Chapter -III

REVIEW OF LITERATURE

3.0 Introduction

Information Technology is the great enabler and it has assumed a directive role in the field of education. It provides, for those who have access to it, an extension of their powers of perception, comprehension, analysis, thought, concentration, and articulation through a range of activities that include: writing, visual images, Mathematics, Music, physical movement, sensing the environment, simulation, and communication Carpenter (1989); Rawlins (1992) relates the changes brought about by the Internet and information technology to what happened as a result of the invention of the printing press. He sees the data highways connecting schools, colleges, universities, researchers, and industry, as helping to start a society-wide revolution similar to what resulted from the invention of the printing press. Noted academic and Management guru Drucker (1999) makes some comparisons between the industrial revolution and the changes that are currently happening because of the introduction of ICT. The real changes, he says, will come as a result of changes to our "mental geography" as we begin to realize the full potential of the new technology.

Review of related literature is an important aspect of every study. It serves multiple purposes and is essential for a well-designed research study. It helps the investigator to acquaint with current knowledge in the area in which he is going to conduct the research. It is a valuable guide in defining the problem, recognizing its scope and significance, suggesting relevant hypotheses, gathering devices, making appropriate study design and understanding about sources of data.

The present study is an attempt to find out the awareness about Information Technology among school students, librarian and teachers. The study aims to discuss trends, identify gaps, and visualize future research needs in use of IT among school students for academic information. The researcher has reviewed literature related to Information Technology, IT Skills, IT tools used in classroom, Social Network use. IT use for academic information. E-resources, etc.

The investigator has carried out extensive literature survey on the topic by scanning abstracting and full text journals and databases like Library and Information Science
Abstract (LISA), Library, Information Science & Technology Abstracts (LISTA), Information Science Abstracts (ISA), Electronic Management Research Library Database (EMERALD), Conference proceedings, and Internet from 1990 to till date. There were many studies related to the different issues concerning use of information Technology by school Student. This concept appeared in the literature since 1980s onwards, Literature published in related topic was scanned and selected reviews of articles are presented in following.

3.1 Main Definitions

Pelgrum and Law (2003) state that near the end of the 1980s, the term ‘computers’ was replaced by ‘IT’ (Information Technology) signifying a shift of focus from computing technology to the capacity to store and retrieve information. This was followed by the introduction of the term ‘ICT’ (Information and Communication Technology) around 1992, when e-mail started to become available to the general public.

According to a United Nations report (1999) ICTs cover Internet service provision, telecommunications equipment and services, information technology equipment and services, media and broadcasting, libraries and documentation centres, commercial information providers, network-based information services, and other related information and communication activities.

According to Adeya (2002) definition, ICTs are embedded in networks and services that affect the local and global accumulation and flows of public and private knowledge and are electronic means of capturing, processing, storing and disseminating information.

3.2 Key Terms

3.2.1 Information technology skills in Students
3.2.2 Information Technology for school librarians, and teachers
3.2.3 Education software, tools, and techniques
3.2.4 Internet services for academic use
3.2.5 Information Technology benefits and its role in academics
3.2.6 Technology for out of school learning
3.2.7 Social networking
3.2.8 IT learning environment
3.2.9 Issues Concerning IT usage in academics

3.2.1 Information Technology Skills in Students

Hakkarainen et al. (2000) indicated that ICT skills is the ability to realize, operate, and utilize the ICT facilities. In this context, the term “skills” will refer to the knowledge and skill of the students to use the ICT services. Skills of using ICT is essential in our developing, knowledge society. It contains the ability to solve progressively complex problems in a variety of knowledge-rich fields, but it may help promote educational change only if students have an access to the new technology and it is intensively used as a tool for learning. Rae (2005) suggested that students should have to sufficient skills in using and work effectively with the new technology.

Hawkridge et al. (1990) suggested that careful consideration should be paid to how to incorporate computers into instruction and learning, in parliamentary law to equip students with the technical skills in an ICT empowered world, McMahon (2009) study indicated that there were statistically significant correlations between studying with ICT and the learning of vital skills. Students higher critical thinking skills can be nurtured by higher exposure to ICT. Bernauer (1996) reported on students developing their own hypermedia software with the introduction of computers at his school. Williams (1999) found that sixth graders who played in a hypermedia supported context, were able to resolve problems more effectively than those who didn’t. Solis (1997) reports on students using computers to collaboratively construct web-based virtual environments.

The White Paper on e-Education DoE (2004) in South Africa claims: ICTs can advance high order thinking skills such as comprehension, logical thinking, problem-solving and creative thinking. Tierney (1996) found that over time, students who use computers begin to research and convey ideas in pretty sophisticated ways using graphics and other non-linear forms. Chessler, Rockman, and Walker (1998) found that teachers reported a higher quality of work from pupils who used laptops than those who didn’t.
Daley (1999) specified reading levels increased for sixth and ninth grade students reflected in results of Florida based Orange County Literacy Project. As high as two grade levels each year was made by the students in reading fluency and comprehension skills. Similar study of Iddings Iddings, Ortmann, Pride, and Pride (1999) indicated reading comprehension and vocabulary development achievement levels improved through technology with multiple instructional strategies.

