CHAPTER II

REVIEW OF RELATED LITERATURE

2.0 Introduction

This chapter presents a critical review of literature in the major areas of the present study such as developments in Second Language Acquisition (SLA) approaches, developments in the use of technology in English language teaching and learning, and the developments of the language laboratory to the present status. It also reviews selected software developed for digital language laboratories, and discusses the principles of multimedia materials’ design and evaluation.

2.1 Language learning theories and CALL

Technology has become inevitable in every walk of life in 21st century. Education system is not an exception. The use of technology in L2 acquisition got momentum in the latter half of the 20th century. The question of 1980s, whether computers should be used for language teaching was replaced by another essential question ‘how the computer be used in second language teaching’ effectively in 1990s (Chapelle, 2001). In the span of just ten years computers had occupied an important space in essential activities of human lives. In recent times, ‘everyday language is so tied to technology
that learning language through technology has become a fact of life with important implications for applied linguists, particularly for those concerned with facets of second language acquisition’ (Chapelle, 2001, p. 1). However, technology in language learning is not new. According to Beatty (2003), the first computers used for language learning were large mainframe computers of 1950s. At the same time Warschauer and Healey (1998) observed that “computers have been used for language teaching since the 1960s” (p.1). Thus, this way of thinking has been around for more than six decades now. During these sixty years, the development of technology from mainframe computers to personal computers to networked computers paralleled in many ways the developments in the theory and approaches to language teaching and learning. Describing the paradigm shift in the field of second language acquisition, Rassool (as cited by Chapell, 2001) rightly pointed out that

…in a world increasingly driven by (a) the need for innovation through research, and development (R & D), (b) the multileveled changes brought about in our everyday lives as of the nature and speed of technological developments, (c) the volume and range of information available, and its open accessibility, (d) the multimodal features of electronic texts as well as (e) its interactive nature, we require significantly more than just the ability to read and write in a functional way. (p.1)
Thus, CALL has changed over the period of time. Several researches outline key issues in theory and practice that divide CALL into three distinct phases viz. Behaviourist CALL, Communicative CALL and Integrative CALL (Warschauer, 2000) or structural CALL, cognitive CALL, and socio-cognitive CALL (Warchauer, 2000). Although the phases are all distinct and separate in their own way, they all rely on each other in order to function. Just because a new phase emerges, it does not necessarily mean that the other phases are obsolete or should be rejected or discarded. Each one of these phases did not just soar to popularity, but as any other innovation, they become more popular and well known with time (Warschauer, 1996).

2.1.1 **Behaviourist or Structural CALL**

Behaviourist views of language learning and of language teaching were predominant in the two decades following the Second World War. The learning theory was very influential in the 1940s and 1950s. These views drew on general theories of learning propounded by psychologists such as Watson (1924), Thorndike (1932), Skinner (1957) and Dakin (1973). With regard to language learning, the best known proponent of this psychological theory was B.F. Skinner. Dakin identifies three general principles of language learning derived from these theories: a. the law of exercise i.e. language learning is promoted when the learner makes active and repeated
responses to stimuli, b. the law of effect i.e. importance of reinforcement of correct responses, and c. the law of shaping the behaviour i.e. learning becomes smooth if complex behaviours are broken down into their component parts and learnt bit by bit (Ellis, 2002). The assumption underlying these principles was when learner imitates the language produced by the people around, their attempts to reproduce what they hear receive ‘positive reinforcement’. Language learning, like any other kind of learning, was a habit formation according to the behaviourist theory. Brooks (1960, as cited in Ellis, 2002) rightly described it as the formation and performance of habits rather than concerning problem solving. Interference from the previous learning was believed to be the main impediment to learning. ‘Proactive inhibition’ occurred when old habits got in the way of attempts to learn new ones. In such cases, the old habits had to be unlearnt’ (Ellis, 2002, p. 299). However, the notion of unlearning made little sense in language learning and especially in L2 acquisition.

Behaviourist and structural account of L2 learning propose a direct relationship between input and output. They ignore the processes that take place inside the learner as they reject the idea of ‘mind’ as an object for inquiry (Ellis, 2002). In behaviourist model, input comprises stimuli and feedback. The early phase of the Behaviourist CALL emerged during the 1950’s and was implemented in the 1960s and 1970’s. This form of CALL was based mainly on behaviourist theories of learning; which is a type of
language learning consisting of repetitive drilling and practicing. The programmes used for language teaching were designed to teach through repetition and to check learners’ responses to grammatical, vocabulary, or reading exercises and provide them with instant feedback on their answers. According to Kern & Warschauer, this is “consistent with the structuralist approach, which emphasized that repeated drilling on the same materials was beneficial or even essential to learning” (p.8). The computer, in this model, acted as a tutor that delivered the language instruction. One of the widely known programs during the Behaviourist era was Programmed Logic/Learning for Automated Teaching Operations (PLATO) developed in 1959 by the University of Illinois (Beatty, 2003). Much of PLATO’s first language learning work was done in teaching Russian using a grammar translation approach. In other words, the focus was on translating Russian scientific documents. Curtin et al.’s (1972) work in Russian language teaching and learning included grammar explanations, vocabulary and other drills (as cited by Beatty, 2003). The programme has so-called ‘intelligent’ feature still used today, such as tests that were followed by directions to complete appropriate remedial work depending on the errors a learner had made. Although the PLATO program is not around today, many other computer programs have adapted and continued to use the same rationale (Warschauer, 1996). According to Beatty (2003) behaviourist learning material:
“Estimates extraneous information,
Simplifies for comprehensibility,
Uses a convergent, task-analysed model as a basis,
Reconstructs/replicates knowledge,
Abstracts instruction experiences,
Focuses on acquiring skills,
Offers perspective sequences of instruction, and
Supports individual learning and competition” (p. 17).

The behaviourist views on language learning were discredited with Chomsky’s review of Skinner’s *Verbal Behaviour* which points out dangers of extrapolating from laboratory studies of animal behaviour to the language behaviour of humans. The terms ‘stimulus’ and ‘response’ were exposed as vacuous where language behaviour was concerned. In addition to this, studies of children acquiring L1 showed that parents rarely corrected their children’s linguistic errors, thus casting doubts on the importance of ‘reinforcement’ (Ellis, 2002). This, growing dissatisfaction towards behaviourist theory paved the way for the subsequent theory of second language learning called Cognitive theory of language teaching and learning.
2.1.2 The Cognitive or Communicative CALL

The Cognitive or Communicative CALL was introduced in 1970s. In this era, mainframe computers were replaced by personal computers. Programmes based on behaviourist learning theories were rejected for they generally failed to provide language learners with authentic communication. A cognitive theory of learning sees second language acquisition as a conscious and reasoned thinking process, involving the deliberate use of learning strategies. Learning strategies are special ways of processing information that enhance comprehension, learning or retention of information. This explanation of language learning contrasts strongly with the behaviourist account of language learning. Cognitive theories of SLA used computer as a metaphor for the mind, comparing language acquisition to the capacities of computers for storing, integrating and retrieving information (Lightbrown and Spada, 2006). Cognitive psychologists see the language learning as an information processing model. Thus, the cognitive model for second language acquisition is based on the input-process-output model of language acquisition, wherein input is the language the learner is exposed to and output is the language that the learner produces (Lamy and Hampel, 2007).
**a. Comprehensible input**

Comprehensible input is an idea that originated with Terrell and Krashen according to Beatty (2003). Ellis (1985) explains the idea of comprehensible input by stating that the input refers to the language which learners are exposed to (Ellis as cited in Beatty, 2003). This can be ‘comprehensible’ which means input that they can understand or ‘incomprehensible’ which means input that they cannot understand. When native speakers speak to L2 learners, they frequently adjust their speech to make it more comprehensible. However, Ellis (1994) notes that Krashen did not see comprehensible input coming from other learners. According to him interaction also provides learners with the opportunity to talk in the L2. Access to comprehensible input may be a necessary condition for acquisition to take place according to Cognitive or Communicative theory of second language learning.

