CHAPTER 2

LITERATURE REVIEW

To understand the Chinese pronunciation incubator in this thesis, five relevant theories and strategies namely error analysis, language acquisition, constructionism, zone of proximal development, and cone of experience will be reviewed as well as propose the contribution of these five strategies to construct the conceptual framework 'Chinese Pronunciation Incubator'.

2.1 Error analysis

Error analysis is a process for analyzing second language errors made by learners, then categorizing such errors and explaining them. The relationship between error analysis and second language acquisition is a part-and-whole relevance. Error analysis is an integral part of the second language acquisition, while error analysis plays an important role in the studies of the second languages (Yang, Xu, 2001).

2.1.1 Error analysis of teaching Chinese as a foreign language

For Chinese language section, Liu (2012) classified errors into 4 levels: Pronunciation errors, Lexical errors, Grammar errors and Pragmatic errors.

Pronunciation errors refer to the speaking errors from initials, finals and tones. For Chinese language, there are 23 initials (consonants), 24 finals (vowels), and 4 tones as well as a special light tone. According to figure 2.1, 23 initials are "b、p、m、f、d、t、n、l、g、k、h、j、q、x、zh、ch、sh、z、c、s 、 y、w、r". 24 finals are composed of 6 simple finals (a o e i u ü) and 18 compound finals (ai ei ui ao ou iu ie üe er an en in un ün ang eng ing ong). 4 tones exist in Chinese language, namely level tone, rising tone, falling-rising tone, and falling tone. They are shown in symbol "ˉ", "ˊ", "ˇ", and "ˋ". Light tone is a special tone without a tone symbol. Foreign students usually make mistakes or errors if some items do not exist in their mother tongue.

Lexical errors mean the language errors of Chinese words or vocabularies. In second language acquisition, pronunciation and grammar acquisition is a phased process. However, lexis acquisition is a lifelong cognitive process. With in-depth study and language improvement, the pronunciation and grammar errors will decrease while the lexical errors will increase. Lexical errors involve seven main error subtypes in speaking and writing, namely Structure errors of lexis, Semantic understanding, Lexical category, Pragmatic failure in lexis, Reduplication, Separable lexis and Reversible lexis. As shown in figure 2.1, there are many categories under each subtype.

Grammar errors are the language rule errors of Chinese phrases, simple sentences, and complex sentences. The subtypes of Grammar errors are listed in figure 2.1. Phrase errors are divided to 8 main types, namely errors of "S + V" phrases, "V + O" phrases, modifier-noun phrases, central-complement phrases, appositive phrases, classifier phrases, prepositional phrases, and "的 de" phrases. Simple sentence errors are composed of 2 main types, subject-predicate sentences, and frequently used sentence patterns. Complex sentence errors consist of errors of coordinate complex sentences, sequential complex sentences, selective complex sentences, progressive complex sentences, conditional complex sentence s, hypothesis complex sentences, causal complex sentences, and disjunctive complex sentences. Different languages have different rules to make phrases and sentences. Learners are able to apply more standard target language after they grasp the language rules and correct their grammar errors.

