1953) analyzed how the attention processes select or reject a specific channel of information. Later, he introduced new experimental techniques called shadowing in which the two nonstop messages are presented over the two earphones and listener is instructed to recall one of the two messages when he received them while ignoring the other. In the existence of the irrelevant message listener quietly attend the relevant message which indicates that how much one successfully rejects the useless message and how efficiently one processes the relevant message.

Attention includes selective consciousness of particular sensory information with the simultaneous restrain of other sensory information. Broadbent (1958) anticipated that selective attention operates like a filter which entertains only one channel of information at a time and inhibit others. All the incoming information is based on their physical characteristics, which makes it possible for the filter to select and attend to a specific message on a physical basis. For instance, a male voice or female voice can be chosen on the basis of its pitch and it has been examined in a dichotic listening situation.

**Divided Attention**

Hawkins & Presson (1986) explored that in divided attention tasks, people attended to several active messages simultaneously and reacting to all as needed.

Many psychologists explained that consciousness might only be directed to a particular activity at one time. James (1890), Woodworth (1921) concluded that conscious attention occur only when two different activities are carried out at the same time and they are harmonized into a particular, higher-order activity and are attend to in quick
alternation. Otherwise, it is understood that at least one of them was performed out automatically and without conscious control.

To investigate that organism has a limited capacity which is to be shared by combining dissimilar tasks during introspection of their performance. Many researchers for example, Neisser and Becklen (1975) noticed the performance by showing two different kinds of games simultaneously with the images overlapping completely. They found that if one follows the specific way of information flow, it would be very complicated to pursue another unrelated way of information flow. Spelke et al. (1976) & Hirst et al. (1980) trained students to read stories silently at the same time they copied down irrelevant words. In the same line, Paulhan (1887) concluded that attention alternated between the two activities by giving task of narrating one poem while writing another, or while performing mathematical calculations. Solomons and Stein (1896) and Downey and Anderson (1915) both were observed reading stories and at the same time involved in writing at dictation, and found the changes that take place in their consciousness at the time of act of writing. They reported that one activity was executed unconsciously (Solomons & Stein, 1896) and the actual division of attention was consummated (Downey & Anderson, 1915). Hirst (1986) argued that practice seems to alter the limits of attentional capacity. Humans do not seem to have a built-in, fixed limit to the number of tasks they can perform simultaneously (Allport, 1989).

Individual’s attentive behavior is inhibited due to the limited capacity of his constitution. Various researches pointed out the notion that simultaneously performing on any tasks resulting in marked decrease in sensitivity would be created by divided attention. Glucksberg (1963) and Eysenck & Thompson (1966) study are in line with this findings and indicating that efficacy in dual task performances decreases. In a detection task visual signals interfered with visual tracking whereas signals from other modalities did not (Glucksberg, 1963). Eysenck & Thompson (1966) used a secondary discrimination task along with a tracking task; performance was found to be lowered in the pursuit rotor task.

1.2 LEARNING

People learn. Learning is fundamental to human beings. It is the specialization that one uses to become fully human (Fischer & Immordino-Yang, 2008).
In the life of an organism, Learning can be considered as a continuous process. It can be said that, learning process goes on from birth till death in the lives of human beings. Consistently, human finds something new, acquiring a new skill to face the forthcoming situations. It is a kind of mental process that modify the behavior, leaves permanent changes in the life of an individual and an organism on the basis of past experiences, respond adequately in a given situation.

According to Woodworth (1952) learning considered as a form of exercise and also as a procedure of development. Further, he defined exercise reinforced the activity which is exercised. But exercise by itself is unable to add something new to the individual knowledge or understanding. Hence, the process of attaining new knowledge is the development of learning.

Learning is thus defined in various ways. Psychological definitions emphasize that learning “includes a change in behaviour or potential behaviour that occurs as a result of experience” (Smith 1993). Harriman (1947) viewed that learning is a wide term referring to a modification of behavior as a result of experience.

Kimble (1961) refers learning as a more or less permanent change in behavior which takes place as a result of practice. Russell (1952) says that learning refers to alteration of behavior as the result of experience. According to Hilgard and Bower (1975), learning transforms subject’s behavior in a particular situation and this transformation is brought out by his repetitive practices in that situation but his changed behavior should not be attributable to the maturation, influence of drugs or fatigue and native response tendencies. Knowles’s (1973) “consensus” definition reads, “Learning is a process by which behavior is changed, shaped, or controlled”.

To understand whether an individual has learned anything or not, Candland (1968) describes learning as an inferred process which cannot be observed straightly. To know whether learning has taken place or not one has to judge or measure the performance. For instance, students for their examination learned everything which is required but confirmation of his learning is totally based on performance in examination. Hence, the impact of learning is inferred and identified by the performance of learner.

Senge (1992) introduced the concept of ‘learning organisations’ in his book “The Fifth Discipline”. He puts emphasis on the personal, qualitative nature of this type of learning. He defines that with the help of learning one recreates oneself. Learning
enables an individual to do something which he or she was never able to do. Through learning an individual reperceives the world and his relationship to it. Through learning one extends his competency to construct and to be part of the generative process of life. There is a deep hunger within each individual for this type of learning.

Many psychologists described that learning includes two dimensions i.e. a concrete (active) and an abstract (intellectual). Within the brain, knowledge is organized and structured in networks of related concepts. Kolb (1984) describes the learning cycle which is consistent with that view. He defines that the learning cycle starts when the learner communicates with the environment (concrete experience). Sensory information from this experience is incorporated and evaluated with existing knowledge (reflective observation). New ideas, plans and models for action are constructed from this information (abstract hypotheses), and at last new action has been performed (active testing).

Educationalists define learning as a procedure through which one understands; attains knowledge, features, and expertise. For example, Atkin (1994) defines that learning takes place very promptly and efficiently when entire processing of brain is occupied specially when the learning procedure shifts from experience to reflection on experience which permits the learner to recognize the significance of the learning in the mind's eye and at last learner is able to utilize languages, rules, laws, principles for accuracy and effective in thinking, doing and further learning.

