CHAPTER I
INTRODUCTION

1.1 BACK GROUND OF THE STUDY

Globalization and technological advancements have resulted in the emergence of a current global economy that is fuelled by information and driven by knowledge. The structure and goal of educational institutions have been severely impacted by the beginning of this new global economy. Schools cannot be satisfied with the limited knowledge that can be conveyed in a fixed period as access to information continues to increase rapidly. They must familiarize you with the ever-expanding body of information while still being equipped with the technologies to deal with it. Radio and television, as well as newer growing technology like computers and the internet, are potentially significant tools for educational change and transformation.

Different ICTs, when used properly, can help widen educational access, strengthen the importance of education in an increasingly digital workplace, and improve educational quality by support in the transformation of teaching and learning into an active process linked to real life. With the aid of information and communication technology, the value of education has evolved in almost every area of life (ICT). The use of ICT has deeply changed the way education works in the last 20 years. In today's environmentally aware world, the significance of education and acceptance of ICT as a social requirement has increased. To boost socioeconomic mobility and lift the pitch for equality and social justice, information and communication methods must be socially acceptable. Education as a means of qualitative development is not limited to the classroom. Students and organizations alike are concerned with modern ICT resources such as eLearning and the online practice of learning and collecting knowledge.

The government is investing heavily in ICT. The National Mission on Education is emphasizing the role of ICT in raising the enrolment ratio in higher education in the higher education sector. In India, school education has a high dropout rate, and we need to figure out how to reduce it. In the same way, we need to increase the number of students in higher education. In the process of disseminating education using ICT, we should also consider the challenges of cost and the availability of qualified teachers. India is becoming a knowledge economy, and it will be unable to function without the use of information and communication technologies. Because of the inequity between demand and supply in higher education, governments and institutions have been forced to set up policies to allow better use of ICT. To close the gap, the public and private sectors must work together more closely. The education ICT policy should define real ways in which ICT will help higher education institutions develop their educational ability and potential.

Present teaching and learning is different from before due to Covid 19. Since middle of March 2020, millions of learners had been out of school, because of the Covid-19 lockdown. This had also affected more than one lakh learners, who could not complete their class 12th board examinations. Due to Covid – 19 pandemic and country wide lockdown, there has been continuing online teaching learning process.

1.2 ICT

Most of the history of computer technology in education can be told in two periods: before and after the introduction of microcomputers in the late 1970s. In 1994, yet another technological development, the World Wide Web, transformed educational technology. This development marked the beginning of the third and current era of computers in education. Innovation is the utilization of Social Sciences in an efficient manner. Substance of innovation is surrounding us. They appear to be the main impetus behind the worldwide and information-based descriptors of our age. Innovation can give contributions to all degrees of schooling. Many examinations consider had talked about the part of innovation in learning and many feature the perspective that innovation can improve learning. ICT Enabled Teaching is one of the new advancements in the 20th century innovation.

1.2.1 Meaning and Definitions

ICT refers to "information and communication technology used for effective presentation of information and for better communication" (Monteith, 1998). "Data introduction devices like OHP, slide projectors, LCD projectors, film projectors, filmstrip projectors and electronic gadgets like TV, radio, PCs, DVD, Internet and other specialized gadgets like e board, e-conversation gatherings, and so forth are aggregately known as ICT" (Chin, 2004). "IT' in lCT addresses Information Technology and 'C represents specialized gadgets" (Goel, 2000). "lCT is an umbrella term which covers data and specialized devices" (BECTA, 2000).