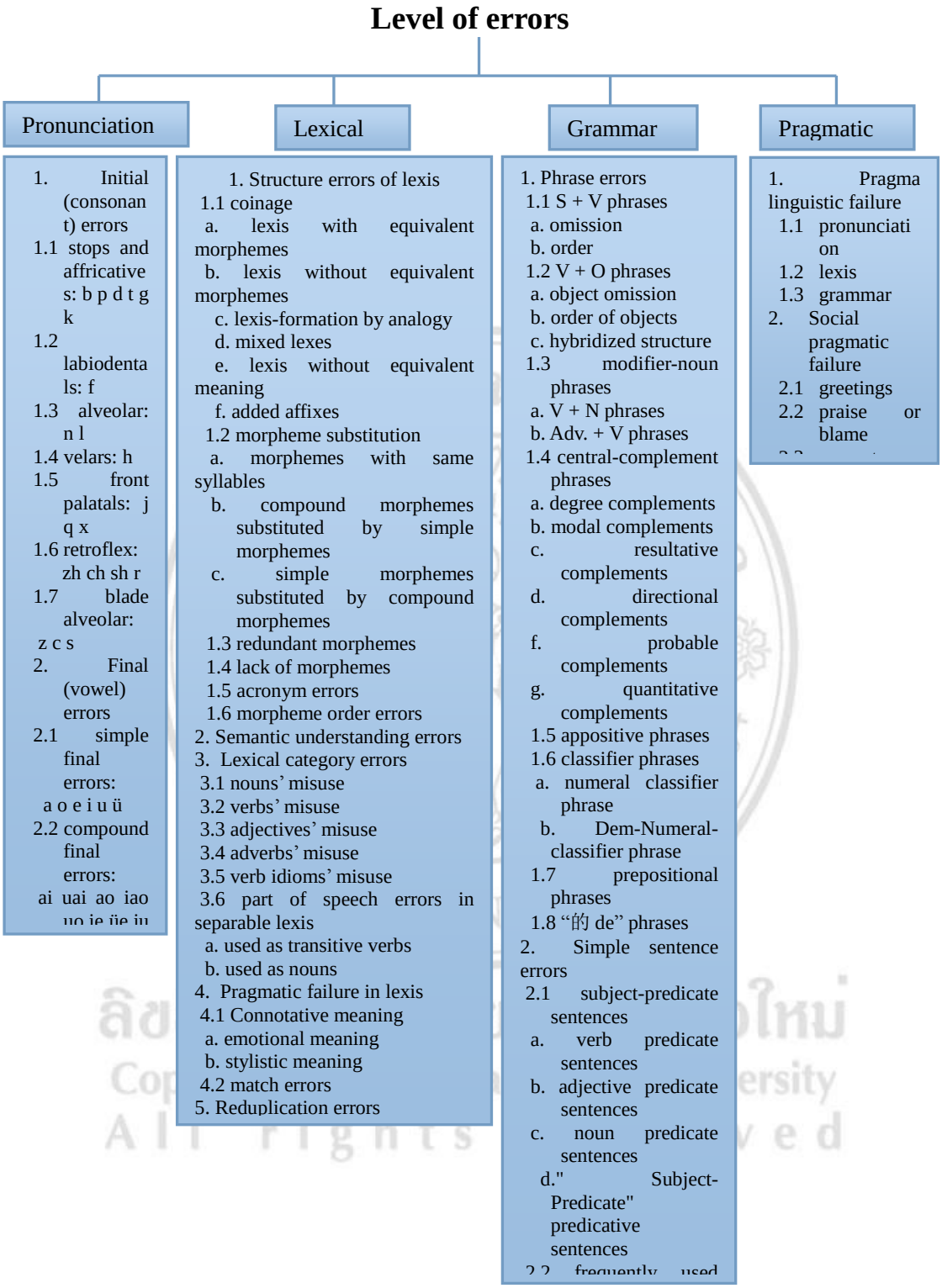

Figure 2.1 Level of errors Adapted from Liu (2012)

Pragmatic failure captures the communication failure between Chinese language learners (who learn Chinese as a foreign language) and Chinese native speakers. They may use the right expressions with correct grammar, but misunderstanding and confusion still exist due to their cultural differences (culture psychology, thinking mode, value orientation, manners and customs, etc.). As it shows in figure 2.1, pragmatic failure comprises 2 main types, pragma linguistic failure and social pragmatic failure. Pragma linguistic failure includes pragmatic failure of pronunciation, lexis, and grammar. Social pragmatic failure contains pragmatic failure of greetings, praise or blame, request or suggestion, thanks or apologies, as well as modesty or courtesy.

2.1.2 Error versus mistake

The first question concerning error analysis is to identify errors (Yang and Xu, 2001). Error analysis distinguishes errors and mistakes, which are two confusable concepts in linguistics. If the learner is inclined and able to correct a fault in his or her output, it is assumed that the form he or she selected was not the one intended, and we shall say that the fault is a mistake. If, on the other hand, the learner is unable or in any way disinclined to make the correction, we assume that the form the learner used was the one intended, and that it is an error. Briefly, the definition of error was refined as being an instance of language that is unintentionally deviant and is not self-corrigible by its author. A mistake is either intentionally or unintentionally deviant and self-corrigible (James, 1998).