**b. Comprehensible output**

The comprehensible output as observed by Tsui (2000) can be explained by observing that when students respond to the teacher’s or their fellow students’ questions, raise queries and give comments, they are actively involved in the negotiation of comprehensible input, which is essential to language acquisition. When students produce the target language and try to make themselves understood, they are in fact testing out the hypotheses they
are forming about the language. Similarly, as asserted by Swain (1985), the production of comprehensible output is also essential to the acquisition of the target language. He maintains that it is not enough for learners to see and hear language in use; to truly understand they need to have opportunities to use the target language.

c. Process

Lamy and Hampel (2007) posit that a crucial site for language development is interaction between learners and other speakers especially, but not only, between learner and more proficient speakers but also between learners and certain types of written texts, especially elaborated ones. In addition, while providing a brief summary of a theoretical account of how discourse affects language acquisition, Ellis (1998) states that ‘acquisition is promoted when the input to which learners are exposed is made comprehensible as a result of interactional modifications that arise from a communication breakdown – a process known as the negotiation of meaning’ (p.160). Therefore, interaction allows learners to negotiate meaning, that is, to make the meaning comprehensible.

A computer can provide a high level of ‘comprehensible input’ in various media (Beatty, 2003). In terms of Computer-assisted language learning (CALL), Krashen (as cited in Kenning and Kenning, 1990) describes optimal input for acquisition as having four characteristics:
a. it is comprehensible

b. it is interesting and/or relevant to the acquirer

c. it is not grammatically sequenced

d. it is provided in sufficient quantity (p. 87)

CALL, and more recently, technology-enhanced language learning (TELL) can generally deal with all of these criteria, including adding a wide range of extra-linguistic clues through sound, images, animation and video. The use of various forms of technology in language learning courses can provide not only comprehensible input, but also a platform for interaction, where learners can work with text and negotiate meaning with peers or a tutor through technology.

2.1.3 The Socio-cognitive or Integrative CALL

The socio-cognitive or Integrative CALL started in 1990. It emphasized the use of language in social context. The framework of the socio-cultural theory also known as ‘Social Development Theory’ is based on Vygotsky’s ideas on interaction and social aspects of learning. Compared to the cognitive paradigm where interaction is seen as the means by which input is made available to the human mind or as an opportunity for producing output, in the socio-cultural context, interaction is defined in social terms. Vygotsky stressed the importance of social interaction such as peer
collaboration, in developing cognition (Beatty, 2003). For language teachers, this meant that providing students opportunities to interact was the single most important factor in stimulating the development of higher-order thinking.

An important aspect of the Vygotsky’s theory is the idea that the potential for cognitive development is limited to a certain gap, which he calls the zone of proximal development (ZPD). The zone of proximal development (ZPD) represents the most crucial of Vygotsky’s postulates owing to its potential implications for education. The underlying assumption is that psychological development and instruction are socially embedded. Vygotsky defines the ZPD as, ‘the distance between the actual developmental level as determined by individual problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers’ (Vygotsky, 1978, p.86).

Learning within the ZPD depends upon full social interaction. Vygotsky felt that the range of skills that would be developed with teacher guidance or through peer collaboration would exceed those that might be achieved by a learner working alone (Beatty, 2003). The ZPD thus, focuses on the language learners’ active creation or use of new means to accomplish and understand an activity. The language learner, as such, is not seen as a mere passive recipient of the teacher’s instruction, nor is the teacher simply the
fount of all-knowing behaviour. Instead, the teacher and the language learner achieve inter-subjectivity in joint problem-solving activity, in which both share knowledge and responsibility for the task. More importantly, Vygotsky’s ZPD actually represents a change of focus from teacher-fronted instruction to student-centred learning (Erben, Ban and Castañeda, 2009).

From Vygotsky’s theoretical perspective, technology has the potential to mediate students’ learning in a multitude of creative ways and open up many potential dynamic zones of proximal development (Erben et al., 2009). In other words, technology can be useful in providing learners with the opportunity to interact and collaborate with others in many ways. Moreover, asserting the social aspects of learning, Lamy and Hampel (2007) state that there is no point to networked learning if you do not value learning through co-operation, collaboration, dialog, and/or participation in a community. Opportunities for second language acquisition or even language enhancement can be offered by technology, as learners are exposed to new language and when learners are prompted to engage in collaboration that promotes negotiation of meaning (Beatty, 2003). Using technology in creative student-centred ways for language learners brings one more step removed from relegation to silence and non-participation. Thus, the socio-cultural theory offers a theoretical framework for understanding technology enabled language learning, which, with its emphasis on
communication, has claimed to provide excellent conditions for interactive and situated learning.

2.1.4 The Constructivist CALL

Constructivism is a humanistic model suggesting that learning is a process by which learners construct new ideas or concepts by making use of their own knowledge and experiences. The learner has greater control and responsibility over what he or she learns and relies on schema or mental models to select and transform information, create hypotheses, and take decisions (Beatty, 2003). In addition, constructivism assumes that the learner comes to the classroom with a rich set of ideas and experiences. According to the constructivist theory of learning, a student never enters a classroom with a blank slate waiting to be filled with knowledge by the teacher. Instead, students come to each task of learning with the expertise and knowledge from prior experiences, which in turn influences the way in which a student approaches each new task of learning and internalises and constructs new knowledge from the task. In other words, constructivism allows and encourages learners to build on what they already know and go beyond the simple collection and memorization of information to develop individualized, internalized meaning. Thus, in a constructivist environment, the learner is the centre of the learning process, the one who constructs
knowledge and meaning, linking incoming or new knowledge and information with existing knowledge.

Moreover, constructivism supports key constructs of collaboration and negotiation of meaning. Collaboration provides opportunities for negotiation of meaning as learners struggle to build new schemata and extend existing ones. Thus, the role of the teacher in a constructivist model includes presenting opportunities for learning and encouraging reflective thinking in learners, partly through collaborative peer activities. The teacher provides the environment for relevant learning by creating whole, authentic, inherently interesting activities and by setting up multiple representations of reality and actual experience for learners, thus enabling them to construct their own knowledge. Thus, in the constructivist learning environment, learning is active rather than passive.

The pedagogical dimensions of constructive learning and approaches to instruction can be summed up as:

- provide a context for learning and stress the use of authentic materials,
- are process-oriented and experiential by nature,
- invite collaboration from many different sources,
- emphasize the use and development of higher order critical thinking skills such as decision-making and problem solving,
• regard reflection as crucial to the learning process, and

• assess learning in ways different from the traditional pen and paper test.