Rae (2005) opined that when school students go into the higher education, the ICT skills that have become gradually important in the fulfillment of a university education will affect both how students manipulate these e-learning resources and how they are used for learning.

As per United Nations (2003) Internet use among 12-19 year olds students in the US mostly involves e-mailing and instant messaging among friends, next most common game played online, downloading music and retrieving courses material, and to involve in chatting and to follow sports and world events. USNC et al. (2000) study illustrated that the students in adolescent age group know how to use and utilize the ICT facilities, since they get easy access to achieve their information retrieving needs.

3.2.2 Information Technology for School Librarians & Teachers

McCannon and Crews (2000) reported as computer use continues to increase in society, instructor must also train for the employment of computers within the schools since they are the key to the effective development of IT resources in the educational arrangement. This affects all stages of instruction, including primary schools. Downs, Clark, and Bennett (1995) stated that the role of the elementary school teacher has grown from that of a presenter of information to that of a facilitator of student scholarship through new technologies that already exist to help teachers complete that evolution.

Harrison and Rainer (1992) carried out series of studies to determine teacher attitudes toward computer use emphasizing that attitudes are key factors in whether teachers accept computer as an instructional tool in their teaching practices. Albirini (2006); Baylor and Ritchie (2002) conducted review which suggests that the success of technology use in the educational settings largely depends on teachers attitudes toward technology use. Kluever, Lam, Hoffman, Green, and Swearinges (1994) highlight the teachers’ attitudes are seen as a major predictor of the role of young
engineering sciences in the educational settings. Thus, it can be resolved that the attitude further related to the usage frequency of technology and usage amount of the technology.

**Albirini (2004)** conducted a survey to look into the attitudes of teachers in Syrian high schools toward technology in teaching, through both quantitative and qualitative methods, where he found that teachers had positive attitudes toward technology use in training.

**Law, Yuen, Ki, Li, Lee, and Chow (2000); Schofield and Davidson (2002)** observed many teachers who saw ICT as a resource, to help them teach the standard curriculum. **Means, Olsen, and Ruskus (1995)** stated that teachers are using ICT within the context of complex tasks, conducted within a multidisciplinary setting and extended blocks of time, and with performance-based assessment.

**Asan (2003)** suggested that the process of designing for technology use should consider the teacher’s opinions and knowledge around technology. This bears on the conclusions they make about strategies, procedures and materials for teaching.

**Kulahci and Gurol (1991)** compared teachers in a computer course with a control group of teachers who had not and found that teachers who had asked the computer course had lower anxiety scores and higher self-perceived ability than those who had not.

**Billig, Gibson Sherry, and Tavalin, (2000)** also note that as teachers pass through several levels of adoption, they will need different forms of musical supplement and professional evolution. They mention that at this stage, most attention has been on the earlier phases of the acceptance process where providing information, is enough, but later more collegial sharing is involved as teachers move to incorporating technology into the curriculum.

**Cagiltay, Cakiroglu, Cagilty, and Cakiroglu (2001)** studied how the teachers in Turkey use computers in education and their perception about it. Their results showed that most of the subjects took the opinion that the utilization of computer technology in schools is beneficial for the teaching-learning process.

**Follansbee, Gilsdorf, Stahl, Dunfey, Cohen, Pisha, and Hughes (1996)** investigation found that teachers with online access deal with a broader scope of
information and discover more around their subjects, acquire more information from their pupils and hold more positive interactions with parents than those without online access.

Watts-Taffe, Gwinn, Johnson, and Horn (2003) found that when teachers are encouraged, provided necessary equipment and technology support, developing an ICT class will be easier for them.

Like the learning activities, some teaching practices and strategies have also undergone changes with the utilisation of computers and some fields have focused on this. Findings include:

- Teachers re-examining their practices and their role as a result of the introduction of computers in schools (Sandholtz, 1997)
- Teachers who used the internet were more likely to describe changes in teaching practices than non-users (Becker, 1997)
- Teachers use internet material to add-on or replace traditional textbooks (Wiesenmayer and Koul, 1998)
- Teachers at high access schools tend to be more constructivist in their approach to teaching and learning and those in low access schools who tended to be more teacher directed (Heflich, 1996)

Tezci (2011) identified factors determining the usage of ICT can be separated into external factors and inner genes. The two types of factors are related to each other and to ICT usage level. Sang, Valcke, Braak, Tondeur, and Zhu (2011) noted that several internal factors also influence technology integration outcomes. Al-Ruz and Khasawneh (2011) Lin, Wang, and Lin (2012) discussed Internal factors related to teachers that included: understanding of ICT use; beliefs, which may conflict with the application of ICT; attitudes toward technology integration; perceptions, including intention or motivation to use ICT; self-confidence and knowledge; technology skills; readiness to use ICT; and technology self-efficacy. Chen (2008) found two common events connected with internal components. First, teachers may carry out policies based on limited or improper theoretical interpretations and comprehension of ICT usage. Second, instructors may be under pressure to compensate all content, and be unwilling or hesitant to let students spend more time exploring content on their own
with technology due to their other conflicting feelings. These issues mean that teacher beliefs may not vibrate in their patterns. A school culture emphasizing competition and a high stakes assessment system can discourage teachers from integrating technology into their classrooms. Therefore, teacher beliefs influence ICT use in the schoolroom.

