CHAPTER I

INTRODUCTION

Education is the backbone of any society or country. It is the process of development and providing equal opportunities to all. It enables the person to expand knowledge and helps to find new ideas and new ways of life. Education is not concerned with present but it means looking further. Academic achievement is a comprehensive term. It is the unique, prime and perennial responsibility of a school or any other educational institution established by society to promote a wholesome scholastic growth and development of the child. It generally refers to the degree or levels of success of proficiency attained in some specific areas concerning academic work. It indicates what an individual has learnt or acquired in particular field.

“There are three types of objectives which are emphasized in teaching-learning situation – cognitive, affective and psychomotor. Educationists and psychologists believe that cognitive achievement is the best representation of the total behavioural change of students. Gaining from the experience accumulated over the years nurturing students from various boards, it has been based upon certain ideas that how to tackle these classroom problems and provide a
one-stop solution for all their learning needs. To make students enjoy and understand at the same time is the key principle on which educational institutions should work upon; it is important on our part to make experiential learning as the way ahead.” (The Scientech Times 2012).

Touching, feeling, seeing and experiencing what is being taught would definitely enhance and enliven the teaching and learning process. It would also remove the necessity of mugging up lessons, something which consumes a lot of the students' time thus, setting them free to pursue their interests and hobbies. A correct platform in the form of a school is where the groundwork has to be done; for the fact remains, that it is the most important link in the whole chain that is to be monitored. In the last two decades, technology has dramatically penetrated into almost all areas of our life and education is not an exception to it. Technology provides the means to keep students engaged, foster a positive learning experience, provide more personalized attention, improve classroom management, and mitigate the digital divide by providing access to technology at school. Educators cannot ignore the potential benefits of tablets and the opportunities afforded by bringing an integrated set of hardware and software solutions in to the classroom (Demircioglu and Geban, 1996).
Today, radical changes are being introduced in cultural and social life by computers that store, retrieve and process information and internet that connect computer and people. Computer applications such as educational games, virtual reality, simulations, multimedia applications and e-books are making significant contributions to the teaching and learning process. Furthermore, the acceleration of computer-assisted instruction practices, since the 1980s, has made individual and group instruction processes more effective. These practices were initiated to ensure permanent learning and maintain student interest in the lesson. Yet another benefit of computers entering the field of education is that it makes the students more active (Çömek and Bayram 2004).

The rapid changes occurring in information and communication technologies have also altered the traditional classroom environment and instructional methods. Projectors, internet linked computers in classrooms, flash disks, mobile phones, digital cameras and video recorders affect many aspects of education ranging from student projects to lesson presentations. Another novelty of the last 20 years has been the interactive whiteboard which consist of a connection between a computer, a projector and a touch screen electronic whiteboard. Owing to their amazing characteristics,
interactive whiteboards are also known as “smart boards” (Akbas and Pektas 2011).

The manipulation of modern technology in teaching has become a necessary demand, due to its effective role in prompting teaching and enriching the learning process, as well as it became an integral part in the successful teaching and learning, however, doing without it is now considered a hindrance for the teaching process, and makes it out of date compared to the teaching process in the developed countries and the surrounding communities (Dashti and Behbehani, 2005).

The present education system is highly different from what it was in the past, especially with regard to application of technology. There is a shift from pen to the computer keyboard, from blackboard presentation to PowerPoint presentation, from paper-pen test to computer-based test, from interpersonal instruction to mediated instruction, from teacher-dependent learning to independent learning.

Now a day all disciplines have become more scientific with the invention and use of modern scientific gadgets like, computer, television, overhead projector etc. Learning has been simplified and made faster & productive. Teaching is not to be regarded as a static accomplishment like riding a bicycle or
Keeping a ledger: it is, like arts of high ambition, a strategy in the face of an impossible task (Lawrence Stenhouse 1995)

Classroom instruction is the heart of the entire educational process. Therefore, use of various techniques, methods, media and approaches is must to make the teaching-learning process interesting, effective, goal-oriented, need-based and different from routine way of functioning. In addition to this, innovation technique like interactive video, various form of print material and smart class room have minimized teaching effort.

In prompting education in the process of teaching, the exploitation of the educational technology and e-learning including the interactive smart board with its various application is considered a smart option that facilitate the achievement. Smart classroom is an interactive computer based aid through the smart classroom programmes and software. Teacher use digital resource such as animation, videos, diagram maps, graphs, working model. It gives the teacher facility and flexibility of bringing a mobile labs right into the classroom. This helps in making the learning of subject more interesting.

The new and modern education system involves modern technologies in the teaching-learning process for teaching the
21st century students. By using the modern technologies in classroom, students enjoy different experience in different environment. The interactive smart board is one of these very sophisticated forms in the area of educational technology. Moving from computer to the internet assisted teaching and then emergence of the term “educational technology" is based upon the use of the modern technology for delivering the content appropriately and effectively and at the same time, as the interactive smart board ‘white board’ is another new method among those new teaching methods in the area of educational technology prevailing as an active tool of the learning to enhance the academic achievement.

1.1. Concept of Smart Classroom

According to Educomp (2010), “Smart Class is educational software arrangement that provides unified communications and collaboration functionality for school level and Higher Education institutions. Smart Class provides an in-classroom theater-style experience for students to participate in online and live collaboration. The main aim of education is to preserve, transmit and advance knowledge. In the past this aim was achieved by the education system with the help of teachers, books, and some audiovisual aids. Nevertheless, the main drawback of the traditional class room is that the main
emphasis is on chalk and talk method. Also, traditional class rooms sometimes were uninteresting and boring. However, the use of various techniques, methods, media and approaches makes the teaching-learning process interesting, effective, goal-oriented, need-based. Use of technology in class room instruction ensures coordination of working of “Head”, “Eyes” and “Ears”. It makes teaching interesting, effective and realistic. Now a day all disciplines become more scientific and for that an innovative concept of smart classroom is introduced in the field of teaching-learning process.