In this paper, error analysis is applied to evaluate and assess the level of P2 students' spoken Chinese. On the one hand, it assists in identifying the main error types in P2 students' speaking ability, which means to justify core problems at the beginning stage. On the other hand, it evaluates the effectiveness of Chinese pronunciation incubator which is designed to improve students' pronunciation ability. While there is a requirement to understand why P2 students have these problems in speaking skill, this could be achieved through language acquisition.

2.2 Language acquisition

All human languages possess a hierarchical structure, which ranges from the fundamental sounds of speech to the more complex levels of spoken conversation, namely phonemes, morphemes, words, phrase and sentence, as shown in Figure 2.2 (Nairne, 2009).

Phonemes are at the bottom of the spoken language hierarchy, which are defined as the smallest significant sound units in speech. These speech sounds are produced through a complex coordination of the vocal cords, lungs, lips, tongue, and even the teeth. Taking English as an example, there isn't a simple relationship between the alphabet and a phoneme. For example, the letter "e" maps onto one kind of speech sound in the word "head" and a different kind in the word "heat".

Morphemes are at the next level in the language hierarchy, which are defined as the smallest units of language that carry meaning. Morphemes usually consist of single words, such as "cool" or "hip", but they can also be prefixes and suffixes. For instance, the word "cool" contains a single morpheme, whereas "uncool" contains two: the root word and the prefix "un". The grammar of a language dictates the acceptable order of morphemes within a word "uncool" has definite meaning in our language, "coolun" does not. The morpheme "s", when placed at the end of a word (oars), designates plural. But the morpheme "s", when placed at the beginning of that same word (soar), means something entirely different.

Words, phrases and sentences are at the higher levels of the language hierarchy. Words combine to form phrases, in conjunction with other phrases, form sentences. To illustrate, the sentence "Stephanie kissed the crying boy" contains a noun "Stephanie" and a verb phrase "kissed the crying boy". The verb phrase contains a verb "kissed" and a noun phrase "the crying boy".

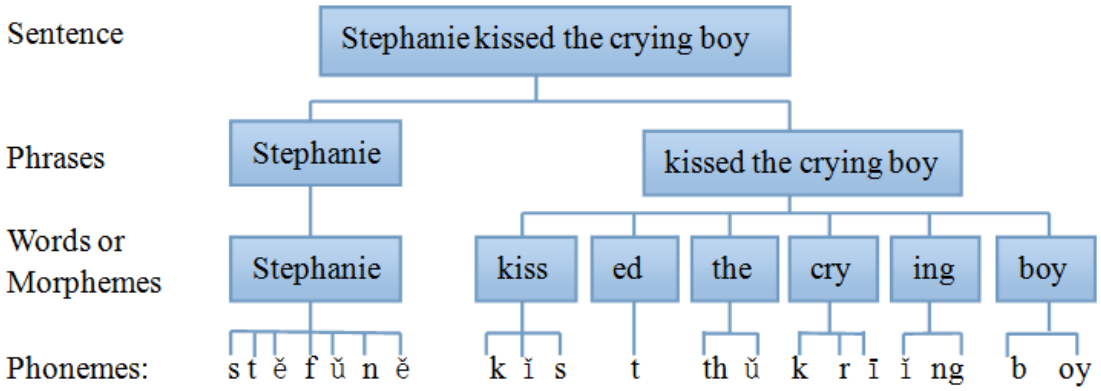

Figure 2.2 Language hierarchy

Source: Nairne (2009)

In this paper, the P2 students' Chinese learning process is designed based on the language hierarchy, from phonemes to sentences. However, as Chinese language beginners, P2 students must focus on the phonemes' learning. That is because phonemes are the most basic knowledge in language hierarchy; and students cannot achieve an appropriate level in words, phrases and sentences without a solid foundation of phonemes. To improve P2 students' pronunciation skill (Chinese phoneme), Chinese pronunciation incubator is created based on constructionism.