Foa, Schwab, and Johnson (1996) noticed that some changes in teachers during early phases of adoption of technology to complete projects that have been performed in the past. For instance, students might be required to collect material and design a Web page. They have found that, the nature of the classroom changes and students have more involvement in curriculum and assessment decisions.

A routine of surveys and reports have concentrated on subjects relating to teachers professional development and how best to fix them in incorporating the use of computers in the schoolroom, proposals are as below:

- Start teachers to produce multimedia software as part of their professional development (Backer and Saltmarch, 1999)

- Get collaborative teams to do task based activities which focus on education when using multimedia and the WWW in teaching (Henderson and Brady, 1999)

- Provide examples and models of technology use in in-service workshops (Hughes, 1998)

- Use internet technologies for teacher professional growth and collaboration (Kaye, 1996)

Zainudin and Ismail (2010) reported that school libraries are visited by students to study, do homework, for information search, and also for relaxation. School library prepare students with information literacy skills and aid them attain life-long learning habits, making them educated and responsible citizens of the knowledge society. Williams, Coles, and Wavell (2002) it is manifested that if the school library provide information access to base on students need, and provide them with quality and variety of resources, including ICT facility, they can be significant influences in their learning.
CILIP (2001) opined project workplace, individual work, group inquiry, reading and the teaching of ICT, amongst other things, can all take place within the school library, and in providing this flexible place for learning, and by standing and giving access to a wide scope of information sources the school library can motivate students and energize learning by offering the means to freely pursue subjects which fully engage them. IFLA/UNESCO (2002) asserted that school library can be fully used, or worked as a channel to promote ICT to the students, since it is a home where pupils go for fulfilling their information demands.

Rahim (1990) implied that school libraries work as information centers for the pupils and teachers in school. The school library is most benefited by the students as the library’s main users, since all of the information resources in one particular school are located in its school library. Also he opined, school libraries are centers that form the solicitation of both printed and non-published materials.

Herselman (2003) noted this 90’s definition of school libraries that, these libraries can eventually evolve to include data processors to help train the students in computer literacy.

Ham and Wenmoth (1998) observed in the New Zealand initiatives, that the schools ICT infrastructures enable libraries to connect learners with information and with each other within the virtual learning community. So, it indicates that the school library can be utilized as a catalyst for uniting the students with the ICT facilities.

Merriam (2012) stated the first key factor in the utilization of ICT among students is the accessibility of the ICT facilities.

United Nations (2003) stated that framework, the term “availability” will cover on the handiness or readiness of the ICT facilities to be employed in the school libraries. United Nations points out that many young people, especially in producing nations, are debarred from the information revolution, leaving them on the wrong side of the digital divide.

Fatimah (2002) said that in Malaysian environment, a school library generally consists of a minimum of three main rooms which is, reading, audio-visual and teaching and reading material, and some schools, especially those with a heavy population of students may broaden the school library network to more than these
three basic rooms by including other rooms like self-access centers, skill labs, computer laboratories and even classrooms as well. Beginning 1989 onwards, all newly built schools are moved over the whole level of the building which is equivalent to four classroom space for a library.

According to Library and Information Services Council Northern Ireland (2012) students without access to a computer at home can be disadvantaged in gaining and practicing ICT skills, and the provision of suitable ICT resources in a school library which is open and freely accessible throughout the daytime, can go a long way towards overcoming this disadvantage. Yushiana and Shahar (2003) mentioned that in a typical school environment, the library could play the role as a gateway to the information world. The advances in ICT, coupled with the melding of computers, telecoms, and broadcasting technologies, have made for a new dimension in the functions of school libraries as they would become “knowledge hub” for the school, connecting the school community to knowledge networks within the country as well as global.

3.2.3 Educational Software, Tools & Techniques

Leidner and Jarvenpaa (1995) opined that there is a wealth of research on the positive effects of technology in the classroom. Written reports on the insertion of video clips into classroom instruction show that video clips are motivating for students. Classrooms with both instructor workstations and videodisks improve student attitudes about the teacher and the class. Various establishments have described positive effects from the use of electronic mail. In 1994, course media elements and slide shows were comprised into a system of web pages that allowed students a nonlinear access the class material. Carver and Howard (1995) defined learning style assessment was added to help students approach the monumental quantity of material contained in the WWW course resource. A hypertext reading file gave students a new manner of questing after a topic through the reading assignments.

A study by Paul, VanderZee, Rue and Swanson (1996) looked into the effects of the Accelerated Reader (AR) technology-based literacy program for attendance and standardized examination scores in primary, middle, and high schools. A comparative analysis of data revealed statistically significant evidence that, on almost every subject test (including reading, writing, mathematics, scientific discipline, and social
the majority of schools that owned AR performed better than socio-economically comparable non-AR schools. Increases in academic performance increased with the distance of time schools owned AR. Findings indicated that AR has a positive result on student academic performance, especially for social-economically deprived kids in urban arenas.

Brown (2000) explored the utilizing a Computer Aided Instruction (CAI) program called FUNdamentally MATH that led to higher mathematics achievement for students in two primary and one middle school in a large urban North Carolina school district. In another study Judson and Sawada (2000) involving eighth grade students, math achievement increased through the integration of mathematics and science using inquiry-based data-generation technology (graphing calculators and probes).

