

Chapter I

INTRODUCTION

The importance of education is undeniable for everyone. It is worth saying that education has a positive effect on mankind. Everyone needs to study. As a result of receiving education, people can gain knowledge and enlarge their view of the world. Being educated helps people earn respect and recognition. As a result, people may become more productive and civilized if they are better educated. Education plays such a fundamental role in our society that we cannot have a life without it. It is an essential element for the civilization of the society. Not only does it help us develop a healthy atmosphere around us, but also brings forth an advanced community. As a matter of fact, everything that we have created today is based on the knowledge that we have obtained throughout our life by means of education. This has assisted scientists in inventing equipment and devices, which has resulted in the advancement of technology today. The more developed the society becomes, the more necessary education is for everyone in the society.

Education is absolutely beneficial for society on the whole. However, we need an education system that may eradicate illiteracy and may provide the layman an access not only to basic education but also to higher and technical education (Jayson de Lemon, 2014). The nature of knowledge is not an object, but a series of flows; it is a process, not a product. The idea of acquiring knowledge, as a series of truths, is obsolete (Downes, 2009). Education can be defined as the process of facilitating learning, or the acquisition of knowledge, skills, values, beliefs, and habits. Education frequently takes place under the guidance of educators, but learners may also educate themselves. (Dewey, 1944).

Although education has a significant impact on the quality of life, the average education received by everyone is not the same in all areas. Therefore, strategies are being evolved to resolve the problem. As a matter of fact, every child should be given equitable opportunities to learn. Because the development of a country depends only on the quality of education, it must concentrate on improving it. The educational systems of different countries are not similar. They need to share a common goal, which is to provide its inhabitants quality education.

There are so many rapid and significant developments in the field of knowledge technology. These developments serve human being in number of ways. Today knowledge technologies became basic components in either exploration-implementation-evaluation process or personal and financial affairs. Many fields should closely follow these new developments in knowledge technologies in order to benefit from them. One of these fields is education.

Education, as a producer of knowledge, is frontrunner and spearheading ICT related developments. The curriculum in developed countries, at all levels of education, has been redesigned and places greater emphasis on the use of ICTs. The educational systems of developing countries are still recovering from the shock waves of the ICT revolution that has already taken place in the developed world during the last two decades. The second role for the education sector is to use these technologies for improving its managerial efficiency and effectiveness. The education sector, perhaps the most mismanaged social sector, is characterised by managerial inefficiencies of high order. With rapidly changing technology and ever-increasing application of ICTs, the deskilling of labour force has already started. Next 10-20 years will be very crucial from this point of view.

In this age of Information and Communication Technology (ICT), there is growing concern for the use of ICT resources such as the computer, scanner, printer, Intranet, Internet, e-mail, videophone systems,

teleconferencing devices, wireless application protocols (WAP), radio and microwaves, television and satellites, multimedia computer and multimedia projector in curriculum implementation. In e-learning, curriculum content in the form of texts, visuals, e.g. pictures, posters, videos, audio/sound, multicolour images, maps, and graphics, can be simultaneously presented online to students in both immediate locations (classroom model of e-learning) and various geographical distances (Distance Education model of e-learning).

It is strongly agreed that information and communication technology have a huge impact on education and society. With the advancement in ICT, it is easier to share the information or to connect with the people across the globe. Recently, the enhancement of student teacher interaction with ICT in the classroom has been recognised. The emergence of information and communication technology (ICT) in school is invincible. ICT covers all aspects of education, leading to the formation of new knowledge and networks of teachers, promoting the development of new methods and approaches to teaching. It is considered as an important instrument that can transfer the current isolated, teacher centred and book-centred learning environment into a student- centred environment. It can be achieved by the use of technological advances such as video-conferencing, online forums, blogging tools etc. Puts teachers and students in contact with each other on global scale. We the human beings uses the technology to access, communicate, share and support their learning in many different ways. In schools too, are using their own technology system, websites and internet or virtual learning environment to make learning resources available online at any time. It has become essential need in educational institutions for learning and teaching in the present day of digital Era. The learners are using, accessing, capturing the important things like video lectures, digital notes through electronic gadgets and teachers, researchers uploading their article, class lectures, videos through ICT tools and techniques. Educational institutions are also adopting the tools for better teaching, management and administration in the schools and campuses.