1.2.2 ICT in India

India has made impressive progress in the application of Information and Communication Technology in recent years. The pace of developments in ICT in India has been breathtaking. The government at the Centre and the State governments have entered in the area of ICT in education in a big way. The ministries, UGC, NCTE, NCERT, SCERT and other agencies like Intel are supporting the use of ICT in education at different levels. The NCERT has also been organising ICT Literacy Camps for teachers throughout India. "The objective is not to prepare technocrats but techno pedagogy" (Edu Tracks, 2006). A dedicated satellite for education, EDUSAT, has recently been launched and the Government of India envisages that the computer and internet facilities will be made available to every school in the country. The cable network, internet and dedicated educational channels have revolutionized the Indian educational scenario greatly. There are many changes and challenges in the field of education. "There is a move from Indian pen to the PC console, structure writing board introduction to PowerPoint introduction, from guidance to development and revelation, from educator 6 subordinate figuring out how to free learning." (Goel, 2001). We have countrywide educational radio, educational TV programmes and computer literacy camps. The use of CHIP is not new to Indian schools. The immense potential of videoconferencing and teleconferencing, e-discussions and e-learning is no more alien to Indian educational system. ICT is given great importance in school curriculum. The government sponsored IT Schools, ICT schools aptly illustrate this aspect. In spite of these advances, we fail to integrate technology into teaching and learning process effectively. The grim fact is that, in India, "the different media are being used in education casually. Technology and pedagogy seem to function in isolation. The use of ICT in education is far from satisfactory.

1.2.3 Approaches to ICT Development

The learning environment in the school system is still largely dominate especially in growing countries. For example, instructing may be supplemented with ICT such as electronic slide presentations and word-processed handouts. Students receive instruction and add notes to teacher prepared handouts. Use ICT tools to complete required lessons and are assessed on prescribed content. School organization provides discrete time periods for each subject with some flexibility to combine subjects and time periods. Until now, ICT has been taught as a separate subject area. To move to the next phase, the school chooses to implement and ICT based curriculum that increases ICT across various subject areas with the use of specific tools and software. In the emerging approach to ICT development, the focus is on the technical functions and uses of ICT and on the need for some knowledge and representation of the impacts of ICT systems as a whole. This approach often involves the teachers 'personal use of ICT, such as, for instance, the use of word processing to prepare worksheets, locating information on CD-ROMs or on Internet, or communicating with friends and family by email. Here, teachers are developing their ICT literacy and learning how to apply ICT to a range of personal and professional tasks. The emphasis is on training in a range of tools and applications, and increasing teacher's awareness of the opportunities for applying ICT in their teaching in the future, missing with 'chalk-talk' method. Computer, computer labs, ICT labs and other media are more for exhibition than for education. Unfortunately, in this age of 'media implosion, improper use of media is widespread. In India, electronic devices TV and radio are used more for entertainment and information than education. The ETV programmes has not yet got the status of a master medium similarly. Computer in education has not been satisfactorily utilized.

1.2.4 ICT and Education

It is generally believed that ICTs can empower teachers and learners, making significant contributions to learning and achievement. However, current research on the impacts of ICTs on student achievement yields few conclusive statements, pro or con, about the use of ICTs in education. Studies have shown that even in the most advanced schools in industrialized countries, ICTs are generally not considered central to the teaching and learning process. Moreover, there appears to be a mismatch between methods used to measure the effects and the type of learning promoted. Standardized testing, for example, tends to measure the results of traditional teaching practices, rather than new knowledge and skills related to the use of ICTs. It is clear that more research needs to be conducted to understand the complex links between ICTs, learning, and achievement.

1.2.5 Effectiveness of Information and Communication Technology in Teaching and Learning

Teaching is a profession which lays the foundation for preparing the individuals for all other professions. It is well established dictum that no nation can rise above the level of teachers. It is the teacher who plays a pivotal role in the educational system and is a catalytic agent of changes in the society. Various factors influence teacher's qualities. Among these are the strategies or the techniques which the teacher adapts in the teaching learning process. Teachers are considered to be the treasure locus of knowledge. Their personality should be multifold and multidimensional. They should be well informed. Experience adds on to their efficiency, Experience is said to be a great teacher. This experience may be gained by the teacher through