Gee (2012) suggests gamification as a teaching tool, because games have distinct features that books fail to make available for digital natives. For example, gamification offers an interactive environment essential skills of twenty first century like digital literacy, critical thinking, creativity, face challenges, problem solving and collaboration. Sinha (2012) opined that the Khan Academy is an example of the use of gamification techniques in online education. Arizona State University (2015) added five interactive story based games to its Environmental science syllabus where, students are positioned in leadership roles and given the task of resolving complex sustainability and environmental issues.

Conyers, Kappel, and Rooney (1999) found that writing scores increased due to keyboard composition activities and the spellchecking, cutting, and pasting tools that are a function of the software. Reading test scores improved due to technology-assisted diagnosis and instruction provided to students. Science and math levels improved with the exercise of a videodisc curriculum (“Windows on Science and Math”).

Findings gathered from 26 studies by Roschelle, Penuel, and Abrahamson (2004) on the implementation of K–12 classroom networks with handheld devices tied to the teacher’s laptop computer and incorporated with a shared screen showed (a) greater student engagement, (b) increased student understanding of complex subject matter, and (c) increased student involvement and enjoyment.
Naqvi, Talati, Ahmed, and Siddiqui (2002) surveyed computer use amongst undergraduate medical students at the AgaKhan University, Karachi. They established that pupils were using computers more for word processing, information data analysis, presentations and e-mails. Mizrachi and Shoham (2004) studied Israeli B. Ed students’ computer attitudes. The most common computer use was word processing, followed by games, spreadsheet, Internet and programming. Kozma (2003) suggested that public initiatives have intended to propagate the usage of computer technology in schools by implementing computer laboratories and embedding actual classrooms with digital technologies to assist and support current classroom learning.

3.2.4 Internet Services for Academic Use

Egnatoff (1999) documents the ascent of a new generation familiar with new media technology centered around the Internet. He gives instances of how the “digital natives” are acting, passing along, playing, shopping, and learning differently than their parents acted. He presents material to abide his view that the purpose of this new technology and the rise of the Net generation is already bringing some important changes in society. He thinks this Net generation will automatically require that information and communication technology which further will be utilized for educational purposes.

Wiesenmayer and Koul (1998) reported on how the net was used in hands-on, project- based activities, including collaboration both inside and outside the classroom. Follansbee, Gilsdorf, Stahl, Dunfey, Cohen, Pisha, and Hughes (1996) found that students with online access produced better projects in terms of introduction, integration of different perspectives and presentation of a full image. He also found those students with computers and online access tended to accumulate, organise and present data in multimedia formats for tasks that related to a project- based unit of work. Kaye (1996) investigated that students in a networked learning environment are able to do discovery-based, student centered learning through a range of personalized and cooperative activities.

Richards (1996) reported that comparison of perceptions of instructors and pupils showed that just 58% of teachers viewed the internet as a useful teaching and reading tool as opposed to 92% of students.
Lau and Au (2002) asked tertiary students in Hong Kong used home computer for doing homework (89%). The other major purposes for using the computer at home were mostly Internet based activities like “using e-mail/ newsgroup/ sending e-cards” (83%), “surfing World-Wide Web” (79.4%), “typing/word processing” (77%) and “using ICQ/Chat room” (66.5%), downloading software/music/photos (50%). Less than 10% of students used the Internet for shopping and purchasing.

Mattheos, Nattestad, Schittek, and Attström (2002) survey results indicate that 60% of pupils use computers for their education, while 72% have access to the Internet. Students in Northern and Western Europe seem to rely mostly on university facilities to access the Internet. The same, however, is not true for students in Greece and Spain, who appear to depend on home computers.

Mahmood (2009) studied 548 students of health schools in France were familiar with ICT in health education, 72.3% had a personal computer, 91.6% used the Internet, and 78.8% had an e-mail id.

Ghabili and Alizadeh (2008) observed that the most common usage of computers by students involved connecting to the Internet (80%). Nearly 35% and 5% shown that they connected to the Internet in order to check mails and read e-newspapers, respectively, and 32% mentioned the Internet as a resource for searching for medical articles. Amongst, nearly 40% visited medical sites for surfing the web.

Kir, Ogur, Kilic, Tekbas, and Hasde (2004) conducted students’ use of computer and Internet at a Turkish military medical school. The motives for students to use computers included hooking up to the Internet (91.9%), listening to music (70.5%) and watching videos (69.6%). The most common use of the Internet was e-mail communication (81.6%).

3.2.5 IT Benefits and its Role in Academics

Jhurree (2005) says substantial resources have been put to justify the place of technology in training, and many research surveys have uncovered the benefits and improvements that can be achieved by students, instructors and administrators. While not all of the existing surveys can be mentioned here, the following writers have frequently been noted:
Start with, **Hepp, Hinostroza, Laval, and Rehbein (2004)** state that the roles ICTs play in the educational system can be pedagogical, cultural, social, professional and administrative:

- **ICTs as Pedagogical Tool** offers a new mode that can improve teaching and learning practices like task-based, collective, and self-paced learning.