2.3 Constructionism

Constructionism is a theory of learning as well as a strategy for education. It is built on the "constructivist" theories of Jean Piaget, proposing that knowledge is not simply transmitted from teachers to students, but actively constructed by students themselves, while teachers are facilitators in the process of learning to guide and organize students. One of the main tenets of construction is that learners construct and reconstruct knowledge out of their experience in the world. It emphasizes on the knowledge construction that takes place during learners' experience to build objects (Yasmin, 1996).

According to the constructionism research, reports and essays (Papert and Harel, 1985-1990), constructionism consists of three main sections, namely problem solving situations, intellectual tool selection, and intelligent learning environment.

Firstly, problem solving situation is related to Problem-based Learning (PBL), which is a constructionist student-centered pedagogy where students work on co-creative problem solving, in which learning occurs in the process of solving problems (Anasol, et al., 2012). Problem solving situation captures the really-existed, meaningful, and goal-oriented problem areas or contents which students need to improve. These situations or contents are the core learning content in students' next learning period.

Secondly, intellectual tools are construction kits that students use to build more "active" models. They are called "LEGO/ LOGO" by Papert and Harel. For example, sensors, miniaturized computers that can run Logo programs, and motor controllers allow a child (in principle) to build a LEGO house with a programmable temperature control system (Papert and Harel, 1991). A constructed computational "object-to-think-with" is the "Turtle". Turtle is a computer-controlled cybernetic animal. It exists within the cognitive minicultures of the "LOGO" environment," LOGO is being the computer language in which communication with the Turtle takes place. The Turtle serves no other purpose than of being good to program and good to think with. Some turtles are abstract objectives that live on computer screens. Others, like the floor Turtles shown in the frontispiece are physical objects than can be picked up like any mechanical toy (Papert, 1993).

Thirdly, intelligent learning environment (computer-based learning environment) is also called microworld, such as the Knot Lab, the Software Design Studio, LEGO/LOGO workshops, and other learning environments (Papert and Harel, 1991). Intelligent learning environment is designed to facilitate effective learning through the exploration of complex problems, to improve students' learning process by providing more advanced educational techniques. It supports both learning through reflective discovery as well as monitored goal-directed interaction.

Papert (1993) discussed the concept of Microworlds-incubator for knowledge, which analyzed how computational ideas can serve as materials for thinking. Taking learning Newton's laws in physics as an example: A body in motion will, if left alone, continue to move forever at a constant speed and in a straight line. The concept of Turtle is enlarged to include entities that behave like Newton's particles. The new Turtle, which is also called Dynaturtles, is put into patterns of motion for aesthetic, fanciful, or playful purposes in addition to simulating real or invented physical laws. In this way,

learning physics consists of bringing physics knowledge into contact with very diverse personal knowledge. And to do this learners are allowed to construct and work with transitional systems.

This paper will create a Chinese pronunciation incubator based on constructionism including the three main sections. Firstly, problem solving situation, namely the learning content, is the error area of Chinese pronunciation. Secondly, tablets installed with Chinese language application are chosen as the intellectual tools. Thirdly, the smart classroom provides an intelligent learning environment for students to improve their pronunciation ability. In such an intelligent learning environment, a construction zone is required to provide students space to construct knowledge by themselves, in which teachers act as facilitators. This construction zone is created according to zone of proximal development.

2.4 Zone of proximal development

Zone of proximal development (ZPD) was originally proposed by Vygotsky (1978). Vygotsky defined that it was the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers. ZPD defined those functions that have not yet formed but were in the process of formation, functions that would mature in the future but were currently in an embryonic state. These functions could be referred to as the "buds" or "flowers" of development rather than the "fruits" of development. ZPD furnished a tool for psychologists and educators through which the internal course of development can be understood. By using this method psychologists and educators could take account of not only the cycles and maturation processes that have already been completed but also those processes that have currently been in a state of formation. Thus, ZPD is available to describe the child's immediate future and his dynamic development state, allowing not only for what already has been achieved developmentally but also for what is in the process of maturing.

