CHAPTER 2
LITERATURE REVIEW

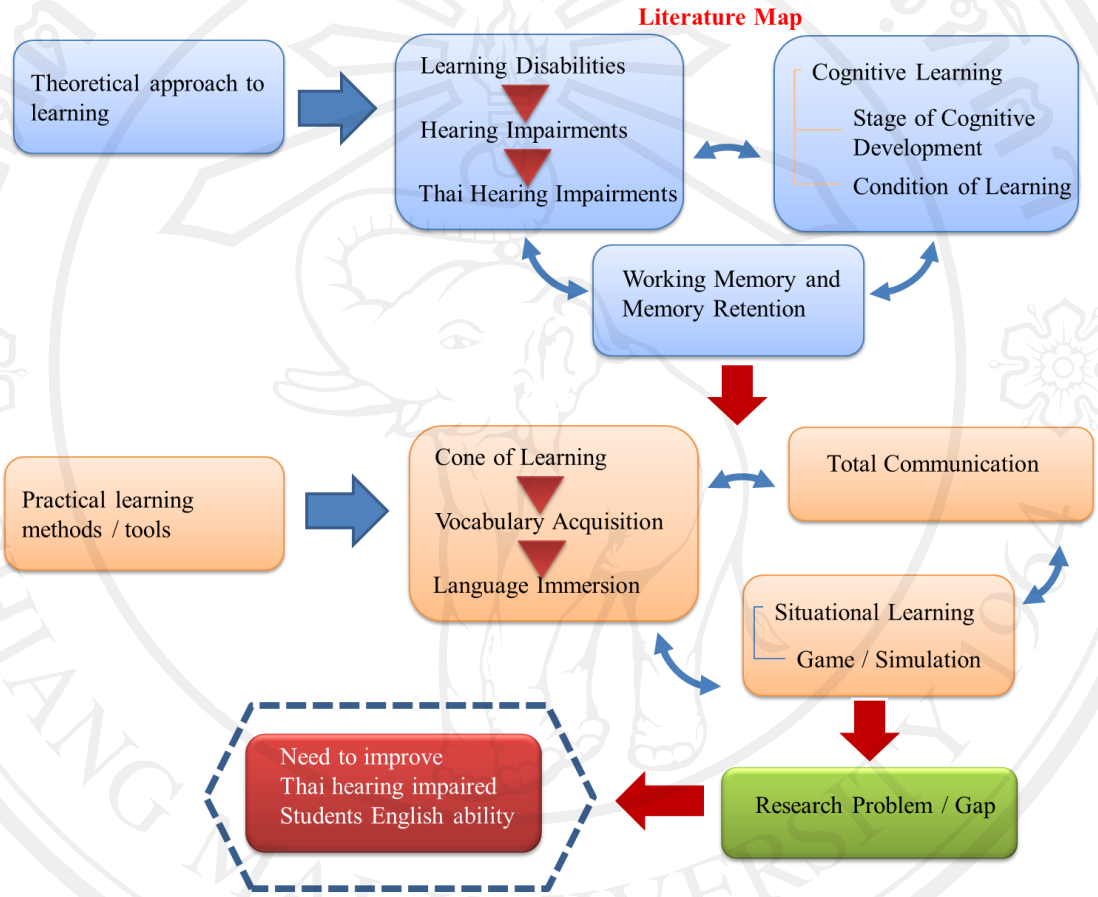

Figure 2.1 Literature review map

This chapter outlines the literature associated with the research problem and potential solution. In this research, there were two major areas of literature. The first part deals with the problem justification literature, which includes the theories of learning disability, cognitive learning, working memory and memory retention. Together these theories constitute the problem justification of this research and describe the methods of learning, memorizing, recalling, and recognizing vocabulary. The second part of literature review comprises, the tools and methodologies, which can be combined to create a problem solution. These theories are the Cone of Learning, Vocabulary Language Acquisition, Language Immersion, Conditions of

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Learning, Total Communication and Learning System for Students with Hearing Impairments that together consolidate to create research methods to solve the problem. Figure 2.1 shows the literature map and identifies the connections between each body of literature and how the research problem emerges from this literature.

2.1 Theoretical Approaches to Learning

2.1.1 Learning Disability

Learning disability is a general term that describes specific types of learning problem (http://www.learningrx.com/learningdisablities.htm). A learning disability can cause a person to have difficulties inlearning and using certain skills. The skills most often affected are: reading, writing, listening, speaking, reasoning, and mathematics. Learning Disabilities can be categorized into Articulation Disorder, Attention Deficit Hyperactivity Disorder, Auditory Processing Disorders, Dyscalculia (Developmental Arithmetic Disorder), Dysgraphia (Developmental Reading Disorder), Dyslexia (Developmental Reading Disorder), Dyspraxia (Motor Planning / Sensory Disorder), Expressive Language Disorder, Receptive Language Disorder, and Visual Processing Disorder.

Auditory Processing Disorder (APD) also known as central auditory processing disorder (CAPD), is a complex problem affecting about 5% of school-aged children. These children cannot process the information they hear in the same way as others because their ears and brain do not fully coordinate. Something adversely affects the way the brain recognizes and interprets sounds, most notably the sounds composed of speech.Children with APD often do not recognize subtle differences between sounds in words, even when the sounds are loud and clear enough to be heard. These kinds of problems typically occur in background noise, which is a natural listening environment. Children with APD therefore have basic difficultiesinunderstanding any speech signal presented under less than optimal conditions. There are many possible causes of APD; they include head trauma, lead poisoning, and chronic ear infections. Sometimes the cause is unknown. With regards

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to learning, hearing disabilities cause five main problems that affect both home and school activities.

First, Auditory Figure-Ground Problems can occur when the child cannot pay attention when there is background noise. Noisy, low-structured classrooms could be very frustrating. (How does this relate to the schools and the deaf school?)

Second, Auditory Memory Problems occur when the child has difficulty remembering information such as directions, listing, or studying materials. Third, Auditory Discrimination Problems can occur when the child has difficulty hearing the difference between sounds or words that are similar. This problem can affect a child's ability to follow directions, read, spell, and write among others. Fourth, Auditory Attention Problems occur when the child cannot maintain the focus for listen long enough to complete a task or requirement.

Lastly, Auditory Cohesion Problems can make higher-level listening tasks are difficult. Auditory cohesion skills — draw inferences from conversations, involve understanding riddles, or comprehending verbal math problems and require heightened auditory processing and language skills. They develop best when all the other skills (levels 1 through 4 above) are intact.

In order for this research to comply with fairness and credibility, an investigation was implemented to assess whether the students had only a hearing impairment or additional learning disabilities. A list of the students' educational profile has been completed.

In terms of this research, this theory will support the pattern of learning disability for using in the hearing impaired as the case study of this research.