Instructional design using computer-based technology provides favourable settings for each of these pedagogical dimensions to take shape. Atkins (1993) reviewed several software packages which have been built on a constructivist model along with the assertion of the importance of the history of technological developments and their design implications for learning and teaching applications. Thus, while constructivism informs various models of instruction, it particularly informs the computer-based instructional design. In other words, technology-enabled language learning could find its roots in the constructivist theory of learning.

2.2 Language Laboratory: A historical perspective

The term laboratory has been defined differently by the dictionaries at different times. For example, the American Heritage Dictionary of the English Language, Fourth Edition (2000), defines laboratory as a room or building equipped for scientific experimentation or research. The same dictionary in the next entries, defines it as a place where drugs and chemicals are manufactured; a place for practice and observation. In turn, language laboratory is defined as “a room designed for learning foreign languages and equipped with tape recorders, videocassette recorders, or
computers connected to monitoring devices enabling the instructor to listen and speak to the students individually or as a group” (Perez-Paredes, 2002). On the other hand, Garcia and Wolff (2001) define it as “an instructional technology tool consisting of a source unit that can disseminate audio, audio-visual, and/or written materials to any number of students at individual seats or carrels, with a wide variety of potential feedback mechanisms to the student, teacher, or other students”. Bedre (2008) defines it as a room in a school, college, training institute, university or academy that contains special equipment to help students learn foreign languages by listening to tapes or CDs, watching videos and recording themselves. Thus, the language laboratory is an audio or audio-visual installation used as an aid in modern language teaching.

Despite different notions, language laboratory as a means to learn pronunciation and speech remained unchallenged for almost four decades (1940s to 1980s) since its inception. The spread of language laboratories ran parallel with the success of the audio-lingual method, which in turn largely derived from structural approach. This methodological connection, later on, won language laboratories a bad reputation. The notion and use of language laboratory changed over the period of time with developments in language learning theories and advancements in the use of technology in education.
According to Gracia & Wolff (2001) the history of the language lab can be divided into five periods:

1. the beginning period, before 1915,
2. the establishing period until 1958,
3. the developing period until the end of the 1960s,
4. the diminishing period until the end of the 1970s, and
5. the revival period that extends from the 1980s until today.

Language laboratories have been practically used for foreign and second language teaching since around 1950. However, its origin dates back to Edison's invention of tin foil phonograph in 1877 (Kitao, 1995). As it has happened with all technological inventions, the phonograph was not invented to be used for language teaching. The first purpose of the phonograph was the preservation and reproduction of sound. However, it was observed that people could hardly hear sounds from this phonograph, and sounds were not clear (Peterson as cited in Kitao 1995). According to Roby (2004), by 1893 there were commercial record sets available for Spanish and English as a foreign language which were used in regular classes and for self study at home with the phonograph. However, to what extent the phonograph was put to use is not documented well. According to Keating (1936), initial use of phonograph and other devices such as stereopticon was haphazard because there was no real absorption of modern
inventions into teaching programmes. This was probably the reason for inconsistent use of phonograph. Nevertheless, it should be noted that the decade saw much interest and use of radio for foreign language instruction. In the 1920s, radios were used for foreign language instruction and equipment such as tape recorders, televisions and movie players were developed simultaneously. The tape recorder has probably had the single greatest impact on language learning. Its introduction meant that the teacher could play recordings of authentic native speech, and learners could also record their own voice and then play back to hear how they sounded (Davis, Bangs, Frisby & Walton, 2005). They have further stated that Audio Active Comparative (AAC) recorder was further developed which made it possible for the learners to record their voice on the same tape as the recorded voice of a native speaker without erasing the original. Thus, there are evidences of use of audio gadgets in the foreign language learning till 1940s. However, there are stray instances of dedicated language laboratory establishments for foreign and second language study using these gadgets.

The technological set up of audio gadgets for language study was named language laboratory by Ralph Waltz in 1930 according to Hocking (1964). This does not mean that language laboratories came into existence in 1930. The set up was already there for quite some time but was known as phonetic laboratory until the years that followed World War II. The modern language laboratory was born in 1946 at the Louisiana State University and the
University of Lava in Quebec City, America (Hocking, 1964). According to Perez-Paredes (2002) the development coincided with the emergence of the so-called Language Laboratory Movement, which was responsible for the big success that these facilities enjoyed in the decades that followed.

Thus, the language laboratory took almost half of a century to be used practically in language teaching and learning. The practical use of language labs began in the 1950s, when tape recorders with two tracks became popular, new teaching methods in language labs evolved, and further study was conducted on the use of visual aids, such as TV and videotapes (Gracia & Wolff, 2001). Language labs then became very popular. In the early 1970s language labs were perceived as a solution to the problem of teaching a language to a large number of learners in a short time. These language labs were based on structuralist and behaviourist theories of language learning. The behaviourist model considers language learning as a habit formation through repetitions and drills. It ignores process that happens in the mind before output. Therefore, the language laboratories used the technology for repetitive drills and mechanical speech production resulting into practice of mere native speaker like pronunciation. Students became speakers of the target language by learning discreet linguistic units, which were mastered through the mechanical process. Due to mechanical approach to language learning and limited output, the behaviourist language laboratories gradually fell out of favour towards the end of the 1970s (Davies, Bangs, Frisby
& Walton, 2005). To describe the situation better, Perez-Paredes (2002) cites the University of Duke language laboratory, and mocks at the traditional set up saying:

The language labs have come a long way since the early sixties. The equipment was large and cumbersome and would seem prehistoric today. There was only a reel-to-reel tape facility, and the only thing the faculty was able to do was to buy tapes that put the students to sleep with repetitive skills. The cubicles were like kennels, and the students were like Pavlov’s dogs. There were house rules-NO TALKING, NO VISITING- and students were not to have fun in the labs. They were to do their drills and get out. The teachers rarely came in.

Stack (1960) as cited in Perez-Paredes (2002) stated that the only realistic purpose of behaviourist language laboratory was to provide a convenient means of hearing and responding to audio-lingual drills. The learners were expected to become loud and clear and there was no room for other activities. In machine-teaching techniques, students were not allowed to advance a step further until they mastered the previous one. Each step was called a frame, and if a student did not succeed in a frame, they were automatically provided remedial work by the teaching machine.
The 1970s and early 1980s were a period of malaise for the language laboratory (Roby, 2004). As Gracia & Wolff (2001) have noted during the 1970s there was a rejection of language labs, since language acquisition theories changed towards communicative fluency rather than linguistic accuracy. Moreover, the expensive maintenance of the language laboratories was also one of the major reasons for the decline. Davies (1997) has stated three sets of reasons for the decline of the structuralist labs: First, the implementation of language laboratories presented important deficiencies including lack of new ideas, materials and training. Second, the very notion of control soon lost its appeal and finally, affective factors such as user-unfriendly gadgetry and a dehumanized conception of classroom organization also contributed to a situation where the costly laboratory was simply not on the agenda of language educators and school managers.