1.1 MEANING OF TECHNOLOGY

Technology is the collection of techniques, skills, methods and processes used in the production of goods or services or in the accomplishment of objectives, such as scientific investigation. Technology can be the knowledge of techniques, processes, etc. or it can be embedded in machines, computers, devices and factories, which can be operated by individuals without detailed knowledge of the workings of such things.

1.2 EDUCATIONAL TECHNOLOGY

Scholars in the field of education have for a long time examined the uses of innovative technologies in education. They examine all aspects such as direct student learning and efficient management of institutions of learning. As in all areas of applied technology, the field of educational technology studies how theoretical knowledge and scientific principles of learning can be applied to problems that arise in a classroom. Experts in educational technology seek new and effective ways of organizing the teaching and learning process through the best possible application of technological appliances. These activities rely upon a body of knowledge for successful and ethical implementation, rather than routine tasks or isolated technical skills.

1.2.1 Definition of Educational Technology

Educational technology can be considered either as a design science or as a collection of different research interests addressing fundamental issues of learning, teaching and social organization (Edutechwiki, 2015).

1.2.2 Importance of Educational Technology

Educational technology is directed to improve the standard of education for the 21st century learner. The importance of technology-based learning in the classroom is listed below:

- Easily accessible course materials

Teachers can post their teaching material or important information on a course website. This means students can study at a time and place they prefer and can access the study material very easily.

- Enhanced student motivation

When receiving computer-based instruction, students usually learn more in less time. They like classes more and develop a positive attitude towards the usage of computers in computer-based classes. Teachers must motivate students in order to successfully implement technology-based teaching and learning into the classroom.

- Varied participation

The study material can be used for long distance learning which can be accessible to a wider audience.

- Enhanced student learning and writing

Technology makes it convenient for students to compile their written work on word processors. This in turn, improves the quality of writing. Students become better in their skills at reviewing and editing the written work which is exchanged among a network of students they know.

- Learner-centered Instruction

Educational technology enables the teacher to focus on active student participation and to make use of different teaching strategies. It widens the scope for individualized instruction and promotes the development of self-learning strategies.

1.2.3 Technology in Education

Technology in education is most precisely and exquisitely defined as a collection of tools that might prove helpful in the advancement of student learning. Its effect may be measured on how and why individuals behave as a consequence of its use in education. Technology in education can refer to material objects of use to humanity, such as machines or hardware, but it can also encompass broader themes, including systems, methods of organization, and techniques. Some modern tools include but are not limited to overhead projectors, laptop computers, and calculators. Newer tools such as smartphones and games (both online and offline) are beginning to draw serious attention for their learning potential (Honghua Tan, 2012).

1.2.4 Technology of Education

In a globalised economy, which witnesses a high degree of competition among countries, the success of a nation depends on the educational standards of its workforce. Traditional school systems tend to prioritize the accumulation of knowledge over the application of knowledge. Educational reforms are essential to provide learners with what is widely known as 21st century skills. Those competencies and values are essential to become dutiful citizens in a knowledge society and maintain employment throughout life in such a society. Technology can make education systems more efficient at the administrative level by helping teachers and administrators organize routine tasks and improve assessment process in the teaching-learning process. Technology of education can serve as a powerful catalyst for change in teaching styles in the classroom. As students use more of technology and play a more active role in modifying their method of learning, teachers take on new roles as facilitators of knowledge rather than knowledge transmitters (Brookfield, 2006).

1.3 DEFINITION OF ICT

Information and Communication Technology (ICT) is a constellation of terms that cover all the technical and digital equipment to process information rapidly. ICT embraces two aspects namely, information technology and communication technology. Information technology incorporates all matters relating to the processing, manipulation, and management of information.