the direct or indirect means. The direct access to the source of gaining firsthand experience is neither always possible nor desirable. Consequently, most of the learning is based on second hand experiences in the formation received by us about the objects, places, persons, ideas or events. This information received by us about the objects, places, person's ideas events. This information provides a base for our knowledge and understanding about them and the environment surrounding them. For this purpose, the teacher must be able to learn the art of getting information, store and make its use as and when directed. ICT popularly known, involve in the most general since the use of technology in managing and processing information. ICT provides "anytime, anywhere" access to 7 reliable information. It paves the way for construction of knowledge by any individual. A belief promoted in the research literature (Fasieyitan, Libii and Hirchbuhl 1996) and amongst the administration is that university/college education can make imaginative or innovative use of ICT to enrich the learning environment and support student learning. It can be used to make students' facet knowledge public and help them develop math cognitive skills to become more reflective and self-regulated learners. A shift from teacher-centred instruction to learner-centred instruction is needed to enable students to acquire the new millennium knowledge and skills. The shift will take place in changing from a focus on teaching to a focus on learning (sanclhots, Ringstaff and Dwyer 1977). We are entering a new era of digital learning in which are in the process of transitions from broadcast learning to interactive learning to build a strong national policy that clearly outlines how ICTs advance national goals and promote innovative use interrelate learning (Topscott 1998). Today students no longer want to be passive recipients in the information transfer model of learning. Rather, they want to be active participants in the learning process. Therefore, education systems around the world are under increasing pressure to use ICT to teach students the knowledge, skills; they need in the 21st century. What does ICT offer that the conventional classroom teacher does not? It facilitates construction of knowledge by providing students with experiences that are otherwise expensive, time consuming or simply impossible to provide, ICT motivates students and energizes the classrooms. It forces the teacher to look beyond the textbooks and traditional methods and enable students to develop good study habits and a spirit of knowledge sharing. According to Driocoll (1994) the constructive conditions for learning are:

• Providing complex learning environments that incorporate authentic activity.

 • Social negotiation as an integral part of learning.

• Juxtaposition of instructional content.

• Access to multiple modes of representation

 • Opportunities to nurture reflection.

• Student centred instruction.

A review of the literature on integration of ICT in the classroom shows that all the above conditions are fulfilled. Multiple senses are involved, real environments are simulated, material can be presented holistically, independent learning takes place within the class group and both individual and collaborative reflections are facilitated. A review of 8 practices, in countries like UK where ICT use in statuary requirement in the National Curriculum indicates that ICT use in the classroom is at two levels.

1. To collect and analyse data, prepare reports, submit assignments etc.
2. To support the teaching learning process through the creation of appropriate environments and so on.

The Government of India has recognized the importance of ICT in education with the latest initiatives being the distribution of computers to the Government schools. The endeavour is not merely to facilitate learning with the use of ICT but also to make students comfortable with them. The National Curriculum Framework (2005) appreciated that the psychological impact of ICT's and the potential they offer for global sharing of knowledge cannot be denied. ICT should be used to enhance learning in all parts of the curriculum and interdisciplinary and cross-disciplinary thinking. Opportunities for professional development in the area are given to the teacher so that they can efficiently perform the role of facilitators, thus allowing students to learn independently. A Meta survey conducted by UNESCO on the use of ICT in education reported that India actively promotes the use of ICT in education both in formal and in the non-formal education sectors. This varies from the use of radio to facilitate the green revolution, to satellite based one way and interactive television for rural development in some of the most backward districts to one and distance learning models. At present the use of newer computer and internet-based ICT resources on education along with broadcast ICT, is being explored. The UNESCO (2002) document "Information and communication technologies" states the importance of ICT in teacher education as follows: "With the emerging new technologies, the teaching profession is evolving from an emphasis on teacher-centred, lecture-based instruction to student-centred, interactive learning environment. Designing and implementing successful ICT, enabling teacher education programs is the key to fundamental, wide-ranging educational reforms" Teacher education institutions may either assume a leadership role in the transformation education or be left behind in the swirl of rapid technological change. For education to reap the full benefits of ICT in learning, it is essential that pre-service and in-service 9 teachers have basic ICT skills and competencies. Teacher education institutions and programs must provide the leadership for pre-service and in-service teachers and must be modelled in the new pedigrees and tools for learning. They must also provide leadership in determining how the new technologies can be used in the context of culture needs and economic conditions within the country. The above passage conveys the vital need for incorporating ICT in teacher educations both pre-service and in-service. The document further suggests that there should be "articulation and the decimation of a vision of how ICTs fit into the broader society and education. Together policy makers and educators can of ICTs to improve teaching and learning.