Learning is not a receptive process, but a constructive (Glasser, 1991). Constructivism theory of learning defines that understanding develops or increases by knowledge and making contact with the environment. Learners utilize their prior knowledge as a foundation to create new knowledge. Therefore, it is the learner’s accountability to construct understanding and knowledge, not the educator. For instance, in a constructive classroom the educator have no “authority” but represents himself as a facilitator and should support the learners in learning.

Zull (2002) defines that novel and original knowledge might be connected to, or built upon the structure of existing knowledge and Underwood (1979) describes that learning deals with the increased execution of old responses and also with the acquisition of new ones. If there is a stronger connection between new and existing information, the
knowledge will be deeper and most frequently it could be recalled and applicable in new circumstances. Savin-Baden and Major (2004) define two methods of learning i.e. surface and deep learning. In surface learning, students focus on information without integration, usually unreflective, and finished their essential learning work by remembering information, desirable for assessment. In deep approach of learning students engage themselves in knowledgeable interaction with content, create link between novel ideas to previous ones, connect thoughts to daily happenings, associate evidence to conclusions, and examine the logic of arguments.

Learning is essential because human beings are not born with the ability to perform proficiently as an adult in society. Byrnes (1996) proposed that the experiences of learning can be transferable; it is described as the capability to relocate learned material in one perspective to new perspectives. Instructors expect that what has been learned by learners, they shift their learning from one difficulty to another within a course, from school to home or workplace. Belief about the transfer is that rather than simply ‘train’ them it is better to broadly ‘educate’ people to perform particular tasks (Broudy, 1977).

Learning theories establish link between classroom teaching and students relationship. Snowman, McCown, & Biehler (2012) studied that modern operant conditioning theory is based on B. F. Skinner's principle that “all behaviors are accompanied by consequences, and these consequences strongly influence (some might say determine) whether these behaviors are repeated”. For classroom teachers any other specific components of the operant model are like shaping, extinction, chaining, punishment and schedules of reinforcement are very important. K-12 education has been deeply influenced by operant model and resulted in several teaching models and techniques (Huitt, 1998). For example, contingency contracts, use of behavioral objectives, applied behavior analysis, early forms of computer-based instruction, mastery learning and programmed instruction (Omrod, 1999). In similar way, based on social learning theory, Schunk (2012) described that classroom teachers facilitate students to develop self-efficacy, or confidence so that they can learn or achieve behaviors at designated levels. Omrod (1999) studied that classroom educators considered the usefulness of modeling or indicating new skills in students. They are more prone to learn and produce self-regulatory behaviors by educating techniques, for instance, self-monitoring, self-instruction, self-imposed stimulus control and self-reinforcement.
Pioneers in learning theories such as Ivan Pavlov and John B. Watson define that learning is based on association or connection between stimuli throughout a procedure in which a neutral stimulus becomes conditioned with unconditioned stimulus through repeatedly pairing to elicit a response (Schunk, 2012). Hence, Omrod (1999) defines inference of classical conditioning for teachers which help the students to understand learning in academic context which exhibit pleasing emotions instead of unpleasing emotions.

Thorndike in the early 1900's propounded three "Laws of Learning" which are most pertinent for the learning procedures and these laws are (i) Law of readiness, (ii) Law of exercise, and (iii) Law of effect.

**Law of Readiness**

It points out that one cannot learn anything unless one is prepared for it. An individual performs or learns most efficiently with contentment, when he is prepared to act or to learn in comparison to when he is not prepared. Therefore, readiness is considered as mental set which specified that children learn their materials when they are prepared to work at them. It is the teacher’s most important responsibility to develop readiness to learn their lessons.

**Law of Exercise**

In Thorndike’s view Law of Exercise has two elements (a) Law of Use (b) Law of Disuse. The law of use refers that “when a modifiable connection occurs between a situation and a response, that connection’s strength is, other things being equal increased”. Similarly, the Law of Disuse states that “when a modifiable connection is not occurring between a situation and a response, over a length of time, that connection's strength is decreased”. Accepting William James's views, Thorndike wrote:

“Intellect and character are strengthened not by any subtle and easy metamorphosis, but by the establishment of particular ideas and acts under the law of habit …. The price of a disciplined intellect and will is eternal vigilance in the formation of habits ….Habit rules us but it also never fails us. The mind does not give us something for nothing, but it never cheats” (Thorndike 1906).
In education, principal of use and disuse are very recognizable. One learns and retains by use and loses or forgets by disuse. Drilling or practice is considered most efficient when it is related with satisfaction and intention. It is also true lack of practice weakens the quality of what we have learned. Therefore, the teacher should promote drill, practices of desired response, purposeful and interesting to form appropriate habit for the purpose of learning enhancement.

**Law of Effect**

Thorndike indicated that the principle of effect is the basic law of teaching and learning. This law refers that “if pleasant or satisfying consequences attend a response, it is inclined to be repeated frequently whereas if painful or annoying consequences follow a response it has a tendency to get eliminated”. The connection between the situation and response is reinforced with pleasurable consequences and declines with the unpleasurable results.

An activity which is accompanied by feeling of pleasure, satisfy our goals and purpose is more successfully learnt, whereas an activity which brings a feeling of unpleasant and annoying is not properly learned. Thorndike found that this law has direct implication to education. The system of rewards and punishments in schools and colleges is based on this law. The child obtains contentment from his accurate reactions, and his materials become interesting for it which stimulate and arouse a passion for instant success.

Therefore, it is necessary that teachers should connect pleasing or wanted contexts with pleasurable situation and unpleasing or uninteresting context with unlikeable one. Each student must be offered those learning experiences that encourage achievement and rewarding feeling rather than unsatisfying and annoying feelings.