Vygotsky (1978) proposed that an essential feature of learning was that it created the zone of proximal development; that is, learning process is beneficial to awaken a

variety of internal developmental mechanism that are able to brisk only while the child is interacting with people in his environment and in cooperation with his peers in his community. Once these processes or mechanisms are activated and then internalized, they become part of the child's independent developmental achievement.

According to Bruner's research in 1985, Vygotsky's zone of proximal development had to do with the ways that educators created or arranged the learning environment to enable students to achieve a higher ground. It was thus a social space where learning and development were socially embedded. Vygotsky maintained that pedagogy created learning processes that leaded development (Efland, 2002). Vygotsky argued that progress across the ZPD occurred as the outcome of assistance from a more capable person such as a teacher, or a more capable peer. He considered that teachers' role should be a facilitator, a guide and a provider of assistance. And teachers' role could be maximized in the "construction zone" (Nakata, 2006).

ZPD will be formed between what the child could do without and what he could do with social interaction using certain cultural tools (tool, stick, words, and gestures). In these "construction zone", learning and progress occurs as people using tools mutually change themselves as well as their tools. People learn and improve because of extending their involvement with others in a community, including the tools that community uses in certain ways. It is those human interactions and communications, supported by a range of auxiliary tools, which allow ZPD to emerge in the process of learning (Lea, Nicoll, 2002).

This paper will create a zone of proximal development which enables students to share, to discuss, to show their ideas and thinking with their classmates and teachers, to get assistance from their teachers and peers. In such a zone, teachers are the facilitators and providers of assistance. And students' progress occurs through interaction and cooperation with people in their environment.

2.5 Cone of experience

Edgar Dale (1946) summarized most of direct and indirect experience, and of concrete and abstract experience in a pictorial device, which was called 'Cone of experience'. This cone helps to explain the relationship of different 10 types of sensory

materials from direct experience to abstract learning. These ten divisions on the cone are divided into three major groups, namely doing, observing, and symbolizing, as shown below.

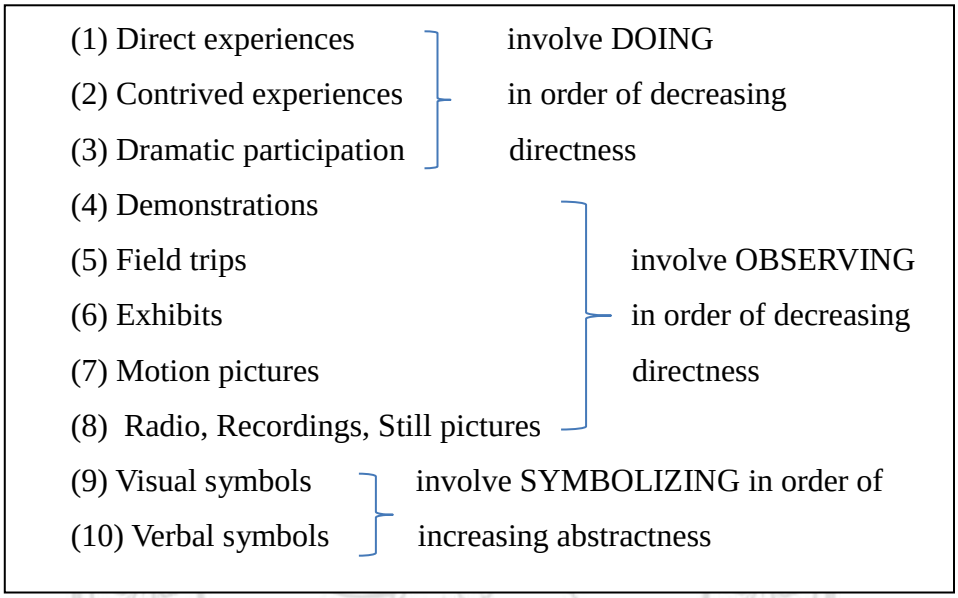

Figure 2.3 Ten divisions on the cone adapted from Edgar Dale (1946)

2.5.1 Involve DOING

The first group of experiences contains 3 subtypes involving "doing", namely direct experiences, contrived experiences, and dramatic participation.