ICT stands for "Information and Communication Technologies." ICT refers to technologies that provide access to information through telecommunications. It is similar to Information Technology (IT), but focuses primarily on communication technologies. This includes the Internet, wireless networks, cell phones, and other communication mediums. (TechTerms, 2010)

1.4 INFORMATION AND COMMUNICATION TECHNOLOGY IN EDUCATION

The recent years have witnessed an enormous interest in how computers and the Internet can be put to the maximum use to improve the efficiency and effectiveness of education at all levels which includes both formal and non-formal settings. But ICTs are more than just these technologies; older technologies such as the telephone, radio and television, although now given less attention, have a longer and richer history as instructional tools. Information and Communication Technology (ICT) has the added advantage of contributing to universal access to education, equity in education, the delivery of quality teaching, enhanced learning potential, professional development of teachers and more efficient education management and administration. ICT can help strengthen democratic education planning and management thus making the process more transparent. It can improve access to learning, improve quality and ensure inclusion in education.

The term "technology", as Ofiesh (1964) observes, implies the application of science to art. When we apply the science of learning and communication to teaching, we evolve a technology, i.e., the technology of instruction. In modern education, we can witness the impact of two forces; one, of physical sciences and electronics and the other, of behavioural sciences, operating on the he uses of teaching machines. Both these forces have contributed to the evolution and growth of educational technology. Fig. 1.1 makes the concept clear. The interaction of physical sciences with education provides us with traditional aids, tools and hardware such as paper, ink, books, radios, lingua-phones, films, etc. and more sophisticated modern hardware like electronic computers, space satellites, language laboratories etc.

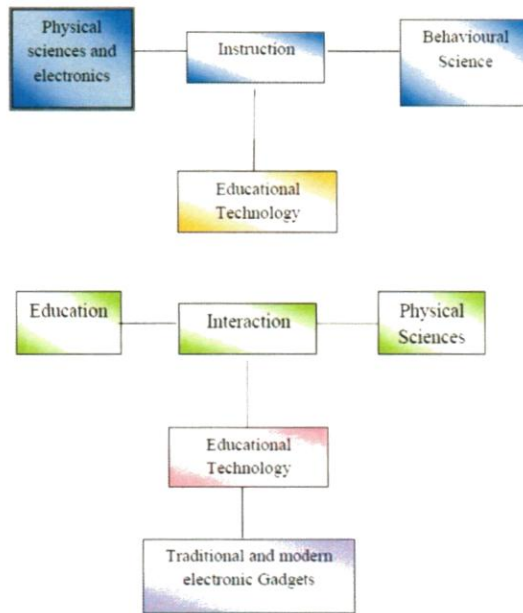


Fig. 1.1 Evolution and growth of educational technology

According to George (2006), advancement in Information and Communication Technology has opened up new vistas of knowledge, resulting modification in modes of teaching: The specific connection between education and technology has been of continual importance, ever since children were required to reproduce their thoughts, ideas and knowledge in some kind of permanent or semi-permanent form. When used appropriately, technology acts as a great catalyst for learning in the classroom. The path from chalk and slate through exercise book and pencil to word processor is not a particularly long one.

However, the point is that some use of technology is invariably required in the execution of learning tasks. Information and communication technology provide better and accurate tools for students to search for solutions than the age-old method of probe and manipulation. One of the greatest advantages due to the usage of modern technology is the ability to receive instruction without the requirement of a teacher. The timing of instruction can be altered and it can be done sometime after the live session. The place of instruction can also be changed according to convenience and done some place without the need for a teacher. The emergence of new technologies like on-line learning have made it possible

to experience place shift teaching and learning with additional facilities like auditory and visual stimuli. This makes the teaching-learning process far more rapid and with a wider range of interaction.

1.4.1 ICT-Based Teaching Methods

Some of the ICT tools used in teaching is shown in Figure 1.2.