All human learning is verbal learning and it provides valuable information. The concept of verbal learning comes out from the field of experimental psychology which mainly aims at studying certain verbal associations similar to memorization, and also deals with acquisition of the associations (Terry, 2009). Verbal learning is related with Ebbinghaus (1885) scientific research on memory and also associates to learning techniques proposed by Ebbinghaus. These techniques which have been receiving
greater attention of the experimenters are: 1) Paired associate learning 2) serial learning 3) Free learning

Serial Learning

Learning is supposed to have occurred in serial manner when each item influences the recall of the following item. Ebbinghaus (1885) study is treated as a pioneer work in serial learning.

Serial Learning Phenomenon

In Serial Learning, there are three broad phenomena which are as follows:

Remote association

To study serial learning Ebbinghaus (1885) promoted the idea of remote association and emphasized that “in serial learning every item is associated with every other item in the list, and that the strength of the association is inversely proportional to the distance between the items.”

Lepley (1934) designed an experiment for remote forward associations in terms of conditioned response concepts. Lepley’s hypothesis was persisted by Hull (1935) who assumed that in a verbal series each item leaves the traces of stimulus in the organism which continues with lessening strength throughout the remainder of a trial. The following items are simultaneous with his trace and throughout it make connection with remote items. Guthrie (1935) projected that remote connections are achievable because the stimulus item are being responded to when the remote response item is presented.

Functional stimulus

In serial learning various experimental studies were taken out to determine the role of functional stimulus. These studies were analyzed by Underwood (1963). Young (1961) suggests that the functional stimulus refers to the item immediately preceding the response to be given. Thus, in this phenomenon every item acts as a dual purpose both as a response and a stimulus apart from the first and the last items. On the other hand, Postman and Stark (1967) and Shuell and Keppel (1967) accomplished that serial learning involved more than a single procedure and preceding items were among the more useful functional stimuli. On the basis of compound stimulus hypothesis the functional stimulus is composed of some sequence of preceding stimulus items. Hence,
the functional stimulus for D in the list of A-B-C-D might be BC or ABC. Horowitz and Izawa (1963) also supported this hypothesis.

**Serial position effect**

Serial position effect is another phenomenon in serial learning. In serial learning curve the numbers of errors are plotted in opposition to the serial positions of the items in the list. Distributions of errors according to the serial positions of the items gave rise to two phenomena 1) bowness of the error distribution refers to the fact that error concentration is being occurred with more density in the middle positions and gradually lessen the denseness of both ends of the list and 2) second phenomena is skewness refers to the fact that in the learning list commonly the concentration of errors is being not occurred in the middle position but is redirected to the right position of the middle.

**Theories of serial learning**

According to Ebbinghaus (1885) in serial learning bond between the S-R units is the governing process. According to Ebbinghaus, bowness of serial learning curve establishes the combination of backward and forward connections. Remote associations measure the middle of the list which makes a number of errors in the middle of list than at the ends.

Lepley-Hull theory (1935) determines that in the series each stimulus item connected to each later response by connections corresponding to trace conditioned responses. Lapely-Hull recognized that learning items are suppressed towards the middle in the list and the serial position curve represents the inhibitory disposition which produced during learning.

Ribback and Underwood (1950) supposed that serial learning continued from the first item in a forward direction and from the last item in a backward direction. By representing that learning occurred more rapidly in the forward as compared to the backward directions. Murdock (1960) Jensen (1962) viewed that the uniqueness of learning materials may play critical role in generating the position effect.

Jenson and Rowher (1965) considered serial learning as a substantial form of response integration. Further he suggested that separate items of the list contain integrated elements. For instance, single trigram letters include integrated elements towards response integration.
Deese and Hulse (1967) assumed that the asymmetry of the serial learning curve may be because of the unique characteristics of the first item. They described serial position effect as the collective result of the end items, uncertainty in the intra list of middle and disparity in learning in support of the starting of the list. They consider that disparity may be due to the ambiguity regarding the position of the permanent items.

Voss (1968, 1969) analyzed two stages of serial learning. First is the response learning stage in which subject seek to learn the items. When an item has learned, the other step is to put it along a sequential and spatial dimension.

Horton and Turnage (1970) affirmed that the serial learning provided the subject with prearranged set of items which does not elicit one another as a sequence of association. They highlighted that in serial learning for serial information one engage in active search of memory.

1.3 MEMORY

Many decades have witnessed the development of many theories and conceptualization of memory illustrating not only a growing tendency of the field, but also the variety of views concerning memory. A number of issues of specific interest have been taken up by various experts. For example, the basic researches on memory (Ebbinghaus, 1885; Bartlett 1932), biological bases (Semon, 1904), multistore model of memory (Atkinson & Shiffrin, 1968) and new concept of working memory (Baddeley 1986).

Aristotle (350 BCE) defines memory is, neither perception nor conception, although a state or affection of one of these and conditioned by lapse of time. Many years back, in his paper “On the Soul” memory was explained by Aristotle in which he compared the human mind and was mentioned as blank slate and human beings were speculated as born free of any knowledge and were termed simply the sum of their experiences. Like Aristotle, several other historical figures tried to interpret the complexities of memory. Plato describes memory as wax tablets to be written on and other philosophers like Descartes and Kant depicted easy and multifaceted ideas as being the building blocks of thought and memory. Ebbinghaus (1885) was the first to take a scientific, systematic approach to the study of human memory and Bartlett (1932) worked on meaningful information and memory.
Memory is considered as the mental process or storage space house in the brain for acquiring and retaining information for later recall. According to Atkinson & Shiffrin (1968) memory is considered as a temporary and permanent stores of information and information are being transmitted between these stores. Craik and Lockhart (1972) focused on processes and operational system of memory rather than structures and mechanisms, viewed that in memory retention reflects the "depth of processing" that an item achieves, where greater depth refers to greater degrees of semantic involvement. In addition, Craik (1983) viewed that memory can be denoted as a set of dynamic processes or actions, ones that are related to those underlying thinking or perceiving.