Direct experiences refer to those realities that we experienced at first hand. This is learning through direct participation, for example, we see, smell, touch, taste and feel things around us. However, people are not able to directly perceive everything through senses. Inevitably, people's direct experience is associated with abstractions.

Contrived experiences are not the original experiences but the edited experiences. For teaching purpose, when the original or direct experiences are difficult for students to grasp, then it is necessary to simplify or edit the direct one to a visualized and more understandable model. This simplified model is what we call contrived experiences.

Dramatic participation means the reconstructed experiences. These experiences are not available to taste it directly, neither to be simplified to a contrived experience. The reconstructed experiences have many different presentation modes, for

example, a play, a pageant, etc. The dramatization reconstructs the real-life situation and provides students a chance to re-live the precious scene.

All the three types of experience involve doing. Students participate actively at first hand to gain the direct experiences. They learn and practice through imitating based on the simplified model to get contrived experiences. In order to acquire dramatic participation experiences, they get as close as possible to certain realities through reconstructing or replaying the previous scene.

2.5.2 Involve OBSERVING

The second group of experiences is composed of five divisions involving "observing", they are demonstrations, field trips, exhibits, motion pictures, as well as radio, recordings, still pictures.

Demonstrations mean to show pupils about how certain things are done. On the one hand, students are required to concentrate on observing each specific step during the demonstration; on the other hand, students are asked to do what they have seen.

In field trips, students also observe other people doing things. Students watch what happens and note the meaning of each action. This kind of sensory experiences helps students to know the whole picture of certain things, or to perceive how they do happen in real life.

Exhibits on the cone denote the working models, photographs, charts and other visualized materials. These materials are offered for students to observe the learning outcome of others. These materials, to some extent, will inspire students to comprehend certain knowledge.

Motion picture experiences refer to the experiences students attain through watching films, cartoons or other videos. The motion picture is vivid with pictures and sound. Students get motion picture experiences via auditory sense and visual sense.

Still pictures, radio and recordings are classified as "one-dimensional". Compared to the motion pictures, these still pictures and sound are not presented in an imposed sequence. As a result, these less ordered materials help to improve students' imagination.

2.5.3 Involve SYMBOLIZING

The third group of experiences is involved in “symbolizing”. This group of experiences includes two divisions, visual symbols and verbal symbols.

Visual symbols are the visualized statistical materials, such as charts, graphs, maps, etc.. These materials are not the realistic pictures but abstract representation items. It is not easy for pupils to understand these abstract items, so teachers must be sure that their students are familiar with comprehending the symbolic aid and visual symbols.

Verbal symbols are the most abstract materials, which is on the pinnacle of the cone. These symbols may be a word, an idea, a concept, a scientific principle, a formula, etc..

2.5.4 Effective teaching methods

Edgar Dale illustrated the knowledge retention when he developed the "Cone of experience", which stated that after two weeks we could remember only 10% of what we read, but we could remember 90% of what we did. Dale’s Cone emphasizes learning experiences that appeal to the different senses and the different ways in which we learn. According to Dale’s research, the least effective method at the top, involves learning from information presented through verbal symbols, i.e., listening to spoken words. The most effective methods at the bottom, involves direct, purposeful learning experiences, such as hands-on or field experience. Direct and purposeful experience represents reality or the closet things to real life.