1.3 Achievement

 In the Standards for test development (APA, 1999) accomplishment is seen fundamentally as the fitness an individual has in a territory of substance. This capability is the aftereffect of numerous scholarly and non-scholarly factors. At the trial level, accomplishment is alluded to as obtaining, learning, or information portrayal, at times relying upon hypothetical predispositions. Accomplishment is the word liked in the instructive or psychometrics fields, being here and there portrayed by the level of surmising needed with respect to the understudy to give a reaction, and by the sort of reference to an intellectual cycle made express in the estimation device. Accomplishment alludes to level of fulfilment in any or all science abilities, normally assessed by execution on a test. In some cases, it even alludes to an individual's previous learning. As indicated by Good (1973), the term 'accomplishment' might be

characterized as "achievement or capability of execution in a given ability or bod}' of information." According to 'Word reference of Education', scholastic accomplishment is characterized as "information acquired or abilities created in the school subjects, ordinarily assigned by test scores or by marks doled out by educators, or by both." Glaser (1963) characterized the estimation of understudy accomplishment as the assurance of the qualities of his presentation concerning determined guidelines. Accomplishment is characterized as "the proportion of what and how much an individual has learnt. It very well might be the quality or amount of learning accomplished by a person in a subject of study after a time of guidance." Thus, Achievement is a final result of realizing whose level and execution are influenced by different conditions existing at the hour of learning and its utilization. Accomplishment has been viewed as a significant factor throughout everyday life. In this quickly changing world and with the developing progression in science and innovation the job of training has gotten essential. At the hour of confirmation, for entrance in work, for grant, for additional examinations, scholastic accomplishment is the solitary measure. The world is getting increasingly serious. Nature of execution has become the vital factor for individual advancement. Guardians want that their youngsters ascend the stepping stool of execution to as high a level as could really be expected. A noticeable component of contemporary instructive reasoning has been a developing worry about the viability and proficiency of showing learning result of an arrangement of training which can be evaluated as far as understudy's accomplishment. Accomplishment implies the measure of information acquired by the understudy in various subjects of study as shown by his scores in the assessment. It s estimation urges the understudies to buckle down. It likewise encourages the educators to realize if training strategies are compelling and to help them in bringing improvement appropriately. Consequently, appraisal of academic achievement helps both the students and teachers to know where they stand. Horrock (1976) defines achievement as the status or level of person's learning and his ability to apply what he has learned. According to him, achievement would not only include acquisition of knowledge and skills but also attitudes and values as aspects of achievement. Achievement as manifested by the application of acquired skills and knowledge is a product of learning attitudes and interests since these factors would implicitly influence the intent of achievement. Christian (1980) remarks that the word 'achievement' indicates the learning outcome of the students. As a result of learning different subjects, the behaviour pattern of the students' changes. Learning affects three major areas of behaviour of students (1) cognitive (intellectual development, recall and recognition) (2) affective (Self-concept and personal growth) and (3) Psycho-motor (developing muscular skills). He says that all these three levels are not affected in equal measures at a time. It means, a student may be at a higher level in one domain and lower in another. Indeed, the entire arrangement of instruction rotates round the scholarly accomplishment of understudies through different results are additionally anticipated from the framework. Hence a ton of time and exertion of the school are utilized for assisting understudies with accomplishing better in their educational undertakings. The requirement for estimating scholastic accomplishment depends on two essential presumptions of brain science. In the first place, there are contrasts inside the person every once in a while, known as conduct swaying, for example scholastic accomplishment of a similar individual varies now and again, starting with one class then onto the next and starting with one instructive level then onto the next, Secondly and there are singular contrasts. People of a similar age gathering, of a similar evaluation and a rule contrast in their capacities and scholarly capability

whether they are estimated by normalized strategies or by instructor's reviewing or by marks acquired in class tests and assessments.