Sternberg (1999) describes memory as a procedure in which an individual can represent his past experiences to facilitate information in the present. According to Schacter and Tulving (as cited in Driscoll, 2001) "memory system is defined as in terms of its brain mechanisms, the kind of information it processes, and the principles of its operation". Eliasmith (2001) stated that memory is the “general ability, or faculty that enables us to interpret the perceptual world to help organize responses to changes that take place in the world”.

Kandel (2000) described that “memory is the means through which knowledge of the world is encoded, stored, and later retrieved.” It has been viewed that memory processes are based on three distinct stages as there are sufficient facts of overlap in the stages. For instance, there are various situations in which encoding of any incident are facilitated by the retrieval of earlier stored information (Bransford & Johnson, 1972). In the same way, the retrieval of an event can also be seen as an additional encoding opportunity (Whitten & Bjork, 1977). Tulving & Thomson (1973) viewed that "Only that can be retrieved that has been stored, and ... how it can be retrieved depends on how it was stored”.

Sargent & Stafford (1965) depict "Memory is a phase of learning and learning has three stages: a) acquiring b) retaining c) remembering. Acquiring refers to the process in which an individual gains independency in a new task or remember verbal material. Retaining refers to the acquisition of new information for a period of time. Remembering facilitates an individual to reproduce the learned task or memorized material. In short, learning simply means acquiring skill".
In similar line, Eston, Tiffin & Knight (1953) depicted that memory and learning is closely related to each other. It can be viewed that without memory there is no learning. Learning occurs because changes are produced in one practice period and remembered or retained in anticipation of the next one. If it is not, an individual always do same thing in one practice which he had completed in the earlier practice period. The reality is that there is continued improvement in learning is evidence of retention. Even if there is only one experience, there is no learning, unless some effect remains after the experience has passed. At the same time, learning is considered as the first and foremost step in memory. Memory is acknowledged with the procedure of learning (involving memorizing, retention, recall and recognition). However, the fundamental feature of memory is retention. Recognition and recall of past experiences are the evidence of memory. Learning may take place and impressions might be retained, but not recognized and recalled. Such impressions may have an impact on one’s behaviour without being conscious about the reality that they are performing so. Therefore, in memory the emphasis is given on the retention of experience. One can restores the information by relearning and reviewing which has been forgotten and one can waits sometimes to do the learning till the last minute before the learning is required.

Lefrancois (1999) studied that the extensively used information processing model is chiefly a memory model which categorize three parts of human memory: sensory memory, short-term memory, and long-term memory introduced by Atkinson and Shiffrin (1968). Incoming information can enter in the sensory store without being attended to, and can be held for up to one second before it decays spontaneously (Sperling, 1960). In sensory memory information is relatively uninterpreted and is for a brief moment a ‘literal copy of the input’ (Craik & Lockhart, 1972). Sensory memory includes the extremely short, unconscious identification and accessibility of sensory data. Information which is attended from sensory memory passed into the next store, known as short-term memory, where its storage capacity is 20 seconds (Lefrancois, 1999). Miller (1956) predicted that the short-term memory have limited storage capacity which could be enhanced by chunking or combined part of linked information and material (Huitt, 2000). The next store known as long term memory which has limitless capacity and memory traces can last a life time. Snowman, Biehler, and McCown (2012) depicted that information transfer from short-term to long-term
memory required encoding, that includes rehearsal, elaboration, and organization. A lot of practice or rehearsal again and again and meaningfulness can help in the information transmission to long-term memory.

Apart from the exasperating moments such as memory failure, or circumstances where someone experiences memory loss, one doesn’t think about how much everything one does or says based on the effortless procedure of one’s memory systems (Schacter, 1996, 2001, 2007; Schacter & Addis, 2007).

Snowman, Biehler, and McCown (2012) recommended that “current instructional technologies hold information processing by facilitating students to organize and mentally represent ideas”. Further, Huitt (2000) and Snowman, Biehler, and McCown (2012) suggested that for the improvement of student learning it is necessary that students focus their attention while starting of the chapter, focusing to mind relevant previous information, presenting information in well structured approach, put emphasis on significant features of information to be learned, diminishing interfering information, offering many options for learners in detail on novel information by active learning, facilitating learners to employ mnemonic techniques, and develop meta cognitive skills based on information processing theory.

**Memory Strategies and its use in education**

Memory Strategies are learner’s thinking processes or techniques that the learners use to retrieve information from memory for communication (Oxford, 1990). Schmitt (1997) states that memory strategies involve the retained words with some formerly learned knowledge by using imagery or grouping are commonly known as ‘mnemonics’.

Thompson (1987) studied the role of memory in language learning to define mnemonics by stating that…..

Mnemonics means aiding memory. It is often referred to as “memory trick”. Mnemonics techniques assist the assimilation of new material into existing cognitive units which turn individuals to learn accurately or faster and recall better because they provide retrieval cues. Students should employ distinguish type of mnemonic techniques and discover which one will be appropriate for them.
One well established mnemonic technique is the method of loci (places). In this technique, one can associate unrelated words by using rhyme, remembering shapes of words, or associating words with the location. Thompson (1987) and Schmitt (1997) conclude that one can visualize any familiar location, such as a garden, and mentally puts the first thing to be recollected in the same location, the second thing in the second position, and so forth. To recall these things, one takes an imaginary walk along the familiar sight in the room and retrieves the things that have been related with each position. Furthermore, Groninger (1971) findings by using this method revealed that participants can recall more words in the first language after one and five weeks than other participants who used rote memorization.

Thompson (1987) used the pictorial representation to study the meanings of words, this mnemonic technique focused that appropriate use of pictures is useful and effective means to memorize vocabulary and that is strongly effective than simply repeating the word. However, in education context (Schmitt, 1997) students can learn new words by using pictures instead of definitions and produce their own mental imagery regarding word’s meaning.