Figure 1.2 ICT-Based Teaching Methods

There are many ICT tools that are being used in the field of education. Based on the functions and use of the ICT tools, they are classified as follows:

➤ **Computer Assisted Instruction**

Computers have become common in classrooms in the twenty-first century. Technology is being used to restructure many educational tasks. It is otherwise called as computer-based instruction (CBI) where the computer serves the base for an interactive and personalized or self-learning environment. The teaching material is saved in the computer and the computer takes the role of a teacher. It is a learner-centered mode of instruction wherein the learner can learn at his own pace.

➤ **Instruction through Interactive Whiteboard**

It is interactive, which is clear from the title. Students can make use of the whiteboard in an interactive method. The teacher can operate the board from her table itself. Other applications can also be used in the class in an interesting way.

➤ **Educational games**

Students can use it to refresh their minds at the start of the day or after a day's hard work. Brain teasers are well known among students which is a best example for these games.

➤ **Intranet**

Schools need to create a website so that students can get necessary information regarding educational matters from the website. Students should also be allowed to discuss important issues in the forum.

➤ **E books**

E books help in access to resources outside the library. They serve as a very important source of locating learning material.

➤ **Virtual or online learning**

A virtual learning environment (VLE) is a Web-based platform that is designed for the digital aspects of courses of study, usually arranged within educational institutions. VLEs in general, enable participants to arrange themselves into units, groups and roles. They facilitate activities and interactions within a course structure. They are of great help in the different stages of assessment. They provide details on participation and they are also integrated at some level with other institutional systems.

➤ **Blended learning**

Blended learning is a kind of formal education program. In this learning system, the student learns the content through instruction via digital and online media with some sort of control over time, place, or pace. This can be accomplished while still attending a formal school structure, in which classroom methods are combined with computer mediated activities.

➤ **Open educational resources**

Open educational resources are related to teaching, learning, and research that have a place in the public domain and are freely available to anyone through the internet. They are an important infrastructure for learning. Podcasts, digital libraries, textbooks and games are good examples for these resources.

➤ **Radio-based instruction**

Radio-based instruction in a formal education setup in combination with school based educational resources and a variety of pedagogical practices is a useful method of instruction to enhance student outcomes.

➤ **TV-based Instruction**

Television in the present day has been utilized successfully as a mechanism for reaching children and youth in a number of countries, especially in Latin America and China. The results of such projects have been widely discussed.

➤ **Mobile Internet centers**

These are being used as a way to reach remote areas. A number of educational programs utilizing mobile Internet centers have been launched in the past decade and are continued to being used to the present day.

➤ **Video-Based Instruction**

The instructional methods in science education of the present day should often make use of video in designing teaching and learning materials.

1.4.2 Advantages of The Use of ICT In Education

ICT encompasses all those gadgets that deal with the processing of information for better and effective communication. In education, communication process takes place between teachers, students, management and administrative personnel which requires plenty of data to be stored for retrieval as and when required, to be disseminated or transmitted in the desired format. However, ICT today is mostly focused on the use of Computer technology for processing the data. In this context, advantages of ICT in education can be listed down as

Quick access to information: Information can be accessed in seconds by connecting to the internet and surfing through Web pages.

Easy availability of updated data: Sitting at home or at any comfortable place the desired information can be accessed easily. This helps the students to learn the updated content. Teachers too can keep themselves abreast of the latest teaching learning strategies and related technologies.

Connecting Geographically dispersed regions: With the advancement of ICT, education does not remain restricted within four walls of the

educational institutions. Students from different parts of the world can learn together by using online, offline resources. This would result in the enriching learning experience. Such collaborative learning can result in developing Divergent thinking ability in students, Global perspectives, Respect for varied nature of human life and acculturation and Facilitation of learning. Situational learning, programmed learning, many Online learning courses are some of the example of self-learning strategies that are being utilized with the help of ICT.