- **ICTs as Social, Cultural, and Professional Roles** are indicative via Internet and CD-based content for the entire educational community: students, teachers, parents and decision-makers.

- **ICTs make Administrative roles** at school less laborious, for instance by making more effectively integrated with the official information flow between students, curricula, teachers, budgets and actions through the educational system information pipelines.

**Harrison, Lunzer, Tymms, Fitz-Gibbon, and Restorick (2004)** in England proposed statistically significant findings that positively associate higher levels of technology usage and school achievement at different key stages in schools.

**Fouts (2000)** found in a reexamination of various studies that achievement increased when computer use was combined with traditional teaching.

**Richards (1996)** who surveyed teachers found that they reported on advances in their students' reading, writing and team skills as a consequence of applying computers.

**Software Publishers Association (1998)** concluded based on 219 research evaluations that a quantifiable increase in student achievement could be achieved when use technology as a determining instrument. As **Jhurree (2005); Papert (1998)** claimed some people claim that engineering will shift the educational landscape forever and in ways that will make a spectacular growth in the performance of learners. **Hepp et al, (2004); Wagner and Kozma (2005); Commission of the European Communities (2001); UNESCO (2003); Pelgrum & Law (2003)** analyzed that ICTs, if appropriately integrated in education, it accepts the potential to improve the instruction and learning process.

**Greenfield, Camaioni, Ercolani, Weiss, Lauber, and Perucchini (1994); Subrahmanym and Greenfield (1994); Weikart (1995); Healy (1999)** says
computer use may also promote reasoning development in both kids and adults, specifically in the field of visual intelligence, where certain computer activities—predominantly games—may raise the power to monitor several visual stimuli at once, to read diagrams, recognize icons, and visualize spatial relationships.

Schofield (1997) findings suggested that computer usage may have a positive result on student motivation at the primary and secondary levels and, depending on how computers are employed, has the potential to better academic performance. Niemiec and Walberg (1992); Bangert-Drowns (1993); Christmann, Badgett, and Lucking (1997); Wegerif (2004) Plomp, ten Brummelhis, and Rapmund (1996) identifies three objectives which distinguished from the utilization of ICT in teaching, such as the usage of ICT an object of study, the use of ICT as an aspect of a field or profession; and the role of ICT as a medium for instruction and scholarship.

Peck and Domcott (1994) estimate few major motivations for using technologies in schools: (a) Technology enables teachers to personalize teaching, which allows students to learn effectively (b) Technology can upsurge the quantity and quality of students' thinking and writing through the usage of word processors; (c) Technology can develop students' critical thinking and allowing them to organize, examine, understand, and evaluate their own work; (d) Technology can inspire students' creative expression and can bring new and stimulating learning skills in them; (e) Technology enables students to search & obtain resources outside the classroom; (f) Technology creates opportunities for students to create significant work.

Murphy and Thuente (1995) summarizes the learning factors that result from the usage of technology in classroom as follows: (1) social growth, (2) problem solving, (3) peer teaching, (4) independent work, and (5) exploration. Tsou, Wang, and Tzeng (2006) explained the positive effects on linguistic communication learning and it becomes as an intact piece of education and contributed as teaching tools in the language classroom.

Blume, Garcia, Mullinax, and Vogel (2001) highlighted that the positive relationship between technology and academic achievement, which was exemplified among Illinois blue collar rural community, where math achievement levels improved (including computation and problem solving skills) as well as student interest among elementary and secondary students, with the usage of technology.
Wenglinsky (1998) report presents findings from a national study (based on sample of 6,227 fourth graders and 7,146 eighth graders) of the relationship between different uses of educational technology and various educational outcomes. The size of the relationship between the various positive uses of technology and academic achievement was substantial for eighth graders than fourth graders.

Serhan (2009) found that ICT fosters autonomy by allowing educators to produce their own material, therefore providing more control over course content than is possible in a traditional classroom context. With respect to capability, once students are more positive in learning processes, they can acquire the capability to apply and transfer knowledge while using new technology with efficiency and potency.

Staehr, Martin, and Byrne (2001) surveyed the students enrolled in an introductory computing class at La Trobe University, Australia, where the previous knowledge in programming and home computer ownership showed a confident effect on computer, and also had less nervousness. In a meta-analysis of over 700 empirical research studies, Schacter (1999) described positive improvements were noted in academic accomplishment with students who had access to: “computer aided teaching, or integrated learning systems technology, or simulations and software that teaches higher order thinking, or collaborative networked technologies, or purpose and programming technologies,”

Waxman, Lin, and Michko (2003) examined the effects of teaching and learning with technology on student outcomes, where the results suggest that when compared with traditional teaching, technology has significant effect on student academic outcomes.

NCES (2001) more recently, analyses of U.S. research have demonstrated a positive relationship between science achievement and the role of computer learning games in the fourth graders, the utilization of simulations in the eighth grade, and the usage of computers to collect, download, and analyze data in the twelfth grade.