2.1.2 Hearing Impairment

A hearing impairment is the result of damage to the tissues or organs that are inside the ear. The degree of hearing loss depends on the severity of that damage. There are two types of hearing impairment; "conductive hearing impairment" is a term used when the problem causing the hearing impairment is in the ear canal or in

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the middle ear. It is then difficult for sound to be conducted through to the inner ear. The problem can often be corrected by treatment, or if it cannot, the patient can be helped by wearing a hearing aid. The “sensorineural hearing impairment” is a term used when the problem causing the hearing impairment is in the cochlea or in the hearing nerve or sometimes both. The "sensory" part comes from the cochlea which is a sense organ and the neural part comes from the hearing nerve. Hearing aids can sometimes be used to help hearing (World Health Organization, 2006). The causes of hearing loss vary from person to person and are related to the individual’s circumstances. Hearing loss can be caused by many factors including causes before and during birth, such as diseases during pregnancy, drugs, premature birth is difficult birth when the baby suffers from lack of oxygen and jaundice after birth, and the consanguineous marriage, the causes after birth such as frequent exposure to loud noise, a serious head injury, or aging, accident (World Health Organization, 2006). The main method currently used to communicate with hearing-impaired individuals is via sign language. The majority of the population in Thailand considers education as very important and the deaf community is also in accord. (World Health Organization, 2006). The deaf have little chances to communicate with non-hearing impaired people. Therefore, the only way for them to communicate is to use the means of the Thai Sign Language. The Thai Sign Language (TSL) is the national sign language of Thailand's deaf community and is used in most parts of the country. The Thai Sign Language was acknowledged as "the national language of deaf people in Thailand" in August 1999, in a resolution signed by the Minister of Education on behalf of the Royal Thai Government (Reilly, et al.1999).

2.1.3 Cognitive Learning

According to Schuman’s research (Schuman,1996) learning theory can be classified into behaviorism, cognitivism, and constructivism. Behaviorism focuses on a new behavioral pattern being repeated until it becomes automatic. Based on the thought process behind the behavior, cognitivism is used as an indicator to describe what is happening inside the learner's mind. Constructivism focuses on preparing the learner to solve problems that are in ambiguous situations. Cognitive learning is the result of listening, watching, touching or experiencing. This is described in Figure 2.1

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below. (Cognitive Model of Learning by Sharon Derry's review of cognitive learning theory)

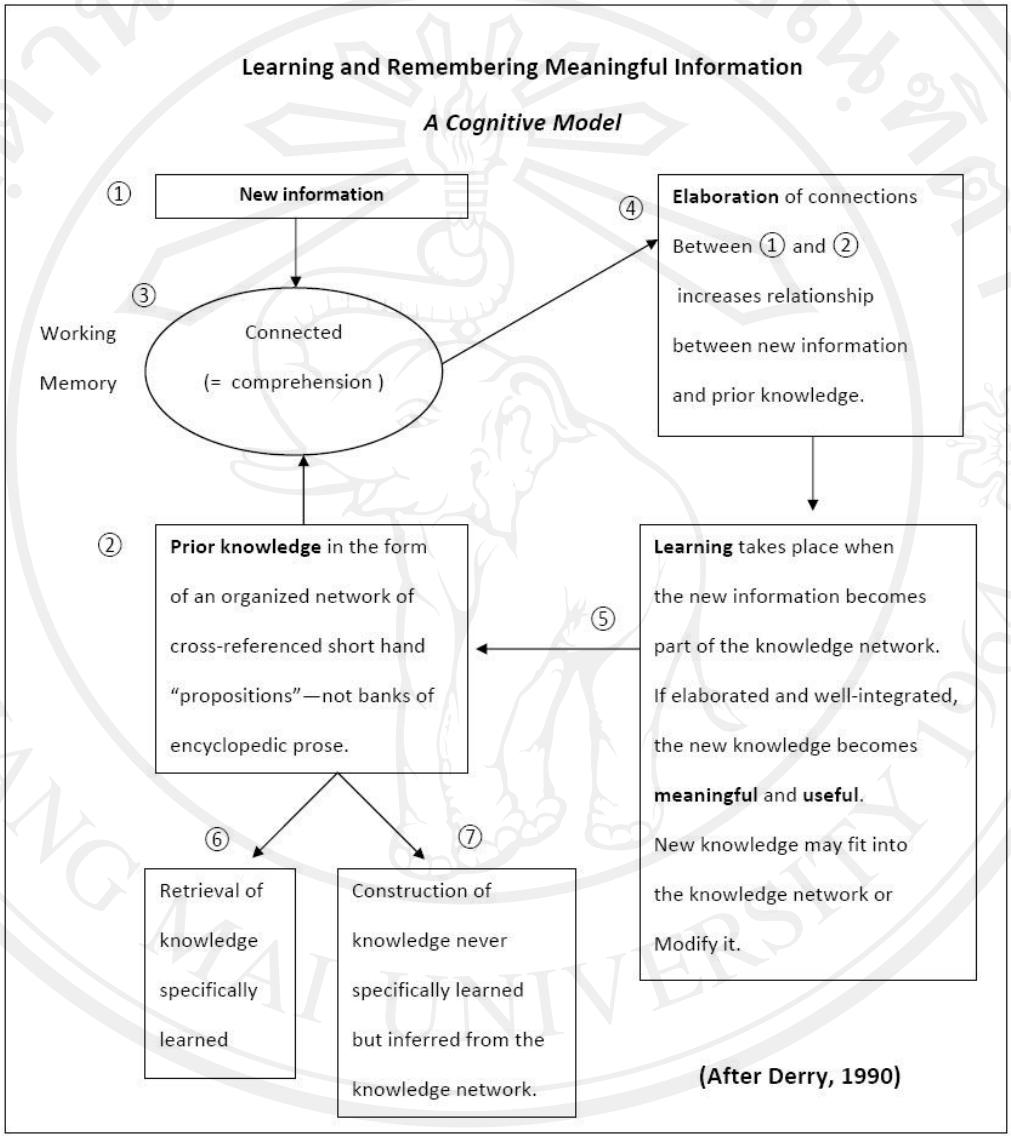

Figure 2.2 Cognitive Model of Learning Derry (1990).

Based on the Cognitive Model of Learning by Derry (1990), learning and remembering meaningful information for a person is set in a pattern. First, new information is obtained through human contact, reading literature, media and sound. In addition, prior knowledge comes from experience or learning. Therefore, people have already gone through life absorbing useful information that provides benefit for their life and a way for living. From here, new information and prior knowledge has

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been fused together to form comprehension or a working memory. Next, elaboration is formed when there is a connection between new information and prior knowledge, thus increasing their relationship. After elaboration, learning starts to resume as new information is integrated with the knowledge network. If utilized effectively knowledge then becomes meaningful and useful. Finally, learning revolves around prior knowledge. This enables the person to retrieve knowledge that was specifically learned. However, the construction of knowledge was never specifically learned. Based on the literature of cognitive learning, the study provides a good start to set the concept of how a person learns. Although the work may be biased against the hearing impaired because of they learn from sign-based to text-based not from phonological or speech-based that effected the linking process of limited prior vocabulary and new vocabulary, the cognitive learning model by Derry can be used as the critical link that maps out a structured plan in creating a device for the hearing impaired.