Another effective technique of remembering the word is keyword techniques, Nation (1990), highlighted that in it, learners are unusually associated between the word form and its meaning. Learner’s task is to visualize words which create relationship between a word and its meaning as it holds the key to the meaning of the word.

In educational implications, Carter and McCarthy (1988) described that key words can be invented by the students, or they can be provided by the teacher without reducing the effectiveness of their recall. The keyword method may actually facilitate rather than interfere with pronunciation, and finally, the technique is valuable for students at both beginning and advanced levels of ability.

Grouping is another method to improve recall; Schmitt (1997) stated that all human beings seem to classify words into groups involuntarily without any delay. In general, Bousfield (1953) viewed that words which are linked to each meaning category are remembered jointly, for instance, vocabulary linking to the animal group comes mutually and memory might be shifted on to a different category, such as flowers. As Thompson (1987) addresses:
It is well known in psychology that if the material is organized in some particular way to be memorized, learners can use this organization as per their own gain. Gairns and Redman (1986) argued that vocabulary contains a series of interconnected systems, so it seems to be clear that presenting the items to a student in a systematical way. Learners can make grouping of the words related to their topic (e.g. types of vegetables, plants, and clothing), grouping the words which contain similar meanings (e.g. ‘way of speaking’- hiss, whisper, mutter, mumble, squeal, whoop) and ‘way of looking’ – glimpse, frown, gaze), grouping the words from synonyms and antonyms (e.g. big/small, bad/good, happy/sad).

According to Carter and McCarthy (1988), one way to enhance storage capacity is to encourage the students to use memory techniques that will aid them in committing words to memory. Although, applying mnemonic techniques in the classroom, most students seem to use these techniques and find them very helpful and reduce the rate of forgetting.

1.4 MINDFULNESS

Conceptualization of mindfulness is relatively new psychological construct. This new buzzword “mindfulness” is an English translation of the Pali word; sati (in Sanskrit, smrti) (which connotes awareness, attention and remembering) as used in ancient texts of Buddhist sacred writing called The Questions of King Milinda in 1890, by Thomas W. Rhy Davids. Mindfulness is considered as the heart of Buddhist meditation and it has been assumed that mindfulness practices employed in modern psychology invent from this tradition. In the development of mindfulness, the Buddha also spoke about three stages (Thanissaro, 1996) and these stages are:

- focusing in the present moment
- noticing how the object changes and the factors related to the change
- bare attention to the object, without clinging or grasping and with equanimity

Many researchers have examined the construct of mindfulness, e.g. Langer, Bishop et al. and few others began some serious research into mindfulness. However it was Kabat-Zinn, who used the term mindfulness, which is now the milestone definition. In Kabat-Zinn (2003) view, “An operational working definition of mindfulness is: the
awareness that emerges through paying attention on purpose, in the present moment, and non-judgementally to the unfolding of experience moment by moment”.

Hanh (1976) described mindfulness as, “keeping one’s consciousness alive to the present reality”. In same line, German Buddhist monk and Nyanaponika (1972) explains it as “the clear and single minded awareness of what actually happens to us and in us at the successive moments of perception”. Gunaratana (1991) states that mindfulness could not be confined into words, due to its ability of restraining, nonverbal, beyond comprehension, and must ultimately be experienced. Lau and McMain (2005) advocate that mindfulness “invites [the person] to notice and accept [thoughts] as an event occurring in the mind rather than as a truth that defines the self. Thus mindfulness can alter one’s attitude or relation to thoughts, such that they are less likely to influence subsequent feelings and behaviours.”

Paramananda (1996) explained mindfulness as a “bright and expansive mental state... [With]...a sense of expansion, a sense of opening up rather than narrowing down...there is a sense of clarity and purpose. The mind is balanced, poised and full of creative energy.” Paramananda views that in meditation “we consciously cultivate this state, so that it becomes much more likely to be available to us in daily life.”

Marlatt and Kristeller (1999) described mindfulness as “bringing one’s complete attention to the present experience on a moment-to-moment basis”. Brown and Ryan (2003) defined it as “the state of being attentive to and aware of what is taking place in the present”. Segal et al. (2002) noted that “in mindfulness practice, the focus of a person’s attention is opened to admit whatever enters experience, while at the same time, a stance of kindly curiosity allows the person to investigate whatever appears, without falling prey to automatic judgements or reactivity”. Shapiro & Carlson (2009) defined “an awareness that arise through intentionally attending in an open, accepting, and discerning way to whatever is arising in the present moment”.

The new concept of mindfulness has been based on the traditional meditation and non-meditative techniques to this human process of being mindful. Basically it has been viewed that mindfulness includes the significant elements of the self regulation of attention and a certain orientation to experience, as Bishop et al. (2004) recommended: (1) “the self regulation of attention so that it is maintained on immediate experience,
thereby allowing for increased recognition of mental events in the present moment”; and (2) “a particular orientation toward one’s experiences in the present moment, an orientation that is characterized by curiosity, openness, and acceptance”.

Baer, Smith, Hopkins, Krietemeyer, & Toney (2006) studied several accessible questionnaire regarding mindfulness and revealed five factors that appeared collectively from separately constructed surveys: (1) non-reactivity to inner experience (e.g. perceiving feelings and emotions without having to react to them); 2) observing or attending to sensations, perceptions, thoughts, feelings (e.g. remaining present with sensations and feelings even when they are unpleasant or painful); 3) acting with awareness / (not on) automatic pilot, concentration / non-distraction (e.g. breaking or spilling things because of carelessness, not paying attention, or thinking of something else; 4) describing / labeling with words (e.g. easily converting beliefs, opinions and expectation into words; 5) non-judgemental of experience (e.g. not criticizing oneself for having irrational or inappropriate emotions.