Kozma (2005) enumerate the following uses of ICT: a. ICTs are used to improve the delivery of and access to education. b. ICTs are the focus of learning. c. ICTs can be used to improve student understanding. d. Knowledge creation, technology, technological innovativeness, and knowledge sharing. Moreover, Papert (1998) identified the following positive effects on students with ICTs in education include:
• Enhanced motivation and creativity when confronted by the new learning environments,
• A greater disposition to research and problem-solving centered on actual social situations,
• More comprehensive assimilation of knowledge in the interdisciplinary ICT environment,
• Systematic encouragement of collaborative work between people and groups,
• Power to get knowledge,
• Mental ability to cope with rapidly changing, complex, and uncertain environments,
• New skills and abilities fostered through technological literacy.

Also, Kozma and Anderson (2002) state that ICTs are transforming schools through latest updated syllabus based on real-life problems, offer more opportunities to students and teachers for feedback and reflection, providing scaffolds and tools to improve scholarship and building local and global academic communities.

Koch et al. (2005) remarked that using ICT enables students to communicate, share, and work collaboratively anywhere, anytime. For instance, teleconferencing in a classroom could be used to invite students to gather from around the globe simultaneously to discuss on a topic. Students may receive the opportunity to analyze problems, evaluate ICT learning solutions and explore ideas as well as to acquire concepts.

Pilgrim (2001) identified several reasons why technologies in general and computers in particular might be important to schools. These included logics relating to societal and economic pursuits, such as preparing students for work and for living in a society permeated with technology and supporting the computer industry.

Researchers Roschelle, Pea, Hoadley, Gordin, and Means (2000) suggest that the interactivity of technologies is a key characteristic that help scholars to get feedback on their performance, and reflect, revise on their thoughts. Networked technology can enable teachers and pupils to build local and global communities that link them with concerned people and extend opportunities.
Romeo (2008) investigated that constructivism and other instructional strategies or frameworks such as cognitive apprentice, modeling, scaffolding, project based learning and problem based learning, along with supporting strategies such as cooperative learning, multiple words and learning communities have also been influential in the conception of technology rich learning environments.

Lundall, and Howell (2000); Polikanov and Abramova, (2003); Selwyn, Gorard, and Williams (2001) stated that however, there are two major views regarding the role of ICT in teaching and its implications for society, where ICTs should be an important component of the school curriculum in order to prepare learners for the modern world of technology.

İşman, Çağlar, Dabaj, Altunay, and Altunay (2004) reported that the increased computer experience diminishes computer anxiety. Confidence with computers can be attributed to familiarity and computer knowledge. Lack of computer knowledge results in high anxiety and negative positions.

Thus far, this literature review has discussed the importance of ICTs in the educational field and provided the reader with an insight about its potential benefits in the related field.

3.2.6 Technology for out of School Learning

Trentin (1998) identifies online education as a third generation of distance education when it employed Internet technologies. First and second generations distance education systems, which were respectively about correspondence (texts) and multimedia (e.g. Computer assisted learning), centered largely on the production of learning stuff and its delivery to the reading community. Two-way communication with the learners and between learners was kept to the lower limit. These cases of education did not treat learning as a social process in which priority was given to teacher-student and student-student interaction. This rule was the basis for the development of third generation distance education organizations in the course of the online learning community. The intention was that learners should interact with one another within a learning community where isolation was eliminated and relationships formed in society to foster collective development.
Henderson and Brady (1999) written report of the Queensland K-12 whole-school approach to technology diffusion for distance education reported that, as part of the beginning stage of the survey, teachers increased confidence and competency in computer skills and had set about utilizing the Internet and integrating computer based technologies in their schoolrooms.

3.2.7 Social Networking

Wang, Chen, and Liang (2011) observed that the new era of social media has emerged where young men and women now exchange ideas, feelings, personal information, images and videos at a truly astonishing rate. The definition of social media is “the relationships that exist between networks of people”. Social media incorporates Facebook, YouTube, Twitter, LinkedIn, Blogs or MySpace etc.

According to Jacobsen and Forste (2011) almost 25 percent of students’ time on the Internet is directly expended on social networking websites.

In an exploratory study Brydolf (2007) astonished to find Facebook is the most common social network of scholars, followed by YouTube and Twitter. Moreover, Facebook alone reports that it now owns 500 million active users, 50% of whom log on every daytime. Further, in a study by Online PhD, students spend about 100 minutes per day on Facebook. In 2007, the number of students who used Facebook was already enormous: 92 percent of college students had an explanation. By 2008, 99 percent of pupils received an account on Facebook. That is rather a large sum considering the service was just opened in 2006 to everyone. Students who may be hesitant to speak in classroom are taking part in book discussion blogs and writing for real interviews.

In a work by Wang et al. (2011) investigated effect of social media on College students among which 60% respondents favored Facebook, 22% like Skype, 10% prefer Twitter and 8% like My Space. In terms of the benefit of social media, 20% agreed that social media helps with school assignments; 25% agreed that social media helps to create new friends; and 55% just used social media for fun. Forty-five percent of the students acknowledged that they spent 6-8 hours per day to check a social media site, 23% spent more than 8 hours, 20% spent 2-4 hours and only 12% spent less than 2 hours. The proportion of participants who responded during school hours was 64%; 15% rarely used social media during school hours; 21% were not certain
whether they would wish to utilize it. Eighty percent of the sample reported that they sent or responded while completing homework; 8% would never use social media while doing homework.