In smart classroom there is an interactive white board i.e. smart board. The smart board is flat electronic screen that operates in compliance with computer and the “Data Show” device. The smart board has several names such as, smart board, interactive board, electronic board, digital board, interactive whiteboard. Thus, it is the innovative way of teaching focused on the main key skills: Knowledge acquisition, Knowledge imparting, knowledge creation and knowledge sharing. Smart classroom is a digital initiative pioneered and invented technology that has already been adopted in India. This concept can be introduced in a thrilling and excited manner. Teaching in smart classroom is transforming the way teacher teaches and a student learns in school. In this kind of teaching, teacher teaches through
software and teaching material is shown to the students with projector in classroom. Smart classroom teaching brings about a complete transformation in classrooms (Educomp, 2010).

A Commerce teacher while explaining how a Share markets works is able to show the class a video clipping of the share market on a large screen. He can explain the fine points of the process, zoom in to show the relevant visuals freeze and annotate when and where he needs to emphasize. All with engaging animations, colors, music, sounds and voice. The teachers gain complete attention and interest of every child in the class. Every child gets a visual input on how it happens and the concepts are well understood and internalized. Towards the end of the class, every teacher displays a set of questions on a large screen; every child in class gets ready to answer the questions. This results faster and accurate understanding of the concepts in class and helps to improve the overall academic performance of students. Teachers are able to keep students engaged in the learning process and also get an instant and accurate assessment of learning outcomes achieved at the end of the class.

A new generation of high technology classrooms is becoming a necessity in school and college campuses and classrooms
where it is easy for faculty to show computer or video output to a room full of students. More and more faculty is creating text, video, charts and graphics on their own computers and is finding useful for this material in the classroom. The objective in the Smart Classroom is to make computer use in the classroom as simple, friendly and non-intimidating as possible. Installations must serve the faculty well, yet remain affordable. Since classrooms/lecture halls will continue to be used for traditional instruction, the front center of the room needs to accommodate chalkboards, overhead projectors, screens, as well as walking space for pacing professors, and open space for displays and experiment. Adequate light is needed for student note taking. Sufficient light is needed at the computer and on the chalkboard. All light fixtures must be located and controlled to minimize washing out the image on the screen while not hampering the student’s vision forward to the screen (Shelf 2000).

According to Perret (2008) of Pierce College, “A smart classroom is a classroom that has an instructor station equipped with computer and audio-visual equipment, Personal Computer, Overhead Projector, Wireless Internet Access, Digital Versatile Disk Player, Smart Board”.
1.1.1. Teaching in Smart Classroom

Teaching in classroom stands for teaching with the help of instruments and gadgets available in a technology equipped classroom. In technological classrooms, there is a need for connectivity to outside teaching resources. Telephone lines, Ethernet connections or Internet Service installations make it possible to interact in real time with distant computers and workstations, databases, or banks of stored text and images. Classrooms having scenario discussed above are known as Smart Classroom. Smart Classroom is an integrated system for class teaching, learning, communication, assessment and teaching management. The system integrates contents, communication and teaching management tools for effective lesson delivery and resource storage. It is designed and developed to be user-friendly to teachers in creating multimedia lessons.

In smart classroom teacher can use all interactive modules like videos and presentations and these visually attractive methods of teaching becomes appealing to students who are already struggling with the traditional method of teaching in a classroom. In fact, smart classes are almost like watching movies as sometimes, animated visuals are used to teach a point. This kind of visual is both eye-catching and
young students can easily relate with them. This is because the audio-visual senses of students are targeted and it helps the students to store the information fast and more effectively. There is the advantage of utilizing much of the time wasted earlier in drawing or preparing diagrams on board. Smart boards have all these information in memory and can be presented during the time of class lectures and thus, the time saved can be used in more important things. Some students and teachers have problems with chalk dust and they tend to suffer from allergic reactions. The smart boards save from such distress and won't let develop any health issues later. Smart classrooms, interactive whiteboards have replaced traditional whiteboards or flipcharts, or video/media systems such as a Digital Versatile Disk player and Television combination. Even where traditional boards are used, the Interactive Whiteboard often supplements them by connecting to a school network digital video distribution system. In other cases, interactive whiteboard (IWBs) interacts with online shared annotation and drawing environments such as interactive vector based graphical websites. This can help transform learning and instruction.

Smart classroom is the latest way of technology. Some of the benefits of this innovative technology/methodology are a
dramatic increase in individual attention that the teacher is able to give each child. Use of technology provides significant gains in informational learning, retention, recall, thinking and reasoning, activity interest, imagination, better assimilation and understanding.

One main advantages of smart classroom is that the teacher can have more options. It improves teacher effectiveness and productivity in the classroom, making learning an enjoyable experience for students, increases motivation, paves way for personality development, active participation of student, better learning, retention and student performance, multi-sensory learning experience and improves academic performance of students. It enables instant formative assessment of learning outcomes in class and also enable teacher to instantly assess and evaluate the achievement of their student in class.

The smart classroom is different from other conventional classroom from the same category in saving the instructor's time and effort, focusing the attention on the content of the educational program, displaying the topics of curricula in an interesting and attractive way, contributing to overcoming some of the chalkboards difficulties, providing an element of movement in the multi-media educational programs,
contributing to solving the problem of shyness and isolation in some students.