However, with the beginning of the digital era in the mid 1980s a revival period began and the language lab was given a new lease of life. The advent of the computer led to digital laboratories. Computer Aided Instruction (CAI) and Computer Aided/Assisted Language Learning (CALL) gained importance with multimedia PC based labs. These digital labs allowed the students to record their voice and teachers to control student position. They became increasingly complex and sophisticated, integrating the latest technological innovations to enable students and teachers to improve the quality of language teaching and learning.
2.3 Analogue Vs Digital Language Laboratory

As seen in the previous section, the history of language laboratory has been a story of ups and downs throughout and their status has been inconsistent. The language laboratories have been in a constant flux of change and development. The modern digital language labs replaced the analogue ones. The two have differed in nature due to several reasons mentioned in the previous section of this chapter. Though, to be specific, two main factors that contributed to the a major difference are:

a. the technological advancements (invention of new audio visual aids),

b. the developments in the psychological theories of language acquisition and its impact on foreign/second language learning/acquisition process.

Thus, the analogue labs and digital labs have differed at two points mainly:

a. technology available and used, and

b. methods and materials used in language practice.

A thumb-nail sketch of the development of analogue lab shows that the use of technological aids in language teaching has a long history. During the early period many electronic instruments gained importance in the field of applied linguistics. According to Navas Brenes (2006), the use of electronic instruments commenced with phonograph record around 1880s. Following
the phonograph, several phonetic laboratories were constructed in American universities around 1920s. In 1924, the first language laboratory equipped with sixteen sets of headphones linked to a single output was built at Ohio State University. The period of 1930s is marked with the use of radio for educational purpose in the history of language laboratory. Speech Spectrograph was invented to analyze the waveforms and frequencies of the sounds that make up human speech and was used in the field of acoustic phonetics in 1940s. In 1950s, telephone was used on a smaller scale to improve students’ aural skills. Around the same time and through 1960s audiotapes and portable recorders were constantly used in education. It was during 1970s and 1980s that television and computers emerged as the glamorous educational media (Johnston, 1987). However, as a matter of fact, the concept of language laboratory came into existence with the use of analogue technology, now considered outdated.

The basic meaning of ‘analogue’ is something that corresponds to something else (Davies, Bangs, Frisby & Walton, 2005). In an analogue setup, the groove on a vinyl record corresponds to the nature and volume of the sound that has been recorded. There is a master/teacher console electrically connected to the rows of student booths typically containing a student tape recorder and headset with a boom arm microphone. The master/teacher console is usually fitted with master playback source equipment (tape recorder), some means of monitoring of each booth in the class via the
teacher headset and an intercom facility offering two-way communication between teacher and student. The analogue labs allowed a teacher to listen to and manage student audio via a hard-wired analogue tape deck based system with 'sound booths' or carrels in fixed locations. Analogue recordings on magnetic tapes can be of very high quality, but they all suffer to some extent from background noise, and the quality of reproduction gradually degrades as the record or tape wears out. If the recording is copied, the copy will not be as good as the original, regardless of the quality of the equipment used to copy it.

However, the first generation laboratories allowed the teacher to remotely control the tape transport controls of the student booths (record, stop, rewind) from the master desk. This allowed for easy distribution of the master programme material, which was often copied at high speed onto the student positions for later use by the students at their own pace. Once the master program had been transferred onto the student recorders, the teacher would then hand over control of the decks to the student. The student then simultaneously heard the playback of the supplied recorded program whilst being able to record their voice in the pauses, using the microphone. This is known as an audio active-comparative system. The analogue labs received bad reputation due to relatively complex and cumbersome technology, issues regarding maintenance, lab design, methods of language teaching and materials.
The traditional labs were put to rest from the education system with dissatisfaction towards long used audio-lingual method and invention of small sized computers in 1980s. However, it was upgradation of computers to multimedia capable PCs in 1990s that led to resurgence and transformation of the language laboratory. The declining status of the language lab was given a new lease of life in mid 1980s with the emergence of digital labs.

A digital language lab is a network of computers loaded with appropriate software, which provide most of the functions of an analogue lab together with integration of video, word-processing and other computer applications that make it a multimedia facility. Thus, digital lab is also known as multimedia lab as it integrates sound, video, word processing, internet and other applications. Reflecting on the change, Davis, Bangs, Frisby & Walton (2005) rightly asserted that:

…user-friendly controls, imaginative materials and improved lab design got away from the battery-chicken-farm appearance of rows of booths. At the same time, self-access was coming into fashion and there was a wealth of new ideas on using the lab: pair work, group work, role-play, communication games …(p.4)

The digital labs provide most of the functions of a conventional/tape based language lab system. However, it does not have to have connections
between the computers other than a single, standard, network cable. Unlike analogue lab, materials can be picked up through intranet from any computer in a digital lab. It is easy to upgrade the software as well as the hardware and the digital labs are comparatively easy to maintain. In addition to this, digital labs have more user-friendly controls, scope for imaginative materials and an improved lab design. It is easy to monitor and make interventions without disturbing the learners. Interaction theory that got underway in the seventies required fundamental change in lab designs and materials used. The digital labs can be designed according to the space available and considering requirements of communicative language teaching. Generally, they follow ‘U’ shaped designs that facilitate interaction among the learners. However, there are other need based improved designs also. David, Bangs, Frisby and Walton (2005) mention the following features of a dedicated digital lab.

a. **Versatility** (Different media can easily be integrated, the teacher can remodel and alter materials to fit the needs of different language teaching programmes)

b. **Ease of movement between different applications**

c. **Interactivity** (Learners can interact with each other, can record and listen their own voice)

d. **Potential for teacher intervention** (control of learner’s computers from teacher console, tracking of learners’ work)
e. **Potential for independent learning** (access to resources beyond the timetable)

All these features of digital labs have contributed to regeneration of faith in language laboratories. Nowadays the language lab is no longer seen as the panacea, but rather as one of the many technological aids that the language teacher can choose to use to enhance teaching and learning. Hence, it becomes clear that language laboratories have undergone two major changes since their creation in the sixties, which have shaped their evolution. One is the advances in learning theory and the other is advances in computer technology.

### 2.4 Taxonomy of Digital Language Lab

The digital language lab set up is subject to change based on cost, availability of eligible human resource, physical resources available and time available for training. Thus, all educational institutions do not have to have dedicated digital language laboratories with all the features discussed in the previous section. There are institutions where computer labs with varying configurations are used as language labs. Davies, Bangs, Frisby and Walton (2005) divide digital labs in three types:

1. **Stand-alone PCs**: In this type of lab, a PC or a group of PCs are used within a department or classroom. The PCs are not networked.
This type of design offers more flexibility in set-up and use for departmental needs. In addition to this, use of limited number of machines require a differentiated approach to learning that may involve techniques like pair work, group work, discussions and simulations. However, it is difficult to ensure individual practice and self-access in this kind of set up. Absence of external connection may limit the resources available for the language practice.

2. **PCs attached to an intranet**: In this kind of set up, PCs within a class are grouped and linked to an institutional intranet. These days laptops are also used that can be connected through a wireless network. Once again, the absence of external connectivity or WWW may limit the language practice resources and activities. However, the interlinked computers make it easy to provide more individualized practice and sharing of the content. To some extent it also facilitates self-access without being able to keep record of the students’ work.