Many researchers explained that mindfulness has a prereflexive quality in which awareness related contents are not interpreted initially through the structure of personal experience and well-established mental representations (Brown & Ryan, 2003; 2007a; 2007b; Levesque & Brown, 2007). It has been concluded that mindfulness integrated by an enhanced capacity to organize, maintain, and reorient attention and awareness in relation of present experiences, and systematic transformation in psychological predisposition that modify the behaviour of one's personal experience.

The innerkids program has been planned to educate young children about the essential abilities of mindfulness, describes mindfulness as “Being aware of what’s happening as its happening” (Kaiser-Greenland, 2006a). Many researchers viewed (e.g. Nyanaponika, 1962; Goleman, 1980; Epstein, 1995; Martin, 1997; Nanananda, 1997; Bishop, 2002; Brown & Ryan, 2003; Shapiro, Carlson, Astin & Freedman, 2006; Brown et al. 2007a) that in mindfulness state an individual can sustain a bare registration of present-moment, in accordance of internal and external experiences as they take place, before self-focused awareness interferes and classify the apparent stimuli.
Salomon and Globerson (1987) argued that the distance between what learners can do and what they do in reality can be lessened with the help of mindfulness practice to large extent. This concept is described as the volitional, effortful processes and meta-cognitively directed the utilization of non-automatic procedures. It is a mid-level construct which considered as a controlled position of mind and makes connections among motivation, cognition, and learning. It is both a general tendency and a response to situational demands.

Langer (1989a, 1989b) suggested two states of being that included cognitive and affective factors: mindfulness and mindlessness. According to Langer, mindfulness is the development of a “limber state of mind” In Langer’s own words (1997), “when we are mindful, we implicitly or explicitly 1) perceive a situation from various perspectives, 2) perceive information in novel situation 3) attend to the context in which one perceives the information, and eventually 4) construct new category by which this new information can be implicit.” In mindless state, one is trapped in inflexible mind-sets, unaware to context or perspectives. Mindlessness also occurs without any conscious awareness and it usually ahead to a particular perceptive of information and directed by rules or routines (Langer, 1989b; Langer, 1992; Langer, 2002).

Burch (2008) describes mindfulness as: “Live in the moment, notice what is happening and make choices in how you respond to your experience rather than being driven by habitual reactions”. Her researches focused on that being awareness of mindfulness permits one to grow with a precise awareness of unlikable stimulus as they occur or pass away instead of being confined into aversion towards the perceived solid ‘enemy’ of the pain. She considered that people experiences two aspect of pain: 1) primary suffering refers to the unpleasurable feelings, and 2) secondary suffering refers to the mental, emotional and physical reaction to these unpleasurable feelings. Burch (2008) concludes that regular practices of mindfulness offers skills to understand the primary suffering and get rid of the secondary suffering which leads to enhancement in quality of life and lessening the painful experiences.

Shapiro et al. (2006) proposed three interconnected mechanism in the mindfulness procedure: attitude, attention and intention. Mindfulness practices are based on attitudinal foundations that involve non-judgement, acceptance, trust, patience, non-
striving, curiosity and kindliness (Kabat-Zinn 1990; Bishop et al. 2004; Shapiro et al. 2006). Attention involves focused, extensive and sustained attention or ability in switching attention from one stimulus to another. The third component of conscious intention extends from an intention to practice, to the intentionality one brings to directing, sustaining or switching attention. Mindfulness approach de-centered one’s own experiences from being a non judgemental, witnessing thoughts, sensations and emotions as transitory phenomenon. Thus, mindfulness leads to clear observation, recognition and disengagement from habitual patterns or mind states, and start to react more reflectively, rather than reactively (Segal et al. 2002; Baer 2003; Shapiro et al. 2006).

Saltzman (2011) argued that sarcasm of modern education is that students were always asked to “pay attention” many times a day, but no one teach them how. The regular practice of mindfulness is to educate students how to pay attention, and this method of paying attention increases both academic and social-emotional learning. In one study by Schoeberlein & Koffler (2005) conducted on the Centre of Mindfulness in Medicine, Healthcare and Society, University of Massachusetts Medical School. They concluded that the teachers who practiced mindfulness reported that they were less reactive, less judgemental, attentive, more patient and more alert. Further, (Jennings, 2011) supported above studies and revealed that such effects positively strengthen the teacher-student relationships.

Kabat-Zinn (1990) viewed that mindfulness is not a mystical or spiritual activity and it is not “….. the ‘answer’ to all life’s problems. Rather it is that all life’s problems can be seen more clearly through a clear mind”. Mindfulness meditation practice is even simple and quite practical.

Langer (1989) points out that mindfulness includes an understanding that “events are not based on evaluations; one imposes them on his experiences, and in so doing produces his experience of the events”. The point of mindfulness is to perceive the world before one evaluates, judges, and stuffs it into preconceived ideas or categories.

Mindfulness is the state which is promoted and nurtured with the help of meditation practices (Kabat-Zinn, 2005). It educates one to make less reaction towards experiences occurring to him in the current moment. Germer, Siegel, & Fulton (2005) argued that
mindfulness relates individual’s whole experiences (i.e. positive, neutral, and negative) through which one is able to lessen his distress and can enhance well-being.

Mindfulness practices teach an individual to identify and overcome the numerous ways in which people easily get caught in distraction, rumination and resistance. Mental Health Foundation (2011) revealed that the innate capacity of the body and mind to rebalance and maintain wellbeing, and assist one to find out positive new perspectives, behaviours and solutions.

Kabat-Zinn (1990) defined seven interrelated attitudes which are beneficial for the purpose of mindfulness meditation. By practicing these seven qualities and begin to continue into everyday life, enhanced the person’s general level of mindfulness. These are laid out below:

1). Non-judging

The basic idea of non-judging is to recognize the continuous evaluation of the things in our lives as “good or bad” when events and people may be come across are not inherently so. Langer (2002) has pointed out that “things out there are not self evidently good or bad,” and that the “the prevalence of value judgements in our lives reveal nothing about the world, but much about our minds”. The point of mindfulness practice is not to stop our continuous evaluation of the world, but to be conscious about of own doing. That is, it would be counterproductive to ‘judge the judging and make matters even more complicated for yourself” (Kabat-Zinn, 1990). Somewhat, non-judging makes aware about the fact that instant responses are most likely to be restricted by individual preferences.