1.1.2. **Benefits of Smart classroom**

Niemeyer (2003) explained the benefits of Smart Classroom as;

- readymade lessons available
- provide ideas for teaching
- instant teaching aids (attractive and/or animated)
- model voice-overs / pronunciation of words, sentences or passages
- allows customization of lessons
- user-friendly tools to support teachers
- modern multimedia presentations
- able to incorporate third party contents
- prepared lessons can be stored and shared
- allows one-teacher-two-class teaching
- interactive communication between two or more classes
- administrators can fix curriculum / lesson strategies

Smart Classroom is the e-solution to traditional problems in teaching. It is the tool for planning, implementing and enhancing teaching in class (Foradian 2013). This allows teaching and learning to be conducted in an electronic
environment. Smarts Classroom provides electronic material (audio, video, text, graphics and animation), contents, ideas and tool support. Smart Classroom content is upgradeable and expendable at any time.

- Smart Classrooms can enhance content and presentation
- Teaching Students with the use of Soft copies of books provided by Central board of secondary education and National Council for Education Research and training on website.
- Students respond well to video clips illustrating a concept – YouTube
- PowerPoint presentation which reviews the major points of the lesson.
- With the computer's desktop being projected relevant Internet sites can add variety to any lesson.
- Empower students
- Student presentation using PowerPoint
- Show their assignments and discuss them
- Bring in Experts – video conferencing Using Skype or CCC (Close Circuit Camera) Connect
- An expert on Market can explain about shares and debentures.
- An expert in the Civil War can enliven a history class
• English class might connect with the author of poetry they are reading;

• Political science class can conduct a moot court competition with another school

One of the main reasons behind the constant increase in popularity of smart classes is the fact that this kind of education is perfect for all kinds of students. A classroom has students with varied power of understanding and learning, and studying from notes and other materials becomes difficult for some students. But the use of smart classes and modern technology eases the learning process for all students. Moreover, this kind of education in class promotes more interaction between teacher and student with more participation from both sides (Foradian, 2013).

1.2. Achievement

The pursuit of achievement is the common concern of everybody in every age. In the modern advanced society, particularly the achievement (academic) is most important for employment or any other selection. Hence importance of achievement cannot be undermined.

The word ‘Achievement’ means the end gained or levels of success attained by an individual or group on the completion
of a task and when it happens in the end of an academic session in the class it is academic achievement.

According to Crow and Crow (1969) Achievement is the extent to which learning is profited from instruction in a given area of learning.

In the words of Mehta (1989) Achievement is the learning outcome of a student, a level of achievement in the academic field of a student is included in the performance of the individual. Academic achievement of the same individual differs from time to time, from class to class and from one educational level to another because of individual differences in academic proficiencies in individual of the same age group.

“Achievement is accomplishment of specific objectives past performance and what an individual or organization can do now in present or in future” (Singh, 2004).

In literal sense, achievement is something done successfully with efforts and skill. This is applicable to every sphere of life individual, institutional & social. The academic achievement is regarded as educational growth of an individual or group of individual through a process of educational instruction. The term academic achievement is the coinage of great philosopher, Plato (32-347 B.C). According to Plato, the academic achievement means the attainment level of a
student. In modern times, the term achievement means all the behavioral changes, which take place in individual as a result of learning experiences of any kind. The behavioral changes being the learning outcomes are expressed in terms of knowledge understanding and skill.

1.2.1. Academic Achievement

The academic achievement is generally applied to the academic status of an individual in different subjects as a whole. It means that pupil has learnt different subjects. It involves the quality of learning attained as per the percentage of marks obtained by them.

Academic achievement may be defined as a measure of knowledge, and understanding of skills in a specified subject or group of subjects. It refers to the achievement in a separate subject or total scores of several subjects combined. Hence, academic achievement is concerned with the quantity and quality of learning attained in a subject or group of subjects, after a period of instructions. Academic achievement means accomplishment or proficiency or performance of the students in various subjects of the curriculum. According to the random House Dictionary of English language, academic achievement has been defined, something accomplished especially of superior ability, special effort and great velour.
Freeman (1965) says, “A test of educational achievement is one designed to measure knowledge, understanding or skills in a specified subjects such as arithmetic, yielding separate score for each subject and a total score for the several scores combined.”

Academic achievement of pupils continues to be primary concern and most important goal of education. Academic achievement plays a very significant and vital role in the attainment of idea of harmonious development of the child. Academic achievement of pupil refers to the knowledge obtained and skills developed through school subjects which are assessed by school authorities with the help of achievement test in the form of examination.

Achievement tests are generally thought of as instruments for the evaluation of the outcome of the training, whether in an educational institution or in a job. Academic achievement is useful in evaluating the result of instructions and serves as a measure of educational progress in predicting educational success. Academic achievement acts as an emotional tonic in one’s life. Sound academic records are the pillars on which the entire future of personality stands. Academic achievement in school builds self-esteem and self-confidence which leads to better adjustment with the group.
Academic achievement plays an important role in the life of a student because it gives a way towards his goal. It is according to his academic achievement that he chooses his vocation, his career and his profession. In educational life academic achievement is highly valued.

The main focus of educative process is to improve the performance or learning of the students. The learning outcomes of the student are measured with the help of their achievement or performance. Performance assessment is the process of measuring the terminal behaviour of the students at the end of instruction. It is the job of the teacher to measure whether the student have acquired the component concepts, as an achievement, before proceeding with the instruction which arranges these concepts in proper relationship for instruction the learning of the principles. The achievement is the end product of the instruction usually verbal performance.

Good (1959) define “Academic achievement as, knowledge attained designated by test scores or by marks assigned by teacher.”