3. **Dedicated language labs**: This type of set up involves networked PCs with software that are connected to a server. There are dedicated labs that have access to WWW as well. The dedicated labs offer all possible advantages that a language lab can offer. On the one hand, the internet connectivity provides wider range of authentic, learner specific and interesting materials and on the other hand the software provides more user friendly access, timely feedback, better
monitoring and enjoyable interactive environment necessary for language learning.

Perez-Predes (2002) classifies modern language laboratories in the following three categories:

I. Language Laboratory type 1
II. Language Laboratory type 2
III. Language Laboratory type 3

Language laboratory type 1 presents a hardware solution where a networked classroom is not essential and where the main features are teacher-oriented. These labs are similar to Stand-alone PC based labs mentioned above and offer almost the same advantages and disadvantages. Language Laboratory type 2 is an upgraded version of type 1 with integrated computer-aided and enhanced multimedia facilities. It presents a hardware-software solution where a networked classroom is essential. However, the main activities are teacher oriented. Language Laboratory type 3 is a multipurpose solution which runs on networked computer environments. A spin-off of this approach does without PCs and Relies on hardware, non PC-based devices which are more affordable and portable although less versatile. Language Laboratory type 3 facilitates the integration of Network Based Language Teaching (NBLT) and simultaneous work on different language learning
paradigms such as the structural, the cognitive and the socio-cognitive (Kern and Warschauer, 2000).

2.5  **Advantages of the language labs**

Advantages of both types of language labs have been confirmed by the teachers across the world. Simultaneously, researches across the world have also confirmed additional advantages of the use of the digital language laboratory for teaching of English as a foreign and second language. Wilga M. Rivers (1970) mentions the following positive aspects regarding the use of analogue language lab in teaching English:

(1) … each student may have the opportunity to hear native speech clearly and distinctly. (2) The students may hear this authentic native speech as frequently as he and his teacher desire. (3) The taped lesson provides an unchanging and unwearying model of native speech for the student to imitate. (4) In the language laboratory the student may listen to a great variety of foreign voices, both male and female. (5) Each student may hear and use the foreign language throughout the laboratory session, instead of wasting time waiting for his turn in a large group, as he does in the usual classroom situation. (6) The laboratory frees the teacher from certain problems of class directions and classroom management, enabling him to concentrate on the problems of individual students. (p. 321)
In addition to this, Navas Brenes (2006) states the following observations made by the language teachers and students during a lab session:

- In language lab sessions, students can listen to different speakers recorded in high quality tapes;
- In the language laboratory, each student can participate and practice as much as possible while repeating sentences aloud. If a listen-response-compare laboratory is available, the learner can record the lesson. Then he or she can listen and compare his or her own responses with those of the tape; and
- The language laboratory makes oral-aural assessment easier since teachers may separately evaluate students; thus, learners will not have access to other people’s answers. During an oral exam the teacher can focus on the oral production of the student he or she is interviewing. Afterwards, he or she can listen to the tape and take notes and make corrections. A feedback form with mistakes can be given to students as well.

(p.9)

The invention of digital language labs have added to the facilities in compliance with requirements of communicative language teaching. The contemporary approaches to language teaching consider paralinguistic features such as body language, gesture and prosody as key contributors in
effective second language acquisition. Digital and multimedia applications for foreign language learning provide a more realistic picture of the new language and culture in the classroom to enhance the language learning experience (Brett 1995; Fidelman 1997; Gassin 1992; Hurley 1992 cited in Ponniah, 2009). Comparing the two ways of disseminating language learning instructions following communicative language teaching, Ponniah (2009) asserts that in traditional classrooms only motivated students get an opportunity to interact in pairs and in small groups, but, in technology enhanced environment, more number of students get this opportunity. In the conclusion of the same article he states the results of the research saying that the technology-enhanced learning motivated the students to learn the language with interest. The students also experienced autonomy and independence in the language lab. Students who showed less interest in learning the language in traditional classes, showed positive attitudes in the language lab due to comprehensible input through the use of technology.

According to V. Deepika and M. Kalaiarasan (2012), the direct sound transmission in a digital language lab gives crystal clear clarity. Moreover, the software in a digital lab is more attention enthralling for the students. It is also possible to increase the pace of comprehension as it is possible to provide level specific learning to different students. The multimedia facility of the digital language lab also allows easy integration of everyday situations of language use. The digital labs also allow easy monitoring of
individual students. There is enough scope for feedback and self evaluation that boost the learning process. The networked and internet connected digital labs offer an additional advantage of accessing additional online resources to encourage independent learning. The automated learning environment reduces anxiety and makes the learning process enjoyable. Adding to the advantages A. Ramesh Babu & A. Komuraiah (2011) state that computer based language learning programs could provide second language learners more independence from classrooms and allow learners the option to work on their learning material at any time of the day. Inhibited and other non-English medium background students from rural and urban places can greatly benefit by this type of individualization. In a well planned language lab session, the students also get opportunities to interact and negotiate meaning. In a digital lab, the learners could practice language skills through projects on themes across curriculum.

2.6 Challenges in using Digital labs

While digital language labs hold a range of positive potential, the barriers inhibiting the use of the laboratory cannot be ignored. One of the many challenges faced by digital labs is the cost of initial set up. Establishing a digital language lab means investing in devices for each learner, budgeting for maintenance repair and upgrades, and specialized technical support to answer users' questions and resolve technical problems.
In addition to this, both the teachers and the learners need to be trained in using the technology. On the one hand, the computer may be a real asset in terms of motivation to learn the language, on the other hand, the novelty of the machine may make it seem alien and unapproachable. Negative attitudes towards technology may inhibit them from using it extensively and effectively in their language learning (Phinney & Khouri, 1993). Physical difficulties that the ESL learner experiences on computer may be compounded by negative psychological reactions to the machine, resulting in a spiralling sense of inadequacy inimical to the development of ideas (Pennington, 1996). For a developing country like India where most of the people using computers are first generation users, attitude and aptitude may pose a potential challenge. With the establishment of a digital lab, the teachers need to be trained to have sufficient knowledge in using technology aligned with pedagogical practices necessary for effective language learning. The knowledge of pedagogy clubbed with knowledge in handling technology will probably help the teachers meet challenge of designing and selecting appropriate exercises.

There is a variety of language lab compatible materials available in the market. However, all the available materials may not suit the needs of the learners. Hence it becomes essential for the teachers to spend good amount of time to find, assess, revise and adjust learning materials, activities and tools to fit the needs of their students. The major reasons behind the fall of
language labs in the 1970’s were lack of imagination in devising activities other than repetitive drills and lack of proper training for teachers. The dedicated digital labs use software that have inbuilt materials for language practice. It is possible that the materials are simple, repetitive or unchallenging for the learners and may result in monotony and boredom. Moreover, second language learners from rural backgrounds have less exposure to English, and thus may face greater difficulty in listening to and comprehending the accent of the native speakers (J. Samuel Kirubahar, V. Jeya Santhi, & A. Subashini, 2010). A teacher with sound pedagogical knowledge may anticipate and avoid such problems. Thus, training in using technology to meet pedagogical challenges is essential for the effective use of the digital labs. According to a study by Vrasidas et al. in the year 2010, the most important challenge that emerged in using CALL is the length of curriculum. They have further stated that the pressure to cover the required content and the limited timeframe were two major concerns. These problems are faced by the teachers in India at all levels.