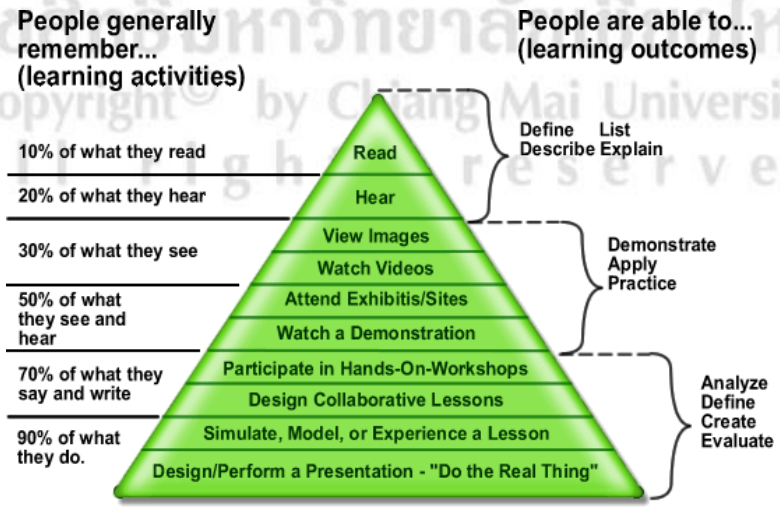

Figure 2.4 Cone of Experience adapted from Edgar Dale (1946)

In the pronunciation incubator of this paper, the language activities are designed based on this cone, the task-based collaborative learning process distributes more time for the more effective teaching methods in order to attain better knowledge retention after teaching.

In conclusion, this chapter presents the literature review of error analysis, language acquisition, constructionism, zone of proximal development, and cone of experience. These five theories follow a mutual principle that students achieve Chinese language speaking skill from learning concrete knowledge to applying abstract knowledge. And how these theories are utilized to create the Chinese pronunciation incubator is briefly reported in table 2.1 .

Table 2.1 Theories applied in this paper

Functions / Theories	Concrete → Abstract					
	Knowledge base level	Learning content	Learning environment	Learning tools	Language activities	Measure
Error analysis	+					+
Language acquisition		+				
constructionism		+	+	+		
Zone of proximal development			+			
Cone of experience					+	

Firstly, error analysis is applied to evaluate and assess the knowledge base level of P2 students' spoken Chinese, to identify the main language problems and weakness. In addition, error analysis is the measure tool of students' Chinese improvement after teaching implementation. Students' concrete Chinese language errors are identified through error analysis，via analyzing these individual errors the abstract error rule is found that most errors are caused by the differences between Chinese language and Thai language. This abstract rule then is utilized in the process of teaching in which the different alphabet pronunciation, word sequence and other parts are the highlighted contents.

Secondly, according to the main error types analyzed through error analysis, the teaching contents are arranged based on the language acquisition, to teach Chinese from alphabets to simple sentences. In terms of the process from concrete knowledge to abstract knowledge, for example, students learn the concrete basic alphabets and tones at the very beginning, then they are taught the abstract Pinyin pronunciation rule by combining the pronunciation of initials, finals and tones. Finally, students are able to read new words by using the abstract Pinyin pronunciation rule, and then words form simple sentences.

Thirdly, the Chinese pronunciation incubator is created based on constructionism as the solution to improve P2 students' Chinese speaking ability. This incubator consists of three main sections. The first section is the learning content, which is the error area of Chinese pronunciation; it is designed based on the language hierarchy, to learn Chinese from phonemes to sentences. The second section is the intellectual tools that are tablets installed with Chinese language application. The third section refers to the smart classroom, an intelligent learning environment for students to practice. In this section, students learn the new words in the concrete scenes first, after practice to use these new words in different scenes; they will acquire the abstract usage of these new words and are able to use them in other different scenes.

Fourthly, a zone of proximal development enables students to share, to discuss, to show their ideas and thinking with their classmates and teachers, to get assistance from their teachers and peers. Students learn Chinese through playing and participating in language activities in this zone. Students work in groups to transfer their concrete individual knowledge to abstract group-agreed knowledge, which in turns enhances students' individual knowledge.

Finally, in this pronunciation incubator, language activities are designed based on this cone of experience to attract students to participate in, to play and learn. And more time are distributed in the more effective teaching methods in order to attain more knowledge retention after teaching. Via using highly effective teaching methods to help students learn concrete knowledge point step by step, then attract students to practice in language activities. Finally students are expected to achieve their own understanding about the concrete knowledge, and build their own understandable abstract language rule, such as the simple word order rule, the simple grammar rule, and

other rules which lay foundation for their deeper study.

The expected output is to improve P2 students' Chinese pronunciation ability as well as their spoken Chinese, and language errors are expected to decrease over time. More details about how to integrate these theories in this paper will be presented in methodology part of chapter 3.