Catering to the Individual differences: ICT can contribute in catering to individual needs of the students as per their capabilities and interest. Crowded class rooms have always been a challenge for the teacher to consider the needs of every student in the class.

Wider range of communication media: With the advent of ICT, different means of communication are being introduced in the teaching learning process. Offline learning, on line learning, blended learning is some of the resources that can be used in educational institutions. Collaborative learning, individualized learning strategies can enhance the quality of group as well as individual learning. With the real society. This can ensure the applicability of knowledge.

Wider learning opportunities for pupils: Application of latest ICT in education has provided many options to the learners to opt for the course of their choices. Many Online courses are available for them to select any as per their aptitude and interest. Students can evaluate their own progress through different quizzes, ready to use Online tests. This can ensure fulfilment of the employment required in the job market thus minimizing the problem of unemployment. It can also provide more efficient and effective citizens to the society as per the changing needs.

1.4.2.1 ICT can be used for the following purposes:

1. To broadcast material, online facility or CD-ROM can be used as sources of information in different subjects;
2. To facilitate communication for pupils with special needs;
3. To use electronic toys to develop spatial awareness and psychomotor control;

4. To use the online resource like, email, Chat, discussion forum to support collaborative writing and sharing of information.
5. To facilitate video-conferencing or other form of Tele conferencing to involve wide range of students from distant Geographic areas.
6. For Blended learning by combining conventional classroom learning with E-learning learning systems
7. To process administrative and assessment data.
8. To exchange and share ideas -among teachers for the professional growth.
9. To carry out internet-based research to enhance, educational process.

1.4.3 Theories Supporting Use of Information and Communication Technology in Education

Several theories have been the basis for investigating the effect of information and communication technology in the teaching and learning process, most of the techniques applied to the design to one of these theories.

i. Behaviourism

Of the theories supporting computer use in education, behaviourism has historically had the greatest influence. Behaviourism was used as the basis for designing early CBI and was also the impetus behind many related teaching strategies, such as the use of teaching machines and programmed texts, Thorndike's connectionism, Pavlov's classical conditioning, and Skinner's operant conditioning steps that guide the developer of instruction including CBI.

ii. Cognitive Theory

Educational psychologists and learning theorists are moving away from the behaviourist approach and have advocated a closer look at the internal processes that occur in learners during instruction. Behavioural psychologists generally ignore the cognitive changes that mentally occur during teaching and maintain that is impossible to design instruction on changes in a learner's brain because these changes are not observable, not measurable, and are impossible to predict, On the other hand, cognitive psychologists, a common name for advocates of cognitive theory, attribute

a greater degree of autonomy and initiative to the learner (Burner, 1960). Hypermedia, a computer-based instruction approach that is nonlinear and consequential, is a powerful tool being used by cognitive scientists to examine how students interact with instruction during the process of learning. The way students use hypermedia, gives insights into the structure of thinking and how learning occurs.

iii. Constructivism and Situated Cognition

Recently, constructivism and situated cognition have captured the attention of teachers and computer education specialists. Most consider these two models directly related to cognitive theory, but they have interesting implications for the design and use of computer-based instruction. The use of multimedia that includes still visuals, graphics, motion segments, visual mnemonics, and sound is important. Computer based instruction should allow students to receive stimuli from a variety of sources and in many different ways. Currently, there is more theorizing about constructivism and situated cognition by computer educators than actual application. This almost certainly, will change as design models become more sophisticated and as powerful multimedia computers become more widely available.

1.5 NEED AND IMPORTANCE OF ICT INTEGRATION

There is no doubt that the ICT has made human life easier than ever. The use of ICT in education gives value to teaching and learning, by enhancing the effectiveness of learning. We need to integrate ICT in schools and in our daily lives. As we know that the education is a Lifelong process therefore anytime and anywhere, we need ICT. We all need to increase access and bring down the cost of education to overcome the challenges of illiteracy and to overcome this challenge, ICT is the most important instrument. ICT is requirement of the school to enhance the student teacher's interaction process. It will help to make students more self-sufficient and with the computer administered programs incorporated into the education such as online quizzes or even class discussions. ICT has a major impact on teaching, learning, research and management. It covers

all the major and minor aspects of education leading to the development and formation of knowledge. The presence of ICT in education permits for the new methods of learning for students and teachers. This uses the technology in most innovative form in which students and teachers get opportunity to experience the method they need to follow during their learning and teaching. This will enhance students' capabilities and potential for their growth, development and understanding of the concept during learning process.