Managing large classes has always been a challenge at all levels for a country like India. At all levels average strength of students per class is sixty. Against that, the common digital language lab setup consists of 25 client computers. Thus, the setup is inadequate to provide intensive individualized language practice to all the learners of a class.
Despite these limitations and obstacles, it must be realized that the computer’s educational potential is immense. Teachers and students must become familiar with using the computers and its various functions.

2.7 Communicative Language Teaching & the Digital Language Lab

As mentioned in section-2 above, language teaching approaches and technology for teaching and learning developed simultaneously. By 1970, the language teachers started observing discrepancy between the language teaching goals and methods used (Freeman, 2000). The theory of communicative language teaching developed and received acceptance around the same time. The *communicative competence* became the goal of language teaching and learning. The students were not supposed to learn mere language structures. They were expected to learn how to use language in the real situation. According to Littlewood (1981), a characteristic feature of CLT approach is that it pays systematic attention to functional as well as structural aspects of language. Along with this, the language teaching-learning process was modelled upon L1 acquisition model that required new methods and techniques like pair and group work along with exposure to authentic and real use of language. Freeman (2000) states the following key principles of communicative language teaching:
a. Use of ‘authentic language’ – language as it is used in the real context,
b. Use of situations likely to promote communication,
c. Teaching of grammar and vocabulary through function and situational context,
d. Language teaching at suprasentential level,
e. Practice in figuring out the speaker’s intention,
f. Use of games and communicative activities,
g. Focus on fluency before accuracy, and
h. Collective as well as individualized feedback.

The digital language lab through its multimedia support allows use of authentic materials that give exposure to the use of the language in real life like situational context necessary for communicative language teaching. The contextualized language input gives better comprehension of vocabulary and grammar. The multimedia content reduces stress and makes the learning process enjoyable and interesting. A networked and internet connected language lab allows access to additional content. The learners, in a digital language lab, get exposure to different voices and accents along with different structures in different situations. The audio visual support makes language learning experiential. The learners get non-verbal clues through audio-visual content that build context for the language comprehension.
The modern labs also promote collaborative work supported by constructivist approach to language teaching owing to its network facility. It is also possible to take into consideration individual differences and learning styles that affect the language learning process. Digital language labs also allow self-paced learning with individualized feedback that promote communicative and constructivist models of language teaching. According to Schoepp and Erogul (2001), the use of computer technology helps develop learner autonomy and independence as well as the growth of self-access language learning. Students gain confidence in “learning by doing” in an interactive environment. According to Sarfraz (2010), Computer-based learning provides an environment that combines the feeling of security, novelty and exposure to real world language use. She further states that computer-based learning also helps students control their own learning pace, increase self-esteem and improve command over language skills along with essential life skills.

2.8 The Digital Language Laboratory Software

There are many types of digital labs in use as mentioned in the previous section of the chapter. Software based and the internet connected multi-purpose labs are widely used these days. There are many software providers that prepare software and materials for undergraduate learners of different
streams of education. Given below is the review of selected softwares in use at UG level these days.

### 2.8.1 Orell Multimedia Language Labs

Orell Language Lab software is developed by Orell Technosystems (India) Pvt. Ltd., Kochi. The Orell language lab set up consists of a teacher console to monitor all student functions and student consoles for practice. The teacher console acts as a control board for the teacher to monitor the activities of students while they practice the lessons. The main function of the teacher console is to design classes, sessions & lessons. Once the students log in to the Orell Language Lab they could access the pre-recorded lessons at the teacher console. The teacher could interact with students individually from the teacher console without disturbing others.

In addition to this, the Orell teacher console offers the following facilities:

- It regulates functions to monitor all student consoles.
- It provides facility to pre-setting the lessons, batches and sessions for the academic year.
- It is possible to pay individual attention for all each student, without disturbing the rest.
- There is a provision for converting already existing passages recorded in tapes into digital format.
• The set up can be used for teaching any language. (Orell Multimedia Language Lab, 2011)

2.8.2 Smart Lab

Smart Lab is a product of Language Lab India, New Delhi. It has many features common with Orell software. The Smart Lab website claims the following key features of the set up that the company provides.

| Listening | Voice Chat |
| Speaking | Text to speech |
| Reading | Dictionary |
| Writing | Broad Cast |
| Recording | Screen Capturing |
| Comparing | Content Development |
| Two way Communication | File Transfer |
| Call Teacher | Video Recording |
| Saving files | Monitoring |
| Group Discussion | Lesson Creator |
| Grouping | Interactive Learning |
| Pairing | Online Examination |
| Text Chat | |

- Voice Chat
- Text to speech
- Dictionary
- Broad Cast
- Screen Capturing
- Content Development
- File Transfer
- Video Recording
- Monitoring
- Lesson Creator
- Interactive Learning
- Online Examination
The company also specifies minimum and recommended system requirements as the following:

<table>
<thead>
<tr>
<th></th>
<th>Teacher Console</th>
<th>Student Console</th>
</tr>
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<tbody>
<tr>
<td><strong>CPU</strong></td>
<td>Minimum P4 1.6 GHz</td>
<td>P4 1.6 GHz</td>
</tr>
<tr>
<td></td>
<td>Recommended Core 2 duo 1.8 GHz</td>
<td>Core 2 duo 1.8 GHz</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>Minimum 512 MB</td>
<td>512 MB</td>
</tr>
<tr>
<td></td>
<td>Recommended 1GB</td>
<td>512 MB</td>
</tr>
<tr>
<td><strong>VGA Adapter</strong></td>
<td>Minimum 32 MB</td>
<td>32 MB</td>
</tr>
<tr>
<td></td>
<td>Recommended 64 MB</td>
<td>64 MB</td>
</tr>
<tr>
<td><strong>Sound Adapter</strong></td>
<td>Minimum Duplex</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Recommended Duplex</td>
<td></td>
</tr>
<tr>
<td><strong>Network</strong></td>
<td>Minimum 10 / 100M share or switch network.</td>
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<tr>
<td></td>
<td>Recommended 10 / 100M share or switch network.</td>
<td></td>
</tr>
<tr>
<td><strong>OS</strong></td>
<td>Minimum Windows XP / 2000 / NT</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Recommended Windows XP / 2000 / NT</td>
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</tbody>
</table>
2.8.3 ETNL

ETNL is a product of eTail Networks Limited, Kochi, India. The company also operates in the US and UK. The software company offers ELT courseware, Library software, Communication Labs, Learning Management Software, Audio-visual labs along with Language Labs. ETNL language labs provide a multilingual platform along with major facilities equivalent to the Orell and Smart Lab set ups. However, the teacher console of the software includes some attractive features for creative teachers such as:

- Lesson creation with auto assist
- Editing of existing lessons
- Student grouping
- Group text chat

The auto assist for lesson creation works like authoring tools and provides templates to feed in the content. Editing of the existing lesson is a very useful feature that helps in making the content learner fit. Student grouping and group text chat facilitates collaborative learning and communication practice. These kind of facilities create a virtual communicative environment necessary for effective second language learning (ETNL eTail Networks Limited, 2011).
2.8.4 Globarena Digital Labs

Globarena digital lab is a product of Globarena Technologies Pvt Ltd., Hyderabad, India. This software has been installed in the labs under the first phase of Digital English Language Lab Project of the Government of Gujarat. The software has a teacher console and clients. The teacher console offers facilities equivalent to Orell and Smart Labs. The technical specifications in almost all software providers are the same. However, the Globarena software lacks existing lesson editing and lesson creation facilities of ETNL. The software offers language practice content at three levels: Level 1, Level 2 and Level 3 that can roughly be categorised as Pre-intermediate, Intermediate and Upper-intermediate. Each level has content and exercises for practicing listening, speaking (repetition), reading, writing, vocabulary and pronunciation. The materials offered are structural and lack contextualized language use. However, the software offers facilities for audio-visual broadcast and for teacher prepared content without hyperlinks (Globarena, 2011).