The effectiveness of any educational system is achieved only when its educational process results in true learning in the individuals and result leads to human resource development
in its true sense. In the 21st century, the advances in technology are changing the whole nature and philosophy of education. It is highly possible to say that Interactive Whiteboard technology in classroom has been had a major impact in point of efficiency on teaching. In layman language, Learning is living and living is learning. That is why we call learning as a change or modification of behaviour.

Academic achievement is of paramount importance particularly in the present socio-economic and cultural context. Obviously in the society great emphasis is placed on achievement, right from the beginning of formal education. The school has its own systematic hierarchy which is largely based on achievement and performance rather than aspiration or quality. Thus the school tends to emphasis achievement which facilitates to achieve the goal of life. This is combination of two words; Academic and Achievement.

According to Hawes and Courage (1994) the term academic refers to instructional system of formal education within a school, college or university.

Good (1959) explained achievement is the accomplishment or Proficiency in a given skill or body of knowledge. Academic achievement refers to the pupil’s knowledge, attainment and skill developed in the school subjects which, are assessed by
the authorities with the help of achievement tests; in the form of examination.

In the words of Trow (1960) achievement is the attained ability, degree of competence in school tasks, usually measured by standardized tests and expressed in age or grade unit based on norms derived from a wide sampling of pupil’s performance.

According to Kohli (1975) academic achievement is level of proficiency attained in academic work or as formally acquired knowledge in school subjects which is often represented by percentage of marks obtained by students in examination.

According to Rogers (1981) a normal achiever is one who accomplishes what may generally be expected of him or her age. If the individual performs below his tested capacity or not up to what he is capable of achieving, he is labeled as under-achiever.

Gowan (1960) and Mohan (1972) have emphasized that an under-achiever is one whose academic performance falls below the normative range of his potentialities. The high or over achiever is one whose academic achievement surpasses his abilities.
Academic achievement of some individual differs from time to time, from one class to another and from one educational level to another because of individual differences. Academic achievement has great importance in person’s life. Every parent sets high goals to educate his child. Good academic achievement provides self-esteem, self-respect and courage to face the harsh realities of the world and helps the individual to create a place for himself in competition ridden society.

Achievement represents the amount of proficiency in a body of knowledge actually attained. A test of achievement is supposed to tell how much the student has learnt. Many factors are responsible for the high and low achievement of the students. It will be of immense interest and importance to know these factors which are contributing to academic achievement. They are Individual Factors which includes Cognitive factors e.g. intelligence and creativity, Non cognitive factors e.g. study habits and aspirations. Secondly Environmental Factors which further include two type of environment: Home environment and school environment. Home environment includes the status of family, family relations, parental expectations etc. and School environment involves e.g. teacher’s personality, teaching methods and curriculum etc.
The academic achievement of a student may be influenced by number of factors in the student’s environment or his personality make up. One such factor may be the classroom climate. Classroom climate is a perceived quality of setting. It emerges in a somewhat fluid state form the complex transaction of many immediate environmental factors like physical, material, organizational, operational and social variables. Both the environment of the classroom and the school reflect the influence of a schools culture which is stable quality emerging from underlying institutionalized values and belief system, norms, ideologies, rituals, and traditions (Adelman and Taylor, 1997).

Persky (1990) emphasize the emotional factors in achievement. School experiences, attitudes and interests influence the development of an adolescents' personality and also effect his achievement; in this way, good academic records predict future of the adolescent and responsible for proper growth and development of personality.

Stephen (2007) says, “Not that other aspect of educational objectives are to be ignored, but the fact remains that academic achievement is the unique responsibility of all educational institutions established by the society to promote a wholesome scholastic development of the pupil.”
Carver (1969) said academic achievement/performance is an index of the amount of learned during the course. He presented a mathematical model in which he has shown that it is possible for the results of final examination to be the best indicator of amount learned even though individuals were not equal in proficiency at the beginning of the learning task. Based upon several considerations it was concluded that at present best indicator of amount learned in many classroom situations is the grade or result of the final examinations. Thus it is clear from the mathematical model of that any teacher or employer can very easily understand about the knowledge of the subject matter and amount of knowledge learned during his/her course. Higher grades in the class will be an indicator of better learning and knowledge. It is also evident from this finding that better grade will facilitates promotion to the higher class and also for getting employment.

"A Test of Educational Achievement is designed to measure knowledge, understanding or skills in a specified subject or group of subjects" (Freeman 1965).

1.3. Creativity

Guilford (1950) stated that among all the qualities of man those contributed to his creative thinking have been most
important for his well-being and his advancement. Guilford further defines “The creativity process is any process by which something new is produced—an idea or an object including a new form of arrangement of old elements. The new creation must contribute to the solution of some problems”

“Creativity is desirable; it is from creativity that major inventions, scientific discoveries and great work of music, literature and art derive. Modern art and literature, philosophy and religion, science and technology, industry and commerce, transportation and communication, agriculture and social institutions owe their origin due to creativity” (Sharma, 2000).

Creativity is considered the ultimate of human qualities, one of the key measures of intelligence that separates us from the rest of the animal kingdom. Our ability to create, to innovate, is believed to be Godlike, described by some religions as one of the divine qualities endowed to man, who was created in the image of God, the creator. The question that has perplexed many researchers in the study of creativity is what is creativity? Although many researchers have attempted to define the concept of creativity, there is no universally accepted definition of creativity. Kronfeldner (2009) defined
creativity as a process that includes psychological novelty, originality, spontaneity, usefulness and adaptive value.