1.4 SCIENCE

1.4.1 Meaning and Definition

The English word Science is derived from a Latin Verb 'Scire', which means 'to know' and Latin Noun 'Scientia' which means 'knowledge'. Meaning of Science is based on German word 'Wissen chaft', which means systematic, organized knowledge. Thus, Science is a systematized knowledge.

The necessity and curiosity of man to know about himself and his surroundings has led him to investigate, find and to know about living beings and nature, which to verifiable knowledge of facts. But Science is not always about the collection of facts or development of new concepts or ideas. It is all about the passion for the discovery that drives one to explore the environment and the nature in every aspect.

Science is basically founded to investigate the nature and its processes. Although there are a number of other methods that can be utilized to acquire the knowledge about nature, but science is considered as the only one that results in the acquisition of reliable knowledge. Hence, Rene Descartes said, "Science is a method of investigating nature that discovers reliable knowledge about it."

Science is the investigation of unknown phenomena and it also looks and compares with existing principles, theories and practices. Science is both a particular kind of activity and also the result of that activity. Science uses tools like observation, measurement and scientific experimentation and is entirely based on the observable facts. Science is observation, identification, description, experimentation, investigation and theoretical explanation of the phenomenon that occur in nature. Science could be described as the study, which attempts to perceive and understand the nature of the universe both living and non-living in its part and as a whole.

1.4.2 Scope of Science

Science is the systematic study of the natural world through observation and experimentation. It has many scopes and plays an important role in our live. The scope of science is infinite. It seeks to answer all that is answered. The scope of the field of science is unlimited, its material is endless, every group of natural phenomena, every phase of social life, every stage of past or present-development is material for science. The scope of a course is the range of disciplines, scientific or social or whatever it includes. Scope of Science is as wide as any other subject. It has many branches. The scope of science encompasses a wide range of fields including physics, chemistry, biology, earth science, and psychology. Let us discuss them one by one.

1. **Physics** deals with the study of matter and energy, including the behaviour of particles and the laws of motion. It provides a foundation for understanding many aspects of

the natural world, such as the behaviour of objects in motion, the nature of light and sound, and the behaviour of the stars and planets.

2. **Chemistry** is related with the structure, composition and properties of matter, as well as the changes it undergoes through chemical reactions. It plays a crucial role in understanding the nature of substances and how they interact with each other. This field is central to many areas of science, including medicine, environmental science, and material science.

3. **Biology** is the study of living organisms and their interactions with the environment. It encompasses a wide range of subfields, including genetics, ecology, and physiology, and plays a critical role in understanding the processes that sustain life and the relationships between different species.

4. **Earth science** is the study of the planet we live on, including its composition, structure, and processes. It encompasses fields such as geology, oceanography, and meteorology, and provides a foundation for understanding the planet's history and its current state.

1.4.3 Importance of Science

The importance of science cannot be overstated. Actually, the modern world is created by science and maintained by science. Science is important because it provides a way to understand and explain the natural world, leading to new technologies and improved standards of living. It is an integral part of human civilization, playing a critical role in improving our quality of life. It also helps us make informed decisions by providing evidence-based explanations and solutions to problems. Additionally, science plays a crucial role in advancing our understanding of the universe and our place in it. Some Importance of Science has given below:

Problem Solving: Science a systematic approach to solving problems and finding solutions to various challenges faced by humanity.

Advancements in Technology: Scientific advancements have led to numerous technological innovations, which have greatly improved the quality of life and solved many of society's problems.

Understanding the Natural World: Science helps us understand the natural world and our place within it, by providing explanations for phenomena and laws that govern the universe.

Health and Medicine: Science has led to numerous medical breakthroughs, such as vaccines, medicines, and treatments that have saved countless lives and improved human health.