2.1.4 Stages of Cognitive Development

Piaget (1896 - 1980) was the first psychologist to create a systematic study of cognitive development. His work includes a theory of cognitive child development, detailed observational studies of cognition in children, and a series of simple but inspired tests to reveal different cognitive abilities.Stages of Cognitive Development in a child's cognitive development arerelatedto a child developing or constructing a mental model of the world. Piaget was interested both in how children learnt and in how they thought. Piaget studied children from infancy to adolescence. For his Stages of Cognitive Development, and the results from empirical research, Piaget showed patterns in their responses to intellectual tasks. Children of similar ages responded in ways that were, at the same time, remarkably similar and yet remarkably different from adult responses and expectations. Similarly, children at different ages had their own characteristic way of responding (Labinowicz, 1980). Table 2.1 illustrates the four cognitive developmental stages categorized by Piaget. According to Piaget's stage theory, children progress through a sequence of qualitative transformations, advancing from simple to more complex levels of thought. He proposed four main stages of cognitive development: sensorimotor, preoperational, concrete operational and formal operational. The first two stages of cognitive development, the

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sensorimotor and preoperational periods, are collectively termed the preparatory, prelogical stages. Also, the concrete and formal operational stages are in a group of termed the advanced, logical thinking stages. Each individual stage, nevertheless, is characterized by specific developmental milestone (Shuman, Brian B. & Capone, Nina C, 2009)

Beginning at birth and extending to the age of two, the child coordinates their physical actions. This stage is termed the sensorimotor period meaning the development of the physical perception that is comprised of movement, visual and audio. The two years to seven years stage called is the preoperational stage where the child learns to use language and to represent objects by images and words or in terms of language learning, they start to learn theirfirst language. At seven to eleven years, this period is called the concrete operational stage where they can think logically about objects and events achieves conservation of number (age 6), mass (age 7), and weight (age 9). Classifies objects according to several features and can order them in series along a single dimension such as size and in term of language learning they start to learn the second language in this period. Eleven years and up is the formal operational stage. In this period they can think logically about abstract propositions and test hypotheses systematically and become concerned with the hypothetical, the future, and ideological problems.

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Table 2.1 Piaget's Stages of Cognitive Development

Stage	Summary
Sensorimotor **(Birth-2 years)**	- Distinguishes self from objects - Identifies self as agent of action and begins to act intentionally: e.g. pulls a string to set mobile in motion or shakes a rattle to make a noise - Attains object durability: realizes that things continue to exist even when no longer present to the sense
Pre-operational **(2-7 years)**	- Studies to use language and to represent objects by images and words - Thinking is still self-centered: has difficulty taking the viewpoint of others - Categorizes objects by a single feature: e.g. groups together classify by color
Concrete operational **(7-11 years)**	- Can think logically about objects and events - Realizes conservation of number (age 6), mass (age 7), and weight (age 9) - Categorizes objects according to several features and can order them in sequence along a single dimension such as size. - 2nd language learning.
Formal operational **(11 years and up)**	- Can think logically about abstract propositions and test hypotheses systematically - Becomes apprehensive with the hypothetical, the future, and philosophical problems

From Table 2.1, Piaget's Stages of Cognitive Development can be summarized to relate with this research in language learning theory in Figure 2.3. This part refers to the period when children start to learn their first and second language. Children start to learn the first language aged between two to seven years or during the preoperational period and start to learn second language aged seven to eleven years. However from the study of Walsh, Terence M. and Diller, Karl C. 1979 they argue that the best period to begin second language learning is some time before six to eight years old. That links to the research problem identified in chapter one, the hearing impaired students in Thailand who start to learn English as second language

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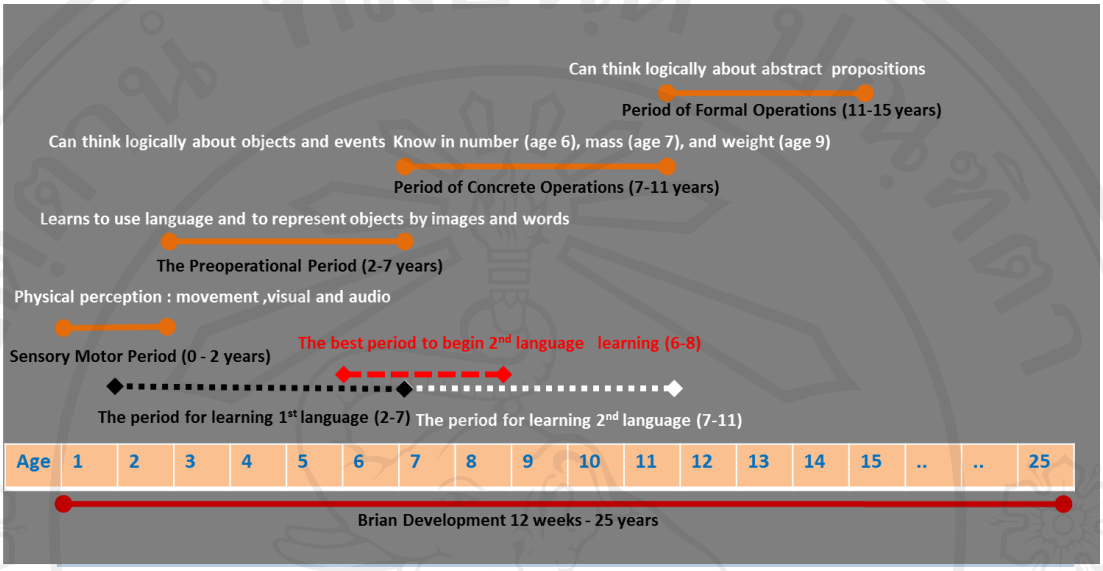
in primary level four to six as 10 - 12 years old which affects second language learning as they cannot become effective in taking part in second language learning.



Sources: Ginsburg &Opper (1998); Labinawicz (1980)

Figure 2.3 Period of language learning adapted from Piaget's Stages of Cognitive Development

2.1.5 Working Memory

According to Buddeley (2007), working memory is comprised of a system for temporary storage that manipulates information. It also forms an important link between perception and controlled action.

In 1974, Baddeley and Hitch proposed that it could be divided into three subsystems. One is concerned with verbal and acoustic information; the phonological loop. The second is the visuo-spatial sketchpad which provides visual equivalency. They are both dependent upon a third subsystem known as the "attentionally"; this is the limited control system, or the central executive.

A fourth subsystem, which is termed as the episodic buffer, has recently been proposed. The system describes particular reference in implications for both the normal processing of language, and its potential disorders.