Quality education has become a huge challenge in the field of education. The kind education delivered to the students is not sufficient and adequate for the quality education as old methods and techniques are being used by the teachers for teaching. ICT Integration is the key to improve the challenges of quality of education in the classroom and teaching- learning process. It provides all the necessary information, knowledge and opens a wide range of educational opportunities for teaching as well as for learning. The availability of ICT tools provides a grand opportunity to assist teachers in teaching well and in improving the learning experiences of the students. It allows the teachers to conduct more activities and projects that include expansion, exploration, investigation and modelling and as a result, ICT may enhance student's development of essential competencies, better attitudes toward learning and stimulate a wider vision of the Education. In education, ICT tools are used to create, communicate, store and manage information.

ICT has become essential and integral part of education and teaching learning processes. Through such technique's chalkboard are being replaced by digital whiteboard, using students own smartphones or other devices for learning during a class. When the teachers are digitally trained and literate to use ICT, these techniques can lead to higher order thinking skills, provide creative and individualized weapon for students to express their understanding and students will be better prepared to deal ongoing technological changes in the society.

1.6 ROLE OF ICT IN SCIENCE

Science education has its roots in the recognition by Victorian society that it had changed – changed from an agrarian society to one dominated by and reliant on scientific and technological expertise. In 1851, the great exhibition brought the realization that this new society could only be sustained by ensuring that a body of people were educated in science and technology. However, there are four common rationales for science education.

- **The Utilitarian:** the view that knowledge of science is practically useful to everyone

- **The Economic:** the view that we must ensure an adequate supply of scientifically trained individual to sustain and develop on advance industrial society.

- **The Cultural Argument:** the view that science and technology are one, if not the greatest, achievement of contemporary society and that a knowledge thereof is an essential prerequisite for the educated individual.

- **The Democratic:** the argument that many of the political and dilemmas posed by contemporary society are of scientific nature. Participating in the debate surrounding their resolution requires knowledge of some aspects of science and technology. Hence, educating the populace in science and technology is an essential requirement to sustain a healthy democratic society.

1.7 ROLE OF SCIENCE AT SECONDARY LEVEL

The Secondary Education which serves as a bridge between primary and higher education is expected to prepare young persons between the age group 14-18 in the world of work and entry into higher education. Secondary Education is strongest link between primary education and college education. After secondary education some children will enter life, few will go to colleges.

The general aim of science education is to help develop well-defined abilities in cognitive and affective domains, besides enhancing psychomotor skills. It helps to foster an uninhibited spirit of inquiry, characterized by creative, innovative and objective approaches. Educational programmes are designed to help unravel the mysteries of the inter-relationship between science and day-to-day life, health, agriculture, industry, and indeed, the individual and the universe.

Scientific wisdom, knowledge and skills are armaments that in still confidence and inspire the individuals to challenge existing beliefs, prejudices and practices. They work as a liberating force and serve as a reliable tool in one's search for truth, harmony and order in different aspects of life. The objectives of teaching science at the primary stage are: To learn about flora and fauna, natural resources, the sources of energy and so on, through interaction with the immediate environment; To sharpen observation, inculcate the spirit of exploration; and to develop concern, sensitivity and the ability necessary for the preservation and protection of physical and natural resources. At the upper primary stage, the student is expected to consolidate and strengthen the abilities acquired during the primary stage. The objective is to develop an understanding of the nature of scientific knowledge; certain physical, chemical and biological facts and their relationship to their manifestation in nature and in daily life. School education comes to a close with the secondary stage comprising Classes IX and X. The aim of teaching science at this stage is primarily directed towards the learning of key concepts that span all disciplines of science. At the secondary stage, the pupil should be enabled to develop a more profound understanding of the basic nature, structure, principles, processes and methodology of science, with special reference to its relationship with agriculture, industry and contemporary technology. The teaching of science at this stage should help pupils develop insights in health and environment. Greater emphasis needs to be placed on precision and accuracy while handling laboratory equipment and while engaged in procedures such as quantitative measurement, collection, presentation, analysis of data, and drawing inferences.