2). Patience

Patience means to disclose the events according to their own time instead of trying to make things happen on the basis of our present desires. Its value lies in to focus on what is occurring right now, in the current situation, and make familiar with the idea that things will nurture according to their own time; rushing ahead generally create problems and difficulties.
3). Beginner’s mind

Beginner’s mind means an open mind that “is willing to see everything for the first time” (Kabat-Zinn 1990). The significance of an open beginner’s mind is to develop perspectives in its present richness and not based on past experiences and understandings.

4). Trust

Trust is an authentic term which means to take responsibility of being your own self (Harter, 2002). Depend too much on others thoughts or ideas, imitate others, and try to be someone you are not, shows lack of trust in self. A mindfulness practice enables an individual to acknowledge his mistakes and develop a trust in the strength of an individual’s own belief, thoughts, intuition and feelings.

5). Non-striving

Kabat-Zinn (1990) focused non-striving as a concept in mindfulness which indicates to eliminate desires and not to expect and not to struggle which further creates a more receptive attitude. By this, Kabat-Zinn (1990) means that people should consider mindfulness meditation without preconceived ideas regarding what should happen in future. The main consideration of this process is neither attains any goal nor to fix on any problem but to discover an awareness of the actual experience and a willingness to let it be the way it is.

6). Acceptance

Acceptance means to allow oneself to perceive things as they are really in the present moment. The importance of acceptance is that one is more prone to know what to do and have inner conviction to behave when they have clarity of image of what is really occurring than when their vision is clouded by their own mind’s self-serving judgement, desires, fear and prejudices (Kabat-Zinn, 1990). This procedure helps in releasing some of the tensions created by the continuous evaluations and comparisons of who one now and who one would like to be.

7). Letting Go

Kabat-Zinn (1990) exhibited that “Letting Go” refers to practicing non-attachment to protrusive thoughts and feelings. In meditation, people discover that certain feelings,
experiences and thoughts occur regularly and with high emotional intensity. That’s why; there are many things which “the mind seems to want to hold on to”. People might hold some disturbing thoughts and in mindfulness meditation practice, these thoughts are just noted and letting go, after that attention returns back to the breath. This process within meditation make a platform of acceptance, hold on to pleasant, reject the unpleasant and more detached consideration of why certain thoughts, fantasies, or experiences have such prominence in our mental life. Thus in turn, may be a promising source of self insight.

Overall, mindfulness practice is an approach that helps an individual to observe the processes of their own mind from a viewpoint similar to that of an outside, non-judgementally observer. Kabat-Zinn (1990) argues that the “most dramatic effect of mindfulness meditation among his practitioners is the realization that they are not their thoughts.”

It is noteworthy how energizing it feels that one can be able to perceive that their thoughts are just thoughts and that they are not ‘themself’ or ‘reality’.

Form last many years mindfulness has admired by psychotherapists using cognitive and behavioral therapies. It includes mindfulness based stress reduction technique by Kabat-Zinn (1990) mindfulness based cognitive therapy by Segal, Williams & Teasdale (2002), dialectical behavior therapy by Linehan (1993a), and acceptance and commitment therapy by Hayes, Strosahl & Wilson (1999).

Mindfulness-based stress reduction (MBSR) technique introduced by Kabat-Zinn (1982; 1990) which is define as "a group program of mindfulness that focuses upon the progressive acquisition of mindful awareness" (Grossman, Niemann, Schmidt & Walach, 2010). This mindfulness based program used the combined techniques of mindfulness meditation, yoga, and body awareness which facilitates to become mindful for the people suffering with pain, stress related problem and another life issues that are hardly treated in hospital setting. However, MBSR has also been used with patients suffering from cancer, females having heart disease, and couples who seeks for enhancing their relationship satisfaction (Carlson, Speca, Patel, & Goodey, 2003; Tacon, McComb, Caldera & Randolph, 2003; Carson, Carson, Gil & Baucom, 2004).
According to Segal et al. (2002) Mindfulness based Cognitive Therapy (MBCT) is considered as a preventing program which is based on relapse of psychosocial group expanded from translational research into mechanisms of depressive relapse or recurrence. The main objective of MBCT is to disrupt these automatic procedures and educate the subjects to concentrate less on reaction of arriving stimulus instead understanding and monitoring them without judgement (Felder et al. 2012). Mindfulness practices allow the subjects to become aware of when automatic processes are happening and modifying their responses for the reflection. Investigation supports the effects of mindfulness based cognitive therapy in three or more times depressed people and also lessens the relapse rates 50%. (Teasdale, 2004)

The concept of Mindfulness in the Dialectical Behavior Therapy approach, is considered as “(1) observing, noticing, bringing awareness, (2) describing, labeling, noting, and (3) participating, all of which are done (a) nonjudgementally with acceptance, (b) in the present moment, and (c) effectively” (Dimidijian & Linehan, 2003). Shapiro, Carlson, Astin, & Freedman (2006) have defined three mechanism of mindfulness (intention, attention, and an attitude) and each one contributes to a process of perceiving things in a new manner, they term “re-perceiving.” Further they viewed that mindfulness are found able to increase outcomes e.g. patience, self compassion, nonreactivity and wisdom.

Fletcher & Hayes (2005) define mindfulness in ACT (Acceptance and Commitment Therapy) as a group of connected procedures whose purpose is to weaken the domination of verbal networks, especially including temporal and evaluative connections. These procedures involve transcendent sense of self, acceptance, defusion, and get in touch with current experience.