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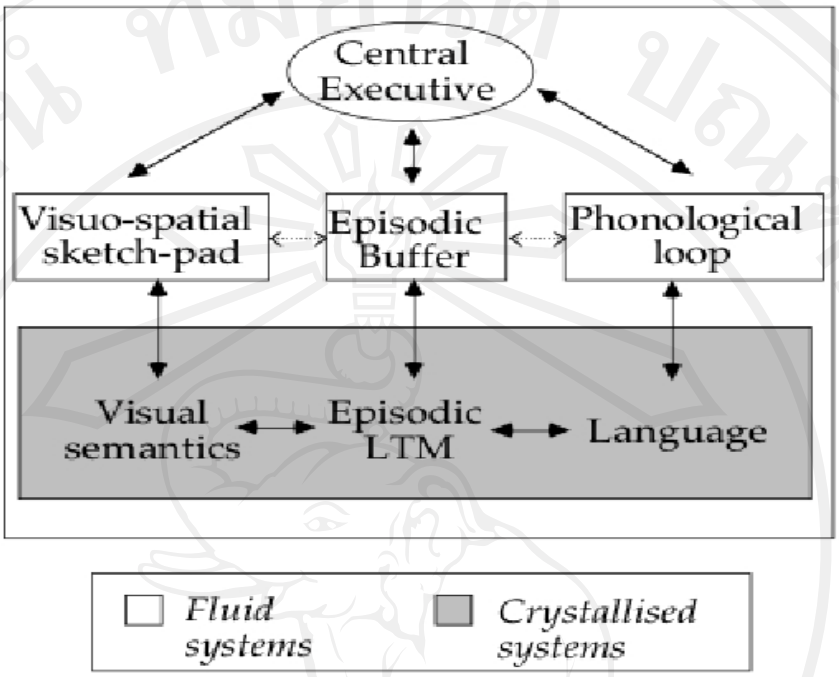

Figure 2.4 Buddeley'sThe model of working memory (2007).

From figure 2 the episodic buffer is assumed to form a temporary storage system that allows information from the subsystems to be combined with that from long term memory into integrated chunks. The system is assumed to form a basis for conscious awareness. In terms of hearing impaired learning, this literature relates to the language development skill that is shown in Figure 2; the language development process in the hearing impaired students connect with visual semantics for transferring and acquiring it into a long term memory that confirms with using an animation and other visual media in this research to support the vocabulary acquisition in the hearing impair students.

2.1.6 Memory Retention

"Learning Strategies Development" (2008) outlined details of the things that make people forget. The assertions for "forgetting and remembering" are as followed:

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The interference or the confusion factor (e.g. mental overcrowding, multi-tasking) is one of the primary reasons that can make a person forget things. Other reasons for forgetting can be identified by the negative attitude or self-concept of the individual. Sometimes these individuals do not learn well enough and easily forget things. The individual can sometimes be faced with not having the right cue, for example the person studied one way but the test question is presented in another way. Also, these individuals can experience a lack of attention or concentration on the material at hand. Things are remembered by the process that starts from thinking to encoding to rehearsing and to retrieving. From here things start to be committed into memory based on pictures.

Memory is developed by organizing, funneling information, associating or connecting with prior knowledge, applying emotion, and grouping the sequence of information together. Long term memory is developed by repeating, reciting, rehearsing, elaborating, connecting, and teaching someone. This research relates with memory retention theory by developing vocabulary retention in the hearing impaired students via promoting the visual perception by using animation and media for learning the English vocabulary: with the system that students can access at anytime and anywhere for the learning rehearsal.

Having considered theoretical approaches to learning, there is a need to understand how these theories are put into practice in the classroom and how they can be leveraged through appropriate tools. The next section considers the current tools and techniques used in the classroom and how their potential for this research.

2.2 Tools and Methodology literature review

2.2.1 Cone of Learning

The cone of learning (Dale. 1969) illustrates the learning level of average people after being taught for two weeks. From the Figure 2.5 there are two types of learning: passive learning and active learning. Passive learning is found in a traditional classroom: instructors lecture and verbalize information to passive note-taking students. The instructor is a ‘verbal’ textbook that reads the definitions to the

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class. Students are considered as ‘empty’ vessels being filled with knowledge or human ‘tape recorders’. Passive learning handles only 10% to 50% of the knowledge retention when time passes are the period of two weeks.

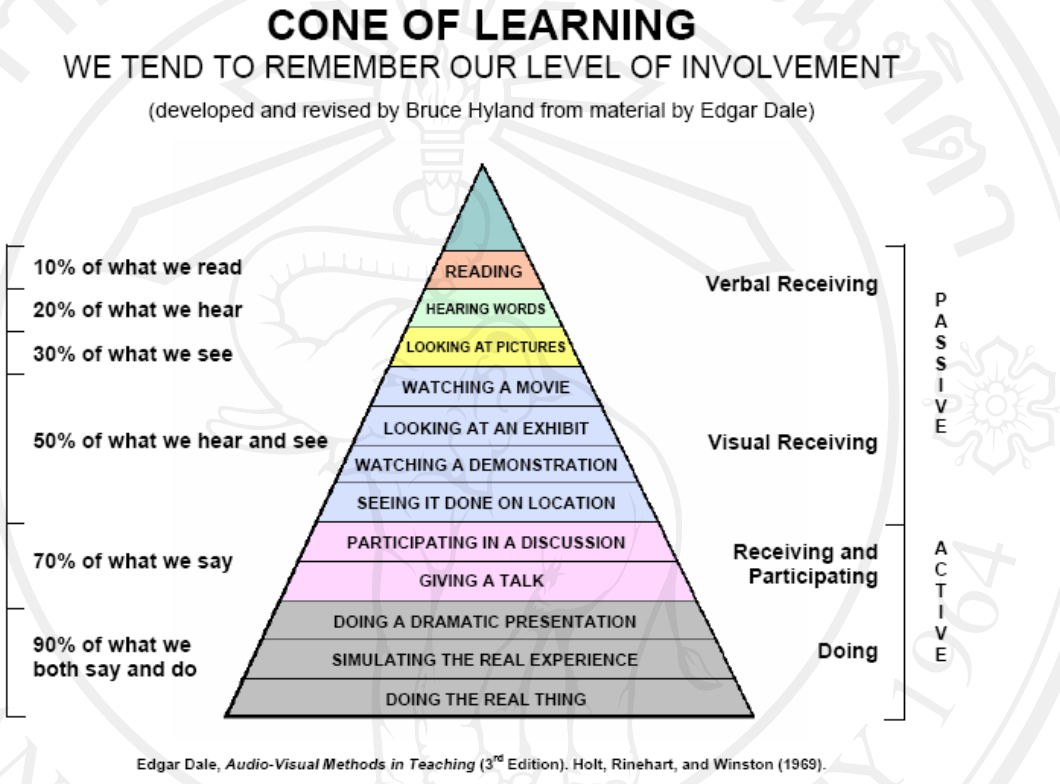

Figure 2.5 Cone of learning Dale. (1969)

In the case of active learning, the instructors create ‘a learning environment’ in which students can learn to restructure new information and their prior knowledge into new knowledge about the content and its application. According to this cone, activities that stimulate verbal perception, visual perception, participation, and performing are brought to class. While conducting active learning, the instructors create ‘a learning environment’ in which students can learn to restructure the new information and their prior knowledge into new knowledge about the content and on how to put it into practice. According to this cone, activities that stimulate verbal receiving, visual receiving, participating, and doing are brought to the classroom. Active learning handles about 51% to 90% of the knowledge retention after a period of two weeks.

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The cone of learning model is a classic example that paints a clear picture on how a person should learn. Since the participation of activities reinforces learning the device created will be able to act as a supportive learning tool to provide students with a hearing impairment a rapid means to learn effectively. The device will link learning behavior, environment, curriculum agendas, as well as instructors to produce a positive outcome for these students' learning abilities.In terms of this research the cone of learning theory is the main reference that supports and answers how to improve learning English for hearing impaired students with active learning.