Creativity is an important element in relation to education and societal growth. In terms of education, creativity is an essential element necessary for leaning. The concept of creativity has different meaning and interpretations for different people. According to Webster dictionary; the word creativity has been derived from the Latin term “creare” which means to create. To create for them, is to bring some new form of character as work of thought or imagination.

According to Passi (1971), creativity is a multi-dimensional attribute differentially distributed among people and includes chiefly the factors solving problems, fluency, flexibility, originality, inquisitiveness, and persistency. Creative thinking is accepted to be marked by the action of mind purposefully directed to manipulate the environment with a view to create new ideas and establish novel patterns and relationship.

Torrance (1962) has defined creativity as a process of becoming sensitive to problems, difficulties, gaps in knowledge, missing elements, disharmonies and so on; identifying the difficulty, searching of solution, making guesses or formulating hypotheses about the deficiencies, testing and retesting of these hypotheses and possibly
modifying and testing them and finally communicating the results.

Gardner (1993) defines the creative individuals as a person who regularly solves problems, fashions products, or defines new questions in a domain in a way that is initially considered novel but that ultimately becomes accepted in a particular cultural setting. Further Gardner defines creativity is the ability to produce work that is original, but still appropriate and useful. Creativity is the capacity of a person to produce compositions, products or ideas which are essentially new or novel and previously unknown to the producer.

Hallman (1963) came across tentatively five major components of the definition of creativity.

1. It is a whole act, unitary instance of behaviours.

2. It terminates in the production of objects or terms of living which are distinctive.

3. It evolves out of certain mental process.

4. It co-varies with specific personality transformation.

5. It occurs within a particular kind of environment.

He describes these components as the act, object, the process the person and the environment.
Kheller (1965) observes that creativity through the approaches of person may be considered in terms of physiology, temperament, personal attitudes, habits and values of the person who creates, explaining it by way of mental process involves motivation, perception, learning, thinking and communicating the way the act of creativity calls into play, press implies understanding of creativity by focusing attention on environment and cultural influences and products of creativity include elements such as theories, interventions, painting, carvings, poems and the like. Thus in order to get a meaningful picture of definition of creativity different views have been tentatively pooled together with in roughly discriminating categories of, (1) Product (2) Process (3) Person, and (4) The press (environment).

According to Good’s dictionary of education(1959), Creativity is a quality of thought to be composed of broad continuum, upon which all members of the population may be placed in different degrees, the factors or creativity are tentatively described as associate and ideational fluency, originality, adaptive and spontaneous flexibility and ability to make logical evolution.

There is consensus among researchers that creativity should be defined as the production of both novel and appropriate
work. Novel refers to original work, work that could not be predicated. Appropriate simple concerns the usefulness of the product towards a certain need. Novel and appropriate products do not rise in vacuum. Finding the factors that influence creativity thus drives most of current research efforts. Lubart (2000) said that in recent years two approaches pre-dominate the research literature i.e Process oriented models of creativity and system-oriented models. The two approaches focus on different facets of creativity. Yet, they can be seen as complementing each other. Process-oriented models concentrate on cognition aspects of creativity, like what and how do creative people think? What are the thought structures doing the creative process? Lubart (2000) summarizes the research efforts on cognitive sub-processes that are seen as crucial to creativity potential: Problem finding, Formulation and redefinition; Divergent thinking; Synthesis and combination of information; and Ideas combinations through random or chance-based processes.

System-oriented models take a broader approach to creativity that involves non-cognitive factors as well. System–oriented approaches range from more social oriented views to more individual oriented views (Sternberg and Lubart 1996; Amabile, 1983)
Sternberg and Lubart (1995, 1996) undertake a type of goal setting approach. They compared creativity to a thriving investment process of buying low and selling high. Creative people purposefully engage in foremost known or unpopular ideas (buying low) in order to successfully disseminate that later (selling high). Sternberg and Lubart (1995, 1996) identify six resources that contribute to creativity: intellectual process, knowledge, intellectual styles, personally motivation, and environmental context.

Creativity is too complex in nature. It is difficult to understand the meaning in one single definition. Different viewpoints have been put forward to explain the concept emphasizing different aspects of creativity. By and large psychologists seem to agree that creativity involve the ability to produce original ideas and to perceive new relationship among unrelated things. However, it doesn’t involve just an ability to produce original ideas. Creativity is multifaceted and in general four approaches have been used to understand the concept of creativity. These are the product of creativity thinking (product), the process of creative thinking (process), and the person who is creative (person) and the press or the environment in which the creation comes about (press).
The concepts behind enhancing creativity are easily integrated in problem-based instruction, resource-based learning, experiential learning and collaborative learning. As a field of study, creativity is still young and growing. In terms of education creativity is an essential element necessary for learning.

Starko (1995) suggest that learning is a creative process that involves students making information relevant by linking prior knowledge and new knowledge in an individually meaningful format. If education strives to prepare children for a productive life in society; the educational system must accept responsibility for supporting and developing creativity.

A major aim of education is to stimulate and enable an individual to further pursuit of knowledge on his/her own initiative and skill after leaving the shell of school far behind. If an education system arise further exploratory, organizing and creative behaviour, it may set off a self-sustaining process which may largely determine the whole character and direction of the individual’s further life and ultimately shape the destiny of a nation (Desmukh, 1984).

Considering above all things, it is clear that certain affective properties which make men and women equal are not in their physical social and intellectual abilities. These affective
properties and some environmental factors stimulate life and in the long run manifest creativity in all human beings.

Creativity given by Bhatnagar (2007) must be original, useful, socially accepted, must include new combinations of old component, leads to talents and has always new and novel approach.

Barren and Roe (1958) consider that a creativity of an individual can be seen in the interaction of his intellect, personality, motivation and the biography.