2.9 Researches in the field of digital language labs

The concept of digital language lab is comparatively new. However, there are adequate number of researches conducted in order to study the potential of the use of technology in second language learning. Vanderplank (2009) has cited several position papers on the use of the technologies. Hoven's
(1999) study claims that ‘computers give learners freedom to work at their own pace and level, and to receive immediate and personalized feedback’. The author devotes considerable space to discussing listening and viewing comprehension, yet omits the basic research literature on television and video in language teaching and learning. In the end, the article represents more of an aspirational checklist and many of the issues raised involving learner choice, flexibility of options, learner interaction, materials design and the role of the teacher are the focus of the research described in the survey.

Another frequently cited position article is by Tschirner (2001), which sets out seven hypotheses in an attempt to apply SLA (Second Language Acquisition) models to the use of digital media in class and the language labs, arguing that new technologies can provide opportunities for enhanced input, output, situated learning, focus on form and the development of memory. Tschirner makes a valiant and sustained attempt to draw digital media into SLA models but unfortunately this produces an unbalanced position with poorly referenced assertions of what we are supposed to know about language learning and teaching and how digital media can enhance these practices. He proposes a rather inefficient and time-wasting model of digitally-enhanced language learning based on principles akin to child language acquisition rather than adult learning models. While it is true that digital media are a step forward in terms of both teacher and learner control,
one does not need SLA models to see their benefits and their drawbacks in the classroom and language labs.

In addition to this, an insightful article by Hulstijn’s (2003) on connectionist approaches takes the view that the acquisition of many forms of cognition, including language, takes place in several phases: (i) the accumulation of a number of information units, (ii) the building of a network of these units with different association strengths between them, reflecting frequency and regularity effects of the input, and (iii) the eventual forming of abstract categories and combinatorial rules. This acquisition order may be at work simultaneously at different levels and domains. In Hulstijn's view, vocabulary acquisition and the automatization of word-by-word understanding processes may be the two most crucial factors to boost L2 acquisition, and the computer may be effectively used in the acquisition of these skills. Hulstijn describes a piece of specially-designed software, called I 23LISTEN, for training students intensively in word-recognition skills using short selected videotexts at an appropriate level without subtitles, with delayed subtitles and with simultaneous text display.

Salaberry (2001), in his excellent retrospective of The Modern Language Journal technology articles, argues that whereas most new technologies may have been revolutionary in society, it is not clear that they have achieved equal degrees of pedagogical benefit in second and foreign language
teaching. Pedagogical effectiveness of different technologies is, he claims, related to four major questions: (a) Is increased technological sophistication correlated to increased pedagogical effectiveness? (b) Which technical attributes specific to new technologies can be profitably exploited for pedagogical purposes? (c) How can new technologies be successfully integrated into the curriculum? and (d) Do new technologies provide for an efficient use of human and material resources? These questions figure highly in the present review, indeed they are central to many of the studies reported here.

Several studies have been conducted to examine the appropriateness of teaching approaches suitable to the purpose of developing communication skills in students. Computer-assisted language learning can reduce the anxiety of students and turns out to be a positive side of learning (Gates, 1997). Researchers show that students have positive attitude toward the use of computers for language learning. Warschauer (1996) reports that most students become motivated if teachers integrate multimedia in the curriculum, provide opportunities of interactivities, and help them get knowledge and computer skills. The more familiar students were with technology, the more positive attitude they had toward technology (Jones, 1992).
Multimedia and Computer-Mediated Communication have been utilized to affect a whole new learning experience. Many teachers and scholars have reported studies of the effectiveness of educational instruction on achievement and students' attitudes regarding learning with technology (Salaberry, 2001). According to Schoepp and Erogul (2001), the use of computer technology helps develop learner autonomy and independence as well as the growth of self-access language learning. Students gain confidence through "learning-by-doing" in an interactive environment. Computer-based learning provides an environment that combines the feeling of security, novelty, and exposure to the real world. It also makes students control their own learning pace, increase self-esteem, and improve academic skills. Pow (1999) indicated that learners experienced the value of group work when they were engaged in interactive activities online. Fujieda (1999) stated that learners who were involved in group work had positive feedback to the application of technology. Students perceived the value of word processing, paid more attention to mechanics in writing and favoured computer-based writing (Cunningham, 2000). The teacher's role, as the designer and facilitator has remained the same except that the instructor must develop computer literacy, and create activities based on his/her understanding of the characteristics of the new technology. Teachers who use computer or Internet as a tool in language teaching also develop their professional growth. The exposure to numerous teaching websites and
authentic resources enables teachers to review valuable materials and make necessary adaptations to meet learners' needs. Technology-supported tasks foster the development of cognitive strategies, socio-affective strategies, and meta-cognitive strategies (Loyo & deMagnago, 2001).

In a new trend of technology based learning, only through the teacher's experimenting with using IT, like the Internet and Computer-Mediated Communication, can both learners and teachers realize what they can or cannot do (Chen, 2001; Mantel-Bromley & Miller, 1991). The audio-visual aided multimedia language lab though exciting, is considerably complex. Computers in a lab, e.g., "provide tools and resources but it is up to the learner to do something with these in a simulated environment" (Kern, R & Warschaur, M (2000)). The usefulness of software for interactive learning depends on its specific requirement. Mostly, the aids in a language lab focus on developing the speaking skills through presentations, discussions, role play etc and provide online assistance for reading comprehension and writing composition skills. Learners experiment with specific programs independently under the supervision of lab teachers and are more receptive to suggestions and corrections from the software than to the teachers in the traditional classroom.
Roby (2004), in providing the most comprehensive review of language lab research up to the present survey period, at least in the United States, takes an unequivocal position with regard to the status of language. Roby proposes that by the 1990s language labs had been re-defined as multimedia learning centres in some universities with video and computers in evidence. However, in the UK, if not elsewhere, it was not until well into the 21st century that there were fast, reliable computer-based language labs with the same functionality as analogue language labs in terms of distribution and control. Although he suggests that the term ‘Language Laboratory’ is obsolete, it appears to be remarkably resilient among teachers and learners as the preferred term compared with others: a view corroborated by Perez-Paredes's (2002) survey of language lab technologies in which he argues, with some justification, for a much longer-term (30-year) view of integrating our new digital language labs.