1.8 RECOMMENDATIONS OF COMMITTEE AND COMMISSIONS

✦ Secondary education commission (1952-53)

Thoroughly examined the prevailing secondary education system and suggestions for reform. According to the recommendation of the Mudaliar commission the study of some compulsory subject was made necessary for the students. At the middle- school stage the curriculum should include languages, general science etc.

✦ The Education Commission (1964-66)

Major recommendations of the Commission included emphasis on Science and Mathematics, introduction of work experience as an integral part of school curriculum, introduction of common school system, educational structure with 12 years of schooling, free text-books at primary stage, provision of mid-day-meals, promotion of education of handicapped and special measures for ensuring equality of educational opportunities (regional, tribal and gender imbalances to be addressed), establishment of school complexes, neighbourhood school, three language formula etc. (two of its major recommendations for democratising school education have been discussed in detail later in this Unit). The Commission emphasized the need of alternative channels of education to eradicate illiteracy and provide adult education. By laying more focus on Mathematics and Science rather than Social Science or Arts, the Commission reinforced the notion that India's development needs are better met by scientists than social scientists.

✦ National Policy on Education 1968

The Policy also emphasized enrichment of curricula and improvement of textbooks and teaching methods. It advocated the strengthening of Science education at the school level and stepping up of scholarship schemes for backward sections of the society. The key legacies of the 1986 policy were the promotion of privatisation and the continued emphasis on secularism and Science.

✦ **National Policy on Education 1986**

The NPE, 1986 also advocated developing consciousness about environment. The Policy had some important features like common school curriculum, minimum levels of learning, value education, role of media and education technology, work experience, emphasis on teaching of Mathematics and Science, Sports and Physical Education and education for international understanding.

✦ **National Curriculum Framework 2005**

Science teaching should engage the learners in acquiring methods and processes that will nurture their curiosity and creativity, particularly in relation to the environment. Awareness of environmental concerns must permeate the entire school curriculum.

Thus, different committees and Commissions from time-to-time emphasis upon the fact that science is the need of school curriculum. Science must adopt the method and techniques that promote creativity, aesthetics and critical perspectives and enable children to draw relationships between the past and present to understand the changes taking place in Society. There is a need to establish connection between classroom activities and social environment and that can be only possible with the integration of ICT in school curriculum.

There are many committees and commissions except the above that have given importance to the use of ICT integrated teaching in classroom learning process as follows. Chattopadhaya commission (1983-85) also gave importance to ICT as it that the teacher education curriculum should have scope for the teachers to use ICT for their learning as well as teaching. Based on the recommendation of The Acharya Ramamurti committee (1990) it is clearly understood that the teacher education curriculum should include the use of ICT for handling differently abled students and for teaching learning process. The Yashpal committee (1993) recommend that using ICT is a need for the school at present times, teaching education programmes should be rigorous to provide training for the student teachers to use ICT. In 1998, UNESCO world education report

refers that the quality of professional development of teacher education depends on the extends of ICT integration in teacher education programmed.