Environmental Protection: Science plays a crucial role in understanding the Earth's environment and the impact of human activities on it, providing the basis for environmental protection and sustainable development.

Economic Development: Scientific advancements have led to the development of new industries, creating jobs and contributing to economic growth.

Improved Education: Science plays a key role in providing a strong educational foundation, promoting critical thinking, and encouraging innovation and creativity.

Better Decision Making: Scientific research provides accurate information, enabling individuals and governments to make informed decisions and respond effectively to challenges.

Promoting Collaboration: Science brings people from different backgrounds and cultures together, promoting international cooperation and collaboration towards common goals.

Inspiring Curiosity: Science stimulates curiosity and encourages people to explore and understand the world around them, leading to new discoveries and advancements in various fields.

1.5 IMPORTANCE OF ICT IN TEACHING LEARNING OF SCIENCE

The role of ICT in education is not homogeneous; ICT currently provides a growing range of tools to manipulate digital data, as well as access to the vast range and variety of content which underpins the information age, only some of which is designed to support learning. In order to harness the power of these technologies to serve science education it is necessary first to identify the precise objectives of that education and then to match appropriate use of the technologies to the achievement of those objectives. The role of ICT in two models of a science curriculum are considered here, one based on empirical science and one on a model of scientific reasoning.

1.6 STATEMENT OF THE PROBLEM

Science is considered generally as a tough subject by students and they found difficult to understand the abstract concepts involved in it. In school majority of the students feel that they need more clarity to comprehend the subject. I felt that this impression can be reversed with the help of integrating technology in teaching and learning for learning the subject. So the problem for the study is stated as, **"A Study of Effect of ICT Integrated Teaching on Achievement in Science of Class VII Students of Bhopal"**

1.7 DEFIFNITION OF KEYWORDS

The relative keywords below were operationally defined relative to their usage in this study.

- **Effect:** Effect is described as significant mean difference of students' post- test over the pre-test achievement scores in science.
- **Instructional material:** what the teacher uses to make the lesson more interesting, understandable, joyful and more effective.
- **ICT Integration:** ICT integration means the use of ICT to introduce, reinforce, supplement and extend skills in teaching learning process.
- **ICT Integrated Teaching:** ICT integrated teaching means to integrate ICT in teaching learning processes like transacting curricular content and students working on technology to do authentic tasks. Teacher uses different technologies in the process of teaching learning
- **Achievement in Science:** To measure students' level of skills, accomplishment and knowledge in science by taking a test in science.
- **Science:** Science is the study of the nature and behaviour of natural things and the knowledge that individual about them.
- **Experimental group:** In experimental research, an experimental group is the group that receives the element being evaluated
- **Control group**: in an experimental design, the control group is the untreated group which is compared with an experimental group.

1.8 OBJECTIVES

The objectives of this study were as follows:

- To compare the mean scores of achievement in Science of ICT integrated teaching and without ICT integrated teaching on pre-test.

- To compare the mean scores of achievement in Science of ICT integrated teaching and without ICT integrated teaching on post-test.
- To compare the mean scores of achievement in Science at pre-test and post-test stages of group taught through ICT.
- To compare the mean scores of achievement in Science at pre-test and post-test stages of group taught without ICT.

1.9 HYPOTHESIS OF THIS STUDY

- Ho 1: There is no significant difference between mean scores of achievement in Science of ICT integrated teaching and without ICT integrated teaching on pretest.
- Ho 2: There is no significant difference between mean scores of achievement in Science of ICT integrated teaching and without ICT integrated teaching on post-test.
- Ho 3: There is no significant difference between mean scores of achievement in science at pre-test and post-test stages of group taught through ICT.
- Ho 4: There is no significant difference between mean scores of achievement in science at pre-test and post-test stages of group taught without ICT.

1.10 DELIMITATIONS

- The area of study is restricted to Bhopal city only.
- The area of study is restricted to R.D. Convent School only.
- This study is limited to Science subject only.
- The area of study is restricted to class 7th only.