**Lusk (2010)** referring to the power of social media to enhance connections by making them easily accessible, social media can afford many benefits for the young, including supplying a virtual space for them to research their interests or problems with similar individuals and academic support.

**Kalpidou, Costin, and Morris (2011)** found that the relationship between Facebook and well-being appears to become positive over the college age, possibly because upper-class students use Facebook to connect socially with their matches and participate in college life. The relationship between social media and grades, a survey issued by Ohio State University reveals that college students who use Facebook spend less time on reading and experience lower results than students who do not utilize the popular social networking sites.

**Schill (2011)** states that the social media sites encourage negative behaviors for teen students such as procrastination. **Jacobsen and Forste (2011)** also highlighted that as social media web sites, such as Facebook, YouTube and Twitter have gained popularity, they are also are becoming increasingly unsafe as they create ways to procrastinate while trying to finish homework. Hence, in a study of 102 pupils, 57% stated that social media has made them less productive.

### 3.2.7 IT Learning Environment (School Facilities & Infrastructure)

**STAR reports (1999)** investigated the computer infrastructure available in schools. **Mooij and Smeets (2001)** found that many governments seem to embrace the optimistic prospect, by furthering the implementation of more and more computers in schools, believing that this medium will change, pupils and society for the better.

**Stevenson (1997)** provides a few lessons of how computers may be practiced in schools:

- To administer schools;
- To educate students in skills which they will need further training and ongoing learning throughout the balance of their lives and for their future jobs, e.g. word processing, computer scheduling, and so on;
To offer access to information and communication outside the schoolroom walls,
E.g. video conferencing with students in other lands, using the internet, and so on;
To support teacher development, e.g. through external networks;
To sustain and potentially transform the learning/teaching process in many and various ways.

**Levine (1998)** stresses the importance of accepting a program that is based on real school needs and one that is realistic, achievable, and efficient. The design should be produced, not for the sole use of putting technology in the classroom, but to ponder the material needs of schools in order to build effective technology deployment and to produce enhanced learning environments.

**Pelgrum (2001)** stated that the parliamentary law to educate students for the “information age”, governments across the world spend vast sums of money on the implementation of ICT in schools. He observed that ICT policies are approved, schools are provided with computer hardware and software, and Internet connectivity is provided to schools. This is even apparent today, where governments monitor the implementation of ICTs in schools on a regular base in order to enhance ICTs in the schools. **Meadows and Leask (2000); Pelgrum (2001)** found that why do governments spend such enormous sums on computers in schools? It is frequently assumed that ICT, especially information processing systems in schools, will contribute to pupils being more productive future workers in the ‘information age’.

Another reason of the mismatch between technology trends and the role of technology in schools is the lack of technology planning. **Vanderlinde, Braak, and Tondeur (2010)** pointed out in a technology policy plan, a school describes its expectations, goals, content and activities concerning the integration of ICT in education. This includes factors such as vision, building, professional growth, and evaluation. While schools have been procuring hi-tech equipment with the purpose of improving in the latest technologies in teaching and learning, but the resolutions are not clearly visible either in terms of adoption by the teachers or in students’ learning results. **Gulbahar (2007)** observed that technology integration is a complex process and a demanding task for instructors and school administrators. This study found that even teachers and
decision makers who felt themselves competent in using ICT reported that there was a lack of guidelines that would guide them to successful consolidation. **Sang, Valcke, Braak, and Tondeur (2010)** affirmed the importance of technology provision in schools where ICT planned together with its support and training has a significant influence on classroom usage. Also, they have pointed out that school policies (related to ICT) are less developed and minimally used. Summary suggest, shared and school-wide vision of ICT is essential to succeed in technology integration.

As by **Hokanson and Hooper (2000)** who noted, despite a history of achieving only marginal benefits from using technology in education, many schools and other educational systems are investing heavily in computer technology. **Zhao and Frank (2003)** says the increasing costs in running schools may be a barrier on the way technology is (not) being utilized for teaching and reading in schools.

**O’Day (1999)** mapped the virtually all technology policies and decisions are about change and frequently require specific changes in schools, such as engineering the system and revising learning standards. In addition, technology is universally seen as a change agent that can catalyze various changes in reading, teaching.

**Tondeur, Valcke and Van Braak (2008)** discuss even if a technology project has been successful, to continue its successful execution, new policies need to be created, more money needs to be spent on advancing software and updating hardware, maintaining and improving sufficient technical support, more appropriate help needs to be offered to both instructors and students. Thus it is important to provide ongoing technology planning and valuation, to endlessly revise and refine current practices, and offer timely support.

### 3.2.8 Issues Concerning IT Usage in Academics

Even though Information Technology (IT) has paved way into our lives and into classrooms as “Education Technology”, still the existing literature present some barriers based on various perspectives:

According to a survey undertaken by **Kozma and Anderson (2002)** both developed and developing nations are starting to utilize their investment in ICTs to reform education. Some see ICT bringing about an era of limitless potential in education, whereas others examine the utilization of technology as misguided and problematic.
Although some empirical research confirms the role of technology, an opposing school of opinion argues that using technology in the classroom may have a negative consequence on the sense of classroom community. Hicks (2011) observed that because technology can be at times frustrating and complex, some teachers worry about sustaining their professionalism within the classroom. They seem to be not only struggling with aptitude levels to integrate technology into the classroom, but also, show resistance towards IT. This study suggests that, even though technology offers challenges in the classroom, for teachers it is still very essential to realize the exceptional opportunities that these digital tools can offer to students. Hiltz (1998) added that one of the possible negative effects of utilizing applied science in the schoolroom is a deprivation of the social relationships and sense of community. This study also indicated that collaborative-learning schemes are as important for computer-based teaching as they are for traditional classroom classes.