1.4. Effects of Teaching in smart class on achievement

The introduction of new technology has provided a new shape to the classroom teaching. Teaching in Smart classroom is the latest way of teaching and achievement can be improved with the help of teaching through smart class (Evangelize 2013). With Smart Classroom teaching, teacher can easily handle lesson creation, classroom management and student assessment. It reduces the time it takes to set up classroom technology, enabling greater focus on teaching and learning. With instant assessment and classroom management tools, teacher can effortlessly move while teaching in whole-class, small-group and individual instruction to meet every student's learning needs. On the other hand, education in schools also needs to ensure that all young people be
equipped with knowledge, understanding and skill that will enable them to engage positively with scientific issues and debates they occur in their daily lives. Hence, the effect of smart class should be used as a tool to enhance the child’s education experiences. The introduction of smart classroom has provided a new shape to the classroom teaching. It is very necessary to use modern technologies in teaching to make teaching effective. These new technologies make teaching student centered i.e. these technologies work according to the appropriate situation that students and environment best. Smart classroom will enhance the teacher as well students’ ability. Smart classroom, not only have the academic standards gone up but also the children get a lot of enthusiasm to participate in this interactive method of teaching. It is a good educational aid and technology to classroom teaching. It engages the entire class in learning process, thereby making interaction interesting and exciting. Teachers are happy in using it and results are encouraging (Martin 2011).

1.5. Justification of the Study

In the present scenario, heavy bags full of text books and notebooks are observed with students at every school. Sad faces of the kids walking to the school bus, to be taught some
facts from textbooks which have not been updated from so many years, to further repeat these facts during exam time, to compete for marks as if lives of students and parents depends on it only. Schools, because of their inherent power to shape young minds are the foundation of any society, so it becomes their responsibility to find out the ways and means to make studies more of a ‘fun’ activity, than it is currently. On the other side, schools have limitations to cater to a large volume of students which affords little scope for innovation and improvisation (DNA Academy report 2009).

“The huge technological capabilities and attendant software of the Interactive Whiteboard (IWB) are fairly captivating to user, efficiently take them into the lesson content. They offer that the technology of Interactive Whiteboard (IWB) might be encouraging is of bounded function as significant as studies of motivation if it is not accompanied by important gains in students’ educational attainment” (Torff and Tirotta 2010). Because of all these causes Interactive Whiteboards are used in a wide range of applications. By applying smart space technologies in a real classroom, the Smart Classroom project bridges the gap between tele-education and traditional classroom activities in terms of the teacher’s experience and seamlessly integrates these two currently separate educational practices. More specifically, extend the user
interface of a legacy desktop-based tele-education system to the 3D space of an augmented classroom (Koila 2009).

In the words of Marzano (2009), “students who were instructed using smart board technology showed a substantial increase in the scores over student who received the same instruction without use of interactive technology. Adding various peripheral devices such as the interactive technology further increased the performance of students instructed with the smart board technology.”

According to Shi (2003), “In the Smart Classroom, teachers can use multiple natural modalities while interacting with remote students to achieve the same effect as a teacher in a classroom with local students. The system turns a physical classroom into a natural user interface for tele-education software. Teachers in the Smart Classroom can move freely, using conventional teaching methods to instruct remote students. Because they are in a real classroom environment, they can accommodate local students at the same time. Simultaneously instructing local and remote students also require a smaller workforce than separate on-campus and tele-education operations.”

Research on classroom situations and creativity can be credited to Lewin (1935) who theorized that the environment
and its interaction with personal characteristics of the individual are potent determinants of human behaviour. Despite the fact that the educational environment is a somewhat subtle concept, remarkable progress has been made in conceptualizing assessing and researching its determinants and effects.

Taking into consideration another angle it has been shown that there is a definite increase in creativity and creative linking or creative activity among the young children when constraints of the classroom are relaxed and creative is encouraged (Torrance, 1965). In India the fields of creativity research in relation to classroom have been right dubbed as being of elementary and fragmentary nature, having been carried on small dimensions mostly by isolated individuals’ (Raina 1971).

The trend of the studies on the concept of teaching in smart classroom shows that numerous studies have been conducted on these variables in the western countries but little emphasis has been given to such studies in India. Above all, the studies related to Smart classroom were rare in India and at its earliest stage. Looking into the importance attached to these variables the researcher has opted this topic for
research pursuit. Thus, the problem for the present study is stated as under:

1.6. Statement of the Problem

EFFECT OF TEACHING IN SMART CLASSROOM ON THE ACHIEVEMENT, RETENTION AND CREATIVITY OF HIGH SECONDARY SCHOOL STUDENTS OF COMMERCE

1.7. Operational definitions of the Terms used

1.7.1. Effect

Oxford Dictionaries of languages (2014) “A change which is a result or consequence of an action or other cause.”

In the present study the effect was taken as the change in the behaviour or level of learning of the students of commerce studying in Eleventh class as result of the experiment.

1.7.2. Teaching

"Teaching is an interactive process, primarily involving classroom talk which takes place between teacher and pupil and occurs during certain definable activity" (Amidon, 1967).

Gagne (1962) has defined teaching from democratic point of view, "Interpersonal influence aimed at changing the behaviour potential of another person."
In the present study, teaching in smart classroom was considered to deliver the Lessons of Commerce (Business studies) with the help of multi-media devices i.e. Laptop with internet connection, Projector and screen, smart board, Digital Versatile Disk player, Microphone and speaker(s), Control devices such as switches and remotes and softcopy of study material used by the teacher on Smart board.