2.2.2 Vocabulary Language Acquisition

Vocabulary Language Acquisition (VLS) constitute a subclass of language learning strategies, which are applicable to a wide variety of language learning tasks, ranging from the more isolated (vocabulary, pronunciation, grammar) to integrative tasks like oral communication and reading comprehension. Studies such as Schmitt and McCarthy (1997) have shown that language learning strategies are not inherently 'good', but depend on the context in which they are used, their combination with other strategies, frequency of use, and the learners' proficiency level. One of the first attempts at providing a comprehensive overview of language learning strategies can be found in Oxford .R. (1990). For this research setting up the vocabulary acquisition strategies in the hearing impaired students to learn English with active way of communication by situational learning via information technology such as web-based dictionary, animation and situational game.

2.2.3 Language Immersion

Language immersion is another method to improve in the communication of the second language (also called L2, or the target language). This method uses the target language as a teaching tool by surrounding or "immersing" students in the second language. In-class activities, such as math, social studies, history, and those outside of the class, such as meals or everyday tasks, are conducted in the target language. Today's immersion programs are based on those founded in the 1960s in Canada when middle-income English-speaking parents convinced educators to establish an experimental French immersion program to enable their children 'to

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appreciate the traditions and culture of French-speaking Canadians as well as English-speaking Canadians. Based on the French immersion program in Canada (Allen, 2004; Holobow, Genesee, & Lambert, 1991), the studies reported that the students in the French immersion programs achieved significantly better in reading than other students. In this program students are taught absolutely in French for 2 years of elementary school. During the outstanding elementary years, they obtain bilingual instruction. Research shows that, in the early grades, these pupils are slightly behind monolingual English-speakers in literacy skills. However, when these children reach the age at a secondary school level, they get higher scores on reading accomplishment tests than monolingual peers. In this research, the theory is applied in terms of an immersion with technology that uses this idea to develop a tool for improving English learning for the hearing impaired – the term is known as hearing impaired (HI) immersion.

2.2.4 Conditions of Learning

This work is attested to the theory of "Conditions of Learning" by Gagne (1985). According to Gagne's theory, there are several different types or levels of learning. The significance of these classifications is that each different type requires different types of instruction. His work identified five major categories of learning: verbal information, intellectual skills, cognitive strategies, motor skills and attitudes. He states that different internal and external conditions are necessary for each type of learning. For example, for cognitive strategies to be learned, there must be a chance to practice developing new solutions to problems; to learn attitudes, the learner must be exposed to a credible role model or persuasive arguments.

Based on his further studies (Gagne.R, 1985), there is a suggestion that the learning tasks for intellectual skills can be organized in a hierarchy according to complexity: stimulus recognition, response generation, procedure following, use of terminology, discriminations, concept formation, rule application, and problem solving. The primary significance of the hierarchy is to identify prerequisites that should be completed to facilitate learning at each level. Prerequisites are identified by doing a task analysis of a learning/training task. Learning hierarchies provide a basis for the sequencing of instruction.

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Gagne outlines nine instructional events and corresponding cognitive processes:

(1) gaining attention (reception)
(2) informing learners of the objective (expectancy)
(3) stimulating recall of prior learning (retrieval)
(4) presenting the stimulus (selective perception)
(5) providing learning guidance (semantic encoding)
(6) eliciting performance (responding)
(7) providing feedback (reinforcement)
(8) assessing performance (retrieval)
(9) enhancing retention and transfer (generalization).

These events should satisfy or provide the necessary conditions for learning and serve as the basis for designing instruction and selecting appropriate media. From this theory that related this research with using the condition of learning and cognitive process link with hearing impaired students in learning English that will explain a process of cognitive occur between their learning English.

2.2.5 Total Communication

Hawkins, L and Brawner, J mention (1997) that Total communication (TC) is a term invented by Roy Holcomb in 1967(Evans, 1982; Garretson, 1976); it is a philosophy of communication rather than a method (Scouten, 1984). Total communication comprises one or more form of communication (manual, oral, auditory, and written), which can be contingent on the particular needs of the students. The original expectation of TC was for teachers to apply the communication scheme(s) that is most suitable for students at a particular stage of development. Consequently, there would be situations when vocalized communication might be appropriate for use, or situations that require nonverbal action (such as signing and written communication), otherwise synchronized communication might work best in that condition (Solit, Taylor &Bednarczyk, 1992).

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Total communication is perceived as the channel that allows a crossover from an ‘oral-only’ philosophy to a philosophy that elaborates sign language. From the 1970's to the 1980's, most schools and organizational programs for children with hearing impairment supported the TC philosophy. Today, even though the discussion appears to be between TC programs and bilingual-bicultural programs, "simultaneous communication is the most common method used in the educational settings for hearing impaired children" (Kaplan, 1996, p. 469).

TC may be used by parents and instructors. Since more than 90% of the parents of children with hearing impairment can already hear (Moores, 1996; Rawlings & Jensema, 1977), many rely on TC as the philosophy that will permit tractability without removing any of the selections that are required for communicating. By using a total technique of speaking and signing, members within the family have uninterrupted access to communication that is happening in their environment (Baker, 1994). Teachers may provide TC options in their classrooms. Those who choose this form of training will provide a greater development of communication skills for their students.

Most learning occurs through a collaboration process with other people. Such learning becomes potential only when individuals are able to communicate with a good form of understanding. Similarly, the quality of association between the student and his/her parents is reliant on the quality of communication that is being exchanged. Thus, the option of acquiring a communication method where it will be highly effective and advantageous to a student at home and in the classroom is of ultimate significance.

The main advantage of TC is that it can provide opportunities and tactics in communicating for the hearing impaired students. Parents and teachers might be hesitant to select one mode of communication over another. TC, nevertheless, permits a diversity of groupings. Whether it’s psychosocial, linguistic, or academic, research studies have frequently demonstrated the advantageous effects of total communication in all capacities of hearing impaired students’ development, (Vernon & Andrews, 1990). If the efficiency of communication is more significant than its given form

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(Kaplan, 1996), then TC possesses the advantage based on the reason that it allows students to use the form that is appropriate for him in any certain situation.

Although the theory may be wide-ranging, one limitation of TC is that it still needs to go through more experimentation and study in order to prove its credibility as an effective training tool for developing the students' skills. Various students with hearing impairment are immersed in a form of instantaneous communication that does not match their level of language readiness or ability. In the classroom, TC often becomes an instantaneous practice of merging manual modules (signs and finger-spelling) with spoken modules used in the English word order. Though TC educational programs will vary on the collection of a manual system, all appear to be in the association of signing with speech. The precise nature of the two modes (spoken and visual) may reason signers/speakers to revise their messages to accommodate one or the other mode, and to analyze a concession between the two approaches (Wilcox, 1989). Even though the idea of individualization is at the core of TC, teachers are restricted on how many different approaches they can use at one time. It may be difficult for one teacher to encounter all the communication requirements that might be present in a single classroom that is distinguished between a group of hearing impaired students and those that have a hard of hearing. For instance, do the students actually see a good demonstration of either English or sign language when the teacher or parent uses them incompatibly, or are they seeing only deprived examples of broken English or any sign language? Researchers have not come to an agreement as to whether a manually oblique English system points to better reading and writing scores (Mayer & Lowenbraun, 1990). In this research, the author applies the philosophy of TC for creating a sign language animation dictionary for the hearing impaired students so that they are able to learn English that comprises of animated Thai sign language (TSL), picture caption, meanings in Thai and English, International Phonetic Alphabet (IPA), finger spelling, lip reading video and situational media and game.