Healy (1999) cautioned that children’s spending too much time in front of a computer could lead to long-term psychological or physical problems.

Russell, Bebell, O’Dwyer and O’Connor (2003) discovered the most school leaders do not possess a clear sense of how to measure effective use of technology and. Russell and Higgins (2003); Tondeur et al. (2008) opine that teachers do not recognize about their schools’ vision for the role of technology in their classrooms. Lei and Zhao (2007) stated that Educational technology research, have studied time spent by students utilizing technology and successful technology integration, but do not assess whether or not, or how, technology is being practiced in meaningful ways in teaching and learning.

Parker (1997) found some logistical factors hindering the use of technology such as lack of time, software, hardware, keyboarding skills, knowledge of available IT resources, and more importantly unavailability of computer labs and computer lab technicians etc.

Odabasi and Namlu (1997) in research about the perceptual experiences of instructional materials, classroom teachers generally demonstrated little knowledge of the technologies. Orhun (2000) conducted study at secondary schools in Izmir, Turkey, found that teachers’ lack of cognition and skill about computer usage for teaching purposes was the most faced barrier in applying computer use in instruction.
Insufficient software, inadequate training opportunities, expertise, direction and technical assistance for instructional use, and insufficient number of computers available were other significant problems.

Researchers have pointed out that there are many obstacles that prevent teachers from using technology in the teaching. Inadequate infrastructure Mehlinger and Powers (2002); Rossberg and Bitter (1988) lack of training and personal expertise. Jacobson and Weller (1987); Strudler and Wetzel (1999); Willis, Thompson, and Sadera (1999), and weak technical support NetDay Survey (2001); Schrum (1995) are most frequently cited challenges.

Studies by Asan (2002); Asan (2003) addressed some of the issues like the extent that time spent using computers displaces time spent on athletics and other physical activity, extensive computer use may lead to a sedentary lifestyle that places kids at risk for obesity and related health problems Hill and Peter (1998); Attewell, Suazo-Garcia, and Battle (2003); Ho and Lee (2001) Utilization of computer game controls or keyboards also entails a risk of trauma from repetitive motion Laester, Maxwell, and Hedge (1998); Oates, Evans, and Hedge (1998); Harris and Straker (2000); Macgregor (2000) Other worries include the potential for Internet usage to increase social isolation among adolescents. Kraut, Patterson, Lundmark, Kiesler, Mukophadhyay, and Scherlis (1998); Sanders, Field, Diego, and Kaplan (2000) and the potential for violent games to make increases in hostility and aggression. Chambers and Ascione (1987); Schutte, Malouff, Post-Gorden, and Rodasta (1988); Irwin and Gross (1995); Kirsh (1998); Wiegman and Schie (1998); Scott (1995). Such games are also considered by some to desensitize players to violence and other people’s suffering. da Silva Ferreira (2014); Grossman and DeGaetano (1999); others regard the evidence regarding the harmful effects of violent games as inconclusive Means, Olson, and Ruskus, (1995); Bensley and VanEnwyk (2001). The Internet is also a medium that displays or provides access for some young people to several forms of incompatible material Mitchell, Finkelhor, and Wolak (2003); Lin and Thornburgh (2002); Shields and Behrman (2000) and materials to facilitate cheating on school assignments Lathrop and Foss (2000).

Noble (1998) enquired about what is going on with the utilization of ICT in educational environments. The movement toward the increasing role of technology
robs teachers of their knowledge and skills, eventually leading to a loss of dominance of their playing lifetimes. **Robertson (1998)** also suggest that the increased role of technology will lead to a loss of control by teachers as our teaching system gets more commercialized. The use of ICT will widen the gap between rich and miserable and pass control of the training system to corporations.

**Pilgrim (2001)** likewise found that the obstacles for using technology related to material problems like insufficient number of computers and the most common non-material problem was the lack of teachers’ sufficient knowledge and skills regarding Information and Communication Technology (ICT).

Moreover **Pelgrum and Law (2003)** contend that while technology has the potential of bringing educational opportunities to more remote regions, while the gap between urban and rural areas might be widened and consequently it might bring in a digital divide to the existing economic and educational divides.

### 3.3 Conclusion

Technology provides higher quality of learning using innovative methods. Computers enables students’ learning personalized, interactive, discover array of information resources, support experimentation, explore various ideas, and induce sense of inquiry. Networks of computers allows learning a dynamic process for students within and beyond classrooms by extending their horizons of thinking. Further, the structuring of literature reveals that modern technology has a positive influence on student learning attitudes.

### 3.4 References


Schacter, J. (1999). The impact of education technology on student achievement: What the most current research has to say.


Kozma, R. (2005) "ICT and Educational Reform in Developed and Developing Countries". [Internet] OECD.