Ponniah (2009) examines the learning experience of adult ESL students in an input rich digital multimedia language laboratory and their attitude towards the application of multimedia in language learning. The data was collected from eighteen third year undergraduate ESL students from an engineering college affiliated to Anna University, Tirunelveli, India. The treatment period lasted three months (one semester), three periods a week in a digital multimedia language laboratory. At the end of the treatment period, the students were given a questionnaire containing two questions to assess
the learning experience and to know how effectively they make use of the resources. The results showed that the technology-enhanced learning motivated the students to learn the language with interest. They experienced autonomy and independence in the language lab. Students, who showed less interest in learning the language in traditional classes, showed positive attitudes in the language lab because they are inspired by the marvelous functions of the technology and they received more comprehensible input that facilitated acquisition.

Waxman, Lin & Michko (2003) carried out a study to estimate the effects of teaching and learning with technology on students cognitive, affective, and behavioural outcomes of learning, 282 effect sizes were calculated using statistical data from 42 studies that contained a combined sample of approximately 7,000 students. The result indicates that teaching and learning with technology has a small, positive, significant effect on student outcomes when compared to traditional instruction.

Sarfaraz (2010) in her study attempts to explore the effectiveness of the multi-media language lab as a supplement to the language courses being offered at the undergraduate level in Pakistan. The study was conducted to identify the motivations and attitudes of those students who reported that they benefited from the multi-media language lab. For this purpose, 100 college students of the Business Administration Program registered in the
English Oral Communication course, with various levels of English proficiency served as subjects. Their pre-semester and post-semester results were collected, they were asked to answer a questionnaire sessions. In addition, the language-lab teachers were asked to record their class observations and evaluations. The questionnaire was designed to find the students’ motivation and general attitudes toward language learning, computers, technology, people, and so on.

The results indicated that the subjects were more or less positive to the technology enhanced environment of the language lab. The following points were noted: students ranked three activities: pronunciation skills, presentation skills and crossfire/argumentation, higher than the teachers ranking of the same activities, indicating that students show positive attitude towards the use of multi-media resources in their language learning program .This study focusing on the students first reactions to computer usage in a language lab, presents sufficient evidence to show that 'multimedia language lab' can be more effective than the traditional classroom as supplement to the English language program for improving communication skills. Without an instructional goal for the sessions, the study is preliminary or exploratory in its nature. It provides one piece of the puzzle in describing the language learning potential found in this particular sample of students. It also shows that the language learning ability of the students underwent a positive change in the setting of the multimedia lab, and language teaching in a
setting other than the traditional classroom is still a promising trend with immense educational potential. In actual implementation, teachers should take the broader context in consideration and find the most appropriate use for the language lab as an integral part of the entire curriculum.

Barge (2009) in the summary of his study on teaching techniques for multimedia language labs highlights that pedagogical sound practices play a fundamental role in the effective delivery of multimedia lab-based language teaching and learning. He further states that in order to be effective practitioners in multimedia lab-based teaching environments, teachers need a high degree of both technical and pedagogical competence.

2.10 Principles in designing CALL

With the advent of information communication technology, language learning through technology has become an important implications for second language acquisition (Chapelle, 2001). New theories and applications of language learning and teaching are exploring the benefits of technology to facilitate SLA. In these activities, instructional design based on the communicative language teaching paradigm has significantly changed language teaching and learning practices in computer-assisted language learning or CALL environments (Chapelle, 2001).
The research findings suggest that the success of any educational process should be based on sound pedagogical principles and interactions. Pennington (1996) notes that an ideal teaching system:

- Helps learners develop and elaborate their increasingly specified cognitive representation for the second language
- Allows learners to experiment and take risks in a psychologically favourable and motivating environment
- Offers input to both conscious and unconscious learning processes
- Offer learners opportunities to practice and to receive feedback on performance
- Puts learners in touch with other learners
- Promotes cultural and social learning
- Promotes interactivity in learning and communication
- Exposes the learner to appropriate contexts for learning
- Expands the learner’s ‘zone of proximal development’
- Builds to learner independence

Thus, the use of technology can create a virtual classroom fulfilling all conditions for communicative language teaching.

**2.11 Principles for CALL evaluation**

CALL has always been viewed as an experiment requiring scrutiny and justification beyond what is expected of evaluation of other classroom
activities. There are incidents where experiments in the use of CALL are over even though the results are inconclusive (Chappele, 2001). One of the obvious reasons may be the use of computers for various purposes by the learners. This makes the CALL design task challenging for the teachers and software developers. Thus, following the need to make judgements about CALL, many teachers and CALL enthusiasts have developed guidelines, checklists and evaluation rubrics for CALL materials.

The evaluation criteria are never easy to develop. So far as CALL materials are concerned, researches suggest that CALL evaluation should be a situation specific argument to be applied to a particular context. It requires judgemental analysis of software and planned tasks along with empirical analysis of the learners’ performance. Finally, the evaluation should have clear guidelines for using it (Chappele, 2001).

The CALL materials can be evaluated in three key areas: CALL software, Teacher-planned CALL activities and Learners’ performance during CALL activities. The first two of the three can be judged using judgement as method and the third is empirical and requires tryout and experiment. In CALL use and evaluation, the teachers may not have much choice in judging the CALL software. However, it is possible to ensure appropriateness of teacher-planned activities and materials used using the following criteria.
**Language Learning Potential:** This refers to the extent to which the activity can be considered to be a language learning activity rather than simply an opportunity for language use. The difference between language learning and language use might best be characterized by the extent to which the task promotes beneficial focus on form.

**Lerner fit:** On the one hand, Language learning potential takes into consideration general processes while on the other, *learner fit* takes into account the individual differences in linguistic ability level and non-linguistic characteristics. To meet this criteria, the teacher chooses tasks that will provide learners an opportunity to work with a range of target structures appropriate to their level (Shekhan, 1989).

**Meaning focus:** This denotes that the primary attention of the learner is directed towards the meaning of the language that is required to accomplish the task as defined by Pica, Kanagy and Falodun (1993) (as cited in Chapelle, 2001). The importance of meaning focus in language learning task goes without saying but needs conscious attempts when form is also to be considered.

**Authenticity:** Authenticity is degree of correspondence between an L2 learning task and situation the learners encounter in real life outside the classroom. The tasks should engage the learners’ interest resulting into willingness to participate. The current theory of communicative language
ability defines authenticity as situation specific, implying that development of ability in language for particular purposes requires practice in using language for those purposes (Bachman & Palmer (1996) as cited in Chapelle, 2001).

Positive impact: As it is expected with the assessment tasks, the CALL task should have its effect beyond its language learning potential. Ideally classroom language learning tasks teach more than language. They should help learners develop their cognitive strategies in a way that will allow them learn language beyond classroom. The CALL tasks should engage learners’ interest in the target culture for effective language retention.

Practicality: It is important the CALL tasks are easy to implement for the teachers and the learners. Availability of adequate hardware and software is necessary. Practicality also means availability of human resource who can solve unforeseen problems. CALL users are not expected to solve technical problems. Therefore, it is necessary that the CALL materials are easy to use.

2.12 Conclusion

This chapter thus, reviewed the literature associated with the main areas of interest on this study. A description of an overview of the theories related to language learning and second language acquisition in particular, followed by a section on the place of technology within the framework of these
theories is given. This then led to the development of the language laboratory followed by examination of positive and negative potential offered the digital language labs. The subsequent section dealt with the principles in designing CALL programs. Finally, the chapter concludes with the evaluation of the CALL signifying its implications of the current study.