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2.2.6 Situational learning

Situational learning is a general theory of knowledge acquisition. It has been applied in the context of technology-based learning activities for schools that focus on problem-solving skills (McLellan, 1995). Situate learning places a learner in an actual domain situation (authentic context) and interrelate with other people or the learning environment with real lessons, then the learning happens.This was first proposed by Jean Lave and Etienne Wenger as a model of learning in a community of practice which is learning that takes place in the same context in which it is applied. Lave and Wenger argue that situational learning is usually unintentional rather than deliberate and is not decontextualized knowledge from one individual to another, but a social process whereby knowledge is co-constructed; they suggest that such learning is situational in a specific context and embedded within an activity, a particular social and physical environment (Lave and Wenger,1991). The main principles of situational learning that are knowledge needs to be presented in an authentic context, i.e., settings and applications that would normally involve knowledge and learning and require social interaction and collaboration. Based on the finding of Lave and Wenger, some pedagogies recommended in the research literature on situational activities are as follows: Classrooms (like real world) that comprise of workshops, kitchens, greenhouses and gardens, role playing (in the real world setting) such as military training (also considered as a behaviorist approach), field trips such as archaeological digs and participant-observer studies in an unfamiliar culture, on-the-job-training such as traineeship and cooperative education and exact actions/practice (in the real setting) with the same paraphernalia or devices such as sports, music and arts practice (McDermott, 1998). In addition Anderson el al. claim that situational learning in four main areas of education are, (1) action is grounded in the concrete situation in which it occurs, (2) knowledge does not transfer between tasks, (3) training by abstraction is of little use and (4) instruction must be done in complex, social environments (Anderson el al, 1996).The term “action is grounded in the concrete situation in which it occurs” mean, in each situation knowledge occurs for problem solving in the context, specific situation and represents different knowledge required in such contexts for example, (Lave,1988) showed the case of an Orange County homemaker

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who did very well making a price optimization calculation when in a supermarket but did worse on question-answer mathematics problems in class, Similarly, and another cited example (Carraher and Schliemann, 1985) proposes the example of Brazilian street children who could implement mathematics when making sales in the street but were incompetent to answer the same problems presented in a school context. The term "knowledge does not transfer between tasks" means knowledge occurring in each situation cannot transfer to another and is personalized in each context. The term "training by abstraction is of little use" means the school instructional materials or methods do not match with the real-world environment and is abstract meaning the abstract instruction can be ineffective if what is taught in the classroom is not what is required on the job (Anderson el al, 1996).The term "instruction must be done in complex, social environments" means any skill must be done practically in real world contexts for example, sport skills require time to practice, musical skills require time to practice with the instrument. M communities of practice (COP) or group of learning are useful ways to help practice within the learning environment by people of equal status working together to enhance their individual acquisition of knowledge and skills. (Anderson et al, 1996)

Situational English vocabulary learning via a free social network game application

From the situation learning theory a real life English learning environment in is applied using web based multimedia technology. Situational learning theory support this work but additionally, the work from Brady 2004 proposes in "More Than Just Fun and Games" and shows that "*multimedia education improves both comprehension of the lesson material and students' interest in the lesson topic* "(Brady, 2004). Moreover Klopfer et al 2010, argue that "games can engage players in learning that is specifically applicable to schooling and there are means by which teachers can leverage learning in such games without disrupting the worlds of either play or school" (Klopfer, et al, 2010). From related work, this reseach focus on using the previous TCAD and TCAD+ with groups of vocabulary to bundled with a social networking game on Facebook (e.g. FarmVille and City Ville) to improve vocabulary acquisition and reading skills. In addition, this work provides a learning management

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system for the teacher to manage the lesson that they have ability to create a related lesson with they own from the online resource.

Facebook

Facebook is a social networking service and website with more than 600 million active users. Users may create a personal profile, add other users as friends, and exchange messages, including automatic notifications when they update their profile. Additionally, users may join common interest user groups which is organized by the school or workplace (Wikipedia, 2011a). The key of Facebook or any social networking site is for each user to have their own profile. These users will have the ability to conduct their online profile and connect with anyone from the same group with the profile or fan page in terms of similar interests (E.Klopfer, S.Osterweil, J.Groff and J.Hass, 2010). Moreover, they can join other application that provide social networking sites (e.g. game, personal application, etc.). The study incorporates the idea of Facebook to construct a portal that connects with free social media games that are related with the vocabulary system for teaching English to the hearing impaired students. Such an example is being linked with the "FarmVille" game where students can learn about vocabularies in the farm context. Another method is being connected to the game of "CityVille" where students have to identify the vocabularies in the city context. .

FarmVille game

FarmVille is a farming social network game developed by Zynga. It is available on the social-networking website Facebook and as an Application on the Apple iPhone. This game allows members of Facebook to manage a virtual farm by plowing land, planting, growing and harvesting virtual crops, harvesting trees and bushes, and by raising livestock (Wikipedia, 2011b). The work uses this game to link with the reading story that will create a situational learning with vocabularies in the farm context.

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Figure 2.6 FarmVille game display screen

CityVille

CityVille is a browser based social city-building simulation game that is developed by Zynga as an application for the social-networking website Facebook. This game allows Facebook members to create a virtual city. In this game, there is a task mission where players are put into a scenario that includes farming, construction, and rent collection in their city .The players can also visit their neighbor's city and perform up to five jobs on a daily basis. The main task of the game is to complete the direction given to perform. Players can also buy goods, sell goods, (supply goods to other players cities if their business branches are on their cities) and produce their own goods by farming and shipping (Wikipedia, 2011c). The author of this study draws on this game to link with the reading story for the aim of creating situational learning with the vocabulary in the city context.

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Figure 2.7 CityVille game display screen

2.2.7 Learning System for Students with Hearing Impairment

Niyomthum.S and Niyomthum.P (1982) categorized learning system for students with a hearing impairment as follows: First, the oral method is teaching that emphasizes oral communication. Oral communication includes speech, lip reading and the use of residual hearing. Second, manual communication involves signs and finger spelling to mediate a message between persons. They are received visually and sometimes tactually upon being expressed manually. Manual communication, when it is a primary form of communication, may be enhanced by body language and facial expressions and other forms of communication. Third, total communication (Mayer and Lowenbraun,1990) is the use of any means of communication - sign language, voice, finger spelling, lip reading, amplification, writing, gesture, visual imagery (pictures). The sign language used in total communication is more closely related to English. In this research the focus is on total communication because this approach is suitable for bundling with animation techniques and related to the teaching method for Thaischools for the deaf.