### 1.7.3. Smart Classroom

“A smart classroom relates to the optimization of teaching content presentation, convenient access of learning resources, deeply interactivity of teaching and learning, contextual awareness and detection, classroom layout and management etc.” (Huang, 2011).

“A traditional Smart Classroom is a traditional lecture style teaching space that has available technological equipment that can be used to aid and enhance instruction of a course. The traditional Smart Classroom is equipped with the basic technology that will enable to connect laptop to the video projector or to play a VHS/ Digital Versatile Disk movie, just to name a few scenarios” (Sacramento 2009).

“A smart classroom is a classroom that has an instructor station equipped with computer and audio-visual equipment, Personal Computer, Overhead Projector, Wireless Internet
Access, Digital Versatile Disk Player, Smart Board” (Perret 2008).

In the present study, a Smart Classroom is one room, equipped with multimedia components i.e. a Laptop with internet connection, Projector and screen, smart board, Digital Versatile Disk player, Microphone and speaker(s), Control devices such as switches and remotes and softcopy of study material used by the teacher on Smart board.

1.7.4. Achievement

Achievement means something accomplished successfully, especially by means of exertion, skill, practice or perseverance (The American Heritage, 2009).

Crow and Crow (1969) defined achievement (academic) as the extent to which the learner is profiting from instruction in a given area of learning.

In the present study, achievement was taken as the marks obtained by students studying in XI class in the achievement test of commerce developed by the investigator himself.

1.7.5. Retention

Retention refers to the knowledge, skill and abilities the learner can exhibit at some time interval after instruction is completed. (Goldstein 1993).
“Retention involves capturing knowledge in the memories so that it can be used later” (Walsh and Ungson 1991).

In the present study, retention means the scores of the Achievement test achieved by the students after a period of two months.

1.7.6. Creativity

According to MacKinnon (1978), “Many are the meanings of creativity. Perhaps for most, it denotes the ability to bring something new into existence, while for others creativity is not ability but the psychological process by which novel and valuable products are fashioned. One would be ill-advised to seek to choose from among these several meanings the best single definition of creativity. Since creativity properly carries all of these meanings and many more besides. Creativity is indeed, a multi-faceted phenomenon”. Singh (1990) described creativity in Mathematics as an ability to produce original and unusual applicable methods and solutions to problems.

In the present study, Creativity of the students was considered as the scores obtained by them in Non Verbal Test of Creative Thinking by Baqer Mehdi.
1.7.7. **High Secondary School Students of Commerce**

In the present study, high secondary school students are the students who are studying in class XI commerce.

**1.8. Objectives of the study**

Following were the objectives of the study:

1. To develop lesson Plans in Commerce for XI class for teaching in Traditional classroom and Smart Classroom.
2. To develop and Standardize Achievement test in Commerce to measure the achievement and retention of subject matter among students of commerce.
3. To study the effectiveness of teaching in smart classroom on the achievement in commerce of the students of commerce.
   a) To Study the significant difference in the pre-test scores of achievement test in commerce of students in control and experimental group.
   b) To study the significant difference in the pre-test scores of achievement test in commerce of girls in control and experimental group.
   c) To study the significant difference in the pre-test scores of achievement test in commerce of boys in control and experimental group.
d) To study the significant difference in the pre-test and post-test scores of achievement test in commerce of the students in control group.

e) To study the significant difference in the pre-test and post-test scores of achievement test in commerce of the girls in control group.

f) To study the significant difference in the pre-test and post-test scores of achievement test in commerce of the boys in control group.

g) To study the significant difference in the pre-test and post-test scores of achievement test in commerce of the students in experimental group.

h) To study the significant difference in the pre-test and post-test scores of achievement test in commerce of the girls in experimental group.

i) To study the significant difference in the pre-test and post-test scores of achievement test in commerce of the boys in experimental group.

j) To study the significant difference in the post-test scores of the achievement test in commerce of students in control and experimental group.

k) To study the significant difference in the post-test scores of the achievement test in commerce of girls in control and experimental group.
l) To study the significant difference in the post-test scores of the achievement test in commerce of boys in control and experimental group.

m) To study the significant difference between the gain scores of all students in Control group and experimental groups.

n) To study the significant difference between the gain scores of girls in Control group and experimental groups.

o) To study the significant difference between the gain scores of boys in Control group and experimental groups.

4. To study the effectiveness of teaching in smart classroom on the retention of the students of commerce.

a) To study the significant difference in the post-test scores of achievement test in commerce and achievement test (after two months for retention) in commerce among students in control Group.

b) To study the significant difference in the post-test scores of achievement test in commerce and achievement test (after two months for retention) in commerce among girls in control Group.

c) To study the significant difference in the post-test scores of achievement test in commerce and
achievement test (after two months for retention) in commerce among boys in control group.

d) To Study the significant difference in the post-test scores of achievement test in commerce and achievement test (after two months for retention) in commerce of the students in experimental group.

e) To Study the significant difference in the post-test scores of achievement test in commerce and achievement test (after two months for retention) in commerce of the girls in experimental group.

f) To Study the significant difference in the post-test scores of achievement test in commerce and achievement test (after two months for retention) in commerce of the boys in experimental group.

g) To study the significant difference in the scores of achievement test (after two months for retention) in commerce of the students of commerce in control group and experimental group.

h) To study the significant difference in the scores of achievement test (after two months for retention) in commerce of the girls of commerce in control group and experimental group.

i) To study the significant difference in the scores of achievement test (after two months for retention) in
commerce of the boys of commerce in control group and experimental group.