The main goal of mindfulness meditation, usually define as the “development of deep insight into the nature of mental processes, consciousness, identity, and reality, and the development of optimal states of psychological well being and consciousness” (Walsh, 1983) through “opening up”.

hospital patients. Over the course of the intervention, authors found improvement in both hardiness and coherence and patients with the more enhancements in sense of coherence reported high reduction in psychological and physical symptom. Further, Kabat-Zinn & Skillings (1992) 3-years follow-up study revealed that the initial gains were maintained, and even further improvement was made in the extent to which patients considered their worlds manageable.

To see the effect of mindfulness meditation, Shapiro, Schwartz, and Bonner (1998) examined the 78 premedical and medical students. In comparison to control group, meditative group has been found with the enhanced feeling of empathy and reduced feeling of anxiety and depression. Moreover, the same findings have been seized at the time of distressful examination period of the students.

Brown and Ryan (2003) studied cancer patients and main objective was to increase positive emotional states and reduce anxiety. The authors confirmed that regular practice of mindfulness lead to reduction in mood disturbances and stresses.

Biegel, Brown Shapiro and Schubert (2009) studied an adolescents dealing with various psychiatric diagnoses by using mindfulness based stress-reduction technique and compared this in a randomized clinical trial to a control group. Findings revealed that the group who received the mindfulness-based stress reduction program reported decreased depressive and anxious symptoms, somatic complaints and also increase in quality of sleep and positive feelings about themselves.

Mindfulness meditation has been benefited in relieving of stress. Weinberger, McCleod, McClelland, Santorelli and Kabat-Zinn (1990) confirmed that the course of mindfulness meditation increased the feeling of affiliative trust and oneness motivation. Duncan, Coatsworth, and Greenberg (2009) recommended a model of mindful parenting that involves “moments to moment awareness” based on parent-child relationship. The main objective is to interact with more compassion toward their children. Astin (1997) employed mindfulness meditation intervention on undergraduate students and reported significant enhancement in spiritual experience.

Thomas (2006) proposed a concept called “cultural intelligence” (CQ). Thomas argued that in the development of this concept mindfulness is considered as a primary element. Thomas describes CQ as “the ability to interact effectively with people who are
culturally different”. This concept established link of knowledge and behaviour with mindfulness and observe the term mindfulness as a connection between knowledge and behavior which can be explained as the ability of having awareness in the present moment and that can help one in achieving cross-cultural interaction effectively. This mindful behavior might be represented in different manner (e.g. being aware of one's preconception or biases, observing context in different perspectives, and tuning in to diverse worldviews and situations as they may have effect on these connections). Thus, mindfulness may be a construct of particular use in our ever-increasingly diverse society today.

1.5 RATIONALE

To work with students has long been interested the researchers in understanding what causes children with average intelligence suffer from academic underachievement, particularly when these academic difficulties are not the result of physical and psychological deficits. Disrupted cognitive functioning (Attention, Learning and Memory) can be the reasons for deterioration in academic performance of the students. Blair (2002) implies that outcome of these disruptions in higher order cognitive processes render the student unable to attend and hold new information in class introduced by the teacher. Hence, both educationally and socially, longer attention spans appear to be desirable.

Specific features like reduced attention span, poor concentration, poor memory and learning are the factors that have emerged as obstacles to academic achievement. These effective psychological processes are necessary in school for success or achievements. Many students often have problems to remain attentive and remember academic content. However, there are many successful strategies for enhancing these psychological processes. Mindfulness Training, thus, is one approach which has the capacity to help the students to lessen the depressing and pessimistic outcome of environmental stressors by being attentive on the present moment non-judgementally so that students can pay full attention on classroom events. Children must have control on their attention for better learning performance in classroom. Mindfulness technique allows focusing the attention and to recognize multiple contexts on a situation, identify the uniqueness of existing information, develop awareness of the perspective of the
information and better able to comprehend the information by the formation of novel categories (Kabat-Zinn, 1990).

Mindfulness has the capacity to embrace something in mind which promotes one’s attitude of accepting the things which can’t be changed and make able to disengage from thoughts. Mindfulness training program has been designed to develop expertise of the students in such a way that they find themselves to identify their actions and thoughts which enhances the ability of self control, concentration, builds skill for mental health, creates pleasant environment in both inside and outside the classroom. Introducing mindfulness in students’ life indicates a lot of improvement in their performances by accepting and changing the attitude towards experiences which they face.

Alison (2009) described mindfulness as being attentive and conscious about what is happening in the current moment. Recently, mindfulness has been considered as social cognitive skill which supports the academic success of children. In particular, mindfulness creates effective and enjoyable learning environment and as well as helps in increasing attention, behavior regulation, social-emotional competence and cognitive control.

**TITLE OF THE PRESENT STUDY**

Keeping the above in view, the importance of Mindfulness approach for students in enhancing attention, learning and memory, the present study has been designed to have more probes in the area. The problem of the study is “EFFECT OF MINDFULNESS ON ATTENTION, LEARNING AND MEMORY AMONG ADOLESCENTS.”

**1.6 MAIN OBJECTIVES OF THE STUDY**

1) To study the relationship between Attention and Memory.

2) To study the relationship between Attention and Learning.

3) To study the relationship between Learning and Memory.

4) To examine the effect of Mindfulness on Attention.

5) To examine the effect of Mindfulness on Learning.

6) To examine the effect of Mindfulness on Memory.
7) To study the difference in Attention between boys and girls.
8) To study the difference in Learning between boys and girls.
9) To study the difference in Memory between boys and girls.

1.7 SPECIFIC HYPOTHESES

1) There will be significant relationship between Attention and Memory.
2) There will be significant relationship between Attention and Learning.
3) There will be significant relationship between Learning and Memory.
4) There will be significant effect of Mindfulness on Attention.
5) There will be significant effect of Mindfulness on Learning.
6) There will be significant effect of Mindfulness on Memory.
7) There will be significant difference in Attention between boys and girls.
8) There will be significant difference in Learning between boys and girls.
9) There will be significant difference in Memory between boys and girls.