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Mertzani (2006a, 2006b) presented Computer-mediated communication (CMC) which has been highly influential in teaching and learning of second language acquisition. This tool had a positive effect on the traditional class and created new language teaching models that focus on a learner centered teaching methodology based on a constructivist approach. With an effective outcome, this tool is applied in interactive sign language classes and other classes for students with a hearing loss.

Massaro and Light (2003) and Barker (2003) research is based on improving vocabulary learning with text to speech and speech recognition through computer animated tools called Language Wizard / Player. This tool can encode a speech to word and be written as a speech together to generate visual speech by a speaking avatar, an animated talking face, nicknamed "Baldi". However, the language player does not cover the principles of total communication.

Ausubel (1978) proposed the "subsumption theory". This theory is concerned with how individuals learn large amounts of meaningful material from verbal/textual presentations in a school setting. Asubel's principles showed firstly that the most general ideas of a subject should be presented first and then progressively differentiated in terms of detail and specificity and secondly, that. Instructional materials should attempt to integrate new material with previously presented information through comparisons and cross-referencing of new and old ideas. From Ausubel's work the TCAD tool was designed to integrate the sign language with a tool that allows hearing impaired students to be familiar with.

Sansonnet et al. (2009) proposed the Sign Language Teacher which is a framework for teaching the French sign language and American Sign Language by using web 2.0 and virtual signal technologies that support the sign lexicon animation and the dynamic sign language utterances generation. Their study is focused on sign language teaching only and does not mention teaching through text base or Total communication.

Husseing and Nisour (2009) discuss developing an effective technology that would support deaf students in learning various topics through a computer. The core of the mentioned technology represents two branches. The first is to offer empty templates to the first user. The system will reconstruct the entry material by the

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teacher to become e-learning modules of tutorial lesson according to the submitted material. The second task of the system is to translate all the submitted material as well as the output material from the normal text into its corresponding lip, sign language and finger spelling. To evaluate the experimental modules of tutorial lessons, the topic of General Science for primary school has been applied to introduce the desired modules. Some selected experts have tested the concerned modules. Viewpoints of the experts have been considered when making conclusions. Many fields have been covered in the evaluation process mostly dealing with software development technique and multimedia objects rather than other standard criteria of special needs requirements. This related research is mainly about creating e-learning modules for deaf and to translate all the submitted material from the normal text into sign language and finger spelling

Gennari and Mich (2008) worked on designing and assessing an intelligent e-tool known as "LODE". It is a logic-based web tool for Italian deaf children who have problems in the comprehension of narratives in a verbal language; it aims to stimulate global reasoning on written e-stories. LODE deals with global temporal reasoning; temporal reasoning problems are encoded as constraint satisfaction problems that can be solved by a constraint reasoned. The paper is focused on the intelligent user interface of LODE; after characterizing the intended end users of LODE, this paper focused on critical issues faced in the design and assessment of the interface of the e-tool.

El-Soud et al. (2009) explored how E-learning can be made available to deaf people and how it can facilitate teaching and learning for both teachers of the deaf and deaf people. Their idea is to have an e-Learning System (LS) which offers Arabic Sign Language (ArSL) that is in correspondence with the text in the learning environment. The aim of the system is building lifelong learning, supporting equal rights of deaf people for their access to education and training, and an easy means of access, using their mother-sign language so they can learn the target-spoken language with ease.

Diwakar (2008) proposed *"A Multilingual Multimedia Indian Sign Language Dictionary Tool* "this paper presents a cross platform multilingual multimedia Indian

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Sign Language (ISL) dictionary building tool. ISL is a linguistically under-investigated language with no source of well documented electronic data. Research on ISL linguistics is also hindered due to a lack of ISL knowledge and the unavailability of any educational tools. The system in this research can be used to associate signs corresponding to a given text.

The previous studies provided an inspiration as well as encouragement when designing a technological and systematic device to help those with a challenging physical condition. Although there is a good display of innovative techniques to help those who are limited in hearing the author felt that move could be done beyond the realm of just being able to master finger spelling, attuning to the programs that are stationed in the computer, obtaining a grasp on the subject matter at hand, or participating in a good cause. This research deals with helping hearing impaired students who know that they are born with this unfortunate condition but are willing to cross over the bridge into the so-called mainstream world and make contact with people who are different from them. The idea is that a total communication device will help them gain a total learning and living experience without having to feel shame and not worthy. This is a learning tool to accompany them on a life journey.

The theories dealing with cognitive learning, memory retention, cone of learning, language development, vocabulary language acquisition, language immersion, learning disabilities, and the learning systems for hearing impairment have all provided a compass for obtaining a better idea and approach to set out a proper framework.

The needs of the learning tool for hearing impaired students came from the learning system in school for the deaf in Thailand. A comparison of the Thai deaf school system with other countries from Asia pacific is presented below as Table 2.2 (JSEAP, 2010).

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Table 2.2 The support and accommodation provided in the Asia pacific

Country	Number of HI Schools	Number of HI student in school	Support and accommodation provide in class
China	630	89,362	Individual education program, use of resource room , support teachers from special school and information assistive devices
India	299	27,774	Provision of appropriate teaching learning material, qualified special teachers trained in learning requirements of each child, ICT enabled teaching processes, helpers, transport, readers, etc. An initiative being taken by the National Council for Teacher Education (NCTE) is the inclusion of a module in the pre service curricula of all teacher training institutes from the session beginning 2010, to enable every teacher to have the fundamental ability to cater to the learning needs of children with disabilities
Indonesia	97	15,576	Some schools have empowered parent skills to teach, doing assessment and guiding special needs children, build special classroom, build accessible infrastructure, special itinerant teacher, professional assistance from district government, recognition to teachers and education personnel of the school implementing inclusive education.
Thailand	20	5,637	Team achievement based teaching, teaching in small groups, support assistants, use of information assistive devices and others.
Japan	116	4,900	Team teaching, achievement based teaching, teaching in small groups, support assistants, use of information assistive devices, and others
Malaysia	25	2,022	Applicable but information and source not found.
Srilangka	18	1,728	Free education, Free Text books, Free Uniforms, Free Mid-Day Meal. Free Spectacles & Free hearing aids, free medical services.
Korea	18	1,540	Teaching in small group, support assistants, use of assistive devices, alternative assessment, and others

From table 2.2, the learning system for the deaf or hearing impaired students in Thailand applies a method that is directed towards team achievement based teaching, teaching in small groups, supporting assistants, and using information. All of the Thai (20) schools for the deaf have approximately 5,637 students in total that are enrolled

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2.2.8 Thai hearing impaired students in learning English

In Thailand many hearing impaired students start to learn by using sign-base as the first language and then have it link to Thai – Text-base in the second language. Based on the initial finding from this research [S.Wicha 09] it was found that the hearing impaired students have limited vocabularies, and lack the basic skills in spelling, writing and organizing. This indicates that these students have a different learning structure. Moreover, the school's curriculum that is designed as a "deaf to deaf communication" does not support these students to take part in a normal environment.