5. To study the effectiveness of teaching in smart classroom on the creativity of the students of commerce.
   a) To study the significant difference in the pre-test scores of the creativity of the students of commerce in control group and experimental group.
   b) To study the significant difference in the pre-test scores of the creativity of the girls of commerce in control group and experimental group.
   c) To study the significant difference in the pre-test scores of the creativity of the boys of commerce in control group and experimental group.
   d) To study the significant difference in the pre-test and post-test scores of creativity of the students of commerce in control group.
   e) To study the significant difference in the pre-test and post-test scores of creativity of the girls of commerce in control group.
   f) To study the significant difference in the pre-test and post-test scores of creativity of the boys of commerce in control group.
g) To study the significant difference in the pre-test and post-test scores of creativity of the students of commerce in experimental group.

h) To study the significant difference in the pre-test and post-test scores of creativity of the girls of commerce in experimental group.

i) To study the significant difference in the pre-test and post-test scores of creativity of the boys of commerce in experimental group.

j) To study the significant difference in the post-test scores of creativity of the students of commerce in control group and experimental group.

k) To study the significant difference in the post-test scores of creativity of the girls of commerce in control group and experimental group.

l) To study the significant difference in the post-test scores of creativity of the girls of commerce in control group and experimental group.

1.9. **Hypotheses of the study**

To achieve objectives of the present study following hypotheses were framed-

a) There exists no significant difference between the pre-test scores of achievement test in commerce among the students in control group and experimental group.
b) There exists no significant difference between the pre-test scores of achievement test in commerce among the girls in control group and experimental group.

c) There exists no significant difference between the pre-test scores of achievement test in commerce among the boys in control group and experimental group.

d) There exists significant difference between the pre-test scores and post-test scores of achievement test in commerce among the students in control group.

e) There exists significant difference between the pre-test scores and post-test scores of achievement test in commerce among the girls in control group.

f) There exists significant difference between the pre-test scores and post-test scores of achievement test in commerce among the boys in control group.

g) There exists significant difference between the pre-test scores and post-test scores of achievement test in commerce among the students in Experimental group.

h) There exists significant difference between the pre-test scores and post-test scores of achievement test in commerce among the girls in Experimental group.

i) There exists significant difference between the pre-test scores and post-test scores of achievement test in commerce among the boys in Experimental group.
j) There exists significant difference between the post-test scores of achievement test in commerce among the students in control group and experimental group.

k) There exists significant difference between the post-test scores of achievement test in commerce among the girls in control group and experimental group.

l) There exists significant difference between the post-test scores of achievement test in commerce among the boys in control group and experimental group.

m) There exists significant difference between the gain scores of achievement test in commerce among the students in control group and experimental group.

n) There exists significant difference between the gain scores of achievement test in commerce among the girls in control group and experimental group.

o) There exists significant difference between the gain scores of achievement test in commerce among the boys in control group and experimental group.

p) There exists no significant difference between the scores of post-test of achievement test and achievement test (after two months for retention) in commerce among the students in control group.

q) There exists no significant difference between the scores of post-test of achievement test and achievement test (after
two months for retention) in commerce among the girls in control group.

r) There exists no significant difference between the scores of post-test of achievement test and achievement test (after two months for retention) in commerce among the boys in control group.

s) There exists no significant difference between the scores of post-test of achievement test and achievement test (after two months for retention) in commerce among the students in experimental group.

t) There exists no significant difference between the scores of post-test of achievement test and achievement test (after two months for retention) in commerce among the girls in experimental group.

u) There exists no significant difference between the scores of post-test of achievement test and achievement test (after two months for retention) in commerce among the boys in experimental group.

v) There exists significant difference between the scores of achievement test (after two months for retention) in commerce among the students in control group and Experimental group.

w) There exists significant difference between the scores of achievement test (after two months for retention) in
commerce among the girls in control group and Experimental group.
x) There exists significant difference between the scores of achievement test (after two months for retention) in commerce among the boys in control group and Experimental group.
y) There exists no significant difference between the pre-test scores of creativity test among the students of commerce in control group and experimental group.
z) There exists no significant difference between the pre-test scores of creativity test among the girls of commerce in control group and experimental group.

aa) There exists no significant difference between the pre-test scores of creativity test among the boys of commerce in control group and experimental group.

bb) There exists significant difference between the pre-test scores and post-test scores of creativity test among the students of commerce in control group.

cc) There exists significant difference between the pre-test scores and post-test scores of creativity test among the girls of commerce in control group.

dd) There exists significant difference between the pre-test scores and post-test scores of creativity test among the boys of commerce in control group.
ee) There exists significant difference between the pre-test scores and post-test scores of creativity test among the students of commerce in Experimental group.

ff) There exists significant difference between the pre-test scores and post-test scores of creativity test among the girls of commerce in Experimental group.

gg) There exists significant difference between the pre-test scores and post-test scores of creativity test among the boys of commerce in Experimental group.

hh) There exists significant difference between the post-test scores of creativity test among the students of commerce in control group and experimental group.

ii) There exists significant difference between the post-test scores of creativity test among the girls of commerce in control group and experimental group.

jj) There exists significant difference between the post-test scores of creativity test among the boys of commerce in control group and experimental group.

1.10. Delimitations of the study

Due to paucity of time and other factors the study was delimited to -

1. 80 students studying in XI class of commerce in high secondary school for conducting the experiment.
2. six specific units of Commerce (Business studies) from class XI for the experiment i.e. Nature and purpose of business, Form of business organization, Private, public and global enterprises, Business Services, Emerging modes of business, Social responsibility and Business ethics.

3. one public school with the facility of smart classroom from Kurukshetra district of Haryana, affiliated to CBSE, New Delhi for conducting the experiment.

4. experiment (treatment) of 25 days of leading 25 lessons of 45 minutes per day in each group.