1.9 NEED AND JUSTIFICATION OF THE STUDY

The present structure of the classroom is changing. There is a technical issue and gap between the progress of the society and the instructional activities in the classroom. We can see in our daily life that on the one hand ICT has revolutionised our society and on the other hand the teaching learning activities at the school have remained so far away from the technology. Brush, Glazewski and Hew (2008) said that ICT is used as an instrument for students to discover learning topics, easy understanding of concept and provide solutions to the problems in the learning process. Serhen(2009) suggest that ICT will foster autonomy by allowing educators to create their own learning and materials with the help of ICT and the students Will have more opportunity to build new knowledge. Koc (2005) suggests that using ICT enables the students to communicate, share and work collaboratively. They may have the opportunity to analyse problems and explore ideas as well as develop concepts. Krishnaveni and Meenakumari (2010) revealed that a clear integration of ICT for managerial or information-based administration in Higher education institutions. Kamal Deb (2016) Found that knowledge of ICT is very essential for both teachers as well as for students. This will help the teachers to integrate the ICT with classroom learning and students will also be more active and curious to know about the subject matter.

In order to make the process of learning participatory in the classroom, there is a need to shift from mere imparting of information to debate and discussion. In the classroom the knowledge is imparted by the teachers in an old way which is most of the time boring and did not gain the attention and interest of students but the present 21st century is student centric education.

So, the present study has a great need and significance for the development of students with the help of ICT integration in the classroom. It helps both

the teacher and student in preparation for teaching and learning. It enables to apply different strategies and tools for the development of teaching learning outcomes.

This study will enable us to know how integration of ICT helps to enhance the learning outcomes of students in biological science classroom. It will also help to know about the effectiveness of teaching with the integration of ICT in achieving students learning competencies and capabilities. To the researcher's knowledge there are limited number of studies focused on effectiveness of ICT integrated teaching in achieving learning outcomes at secondary level and if done not in investigator's area. So, the investigator decided to undertake the study.

1.10 STATEMENT OF THE PROBLEM

Effectiveness of ICT integrated teaching in achieving learning outcomes in biological science of grade 9th students.

1.11 OBJECTIVES OF THE STUDY

The present study has the following objectives

1. To know the effect of ICT integrated and traditional teaching method in achieving learning outcomes of grade 9th students
2. To compare the effectiveness of ICT integrated and traditional teaching method in achieving learning outcomes in Boys of grade 9th students
3. To compare the effectiveness of ICT integrated and traditional teaching method in achieving learning outcomes in Girls of grade 9th students
4. To compare the effectiveness of ICT integrated teaching in achieving learning outcomes in Boys and Girls of grade 9th students

1.12 HYPOTHESIS OF THE STUDY

1. There will be no significant difference in the learning outcomes of students taught through ICT integration and traditional method.
2. There will be no significant difference in the learning outcomes between Boys taught through ICT integration and traditional method.
3. There will be no significant difference in the learning outcomes between Girls taught through ICT integration and traditional method.
4. There will be no significant difference in the learning outcomes between Boys and Girls taught through ICT integration strategy.

1.13 OPERATIONAL DEFINITIONS OF THE TERMS USED

EFFECTIVENESS: The ability to be successful and produce the intended results.

ICT: Refers for the technologies that provides access to information through telecommunications primarily focus on communication technologies.

LEARNING OUTCOMES: They are the statements that describes the knowledge or skills students should acquire by the end of a particular course or program.

SECONDARY LEVEL: Students belonging to 14 years to 16 years generally of class 9th and 10th.

1.14 SCOPE OF THE STUDY

ICT is a powerful tool in this 21st Era for training and developing the abilities as well as bringing up the human talents in a suitable mechanism to create educational opportunities. Thus, study will helpful to understand the effectiveness of ICT in students learning outcomes in biological science at grade 9th level. ICT will enable a wide range of experience and knowledge so that students can relate biological science to their own and other world of experience.

1.15 DELIMITATIONS OF THE STUDY

This study will be conducted only in a limited sample. The study will be undertaken only in one school of Deogarh district of Odisha. Medium of instruction will be Odia & English.

1.16 CONCLUSION

In this chapter the investigator has given details of the importance of ICT integrated teaching in developing learning outcomes in biological science, recommendation of various committees and Commissions, statement of the problems, operational definitions, objectives of the study and limitations of the study.