Stoppok, (2010) discusses the early learning of English by hearing impaired children in Germany, arguing that in Germany the students with hearing impairment schooling by German federal states support center and integrational classes with normal students that comparing with Thailand, the hearing impaired students study in the special school that are 20 school for the hearing impaired around nationwide and some of hearing loss students take part with normal school (National Institute of Special Needs Education, Japan, 2010).In Thai school for hearing impaired they using total communication approach for running class instruction (The promotion of educational materials for people with disabilities, Thailand, 2007). Total communication (TC) a term invented by Roy Holcomb in 1967, is the title of a philosophy of communication, not a method (Scouten, 1984). Total communication may contain one or several modes of communication (manual, oral, auditory, and written), depending on the specific needs of the students. Focusing on the language learning of Thai hearing impaired, they start to learn Thai sign language as the first language and learn to Thai (writing) as the second language (The promotion of educational materials for people with disabilities, Thailand, 2007) and move to English as the third language. The methodology of foreign language learning for the hearing impaired that composes of three basic structures. The first method, Total Physical Response (TPR) is currently used in teaching hearing impaired primary school children in Germany (A.Stoppok, 2010).TPR is the method that connecting word and motion and the stress on understanding a language before speaking. These methods need time for the learner for adaptation of the language and collective the

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number of vocabulary (AK BW 2007 cited in A.Stoppok, 2010). The second methods , Universal Design for learning (UDL) achievements diverse ways of learning by applying knowledge of information processing in the brain this method proposed by Strangman et al. (Strangman et al, 2008 cited in A.Stoppok, 2010) that proposed for foreign language teaching to created adaptive goals, methods, materials and assessment. In class the multiple methods for vocabulary training can be used in either a digital or an audio format. Finally an instructional technique with visual emphasis that propose by Sutherland (Sutherland, 2008) that composed of "Color Coding" and "Signs" the way to learn foreign language via visual perception the "Color Coding" is an aid for students to recognize the inflection that is vital syntactic feature of the language that uses an added color to the text it helps the mind track the words and organize the information greater than using in monochrome versions and the mind comprehends that the color represents a system inherit in words that are spelled the same. Signs can provide support to structured grammatical that sign to improve the understanding of all student with hearing loss by using hand shape with declensions. From the three method of foreign language learning, in Thailand using TC approach as same as the part of TPR approach that connecting word and motion with Thai sign language and teaching with the teacher who can using sign language and finger spelling and using the picture or vocabulary card for show the example of vocabulary. However from the research report of The promotion of educational materials for people with disabilities, the center of educational technology, Ministry of Education, Thailand in topic "Problems and the requirement in educational materials of teachers and students in School for the hearing impaired (The promotion of educational materials for people with disabilities, Thailand, 2007). They found that the school for hearing impaired in Thailand lack of the educational materials and the results of student and teacher requirements show that, the student 59 % requires the educational materials in the gaming computer-assisted instruction (CAI), 47% require the practical CAI, 45 % require the simulation CAI and 41% require the questioning CAI. Moreover they 85% require the internet in class time. For the teacher, 92% of the English language teacher requires the internet in their classroom. In the English class teacher require the content of instructional of CAI and internet content show below in table 2.3

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Table2.3 The requirements of educational media content from the teacher in school for the hearing impaired, Thailand. (Source: The promotion of educational materials for people with disabilities, Thailand, 2007, Translate by author)

The requirements of educational media content from the teacher	
computer-assisted instruction (CAI) content	Internet (Web) content
1. Vocabulary and meaning 2. Vocabulary spelling lesson 3. Writing lesson 4. Conversation lesson 5. Reading lesson 6. Noun 7. Verb 8. Place and location lesson	1. Tale and short story 2. Daily life short story 3. Short English news 4. A-Z 5. Fruits 6. Animal 7. Direction

A review of the literature reveals a number of animated pedagogical assistants are available with varying functionalities and aims. It is well recognised that virtual characters in an interactive learning environment significantly improve students' learning experience (Lester et al., 1997). Several educational systems and prototypes that incorporate various kinds of animated pedagogical agents are available. Gutz and Haake (2006) surveyed these pedagogical agents. Some systems play the role of a teacher, instructor or coach (e.g. McCauley et al., 1998; Paiva and Machado, 1998; Lester et al., 1999), while others are dedicated to teaching English as a second language (Choi and Clark, 2006) or Spanish (Perez Galluccio, 2008). However, very few systems address the needs of adult hearing impaired learners; current systems are either concerned with the tutoring aspects such as the Colorado Literacy Virtual Tutor project (Wise et al., 2008), and the intelligent tutoring system to improve literacy

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(Michaud et al. 2000), or are designed to teach vocabulary and grammar, such as the system developed by Massaro (2006).

2.2.9 Conclusion of Literature review in research context

From the literature review section on above all of literature review classify into two modes of literature review that are Problem justification literature review and Tools and Methodology literature review. After reviewed of related literature review can distinguish the vital theory into three parts that shows in Figure 2.7.

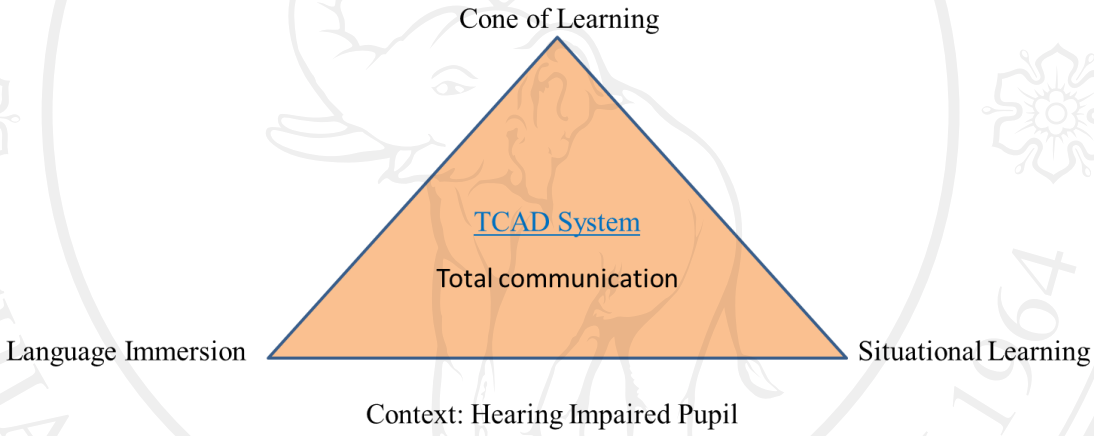

Figure 2.8 Conclusion of Literature review in research context

This research comprise the main four related theory that are Cone of learning, Situational learning, Language immersion and Total communication for created the TCAD system in the context of hearing impaired students focus group. Followed by main three literacy the Cone of learning is the theory that link the methodology of how to created active learning and why that will improve the vocabulary retention, the Language immersion link with how to setting up the technology that support English immersion in the hearing impaired students and why the system that will improve the vocabulary learning with link with the Total Communication philosophy to bundle all of media and learning contents together to facilitate and improve English learning in the hearing impaired students. The last section of the main theory is the Situational learning theory which is linked with the process of creating an authentic case study

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that provides concrete examples of an English learning system for the hearing impaired. It will provide reasons on why that will improve the English learning in the case study.

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